Flora of India
Series 2

FLORA OF MAHARASHTRA STATE

DICOTYLEDONES

VOLUME 1

Editors
N. P. Singh
&
S. Karthikeyan

With assistance from
P. Lakshminarasimhan
&
P. V. Prasanna



BOTANICAL SURVEY OF INDIA

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VOLUME 1

(Ranunculaceae to Rhizophoraceae)

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FOREWORD

There is a global concern for assessing the status of living organisms belonging to various kingdoms and conserving biodiversity. All life is based on the genetic code: all forms have life evolved by natural selection and all life is connected. There is no true estimate of the total number of species in the world, although the sum of recorded number exceeds 1.7 million. As plants are the main solar energy converters and providers of food, oxygen and a host of useful products, it is essential to estimate their occurrence and availability. As continued research is yielding plant compounds with newer uses, it is all the more essential to prepare comprehensive databases. The main requirements for an inventory are accurate identification, nomenclature, description and environmental status.

Since it's re-organisation, the Botanical Survey of India (BSI) has been engaged in floristic survey of unexplored and incompletely studied areas of the country. From 1980, the BSI has started publishing the **Flora of India** under four series: (i) national flora comprising taxonomic revisions of families of flowering plants, tribes and genera of the entire country, (ii) floristic inventories of the various states / union territories, (iii) floras of phytogeographically interesting and floristically rich districts and (iv) special and miscellaneous publications. The number of recorded species of plants including lichens and fungi from India is around 47,000 of which 17,500 are angiosperms.

The present publication belongs to Series (ii) and covers the State of Maharashtra. This state is the third largest in the Indian Union and was carved out of the former Bombay Presidency, that included parts of Gujarat, Maharashtra, Goa, North Kanara and Sind (which is now in Pakistan). As now reconstituted Maharashtra has 34 districts and is bounded by the Arabian sea in the west, Goa and Karnataka in the south, Andhra Pradesh in the south-east, Madhya Pradesh in the north and Gujarat in the north-west.

Cooke's **Flora of the Presidency of Bombay** (1901 1908) continues till today as the most authoritative floristic account for the identification of species of this region. Nevertheless, this work has become obsolete owing to changes in the regional boundaries and modifications in the patterns of the flora caused by natural and anthropogenic activities. Through extensive collections in the past ninety years 1087 species, 21 sub- species, 51 varieties, one sub-variety and two formas have been added to Cooke's **Flora.** Importantly, taxonomists have introduced name changes for 1045 species, 4 sub-species and 18 varieties. Therefore, revising and rewriting this flora along modern lines have become absolutely essential.

The flora of Maharashtra is rich and extremely interesting. Internationally, the Western Ghats have been classified as one of the world's hotspots of biodiversity that are under threat. A major portion of northern Western Ghats the **Sahyadris** is spread over 11

districts. The **Sahyadris** are characterised by a high degree of diversity in floristic composition that is only next to the Indian Himalayan region. Moreover, 400 sacred groves are reported from Maharashtra at various conditions of preservation and floral compositon. Konkan, Deccan, Khandesh, Marathwada and Vidarbha regions represent unique floristic features that differ from one another owing to differences in rainfall, temperature, elevation and edaphic features.

The BSI is bringing out floristic account of the Maharashtra State in **three volumes**. The volume containing the account of **Monocotyledones** has already appeared in 1996. The remaining two volumes deal with **Dicotyledones**. It is estimated, that presently the state of Maharashtra is represented by 187 families, 1081 genera, 3025 species, 21 sub-species, 145 varieties, one sub-variety and two formas that occur in the wild. Besides, 844 cultivated species have been recorded. 25 genera and 694 species which are endemic to India occur in Maharashtra. Some of the critically endangered plants from this flora include among others : *Abutilon ranadei, Aponogeton bruggenii, Bonnayodes limnophiloides, Ceropegia panchganiensis, Crinum brachynema, Dipcadi concanense, Frerea indica* and *Lepidagathis bandraensis.*

The highest amount of colchicine the polyplodizing agent has been reported from the seeds of *Iphigenia stellata*, endemic to Maharashtra.

This is the **second** of the three **volumes** covering 70 families, 314 genera, 856 species, 10 subspecies and 53 varieties in wild. In addition, there are 5 families which include only cultivated species. A total of 262 cultivated taxa have also been treated in this volume. The **Flora** provides an extended introductory chapter on several topics such as vegetation, mangroves, aquatics, weeds, economically important plants, medicinal plants, endemic and threatened plants, major threats to diversity, national parks and sanctuaries, ethnobotany, sacred groves, wasteland development and forest biota. Line drawings of 179 plants and 26 colour photographs have also been given.

It is hoped that the **Flora** will be useful to students of botany, professional taxonomists, teachers, plant geographers, wildlife biologists, foresters, and all those interested in learning about the flora, conservation and utilisation of the plant resources of the state. This is also an authentic source of reference to planners and decision makers.

I congratulate the scientists who have brought this volume by professional competence, dedication and labour.

H. Y. Mohan Ram
INSA Senior Scientist,
Formerly Professor of Botany
University of Delhi, Delhi

1 January, 2000

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We wish to record our sincere gratitude and appreciation to :

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A view of semi-evergreen forest at Ambolighat, Sindhudurg district with **Actinodaphne angustifolia, Ancistrocladus heyneanus, Atalantia racemosa, Mangifera indica, Memecylon umbellatum, Nothapodytes nimmoniana, Symplocos racemosa, Syzygium hemisphericum,** etc.
(Courtesy, P. Tetali, N. G. C. P. R.)



Scree vegetation comprising **Ensete superbum, Eriophorum comosum, Senecio bombayensis,** etc.



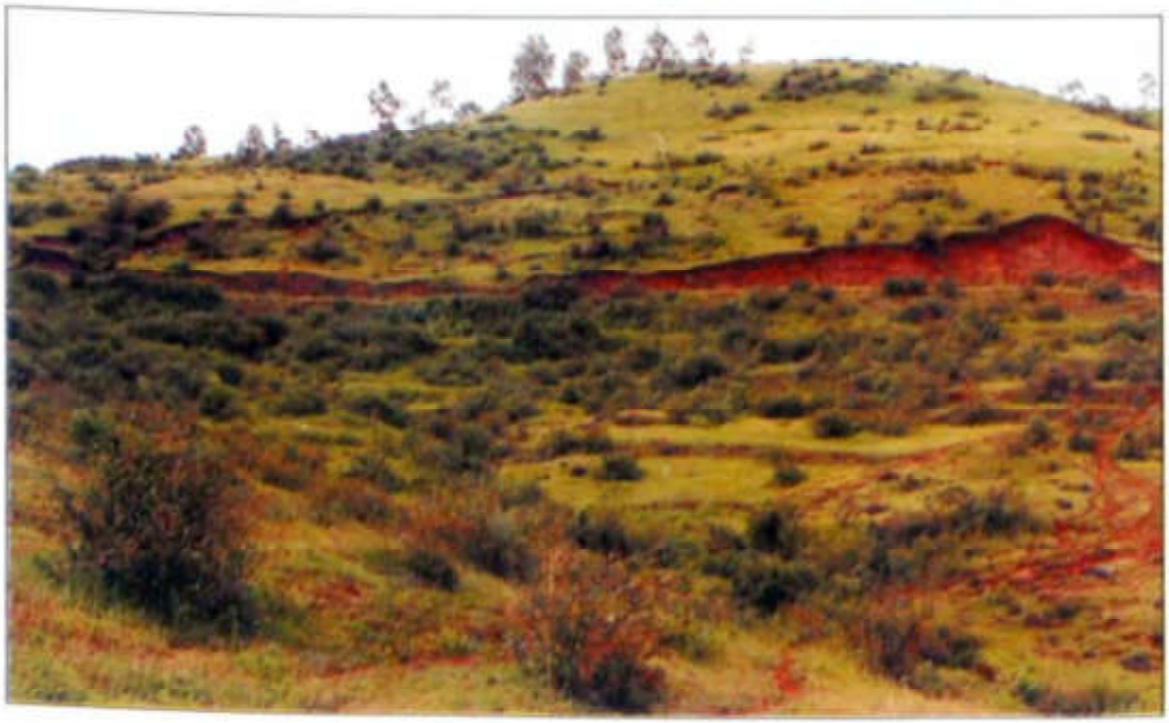
A view of moist deciduous forest at Sinhagad, Pune district.



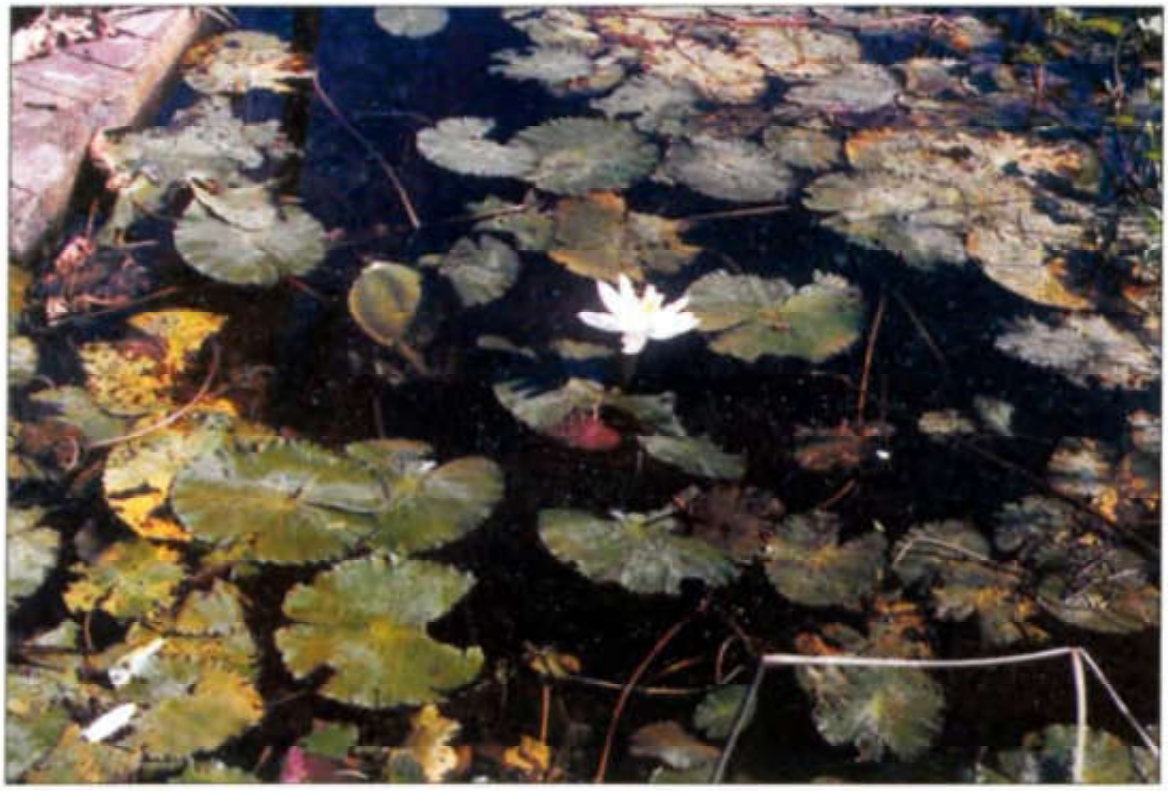
A view of moist deciduous forest on way to Vishalagad, Kolhapur district comprising **Hymenodictyon orixense, Lannea coromandelica, Terminalia elliptica, Trema orientalis,** etc.



A view of dry deciduous forest at Yavatmal comprising **Madhuca longifolia** var. **latifolia, Tectona grandis, Terminalia cuneata,** etc.



Degraded scrub land at Panshet, Pune district.
(Courtesy, P. Tetali, N. G. C. P. R.)



Nymphaea nouchali Burm. f. - An aquatic plant.



A view of mangrove vegetation.



Viviparous germination in **Bruguiera gymnorrhiza** Lam.



Habit of **Rhizophora mucronata** Lam.



Nothapodytes nimmoniana Grah. - A source of anti carcinogenic drug.



Drosera burmannii Vahl - An insectivorous plant
(Courtesy : P. Tetali, N. G. C. P. R.)



Abutilon ranadei Woodr. &
Stapf - Endemic.
(Courtesy : P. Tetali, N. G. C. P. R.)



Crotalaria decasperma Naik - Endemic.



Eriolaena quinquelocularis (Wight & Arn.) Wight - Endemic.
(Courtesy : P. Tetali, N. G. C. P. R.)



Flemingia neilgheriensis (Baker) Wight ex T. Cooke - Endemic.



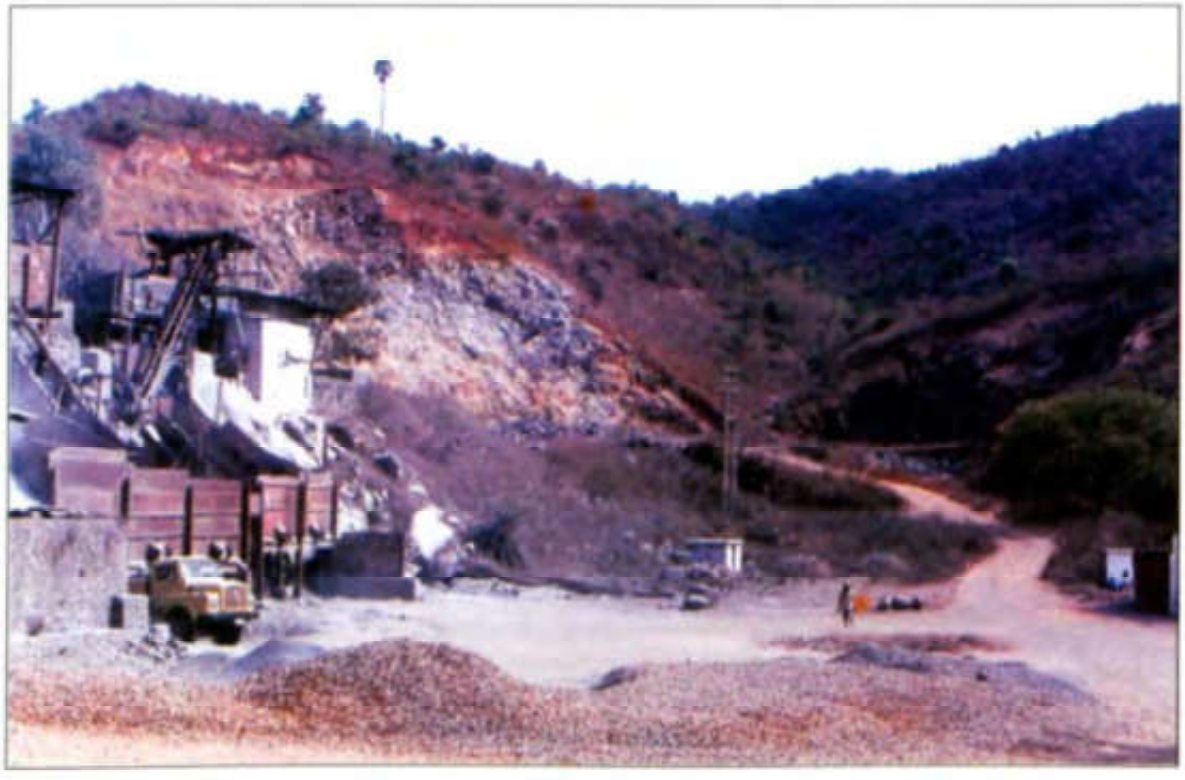
Moullava spicata (Dalz.) Nicols. - Endemic.



Vigna khandalensis (Sant.) Raghavan & Wadhwa - Endemic.
(Courtesy : P. Tetali, N. G. C. P. R.)



Sacred grove at Mangaon, Pune District.
(Courtesy : P. Tetali, N. G. C. P. R.)



Quarry mining operation affecting the vegetation.



Capparis divaricata Lam.



Celastrus paniculatus Willd.



Cleome speciosa Raf.



Memecylon umbellatum Burm. f.

INTRODUCTORY CHAPTERS FOR THE FLORA OF MAHARASHTRA STATE

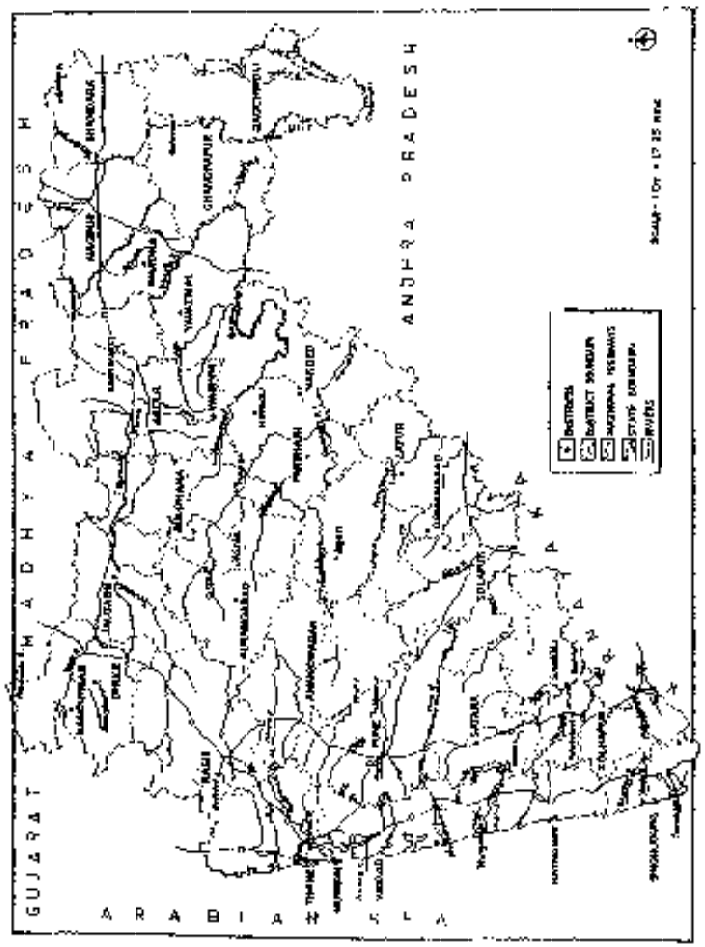
(P. Lakshminarasimhan & N. P. Singh)

GENERAL NOTE

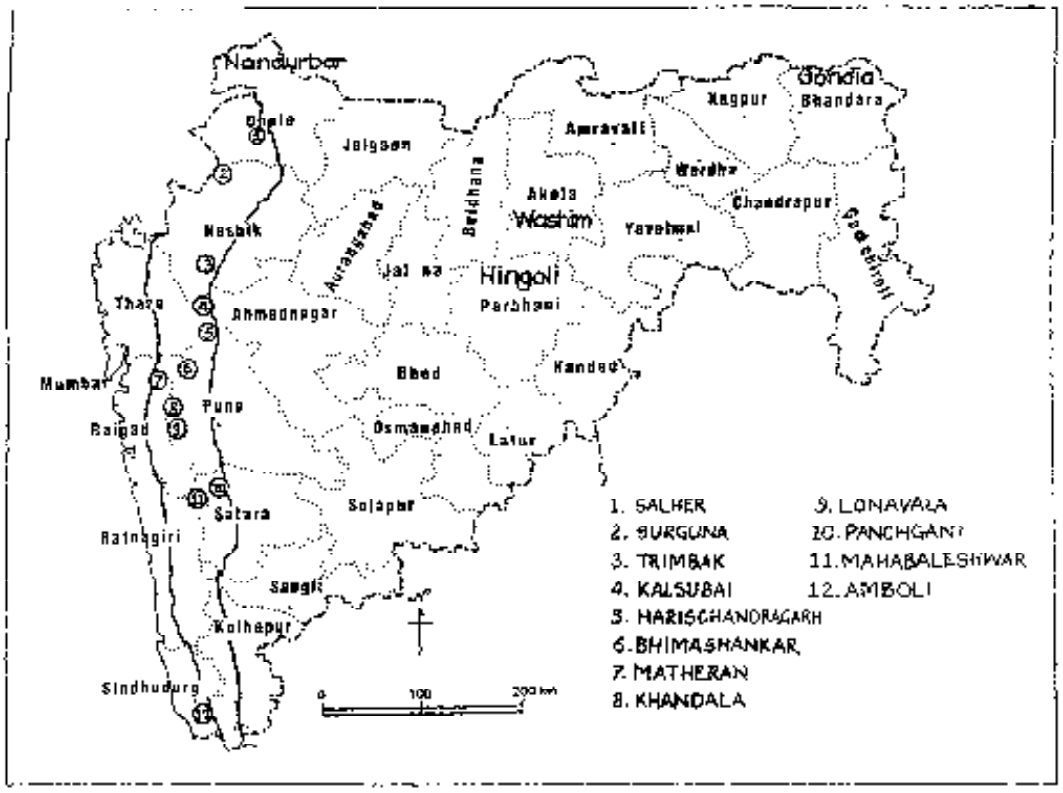
Maharashtra state was part of Bombay Presidency during the British rule, subsequently it formed part of Bombay State. The present state of Maharashtra was formed on 1st May, 1960. Its political boundary extends from Bombay to Gadchiroli and Dhule to Sindhudurg and Kolhapur districts. It is about 800 km east-west and 700 km north-south, lying between 22°1' to 16°4' N latitude and 72°6' to 80°9' E longitude, having an area of 3,07,690 sq km (The Hindu Survey of the Environment, 1998).

Its limits are Arabian Sea on the west whose coast line extends up to 720 km, Goa and Karnataka in the south, Andhra Pradesh in the south-east, Madhya Pradesh in the north and Gujarat in the north-west (MAP I). It is the third largest state of Indian union. The state has a population of 7,89,37,187 people according to the 1991 census. The language spoken is Marathi. The state has been divided into 34 districts.

The state is divided into high and low level tracts by Western Ghats which run parallel to the western coast. The area of Western Ghats of Maharashtra known as 'Sahyadris' (Map II) lies between 72°61' to 74°40' E and 15°60' to 20°75' N, covering an area of c 1500 m. The north-south run of Western Ghats is c 750 km and average breadth is 80 km. The ghat region traverse 11 districts viz., Thane, Raigad, Ratnagiri, Sindhudurg, Dhule, Nasik, Ahmednagar, Pune, Satara, Sangli and Kolhapur. The ghats receive high rainfall (250-440 cms) and are densely forested. They also constitute the main watershed of the Deccan, feeding the great east flowing rivers of Godavari, Krishna and their numerous tributaries, as well as smaller and shorter rivers flowing into the Arabian sea. The western face of the ghats is cut by deep ravines and cayons. Between the foot hills and the Arabian Sea lies a narrow strip (40 miles in width) of rugged land broken by numerous rapid flowing rivers and streams, creeks and isolated ranges of hills. The rainfall in this area ranges between 190-250 cms a year. The river Tapti flows through a valley between Satpura hills situated along the northern fringe of the State Ajanta hills which form the northern edge of the plateau. The valley is distinguished from the main plateau by its alluvial soils. Being a rain shadow area, the precipitation is as long as 63 cm in the western portion whereas the eastern portion of the valley receives up to 88 cm.



Map I : Maharashtra State–General



Map II : Maharashtra State–North Western Ghats (not to scale)

The Maharashtra plateau is a table-land, it accounts for major portion of State's area; it slopes gradually away from the eastern sides of the Ghats. It is made up of an impervious base of basaltic rocks overlaid with the Deccan lavas. The Mahabaleshwar-Panchgani plateau is ecologically a very important region in the North Sahyadri hill ranges. It forms watershed of 5 rivers viz., Krishna, Koyna, Venna, Gayatri and Savitri and for the three important reservoirs of Koyna, Dhom and Kanhar. The high wall of Sahyadris serves as a barrier for the migration of species on either side. The mountain passes locally called Ghat or Bari, are useful for traffic, trade and commerce. They are the routes for going from Desh to Konkan and vice versa. The river valley system in Desh are Narmada, – Tapti, – Purna, Wardha, Vainganga, Godavari, Bhima and Krishna. They run from west to east forming four compartments of the state. The Satmala range starts from Saptashringi hills and extends towards Daulatabad, Aurangabad and Manmad. The second range of mountain is Balaghat range which starts from Harishchandragad in Ahmednagar district and extends up to Gulbarga through Osmanabad and Bidar. The third mountain range is Shambu Mahadev mountains. They extend further into Karnataka.

The other major rivers in the state are Pravara, Pranahita, Ghatprabha, Damanganga, Tansa, Vaitarna and Ulhas. The principal smaller rivers are Amba, Kundalika, Savitri, Shastri, Vasishthi, Kajali, Muchkundi, Shuk, Gadnadi, Terekhol, etc.

The hill passes, known as ghats and the hill forts built along the line to Sahyadri on places that are not easily accessible are the two conspicuous features in Sahyadris. There are at least 20-30 major passes or ghats serving as highways or bye-ways between Konkan and Desh. These ghats are often quite narrow and lead from plains at lower altitude to higher mountain plateau and vice-versa. They are generally in the weak sectors of mountains where the lava flows have been brittle and get easily disintegrated and washed away, than in harder core of the Deccan traps. Quite often rivers, brooks, or small streams follow labyrinthous path by their side and open into a low altitude basin of a river in the valley. Such valleys are well protected by two mountain spurs running parallel and are fed by mountain streams. They provide unique climate and locations for plants to grow isolated. They are called `Mavals' which are many. They are well protected uplands, well-drained valleys, well-watered by hill streams. Their environment and flora are different and resemble like the Sholas in the Nilgiris. Humidity in Maval valleys is conducive to the development of semi-evergeen forest types and to endemism.

The principal hill forts on the peaks and spurs of Sahyadris are Sinhagad, Raigad, Pratapgad, Purandhar, Panhala, Harishchandragad,

Shivneri, Daulatabad, Songa, Aguala, Fonda, etc. In their canyans and trenches, ledges and chinks often rare species have been preserved due to their inaccessibility. Many ferns, liverworts and mosses grow on fort walls. Another habitat of plants in Maharashtra are the sacred groves of trees dedicated to Gods, locally known as 'Dev Raies'. They constitute bits of select vegetation and are conservatories of past types.

The north-eastern portions of the state, comprising basins of Wardha and Vainganga rivers, are known as Nagpur plains. The Wardha basin has the characteristic black soil of the Deccan, but geologicaly it is in the transition zone. More minerals, especially coal are found in this region. The transition is complete in Vainganga basin, which presents marked contrast to the plateau. The rainfall is heavy (125 cms or more). The valley floors and its adjoining hills are thickly forested with bamboo; the soils are lateritic and the geological formation is quite different from those of plateaus. This region has the largest known concentration of the mineral deposit in the state. The early cultivation in India was associated with Maharashtra and cereals were first grown in the state. Maharashtra is not only industrially advanced and has in Bombay city, the commercial capital of India but is also one of the highly literate states of India. Agriculture continues to be the main occupation of the people. The net irrigated area is c 25.14 lakh hectares and the principal crops include rice, jowar, bajra, wheat, pulses, cotton, sugarcane, several oil seeds including groundnut, sunflower and soyabean, turmeric, onion and other vegetables (Bhatt, 1998). The state has large areas under fruit cultivation, of which mangoes, bananas, grapes and the Nagpur oranges are important. In Maharashtra, the average yield of cotton is 4 quintals per hectare. Maharashtra tops onion production in the country as follows :

	Area (in hectares)	Production (in lakh tonnes)
Kharif	11,000	1.5
Rabi	32,500	6.0

GEOLOGY

The rock formation in Maharashtra can be classified into the following divisions :

I. A group of very ancient rocks partly crystalline and partly sedimentary. These includes a variety of granite and gneisses which occur in southern districts of Kolhapur and also in parts of Rewa and Panch Mahals.

II. An immense accumulation of volcanic rocks, principally basaltic lavas, known as Deccan Trap. Ninety percent of Maharashtra's geology is made up of Deccan Traps. The word 'Trap' is applied to the step-like aspect of the weathered hills of basalt which is the most common feature in the state. In composition, the basalts are singularly uniform. Augite basalt of specific gravity 2-68 is the most common. The colour of the rock is greyish-green with lighter or deeper shades. The bulk of the rock is composed of fine-grained mixture or ground mass of feld-spar or augite. Besides, abundant plagioclase (labordorite or anorthite) prisms, sometimes large tubular crystals of clear glossy orthoclase (samidine or adularia) as phenocrysts in the ground mass are observed. Primary accessary minerals like abatite are few but secondary minerals like calcite and quartz are plenty. Another important formation is the Gondwanas seen in Bhandara, Chandrapur, Wardha, Wardha-Godavari-Pranahita valley and in Konkan. Small areas in Konkan have the Archeans.

The state Geological and Mineral Ore Department has carried a survey of more than 1,464 sq km in the state and has been successful in unearthing large reserves of minerals in the region. Coal reserves to the tune of 60.97 million tonnes have been found in Nagpur, Chandrapur and Yavatmal districts while 4,200 sq mtrs of granite has been found in Sindhudurg district (Indian Express, 9.8.1997).

Recently two scientists of MIT, Pune have discovered large deposits of copper in the form of Malachite in dense forest area, 15 km north-east of Vaibhavwadi in Sindhudurg district. They have also detected another large site of copper ore (Chalcopyrite or copper sulphide) from a location 5 km east of Kankavali. Until now Konkan was only known for chromite deposits found in Kankavali, mica in Kadaval and iron in Redi. According to Dr. Avinash Phadke, well known geologist, volcanic ash deposits seen in plenty in and around the Kukdi river basin at Bori village are significant geologically since they provide new insight into the historical perspective of human life in Maharashtra (Indian Express, 9.12.1998). According to Prof. Somaya, the age of tephra (ash) deposit is seven lakh years. Similar deposits are also found near Morgaon (Pune district) and in Purna river bed (Akola district).

SOILS

Most of the soils in Maharashtra are formed from the Deccan Traps generally from the augite or amygdalodial basalt. These soils are black, dark brown or reddish in colour and hence are called Black

cotton soils or `Regur' soils meaning thereby red soils. Some soils in Nagpur, Bhandara and Chandrapur districts are derived from Vindhyan and Gondwana formations. They form small areas of sandy or loamy soils in Bhandara, Chandrapur and in small pockets in Ratnagiri district near Redi and Savantwadi.

The largest area is occupied by the black soils. The black cotton soils are heavy in texture and have high percentage of clay. They have adequate proportions of mineral nutrients and also micronutrients, hence they are considered good for plant nutrition. Sometimes they are slightly alkaline but they are poor in humus or nitrogen. The dark colour of the trap soils is due to clay fraction and is responsible for their sticky nature. The black cotton soils are one of the oldest group of soils since the Tertiary era. The temperature and rainfall where the black coton soils occur support dry deciduous forests or a thorn savannah. They have 40-60 percent clay contents. The structure of these soils is usually cloddy or sometimes crumby with aggregates having natural cleavages.

Padoley (1955) observed that (1) the detritus (material above 2 mm in diameter) in soil consists of disintegrated and weathered bits of parent rock, (2) the hygroscopic moisture content varies from 5-7%, (3) the pore space is 48 to 61%, the volume expansion ranges from 17 to 34% and (4) dispersion co-efficient ranges from 5 to 12 in surface soils.

Black soils, in general, are calcareous, neutral to mild alkaline in reaction (pH 7.2-8.5), high in clay contents. The most characteristic black soil cap the volcanic plateau of Deccan traps forming a mantle of rich residual soils of moderate depth. There are a few definite horizons, the lowest of which passes with easy gradations to the disintegraded lava (murram) of red to brown colour. There are also alluvial black soils, the profiles of which are much deeper.

Black soils :

In general are very fertile except in the uplands where it shows low fertility. In the valleys the soils are darker, deeper and richer and are constantly enriched by washings from highlands. Calcium and magnesium carbonates and iron are found in appreciable proportions with variable proportions with variable quantities of potash. These soils are, however, poor in organic matter, nitrogen and phosphorus. The black cotton soils, if fed with sufficient water and nitrogen, are capable of high productivity, particularly of cash crops like sugarcane, chillis, groundnut, jowar, wheat, etc. Saline soils occur in the khar-land zone close to sea coast. The khar-lands lead to mangrove soils which are quite rich in salt content and also calcium. They form an important

belt of vegetation along the sea coast. The black cotton soils in scarcity zone of Ahmednagar, Solapur, Jalna, Beed and Aurangabad districts are saline and infertile. Due to high temperature and low rainfall, they become unproductive. But in some years when the rains are heavy they produce bumper crops. The most important soils of Maharashtra are as given below:

Deep black soils :

These are found along the courses of the river Tapti, Godavari, Bhima and Krishna and are observed on low lying or flat topography.

Medium black soils :

These are similar in properties described earlier, but are of medium depth up to about 1.2 to 1.5 m, comparatively less clayey and have higher calcium carbonate contents.

Shallow black soils :

These are residual soils derived from trap and are usually found on hill slopes and plateaus. They are lighter in colour and are well suited for perennial or seasonal irrigation and especially so when adequately manured.

Laterite soils :

The laterite belts are found in Ratnagiri district and western portions of Kolhapur and North Satara. It has concretionary clay loam soil at the surface. These areas stand good vegetative cover. These soils are poor in plant nutrients and organic matters. The pH ranges from 5.5 to 6.5.

Red and grey soils :

Red and grey soils are present in north of the laterite belt mainly in Thane and Raigad districts and also in the western portion of Pune district. On the hill slopes, coarse sandy soil and on the valleys clay loam soils are observed. These are complex group of soils varying in depth and texture. The soils of the hill slopes are reddish-brown or yellowish-red in colour varying in depth from 8-15 to 45 cm. They are sandy loams with gravel and iron concretions and have a pH slightly on the acidic side. They rest on Deccan trap which in places is columnar. Occasionally thin laterite capping are observed in the area.

The soil on the flat land and valleys are deeper. The colour ranges from dark-red to grey and depth from 60 cm onwards. They are generally loam having neutral to very slightly alkaline reactions.

Paddy is main kharif crop while in rabi season, small areas grow crops like tur, mung, etc.

Coastal alluvial :

These are deep sandy soils of very little clay content. In certain portion in this sandy belt there are saline soils, a condition brought about mainly by the ingress of sea water or by the low lying nature. The surface layers are clay loams, have cloddy structure, grey colour and extensive incrustation of salts. The lower layers are silty loams. The profile contains fair quantities of calcium carbonate.

CLIMATE

It is monsoonal. Rainfall and humidity in Konkan and hill tops in Sahyadris are equable and suitable for plant growth. There is no extreme of hot or cold. Generally from the last week of March to first week of May, it is very pleasant in Western Maharashtra. It is a little hotter in Vidarbha and quite hot in summer in Khandesh. A peculiar type of climate intermediate between that of hill tops and plains on Desh side prevails in Mavals. It provides very salubrious climate in cities like Pune, Nasik, Kolhapur and Satpura ranges. Because of the varied climate, temperature, rainfall, humidity and topography different types of plants and crops thrive in Maharashtra.

Rainfall

According to India Meteorological Department, the average annual rainfall in the peninsular India which accounts for 49.5 per cent of the country's total Geographical area during the period from 1901-1990 was 86.92 cm (The Hindu, 26.4.99). The rainfall is mostly due to SW monsoon. The total rainfall in different parts of Maharashtra is not uniform. The Konkan and the coastal regions get regularly about 2,540 mm per annum, though much of the water goes to the sea. In western Vidarbha, the rainfall is c 975 mm. In the eastern Vidarbha, the rainfall is between 1200-1400 mm. The highest rainfall recorded in Vidarbha is 1,736 mm at Dhanora in Chandrapur District. At Mahabaleshwar, the rainfall rises to 6226.3 mm. The lowest rainfall is in Solapur district at Akluj which is 448.8 mm. In Khandesh, rainfall is 900-1000 mm. The highest number of rainy days ranges from 120-140 and the lowest is 25-40. The high level plateaus such as Matheran, Mahabaleshwar, Lonavla, Trimbak have relatively high rainfall, but the vegetation does not look much different from that on the Desh side, as it gets dried up in summer months. Table I gives the rainfall at selected centres (See also graphs 1-4).

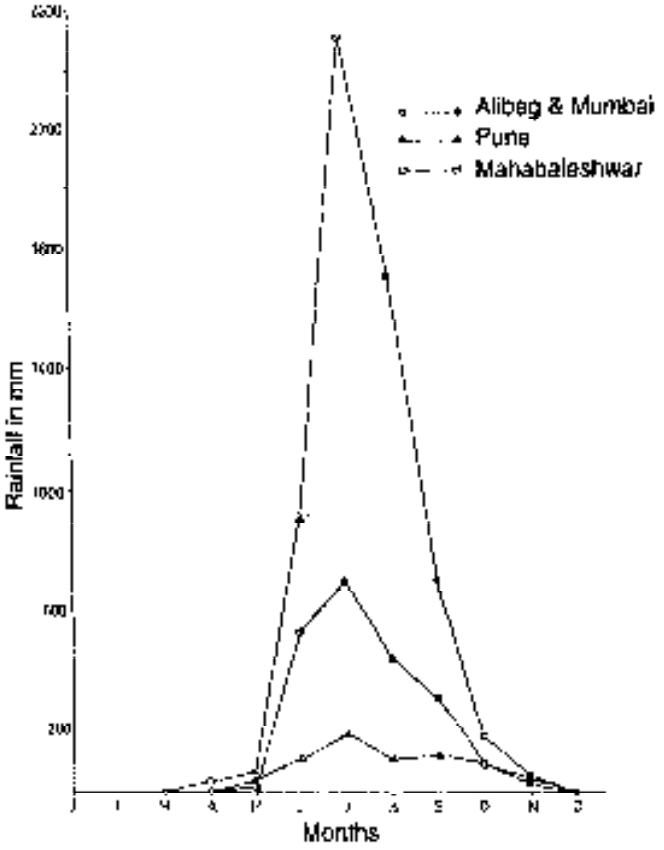
Table I ; Rainfall at selected centres in Maharashtra (1931-1960)

Name of the Month	Bombay		Alibag		Jalgaon		Malegaon		Ahmednagar		Pune		Mahabaleshwar	
	Monthly total (mm)	No. of Rainy days	Monthly total (mm)	No. of Rainy days	Monthly total (mm)	No. of Rainy days	Monthly total (mm)	No. of Rainy days	Monthly total (mm)	No. Rainy days	Monthly total (mm)	No. of Rainy days	Monthly total (mm)	No. of Rainy days
January	2.0	0.3	2.0	0.3	5.1	0.4	4.0	0.4	3.3	0.3	1.9	0.2	3.1	0.3
February	1.1	0.1	0.3	0.1	2.1	0.3	2.6	0.2	0.4	0.1	0.3	0.1	1.9	0.1
March	0.4	0.1	0 3	0	4.7	0.5	1.2	0.2	5.0	0.3	3.1	0.3	5.8	0.5
April	2.8	0.3	2.0	0.2	2.1	0.2	3.6	0.4	11.2	1.0	17.6	1.3	29.6	1.8
May	16.9	1.2	17.0	1.1	12.5	1.0	14.6	1.2	26.2	1.6	34.7	2.4	85.4	3.9
June	520.3	15.4	528.9	15.4	142.7	6.9	109.6	6.3	131.2	7.2	102.8	6.9	698.9	21.9
July	709.5	23.5	699.3	24.2	242.2	15.6	105.8	7.9	101.9	7 0	186.8	13.9	2521.3	30.9
August	459.3	19.1	447.7	21.0	194.0	11.6	94 9	6.7	98.3	5.5	106.4	9.0	1714.7	29.1
September	297.0	12.8	310.1	14.1	150.3	8.1	144.1	8.2	174.7	8 4	127.9	7 8	700.2	32.5
October	88.0	3.7	90.2	4.2	48.1	2.2	55.7	3.2	83.9	4.5	91.9	5.8	179.3	8.4
November	20.6	1.0	28.2	1.4	21.6	1.1	36.2	1.5	33.3	1.6	37.0	2.0	56.7	3.2
December	2.2	0.3	2.5	0.2	6.0	0.5	3.9	0.4	7.9	0.5	4.9	0.4	6.1	0.4
Annual Total	**2099.2**	**77.6**	**2124.9**	**82.2**	**840.4**	**48.3**	**679.5**	**38.6**	**677.3**	**38.2**	**714.7**	**50.1**	**6182.9**	**132.7**

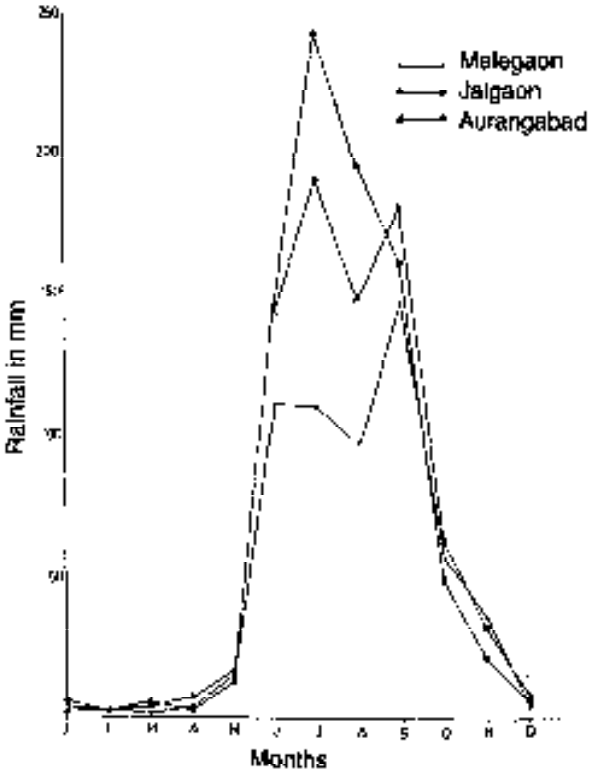
Name of the Month	Solapur		Miraj		Aurangabad		Amravati		Akola		Chandrapur	
	Monthly total (mm)	No. of Rainy days	Monthly total (mm)	No. of Rainy days	Monthly total (mm)	No. of Rainy days	Monthly total (mm)	No. of Rainy days	Monthly total (mm)	No. of Rainy days	Monthly total (mm)	No. of Rainy days
January	3.6	0.1	2.7	0.1	2.7	0.4	15.0	1.3	9.1	0.6	5.1	0.6
February	2.9	0.2	0.3	0	3.0	0.3	12.7	1.1	7.7	0.6	20 6	1.4
March	7.2	0.7	4.4	0.6	3.8	0.5	12.3	1.0	7.5	0.5	21.5	1.7
April,	15.8	1.0	30.3	2.3	7.2	0.7	13.0	0.9	6.6	0.6	17.1	1.6
May	26.4	2.2	65.9	3.6	16.8	1.3	11.9	1.2	10.9	1.1	10.9	1.1
June	108.7	7.3	70.8	5.9	141 2	8.0	149.3	8.6	146.0	8.2	181.1	1.3
July	127.7	9.2	116.3	10.6	188.3	13.1	285.7	14.7	260.7	14.1	403 8	18.3
August	139.9	8 6	100.7	8.7	146.8	10.1	209.6	11.8	170.1	9.4	362.6	15.4
September	163.8	9.3	104.8	6.1	179.4	9.4	185.9	9.3	177.9	8.1	294.5	10.8
October	92.3	5.3	107.2	6.4	62.1	4.2	49.6	2.9	46.3	2.7	72.5	3.9
November	28.0	1.6	42.0	2.4	32.3	1.7	23.9	1.2	27.6	1.3	14.4	0.9
December	6.6	0.6	3.6	0.3	8.5	0.4	5.6	0.5	6 4	0.5	2.5	0.2
Annual Total	**742.0**	**46.5**	**638.9**	**47.1**	**792.1**	**50.1**	**974.5**	**54.0**	**875.8**	**47.2**	**1348.6**	**65.5**

Source : Climatological tables of observatories in India (IMD)

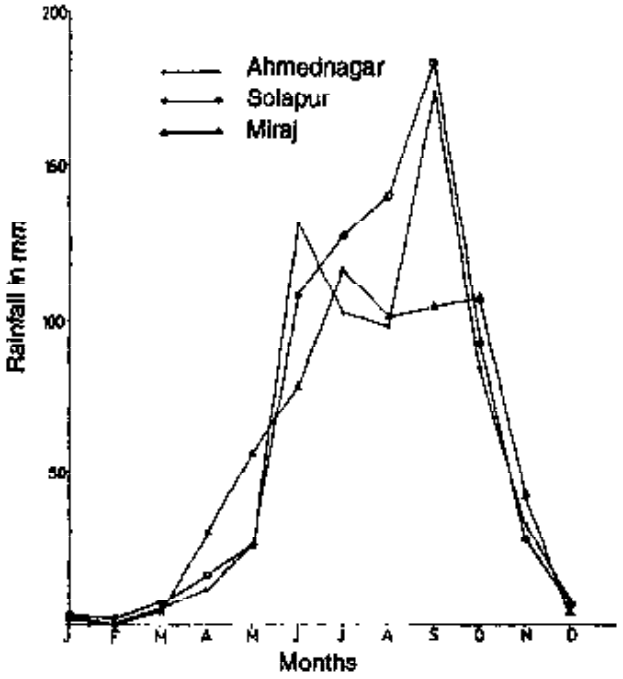
Graphs 1-4 : Rainfall at selected centres in Maharashtra (1931-1960)



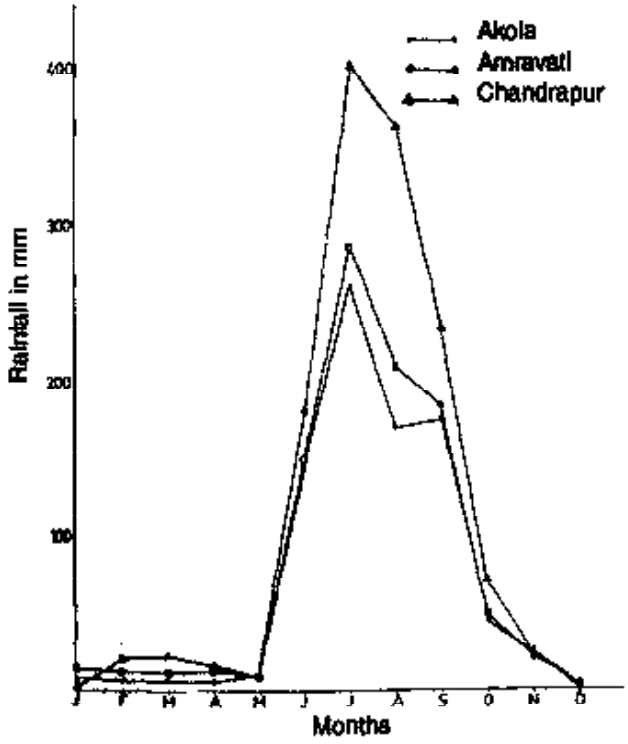
1. Alibag & Mumbai, Pune, Mahabaleshwar



2. Malegaon, Jalgaon, Aurangabad



3. Ahmednagar, Solapur, Miraj



4. Akola, Amravati, Chandrapur

Temperature

The temperature prevalent in Konkan is the lowest due to the nearness of Arabian sea. In highlands and hill tops in Sahyadris also, the temperature is low due to the altitude. The temperature in parts of Ahmednagar, Solapur and Osmanabad districts and Khandesh is high. The temperature in the whole state at different places normally vary from 10° to 42.7° C. Table II shows the maximum and minimum monthly temperature at selected centres in Maharashtra (See also graphs 5-8).

Humdity

All through Maharashtra, the humidity is low. Average mean humidity ranges between 56% to 74%. The humidity in Konkan never goes below 60% and plants look lush green. On the Desh side it is quite high for four months of the rainy season and low for eight months (October-May). The relative mean humidity is as high as 80% in July-August, but the lowest in March-April, as low as 25 to 30%. Table III shows relative humidity at selected centres, (See also Graph III).

Wind Movements

During the summer months and rainy season movement of wind is from sea to land and is from land to sea during winter. The Sahyadri ranges obstruct the water laden clouds as they ascend them. Naturally the rainfall on the top of the ghat regions and in the regions in the immediate vicinity of Sahyadris is high. There are no frosts except an occasional thundershower in winter months and early May. The trees on mountain top consequently grow low and stunted. There are pockets of evergreen vegetation and humid monsoon evergreen forests in the valley and in a few places in the Satpura range in Melghat and at Khandala in Sahyadris where the vegetation has optimum conditions for growth and the plants well protected. These pockets of evergreen vegetation in Konkan and in Maval region on Desh side look something like the Shola pockets at higher altitudes in Nilgiris.

On the eastern side of Maharashtra, the Desh presents a different picture. It lies in the 'Rain shadow' region which forms the major part of Western Maharashtra. There is a dry belt of Maharashtra (parts of Ahmednagar, Solapur and Osmanabad districts) where rainfall is poorest, humidity low, temperature and evaporation rate high. In Khandesh, south-west monsoon clouds escape through the valley of Tapi. The annual mean temperature is high, rainfall is moderate which is helpful for Rabi crops. In the region of western Vidarbha, the

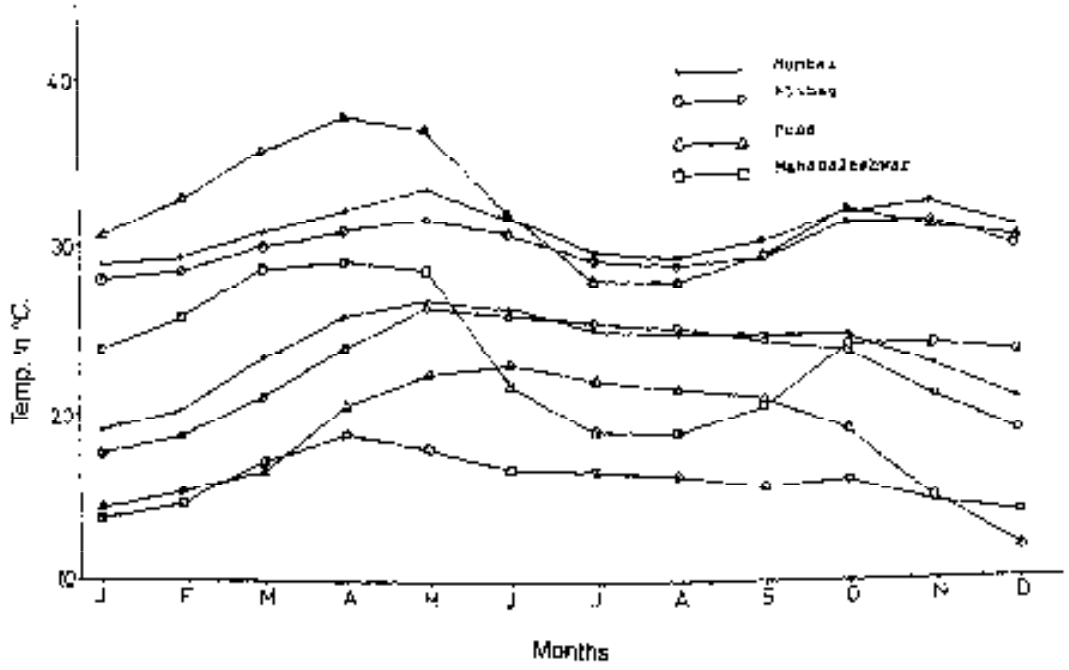
Table II : Maximum and minimum monthly Air temperatures of selected centres in Maharashtra (1931-1960) in °C.

Name of the month	Bombay		Alibag		Jalgaon		Malegaon		Ahmednagar		Pune		Mahabaleshwar	
	Daily max.	Daily min.	Daily max.	Daily min.	Daily max.	Daily min.	Daily max.	Daily min.	Daily max.	Daily min.	Daily max.	Daily min.	Daily max.	Daily min.
January	29.1	19.4	28.2	17.7	30.6	12.7	30.1	11.6	29.5	12.5	30.7	12.0	24.6	13 6
February	29.6	20.9	28.6	18.4	33.2	14.9	32.6	12.9	32.0	14.1	32.9	13.3	26.1	14.9
March	31.0	22.7	30.1	21.2	32.6	18.7	36.5	17.0	35.6	18 0	36.1	16 8	28 6	17 4
April	32.3	25 1	31.1	24.2	41.1	24.1	39.4	21.8	38.0	21.8	37.9	20.6	29.3	18.5
May	33.3	26.9	31.8	26.4	42.6	27.2	40.7	24.3	39.1	23.1	37.2	22.6	28.8	18.2
June	31.9	26.3	30.8	26.0	38.1	26.0	36.1	24.2	33.7	22.8	31.9	22.0	21.9	16.9
July	29.8	25.1	29.2	25.2	32.1	24.0	31.1	23.0	29.5	21.7	27.8	22.0	19.0	16.7
August	29.5	24.8	28.8	24.9	31.2	23.4	30.7	22.3	29.4	20.9	27.7	21.5	18.9	16.3
September	30.1	24.7	29.2	24.4	31.8	22.9	31.1	21.3	29.9	20.3	29.2	20.5	20.3	15.7
October	31 9	24 6	31 2	23 6	34.1	19 2	33 7	18 8	31.2	19.1	31.8	19.3	24 0	16.1
November	32.3	22.8	31.3	20.9	32.0	14.5	31.0	14.3	29.7	15.1	30.8	15.0	24.0	14.9
December	30.9	20.8	29.7	18.7	30.3	12.0	28.9	11.7	28.9	12.3	30.1	12.0	23.5	13.9
Annual mean	**31.0**	**23.6**	**30.0**	**22.6**	**34.6**	**19.9**	**33.5**	**19.6**	**32.2**	**19.5**	**32.0**	**19.2**	**24.1**	**16.1**

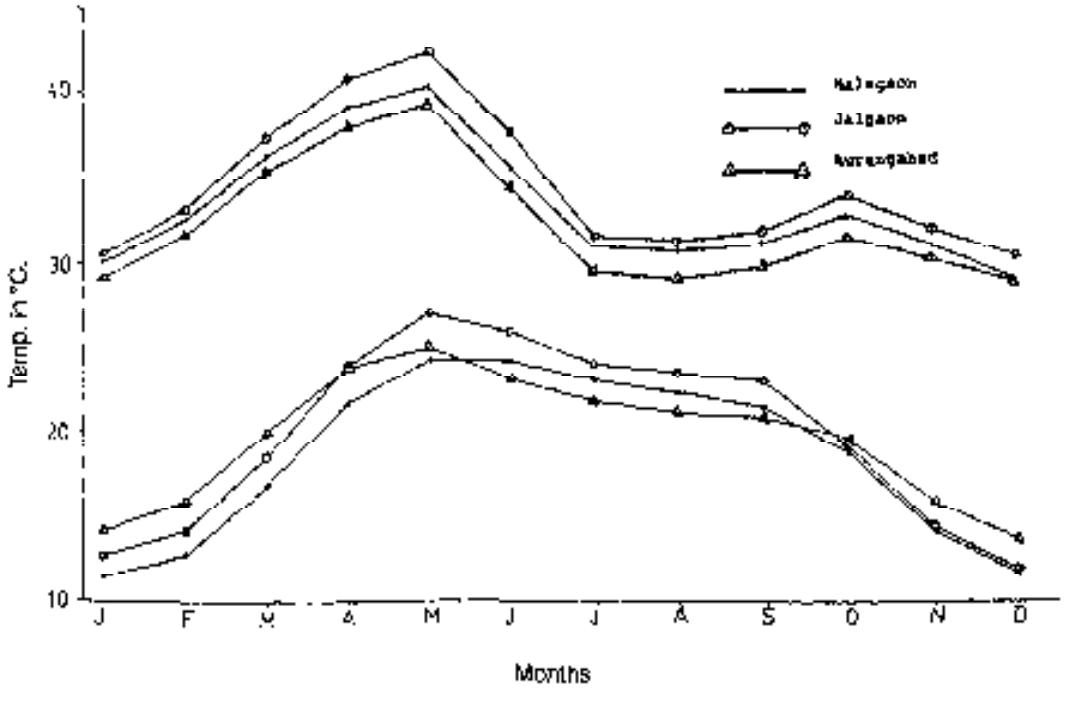
Name of the month	Miraj		Solapur		Aurangabad		Amravati		Akola		Chandrapur	
	Daily max.	Daily min.	Daily max.	Daily min.	Daily max.	Daily min.	Daily max.	Daily min.	Daily max.	Daily min.	Daily max.	Daily min.
January	30.6	14.3	30.8	15.8	29.3	14.3	28.9	15.5	30.2	13.7	29.5	13.7
February	33.1	16.4	33.7	17.5	31.3	16.1	31.8	17.2	32.3	15.2	32.3	15 9
March	36.2	18.6	37.1	21.1	35.6	20.1	36.2	21.2	37.1	19.1	36.7	19.8
April	37.9	21.6	39.3	24.5	38.3	23.8	39.7	25.2	40.5	24.6	40.0	24 7
May	37.4	22.7	40.4	25.6	39.8	25.0	42.2	27.6	42.4	26.1	42.6	28 3
June	31.6	22.3	35.0	23.5	34.7	24.2	37.0	25.7	37.4	26.2	37.7	26.9
July	27.9	21.6	31.4	22.8	29.6	23.8	30.3	23.4	31.4	23.9	30.9	24.3
August	28.0	21.1	31.3	21.9	29.2	23.2	24 8	23.0	30.7	23.5	30.6	24.1
September	29.4	20.5	31.5	21.5	29.8	20.9	30.5	22.7	31.6	23.1	31.2	23.7
October	31.0	20.1	32.3	20.6	31.6	19.6	32.1	20.8	33.3	20.0	31.6	20.7
November	30.1	17.1	31.0	17.2	30.3	16.1	30.1	17.4	31.0	15.0	29.6	15.1
December	29.7	14.6	30.0	15.0	28.9	13.8	28.6	15.1	29.6	12.6	28.4	12.2
Annual mean	**31.9**	**19.2**	**33.7**	**20.5**	**32.4**	**19.7**	**33.1**	**21.3**	**34.0**	**20.4**	**33.4**	**20.8**

Source : Climatological tables of observatories in India (IMD)

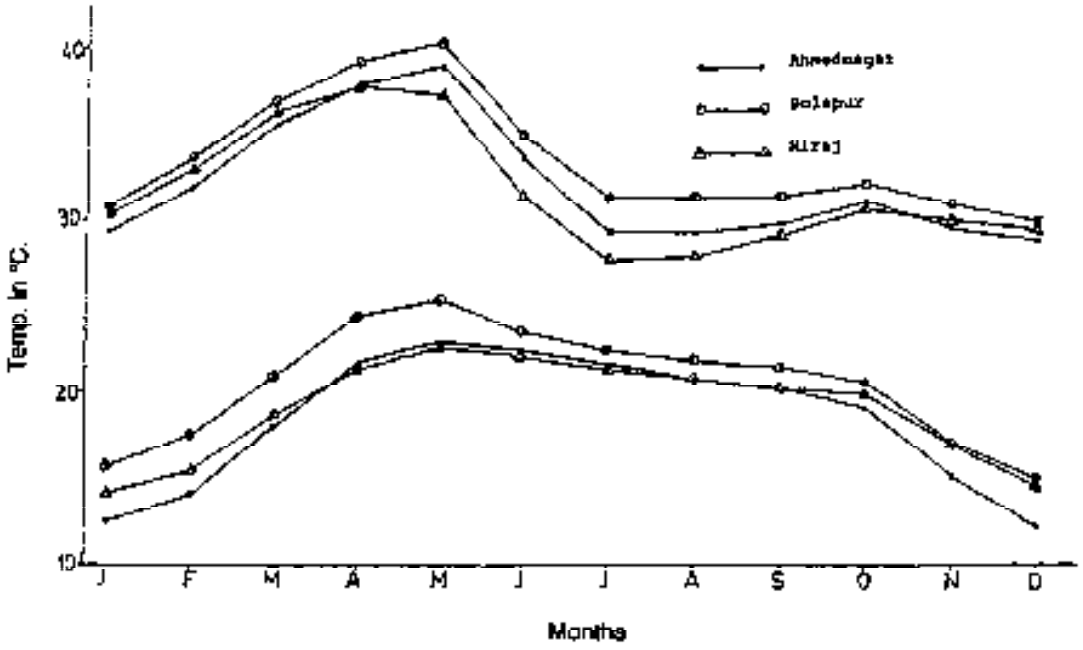
Graphs 5-8 : Maximum & Minimum Temperatures at selected centres in Maharashtra (1931-1960)



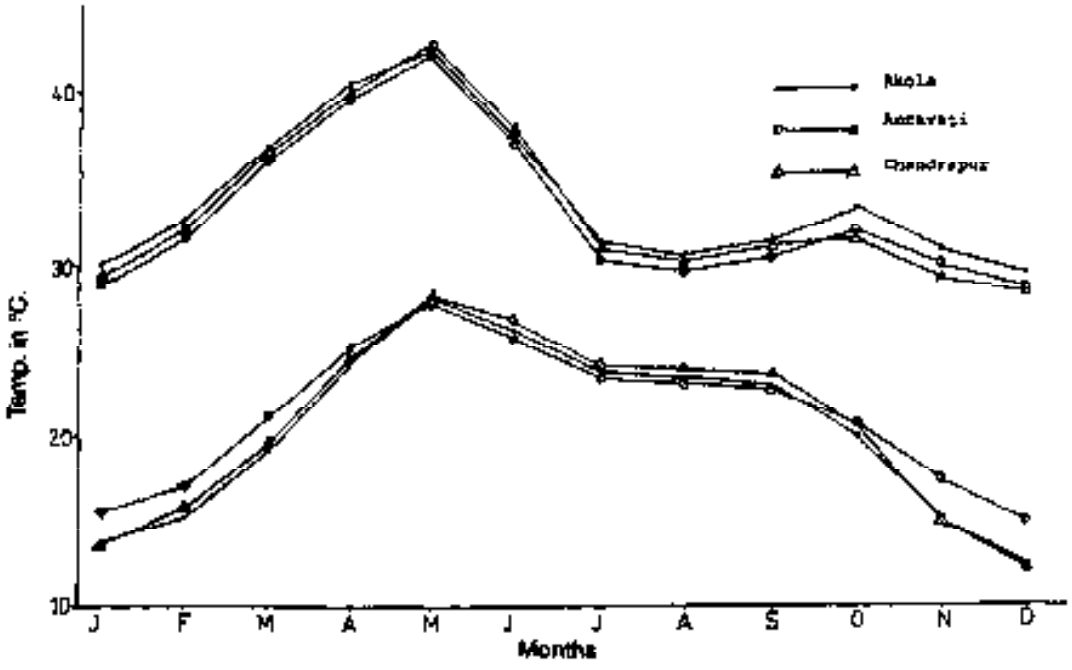
5. Mumbai, Alibag, Pune, Mahabaleshwar



6. Malegaon, Jalgaon, Aurangabad



7. Ahmednagar, Solapur, Miraj



8. Akola, Amravati, Chandrapur

temperatures are quite high, rainfall is moderate. The eastern part of Vidarbha (Chandrapur, Bhandara and Nagpur) gets substantial rains from the Bay of Bengal. The humidity becomes high and temperature is low. Rainfall is comparatively higher. The soils are sandy and or black cotton trap soils which support rich forest vegetation. Chandrapur and Bhandara have the best forests in Maharashtra. The thunderstorms are quite common. In mountainous regions and valleys fog is there in winter.

In Khandesh, frost is occasional at early morning hours in winter. The water evaporation due to transpiration from forest trees does not make much difference in the humidity on Desh side, as there are no thick forests and they are mostly deciduous.

Table III. : Relative Humidity of selected centres in Maharashtra in %

Name of the Month		Bombay	Alibag	Jalgaon	Malegaon	Ahmednagar	Pune	Mahabaleshwar
January	I	71	69	58	53	54	74	54
	II	63	–	27	27	29	30	49
February	I	72	70	45	43	44	64	43
	II	62	–	17	21	23	28	40
March	I	72	71	38	35	34	52	36
	II	63	–	13	18	17	20	43
April	I	73	74	39	33	34	50	39
	II	66	–	14	15	18	26	55
May	I	73	76	54	43	44	58	59
	II	68	–	18	23	22	36	67
June	I	80	84	72	67	72	74	95
	II	78	–	42	48	51	63	94
July	I	85	87	85	76	79	83	95
	II	85	–	65	66	64	78	100
August	I	85	87	87	77	80	85	99
	II	84	–	70	65	63	77	100
September	I	85	86	66	77	81	82	96
	II	80	–	60	63	62	71	98
October	I	80	79	70	65	68	79	75
	II	74	–	39	40	47	52	78
November	I	73	69	61	57	59	73	63
	II	67	–	30	34	40	40	62
December	I	70	68	63	56	57	75	56
	II	64	–	31	30	34	35	52
Mean	**I**	**77**	**77**	**63**	**57**	**59**	**71**	**67**
	II	**71**	**-**	**325**	**97**	**39**	**46**	**70**

Table III. : Continued

Name of the Month		Miraj	Solapur	Aurangabad	Amravati	Akola	Chandrapur
January	I	61	59	52	49	57	71
	II	34	29	30	30	29	43
February	I	56	39	41	40	46	61
	II	32	22	23	22	22	31
March	I	54	36	33	33	34	46
	II	25	19	18	25	16	24
April	I	64	41	34	30	30	41
	II	31	22	20	23	16	23
May	I	73	50	47	37	39	36
	II	41	24	24	21	19	21
June	I	81	72	76	65	66	64
	II	64	49	51	43	43	49
July	I	87	79	87	84	81	82
	II	76	61	72	69	68	75
August	I	87	79	87	83	82	83
	II	74	59	69	69	67	74
September	I	86	80	84	81	81	83
	II	68	58	64	66	64	74
October	I	76	68	64	60	66	76
	II	52	46	46	45	41	64
November	I	65	57	56	48	59	72
	II	42	36	38	33	55	53
December	I	65	54	55	50	60	75
	II	36	32	33	33	32	47
Mean	**I**	**71**	**59**	**60**	**55**	**58**	**66**
	II	**48**	**38**	**41**	**40**	**38**	**48**

Source : Climatological tables of observatories in India (1931-1960).

FLORISTIC STUDIES IN MAHARASHTRA

Some of the earliest explorers of Western India, particularly of Maharashtra, in the early 18th century include Law, Graham, Nimmo, Sykes, Jacquemont, Gibson and Dalzell followed by Birdwood, Nairne, Hallberg, Acland, Cooke, Woodrow, Gammie, Ryan, etc. around the turn of the century. Graham (1837) was the first to publish a 'Catalogue of Bombay Plants' which was followed by the 'Flora of Bombay' by Dalzell & Gibson (1861). Then came the 'Flowering Plants of Western India' by Nairne (1894). Many interesting papers on the Western India Flora were published by Woodrow (1897-1901). An enumeration of

plants of Matheran & Mahabaleshwar was published by Birdwood (1896, 1887, 1896, 1897) while a list of Bombay Grasses was published by Lisboa (1890-1898).

Cooke (1880-1896) and Woodrow (1880-1899) were the foremost in starting the Pune herbarium (BSI). Cooke's 'Flora of the Presidency of Bombay' (1901-1908) continues till today to be the most important floristic work for identification of the species that would be collected in the localities of the erstwhile Bombay Presidency viz., parts of Gujarat, Maharashtra, Goa, North Kanara and Sind which is now in Pakistan. This flora included 2513 species and 162 varieties under 999 genera belonging to 147 families to which Karthikeyan et al. (1981) added 5 genera, 715 species and 133 infraspecific taxa. Cooke was ably assisted by a number of Indian workers like Kanitkar (1891), Ranade (1898) and Bhide (1898), to mention a few. Gammie (1899-1902) also explored the Presidency and enriched the herbarium, who was followed by a number of workers like Patwardhan (1908), Paranjpye (1909), Shevade (1909), Burns (1916), Narayana (1922), Godbole (1929), Bhiva, Garade, etc. Talbot supplemented Cooke's work by publishing the 'Forest Flora of the Bombay Presidency and Sind' (1909 & 1911). Blatter & McCann (1926-1935) published a series of valuable papers enriching our knowledge of the Bombay Flora besides publishing a monograph on 'Bombay Grasses' (1935).

Santapau took over the Blatter Herbarium (BLAT) at St. Xavier's College, Bombay in 1940 and was largely responsible in reviving the interest in taxonomy and floristics and getting its due recognition in India. Some of his important works includes revisionary studies on Convolvulaceae (1947), Solanaceae (1948), Gesneriaceae (1949), Scrophulariaceae (1950 a), Lentibulariaceae (1950b), Acanthaceae (1952), Asclepiadaceae and Periplocaceae (with Irani, 1962), Orchidaceae (with Kapadia, 1966), etc. of Bombay besides 'The flora of Khandala' (1953, 1967) and 'The Flora of Purandhar' (1958). Bole (1970) has listed the numerous papers of Santapau (1944-1969) and his students which deal with varied aspects of taxonomy and floristics including history, herbarium techniques, bibliography, nomenclature and regional revision of some families and genera. This institute continues to serve the cause of taxonomy and floristics even today. Saldanha revised two genera viz., *Striga* and *Torenia* of Scrophulariaceae (1963, 1966). Bole and Almeida (1981 1985) have published materials for the Flora of Mahabaleshwar in a series of articles. S.M. Almeida (1983-1986) submitted a 'Report on the Flora of Ratnagiri district' which comprise c 1000 species and published the 'Flora of Savantwadi' (1990) which includes c 1600 species. G.L. Shah has also contributed many papers to the Flora of Bombay and its neighbouring Islands, the last being 1984. M.R. Almeida has recently

published 'Flora of Maharashtra Vol. 1' (1996) which includes families from Ranunculaceae to Connaraceae with 614 species.

Another school has been set up by Vartak at the Agharkar Research Institute, Pune. He has contributed to a better understanding to the Flora of Western Maharashtra, particularly of Pune, Satara, Raigad and Ahmednagar districts. His publications deal with varied topics like new and interesting records, medicinal, economic, horticultural and edible plants, ethnobotany and Flora of Sacred Groves besides families Cyperaceae (Vartak, 1966, Datar & Vartak, 1976, Vartak & Ghate, 1983), Podostemaceae (Vartak & Dhadbhade, 1973) and Vitaceae and Leaceae (Kumbhojkar & Vartak, 1983). Pune Agriculture College has contributed to the knowledge of a few grasses. Karnik (1961) and Mahabale & Karnik (1960) have published the Flora and vegetation of Satpura mountains (Dhule & Jalgaon district) besides the study of the flora of Ulhasnagar in Thane district (Dabhade, 1966), Mahabale (1987) has published the 'Botany and Flora of Maharashtra'. Pune University has also contributed some stray papers.

Naik from Marathwada University, Aurangabad has published a book on the 'Flora of Osmanabad district' (1980) and 'Flora of Marathwada' (1998) comprising 1718 taxa. He has described some new species of Fabaceae and Poaceae and some records as well. Mirashi and his team from Nagpur University have published many papers on Asteraceae, Cyperaceae (Dande, 1966), Tubiflorae and new records for Nagpur district as precursors to the Flora of Nagpur. Finally, Ugemuge (1986) has published a book on the 'Flora of Nagpur district' with 1163 species. B.D. & M.D. Deshpande (1963) have published the Flora of Chandmari hills in Wardha district. Mahajan and his co-workers from Shivaji University, Kolhapur have published some stray papers on the Flora of Kolhapur. Patel (1968) has worked out the 'Flora of Melghat'. Dhore & Joshi (1988) have published the 'Flora of Melghat Tiger Reserve' comprising 648 species. A contribution to the flora of Sholapur district has also been published. Bharucha and Shankarnarayan (1958) and Satyanarayan (1958, 1959, 1961) have studied the ecology of grasslands, coastline strand vegetation and evergreen forests of Maharashtra.

Soon after the re-organisation of the Botanical Survey of India, Western Circle, Pune, the explorations in Maharashtra were of general nature leading to a proper and rational planning of future exploration programmes to under explored and un-explored regions. In the early years (1956-1960), several papers were published on the ecology and vegetation of Pune district (Puri & Jain, 1959-1960; Puri & Patil, 1960), Konkan (Jain, 1959), Khandesh (Jain & Deshpande, 1964),

Mahabaleshwar (Puri & Mahajan, 1960), Mangrove vegetation of Western India (Patil, 1957; Puri & Jain, 1957) and few more miscellaneous publications. This preliminary survey led to the identification and future exploration of floristically and taxonomically rich areas besides the developmental project sites whose flora was threatened with a drastic and sudden change, in Sahyadri ranges, particularly so in Pune district. Janardhanan (1966) dealt with 838 species from Bhimashankar and surroundings. Reddi (1969, 1970) enumerated 850 species from Sakarpathar & Ambavane areas while Hemadri (1970) detailed 986 species from Junnar and surroundings, describing over a dozen new species besides several new and interesting records. Ansari (1960- onwards) undertook many short field trips to Sinhagad, Purandhar and other adjoining areas and again described quite many new species belonging to *Ceropegia* in particular. All these works of Pune district added to Santapau's Flora of Khandala and that of Purandhar total up to c 60% of the Flora of the complete Maharashtra State. Short field trips to Mahabaleshwar and Panchgani resulted in one new genus viz., *Seshagiria* and many new species while several described earlier by Hallberg, Blatter & McCann could not be recollected.

Subramanyam & Rao (1961) have made representative collections from Pravarasangam in Ahmednagar district whereas Harischandragarh was similarly explored by Billore & Hemadri (1969). Singh et al. (1972) published an account of the Flora of Kolhapur district based on earlier collections. Billore (1972) has dealt with 1096 species from Thane district describing over half a dozen new species besides many interesting records. Cherian & Pataskar (1969a, b) have published on Surgana-Harsul ranges; Saptashringi and adjoining hills in Nasik district. Karthikeyan et al. (1981) has published 'An Annotated Bibliography of Taxonomic Botany of Peninsular India 1959-1978'. Karthikeyan et al. (1982) has listed the aquatic angiosperms of Maharashtra. Karthikeyan & Sharma (1983) have discussed about species whose occurrence Cooke expressed doubt and have been subsequently collected.

Recently many district floras have been worked out by research workers of Pune in Botanical Survey of India, who have explored intensively and extensively. The following district floras have been published or is in press. 'Akola district' with 651 taxa (Kamble & Pradhan, 1988), 'Sindhudurg district' (Kulkarni, 1988) with 1123 taxa, 'Nasik district' (Lakshminarasimhan & Sharma, 1991) with 952 taxa, 'Mahabaleshwar & adjoinings' (S.D. Deshpande et al. 1993 & 1995) with 1446 taxa, 'Raigad district' (Kothari & Moorthy, 1993) with 1248 taxa, 'Yavatmal district' (Karthikeyan & Anand Kumar, 1993) with 579 taxa, 'Ahmednagar district' (Pradhan & Singh ined.) with 1042 taxa,

'Buldhana district' (Diwakar & Sharma ined.) with 584 taxa, 'Kolhapur district' (Sharma et al. ined.) with 1255 taxa, 'Chandrapur district' (Malhotra & Moorthy ined). with 1184 taxa and 'Bhandara district' (Malhotra & Rao ined.) with c 600 taxa. Besides Amravati district with special reference to Project Tiger area, Melghat with c 600 species has been explored by Ansari. Explorations in Dhule district (by Pataskar) has yielded 630 species and Jalgaon district (by Rao) has yielded 500 species. In addition some wild life sanctuaries and National Parks have been explored. Nagzira (174 species) and Nawegaon (301 species) in Bhandara district have been published by Malhotra & Rao, 1980, 1981), 'Taroba National Park' (Chandrapur Dt.) comprising 667 species by Malhotra & Moorthy has been published in 1992. Work on Sanjay Gandhi National Park (Borivli) comprising 1064 taxa by Sharma & Pradhan and have been completed and submitted for publication. 'Grasses of Maharashtra State' comprising c 400 species has been published by Deshpande & Singh (1986). Bison Sanctuary at Dajipur has been included in Kolhapur district Flora. Recently 'Flora of Maharashtra State : Monocotyledones' by Lakshminarasimhan in Sharma et al. 1996 has been published which included 34 families, 956 genera, 904 species, 2 subspecies, 39 varieties, 1 subvariety and 1 forma of wild plants. 'Flora of Maharashtra State : Dicotyledones' is being brought out by BSI in 2 volumes. Karthikeyan et al. in Mudgal & Hajra (1997) have discussed about the Floristic Diversity and conservation strategies in Maharashtra. Karthikeyan in Hajra et al. (1996) has published an account of the Northern Western ghats (3000 species) and Northern West coast (1550 species).

PHYTOGEOGRAPHY

The flora of Maharashtra is heterogeneous in composition. The Deccan traps continue into Madhya Pradesh and Gujarat through Khandesh. The flora of regions such as Nag region formed by Nagpur, Bhandara, Chandrapur and Gadchiroli districts, the plateau of Vidarbha composed by Wardha, Amravati, Yavatmal, Akola and Buldhana districts and the ten districts of Maharashtra such as Raigad, Ratnagiri, Sindhudurg, Thane, Ahmednagar, Kolhapur, Nasik, Pune, Sangli and Satara with some part of Sahyadris, and the long narrow coastal strip of Konkan running through the districts of Bombay, Thane, Raigad, Ratnagiri and Sindhudurg differ because their physiography, climate and soil conditions are different.

The flora akin to Malabar region is met with in coastal Konkan. The plants from the Vindhyan and Indo-Gangetic plains meet those in Khandesh and in Narmada basin. There is similarity between the plants of Maharashtra, Madhya Pradesh and South Gujarat.

The rainfall and humidity progressively increase towards south and west. As a result Sahyadri regions in Karnataka have rich vegetation of moist deciduous species and some evergreen species which do not occur in Maharashtra.

There is a strange resemblance between the flora of Assam and flora of Maharashtra as illustrated by grasses. One of the reasons for this is, because of soils and due to migration of species along Garo hills, Vindhyas, Satpuras down to Malabar through Sahyadris. This forms a route for migration of species from Malaya-Burma-Assam-Garo-Vindhyan-Satpuras-Konkan-Malabar (Mahabale, 1987). This is evidenced by the occurrence of species like *Lilium nilgirense,* which grow in E. Himalayas as well as Nilgiris. The Satpura Hypothesis explains the migration of species across the continent of India from East to West and from there to South through Satpuras. The Junagadh hill, Girnar Parvat and Barda-dongar have species akin to those in dry parts of Deccan of Maharashtra. The flora of Saurashtra resemble the flora in deciduous forests of Deccan and that in drier parts of Konkan like Deogad.

The flora of Khandesh is comparable of South Gujarat and Madhya Pradesh.

FOREST DIVISIONS AND RANGES IN MAHARASHTRA

The Forest area in the Maharashtra State is 63,798 sq km. There are eleven Foest circles, forty three divisions and five subdivisions. The undermentioned table gives forest circles, divisions and the forest area for facilitating the research workers and other interested parties in locating the Ranges and Divisions properly (Chief Forest Statistician Bulletin, 1992).

Name of the circle	Divisions/ S. Div.	No. of ranges	Forest area
Kolhapur	Kolhapur division Savantwadi division Satara division Sangli subdivision Chiplun subdivision	27	4,466 sq km
Pune	Pune division Junnar division Solapur division Bhor subdivision	18	2,386 sq km

Thane	Thane division Dahanu division Shahapur division Alibagh division Roha division Sanjay Gandhi National Park	48	5,632 sq km
Nashik	East Nashik division West Nashik division Ahmednagar division	21	5,280 sq km
Dhule	West Dhule division North Dhule division Mewasi division Jalgaon division Yaval division	28	6,431 sq km
Aurangabad	Aurangabad division Parbhani division Nanded division Beed sub division Osmanabad subdivison	22	2,820 sq km
Amravati	Akot division Dharani division Amravati division Paratwada division Tiger project circle Paratwada (308.24 sq km)	20	3,575 sq km
Yavatmal	Wani division Yavatmal division Pusad division Akola division Buldhana division	33	6,139 sq km
Nagpur	Nagpur division Wardha division Bhandara division Gondia division	31	8,293 sq km
North Chandrapur	Brahmapuri division Wadsa division Chandrapur division Gadchiroli division	17	7,676 sq km

South Chandrapur Circle	Allapalli division Bhamragad division Sironcha division Central Chandrapur division	24	11,100 sq km

The total geographical area of the state is 3,07,690 sq km, out of which, the forest area is 63,798 sq km which comes to 20.73%.

VEGETATION

The forest area recorded for Maharashtra state is 63,842 sq km which is c 20.75% of its geographical area (The Hindu, Survey of the Environment, 1998). The total forest cover is 46, 143 sq km which is 15% of area, out of which 23622 sq km is dense forest, 22,397 sq km is open forest and 124 sq km is mangrove forests. The vegetation of Maharashtra can be classified into the following zones (MAP III) : Konkan strip adjacent to Arabian Sea, Sahyadris or N.W. Ghats; Desh forming a flat plain to east, with side off-shoots of ranges of Sahyadris, Khandesh at the north with low hills of Satpura and Vidarbha (Mahabale, 1987). The vegetation of these zones differ due to factors like rainfall, temperature, humidity, type of soils and topography. The pattern of vegetation in these places is influenced by the vegetation of adjoining regions also, the plants from the Indo-Ganga plains reach as far as Khandesh, the Tapti and Narmada basins, and those from Gujarat enter at the North; those from Malabar at the South reach south Konkan. The forests of Andhra Pradesh and Madhya Pradesh adjoin the forests of Chandrapur and Gadchiroli districts and vegetation of Khandesh gets mixed with that of south Gujarat and Madhya Pradesh.

The vegetation of low lying valleys of Sahyadris differ from that of higher altitudes because of climatic and edaphic factors. The flora of Maharashtra is considered to have formed part of `Dandakaranya' of ancient times. Major regions of Maharashtra belong to the `Deccan' as proposed by Hooker & Thomson (1855). The Deccan Peninsula of which Maharashtra is a large part - is relatively a dry elevated table land and it is a part of the most ancient Indian continental land mass the Deccan peninsula. They have considered Konkan as part of Malabar.

Map III : Maharashtra State--Vegetation Types

The State of Maharashtra constitutes 34 districts which can be classified as follows (MAP IV):

1.	Konkan	Bombay, Raigad*, Ratnagiri*, Sindhudurg* and Thane*.
2.	Desh or Deccan	Ahmednagar*, Kolhapur*, Nasik*, Pune*, Sangli*, Satara* and Solapur.
3.	Khandesh	Dhule*, Jalgaon and Nandurbar.
4.	Marathwada	Aurangabad, Beed, Hingoli, Jalna, Latur, Nanded, Osmanabad and Parbhani.
5.	Vidarbha	Akola, Amravati, Bhandara, Buldhana, Chandrapur, Gadchiroli, Gondia, Nagpur, Wardha, Washim and Yavatmal.

The greater part of Deccan table land is above 610 m above m.s.l.

* Sahyadris run through these districts starting from Dhule down to Sindhudurg.

FLORA OF KONKAN AND SAHYADRIS

Konkan is a narrow strip, 27 to 48 km broad and about 800 km long which starts from Tapti basin down to Goa. It is a botanical subunit of Malabar province of Hooker & Thomson. It is a maritime province, with high humidity throughout the year which is 60-70% at any time of the year. Throughout the year the vegetation is green, though the hills are barren. The average height of Konkan plains is 6-9 m above m.s.l. The higher peaks of adjoining Sahyadris - which rise to nearly 1220 m in Mahabaleshwar and Harischandragad serve as a wall to obstruct the clouds coming with S.W. monsoons and interrupt them in 'ghats' or passes from west to east. The rainfall at the foot of Sahyadris on the Konkan side on an average is c 2540 mm but it is less in the coastal region. The coastal strip of 15 to 17 km is a marshy saline bed due to the incoming of the Arabian sea. Only salt tolerant plants grow here. Konkan plains are full of cultivable lands where rice, ragi and other crops and vegetables are cultivated. Wherever rich alluvial deposits are found, coconut, areca-nut, mango, nut-meg, cashew, etc. are grown.

On the western side of Sahyadris, marshy conditions prevail only during monsoons. As soon as the rains are over, the soil becomes nearly dry because it is lateritic and the water flows away towards the sea.

Map IV : Maharashtra State–Major Regions

But on the eastern side, i.e. towards the Deccan side of the Sahyadris, the slope is gentle and ravines are deep. Small and large rivers bring rich detritus material from the traps to the valleys. Through the valleys the rain water flows enriching the river banks and valleys. Consequently, the lateral spurs of Sahyadris having high humidity and good drainage have developed 'Shola' like vegetation. These are known as 'Mavals'. The flora of Konkan has been studied by Hooker, Dalzell, Nairne, Cooke, Blatter, McCann, Santapau, Kulkarni, S. M. Almeida, etc.

The Flora of North Bombay is richer than that of S. Bombay. The flora of Sindhudurg has more humid species as in Goa, North Kanara and Malabar (Kulkarni, 1988). Dalgado (1896) has descibed the Flora of Savantwadi. The flora of Raigad (Kothari & Moorthy, 1993), Ratnagiri (S.M. Almeida, 1983-86 ined.), Thane (Billore, 1972 ined.) and Savantwadi (S.M. Almeida, 1990) have been thoroughly explored. The major rivers of Konkan region are Ulhas, Vashishthi, Kundalika, Shastri, Urali, Gad, Ter, etc. As they deposit rich alluvium on the banks and depressions, coconut, betelnut and mangoes grow well here. All along the coast line, there are tidal swamps and mud flats mostly covered by mangroves. *Avicennia marina, A. officinalis* and *Rhizophora mucronata* are the common mangrove species. The associate species are *Acanthus ilicifolius, Aegiceras corniculatum, Avicennia marina, Bruguiera cylindrica, B. gymnorrhiza, B. parviflora, Cerbera manghas, Ceriops tagal, Excoecaria agallocha, Kandelia candel, Lumnitzera racemosa, Rhizophora apiculata, Sonneratia apetala, S. caseolaris*, etc. Behind them sand binders and strand vegetation occurs. Wherever the soils are sandy and the coast is not muddy *Aeluropus lagopoides, Cressa cretica, Cyperus bulbosus, Pandanus tectorius, Pedalium murex, Spinifex littoralis, Tribulus terrestris*, etc. occur.

There are semi-evergreen forest pockets interspersed with *Tectona grandis*. There are a few pockets of evergreen forests in Sindhudurg but they are not continuous.

The strand vegetation present behind the tidal swamps is in patches. Trees and shrubs such as *Caesalpinia bonduc, Calophyllum inophyllum, Clerodendrum inerme, Colubrina asiatica, Pandanus tectorius, Pongamia pinnata, Premna corymbosa, Thespesia populnea, Vitex trifolia*, etc. are common. The commonly found climbers in these patches are *Canavalia virosa, Derris trifoliata, Ipomoea pes-caprae*, etc. The herbs prevalent here are *Crotalaria verrucosa, Cyperus squarrosus, Launaea procumbens, Neanotis rheedii, Perotis indica, Tricholepis glaberrima, Vernonia cinerea, Zoysia matrella*, etc. Groves of *Cocos nucifera* fringe behind the coast line. The branched palm

Hyphaene dichotoma is found in patches in places like Alibag and Vasai. *Areca catechu* and *Phoenix sylvestris* are found in Thane, Uran, etc.

Plateau vegetation at lower elevations or plains :

Vegetation is sparse in the undulating rocky plateau in various places in 'Konkan'. *Acacia chundra, Buchanania lanzan, Carissa congesta, Flacourtia indica, Holarrhena pubescens, Maytenus senegalensis, Woodfordia fruticosa,* etc. occur here. On low hills and slopes, *Crotalaria lutescens, Elephantopus scaber, Ixora coccinea and Sida rhomboidea,* etc. are intermixed. *Abrus precatorius, Aspidopterys cordata, Derris scandens, Gloriosa superba, Gymnema sylvestris, Hemidesmus indicus, Quirivelia frutescens, Wattakaka volubilis,* etc. are found to be climbing over some of these elements.

The most common species found along the riparian flora on the river banks of stony, sandy or alluvial soils are *Barringtonia acutangula, B. racemosa, Homonoia riparia, Rotula aquatica, Saccharum spontaneum, Tamarix dioica, T. ericoides, Vetiveria zizanioides,* etc.

Grasslands :

Grasslands occur from Raita near Kalyan, Bhivandi to Palghar, Dahanu and Umbargaon. Poaceae is the dominant family. The common grasses are *Arthraxon hispidus, Dichanthium annulatum, D. huegelii, D. pertusum, Echinochloa colona, Heteropogon contortus, Iseilema laxum, Jansenella griffithiana, Saccharum spontaneum, Themeda cymbaria,* etc.

Scrub forests :

Along foot hills, and lower elevations where the soil is usually lateritic and gravelly, scrub jungles thrive. *Maytenus senegalensis* is the pioneer species here. The other common species of different habits occurring in this type are *Acacia chundra, A. nilotica* ssp. *indica, Barleria prionitis, Capparis divaricata, Dichrostachys cinerea* var. *indica, Eranthemum roseum, Flacourtia indica, Hemigraphis latebrosa, Rostellularia diffusa, Rungia diffusa,* etc.

Dry deciduous forests :

With altitudes going higher up and improved soil type which retains more moisture, there is a perceptible change in vegetation and the scrub jungles yield to elements of dry deciduous type. *Tectona grandis* grows luxuriantly. *Acacia chundra, Anogeissus latifolia, Bombax ceiba, Cassia fistula, Dalbergia latifolia, Gmelina arborea,*

Haldina cordifolia, Holarrhena pubescens, Holoptelea integrifolia, Lagerstroemia parviflora, Lannea coromandelica, Mitragyna parvifolia, Terminalia chebula, T. elliptica, T. paniculata, Wrightia tinctoria, Ziziphus mauritiana, etc. are the common small and large trees.

Shrubs and climbers are also represented abundantly. Some common species are *Abrus precatorius, Alangium salvifolium, Aspidopterys cordata, Carissa congesta, Celastrus paniculatus, Derris scandens, Dioscorea bulbifera, Helicteres isora, Maytenus rothiana, Quirivelia frutescens, Wattakaka volubilis, Woodfordia fruticosa, Ziziphus oenoplia,* etc.

The most common herbs and undershrubs include *Apluda mutica, Cymbopogon martinii, Dichanthium annulatum, Digitaria ciliaris, Elephantopus scaber, Eragrostis unioloides, Flemingia strobilifera, Heteropogon contortus, Naregamia alata, Sehima nervosum, Themeda triandra,* etc.

Tropical moist deciduous forests :

Still higher elevations coupled with better and richer soil and rainfall create conditions suitable for tropical moist deciduous forests. The common trees occurring here are *Albizia chinensis, Canthium dicoccum, Catunaregam spinosa, Dillenia pentagyna, Ficus racemosa, Glochidion hohenacheri, Hymenodictyon obovatum, Macaranga peltata, Mallotus philippensis, Meyna laxiflora, Syzygium cumini,* etc.

In many places distinct communities of *Ligustrum perrottetii* and *Wendlandia thyrsoidea* has been found to occur. The common shrubs include *Callicarpa tomentosa, Canthium rheedii, Grewia abutifolia, Leea asiatica, Trema orientalis,* etc.

Some of the climbers which occur commonly here are *Clematis gouriana, Combretum albidum, Jasminum malabaricum, Mucuna monosperma, Stephania japonica, Ziziphus rugosa,* etc.

The herbs and undershrubs prevalent here include *Adenostemma lavenia, Alysicarpus bupleurifolius, Carvia callosa, Crotalaria retusa, Desmodium laxiflorum, Ecbolium ligustrinum,* etc. Some common epiphytes met with include *Aerides crispum, Dendrobium barbatulum, Drynaria quercifolia, Eria microchilos, Impatiens acaulis, Oberonia recurva, Vanda tessellata,* etc.

Parasites, saprophytes and insectivorous plants, also abound forests, some of them are *Aeginetia indica, Balanophora fungosa* ssp. *indica, Dendrophthoe falcata, Drosera indica, Tolypanthus lagenifer, Utricularia caerulea, U. graminifolia, U. reticulata, U. striatula, U. uliginosa, Viscum articulatum,* etc.

Montane subtropical evergreen forests :

The evergreen forests that occur in the N.W. Ghats of Maharashtra are not typical evergreen forests (Qureshi, 1965). As the trees tend to be dwarfish without any tiers or canopies of tropical elements these are classified as montane subtropical evergreen forests. It is seen in Varandha ghat, Matheran, Thane district, etc.

The common trees found in these forests are *Actinodaphne angustifolia, Elaeocarpus serratus, Garcinia indica, Holigarna grahamii, Knema attenuata, Lagerstroomia microcarpa, Litsea stocksii, Memecylon umbellatum, Mesua ferrea, Neolitsea cassia, Nothapodytes nimmoniana, Persea macrantha, Polyalthia fragrans, Prunus ceylanica, Symplocos racemosa, Syzygium laetum, Vitex altissima*, etc.

Small trees or shrubs such as *Actephila indica, Blachia denudata, Dichapetalum gelonioides, Euonymus indicus, Ixora nigricans, Meiogyne pannosa, Melicope lunuankenda, Pavetta tomentosa, Psychotria dalzellii*, etc. are commonly found.

Some of the climbers or scandent shrubs occurring here are *Ancistrocladus heyneanus, Arnicratea grahamii, Dalbergia volubilis, Elaeagnus conferta, Embelia viridiflora, Luvunga eleutherandra, Naravelia zeylanica, Paramignya monophylla, Toddalia asiatica, Ventilago madraspatana*, etc.

Some epiphytes are *Aerides dalzelliana, Aeschynanthus perrottetii, Bulbophyllum fimbriatum, Cymbidium aloifolium, Dendrobium barbatulum, Hoya wightii, Piper trichostachyon, Porpax jerdoniana*, etc.

Some of the common parasites are *Dendrophthoe trigona, Helicanthus elastica, Helixanthera wallichiana, Macrosolen capitellatus, Scurrula philippensis, Taxillus cuneatus, Viscum angulatum, V. monoicum*, etc.

The herbaceous flora is highly rich. Some of these are *Anisomeles heyneana, Costus speciosus, Delphinium malabaricum, Exacum bicolor, Flemingia congesta, Gynura cusimbua, Impatiens kleinii, Leucas ciliata, Neanotis calycina, Pecteilis gigantea, Thalictrum dalzellii, Urena lobata*, etc.

Ensete superbum grows in the screes. The subtropical evergreen forests, encountered in Amboli ghat (Savantwadi) and surroundings though contain majority of the evergreen components of north Konkan, have in addition several other taxa which are predominantly restricted to this area. This area serves as a transition sector between northern

Konkan and subtropical evergreen forests of Coorg and Kanara. The top layer includes trees like *Cinnamomum verum, Beilschmiedia dalzellii, Dimocarpus longan, Garcinia gummi-gutta, Holigarna grahamii, Hopea ponga, Knema attenuata, Litsea josephii, Myristica dactyloides, Polyalthia fragrans*, etc. The middle layer is composed of *Carallia brachiata, Ixora pavetta, Litsea deccanensis, Stereospermum colais, Symplocos racemosa, Vitex altissima, V. leucoxylon*, etc. The climbers (woody or herbaceous) like *Derris scandens, Gouania microcarpa, Grewia umbellifera, Luvunga sarmentosa, Pothos scandens, Premna coriacea, Sarcostigma kleinii, Schefflera elliptica, Toddalia asiatica, Ventilago bombaiensis*, etc. occur here. The common species found as ground flora include *Chassalia curviflora* var. *ophioxyloides, Gymnostachyum latifolium, Hedyotis auricularia, Ophiorrhiza rugosa var. prostrata*, etc. Epiphytes like *Garnotia arborum, Hoya retusa, Remusatia vivipara*, etc. are commonly found.

Along rivers the plants observed are *Melastoma malabathricum, Psychotria truncata, Symplocos cochinchinensis ssp. laurina, Syzygium zeylanicum*, etc.

West cost semi-evergreen forests

This is found in some parts of Ratnagiri and Savantwadi. Broadly the forests can be distinguished as follows :

Top canopy comprises of trees like *Anogeissus latifolia, Bridelia retusa, Careya arborea, Catunaregam spinosa, Holigarna arnottiana, Lagerstroemia microcarpa, Macaranga peltata, Pterocarpus marsupium, Syzygium cumini, Terminalia bellirica, T. elliptica, T. paniculata, Vitex altissima, Xantolis tomentosa, Xylia xylocarpa*, etc. The second storey comprises of trees like *Bauhinia racemosa, Bridelia squamosa, Dimorphocalyx lawianus, Emblica officinalis, Garuga pinnata, Mallotus philippensis, Memecylon umbellatum, Zanthoxylum rhetsa*, etc. The shrubby layer comprises of *Carvia callosa, Gnidia glauca, Holarrhena pubescens, Murraya koenigii, M. paniculata*, etc, associated with other scandent shrubs like *Ancistrocladus heyneanus, Connarus wightii, Moullava spicata, Salacia macrosperma, Grewia umbellifera, Uvaria narum*, etc.

The following two edaphic types depending upon the local variation in soil and moisture are found with in the semi- evergreen forests.

a) Cane brakes: These occur in Savantwadi forests along the nallahs where wet situations prevail for long period. *Calamus* species are common.

b) Lateritic semi-evergreen forests : This type occurs on localised areas in semi-evergreen forests of Raigad district. It is characterised by *Xylia xylocarpa*. The other associates in top canopy are *Anogeissus latifolia, Grewia tiliifolia* and species of *Terminalia*. The second storey is represented by *Bridelia retusa, Careya arborea and Strychnos nux-vomica*. The undergrowth is sparse and consists of *Holarrhena pubescens and Justicia adhatoda*.

FLORA OF DECCAN OR `DESH'

The region to the east of Sahyadris lying between rivers Krishna, Bhima, Sina and Godavari is known as `Desh' or 'Deccan'. The area of `Desh' is approximately 565 km. Climate here is hot and dry and the rainfall is irregular. Soils are derived from Deccan traps and are deep black or reddish. In river valleys they are alluvial.

The Sahyadri ranges run directly on the western fringes in Kolhapur, Sangli, Satara, Pune, Nasik and western part of Ahmednagar whereas in other districts only their lateral extensions or spurs run. Parts close to direct ranges of Sahyadris are called `Dang', `Maval' or `Pangan' and are just like Konkan in soils being lateritic or gravelly. The soils are better preserved and matured as the country on Desh side is terraced according to altitudes enabling the people to take both Kharif as well as Rabi crops Cereals, groundnut, pulses, sugarcane, cotton, turmeric, chillis, grapes, tobacco, etc.

The highest peaks of Sahyadris such as Kalsubai [(1646 m) Lakshminarasimhan & Sharma, 1991], Harischandragad [(1424 m) Billore & Hemadri, 1972] and Mahabaleshwar [(1438 m) S.D. Deshpande et al, 1993 & 1995] are in Deccan. The variation in local topography and soils give rise to varied vegetation. The vegetation of this region is dry deciduous in general, mostly of *Tectona grandis* due to semi-arid conditions. There are no mangroves on the Desh side. Some pockets of semi-evergreen vegetation occur here in regions close to Sahyadris. When they degenerate, they produce moist deciduous forests in high rainfall regions or changes into dry deciduous forests in low rainfall areas. But when they also degenerate they form a thorn savannah or a scrub. There are open grasslands where the soil is poor. In many dry sandy or gravelly areas succulents and xerophytes occur. Near Daund, *Acacia nilotica* ssp. *indica* grows in river banks and forms a thick *Acacia* tract. The main vegetation types are discussed in detail below.

Western (montane) subtropical hill forests :

There are found scattered in the higher ridges of the western ghats at an elevation betwen 900 and 1400 m where rainfall varies between 3000 and 6000 mm. The maximum rainfall is received in the months of July and August. The foggy conditions frequently prevail in the area where the rainfall is above 4800 mm. However, these forests may descend to lower elevation (900 m) especially in the western side wherever moist and sheltered conditions are available. These forests are conspicuous at Akola taluka (Ahmednagar District), Bhimashankar, Harischandragad, Khandala, Koyna, Lonavla, Mahabaleshwar, etc. The vegetation is stunted and a typical evergreen vegetation with distinct storeys is conspicuous with its absence. The top layer (15-20 m high) comprises of tree species such as *Actinodaphne angustifolia, Canthium dicoccum, Careya arborea, Celtis timorensis, Dillenia pentagyna, Diospyros montana, Eravatmia heyneana, Flacourtia montana, Garcinia indica, G. talbotii, Macaranga peltata, Mangifera indica, Mimusops elengi, Olea dioica, Persea macrantha, Sageraea laurifolia, Stereospermum colais, Syzygium cumini, Xantolis tomentosa*, etc. The constituents of the middle layer (2-6 m high) are mostly shrubby elements found on the fringes of the forests and open areas of the hill tops. Some important shrubs are as follows :

Allophylus serratus, Ancistrocladus heyneanus, Barleria terminalis, Capparis rotundifolia, Carissa congesta, Colebrookea oppositifolia, Crotalaria retusa, Flemingia strobilifera, Maytenus rothiana, Leea indica, Pogostemon plectranthoides, Rauvolfia verticillata, etc. The climbers and ramblers occurring here are *Anodendron manubriatum, Caesalpinia cucullata, Clematis hedysarifolia, Combretum albidum, Dalbergia volubilis, Diploclisia glaucescens, Elaeagnus conferta, Entada rheedei, Jasminum malabaricum, Moullava spicata, Piper trichostachyon, Smilax zeylanica, Strychnos wallichiana*, etc. The ground flora include *Arundinella pumila, Asystasia dalzelliana, Carex.caricina, Cynoglossum wallichii, Desmodium triquetrum, Ecbolium ligustrinum, Haplanthodes verticillatus, Leucas stelligera, Oplismenus compositus*, etc.

Arisaema, Curcuma, Habenaria, Hitchenia, Impatiens, Senecio, Zingiber, etc. are some of the genera which appear during or after rainy season. Prominent among the epiphytic orchids and grasses are : *Aerides, Dendrobium, Eria, Garnotia, Tripogon*, etc.

West–coast semi-evergreen forests :

The semi-evergreen forests occur mainly on the hill slopes at elevation varying from 450 to 1050 m on the Western ghats between

evergreen and moist deciduous forests. The rainfall is restricted to south-west monsoon and varies from 2000-2500 mm. The climate is comparatively warmer than experienced in evergreen forests. The indiscriminate felling of tree species, forest encroachment of the forest areas for agriculture and developmental projects have depleted the semi-evergeen forests considerably. These forests occur in Ajra, Chandgad and Radhanagari of Kolhapur districts, Koyna, parts of Satara, Nasik and Pune districts. Trees like *Aglaia lawii, Cinnamonum zeylanicum, Elaeocarpus oblongus, Ficus racemosa, Garcinia indica, Holigarna grahamii, Lagerstroemia parviflora, etc.* occur. *Shrubs such as Crotalaria retusa, Gnidia glauca, Leea indica, Maytenus rothiana,* etc. are found. Grasses such as *Apluda mutica, Aristida adscensionis, Chrysopogon fulvus, Dichanthium annulatum, Dinebra retroflexa, Eragrostis unioloides, Ischaemum pilosum, Leptochloa chinensis, Ophiuros exaltatus, Panicum psilopodium, Setaria pumila, Themeda quadrivalis, Urochloa reptans,* etc. are common. *Capparis moonii, Clematis gouriana and Gnetum ulva* are some of the common climbers of these areas. *Calamus pseudotenuis, Calycopteris floribunda, Piper hookeri, etc. are also found.* Some of the common herbs include *Abelmoschus manihot ssp. tetraphyllus, Ammannia baccifera, Boerhavia diffusa, Caesulia axillaris, Cardamine trichocarpa, Cleome viscosa, Corchorus aestuans, Cyperus rotundus, Echinops echinatus, Euphorbia hirta, Heliotropium indicum, Impatiens balsamina, Lavandula bipinnata, Lepidagathis cristata, Ludwigia perennis, Melochia corchorifolia, Polygala arvensis, Portulaca oleracea, Sida mysorensis, Solanum virginianum, Sopubia delphinifolia,* etc.

South Indian moist deciduous forests :

The moist deciduous forests occur on the slopes of western ghats and plains with high rainfall (1500-2500 mm). The rainfall is restricted to south-west monsoon. The dry spell ranges from 4-5 months. These are found in Ahmednagar, Nasik, Sangli and Satara districts. The forests are composed of tall trees (30-40 m or more) and are mixed in nature. The evergreen species are found in the lower storeys. The bamboo thickets are witnessed in the open forests along nallahs. They can be classified into :

a) Moist teak bearing forests :

In the teak bearing forests the percentage of teak (*Tectona grandis*) is more. They are restricted to hilly terrain. These are found in Nasik District. The top layer includes trees like *Acacia chundra, A. ferruginea, Albizia lebbeck, A. procera, Anogeissus latifolia, Bauhinia foveolatum, Bombax ceiba, Dalbergia lanceolaria, D. latifolia, Erythrina stricta, Garuga pinnata, Haldina cordifolia, Lagerstroemia*

parviflora, Lannea coromandelica, Mitragyna parvifolia, Ougeinia oojeinensis, Pterocarpus marsupium var. acuminatus, Schleichera oleosa, Tectona grandis, Terminalia bellirica, T. chebula, T. elliptica etc. The middle layer consists of *Acacia catechu, Bauhinia racemosa, Bridelia retusa, Butea monosperma, Careya arborea, Cassia fistula, Cordia dichotoma, Dendrocalamus strictus, Dillenia pontagyna, Diospyros melanoxylon, Emblica officinalis, Ficus racemosa, Grewia tiliifolia, Heterophragma quadriloculare, Holarrhena pubescens, Holoptelea integrifolia, Kydia calycina, Madhuca longifolia var. latifolia, Mallotus philippensis, Mangifera indica, Miliusa tomentosa, Oroxylum indicum, Spondias pinnata, Sterculia urens, Trewia polycarpa, Wrightia tinctoria,* etc. The shrubs include *Carissa congesta, Carvia callosa, Casearia graveolens, Catunaregam spinosa, Flacourtia indica, Helicteres isora, Meyna laxiflora, Woodfordia fruticosa, Ziziphus glaberrima,* etc.

b) Southern moist mixed deciduous forests :

The evergreen species are usually larger than in the case of teak bearing forests, except for the moist subtype, teak is present occasionally and may be an indicator of secondary succession. These occur in some parts of Ahmednagar (Akola taluka), Nasik and Satara districts. The dominant trees are *Acacia chundra, Anogeissus latifolia, Butea monosperma, Careya arborea, Casearia graveolens, Cassia fistula, Catunaregam spinosa, Dalbergia malanoxylon, D. montana, Emblica officinalis, Ficus exasperata, F. racemosa, Flacourtia indica, Garuga pinnata, Grewia tiliifolia, Heterophragma quadriloculare, Ixora pavetta, Kydia calycina, Lagerstroemia parviflora, Lannea coromandelica, Syzygium cumini, Terminalia bellirica, T. chebula, T. elliptica, Toona hexandra, Wrightia tinctoria, Xantolis tomentosa, Ziziphus xylopyra,* etc. *Chukrasia tabularis, Eriolaena quinqueloculoris and Sterculia guttata* are of rare occurrence. The common shrubs are *Callicarpa tomentosa, Canthium rheedii, Carissa congesta, Carvia callosa, Catunaregam spinosa, Clerodendrum viscosum, Desmodium triangulare var. congestum, D. triquetrum, Eranthemum roseum, Flacourtia indica, Gnidia glauca, Grewia abutilifolia, Helicteres isora, Holarrhena pubescens, Ixora brachiata, Leea indica, Meyna laxiflora, Rhus mysorensis, Vitex negunda, Woodfordia fruticosa, Ziziphus glaberrima, Z. rugosa,* etc.

The common climbers are *Caesalpinia cucullata, Cayratia auriculata, Cocculus hirsutus, Diospyros oppositifolia, Elaeagnus conferta, Jasminum malabaricum, Moullava spicata, Stephania japonica,* etc. The common herbaceous species are *Alysicarpus spp., Crotalaria filipes, C. nana, Desmodium laxiflorum, Hemigraphis latebrosa, Hibiscus hispidissimus, Laportea interrupta, Lepidagathis*

cuspidata, L. prostrata, Mukia maderaspatana, Ophiorrhiza prostrata, Smithia setulosa, Solena amplexicaulis, Tephrosia tinctoria, etc.

Southern tropical thorn forests :

These occur in drier areas with low rainfall. The forests are open and restricted to shallow soils. The grasses are stunted (except in fenced kurans). The forests being scattered and surrounded by cultivation on all sides are subjected to heavy grazing, lopping and illicit felling. These factors combined with poor site quality, frequent fire, sheet and gulley erosion proceeding at an alarming pace contributed to the lack of regeneration of the main species and deterioration of forests. These are found in some parts of Satara, Nasik, Pune, Ahmednagar, Solapur, etc. The common species are *Acacia chundra, A. leucophloea, Albizia odoratissima, Anogeissus latifolia, Azadirachta indica, Capparis moonii, C. zeylanica, Carissa congesta, Cassia auriculata, Dichrostachys cinerea var. indica, Maytenus senegalensis, Mimosa hamata, Ziziphus mauritiana,* etc.

The common herbs include *Aeschynomene indica, Alysicarpus vaginalis, Biophytum sensitivum var. candolleanum, Cassia pumila, Cleome viscosa, Corchorus aestuans, Crotalaria hebecarpa, C. mysorensis, C. orixensis, Glossocardia bosvallea, Indigofera cordifolia, Launaea procumbens, Linum mysorense, Polygala arvensis, P. persicariaefolia, Rostellularia japonica, Spermacoce hispida, S. pusilla, Zornia gibbosa,* etc. The common grasses are *Apluda mutica, Arundinella pumila, Chrysopogon fulvus, Cymbopogon martinii, Cynodon dactylon, Dichanthium annulatum, Digitaria ciliaris, Dinebra retroflexa, Echinochloa colona, Eragrostis pilosa, E. unioloides, Heteropogon contortus, Ischaemum indicum, Melanocenchris jacquemontii, Setaria pumila,* etc.

Southern tropical dry deciduous forests :

These forests are situated in moderate rainfall zone (500-1500 mm). Trees are stunted. These occur in Ahmednagar district and some parts of Nasik, Pune, Sangli and Satara districts. Excessive biotic interference resulted in dry condition and so xerophytic species such as *Aloe vera, Asparagus racemosus, Opuntia elatior,* etc. come up predominantly. The following subtypes are recognized.

a) Dry teak forests :

These occur in Nasik district and are confined to flat and undulating areas, where the depth of soil is good. The forests are open, understocked and large grassy areas are often met with due to biotic interference such as illicit felling, exessive grazing, fire and

encroachments. The top storey includes *Acacia chundra, A. ferruginea, Albizia lebbeck, Anogeissus latifolia, Boswellia serrata, Careya arborea, Garuga pinnata, Gmelina arborea, Heterophragma quadriloculare, Lagerstroemia parviflora, Lannea coromandelica, Madhuca longifolia var. latifolia, Mitragyna parvifolia, Pterocarpus marsupium var. acuminatus, Tectona grandis, Terminalia bellirica, T. elliptica*, etc. The second storey consists of *Acacia leucophloea, A. nilotica ssp. indica, Bauhinia racemosa, Butea monosperma, Cassia fistula, Diospyros melanoxylon, Dolichandrone falcata, Emblica officinalis, Holarrhena pubescens, Meyna laxiflora, Wrightia tinctoria, Ziziphus glaberrima, Z. mauritiana*, etc. Bamboos are absent. Shrubs include *Carissa congesta, Cassia auriculata, Catunaregam spinosa, Lantana camara var. aculeata, Securinega leucopyrus, Woodfordia fruticosa*, etc.

b) Southern dry mixed deciduous forests :

This type is found in the central part of Nasik and Satara districts. The common trees are *Acacia chundra, A. ferruginea, A. nilotica ssp. indica, Albizia amara, A. chinensis, Anogeissus latifolia, Bauhinia racemosa, Bombax ceiba, Butea monosperma, Cassia fistula, Diospyros melanoxylon, Embelia basaal, Erinocarpus nimmonii, Erythrina stricta, Ficus hispida, F. retusa, Lagerstroemia microcarpa, Maytenus senegalensis, Pongamia pinnata, Semecarpus anacardium, Terminalia bellirica, T. elliptica, Ziziphus glaberrima*, etc.

Bamboos are absent. The common shrubs are *Barleria prionitis, Bochmeria macrophylla, Breynia retusa, Carissa congesta, Carvia callosa, Cassia auriculata, Catunaregam spinosa, Clerodendrum serratum, Lantana camara var. aculeata, Lepidagathis cuspidata, Pogostemon plecranthoides, Rhus mysorensis, Tamilnadia uliginosa, Woodfordia fruticosa, etc. The common climbers are Calycopteris floribunda, Cayratia elongata, Combretum albidum, Cryptolepis buchanani, Dioscorea oppositifolia, D. pentaphylla, Gloriosa superba, Jasminum malabaricum, Mucuna pruriens, Paracalyx scariosa, Tylophora dalzellii, etc.* The herbs are represented by *Blepharis asperrima, Blumea eriantha, B. malcolmii, Celosia argentea, Corchorus olitorius, Crotalaria filipes, Elephantopus scaber, Evolvulus alsinoides, Exacum bicolor, Geissaspis cristata, Hemigraphis latebrosa, Polygala persicariaefolia, Solanum anguivi, Wedelia urticifolia*, etc.

c) Hardwickia forests :

These occur in eastern part of Nasik district where the rainfall is low (300-350 mm). The forests are mostly understocked and have

blanks. The area is grazed and hacked and the existing growth is stunted and malformed and also pronounced xerophytic species have come up. The grasses are stunted due to shallow soils. It is mainly composed of *Hardwickia binata.* Other trees *like Acacia chundra, Aegle marmelos, Albizia amara, A. lebbeck, Anogeissus latifolia, Bauhinia racemosa, Boswellia serrata, Butea monosperma, Dalbergia lanceolaria, Diospyros melanoxylon, Emblica officinalis, Garuga pinnata, Grewia tiliifolia, Lagerstroemia parviflora, Sterculia urens, Wrightia tinctoria, Ziziphus glaberrima,* etc. are also found. Bamboos are absent. Shrubs include *Cassia auriculata, Grewia damine, G. tenax, Maytenus senegalensis, Mimosa hamata, Rhus mysorensis, Securinega leucopyrus,* etc.

Degradation of tropical dry deciduous forests leads to *Euphorbia* scrub which is seen on the slopes in parts of Ahmednagar, Nasik and Pune.

FLORA OF KHANDESH

The districts of Dhule and Nandurbar come under West Khandesh whereas Jalgaon district comes under East Khandesh region. Khandesh is treated by Hooker & Thomson (1853) as a distinct subprovince botanically. It lies in the lower part of Tapi valley and is separated from Western Maharashtra by the valley of Godavari which mainly flows through the districts of Nasik, Ahmednagar, Aurangabad, Parbhani and Nanded. The other river which flows through Khandesh is Narmada, also going to Arabian sea westwards. Khandesh is situated between various parallel ranges of Satpudas which are extension of the spurs of the Sahyadris and lie in continuation with the trends of Vindhyas. The land is mostly flat, plain. The soils are alluvial on the banks. The whole of Khandesh stands at an elevation of 216 m and its hilly terrain rises a little (91m) higher to c 3.7 m alt. The valley of Khandesh rises gently towards west, there being mountains on its both sides, Ajantha and Satpudas. The rains though not heavy are well spread and continue for long. The subsoil water table is deep, the humidity lasts throughout the rainy season. Some important contributions pertaining to the flora of Khandesh were made by Karnik (1955, 1957, 1961, 1966), Moghe (1957), Mahabale & Karnik (1960) and Jain & Deshpande (1964). The flora is mostly of the deciduous type in the hills of Satpudas and is not much different from that in other parts of Maharashtra with similar geology, climate and rainfall. In many places in the plains there is dry scrub jungle or a dry thorn savannah but in the hill slopes of mountains, forests are wooded. On the slope of the hills in Dhule district, forests of *Anogeissus latifolia* and *Hardwickia binata* occur. According to Champion and

Seth (1968), the forests in Khandesh can be categorised as 'Dry Tropical Forests'. They can be subdivided as Southern tropical dry deciduous forests and southern tropical thorn forests.

I. Southern tropical dry deciduous forests :

This type of forests comprise mixed tree species which remain deciduous for several months during dry season. The upper canopy is closed, uneven and not dense. The height varies from 13-20 m. These forests are not rich species wise. The lower canopy also consists of deciduous species but evergreen species, if present are restricted to moist and sheltered situations. Shrubs are present. Bamboos are occasionally met with but do not have luxuriant growth. The climbers are few and woody. They can be further classified into the following subtypes.

a) Dry teak bearing forests :

The rainfall varies between 90-1300 mm. Soil is shallow, porous and clayey. Ground cover is scanty. Forest fires are frequent and grazing heavy. Seedling regeneration is usually absent. These are mixed forests where teak predominates. The dominant trees are *Anogeissus latifolia, Bombax ceiba, Boswellia serrata, Butea monosperma, Dalbergia latifolia, Diospyros chlororoxylum, Lagerstroemia parviflora, Lannea coromandelica, Sterculia urens, Tectona grandis,* etc. The other species occurring are *Acacia catechu, A. leucophloea, Hardwickia binata, Terminalia elliptica,* etc. The undergrowth consists of *Lantana camara* var. *aculeata.*

b) Southern dry-mixed deciduous forests :

Here the rainfall varies from 850-1100 mm. The percentage of teak is low. The thorny plants occur and increase in proportion to heavy grazing and fires. Bamboos are usually absent and climbers are few.

The top layer consists of *Aegle marmelos, Anogeissus latifolia, Ceriscoides turgida, Chloroxylon swietenia, Diospyros melanoxylon, Emblica officinalis, Haldina cordifolia, Lagerstroemia parviflora, Lannea coromandelica, Mitragyna parvifolia, Nyctanthes arbor-tristis, Ougeinia oojeinensis, Pterocarpus marsupium* var. *acuminatus, Soymida febrifuga, Terminalia elliptica, Ziziphus xylopyra,* etc. *Dendrocalamus strictus* occur only in hilly parts. The undergrowth consists of *Achyranthes aspera, Cassia auriculata, C. tora, Helicteres isora, Woodfordia fruticosa,* etc. Grasses like *Aristida funiculata, Heteropogon contortus, Mnesithea laevis, Themeda quadrivalvis,* etc. are seen. Straggling or scandent shrubs like *Caesalpinia decapetala,*

Calycopteris floribunda, etc. are also met with. The following two edaphic types are met within this type of forests :

1) *Boswellia* forests (12-15 m) : It occurs in places where forest fires are common and which makes the site drier. The undergrowth is scanty and grasses are low. *Boswellia serrata* dominates the area. Other trees like *Anogeissus latifolia*, *Lannea coromandelica*, *Soymida febrifuga*, *Sterculia urens*, etc. also occur.

2) *Hardwickia* forests : They are formed in shallow and gravelley soil. *Hardwickia binata* predominates and almost found in pure strands as seen in Pal (Jalgaon district). *Tectona grandis* is scattered. Other trees occurring are *Acacia catechu*, *Albizia amara*, *A. lebbeck*, *Ailanthus excelsa*, *Anogeissus latifolia*, *Azadirachta indica*, *Boswellia serrata*, *Butea monosperma*, *Dalbergia sisoo*, *Diospyros melanoxylon*, *Dolichandrone falcata*, *Sterculia urens*, etc. Grasses like *Cymbopogon martinii*, *Themeda quadrivalvis*, etc. occur.

II. Southern Tropical thorn forests

These forests occur in drier areas with low rainfall and in majority of cases are resultants of biotic factors such as illicit felling, illicit cultivation, excessive grazing, fire, etc. The natural forests disappear and those species which can withstand adverse conditions continue to survive or intrude in these areas. The soil becomes poor due to continuous erosion thereby resulting into stunted growth of the vegetation. The thorn forests comprise of hardy and thorny species. The density is low and plant height varies from 6 to 9 m. These forests are represented by a mixture of species with xerophytic characters. The dominant trees include *Acacia catechu*, *A. leucophloea*, *A. nilotica* ssp. *indica*, *Azadirachta indica*, *Balanites aegyptiaca*, *Bauhinia racemosa*, *Bridelia retusa*, *Dolichandrone falcata*, *Emblica officinalis*, *Flacourtia indica*, *Gardenia gummifera*, *Ziziphus rugosa*, etc. The growth of *Tectona grandis* and other tree species here is rather poor. Small trees of *Boswellia serrata*, *Capparis divaricata*, *C. grandis*, *Grewia tiliifolia*, *Maytenus senegalensis*, *Mimosa hamata*, *Rhus mysorensis*, etc. are abundant. The undergrowth consists of *Aristida redacta*, *Cassia auriculata*, *Cymbopogon martinii*, *Echinops echinatus*, *Heteropogen contortus*, *Mimosa hamata*, *Sorghum halepense*, *Themeda triandra*, etc. The further degradation of the forests give rise to southern thorn scrub. Here the percentage of thorny elements is more, vegetation is sparse and plants are more stunted (4 to 6 m). Bamboos (*Dendrocalamus strictus*), though stunted occur in these forests.

FLORA OF MARATHWADA

Marathwada region forms the part of the vast Deccan plateau. The total area of 64,798 sq km is bounded by the Vidarbha region on the north, by Andhra Pradesh on the east and south-east, by Karnataka on the south and by Western Maharashtra on the West. Major part of the region has deep black soil derived from the trap rock. The weather in general, can be said to be dry and moderately extreme. Relative humidity is extremely low for major part of the year (35-50%) while it is highest (85%) during the monsoon. The normal average rainfall is c 90 cm. The climate and flora of adjoining dry districts of Ahmednagar, Solapur and Akola have a strong influence on the climate and flora of Marathwada. Kannad ghat joins Marathwada to Khandesh. The plants of Ajantha are dry deciduous growing on hill slopes. They contain woody species such as *Anogeissus latifolia, Boswellia serrata, Dalbergia latifolia, Terminalia chebula*, etc. The species found in Kannad ghat are the same in Nasik and Khandesh districts. The characteristic plants of dry ghats are *Capparis horrida, Cochlospermum religiosum, Flacourtia montana* and also a few semi moist species such as *Moullava spicata* and *Thespesia lampas*. The plants of Kinwat consist of a few characteristic species of higher rainfall region, but the rest are all scrub as the rains last for a few days during a couple of months in rainy season, followed by a long dry spell. The vegetation of Marathwada can be conveniently divided into tropical dry deciduous forests, the open scrub jungles and vast tracts of grasslands (Naik, 1998).

Tropical Dry deciduous forests :

It is characterised by tree species like *Anogeissus latifolia, Boswellia serrata, Buchanania lanzan, Dalbergia latifolia, Holarrhena pubescens, Lannea coromandelica, Tectona grandis, Terminalia bellirica, T. chebula, T. cuneata, Wrightia tinctoria*, etc. In addition to these there are many subdominant tree species like *Azadirachta indica, Ailanthus excelsa, Aegle marmelos, Bauhinia racemosa, Bridelia stipularis, Butea monosperma, Capparis grandis, Cordia macleodii, Dalbergia sisoo, Dolichandrone falcata, Lagerstroemia parviflora, Syzygium cumini*, etc.

A few trees like *Acacia chundra, A. leucophloea, Annona squamosa, Flacourtia indica* and bushy shrubs like *Helicteres isora, Maytenus senegalensis, Rhus mysorensis, Securinega leucopyrus*, etc. are found. Straggling shrubs like *Capparis decidua , C. sepiaria*, etc. are also seen. Climbers like *Cocculus hirsutus, Cryptolepis buchanani, Dioscorea bulbifera, Hemidesmus indicus, Wattakaka volubilis*, etc. occur. Some of the common herbs include

Achyranthes aspera, Aeschynomene indica, Alysicarpus bupleurifolius, Apluda mutica, Blepharis repens, Cassia pumila, Chrysopogon fulvus, Dichanthium pertusum, Polygonum plebeium, Rostellularia diffusa var. prostrata, Setaria intermedia, Sida acuta, S. cordata, Triumfetta rhomboidea, etc.

Open scrub jungles :

The dominants among these include *Acacia chundra, Carissa congesta, Dichrostachys cinerea var. indica, Euphorbia ligularia, Maytenus senegalensis, Securinega leucopyrus, Ziziphus oenoplia, etc. Climbers like Clematis heynei, Jasminum auriculatum, Rivea hypocrateriformis, Wattakaka volubilis,* etc. forms cover.

Grasslands :

The grasses and other herbs are interspersed with fire resistent trees and shrubs such as *Butea monosperma, Canthium coromandelicum, Rhus mysorensis, etc. Dominant grasses are Alloteropsis cimicina, Andropogon pumilus, Aristida funiculata, Chrysopogon fulvus, Dichanthium foveolatum, Dinebra retroflexa, Eragrostis viscosa, Iseilema anthephoroides, Sehima nervosum, S. sulcatum, Themeda quadrivalvis, Urochloa ramosa,* etc.

FLORA OF VIDARBHA

Vidarbha stands on an upland plateau having nearly 457-549 m elevation above m.s.l. It is a continuous stretch of land with black cotton soils derived from the Deccan Trap basalt. The major rivers of this region are Wardha, Penganga, Katepurna and Purna. The climate of Vidarbha is hot and dry (Kamble & Pradhan, 1988). Nagpur is famous for its oranges throughout India. A variety of cereals *(Hordeum vulgare, Oryza sativa, Setaria italica,* etc.), pulses *(Cajanus cajan, Lablab purpureus, Pisum sativum, Vigna* spp., etc.), oil seeds *(Arachis hypogea, Brassica* spp., *Sesamum orientale,* etc.) and a host of vegetables (*Brassica* spp.), condiments *(Emblica officinalis),* narcotics *(Nicotiana tabacum),* fruits and *Saccharrum officinarum* are being cultivated here. The vegetation is dry deciduous with occassional patches of moist deciduous species. *Tectona grandis* plantations are found in almost all districts. *Anogeissus latifolia* and *Haldina cordifolia* occur thoughout (Karthikeyan & Anandkumar, 1993). In Chandrapur and Gadchiroli the vegetation is comparatively rich as the flora of Bastar district influence it (Malhotra and Moorthy, 1974). The growth of teak is luxuriant.

According to Champion and Seth, the forests of this region can be classified into two main types 1) Moist tropical forests (South Indian moist deciduous forests) and 2) Dry tropical forests.

1) South Indian Moist deciduous forests :

These are found in Bhandara, Chandrapur and Gadchiroli districts. They can be further divided into the following:

i) Moist teak bearing forests :

The top canopy consists of trees like *Acacia catechu, Albizia spp., Bombax ceiba, Careya arborea, Dalbergia latifolia, Diospyros chloroxylon, Haldina cordifolia, Lagerstroemia parviflora, Madhuca longifolia var. latifolia, Mitragyna parvifolia, Pterocarpus marsupium, Stereospermum colais, Tamarindus indica, Terminalia elliptica, T. paniculata,* etc. The middle layer consists of *Cleistanthus collinus, Careya arborea, Diospyros montana, Emblica officinalis, Grewia tiliifolia, Ixora pavetta, Schleichera oleosa, Tectona grandis, Xylia xylocarpa,* etc.

Dendrocalamus strictus is the only bamboo occurring in these forests. The undergrowth (ground flora) consists of *Apluda mutica, Arundinella pumila, Chloris barbata, Helicteres isora, Heteropogon contortus, Imperata cylindrica, Indigofera spp., Petalidium barlerioides, Pogostemon plectranthoides, Rostellularia japonica, Sorghum halepense, Urena lobata,* etc. Climbers like *Bauhinia vahlii, Calycopteris floribunda, Cissus* spp., *Combretum roxburghii, Dioscorea pentaphylla,* etc. are found.

ii) Southern moist mixed deciduous forests :

The top canopy consists of *Albizia procera, Bombax ceiba, Butea monosperma, Dillenia pentagyna, Lagerstroemia microcarpa, Strychnos nux-vomica, Terminalia cuneata, T. elliptica, T. paniculata,* etc. The middle layer consist of Allophylus serratus, *Aporosa lindleyana, Callicarpa tomentosa, Ixora brachiata, Trema orientalis,* etc. The ground layer consists of species of Acanthaceae, Malvaceae, Lamiaceae, etc. Bamboos occur in wet areas. Climbers and lianas like *Bauhinia vahlii, Caesalpinia mimosoides, Dalbergia volubilis, Tinospora sinensis,* etc. are seen.

2) Dry Tropical forests :

They can be subdivided into two types :

i) Scrub forests :

These are found in Akola district in the areas of rivulets, streams and some plains and the area is covered with open grassland with few

scattered shrubs, and trees. Stunted small trees occurring here are *Acacia nilotica* ssp. *indica, Balanites aegyptiaca, Capparis decidua, Dichrostachys cinerea* var. *indica, Dolichandrone falcata, Mimosa hamata, Ziziphus mauritiana,* etc. Common shrubs include *Canthium parviflorum, Cassia auriculata, Morinda pubescens, Ziziphus oenoplia, Z. nummularia,* etc. In addition, some typical members of deciduous forests like *Bombax ceiba, Butea monosperma, Diospyros melanoxylon, Tectona grandis,* etc. are also found in scrub forests; though much smaller. The herbaceous species of grasslands include *Alysicarpus scariosus, A. tetragonolobus, Apluda mutica, Arthraxon lanceolatus, Blepharis repens, Boerhavia diffusa, Cassia pumila, Cyanotis fasciculata, C. tuberosa, Cyperus* spp., *Desmodium triflorum, Dichanthium pertusum, Digitaria* spp., *Iseilema anthephoroides, Lagascea mollis, Lophopogon tridentus, Melanocenchris jacquemontii, Sehima nervosum, Sopubia delphinifolia, Striga gesnerioides, Trichodesma indicum, Urochloa panicoides, Zornia diphylla,* etc. There are some tall grasses like *Chrysopogon fulvus, Cymbopogon martinii, Heteropogon triticeous, Themeda quadrivalvis,* etc.

ii) Southern tropical dry deciduous forests :

This type is found in Akola, Buldhana, Wardha and Yavatmal districts. The common tree species are *Acacia leucophloea, Aegle marmelos, Anogeissus latifolia, Bombax ceiba, Boswellia serrata, Bridelia retusa, Buchanania lanzan, Diospyros melanoxylon, Emblica officinalis, Lagerstroemia parviflora, Madhuca longifolia* var. *latifolia, Mitragyna parvifolia, Nyctanthes arbor-tristis, Semecarpus anacardium, Soymida febrifuga, Tectona grandis, Terminalia bellirica, T. cuneata, T. elliptica,* etc. Small tees such as *Acacia pennata, Bauhinia purpurea, Butea monosperma, Cassia fistula, Cassine glauca, Chloroxylon swietenia, Eriolaena hookeriana, Morinda pubescens, Wrightia tinctoria* ssp. *rothii, Ziziphus mauritiana, Z. xylopyra,* etc. commonly occur.

Shrubs and undershrubs such as *Abutilon indicum, Aeschynomene indica, Baliospermum montanum, Barleria prionitis, Calotropis gigantea, Crotalaria hirta, Dichrostachys cinerea* var. *indica, Echinops echinatus, Grewia abutilifolia, G. hirsuta, Maytenus senegalensis, Mimosa hamata, Peristrophe paniculata, Sida mysorensis,* etc. are often met within this type.

Climbers both shrubby and herbaceous are quite common in these areas. They consists of *Basella rubra, Butea superba, Cajanus platycarpus, Canavalia virosa, Capparis zeylanica, Cardiospermum halicacabum, Cayratia trifolia, Cissus vitiginea, Clitoria ternatea, Coccinia grandis, Cocculus hirsutus, Ctenolopis garcinii, Dioscorea bulbifera, Diplocyclos palmatus, Gloriosa superba,*

Hemidesmus indicus, Ipomoea hederifolia, I. obscura, I. pestigridis, Jacquemontia paniculata, Momordica dioica, Mucuna pruriens, Mukia maderaspatana, Paracalyx scariosa, Pergularia daemia, Rivea hypocrateriformis, Teramnus labialis, Tinospora cordifolia, Trichosanthes cucumerina, Vigna aconitifolius, etc.

The herbs which frequently occur are *Acalypha malabarica, Ammannia multiflora, Andrographis paniculata, Biophytum sensitivum, Boerhavia diffusa, Caesulia axillaris, Cyathocline purpurea, Desmodium gangeticum, Dicliptera verticillata, Emilia sonchifolia, Evolvulus alsinoides, Exacum pedunculatum, Fimbristylis complanata, Indifgofera cordifolia, Polygonum glabrum, Rungia elegans, Sida spp., Tridax procumbns, Vicoa indica,* etc. Grasses are common in this type of forests either as undergrowth or in open places wherever a little moisture is available. Some of the common species are *Alloteropsis cimicina, Andropogon pumilis, Apluda mutica, Aristida redacta, Arthraxon hispidus, Brachiaria eruciformis, Chionachno koenigii, Chloris virgata, Chrysopogon fulvus, C. polyphyllus, Coix lacryma-jobi, Cymbopogon martinii, Cynodon dactylon, Dactyloctenium aegyptium, Dichanthium annulatum, D. aristatum, D. pertusum, Digitaria ciliaris, D. stricta, Eragrostis japonica, E. pilosa, E. tenella, Heteropogon contortus, Ischaemum pilosum, I. rugosum, Isilema anthephoroides, I. laxum, Melanocenchris jacquemontii, Oryza rufipogon, Panicum psilopodium, Sehima nervosum, S. sulcatum, Setaria intermedia, S. pumila, Sorghum halepense, Sporobolus capillaris, S. coromandelianus, S. indicus* var. *flaccidus, Thelepogon elegans, Themeda laxa, Tragus roxburghii, Urochloa panicoides, U. reptans, Vetiveria zizanioides,* etc.

The common parasite found in these areas is *Cuscuta reflexa.*

The climax types under this are :

a) Dry teak bearing forest :

These are found in Yavatmal district. It consists of teak and other dry deciduous elements mixed. The trees which commonly occur in these areas are *Anogeissus latifolia, Bridelia retusa, Cleistanthus collinus, Emblica officinalis, Ficus amplissima, F. hispida, Gardenia latifolia, Kydia calycina, Lagerstroemia parviflora, Mallotus philippensis, Moringa concanensis, Pterocarpus marsupium, Semecarpus anacardium, Strychnos potatorum, Tectona grandis, Terminalia cuneata, T. elliptica,* etc.

The second storey is formed by *Acacia chundra, Antidesma acidum, Bauhinia malabarica, B. racemosa, Bridelia retusa, Butea monosperma, Cassia fistula, Coriscoides turgida, Diospyros chloroylon, Ixora arborea, Sterculia urens,* etc. Some of the common shrubs and undershrubs are *Anisomeles indica, Cassia tora, Cissus woodrowii,*

Desmodium velutinum, Dichrostachys cinerea var. *indica, Grewia hirsuta, Helicteres isora, Indigofera cassioides, Leea macrophylla, Maytenus senegalensis, Woodfordia fruticosa,* etc.

Some of the most commonly occurring herbs are *Acalypha lanceolata, Barleria cristata, Blumea eriantha, B. membranacea, Canscora decussata, Cassia pumila, Chrozophora rottleri, Chrysanthellum indicum, Colocasia esculenta, Commelina attenuata, C. hasskarlii, Crotalaria hebecarpa, C. pusilla, Curculigo orchioides, Curcuma pseudomontana, Cyperus alulatus, Desmodium triflorum, Elytraria acaulis, Enicostema axillare, Eriocaulon dianae, Fimbristylis ovata, Flemingia nana, Hedyotis nagporensis, Indoneesiella echioides, Iphigenia indica, Knoxia sumatrensis, Leucas cephalotes, Orthosiphon pallidus, O. rubicundus, Pycreus pumilis, Rostellularia japonica, Rungia pectinatum, Sauromatum pedatum, Scilla hyacinthina, Thecagonum ovatifolium, Tylophora fasciculata, Uraria alopecuroides, U. rufescens, Vicoa indica,* etc.

Some of the common grasses are *Chrysopogon polyphyllus, Dichanthium huegelii, Echinochloa colona, Eragrostiella bifaria, Eragrostis gangetica, E. unioloides, Hemarthria compressa, Mnesithea granularis, Ophiuros exaltatus, Oplismenus burmannii, Rottboellia cochinchinensis, Saccharum spontaneum, Urocholoa remota, U. reptans,* etc.

Some of the climbers found in this type of forest are *Ampelocissus latifolia, A. tomentosa, Aspidopterys cordata, Dioscorea wallichii, Luffa acutangula, Olax scandens, Rhynchosia minima, Trichosanthes tricuspidata, Ventilago denticulata,* etc.

Parasite encountered in this type is *Cassytha filiformis.* Epiphytic orchids like *Vanda tessellata* occur. The bamboo, *Dendrocalamus strictus* occurs in abundance in patches.

b) Southern dry mixed deciduous forests :

There is a concentration of thorny species in this type. Availability of grasses and plants useful as fodder is more and consequently grazing is heavy. This forest type occurs in Bhandara, Chandrapur, Gadchiroli, Nagpur and Yavatmal. The common trees of this type include *Acacia farnesiana, A. tomentosa, Aegle marmelos, Ailanthes excelsa, Albizia lebbeck, A. odoratissima, Anogeissus latifolia, Boswellia serrata, Dalbergia latifolia, Diospyros melanoxylon, Dolichandrone falcata, Haldina cordifolia, Lannea coromandelica, Mitragyna parvifolia, Schrebera swietenioides, Soymida febrifuga, Sterculia urens, Tectona grandis, Terminalia bellirica, T. chebula, T.*

elliptica, etc. The small trees found are *Acacia torta, Balanites aegyptiaca, Bauhinia racemosa, Butea monosperma, Catunaregam spinosa*, etc.

The common shrubs and undershrubs include *Abutilon indica, Anisomeles indica, Dodonaea viscosa, Hyptis suaveolens, Maytenus senegalensis, Petalidium barlerioides, Phyllanthus reticulatus, Triumfetta rhomboidea, Ziziphus nummularia*, etc.

Herbs abound in this type. Some of the common herbs are *Alysicarpus hamosus, Argemone mexicana, Blainvillea acmella, Caesulia axillaris, Commelina benghalensis, Crotalaria hebecarpa, Cyathocline purpurea, Desmodium gangeticum, Eranthemum roseum, Eriocaulon quinquangulare, Exacum pedunculatum, Fuirena wallichiana, Glossocardia bosvallea, Goniocaulon indicum, Ipomoea eriocarpa, Mollugo pentaphylla, Orthosiphon rubicundus, Phyla nodiflora, Rostellularia diffusa* var. *prostrata, Rungia pectinata, Sclerocarpus africanus, Sopubia delphinifolia, Spermacoce articularis, Tribulus terrestris, Xenostegia tridentata, Zornia gibbosa*, etc.

Some of the common grasses are *Aristida setacea, Arthraxon lancifolius, Chloris dolichostachya, Chysopogon fulvus, Cynodon dactylon, Dichanthium foveolatum, D. kuntzeana, D. pertusum, Dinebra retroflexa, Eragrostiella brachyphylla, Eragrostis aspera, E. coarctata, E. tenella, E. tremula, E. viscosa, Ophiuros exaltatus, Oplismenus burmannii, Perotis indica, Setaria verticillata, Sporobolus capillaris, Themeda quadrivalis, Urochloa ramosa, U. reptans*, etc.

Climbers occurring here are *Colastrus paniculatus, Combretum albidum, Cryptolepis buchananii, Dioscorea hispida, Jasminum auriculatum, Oxystelma secamone, Rhynchosia aurea, Tragia plukenetii, Wattakaka volubilis*, etc. Dendrocalamus strictus occurs on hilly parts. *Dendrophthoe falcata* is a parasite found in this type of forests.

EDAPHIC TYPES :

i) Babul forests :

These occur on black cotton soils, in parts of Akola, Amravati and Buldhana districts where *Acacia nilotica* ssp. *indica* predominates and often found in pure stands.

ii) Harwickia forests.

These occur in Botha forests (Buldhana district). *Hardwickia binata* predominates and is almost found in pure strands.

iii) Butea forests :

These forests occur on clayey and ill drained soils, frequently found in pure strands in Chandrapur and Bhandara districts. The trees are stunted.

STATISTICAL ANALYSIS

The comprehensive Flora of Maharashtra as such has not been compiled earlier. The most important work available so far dealing with Flora of Maharashtra was Cooke's 'Flora of the Presidency of Bombay' (1901-1908). Talbot (1909 & 1911) also studied the region thoroughly and supplemented Cooke's work.

The major lacuna in Cooke's Flora is that some regions of present day Marathwada and Vidarbha have not been included. He has described 147 families, 999 genera, 2513 species and 162 varieties. Even up to 1978, 7, genera, 715 species, 4 subspecies, 104 varieties and 5 formas have been added to Cooke's Flora (Karthikeyan et al. 1981). The former Bombay Presidency included parts of Gujarat, Maharashtra, Goa, Karnataka and Sind. Cooke (op. cit.) recorded from Maharashtra alone, 139 families, 849 genera, 1938 species and 94 varieties of wild species (See table IV).

Table IV.

GROUP	Cooke's Flora (1901-1908)				Present Work						
	Families	Genera	Sp.	varieties	Families	Genera	Sp.	Ssp.	Varieties	subvar.	formas
DICOTYLEDONES	116	689	1469	82	153	832	2123	18	107		1
MONOCOTYLEDONES	23	160	469	12	34	249	902	3	38	1	1
TOTAL	139	849	1938	94	187	1081	3025	21	145	1	2

Recently 'Flora of Maharashtra State: Monocotyledones' (Lakshminarasimhan in Sharma et al. 1996) and 'Vol. 1 of Flora of Maharashtra' from Ranunculaceae to Connaraceae comprising of 614 species by M.R.. Almeida (1996) have been published.

It has been estimated that at present, the Flora of Maharashtra State is composed of 187 families, 1081 genera, 3025 species, 21 subspecies, 145 varieties, 1 subvariety and 2 formas which occur in wild (see table IV). These figures may vary slightly as the exact position will be clear only after the publication of Vol. 2 of Dicots. Nearly 780 species, 6 subspecies, 77 varieties, 1 subvariety and 2 formas have been recorded as new since publication of Cooke's Flora. Further, 1045 species, 14 subspecies and 18 varieties have undergone name changes.

Besides 844 cultivated species have been recorded from the state. This brings a total of 3869 species for Maharashtra state. The increase in the number of families is due to the changed concepts and addition of families viz., Petiveriaceae and Hydatellaceae. There are 41 families with one genus and 1 species in wild.

The 10 largest families in Maharashtra according to number of genera and species is given in tables V and VI respectively.

Table V : Ten Largest Families of Flowering Plants in Maharashtra according to number of genera

1.	POACEAE	104
2.	FABACAE (LEGUMINOSAE)	76
3.	ASTERACEAE	57
4.	ACANTHACEAE	40
5.	RUBIACEAE	38
6.	ORCHIDACEAE	34
7.	EUPHORBIACEAE	34
8.	ASCLEPIADACEAE	25
9.	SCRUPHULARIACEAE	24
10.	LAMIACEAE	22

Table VI: Ten Largest Families of Flowering Plants in Maharashtra according to number of species (includes infraspecific taxa).

1.	POACEAE	373
2.	FABACAE (LEGUMINOSAE)	364
3.	CYPERACEAE	174
4.	ACANTHACEAE	131
5.	ASTERACEAE	116
6.	ORCHIDACEAE	114
7.	EUPHORBIACEAE	111
8.	RUBIACEAE	89
9.	LAMIACEAE	80
10.	SCROPHULARIACEAE	66

MANGROVES OF MAHARASHTRA

Mangroves are the characteristic littoral plant formations of sheltered, low-lying, tropical and subtropical coasts (WCMC, 1992). They are also known as tidal forests, are estuarine wetlands and are among the world's largest such formations (Untawale & Jagtap, 1998).

Several adaptations evolved in mangroves, makes them absolutely unique and of immense interest to academics and researchers. In Maharashtra, although the mangroves are degraded, luxuriant pockets can still be found. According to State of Forest Report, 1997 the total area in India under mangrove habitat is 4,827 sq km and that of Maharashtra is 124 sq km. Mangroves of Maharashtra are located mainly in estuarine parts along the coasts of Greater Bombay, Raigad, Ratnagiri, Sindhudurg and Thane. According to Banerjee et al. (1989), the mangroves can be classified into the following three main types.

Typical Mangroves :

All along the coast line, there are tidal swamps and mud flats mostly covered by mangroves. *Avicennia marina, A. offinalis, Ceriops tagal, Rhizophora mucronata, Sonneratia apetala* and *S. caseolaris* are the common species. The other species which are infrequently found include *Avicennia alba, A. marina* var. *acutissima, Bruguiera cylindrica, B. gymnorrhiza, B. parviflora, Kandelia candel, Lumnitzera littorea, L. racemosa* and *Rhizophora apiculata.*

Semi-Mangroves :

Aegiceras corniculatum and *Excoecaria agallocha* are commonly occurring along the sheltered intertidal banks of creeks and channels in mangrove forests.

Mangrove associates :

These are not strictly mangroves but are usually associated with them. They are of two types : i) species such as *Acanthus ilicifolius, Dalbergia spinosa, Derris scandens, D. trifoliata, Xylocarpus granatum,* etc. along the banks of creeks and in salt marshes ii) A few species such as *Barringtonia racemosa, Caesalpinia bonduc, C. crista, Clerodendrum inerme, Fimbristylis ferruginea, Hibiscus tiliaceus, Hyphaene dichotoma, Ipomoea pes-caprae, Pandanus odoratissimus, Salvadora persica* var. *wightiana, Thespesia populnea, Vitex trifolia, Wedelia biflora,* etc. are usually seen in parts of tidal swamps under fresh water conditions or along coastal regions.

Halophytes : are plants which have adapted to high salinity. They have specialised themselves in avoiding salt in the vicinity, at least in avoiding ill effects of salt stress. Some halophytes can also withstand water stress, hence they could grow in arid saline lands. A few examples of halophytes occurring in the state are *Aeluropus lagopoides, Arthrocnemum indicum, Cressa cretica, Hygrophila serpyllum, Indigofera oblongfolia, Salicornia brachiata, Schoenoplectus litoralis, Sesuvium portulacastrum, Spinifex littoreus, Suaeda maritima, S. monoica, S. nudiflora, Tamarix troupii,* etc.

Vast areas of mangroves are being destroyed either directly or as a secondary result of other activities.

Mangroves are a rich ecosystem. The habitat of mangroves is extremely conducive to numerous forms of life. Mangroves stabilise shorelines and decrease coastal erosion. They act as wind breaks and protection from coastal storms forming self-repairing barrier (WCMC, 1992). Mangroves are mainly exploited for timber and used in minor constructions by rural comunities.

Various biotic factors, viz., overgrazing, over exploitation, chemical hazards, industrialisation and urbanisation in port areas have affected the mangroves. As this ecosystem is a unique system the need for conserving this type is felt intensively. Programmes have been initiated to study, conduct research, cultivate and propagate mangroves and to devise practices for the management of mangrove ecosystems. Maharashtra has declared mangrove species as protected by law. Mangrove parks are being designed in Goa and Maharashtra.

AQUATIC ANGIOSPERMS OF MAHARASHTRA

Aquatic vegetation has profound influence on the nutrient budget of the aquatic ecosystems and their hydrological balance. Subramanyam (1962) made a major contribution to the knowledge of aquatic vegetation of India as a whole. As far as Maharashtra is concerned, excepting for Mirashi (1954, 1957, 1958) who has concentrated mainly in and around Nagpur district, other works (Puri & Mahajan, 1958; Vartak, 1958 and Gudet, 1963) however, do not help much in assessing the exact extent of aquatic angiosperms of Maharashtra. Karthikeyan et al. (1982) have prepared an inventory of hydrophytic flowering plants occurring in Maharashtra. They have reported 279 species, 4 subspecies and 12 varieties of hydrophytic angiosperms. The aquatic vegetation can be broadly classified into the following categories adapted with modifications after Maheshwari (1960).

Free floating hydrophytes

These are plants that are in contact with water and air only. The following are some of the plants belonging to this category.

Eicchornia crassipes, Hygroryza aristata, Ipomoea aquatica, Lemna gibba, L. perpusilla, L. trisulca, Myriophyllum oligantham, M. tuberculatum, Nelumbo nucifera, Pistia stratiotes, Spirodela polyrhiza, Trapa natans var. *bispinosa, Utricularia exoleta, Wolffia arrhiza*, etc.

Suspended hydrophytes

These are rootless, submerged hydrophytes that are in contact with water only. *Ceratophyllum demersum* comes in this category.

Attached submerged hydophytes

These are entirely or at least to the most part, in contact with soil and water. The following are some plants belonging to this category.

Blyxa aubertii, B. echinosperma, B. octandra, Butomopsis latifolia, Cryptocoryne retrospiralis, C. spiralis, Elatine triandra, Eriocaulon setaceum, Hydrilla verticillata, Lagarosiphon alternifolia, Limnophyton obtusifolium, Limnophila aquatica, L. indica, Najas graminea, N. indica, Neptunia oleracea, Nymphaea nouchali, N. pubescens, Nymphoides aurantiaca, N. indica, N. parviflora, Potamogeton crispus, P. nodosus, P. pectinatus, P. perfoliatus, Pseudoraphis spinesceas, Sagittaria guayanensis ssp. *lappula, S. trifolia, Utricularia stellaris, Vallisneria spiralis,* etc.

Attached hydrophytes with floating leaves

These are in contact with soil, water as well as air. The following are some plants belonging to this category.

Aponogeton echinatus, A. natans, A. satarensis, Nymphoides hydrophylla, Ottelia alismoides, Oxystelma secamone, Paspalidium flavidum, P. geminatum, etc.

Wetland hydrophytes

These are rooted in the soil that is usually saturated with water, at least in the early part of their life. The following plants belong to this category.

Aeschynomene aspera, A. indica, Alternanthera sessilis, Ammannia baccifera, ssp. *baccifera, A. baccifera* ssp. *aegyptiaca, A. multiflora, A. senegalensis, Bacopa monnieri, Burmannia coelestis, Caesulia axillaris, Canscora decurrens, C. pauciflora, Centaurium centaurioides, Centipeda minima, Chrozophora prostrata, C. rottleri, Coelachne minuta, C. perpusilla, C. simpliciuscula, Coix aquatica, C. gigantea, C. lacryma-jobi, Crinum viviparum, Cyathocline lutea, C. purpurea, Cyperus articulatus, C. compressus, C. corymbosus, C. digitatus, C. distans, C. exaltatus, C. halpan, C. iria, C. nutans* var. *nutans, C. nutans* var. *eleusinodes, C. tenuispica, Dopatrium junceum, Drosera indica, Echinochloa colona, E. crusgalli, E. frumentacea, E. stagnina, Eclipta prostrata, Eleocharis acutangula, E. atropurpurea, E. dulcis, E. geniculata, Enhydra fluctuans, Epaltes divaricata, Eragrostis gangetica, E. japonica, E. unioloides, Eriocaulon breviscapum, E. cinereum, E. cuspidatum, E. eurypeplon, E. hamiltonianum, E. heterolepis, E. lanceolatum, E. margaretae, E.*

minutum, E. nepalense, E. odoratum, E. quinquangulare, E. santapaui, E. sexangulare, E. stellulatum, E. trilobum, E. truncatum, E. tuberiferum, E. xeranthemum, Eriochloa procera, Fimbristylis aestivalvis, F. argentea, F. bis-umbellata, F. complanata, F. dichotoma, F. ferruginea, F. microcarya, F. ovata, F. schoenoides, F. sieberiana, F. tenera, F. tetragona, F. woodrowii, Floscopa scandens, Fuirena ciliaris, Geissaspis cristata, Glinus lotoides, Glossostigma diandrum, Grangea maderaspatana, Heliotropium indicum, H. supinum, Hydrolea zeylanica, Hygrophila auriculata, H. pinnatifida, H. polysperma, H. salicifolia, H. serpyllum, Indocourtoisia cyperoides, Isachne elegans, I. miliacea, Ischaemum rugosum, Jansenella griffithiana, Juncellus alopecuroides, J. laevigatus, J. pygmaeus, Kyllinga nemoralis, K. squamulata, Lagenandra ovata, Limnophila repens, L. rugosa, L. sessiliflora, Lindernia anagallis, L. hyssopioides, L. oppositifolia, L. parviflora, Lipocarpha chinensis, L. sphacelata, Lobelia alsinoides, Ludwigia adscendens, L. hyssopifolia, L. octovalvis ssp. *sessiliflora, L. perennis, L. prostrata, Mariscus ferax, M. paniceus* var. *roxburghianus, Monochoria hastata, M. vaginalis, Oryza rufipogon, Panicum paludosum, P. repens, Paspalidium punctatum, Paspalum scrobiculatum, Pennisetum hohenackerii, Persicaria barbata* var. *barbata, P. barbata* var. *gracilis, P. barbata* var. *stagnina, P. pulchera, P. salicifolia, Phragmites vallatoria, Phyla nodiflora, Phyllanthus lawii, Pogostemon salicifolius, P. stellatus, Polygonum plebeium, Pycreus flavescens, P. flavidus, P. macrostachyos, Rhynchospora corymbosa, Rorippa indica, Rostellularia quinquangularis, Rotala densiflora, R. indica, R. occultiflora, R. ritchiei, R. rotundifolia, R. serpyllifolia, R. verticillaris, Saccharum spontaneum, Sacciolepis indica, S. interrupta, S. myosuroides, Salix tetrasperma, Schoenoplectus articulatus, S. grossus, S. lateriflorus, S. litoralis, S. roylei, Scirpus tuberosus, Sesbania bispinosa, Sphaeranthus indica, Sphenoclea zeylanica, Stemodia viscosum, Tonningia axillaris, T. cucullata, Typha angustifolia, Utricularia aurea, U. graminifolia, U. purpurascens, U. reticulata, U. scandens, U. uliginosa, Veronica anagallis-aquatica, Wahlenbergia marginata, Wiesneria triandra, Xyris indica,* etc.

The following members of Podostemaceae occur on rocks in running streams.

Cladopus hookerianus, Dalzellia ceylanica, Polypleurum dichotomum, P. stylosum, Zeylanidium lichenoides and *Z. subulatum.*

The plants occurring along wet banks/ margins of rivers, ponds, streams, or water logged areas or rocky crevices along water courses or river beds include *Barringtonia acutangula, B. racemosa, Bergia ammannioides, Cerbera manghas, Coldenia procumbens, Homonoia retusa, H. riparia, Peplidium maritimus, Rotula aquatica, Ruppia maritima, Tamarix dioica, T. ericoides, T. troupii,* etc.

Saline plants

The following are some plants occurring along sea coast and in salt marshes. *Acanthus ilicifolius, Aegiceras corniculatus, Aeluropus lagopoides, Avicennia marina, A. officinalis, Bruguiera cylindrica, B. parviflora, Ceriops tagal, Excoecaria agallocha, Kandelia candel, Lumnitzera racemosa, Rhizophora apiculata, R. mucronata, Salicornia brachiata, S. nudiflora, Sesuvium portulacastrum, Sonneratia apetala, S. caseolaris, Zannichellia palustris,* etc.

WEEDS OF MAHARASHTRA

(*S. Moorthy & P. Lakhminarasimhan*)

Weed is a plant that interferes with human intentions. The term 'weed' was first coined by Jethro Tull (1731). Moore (1954) has defined weed as a plant which interferes with man's utilisation of land for a specific purpose. A weed in general is a 'plant out of place' (Tadulingam & Venkatanarayana, 1955). They are plants which are not wanted where they are growing. The classified category of weed was not separated before agriculture and probably the category of weeds emerged along with the crops. Man played a key role in the distribution of weeds. Unlike other plants, weeds are capable of growing everywhere (Kaul, 1986). Weeds are the biggest competitors for the economic crops, lawn grasses and open places left for beautification (Sen, 1981). They cause tremendous loss to crop production. Although, weeds are usually undesirable plants, they are useful in many cases as fodder for animals, food or medicine for man and also as ornamentals.

Weeds are generally classified based on their habitat viz., weeds of cultivated crop fields, fallow fields or harvested fields, etc. There are some categories of weeds which can be termed as 'Special weeds' because of some special characteristic features they possess. Under this category come parasites, epiphytes, poisonous, aquatic weeds, etc. However, it has been observed that a particular weed is not specific to any particular habitat or crop. Thus the weeds of cultivated fields are not further classified into weeds of paddy fields, wheat fields, etc. Besides seedlings of tree species like *Azadirachta indica, Ficus racemosa, F. religiosa,* etc. are of common occurrence along the cracks of walls, wells, open stairs, walls, roofs, etc. The following are some of the common weeds occurring in different habitats of Maharashtra state, like cultivated fields including bunds, fallow and harvested fields, along the rail–tracks, road-sides, hedges, waste places, in gardens and orchards on old walls and roof tops, etc.

Abelmoschus manihot ssp. *tetraphyllus* var. *megaspermus*, *Abutilon indicum*, *A. pannosum*, *Acalypha ciliata*, *A. indica*, *Acanthospermum hispidum*, *Achynanthes aspera*, *Aerva lanata*, *Ageratum conyzoides*, *Alloteropsis cimicina*, *Alternanthera pungens*, *A. sessilis*, *A. tenella*, *Alysicarpus bupleurifolius*, *A. hamosus*, *A. monilifer*, *A. pubescens* var. *pubescens*, *A. pubescens* var. *vasavadae*, *A. scariosus*, *A. tetragonolobus*, *A. vaginalis*, *Amaranthus cruentus*, *A. graecizans* ssp. *thellungianus*, *A. spinosus*, *A. tenuifolius*, *A. tricolor*, *A. viridis*, *Amberboa ramosa*, *Ammannia baccifera*, *A. multiflora*, *Anagallis arvensis*, *Apluda mutica*, *Aponogeton natans*, *Argemone mexicana*, *Argyriea nervosa*, *Aristida adscensionis*, *A. funiculata*, *Arthraxon lanceolatus* var. *meeboldii*, *Arudinella pumila*, *Asclepias curassavica*, *Asphodelus tenuifolius*, *Bacopa floribunda*, *B. hamiltoniana*, *B. monnieri*, *Barleria cristata* var. *cristata*, *B. cristata* var. *dichotoma*, *B. prionitis*, *Bergia ammannioides*, *B. capensis*, *Bidens biternata*, *Biophytum reinwardtii*, *B. sensitivum*, *Blainvillea acmella*, *Blepharis maderaspatensis*, *Blumea membranacea*, *Boerhavia diffusa*, *Brachiaria eruciformis*, *Buchnera hispida*, *Bulbostylis barbata*, *Caesalpinia pulcherrima*, *Caesulia axillaris*, *Cajanus scarabaeoides*, *Calotropis gigantea*, *Canscora decurrens*, *C. diffusa*, *Capsella bursa-pastoris*, *Cardiospermum halicacabum*, *Cassia absus*, *C. mimosoides*, *C. pumila*, *C. sericea*, *C. tora*, *Cassytha filiformis*, *Catharanthus rosea*, *Celosia argentea*, *C. cristata*, *Centaurium centauroides*, *Centella asiatica*, *Chenopodium album*, *C. ambrosioides*, *C. murale*, *Chicorium intybus*, *Chionachne semiteres*, *Chloris barbata*, *C. virgata*, *Chlorophytum laxum*, *C. tuberosum*, *Chrozophora prostrata*, *C. rottleri*, *Cicer arietinum*, *Cleome gynandra*, *C. monophylla*, *C. simplicifolia*, *C. viscosa*, *Clitoria ternatea*, *Coix lacryma-jobi*, *Coldenia procumbens*, *Commelina benghalensis*, *C. diffusa*, *C. forsskalaei*, *C. hasskarlii*, *C. subulata*, *Convolvulus arvensis*, *Conyza bonariensis*, *Corchorus aestuans*, *C. capsularis*, *C. fascicularis*, *C. olitorius*, *C. trilocularis*, *Cressa cretica*, *Crossandra infundibuliformis*, *Crotalaria albida*, *C. filipes*, *C. hebecarpa*, *C. hirta*, *C. medicaginea*, *C. nana*, *C. orixensis*, *C. prostrata*, *C. quinquefolia*, *C. retusa*, *Croton bonplandianus*, *Cryptolepis buchanani*, *Cryptostegia grandiflora*, *Cucumis callosus*, *Cullen corylifolia*, *Curcuma pseudomontana*, *Cuscuta chinensis*, *C. reflexa*, *Cyanotis cristata*, *C. fasciculata*, *Cyathocline purpurea*, *Cynarospermum asperrimum*, *Cynodon dactylon*, *Cynoglossum zeylanicum*, *Cyperus alulatus*, *C. compressus*, *C. corymbosus*, *C. difformis*, *C. halpan*, *C. iria*, *C. nutans* var. *nutans*, *C. nutans* var. *eleusinoides*, *C. pangorei*, *C. rotundus*, *C. tenuispica*, *Dactyloctenium aegyptium*, *Datura ferox*, *D. metel*, *D. stramonium*, *Dendrophthoe falcata*, *Dentella repens*, *Desmodium dichotomum*, *D. laxiflorum*, *D. triflorum*, *Dichanthium annulatum*, *D. caricosum*, *D. pertusum*, *Digera muricata*, *Digitaria ciliaris*, *D. stricta*, *D. ternata*,

Dinebra retroflexa, Diplachne fusca, Diplocyclos palmatus, Dipteracanthus patulus, D. prostratus, Dopatrium junceum, Duranta erecta, Dyschoriste nagchana, Echinochloa colona, E. stagnina, Echinops echinatus, Eclipta prostrata, Eichhornia crassipes, Elatostema cuneatum, Eleusine indica, Elytrophorus spicatus, Emilia sonchifolia, Enicostemma axillare, Epaltes divaricata, Eragrostiella bifaria, E. brachyphylla, Eragrostis aspera, E. ciliaris, E. gangetica, E. japonica, E. pilosa, E. tenella, E. unioloides, E. viscosa, Erigeron asteroides, Eriocaulon cinereum, E. dalzellii, E. heterolepis, E. margaretae, E. minutum, E. nepalense, E. quinquangulare, E. sexangulare, E. trilobum, Eruca sativa, Euphorbia coccinea, E. dracunculoides, E. elegans, E. geniculata, E. heterophylla, E. heyneana, E. hirta, E. laeta, E. notoptera, E. parviflora, E. perbracteata, E. prostrata, E. pulcherrima, E. thymifolia, E. tirucalli, Evolvulus alisinoides, Exacum pedunculatum, E. pumilum, E. tetragonum, Fagonia cretica, Fimbristylis aestivalis, F. bisumbellata, F. dichotoma, F. ferruginea, F. miliacea, F.tetragona, Flaveria trinervia, Fuirena ciliaris, F. wallichiana, Fumaria indica, Gantelbua urens, Geissaspis cristata, G. tenella, Gendarussa vulgaris, Glinus lotoides, G. oppositifolius, Gloriosa superba, Glossocardia bosvallea, Glossostigma spathulatum, Gnaphalum polycaulon, G. pulvinatum, Gomphrena celosioides, G. globosa, Goniocaulon indicum, Grangea maderaspatana, Haplanthodes neilgherryensis, H. tentaculatus, H. verticillatus, Hedyotis auricularia, H. corymbosa, Heliotropium indicum, H. ovalifolium, H. supinum, H. zeylanicum, Hemidesmus indicus, Heteropogon contortus, Hibiscus cannabinus, H. lobatus, H. trionum, Hoppea dichotoma, Hybanthus enneaspermus, Hydrolea zeylanica, Hygrophila auriculata, Hyptis suaveolens, Indigofera astragalina, I. cordifolia, I. glabra, I. glandulosa, I. linifolia, I. linnaei, I. prostrata, I. trifoliata, I. trita, Indocourtoisia cyperoides, Indoneesiella echioides, Ipomoea aquatica, I. cairica, I. carnea ssp. fistulosa, I. curassavica, I. eriocarpa, I. hederifolia, I. marginata, I. nil, Isachne elegans, Ischaemum indicum, I. pilosum, I. rugosum, Iseilema laxum, Jatropha glandulifera, J. gossipifolia, J. nana, Juncellus alopecuroides, J. pygmaeus, Justicia adhatoda, Kickxia ramosissima, Kyllinga brevifolia, K. nemoralis, K. tenuifolia, Lactuca remotiflora, Lagascea mollis, Lantana camara var. *aculeata, Launaea intybacea, L. procumbens, L. sarmentosa, Lavandula bipinnata, Leonotis nepetaefolia, Lepidagathis cristata, Leptochloa chinensis, Leucas aspera, L. cephalotes, L. indica, L. lavandulaefolia, L. stricta, L. urticaefolia, Limnophila indica, L. repens, L. sessiliflora, Limnophyton obtusifolium, Lindenbergia muraria, Lindernia ciliata, L. crustacea, L. estaminodiosa, L. multiflora, L. parviflora, Lipocarpha chinensis, L. sphacelata, Lobelia alsinoides, Lophopogon tridentatus, Ludwigia hyssopifolia, L. perennis, Malachra capitata, Malva parviflora,*

Malvastrum coromandelianum, Mariscus squarrosus, Martynia annua, Melanoconchrie jacquemontii, Melilotus indica, Melochia corchorifolia, Microchloa indica, Mirabilis jalapa, Mnesithea granularis, Mollugo cerviana, M. pentaphylla, Momordica charantia, Monochoria hastata, M. vaginalis, Mukia maderaspatana, Murdannia nudiflora, M. semiteres, Myriophyllum oliganthum, Najas graminea, N. indica, Neanotis foetida, N. lancifolia, N. montholoni, N. quadrilocularis, N. rheedei, Nepeta hindustana var. *woodrowii, Nicandra physaloides, Ocimum americanum, Ophiuros exaltatus, Opuntia elatior, Oropetium thomaeum, Ottelia alismoides, Oxalis corniculata, Panicum johnii, P. paludosum, P. trypheron, Parthenium hysterophorus, Paspalidium flavidum, Paspalum scrobiculatum, Pavonia odorata, P. zeylanica, Pedalium murex, Pennisetum pedicellatum, Pentanema indica, Peplidium maritimum, Pergularia daemia, Peristrophe paniculata, Phalaris minor* var. *napalensis, Phyla nodiflora, Phyllanthus debilis, P. fraternus, P. lawii, P. maderaspatensis, P. reticulatus, P. urinaria, P. virgatus, Physalis minima, Pilea microphylla, Pisum sativum, Pogostemon deccanensis, Polycarpon prostratum, Polygala arvensis, P. erioptera, Polygonum plebium, Portulaca oleracea, P. quadrifida, Pouzolzia zeylanica, Protasparagus jacquemontii, Pseudanthistiria hispida, Pupalia lappacea, Pycreus bolei, P. flavidus, P. lancelotii, P. pumilus, P. sanguinolentus, Queenslandiella hyalina, Rhamphicarpa longiflora, Rhinacanthus nasuta, Rhynchoglossum obliquum var. parviflora, Rhynchosia minima, Rhynchospora wightiana, Ricinus communis, Rikliella squarrosa, Rivia hypocrateriformis, Rorippa indica, Rostellularia diffusa* var. *diffusa, R. diffusa* var. *prostrata, Rotala densiflora, R. indica, Ruellia tuberosa, Rungia elegans, R. repens, Saccharum spontaneum, Sacciolepis interrupta, Schoenoplectus articulatus, S. lateriflorus, Scilla hyacinthina, Scleria annularis, S. biflora, S. lithosperma, S. parvula, Scoparia dulcis, Sebastiana chamelea, Sehima nervosum, Sesamum orientale, Sesbania bispinosa, S. procumbens, Sesuvium portulacastrum, Setaria intermedia, S. pumila, S. verticillata, Sida rhombifolia* ssp. *rhombifolia, S. rhombifolia ssp. retusa, S. spinosa, Silene noctiflora, Smithia conferta, Solanum anguivi, S.nigrum, S. virginianum, S. trilobatum, Sonchus aspera, S. oleraceus, Sopubia delphinifolia, Sorghum halepense, Spermacoce articularis, Sphaeranthus africanus, S. indicus, Sphenoclea zeylanica, Spilanthus paniculata, Sporobolus capillaris, S. coromandelianus, S. fistivus, S. indicus var. flaccidus, S. tetragonus, Stachytarpheta jamaicensis, Stemodia viscosa, Striga angustifolia, S. asiatica, S. densiflora, S. gesnerioides, S. sulphurea, Sutera dissecta, Synedrella nodiflora, S. vialis, Tacca leontopetaloides, Tephrosia purpurea, T. strigosa, T. villosa, Tetrapogon tenellus, Themeda quadrivalvis, Thevetia peruviana, Tonningia axillaris, T. cucullata,*

Tragia plukenetii, Tribulus terrestris, Trichodesma indicum, T. zeylanicum, Tricholepis amplexicaulis, T. glaberrima, T. radicans, Tridax procumbens, Typha angustifolia, Triumfetta rhomboidea, Urena lobata ssp. *lobata, U. lobata* ssp. *sinuata, Urochloa reptans, Utricularia aurea, U. reticulata, U. stellaris, Vaccaria pyramidata, Vallisneria spiralis, Verbascum chinense, Verbena officinalis, Vernonia cinerea, Vigna trilobata, Viscum angulatum, V. articulatum, Vitex negundo, Waltheria indica, Xanthium strumarium, Zinnia elegans, Ziziphus oenoplia* (Seedlings) and *Zornia gibbosa*, etc.

ECONOMICALLY IMPORTANT PLANTS

The forests are our national repository of a variety of raw materials. The forest products and bye-products can be divided into major and minor forest produce as follows :

I. MAJOR FOREST PRODUCE

The major produce of forests are timber which are divided into two main groups -

i) All timber yielding plants :

a) Hard wood timbers.: *Tectona grandis* (Teak) is the prized timber and accounts for nearly 80% revenue of the total timber produce of the state. Some of the finest teak forests exist in Maharashtra state in the Chandrapur and Gadchiroli districts. The other hard-wood species are *Acacia nilotica* ssp. *indica, Albizia lebbeck, Anogeissus latifolia, Chloroxylon swietenia, Dalbergia latifolia, D. sissoo, Gmelina arborea, Grewia tiliifolia, Hardwickia binata, Ixora arborea, Lagerstroemia parviflora, Ougeinia oojeinensis, Pterocarpus marsupium, Terminalia elliptica, Xylia xylocarpa*, etc.

b) Soft-wood timbers : The major soft-wood timber species witnessed in Maharashtra are *Ailanthus excelsa, Bombax ceiba, Boswellia serrata, Erythrina indica, Haldina cordifolia, Kydia calycina, Mangifera indica, Mitragyna parvifolia*, etc.

These are used for various purposes as given below :

Furniture : The timber of *Albizia chinensis, A. procera, Anogeissus latifolia, Artocarpus heterophyllus, Calophyllum inophyllum, Carallia brachiata, Chloroxylon swietenia, Chukrasia tabularis, Gmelina arborea, Mangifera indica, Mitragyna parvifolia, Radermachera xylocarpa, Symplocos cochinchinensis* ssp. *laurina, S. racemosa, Tectona grandis, Terminalia elliptica, T. paniculata, Toona hexandra,* etc. are used for making furniture.

Construction purposes : The timber of *Albizia chinensis, A. lebbeck, A. odoratissima, A. procera, Anogeissus latifolia, Aphanamixis polystachya, Bridelia retusa, Calophyllum apetalum, Carallia brachiata, Dalbergia paniculata, Diospyros peregrina, Dolichandrone falcata, Eucalyptus camadulensis, E. citriodora, E. paniculata, Garcinia spicata, Glochidion hohenackeri, Lagerstroemia microcarpa, L. parviflora, Lannea coromandelica, Madhuca longifolia* var. *latifolia, Mammea suriga, Mesua ferrea, Mimusops elengi, Radermachera xylocarpa, Rhizophora mucronata, Soymida febrifuga, Tectona grandis, Terminalia bellirica, T. catappa, T. chebula, T. elliptica, T. paniculata, Vitex altissima, V. leucoxylon*, etc. are used for construction purposes.

Agricultural Implements : The wood of *Acacia leucophloea, Albizia amara, Anogeissus latifolia, Bauhinia purpurea, B. variegata, Bridelia retusa, Caryota urens, Citrus medica, Diospyros montana, Emblica officinalis, Flacourtia indica, Mimusops elengi, Pithecellobium dulce, Securinega virosa, Tamarindus indica, Terminalia cuneata, T. elliptica, Trewia nudiflora, Ziziphus glaberrima*, etc. are used for making agricultural implements.

Carts and Accessories : The wood of *Acacia ferruginea, A. leucophloea, A. nilotica ssp. indica, Albizia chinensis, A. odoratissima, A. procera, Anogeissus latifolia, Capparis decidua, Cordia macleodii, Hardwickia binata, Holigarna arnottiana, Holoptelea integrifolia, Ougeinia oojeinensis, Pithecellobium dulce, Pongamia pinnata, Syzygium cumini, Terminalia bellirica, T. chebula, T. cuncata, T. elliptica, Thespesia populnea*, etc. are used for making carts and accessories.

Plywood : Timber of *Alseodaphne semecarpifolia, Boswellia serrata, Chukrasia tabularis, Dalbergia latifolia, D. sissoo, Dillenia pentagyna, Duabanga grandiflora, Erythrina stricta, E. suberosa, Grevillea robusta, Holoptelea integrifolia, Kydia calycina, Lagerstroemia microcarpa, Lannea coromandelica, Melicope lunu-ankenda, Sterculia foetida, Tectona grandis, Terminalia bellirica, T. catappa, T. cuneata, T. paniculata, Tetrameles nudiflora, Toona hexandra, Trewia nudiflora*, etc. are used for making plywood.

Panelling for Railway carriages : The timber of *Albizia chinensis, A. lebbeck, A. odoratissima, Chloroxylon swietenia, Chukrasia tabularis, Cordia macleodii, Haldina cordifolia, Pterospermum acerifolium, Radermachera xylocarpa, Tamarindus indica, Toona hexandra*, etc. are used for panelling. Owing to over exploitation of wood earlier and the limited source of wood from day-to-day depleting forests and the corresponding higher and unaffordable prices of wood forced the use of metals like iron, etc. in present days for frames and

panels of doors and windows and other construction works of buildings. Hence it should act as a pointer to preserve our forests for future generations.

Boat making : The wood of *Barringtonia acutangula, Calophyllum apetalum, Cordia dichotoma, Diospyros peregrina, Mesua ferrea, Polyalthia cerasoides, Syzygium cumini, Thespesia populnea, Xylia xylocarpa,* etc. are used for making boats.

Ship building : Timber of *Calyophyllum inophyllum, Gmelina arborea, Lagerstroemia reginae, Sterculia villosa, Tectona grandis, Terminalia paniculata,* etc. are used in ship building.

Walking sticks : Wood of *Caesalpinia sappan, Cassia siamea, Ceriscoides turgida, Citrus sinensis, Dalbergia melanoxylon, Didymostachys cinerea var indica, Diospyros buxifolia, D. melanoxylon, Grewia villosa, Holarrhena pubescens, Memecylon umbellatum, Mesua ferrea, Murraya paniculata, Osyris quadripartita,* etc. are used for making walking sticks.

ii) Firewood and Charcoal : Wood of *Acacia horrida, A. nilotica ssp. astringens, Aegiceras corniculatum, Allophylus cobbe, Barringtonia racemosa, Bruguiera cylindrica, Butea monosperma, Capparis zeylanica, Casuarina equisetifolia, Ceriops tagal, Dillenia aurea, Diospyros chloroxylon, D. montana, Elaeagnus conferta, Erythroxylon monogynum, Glochidion velutinum, Hiptage benghalensis, Kandelia candel, Ligustrum perrottetii, Miliusa tomentosa, Parkinsonia aculeata, Radermachera xylocarpa, Rhus mysorensis, Sesbania sesban, Sterculia guttata, S. urens, Symphorema involucratum, Syzygium cumini, Tamarix dioica, Tamarindus indica, Ventilago denticulata,* etc. are used as fuel wood/ fire wood. Likewise the wood of *Acronychia pedunculata, Aegle marmelos, Anogeissus latifolia, Calotropis gigantea, Caryota urens, Cerbera manghas, Colebrookea oppositifolia, Dalbergia sissoo, Debregeasia longifolia, Diospyros peregrina, Ficus rumphii, Holoptelea integrifolia, Lagerstroemia parviflora, Leucaena leucocephala, Memecylon umbellatum, Securinega virosa, Stereospermum suaveolens,* etc. are used in making charcoal.

Bamboos : Bamboo is in great demand for various rural industries, is valuable raw material for paper pulp and rayon production. Importance wise it is next to teak wood in the state. Mainly four species are used in Maharashtra viz., *Bambusa arundinacea, Dendrocalamus strictus, Pseudoxytenanthera ritcheyi and P. stocksii. Dendrocalamus strictus* is widely used.

II. MINOR FOREST PRODUCE :

The various forest produce other than timber, bamboos, firewood and charcoal come under minor forest produce.

Aromatic Plants : Aromatic components are known to be present in c 87 families of higher plants. India's exports mainly consist of sandal-wood, palm-rosa and vetiver oils or their end products. Tetali et al. (1997) have provided a check-list of nearly 190 species freom Maharashtra along with plant parts used. Root fibres of *Vetiveria zizanioides, rhizomes of Curcuma aromatica, heartwood and underground portions of Santalum album, stems of Canarium strictum, leaves of Artemesia nilagirica, Cymbopogon citratus, C. martinii, C. nardus, Eucalyptus citriodora, E. globulus, Mentha arvensis, Ocimum americanum, O. gratissimum, O. tenuiflorum,* flowers of *Curcuma aromatica, Jasminum malabaricum, J. multiflorum, J. sambac, Michelia champaca,* etc. yield aromatic compounds.

Fodder plants : The whole plants of *Desmodium dichotomum, Elephantopus scaber, Indigofera astragalina, I. glandulosa, Ipomoea aquatica, Scoparia dulcis, Stylosanthes fruticosa, Tribulus terrestris, twigs of Albizia chinensis, A. lebbeck, A. odoratissima, Bambusa arundinacea, Ficus elastica, F. rumphii, Flacourtia indica, Sesbania bispinosa, S. grandiflora, S. sesban, leaves of Albizia chinensis, A. lebbeck, A. odoratissima, Bambusa arundinacea, Bauhinia variegata, Bridelia retusa, Buchanania lanzan, Butea superba, Dalbergia latifolia, D. sissoo, D. volubilis, Derris trifoliata, Dichrostachys cinerea var. indica, Emblica officinalis, Erythrina variegata, Ficus elastica, F. rumphii, Flacourtia indica, Hardwickia binata, Kydia calycina, Leucaena leucocephala, Maytenus senegalensis, Medicago sativa, Meyna laxiflora, Oroxylum indicum, Ougeinia oojeinensis, Pithecellobium dulce, Sesbania bispinosa, S. grandiflora, S. sesban, Solanum anguivi, S. virginianum, Syzygium cumini, Terminalia elliptica, Trema orientalis, Ziziphus glaberrima, Z. xylopyra, fruits of Emblica officinalis, Leucaena leucocephala, Pithecellobium dulce and seeds of Leucaena leucocephala,* etc. are used as fodder. The following are some of the fodder grasses. *Andropogon pumilus, Apluda mutica, Aristida adscensionis, A. funiculata, Arundinella leptochloa, Cenchrus biflorus, C. ciliaris, C. pennisetiformis, C. setigerus, Centotheca lappacea, Chionachne koenigii, C. semiteres, Chloris dolichostachya, C. gayana, C. virgata, Chrysopogon aciculatus, C. fulvus, C. lanceolaris, Coix aquatica, C. lacryma-jobi, Dactyloctenium aegyptium, D. aristatum, D. scindicum, Danthonidium gammiei, Desmostachya bipinnata, Dichanthium annulatum, D. caricosum, D. parviflorum, D. pertusum, Digitaria abludens, D. bicornis, D. ciliaris,*

D. longiflora, Dinebra retroflexa, Diplachne fusca, Echinochloa colona, Eragrostiella bifaria, Eragrostis ciliaris, E. gangetica, E. japonica, E. pilosa, E. tef, E. tenella, E. unioloides, E. viscosa, Hemarthria compressa, Heteropogon contortus, Isachne globosa, I. miliacea, Ischaemum pilosum, I. semisagittatum, I. timorense, Iseilema anthephoroides, I. laxum, I. prostratum, Lophopogon tridentatus, Mnesithea granularis, Ochtochloa compressa, Ophiuros exaltatus, Oplismenus burmannii, O. compositus, Panicum antidotale, P. maximum, P. miliaceum, P. repens, P. sumatrense, P. trypheron, Paspalidium flavidum, P. geminatum, P. punctatum, Paspalum scrobiculatum, Pennisetum pedicellatum, P. purpureum, Perotis indica, Pseudanthistiria heteroclita, Saccharum spontaneum, Sacciolepis indica, S. interrupta, S. myosuroides, Sehima nervosum, S. notatum, S. sulcatum, Setaria italica, Sporobolus coromandelianus, S. helvolus, S. indicus var. *flaccidus, S. indicus* var. *major, S. humilis, Themeda cymbaria, T. quadrivalvis, Thysanolaena maxima* and *Zoysia matrella*, etc.

Dye yielding plants : Roots of *Morinda citrifolia, M. pubescens*, tubers of *Kaempferia rotunda*, bark of *Acacia leucophloea, A. nilotica* ssp. *indica, Bauhinia variegata, Hardwickia binata, Mangifera indica, Securinega virosa, Symplocos cochinchinensis* ssp. *laurina, S. racemosa, Syzgyium cumini*, heartwood of Acacia catechu, wood of *Ceratonia siliqua*, leaves of *Acacia nilotica* ssp. *indica, Emblica officinalis, Justicia adhatoda, Lawsonia inermis, Memecylon umbellatum, Symplocos racemosa*, flowers of *Caesalpinia pulcherrima, Hibiscus rosa-sinensis, Toona hexandra*, pods of *Acacia nilotica* ssp. *indica* and glands on capsules of *Mallotus philippensis*, etc. yield dye.

Plants used in Paper Industry : The following are some of the plants used in paper industry. *Arundo donax, Boehmeria nivea, Ceratonia siliqua, Chukrasia tabularis, Dendrocalamus strictus, Desmostachya bipinnata, Drimia indica, Ficus benghalensis, F. racemosa, Holostemma ada-kodien, Opuntia elatior, Sehima nervosum, Streblus asper, Terminalia elliptica, Trema orientalis* and *Triticum aestivum*.

Plants used in soap industry : Oil extracted from seeds of *Brassica nigra, Calophyllum inophyllum, Cochlospemum religiosum, Jatropha curcas, Ocimum americanum, Olea europia, Pongamia pinnata, Riccinus communis, Salvia officinalis, Santalum album, Sesamum orientale, Xanthium strumarium, Zea mays*, etc. are used for making soaps.

Tannin yielding plants : Roots of *Rumex nepalensis*, bark of *Acacia catechu, A. concinna, A. nilotica* ssp. *indica, Barringtonia racemosa, Bridelia retusa, Bruguiera parviflora, Caesalpinia decapetala, Cassia auriculata, C. fistula, Garuga pinnata, Lagerstroemia parviflora, Lannea coromandelica, Rhizophora mucronata, Salix tetrasperma, Securinega virosa, Soymida febrifuga, Terminalia cuneata, Xylia xylocarpa, Ziziphus glaberrima, Z. oenoplia,* wood of *Rhizophora mucronata*, twigs of *Bruguiera parviflora*, leaves of *Anogeissus latifolia, Bruguiera parviflora, Prosopis cineraria* and fruits of *Caesalpinia coriaria, C. pulcherrima, Ziziphus zylopyra*, etc. yield tannin.

Plants used in Cordage : The following are some plants used in cordage : *Agave cantula, A. vera-cruz, Boehmeria nivea, Butea monosperma, Cryptolepis buchanani, Derris trifoliata, Furcraea foetida, Grewia tiliifolia, G. villosa, Hibiscus hispidissimus, Holostemma ada-koden, Imperata cylindrica, Livistona chinensis, Millettia extensa, Ougeinia oojeinensis, Sansevieria roxburghiana, Sesbania bispinosa, Sterculia guttata* and *S. villosa.*

Plants yielding essential oils : The following are some plants yielding essential oils: *Artemesia dracunculus, A. pallens, Blumea eriantha, B. lacera, B. malcolmii, Commiphora wightii, Eupatorium triplenerve, Euphorbia thymifolia, Lavandula bipinnata, Nyctanthes arbor-tristis, Pogostemon heyneanus, Saraca asoca, Syzygium jambos* and *Vitex trifolia*, etc.

Plants used in perfumery : The following are some of the plants used in perfumery : *Citrus aurantium, C. sinensis, Eucalyptus citridora, Gardenia angusta, Jasminum auriculatum, J. sambac, Limnophila rugosa, Pavonia odorata, Sesamum orientale, Siegesbeckia orientalis, Tagetes erecta* and *Vitex trifolia*, etc.

Resin yielding plants : The following are some plants that yield resin : *Ailanthus triphysa, Boswellia serrata, Commiphora gileadense, C. wightii, Euphorbia tirucalli* and *Holigarna arnottiana.*

Fibre yielding plants: The following are some plants which yield fibre:

Agave cantula, Borassus flabellifer, Butea superba, Ficus hispida, F. rumphii, Helicteres isora, Hibiscus cannabinus, Malachra capitata, Meiogyne pannosa, Melochia corchorifolia, Microcos paniculata, Sida cordifolia and *Triumfetta rhomboidea*, etc.

Plants used as green manure : The following are some plants used as green manure : *Calophyllum inophyllum, Crotalaria juncea, C. laburnifolia, Croton bonplandianus, Cyamopsis tetragonolobus, Desmodium gangeticum, D. heterocarpon, D. umbellatum, Dillenia pentagyna, Eragrostis unioloides, Hyptis suaveolens, Sapindus emarginatus, Tephrosia purpurea, Teramnus labialis* and *Vicia faba*, etc.

Gum yielding plants : Some of the gum yielding plants are as below : *Acacia nilotica ssp. indica, A. ferruginea, Aegle marmelos, Anogeissus latifolia, Bauhinia variegata, Butea monosperma, Ceratonia siliqua, Cochlospermum religiosum, Cordia dichotoma, Grevillea robusta, Soymida febrifuga, Sterculia urens* and *Stereospermum suaveolens*, etc.

Flavouring agents : (Wild and cultivated) :

Abelmoschus ficulneus, Allium cepa, A. sativum, Anethum graveolens, Carum copticum, Coriandrum sativum, Cuminum cyminum, Cymbopogon citratus, Ferula asafoetida, Foeniculum vulgare, Garcinia indica, G. xanthochymus, Limnophila rugosa, Melicope lunu-ankenda, Myrtus cummunis, Ruta graveolens, Sesamum orientale, Tamarindus indica, etc. are some plants which are used for flavouring.

Fish poison : The whole plants of *Sphaeranthus indicus, Spilanthus calva, S. paniculata,* roots of *Barringtonia acutangula,* bark of *Barringtonia racemosa, Gnidia glauca, Ougeinia oojeinensis, Nauclea orientalis, Securinega leucopyrus,* fruits of *Catunaregam spinosa, Sapium indicum* and seeds of *Barringtonia acutangula, B. racemosa*, etc. are used as fish poison.

Plants used for thatching : Grasses like *Ophiuros exaltatus, Saccharum spontaneum, Schizachyrium exile, Sehima nervosum*, dried plants of *Schoenoplectus articulatus, S. grossus*, slender branches of *Securinega leucopyrus, S. virosa* and leaves of *Borassus flabellifer*, etc. are used for thatching.

Sand/Soil binders : *Casuarina equisetifolia, Imperata cylindrica, Ipomoea pes-caprae, Prosopis juliflora, Saccioleρis interrupta, Scaevola sericea, Sesuvium portulacastrum, Spinifex littoreus, Sporobolus humilis* ssp. *minor, S. virginicus,* etc. are some sand/ soil binding plants.

Edible fruits : Some of the plants yielding edible fruits (wild and cultivated) are as given below :

Anacardium occidentale (cashew nut of commerce), *Annona reticulata, A. squamosa, Artocarpus heterophyllus, Averrhoa bilimbi, A. carambola, Calophyllum apetalum, Carallia brachiata, Careya arborea, Carica papaya, Carissa congesta, Citrus aurantium, C. chrysocarpa, C. limon, C. maxima, C. paradisi, C. reticulata, Coccinia grandis, Dillenia indica, Diospyros melanoxylon, Elaeagnus conferta, Eugenia uniflora, Ficus carica, F. hispida, F. racemosa, Flacourtia indica, Mangifera indica (commercial fruit crop), Manilkara zapota, Meyna laxiflroa, Mimusops elengi, Psidium guajava, Punica granatum, Radermachera xylocarpa, Sterculia villosa, Syzygium zeylanicum*, etc.

Fruits used as pickles : (Wild and cultivated) :

The fruits of the following plants are used for preparing pickles : *Capparis decidua, C. spinosa, C. zeylanica, Capsicum annuum, Citrus medica, Elaeocarpus serratus, Emblica officinalis, Grewia asiatica, Mangifera indica, Syzygium aromaticum, S. malaccensis*, etc.

Vegetables : (Wild and cultivated) :

The following are some plants which are used as or grown as vegetable : *Allium cepa* (leaves and bulbs), *Amaranthus cruentus* (tender shoots and leaves), *Brassica oleracea* var. *botrytis* (flowers), B. oleracea var. *capitata* (leaves), *B. oleracea* var. *gonylodes* (stems), *Cicer* arietinum (tender shoots), *Coccinia grandis* (green fruits), *Daucus carota* (roots), *Dioscorea bulbifera* (tubers), *D. pentaphylla* (leaves), *Euphorbia hirta* (leaves), *Foeniculum vulgare* (leaf stalks), *Lagenaria siceraria* (fruits), *Lens culinaris* (young pods), *Luffa acutangula* (fruits), *Lycopersicon lycopersicum* (fruits), *Moringa concanensis* (fruits), *M. oleifera* (fruits), *Raphanus caudatus* (pods), *R. sativus* (roots), *Trigonella foenum-graecum* (leaves), *Solanum melongena* (fruits), *S. tuberosum*, (tubers), etc.

Pulses: Some of the pulses grown in the state are as follows: *Arachis hypogea, Cajanus cajan, Cicer arietinum, Phaseolus lunatus, P. vulgaris, Pisum sativum, Vicia hirsuta, Vigna aconitifolia, V. mungo*, etc.

Cereals : Some of the cereals grown in the state are *Eleusine coracana, Guizotia abyssinica, Oryza sativa, Pennisetum americanum, Sorghum bicolor, Triticum aestivum, Zea mays*, etc.

FOREST BASED INDUSTRIES

The forests yield numerous products which provide the basis for a variety of industries: timber for wood working industries, bamboo and grass for paper, chemical pulp, straw-boards etc., tender leaves fore bidi wrapping and myrobalan for manufacture of tan extract (Anon., Techno-Economic Survey of Maharashtra, 1963).

a) Saw mills : In 1957, Maharashtra had 165 registered Saw mills employing 2700 workers, mostly located in Bombay and Nagpur. A number of small units in Amravati, Chandrapur, Yavatmal, Wardha, etc. are located near the forest areas. Saw mills near forests cut the timber into size convenient for handling and transport.

There is no information regarding the actual volume of timber processed by saw mills in Maharashtra.

b) Seasoning and preservation : There is great demand for high quality timbers. The establishment of seasoning, preservation kilns near the saw mills is necessary.

c) Plywood and veneers : There are no other plywood or veneer factory except slicing unit of the Indian Plywood Company in Bombay. Chandrapur district has adequate quantities of soft wood and the location is ideal for establishment of a factory there.

d) Chipboard and Hardboards : There is one hardboard factory at Bhandup near Bombay with the capacity of 6,600 tonnes of boards. Its annual consumption of wood, mostly firewood, is estimated to be 12000 tonnes. Saw-dust and wood chips, which are now burnt as fuel can be made into hardboard, a good substitute for timber in several uses.

e) Textile requisites : Wood is a major raw material for the manufacture of bobbins and shuttles used in textile manufacture. 11 Bobbins factories are located in Bombay. Plants species of *Corchorus*, *Gossypium*, etc. are used in cotton textiles.

f) Matches : Semal, mango and Satwin are main species of softwood used for making the match splints. At present there are 3 large factories in the State.

g) Other wood-based industries : There are other numerous wood-based industries such as manufacture of furniture, packing cases, toy making, boat and truck body building, manufacturing of carts and other transportation vehicles. Major units are located in Bombay and Pune.

h) Paper and Paper boards : In 1957, Maharashtra had 83 registered factories, of which 63 units were located in Bombay and its suburbs.

There is a 30 tons paper plant using bamboo as a major raw material at Bellarpur in Chandrapur district. Chopli in Thane and Ogalewadi in Satara are other important centres. Some plants used are *Ficus racemosa, Gnidia glauca, Lannea coromandelica, Streblus asper,* etc.

12 factories in 1956 produced 22,000 tons of paper and paper-boards. It is estimated that bamboo resources of State forests can give a sustained annual yield of about 0.87 million tons.

Bamboo can also be used as raw material for manufacture of rayon grade pulp and newsprint.

Apart from bamboos, the State forests grow certain varieties of grass suitable for making paper and paperboards. Khapoli in Raigad district has a paper-board manufacturing plant using grass as a raw material.

Other minor products :

i) Tan Extract : There is only one factory - located at Kolhapur district manufacturing tan extract. It has a monopoly for collection of hirda from the forests of Kolhapur district. The plant has an installed capacity to produce 10 tons of extract per day.

ii) Essential oils : Essential oils from Rosha grass and Geranial, a derivative of palmarosa oil, which is extensively used in the manufacture of perfume is extracted on large scale.

Pharmaceutical concerns :

The following are some of the plants used in pharmaceutical concerns. *Catharanthus roseus, Gloriosa superba, Iphigenia stellata, Terminalia bellirica, T. chebula, Tinospora cordifolia, Tribulus terrestris. Cymbopogon* (Rosha grass), Chavanapras Dabar, Cream Vicco, Tooth paste and powder cosmetic are made of plant products. *Vetiveria zizanioides* - Khus ingradient for Talcum powders, Soaps, etc.

Distillery : Commercial alcohol - (Sawdust is used).

MEDICINAL PLANTS OF MAHARASHTRA

(P. Lakshminarasimhan & S. Moorthy)

Maharashtra State Flora abounds in medicinal plants which can even be called as a rich storehouse as it covers varied geographical areas, phytogeographic regions like interesting north western ghats including Sahyadri range of hills, a long stretch of coastal region for the rich growth of mangroves and allied plants, and other plains. Infact some of the industries in and around Maharashtra state are exploiting the medicinal plants of the region through plant collectors in bulk.

The medicinal plants are used for various diseases right from common cold to the dreaded diseases like a variety of Cancers. Some of the medicinal herbs are believed to cure practically every human disease from head to toe.

Recent researches are on for potential drugs from plant materials like *Nothopodytes nimmoniana* for Leucaemia or blood cancer. There are positive indications for possible drugs even for AIDS from plant materials as per some recent news paper reports. Even now the tribals mostly rely on traditional medicine that is claimed to be effective in curing ailments such as fever, diabetes, epilepsy, leucoderma, skin diseases, gastric disorders, etc.

The history of medicine and surgery dates back perhaps to the origin of the human race itself. The reference of curative properties of some herbs in 'Rigveda' (3500-1800 BC) though in brief, seem to be the earliest records of use of plants in medicine. The more detailed account however is available in 'Atharv Veda'. Then came Charak Samhita and Susruta-Samhita. Still later are Bhangbhatta, Chakradutta, Bhavaprakash, Sarangdhar, Yadavji, Bhangasen and many others.

With the passing of time more and more plants have been added to the native medicine. Out of the 17,000 known flowering plant species from India, c 7,500 wild plant species are reported to be used for medicinal purposes. Some important work on Indian medicinal plants include those of Watt (1889-1893), Ymoch et al. (1890), Basu & Kirtikar (1918), Kirtikar & Basu (1918), Nadkarni (1954), Chopra et al. (1956), Jain & De Filipps (1991), etc.

The plants are generally classified according to their therapeutic value and use. The medicinal plants are mainly used in India (indigenous) system of medicine viz., Ayurveda and Siddha. Unani System also utilises plants as medicines. The extract concentrates of plants is used in Homoeopathy, while pure chemical (devoid of plant material) are used in Allopathy. However, some diseases like Jaundice,

asthma, etc. have no proper medicine in Allopathy. Hence even allopathic doctors prescribe Ayurvedic (plant materials) medicine for the above mentioned diseases. Besides almost every allopathic treatment has several side effects as compared to the other indigenous (Indian) system of medicine like Ayurved, etc. in the treatment of even chronic ailments without the side effects and under the recent public trend in switching over to Ayurvedic treatment where only the plant materials are used as medicine. The Indian medicinal plant flora has some very important world-wide popular species such as *Rauwolfia serpentina (included in Appendix II of Cites)*, a source of serpentine alkaloid, is very much present all along the western ghats of Maharashtra too. It is estimated that by 2050, the global market of herbal based products may be around US $ 5 Trillion.

The physicians in the next century would depend more and more on plant based treatment taking the leads from Ayurveda, using modern scientific method of screening and isolation of active molecules. 70-80% of the world's population in the developing countries as in the case of Maharashtra too may still continue to depend on the herbal medicines. It is holistic system of treatment which is the underlaying principle of Ayurveda maintaining the balance between nature, man and environment may provide remedies for many dreadful diseases.

Medicinal plants have to be concentrated in a big way in not only developing herbal formulations but new molecules and drugs which will certainly lead us as world leaders in this field.

Important contributions in medicinal plants of Maharashtra was made by Agarkar (1953), Vartak (1959), Janardhanan (1964, 1965), Karnick (1966), Sawant (1974), Malhotra & Moorthy (1976), Kamble & Pradhan (1980), Vartak & Mandavgane (1981), Badhe & Sharma (1982), Shah et al. (1983), Sharma & Lakshminarasimhan (1986), Upadhye et al. (1986, 1994), Ved Prakash & Mehrotra (1987), Yadav & Bhamare (1989), Deokule & Magdum (1992), etc. Recently Upadhye & Kumbhojkar (1997) have given a list of 424 medicinal plants from Maharashtra. Singh & Sharma (1997) have reported nearly 443 species along with their medicinal uses.

As any plant is not specific to any disease and one disease may sometimes involve the combination of several parts of the same or different plant species, it is difficult to list out all the plants for various diseases. Hence only a sample of very important constituents of plants that are mentioned in the following heads of diseases, although several plant species as well as diseases are left out for want of space as it requires very lengthy list of plant species and diseases to this rich phytodiversic state like Maharashtra.

Abortifacients

Roots of *Abrus precatorius, Achyranthes aspera, Boerhavia diffusa, Dolichandrone falcata, Gloriosa superba,* bark of *Bombax ceiba,* bark and fruits of *Mallotus philippensis,* leaves of *Rhynchosia minima* and seeds of *Crotalaria pallida, Strychnos nux-vomica* are used.

Antiasthmatics

Whole plants of *Emilia sonchifolia, Triumfetta rhomboidea,* roots of *Boerharia diffusa, Costus speciosus, Curculigo orchioides, Vitex negundo,* stem, leaf and seed of *Baliospermum montanum,* bark and leaf of *Acacia catechu,* leaf of *Cajanus lineatus, Tylophora indica* and seed of *Semecarpus anacardium* are used.

Antidiabetics

Whole plants of *Catharanthus roseus,* roots of *Helicteres isora, Kyllinga tenuifolia,* tubers of *Geodorum densiflorum,* bark of *Ficus benghalensis,* leaves of *Argyreia cuneata, Gymnema sylvestre,* flowers of *Pongamia pinnata,* seeds of *Syzygium cumini,* while *Casearia esculenta* whose parts are not specific also used.

Antidysenterics

Roots of *Calotropis gigantea, Cissampelos pareira* var. *hirsuta, Indigofera trita,* root, bark of *Murraya koenigii,* root, bark and seed of *Holarrhena pubescens,* rhizomes of *Curculigo orchioides,* bark of *Ailanthus triphysa,* bark, fruits of *Helicteres isora,* leaf of *Alangium salvifolium,* fruits of *Oroxylum indicum,* seeds of *Terminalia bellirica* and gum of *Pterocarpus marsupium* are used.

Antiepileptics

Whole plants of *Bacopa monnieri, Desmodium velutinum, Evolvulus alsinoides,* roots of *Asparagus racemosus, Hemidesmus indicus,* root, fruit and seed of *Cassia fistula,* bark and seed of *Wrightia tinctoria,* leaf of *Martynia annua,* fruit of *Celastrus paniculatus, Elaeocarpus sphaericus* are used.

Antiplague

Leaves of *Ocimum tenuiflorum,* leaves and fruit pulp of *Aegle marmelos* are used.

Antirheumatics

Roots of *Achyranthes aspera*, *Gloriosa superba*, *Urena lobata*, root and leaf of *Boerhavia diffusa*, tubers of *Dioscorea pentaphylla*, latex of *Euphorbia tirucalli*, leaf of *Alangium salvifolium*, *Cadaba fruticosa*, *Leucas aspera*, leaf oil of *Cymbopogon martinii* and seed of *Strychnos nux-vomica* are used.

Antisterility

Root of *Chlorophytum tuberosum*, leaf of *Terminalia cuneata*, fruit of *Solanum virginianum*, seed of *Amaranthus spinosus*, *Diplocyclos palmatus*, *Madhuca longifolia* var. *latifolia* are used.

Boils

Whole plant of *Heliotropium indicum*, *Trichosanthes cucumerina*, root of *Michelia champaca*, bark of *Acacia chundra*, latex of *Phyllanthus fraternus*, leaf of *Argyreia nervosa*, *Mirabilis jalapa*, *Pterocarpus marsupium*, *Wattakaka volubilis* and *Clematis triloba* whose plant part is not specific is also used.

Cold

Roots of *Abrus precatorius*, *Spilanthus calva*, root and leaf of *Dillenia indica*, root, leaf and seed of *Clitoria ternatea*, leaf of *Achyranthes aspera*, *Haldina cordifolia*, *Vitex negundo*, leaf and stem of *Ipomoea obscura* and flowers of *Madhuca longifolia* var. *latifolia* are used.

Cough

Roots of *Costus speciosus*, *Thunbergia laevis*, bark of *Acacia catechu*, bark, fruit and seed of *Balanites aegyptiaca*, leaf of *Achyranthes aspera*, *Cajanus lineatus*, *Clematis hedysarifolia*, flower of *Calotropis gigantea*, fruit of *Terminalia chebula*, seed of *Abutilon indicum* and *Barringtonia acutangula* whose plant part is not specific is also used.

Fevers

Root of *Costus speciosus*, *Hemidesmus indicus*, *Ludwigia octovalvis* ssp. *sessiliflora*, bark of *Mimusops elengi*, leaf of *Gmelina arborea*, *Oxalis corniculata*, leaf/ fruit of *Cordia gharaf*, seed of *Caesalpinia bonduc*, *C. crista* and *Helicteres isora* whose part is not specific also used.

Jaundice

Whole plants of *Bacopa monnieri, Eclipta prostrata, Phyllanthus fraternus, Sphaeranthus indicus,* root of *Boerhavia diffusa, Phyllanthus virgatus, Trianthema portulacastrum,* rhizome of *Curculigo orchioides,* stem of *Cuscuta reflexa,* leaf of *Litsea glutinosa,* fruit of *Flacourtia montana* and *Hygrophila auriculata* whose plant part is not specific also used.

Laxatives

Whole plant of *Acalypha indica, Dendrobium ovatum, Moringa concanensis,* root of *Ipomoea pes-tigrides,* root & leaf of *Amaranthus spinosus,* tuber of *Dioscorea hispida,* wood of *Caryota urens,* fruit of *Embelia ribes,* seed of *Alangium salvifolium, Clitoria ternatea* are used.

Leprosy

Whole plants of *Ageratum conyzoides,* root of *Albizia procera,* root and seed of *Albizia lebbeck,* tuber of *Pueraria tuberosa,* bark of *Ficus racemosa, Lawsonia inermis, Mallotus philippensis, Wrightia tinctoria,* leaf of *Mimosa hamata,* seed of *Calophyllum apetalum, Cullen corylifolia* are used.

Opthalmic Diseases

Root of *Desmodium gangeticum, Lobelia nicotianaefolia,* root & leaf of *Cocculus hirsutus,* root, leaf and seed of *Argemone mexicana,* bark of *Ehretia laevis,* leaf of *Bidens biternatus, Ocimum tenuiflorum, Pergularia daemia, Terminalia chebula,* fruit of *Ailanthus triphysa,* seed of *Cassia absus* are used.

Piles

Whole plants of *Achyranthes aspera, Sacciolepis interrupta,* root of *Gloriosa superba, Lepidagathis trinervis, Plumbago zeylanica,* root-bark of *Alangium salvifolium,* rhizome of *Curculigo orchioides,* leaf of *Desmodium triquetrum, Indigofera cassioides, Lannaea procumbens* and seed of *Abutilon indicum* are used.

Purgatives

Whole plants of *Clitoria ternatea,* root of *Ipomoea pes-tigrides,* root and seed of *Cassia fistula,* root bark of *Alangium salvifolium,* fruit of *Embelia ribes, Gardenia gummi-gutta, Terminalia chebula* and seeds of *Ipomoea nil, Jatropha curcas, Ricinus communis* are used.

Skin Diseases

Whole plant of *Ageratum conyzoides*, root, leaf, seed of *Abrus precatorius*, rhizome of *Curculigo orchioides*, bark and fruit of *Garcinia indica*, latex of *Calotropis gigantea*, leaf of *Acacia ferruginea*, *Jasminum grandiflorum*, leaf and seed of *Datura metel*, flowers of *Leonotis nepetiifolia*, seeds of *Entada rheedei* are used.

Snake-bites

Corms of *Arisaema tortuosum*, roots of *Achyranthes aspera*, *Costus speciosus*, *Desmodium triquetrum*, *Emblica basaal*, *Hemidesmus indicus*, *Leea robusta*, root and leaf of *Elephantopus scaber*, leaf of *Crinum asiaticum*, *Gmelina arborea* are used.

Stomachaches

Roots of *Elephantopus scaber*, root, bark and leaf of *Murraya koenigii*, bark of *Grewia serrulata*, bark, stem and fruit of *Cassia fistula*, bark, calyx and fruit of *Careya arborea*, stem of *Garuga pinnata*, leaf of *Actinodaphne angustifolia*, fruit of *Heracleum grandis*, *Indigofera glandulosa* and *Vicoa indica* whose plant part is not specific also used.

Tonics

Whole plants of *Evolulus alsinoides*, roots of *Bombax ceiba*, *Leea asiatica*, rhizome of *Acorus calamus*, stem of *Entada rheedei*, bark of *Ailanthus triphysa*, *Oroxylum indicum*, *Sesbania grandiflora*, leaf and stem of *Tinospora sinensis* and flowers of *Careya arborea* are used.

Toothache

Root of *Elephantopus scaber*, *Phoenix sylvestris*, root and seed of *Achyranthes aspera*, stem of *Jatropha gossypifolia*, leaf of *Barleria prionitis*, *Lindenbergia indica*, *Wrightia tinctoria*, fruit of *Solanum virginianum*, fruit and seed of *Solanum anguivi* and *Ervatamia heyneana* whose plant part is not specific also used.

Tuberculosis

Whole plants of *Centella asiatica*, *Tinospora cordifolia*, *Triumfetta rhomboidea*, roots of *Asparagus racemosus*, *Oroxylum indicum*, roots and leaves of *Abrus precatorius*, rhizomes of *Alpinia galanga*, tubers of *Eulophia nuda*, bark of *Bauhinia variegata*, leaf of *Melia azadirach* and fruits of *Capparis zeylanica* are used.

Wounds

Whole plants of *Trichodesma inaequale, Tridax procumbens,* root of *Boerhavia diffusa,* rhizome of *Curculigo orchioides, Curcuma longa,* stem of *Acacia chundra,* leaf of *Ageratum conyzoides, Aloe barbadense, Blumea malcolmii,* fruit of *Bombax ceiba* and *Elephantopus scaber* whose plant part is not specific also used.

ENDEMIC PLANTS OF MAHARASHTRA

An endemic species is the one restricted to some given area, which might be a mountain top, river, a country or continent (WCMC, 1992). Out of 17000 species of flowering plants found in India, nearly 5000 species are said to be endemic. Nearly 58 genera and 1,932 taxa are found to be endemic to Peninsular India (Ahmedullah & Nayar, 1987). Western Ghats which represent areas of tropical montane forests is one of the 18 places on earth, termed as hot spots. It harbours nearly 1,600 endemic species of Higher Plants. According to Karthikeyan et al. (1997), 11 genera and 122 species are found to be endemic to Sahyadris. Yadav et al. (1997) have listed 33 rare, endangered and threatened endemic plants of Maharashtra. Over 500 species and 45 infraspecific taxa endemic to Peninsular India occur in Maharashtra, of which c 125 species are known only from the state (Yadav, 1997). According to Karthikeyan et al. (1997), 24 genera and 605 taxa of plants which are endemic to India are occurring in Maharashtra, of which 7 genera and 169 taxa are found to occur only in Maharasthra.

At present, it has been estimated that nearly 25 genera and 694 taxa of plants which are endemic to India are occurring in Maharashtra, of which 8 genera and 157 taxa are found to occur only in Maharashtra. A list of endemic genera, species and infraspecific taxa are given below. Endemic taxa which occur only in Maharashtra have been marked with an asterisk.

Endemic genera and species of Maharashtra :

RANUNCULACEAE

1. *Clematis heynei*

*2. *Delphinium malabaricum* var. *malabaricum*

*3. *D. malabaricum* var. *ghaticum*

4. *Thalictrum dalzellii*

*5. *Thalictrum obovatum*

ANNONOCEAE

6. *Meiogyne pannosa*
7. *Polyalthia fragrans*
8. *Sageraea laurifolia*

CAPPARACEAE

9. *Capparis grandiflora*
10. *C. rheedei*
11. *Cleome felina*
12. *C. simplicifolia*

FLACOURTIACEAE

13. *Casearia ruboscens*
14. *Flacourtia latifolia*
15. *F. montana*
16. *Hydnocarpus pentandra*

PITTOSPORACEAE

17. *Pittosporum dasycaulon*

XANTHOPHYLLACEAE

*18. *Xanthophyllum bombayanum*

CARYOPHYLLACEAE

19. *Polycarpaea corymbosa* var. *aurea*

CLUSIACEAE

20. *Calophyllum apetalum*
21. *Garcinia gummi-gutta* var. *gummi-gutta*
22. *G. gummi-gutta* var. *conicarpa*
23. *G. indica*
24. *G. talbotii*

THEACEAE

25. *Gordonia obtusa*

DIPTEROCARPACEAE

26. *Hopea ponga*

ANCISTROCLADACEAE

27. *Ancistrocladus heyneanus*

MALVACEAE

28. *Abelmoschus manihot* ssp. *tetraphyllus* var. *megaspermus*

*29. *Abutilon ranadei*

30. *Decaschistia crotonifolia*

31. *D. trilobata*

32. *Hibiscus talbotii*

STERCULIACEAE

33. *Eriolaena quinquelocularis*

34. *E. stocksii*

35. *Melhania magnifolia*

TILIACEAE

I. ERINOCARPUS

36. *Erinocarpus nimmonii*

37. *Grewia heterotricha*

38. *G. umbellifera*

ELAEOCARPACEAE

39. *Elaeocarpus munroii*

MALPIGHIACEAE

40. *Aspidopterys canarensis*
41. *A. cordata*

ZYGOPHYLLACEAE

42. *Tribulus rajasthanensis*
43. *T. subramanyamii*

BALSAMINACEAE

44. *Impatiens dalzellii*
45. *I. inconspicua*
46. *I. latifolia*
47. *I. lawii*
48. *I. leschenaultii*
49. *I. lucida*
50. *I. minor*
51. *I. pulcherrima*
52. *I. rupicola*
53. *I. scabriuscula*
54. *I. talbotii*
55. *I. tomentosa*

RUTACEAE

56. *Atalantia wightii*
57. *Luvunga eleutherandra*

OCHNACEAE

58. *Ochna gamblei*

BURSERACEAE

59. *Boswellia serrata*

MELIACEAE

60. *Naregamia alata*
61. *Reinwardtiodendron anamalaiense*
62. *Toona microcarpa* var. *pilipetala*

AQUIFOLIACEAE

63. *Ilex malabarica*

CELASTRACEAE

64. *Euonymus indicus*
65. *Maytenus puberula*
66. *Microtropis latifolia*
67. *M. microcarpa*
*68. *Salacia brunoniana*
69. *S. talbotii*

RHAMNACEAE

*70. *Rhamnus purandharensis*
71. *Smythea bombaiensis*
72. *Ventilago gamblei*
*73. *V. madraspatana* var. *fructifida*
*74. *Zizyphus horrida*
*75. *Z. rugosa* var. *glabra*
76. *Z. rugosa* var. *glabrescens*
77. *Z. williamii*

VITACEAE

78. *Ampelocissus araneosa*
79. *Cissus glauca*
80. *C. woodrowii*

SAPINDACEAE

81 *Allophylus concanicus*

ANACARDIACEAE

82. *Holigarna arnottiana*

83. *H. grahamii*

FABACEAE

84. *Alysicarpus belgaumensis*

85. *A. bupleurifolius* var. *hybridus*

*86 *A. luteo-variillatus*

*87. *A. narimanii*

88. *A. pubescens* var. *vasavadae*

89. *A. racemosus*

90. *A. roxburghianus*

*91. *A. salim-alii*

*92. *A. tetragonolobus* var. *peshanensis*

93. *Cajanus linearis*

94. *C. sericea*

95. *Clitoria biflora*

96. *C. ternatea* var. *pilosula*

*97. *Crotalaria decasperma*

98. *C. epunctata*

99. *C. filipes* var. *filipes*

100. *C. filipes* var. *trichophora*

101. *C. leptostachya*

102. *C. lunulata*

103. *C. lutescens*

104. *C. madurensis*

105. *C. naikiana*

106. *C. notonii*

107. *C. priestleyoides*

108. *C. pusilla*

109. *C. quinquefolia*

110. *C. ramosissima*

111. *C. tecta*

112. *C. vestita*

113. *Dalbergia horrida* var. *horrida*

114. *D. horrida* var. *concanensis*

115. *D. malabarica*

116. *Derris brevipes*

117. *D. heyneana*

118. *D. thothathrii*

119. *Desmodium benthamii*

120. *D. ritchiei*

121. *Flemingia gracilis*

122. *F. nilgheriensis*

123. *F. praecox* var. *robusta*

*124. *F. rollae*

125. *F. tuberosa*

*126. *Galactia tenuiflora* var. *latifolia*

127. *G. tenuiflora* var. *lucida*

*128. G. tenuiflora var. minor

129. Geissaspis tenella

130. *Indigofera angulosa*

131. *I. dalzellii*

*132. *I. deccanensis*

133. *I. glandulosa* var. *sykesii*

134. *I. prostrata*

*135. *I. santapaui*

*136. *I. trifoliata* var. *duthiei*

*137. *I. trita* var. *purandharensis*

138. *Millettia orissae*

139. *Nogra dalzellii*

140. *Pterocarpus marsupium* var. *acuminata*

141. *Sesbania procumbens*

*142. *Smithia agharkarii*

143. *S. bigemina*

144. *S. capitata*

145. *S. gracilis*

146. *S. hirsuta*

*147. *S. oligantha*

148. *S. purpurea*

149. *S. pycnantha*

150. *S. salsuginea*

151. *S. setulosa*

152. *Spatholobus purpureus*

*153. *Sphenostylis bracteatus*

154. *Tephrosia canarensis*

155. *T. coccinia*

156. *T. collina*

157. *Vigna khandalensis*

*158. *V. trilobata* var. *pusilla*

159. *V. vexillata* var. *sepiaria*

160. *V. vexillata* var. *stocksii*

CAESALPINIACEAE

161. *Bauhinia foveolatum*

162. *B. phoenicea*

*163. *Cassia kolabensis*

164. *Hardwickia binata*

II. MOULLAVA

165. *Moullava spicata*

MIMOSACEAE

166. *Dichrostachys cinerea* var. *indica*

CRASSULACEAE

167. *Kalanchoe bhidei*

168. *K. olivacea*

COMBRETACEAE

169. *Terminalia paniculata Roth*

MYRTACEAE

170. *Syzygium laetum*

171. *S. stocksii*

MELASTOMATACEAE

172. *Memecylon talbotianum*

173. *Sonerila rheedei*

174. *S. scapigera*

LYTHRACEAE

175. *Ammannia nagpurensis*

176. *Lagerstroemia microcarpa*

*177. *Rotala floribunda*

178. *R. ritchiei*

CUCURBITACEAE

179. *Corallocarpus conocarpus*

180. *Cucumella ritchei*

181. *Cucumis setosus*

III. DICAELOSPERMUM

*182. *Dicaelospermum ritchiei*

BEGONIACEAE

183. *Begonia concanensis*

184. *B. crenata*

*185. *B. phrixophylla*

186. *B. trichocarpa*

APIACEAE

187. *Heracleum aquilegifolium*

*188. *H. dalgadianum*

189. *H. grande*

190. *H. sprengelianum*

191. *Peucedanum dhana var. dalzellii*

192. *Pimpinella adscendens*

193. *P. candolleana*

*194. *P. rollae*

*195. *P. tomentosa*

196. *P. wallichiana*

IV. PINDA

197. *Pinda concanense*

V. POLYZYGUS

198. *Polyzyus tuberosus*

199. *Seseli diffusum*

200. *Trachyspermum roxburghianum*

RUBIACEAE

201. *Discospermum apiocarpum*

202. *D. sphaerocarpum*

203. *Hedyotis stocksii*

204. *Hymenodictyon obovatum*

205. *Ixora brachiata*

206. *I. elongata*

207. *I. polyantha*

208. *Lasianthus acuminatus*

209. *L. sessilis*

210. *L. venulosus*

211. *Neanotis carnosa*

212. *N. decipiens*

213. *N. foetida*

214. *N. lancifolia*

215. *N. montholoni*

216. *N. rheedei*

*217. *N. sahyadrica*

218. *Pavetta siphonantha*

219. *Psychotria dalzellii*

220. *P. flavida*

221. *P. octosulcata*

222. *Saprosma glomeratum*

ASTERACEAE

223. *Adenoon indicum*

224. *Anaphalis lawii*

225. *Blepharispermum subsessile*

226. *Blumea belangeriana*

227. *B. eriantha*

228. *B. malabarica*

229. *B. malcolmii*

*230. *B. venkataramanii*

231. *Cyathocline lutea*

*232. *C. purpurea var. alba*

*233. *C. purpurea var. bicolor*

234. *Emilia zeylanica var. paludosa*

235. *Gynura travancorica*

VI. LAMPRACHENIUM

236. *Lamprachenium microcephalum*

VII. NANOTHAMNUS

237. *Nanothamnus sericeus*

*238. *Phyllocephalum hookeri*

239. *P. ritchiei*

240. *P. scabridum*

241. *Senecio belgaumensis*

242. *S. dalzellii*

243. *S. edgeworthii*

244. *S. gibsonii*

245. *S. hewrensis*

246. *Tricholepis amplexicaulis*

247. *T. radicans*

248. *Vernonia indica*

CAMPANULACEAE

249. *Campanula alponsii*

250. *Wahlenbergia flexuosa*

LOBELIACEAE

251. *Lobelia dichotoma var. aligera*

SAPOTACEAE

252. *Isonandra stocksii*

OLEACEAE

253. *Jasminum malabaricum*

APOCYNACEAE

254. *Beaumontia jerdoniana*

255. *Carissa inermis*

256. *Kamettia caryophyllata*

257. *Tabernaemontana heyneana*

ASCLEPIADACEAE

258. *Bidaria cuspidata*

*259. *Bidaria khandalense*

260. *Brachystelma edulis*

*261. *B. malwanensis*

*262. *B. naroji*

263. *Ceropegia attenuata*

*264. *C. evansii*

265. *C. fantastica*

*266. *C. huberi*

*267. *C. jainii*

*268. *C. lawii*

*269. *C. maccannii*

*270. *C. mahabalei*

*271. *C. media*

272. *C. noorjahaniae*

273. *C. oculata*

274. *C. odorata*

*275. *C. panchganiensis*

*276. *C. rollae*

*277. *C. sahyadrica*

*278. *C. santapaui*

*279. *C. vincaefolia*

VIII. FREREA

*280. *Frerea indica*

281. *Heterostemma dalzellii*

*282. *H. deccanense*

283. *H. urceolatum*

284. *Hoya retusa*

285. *Sarcostemma intermedium*

IX. SESHAGIRIA

286. *Seshagiria sahyadrica*

LOGANIACEAE

287. *Strychnos dalzellii*

GENTIANACEAE

288. *Canscora concanensis*

289. *C. decurrens*

290. *C. khandalensis*

291. *C. pauciflora*

292. *C. perfoliata*

293. *C. stricta*

294. *Exacum lawii*

295. *E. pumilum*

296. *Swertia corymbosa var. elatior*

297. *S. densifolia*

298. *S. lawii*

299. *S. minor*

BORAGINACEAE

300. *Cordia domestica*

301. *Heliotropium cornutum*

302. *Pamcaryopsis coelestina*

303. *P. malabarica*

CONVOLVULACEAE

*304. *Argyreia boseana*

305. *A. cuneata*

306. *A. lawii*

307. *A. pilosa*

308. *A. sericea*

309. *Ipomoea clarkei*

*310. *I. salsettensis*

*311. *Operculina tansaensis*

SCROPHULARIACEAE

X. BONNAYODES

*312. *Bonnayodes limnophiloides*

313. *Limnophila polystachya*

*314. *Lindernia estaminodiosa*

*315. *L. quinquelobs*

316. *Rhamphicarpa longiflora*

317. *Torenia indica*

318. *T. lindernioides*

LENTIBULARIACEAE

319. *Utricularia alho-coerulea*

320. *U. praeterita*

321. *U. purpurascens*

GESNERIACEAE

322. *Aeschynanthus perrottetii*

ACANTHACEAE

323. *Asystasia dalzelliana*

324. *A. mysorensis*

325. *Barleria courtallica*

326. *B. cuspidata*

327. *B. gibsoni*

*328. *B. gibsonioides*

329. *B. involucrata* var. *elata*

330. *B. prattensis*

*331. *B. sepalosa*

332. *Calacanthus grandiflorus*

XI. CARVIA

333. *Carvia callosa*

334. *Cynarospermum asperrimum*

335. *Dicliptera cuneata*

*336. *D. ghatica*

*337. *D. nasikensis*

338. *Dyschoriste dalzellii*

339. *D. vagans*

340. *Eranthemum capense* var. *concanense*

341. *E. roseum*

XII. GANTELBUA

342. *Gantelbua urens*

343. *Gymnostachyum canescens*

344. *G. latifolium*

345. *Haplanthodes neilgherryensis*

346. *H. plumosa*

347. *H. tentaculata*

348. *H. verticillatus*

349. *Hygrophila anomala*

350. *H. pinnatifida*

*351. *Hypoestes lanata*

XIII. INDONEESIELLA

352. *Indoneesiella longipedunculata*

353. *Justicia neesii*

354. *J. santapaui*

355. *J. trinervia*

356. *J. wynaadensis*

*357. *Lepidagathis handrsensis*

358. *L. mitis*

359. *Mackenziea integrifolia*

360. *Neuracanthus sphaerostachyus*

361. *Nilgirianthus asper*

362. *N. barbatus*

363. *N. ciliatus*

264. *N. heyneanus*

365. *N. lupulinus*

366. *N. membranaceus*

*367. *N. reticulatus*

368. *N. warreensis*

XIV. PLEOCAULIS

369. *Pleocaulis ritchiei*

370. *Rungia linifolia*

XV. SUPUSHPA

371. *Supushpa scrobiculata*

372. *Thelepaepale ixiocephala*

LAMIACEAE

373. *Anisochilus verticillatus*

374. *Anisomeles heyneana*

375. *Coleus caninus*

376. *Lavandula lawii*

*377. *Leucas deodikarii*

378. *Nepeta bombaiensis*

*379. *Pogostemon benghalensis* var. *glaberrima*

380. *P. deccanensis*

*381. *P. erectus*

382. *P. mollis*

383. *P. myosuroides*

384. *P. purpurascens*

*385. *P. salicifolius*

*386. *P. stocksii*

AMARANTHACEAE

*387. *Achyranthus coynei*

*388. *Amaranthus cathrus*

389. *Psilotrichum sericeum*

PODOSTEMACEAE

390. *Cladopus hookerianus*

PIPERACEAE

391. *Piper trichostachyon*

MYRISTICACEAE

392. *Knema attenuata*

393. *Myristica malabarica*

LORANTHACEAE

394. *Dendrophthoe trigona*

XVI. HELICANTHES

395. *Helicanthes elastica*

396. *Helixanthera obtusata*

397. *H. wallichiana*

*398. *Scurrula stocksii*

399. *Tolypanthus lagenifer*

EUPHORBIACEAE

*400. *Acalypha dalzellii*
401. *Blachia denudata*
402. *Bridelia crenulata*
403. *Cleistanthus malabaricus*
404. *Croton gibsonianus*
405. *Dimorphocalyx lawianus*
406. *Drypetes venusta*
*407. *Euphorbia concanensis*
*408. *E. katrajensis*
*409. *E. khandalensis*
410. *E. notaptera*
*411. *E. panchganiensis*
412. *E.sebastinei*
413. *Glochidion ellipticum*
414 *G. johnstonei*
415. *G. malabaricum*
416. *G. tomentosum*
417. *Jatropha nana*
418. *Mallotus stenanthus*
419. *Phyllanthus scabrifolius*
420. *Trewia polycarpa*

URTICACEAE

421. *Pouzolzia integrifolia*

ORCHIDACEAE

422. *Aerides dalzelliana*
423. *A. maculosum*
424. *Bulbophyllum fimbriatum*
425. *B. neilgherrense*
426. *Dendrobium aqueum*
427. *D. barbatulum*
428. *D. herbaceum*
429. *D. lawianum*

430. *D. mabelae*

431. *D. microbulbon*

432. *D. ovatum*

XVII. DIPLOCENTRUM

433. *Diplocentrum recurvum*

434. *Eria dalzellii*

435. *E. exilis*

436. *E. microchilos*

437. *E. mysorensis*

438. *Eulophia ochreata*

439. *E. ramentacea*

440. *Flickingeria macraei*

*441. *Habenaria caranjensis*

442. *H. crassifolia*

443. *H. foliosa* var. *foliosa*

*444. *H. foliosa* var. *foetida*

445. *H. foliosa* var. *gibsoni*

446. *H. grandifloriformis*

447. *H. heyneana*

448. *H. hollandiana*

449. *H. longicorniculata*

450. *H. multicaudata*

451. *H. ovalifolia*

*452. *H. panchganiensis*

453. *H. rariflora*

454. *H. roxburghii*

455. *H. suaveolens*

456. *Loxoma maculatum*

457. *Oberonia brunoniana*

458. *O. platycaulon*

459. *Peristylus stocksii*

460. *Porpax jerdoniana*

461. *P. reticulata*

462. *Trias stocksii*

ZINGIBERACEAE

463. *Curcuma amada*

464. *C. decipiens*

*465. *C. inodora*

466. *C. neilgherrensis*

467. *C. pseudomontana*

*468. *C.purpurea*

*469. *Hitchenia caulina*

470. *Zingiber cernuum*

471. *Z. neesanum*

MUSACEAE

472. *Ensete superbum*

AMARYLLIDACEAE

*473. *Crinum brachynema*

*474. *C. eleonorae* f. *elaonarae*

*475. *C. eleonorae* f. *purpurea*

*476. *C. woodrowii*

477. *Pancratium parvum*

*478. *P. sanctae-mariae*

DIOSCOREACEAE

479. *Dioscorea bolophylla*

LILIACEAE

480. *Asparagus laevissimus*

*481. *Camptorrhiza indica*

482. *Chlorophytum attenuatum*

483. *C. bharuchae*

484. *C. borivilianum*

*485. *C. glaucoides*

486. *C. glaucum*

*487 *Dipcadi concanense*

*488. *D. maharashtrensis*

*489. *D. minor*

*490. *D. saxorum*

*491. *D. ursulae* var. *ursulae*

492. *D. ursulae* var. *longiracemosae*

493. *Drimia polyantha*

*494. *D. polyphylla*

*495. *D. razii*

496. *Iphigenia magnifica*

497. *I. patlida*

*498. *I. stellata*

499. *Protasparagus asiaticus*

500. *P. jacquemontii*

*501. *P. karthikeyanii*

502. *P. racemosus* var. *subacerosa*

*503. *Scilla viridis*

COMMELINACEAE

504. *Belosynapsis vivipara*

505. *Commelina attenuata*

506. *C. hirsuta*

507. *Cyanotis arcotensis*

508. *C. cerifolia*

509. *C. concanensis*

510. *C. fasciculata* var. *glabrescens*

511. *C. papilionacea* var. *vaginata*

512. *Murdannia crocea* ssp. *ochracea*

513. *M. lanuginosa*

514. *M. versicolor*

515. *Tonningia cucullata*

ARECACEAE

516. *Arenga wightii*

517. *Calamus thwaitesii*

518. *Hyphaene dichotoma*

519. *Phoenix robusta*

ARACEAE

520. *Amorphophallus commutatus*

*521. *A. konkanensis*

*522. *Arisaema caudatum*

523. *A. murrayi*

*524. *A. sahyadricum*

*525. *A. sivadasanii*

*526. *Cryptocoryne cognata*

527. *C. cognatoides*

528. *Theriophonum dalzellii*

529. *Typhonium bulbiferum*

ALISMATACEAE

530. *Wiesneria triandra*

APONOGETONACEAE

*531. *Aponogeton bruggenii*

532. *A. satarensis*

ERIOCAULACEAE

*533. *Eriocaulon bolei*

534. *E. conicum*

535. *E. cuspidatum*

536. *E. dalzellii*

537. *E. duthiei*

538. *E. eleanorae*

539. *E. eurypeplon*

540. *E. fysonii*

541. *E. heterolepis*

542. *E. lanceolatum*

543. *E. leucomelas*

544. *E. margaretae*

545. *E. minutum*

546. *E. parviflorum*

*547. *E. ratnagirica*

548. *E. ritchieanum*

*549. *E. rouxianum*

*550. *E. santapaui*

551. *E. sedgwickii*

*552. *E. sharmae*

553. *E. stellulatum*

554. *E. talbotii*

*555. *E. tuberiferum*

HYDATELLACEAE

556. *Trithuria konkanensis*

CYPERACEAE

557. *Bulbostylis subspinescens*

558. *Carex caricina var. glaucina*

*559. *Cyperus decumbens*

*560. *C. pentabracteatus*

*561. *Eleocharis lankana* ssp. *mohamadi*

562. *Fimbristylis kingii*

563. *F. nagpurensis*

*564. *F. ratnagirica*

*565. *F. unispicularis*

566. *F. woodrowii*

*567. *Mariscus blatteri*

*568. *M. konkanensis*

*569. *Pycreus bolei*

*570. *P. lanceolatii*

571. *P. malabaricus*

*572. *Scirpus naikianus*

*573. *Scleria poklii*

POACEAE

574. *Apocopis mangalorensis*

575. *A. vaginata*

576. *Aristida redacta*

577. *A. stocksii*

*578. *Arthraxon hispidus* var. *junnarensis*

579. *A. hispidus* var. *santapaui*

580. *A. jubatus*

581. *A. lanceolatus* var. *meeboldii*

582. *A. lanceolatus* var. *raizadae*

583. *A. lanceolatus* var. *villosus*

584. *Arundinella ciliata*

585. *A. leptochloa*

586. *A. metzii*

587. *A. nervosa*

588. *A. purpurea*

589. *A. spicata*

590. *A. tuberculata*

XVIII. BHIDEA

*591. *Bhidea burnsiana*

592. *Chloris bournei*

593. *C. quinquesetica*

594. *Chrysopogon asper*

595. *C. hackelii*

596. *C. lancearius*

597. *C. orientalis*

598. *C. polyphyllus*

599. *Cleistachne stocksii*

*600. *Coelachne minuta*

601. *Cymbopogon gidarba*

602. *Cynodon barberi*

XIX. DANTHONIDIUM

603. *Danthonidium gammiei*

*604. *Dichanthium armatum*

*605. *D. compressum*

606. *D. concanensis*

607. *D. filiculme*

608. *D. huegelii*

*609. *D. jainii*

*610. *D. maccanii*

611. *D. odoratum*

612. *D. oliganthum*

*613. *D. panchganiensis*

614. *D. paranjpyeanum*

615. *D. tuberculatum*

*616. *D. woodrowii*

*617 *Dimeria blatteri*

618. *D. connivens*

619. *D. hohenackeri*

620. *D. ornithopoda* var. *megalantha*

621. *D. santapaui*

*622. *D. stapfiana*

623. *D. woodrowii*

624. *Eragrostiella brachyphylla*

625. *Garnotia arborum*

XX. GLYPHOCHLOA

626. *Glyphochloa acuminata* var. *acuminata*

627. *G. acuminata* var. *stocksii*

628. *G. acuminata* var. *woodrowii*

629. *G. divergens* var. *divergens*

630. *G. divergens* var. *hirsuta*

631. *G. forficulata*

632. *G. goensis*

633. *G. mysorensis*

*634. *G. ratnagirica*

*635. *G. santapaui*

636. *G. talbotii*

*637. *Heteropogon polystachyos*

638. *H. ritchiei*

XXI. INDOPOA

639. *Indopoa paupercula*

640. *Isachne angladei*

*641. *I. bicolor*

*642. *I. borii*

643. *I. elegans*

644. *I. gracilis*

645. *I. lisboae*

646. *I. meeboldii*

*647. *I. swaminathanii*

*648. *Ischaemum holei*

*649. *I. bombaiense*

650. *I. dalzellii*

*651. *I. diplopogon*

*652. *I. huegelii*

653. *I. impressum*

654. *I. molle*

655. *I. pilosum*

656. *I. raizadae*

657. *I. ritchiei*

*658. *I. santapaui*

659. *I. thomsonianum*

660. *I. travancorense*

661. *I. tumidum*

662. *Iseilema anthephoroides*

663. *I. holei*

664. *Lophopogon tridentatus*

665. *Mnesithea clarkei*

666. *Ophiuros bombaiensis*

667. *Oropetium roxburghianum*

668. *O. villosulum*

*669. *Panicum deccanense*

*670. *P. johnii*

*671. *P. paianum* var. *painanum*

*672. *P. paianum* var. *minor*

*673. *P. phoiniclados*

674. *Paspalum canarae* var. *fimbriatum*

XXII. POGONACHNE

*675. *Pogonachne racemosa*

676. *Pseudanthistiria heteroclita*

XXIII. PSEUDODICHANTHIUM

*677. *Pseudodichanthium serrafalcoides*

678. *Pseudoxytenanthera ritcheyi*

679. *P. stocksii*

*680. *Sacciolepis indica* var. *intermedia*

681. *Sehima sulcatum*

682. *Sorghum deccanense*

683. *Spodiopogon rhizophorus*

684. *Themeda strigosa*

685. *Tragus roxburghii*

XXIV. TRILOBACHNE

686. *Trilobachne cookei*

XXV. TRIPLOPOGON

*687. *Triplopogon ramosissimus*

688. *Tripogon capillatus*

689. *T. jacquemontii*

690. *T. lisboae*

*691. *T. polyanthus*

692. *T. pungens*

693. *Urochloa semiundulata*

694. *Vetiveria lawsonii*

THREATENED PLANTS OF MAHARASHTRA

A threatened species is one thought to be at significant risk of extinction in the foreseeable future, because of stochastic or deterministic factors affecting its populations or by virtue of inherent rarity (WCMC, 1992). In the year, 1994, during the 40th meeting of IUCN Council, the species Survival Commission (SSC) has come out with an improved version of Red List categories. In India out of the 17000 species of Higher plants near 1256 species are threatened. Nearly 251 species of plants are under varying degrees of threat in Maharashtra. The threatened plants have been listed category-wise below :

Extinct (EX) : A taxon is extinct where there is no reasonable doubt that the last individual has died. Seven taxa viz., *Crinum eleonorae* f. *eleonorae* *C. eleonorae* f. *purpurea*, *C. woodrowii*, *Drimia polyphylla*, *Eriocaulon rouxianum*, *Habenaria caranjensis* and *Scilla viridis* have probably become extinct.

Critically endangered (CR) : A taxon is critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future. Twenty seven species viz., *Abutilon ranadei*, *Aponogeton bruggenii*, *A. satarensis*, *Begonia concanensis*, *Brachystelma malwanense*, *Camptorrhiza indica*, *Ceropegia evansii*, *C. fantastica*, *C. huberi*, *C. jainii*, *C. lawii*, *C. maccannii*, *C. mahabalei*, *C. oculata*, *C. odorata*, *C. panchganiensis*, *C. rollae*, *C. sahyadrica*, *C. santapaui*, *Crinum brachynema*, *Dipcadi concanense*, *D. saxorum*, *Drimia razii*, *Frerea indica*, *Ipomoea salsettensis*, *Lepidagathis bandraensis* and *Rotala ritchiei* come under this category.

Endangered (EN) : A taxon is endangered when it is not critically endangered but is facing a very high risk of extinction in the wild in the near future. The following 38 taxa come under this category. *Argyreia pilosa*, *Barleria sepalosa*, *Begonia trichocarpa*, *Bidaria khandalensis*, *Campanula alphonsii*, *Ceropegia attenuata*, *C. media*, *C. noorjahaniae*, *C. vincaefolia*, *Chlorophytum attenuatum*, *C. borivilianum*, *Crotalaria filipes*, *Cryptocoryne cognatoides*, *Cucumis setosus*, *Delphinium malabaricum* var. *malabaricum*, *D. malabaricum* var. *ghaticum*, *Dicaelospermum ritchiei*, *Dipcadi maharashtrensis*, *Entada rheedei*, *Eulophia ochreata*, *E. ramentacea*, *Euphorbia panchganiensis*, *Flickingeria macraei*, *Glyphochloa santapaui*, *Habenaria multicaudata*, *Heterostemma deccanense*, *H. urceolatum*, *Hygrophila anomala*, *Iphigenia magnifica*, *Nothapodytes nimoniana*, *Pogostemon stocksii*, *Polyzygus tuberosus*, *Salacia brunoniana*, *Seshagiria sahyadrica*, *Thalictrum dalzellii*, *T. obovatum*, *Trilobachne cookei* and *Triplopogon ramosissimus*.

Vulnerable (VU) : A taxon is vulnerable when it is not critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium future. The following species come under this category.

Aerides maculosum, Alysicarpus belgaumensis, A. luteo-vexillatus, A. pubescens var. vasavadae, Amorphophallus konkanensis, Arisaema caudatum, A. murrayi, A. sahyadricum, Barleria gibsonii, B. gibsonioides, B. prattensis, Beaumontia jerdoniana, Belosynapsis vivipara, Bhidea burnsiana, Bulbophyllum fimbriatum, B. neilgherrense, Calacanthus gandiflorus, Capparis rheedei, Chlorophytum glaucoides, C. glaucum, Crotalaria decasperma, C. lutescens, Cryptocoryne cognata, Curcuma amada, C. decipiens, C.inodora, C. pseudomontana, Cyanotis concanensis, Decaschistia trilobata, Dendrobium barbatulum, Dichanthium maccanii, D. woodrowii, Dicliptera nasikensis, Drimia polyantha, Eriocaulon dalzellii, E. fysonii, Euphorbia concanensis, Flemingia nilgheriensis, Habenaria crassifolia, H. foliosa, H. longicorniculata, H. panchganiensis, H. rariflora, Hitchenia caulina, Hydnocarpus pentandra, Hygrophila pinnatifida, Hyphaene dichotoma, Impatiens dalzellii, I. lawii, I. pulcherrima, I. tomentosa, Indigofera dalzellii, I. deccanensis, Iphigenia pallida, I. stellata, Ischaemum diplopogon, Lamprachenium microcephalum, Lobelia nicotianaefolia, Nogra dalzellii, Ophiuros bombaiensis, Paracaryopsis coelestinum, P. malabarica, Phoenix robusta, Piper trichostachyon, Pogonachne racemosa, Smithia purpurea, Sonnerila scapigera, Swertia corymbosa var. elatior, Wiesneria triandra, Zingiber cernum and *Z. neesanum.*

Lower Risk (LR) : A taxon is Lower Risk when it has been evaluated but does not satisfy the criteria for any of the categories Critically Endangared, Endangered or Vulnerable. The following 109 species come under this category. *Achyranthes coynei, Allophylus concanicus, Amorphophallus commutatus, A. sylvaticus, Argyreia cuneata, Arthraxon lanceolatus var. meeboldii, Arundinella tuberculata, Begonia phrixophylla, Bidaria cuspidata, Canscora concanensis, Carvia callosa, Ceropegia bulbosa, Cleome simplicifolia, Coelachne minuta, Commelina hasskarlii, C. kotschyi, C. paleata, Crotalaria lutescens, C. priestleyoides, Curcuma neilgherrensis, C. purpurea, Cyanotis cerifolia, C. fasciculata var. glabrescens, C. pilosa, C. tuberosa, Cyathocline lutea, Cynospernum asperrimum, Danthonidium gammiei, Dendrobium microbulbon, Derris thothathrii, Dichanthium armatum, D. compressum, D. oliganthum, D. panchganiensis, D. paranjpyeanum, D. tuberculatum, Dimeria blatteri, D. hohenackeri, D. stapfiana, D. woodrowii, Dipcadi minor, D. ursulae, Elaeocarpus munronii, Ensete superbum, Erinocarpus nimmonii, Eriocaulon ratnagirica, Euclasta clarkei, Euphorbia*

katrajensis, E. sebastinei, Exacum lawii, Flemingia gracilis, Garcinia gummi-gutta var. conicarpa, Garnotia arborum, Glyphochloa acuminata, Habenaria grandifloriformis, H. panchganiensis, Haplanthodes tentaculata, H. verticillatus, Heracleum aquilegifolium, Heteropogon polystachyos, Hoya alexicocca, Hypoestes lanata, Indopoa paupercula, Iphigenia indica, Ipomoea clarkei, Isachne lisboae, Ischaemum bombaiense, I. raizadae, I. ritchiei, I. santapaui, I. thomsonianum, I. travancorense, I. tumidum, Kalanchoe olivacea, Lepidagathis lutea, Murdannia crocea ssp. ochracea, M. dimorpha, M. versicolor, Nanothamnus sericeus, Neanotis carnosa, N. montholoni, N. rheedii, Oropetium roxburghianum, Pogostemon salicifolius, Porpax reticulata, Pseudodichanthium serrafalcoides, Pseudoxytenanthcra ritcheyi, Psilotrichum sericeum, Pterospermum reticulatum, Rhamphicarpa longiflora, Rungia crenata, R. linifolia, Scleria psilorrhiza, Scurrula stocksii, Senecio dalzellii, Smithia agharkarii, Sorghum deccanense, Sphenostylis bracteata, Swertia minor, Theriophonum dalzellii, Tripogon capillatus, T. jacquemontii, T. lisboae, Trithuria konkanensis, Typhonium bulbiferum, Utricularia praeterita, U. purpurascens, Vepris bilocularis and Vigna khandalensis.

VULNERABILITY AND MAJOR THREATS TO DIVERSITY

Maharashtra has some of the most diverse natural ecosystem in India. The plant diversity is increasingly affected by various factors, both biotic and abiotic. The threats in the former category include grazing, regeneration of scrub, changes in arable farming, ploughing of old grassland, forestry, traditional rural pracices, drainage, water pollution, air pollution, industrialization and urbanisation, road building, tourism and tourist development, dam construction, mining and quarrying, pressure from introduced plants, collectors for botany, fishing, hunting or harvest for medicine and timber, loss of habitat because of exotic animals, fragmentation and exotic plants.

The natural threats include floods, earthquakes, lack of pollinators, climate, disease, edaphic (soil related) factors, genetic problems, marine perturbations, drought, fire, hurricane, landslides and pressure from weeds and alliens. The following examples go to show as to how plant diversity of Maharashtra is being threatened because of biotic factors.

Sinar Mas Paper and Pulp Project :

As this plant which is located near Bhigwan was consuming water from the neighbouring populations and having an adverse effect on

hundred acres of neighbouring agricultural land due to discharge of untreated effluents, the Maharashtra Pollution Board revoked the permission for the controversial trial runs of this project.

Bandra-Kurla Complex :

According to the observations made by NEERI, the tidal influence from the Mahim bay does not reach Mithi river due to blockage on the river created by the temporary bridge made of hume pipes.

Lonar lake :

Unchecked cutting of trees surrounding the lake located in Buldhana district is disturbing the lake ecosystem and accelerating the rate of silting in the lake.

Western ghats :

The forest cover in the Western ghats of Maharashtra has dropped to 25 per cent the lowest in the entire range resulting in denudation of hills as they have been subjected to intensive developmental activity since Independence. Internationally the Western ghats, have been classified as one of the world's 18 hot spots of bio-diversity that is under threat. A special regulation to develop tourism in Maharashtra was passed by the State Government in 1996 which threaten to destroy the ecology of the Western Ghats. Some of the main ecological concerns are advent of Konkan Railway, with new concepts of development and industrialisation, stimulating urbanisation of the Western Ghats, growth of devastating chemical zones.

Sugar factories coming up in wooded regions like Amboli, Gagan Bawada, Shirala in south Maharashtra and setting off a change in crop patterns. More land being used for sugarcane cultivation leading to unbalanced use of water.

Increasing pressure on sanctuaries due to loss of habitat outside. Alarming rise in differentation and poaching activities. Growing land deals in the western ghats. The farm house and resort culture is threatening the jungles and disturbing wildlife. Spread of horticulture, land levelling, clearing of native vegetation on hill slopes and unplanned plantations resulting in monocultural. Soil erosion, hampering the life of major rivers. Recurrent occurrences of devastating landslides.

Mahabaleshwar :

According to a survey carried out jointly by the BEAG and the Satara Collector it has been observed that avaricious entrepreneurs are

throwing all rules to wind to erect monstrous multistoreyed structures in the heart of this hill station which comprises the charming bazaar. The sylvan surroungings of the thickly wooded leasehold residential properties are also being mauled to make way for ambitious hotels and motels. The Mahabaleshwar-Panchgani plateau is ecologically a very important region in the North Sahyadri hill ranges. It forms the watershed of 5 rivers, viz., Krishna, Koyna, Venna, Gayatri and Savitri and for the 3 important reseroirs of Koyna, Dham and Kanher. It is a store house of botanical wealth. Nearly 70% of the total number of plant species found in the whole of Maharashtra can be encountered in the plateau. The forest, wherever it is protected, exhibits climax vegetation where all the elements of the ecosystems are in balance and the web of life is complete. Any disturbance to any of its elements is sure to have wide ranging repercussions. Annually 6-7 lakh tourists visit Mahabaleshwar. *Carvia callosa* ('Karvi') which flowers once in 7 years is responsible for holding the soil firmly in the hill slopes. It is being continuously uprooted for commercial use and soil erosion has been tremendous on the fragile Mahabaleshwar.

Matheran :

If proper care is not taken this beautiful hill resort may soon give into the clutches of pollution. Natural erosion of the soil due to torrential rains during monsoon is the dreadful enemy of the forests at Matheran. This hill station has to also deal with tonnes of plastic bags strewn all over the places by careless tourists, hoteliers and local residents.

Recently Maharashtra Government's Environment Department has prepared a draft notification aimed at banning the use of plastic bags. The plastic bags are choking the drains during the monsoon season.

Sahara Lake City complex which was under construction in Lonavla on the slopes above Mulshi Lake was affecting the hydrology and forest cover of the region. It involved 3,763 acres of land. Bombay High Court in December 1998 set aside the permission granted by the State Government to Sahara India Housing Ltd. to develop a hill station near Lonavla. Again the work of Dimbhe dam, across the river Ghod, meant to irrigate the area began in 1978 has caused endless problems to the state. Another project viz., the Enron Power Project located in a remote village, Dabhol on the verdant Konkan coast, had generated a lot of heat and public controversy. According to NEERI report there is contamination of water sources due to the power plant.

Senior forest officials, associated with research are perturbed over not yet dropped mining proposal that has threatened the department's

clonal Teak seed Orchard a unique collection of teak clones at Lohara in Chandrapur District despite Indian Government's commitment to strike a balance between open economy and protecting its rich environment. Deforestation is in the cards in at least 3 forest blocks covering over 6,548 hectares in the rich eastern forests of Maharashtra for supplying coal for Nippon Denro Ispat company's Thermal Power Project. It also threatens Maharashtra's prime Tadoba-Andhari-Tiger Reserve. The Nippon Denro mining proposal could affect reserved and protected forests in Lohara forest block and Baranj and Bandar mining blocks. The Lohara and Bandar blocks are so close to the famous Tadoba-Andhari tiger reserve that the mining activities there would spoil the continuous track of forest, severely damaging the habitat for once-again threatened tiger population and the wild life.

Large aras of mangrove forest have been destroyed along the Thane Creek, from the mud flats of Sewri up to the estuaries that lead into Bhiwandi and Kalyan. Some moths have also defoliated plants dotting the coast of Navi Mumbai Belapur leaving large tracts of brown patches which are actually mangroves stripped to their roots by the moths. The ecologically sensitive mangroves play a very important role in maintaining the biodiversity along the shores of Mumbai. Besides being spawing ground for fish and other marine life, they also prevent the shore line from being eroded by sea. In October 1996, the NEERI submitted a set of recommendations to the Supreme Court regulating a number of plans with the Regional Plan for Dahanu region. The report also mentions an incident when a large number of fishes were found dead in the Mumbra creek.

Pune city forest department was trimming trees on the reserve slopes of Vetal Tekdi at Bhamburda, to clear patches for bungalows to house its officials. Following protests raised by nature loving citizens the forest department has given up its plan for construction on the thickly afforested area in a valley behind Gokhale Nagar forming a part of the verdant Bhamburda forest park. The Pashan Lake which was once a source for drinking water and also the destination of several exotic species of Asian migratory birds faces threat to its very survival as a precious fresh water source because of 1) the thick and rapid growth of *Ipomoea* weed which chokes the lake 2) Construction of houses near lakes and the sewage being dumped pollutes the fresh water source, 3) Unchecked grazing has harmed the indigenous tree species 4) The Asian migratory birds have reduced in number due to the degradation of the lake's environment. An example of natural threat the region at the foot hill on Western side of the Mahabaleshwar plataeu, the sites in Panchgani city on western side of table plateau, which are densely populated, are falling great risk of devastating landslides. Subsidence or soil creeping can be distinctly

observed at various places in these regions which indicates the initiation of landslide activity. Landslides have also occurred in Varandha ghat in Raigad District and Malshej ghats near Junnar recently.

CONSERVATION MEASURES

The above said various threats affecting the phytodiversity should be taken care of to conserve it. Developmental activities are inevitable in any developing society but efforts should be made to make use of the ecosystems in a sustainable manner, which means a balance has to be achieved between the two.

The hill chain of Western Ghats has been recognised as one of the world's 18 biodiversity hot spots, i.e., region of high levels of biodiversity under threat of rapid loss. If we want to protect western ghat's biodiversity, we need to avoid a crisis and confrontation. We need a totally new approach, which should encourage us to look at whole ecosystems and not at tiny plots of land. It should strike out a compromise and balance between man and nature.

Maharashtra has a large numer of sacred froves ('Devraies') which represent relict type of vegetation and conserve many rare and threatened plants. Earlier these were protected due to the fear of the ruling deity but due to education, belief in the supernatural is diminishing and so these have to be managed properly by educating and creating awareness among people. Sacred groves should be conserved (Vartak, 1996). Recently, the Union Government has proposed statuatory protection to sacred groves by including it in the draft bio-diversity bill. With this, India will become the first country to legislate bio-diversity.

The government has also declared 5 National Parks and 34 Sanctuaries which is an essential part of conservation. These also should be managed effectively. Besides this insitu conservation, exsitu measures have also to be adopted through biotechnology and multiplication in botanical gardens, etc. Sincere Non-Government Organisations have also to be roped in to educate the masses, for proper and effective conservation of plant diversity.

NATIONAL PARKS AND SANCTUARIES IN MAHARASHTRA

National parks and sanctuaries are legally protected areas. While National Parks are habitat oriented, Sanctuaries are species oriented. Currently there are some 8,491 protected areas in the world covering 77,34,900 sq km or 5.19% of the earth's land area (WCMC, 1992). In

India, protected areas have existed since the 4th Century BC with the establishment of 'Abhayaranxyas' or 'forest reserves'. There are 362 sites covering 1,37,70,557 hectares of land area (WCMC, 1992). According to World Development Indicators 1998 (World Bank) in India, the area of land under naturally protected forests is 143.4 thousand sq km which is 4.8% of total land area. According to Samar Halarnhar (India Today of 9th March 1998), the forests and the protected area network of India comprise 532 National Parks and Wildlife sanctuaries occupying an area of 1.5 lakh sq km.

Mabarashtra has an extremely heterogenous bigeographical configuration. The topography varies fom sea coast to high mountains of Western Ghats and Deccan Plateau. Likewise the vegetation also varies from mangroves, semi-evergreen, moist deciduous, dry-deciduous, scrubs and thorn forests. It provides an ideal habitat for varied animal life. The state houses tigers, bisons, black-bucks, sambhars, leopards, an array of birds, insects, reptiles, etc.

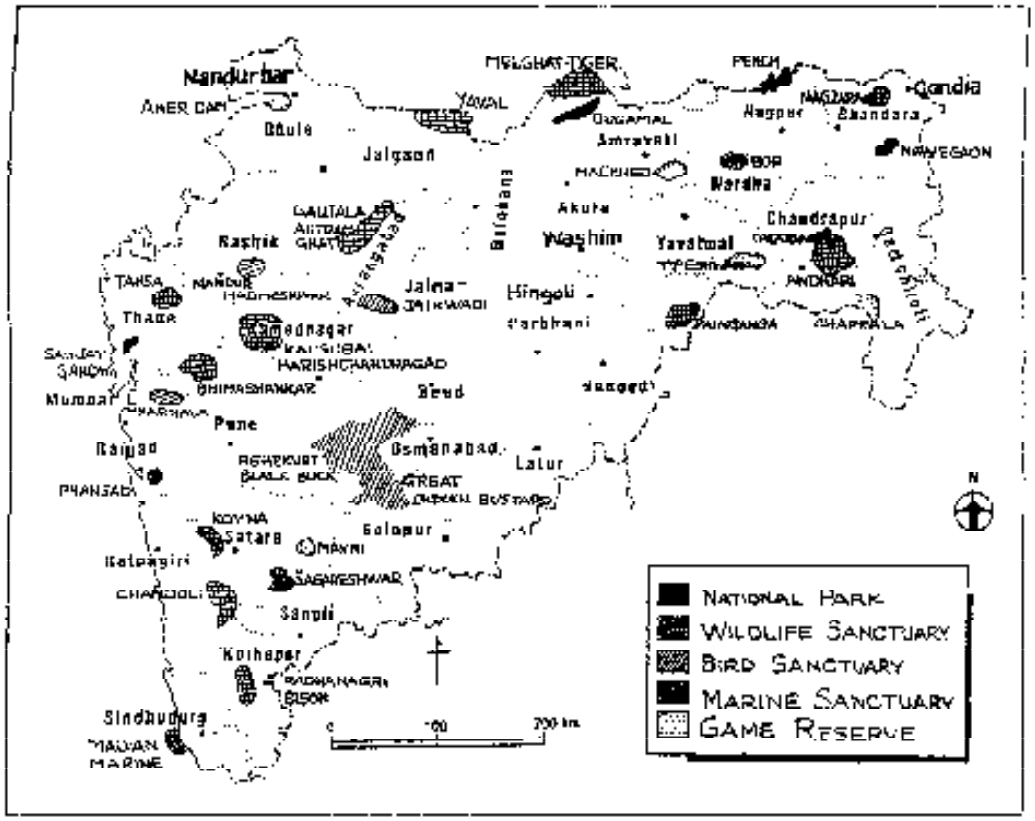
There are 5 National Parks and 34 sanctuaries (Map V). The total area of protected forests is 15,340.82 sq km which is 5% of the land mass. List of National Parks and sanctuaries along with their districts in Maharashtra is as given below :

National Parks :

Gugamal (Amravati), Nawegaon (Bhandara), Pench (Nagpur), Sanjay Gandhi Rashtriya Udyan (Mumbai, Thane) and Tadoba (Chandrapur).

Sanctuaries :

Ambabarwa Wildlife (Buldhana), Andhari Wild Life (Chandrapur), Aner Dam Wildlife (Dhule), Bhamargarh Wildlife (Gadchiroli), Bhimashankar Wildlife (Thane, Pune), Bor Game (Wardha, Nagpur), Chandoli Wildlife (Kolhapur, Sangli, Satara, Ratnagiri), Chaprala Wildlife (Gadchiroli), Deulgaon Rehukari black buck (Ahmednagar), Dnyanaganga Wildlife (Buldhana), Gautala Autramghat (Jalgaon, Aurangabad), Great Indian Bustard (Solapur, Ahmednagar), Jaikwadi bird (Ahmednagar), Kalsubai-Harishchandragad Wildlife (Ahmednagar), Karnala Fort bird (Raigad), Karanja Sohal Kalvit (Akola), Katepurana (Akola), Koyna Wildlife (Satara), Malvan marine (Sindhudurg), Mayureshwar wildlife (Pune), Melghat wildlife (Amravati), Nagzira Wildlife game (Bhandara), Naigaon peacock (Beed), Nandur Madhmeshwar bird (Nasik), Narnala wildlife (Akola), Painganga (Kinwat) (Yavatmal), Phansad Wildlife (Raigad), Radhanagari Wildlife (Extension) (Kolhapur), Sagareshwar Wildlife (Sangli), Tansa Wildlife (Extension) (Thane), Tipeshwar wildlife



Map V : Maharashtra State—National Parks and Sanctuaries

(Yavatmal), Wan wildlife (Amravati), Yadai Ramling ghat wildlife (Osmanabad) and Yawal Wildlife (Jalgaon).

The biodiversity loss is increasing at an alarming rate in the state as a result of rapid industrialisation (especially in the rural areas) and spreading transport facilities. Therefore, efforts for conservation of biodiversity need to be urgently made. Establishment of National Parks and Sanctuaries is a good example of insitu conservation wherein the forest trees, wild plants, wild animals and micro-organisms all occur together in an ecosystem. Proper management of a protected area is dependent on so many factors. IUCN and WCMC are working in an effort to develop reliable indicators by which management can be accurately assessed. According to IUCN at least 5% of land should be set aside for conservation. Even though Maharashtra fulfils this condition it is mainly due to the disproportionately large size of the Great Indian Bustard Sanctuary in Solapur District which is 8,496.64 sq km and consists primarily of agricultural land. If this area is excluded only 6,844.18 sq km or 2.2% of the cover mass of Maharashtra could be considered to be within the protected area network. This area, therefore needs to be reduced and alternative sites which have conservation potential must be included in the protected area network of the state so that the proportion of land necessary to maintain the diversity of species and ecosystems can be enhanced (Bharucha, 1997). Out of the protected areas notified, only 3 are primarily aquatic. Thus we find that certain ecotypes are poorly represented in the heterogenous landscape types of Maharashtra. Out of 5 National Parks, Nawegaon (Malhotra & K.M. Rao, 1982), Pench (Kamble & Londhe to be published), Sanjay Gandhi Rashtriya Udyan (Fernandes, 1954 M.Sc. thesis, Sharma & Pradhan to be published) and Taroba (Malhotra & Moorthy, 1992) have been botanically studied. Out of 34 sanctuaries work on Bhimashankar Wildlife (Janardhanan, 1966, Ph.D. Thesis), Nagzira Wildlife game (Malhotra & K.M. Rao, 1981), Nandur Madhmeshwar Bird (Shinde & S.M. Almeida, 1994) and Radhanagari Bison Sanctuary (Sharma et al. to be published) have already been completed. Project Tiger area in Amravati district has also been botanically explored.

Sanjay Gandhi National Park faces threat mainly due to 1) Urbanisation and industrialisation, 2) Clandestine felling of trees for multifarious purposes, 3) Quarry, mining operations and 4) Clearance of forests for high tension electric towers and cables.

Recently the Maharashtra Government shrank the Kalsubai-Harishchandragarh Sanctuary to find a place for a pumping station and reservoir without referring to the State legislature. This is a dangerous trend, which should not be encouraged at any cost.

SACRED GROVES IN MAHARASHTRA

These are relicts of conserved natural forests, generally composed of trees thanks largely due to the faith and reverence man has got for God. It is locally known as `Deorai' or `Deorahat'. These groves are associated with religious beliefs. It is supposed to be the abode of `Forest God', generally Goddess and are known for long. The practice of dedicating forest patches to deities is an ancient custom. Even the Rishies and Munies used to have their ashrams in such groves for training disciples in various fields. The wild animals also used to live there in complete harmony along with human beings. This sort of co-existance provided natural sanctuaries for both life forms plants and animals. The removal of any plant material or killing any animal from the sacred grove is taboo. Thus the sacred groves have often remained intact in ancient times as natural sanctuaries. With change of time such beliefs have been breaking down and with it sacred groves are also disappearing.

The size of sacred groves vary between 1 acre or 10-15 or more acres. Various records of sacred groves and their floristic analysis have been published. (Gammie, 1903; Gadgil & Vartak, 1976a & b; Kumbhojkar & Vartak, 1988; Nipunage et al., 1988; Sharma & Kulkarni, 1980; Vartak, 1983 & 1987; Vartak & Gadgil, 1981 a & b; Vartak et al. 1987).

There are more than 400 sacred groves in various regions of Maharashtra. They are found in western ghats, Konkan and drier parts of the state. Pune has nearly 109 sacred groves, followed by Kolhapur with 37, Thane with 21, Satara & Sindhudurg with 16 each, Raigad & Ratnagiri with 15 each. Some examples of sacred groves are Janni near Mangaon village in Panshet water catchment area of Pune district, Khandoba near Shirdale village in Ambegaon taluka of Pune district, Bapuji boovalhe in Sinhagad hill of Pune district, etc.

An inventory of sacred groves in Maharashtra has been provided (Gadgil & Vartak, 1981). The total area documented for the sacred groves is c 3,570 hectares. The sacred groves exhibit rich floristic diversity and are more or less pockets of climax vegetation. The well preserved vegetation in the sacred groves is quite distinct from surrounding areas which support dry deciduous or scrub type of vegetation. Most of the sacred groves contain a small number of montane subtropical evergreen, moist deciduous and some dry deciduous elements which are rare or threatened. There are nearly 790 or more species belonging to c 352 genera (Jagtap, 1997).

The common trees observed in these 'Dev Raies' are *Albizia chinensis, Atalantia racemosa, Cassia fistula, Dysoxylum binectariferum, Ixora brachiata, Lagerstroemia microcarpa, Mangifera indica, Memecylon umbellatum, Terminalia bellirica, T. chebula*, etc.

The common shrubs include *Carrisa congesta, Clerodendrum viscosum, Crotalaria retusa, Gnidia glauca, Leea indica, Microcos paniculata*, etc. *Climbers usually found are Capparis moonii, Clematis gouriana, Combretum latifolium, Elaeagnus conferta, Jasminum malabaricum, Luvunga sarmentosa*, etc.

The tree species that occur rarely in these groves are *Aglaia lawii, Beilschmiedia dalzellii, Clausena indica, Diospyros oocarpa, Elaeocarpus serratus, Erinocarpus nimmonii, Euonymus indicus, Garcinia talbotii, Holigarna grahamii, Persea macrantha, Prunus ceylanica, Syzygium cumuni, S. hemisphericum*, etc.

The climbers found rarely are *Aganosma cymosa, Carissa inermis, Diploclisia glaucescens, Hippocratea grahamii, Naravelia zeylanica, Paramignya monophylla, Salacia macrosperma*, etc. The herbaceous plants found rarely include *Floscopa scandens, Gymnostachyum glabrum, Lepidagathis fasciculata, Staurogyne zeylanica*, etc. in addition to the common species of *Begonia, Blumea, Sida, and Triumfetta*.

The sacred groves harbour some wild relatives of cultivated plants besides many medicinal, timber yielding, economically important, rare and endangered plants. Hence it is important for us to conserve these groves which are repository of rich biodiversity and genetic resources. They have become particularly important in modern times because of the increasing pace of deforestation. The sacred groves help in conservation of water, provides good manure to the surrounding vegetation and focus the relationship between ethnic groups (Kumbhojkar & Kulkarni, 1998). More than 150 sacred groves have been affected in Kolhapur, Satara and Pune districts as a result of establishment of water reservoirs. Increase in population and commercialisation of agriculture have resulted in encroachment of sacred groves. Recently the government of India has proposed statutory protection to sacred groves (protected forests) by including it in the draft biodiversity bill. It is essential to determine the economics of conservation as regards the livelihood of the people living around the area.

ETHNOBOTANICAL STUDIES IN MAHARASHTRA

Man depended on plants since times immemorial. Our knowledge of the intimate relationship between early man and plants is mainly due to the surviving tradition. This relationship which now forms the core of interdisciplinary science known as `Ethnobotany' has attracted much attention, not only due to its great academic or historical importance but also due to many economic applications. The term 'ethnobotany' was first coined by J.W. Harshberger in 1895 to indicate plants used by the aboriginals. According to Robins et al. (1916) ethnobotany is the study and evaluation of the knowledge of all phases of plant life of among primitive societies and of the effects of the vegetal environment upon the life, customs, beliefs and history of the people of such society. C.B. Heisser, Jr. (1995) defines 'ethnobotany' as the study of plants in relation to people and include both wild and domesticated plants. Plotkin (1995) defined 'ethnobotany' as the study of tribal people and their utilisation of tropical plants.

The research in the field of ethnobotany in India was initiated by Janaki Ammal in mid fifties who made intensive studies on the food plants of certain tribes. Jain and his associates carried out extensive and intensive studies among certain tribes and revealed the intimate relationship between the tribals and plant environs. Valuable new information on plants used by the tribals and potential resources for further exploitation was brought on record by them from central, western and eastern India. These studies gave a great boost to the subject as it is evident from the publications emanating from various institutions.

In Maharashtra, Malhotra & Moorthy (1973) suggested the need for ethnobotany. Gadgil & Vartak (1980) initiated the study of sacred groves and its relation to ethnobotany. Other important works dealing with general ethnobotany of the region include those of Kamble & Pradhan (1982), Kulkarni & Kumbhojkar (1997), Kumbhojkar et al. (1996), Sharma & Lakshminarasimhan (1986), Sharma & Malhotra (1984), Tiwari (1995), Tosh (1996) and Ved Prakash & Mehrotra (1987). Information on wild food plants used by the tribals from Western ghats of Maharashtra have been compiled by Datar et al. (1975), Gunjatkar & Vartak (1982), Kulkarni & Kumbhojkar (1992), Kumbhojkar & Vartak (1988), Vartak (1959, 1981), Vartak & Kulkarni (1987) and Vartak & Suryanarayana (1995).

Information about the fuel, wood, fodder, non-wood and socio-economic plant resources used by the tribals of Western Maharashtra have been provided by Ghate (1992), Ghate & Sane (1994), Ghate & Vartak (1996), Ghate et al. (1990) and Kulkarni & Kumbhojkar (1992 a

& b, 1993, 1994, 1996). A number of plants have been used by tribals as medicine which have been recorded by Badhe & Sharma (1982), Janardhanan (1963), Kulkarni (1968), Upadhye et al. (1986, 1994), Vartak & Madhavgane (1981), Vartak et al. (1987) and Yadav & Bhamare (1989).

Tribal population of Maharashtra is low as compared to states like Madhya Pradesh, Rajasthan, Orissa, Bihar and NE India. The size of tribal population in Maharashtra is 9.19% of the total population according to 1991 census. There are 47 tribes found in Maharashtra (Bhatt, 1998). Some of the main tribals and the areas where they are concentrated are as given below :

Tribes	Districts
Bhil	Dhule, Nasik, Jalgaon.
Mahadeokoli	Nasik, Pune, Thane, Raigad, Ahmednagar.
Gond	Chandrapur, Yavatmal, Nanded.
Warli	Thane, Nasik.
Kokana	Nasik, Dhule, Thane.
Thakur	Thane, Raigad, Pune, Nasik, Ahmednagar.
Katkari	Raigad, Thane, Pune, Nasik.
Gamit	Dhule.
Malhar Koli	Thane.
Korku	Amravati.
Andh	Parbhani, Nanded.
Kolam	Yavatmal.
Dhanaka	Dhule, Jalgaon.
Dhar Koli	Thane, Nasik.

Here is a comprehensive list of plants used by tribals for various purposes.

I. Plants used as famine food :

Abutilon pannosum (seeds), *Acacia leucophloea* (young pods), *Acalypha indica* (leaves), *Aerva lanata* (leaves), *A. sanguinolenta* (leaves), *Alternanthera sessilis* (leaves), *Alysicarpus rugosus* (seeds), *Amaranthus spinosus* (leaves), *A. tricolor* (leaves), *A. viridus* (leaves & shoots), *Amorphophallus paeoniifolius* var. *campanulatus* (tubers), *Ariopsis peltata* (leaves), *Arisaema tortuosum* (tubers), *Asystasia gangetica* (leaves), *Bambusa arundinacea* (shoots), *Basella alba* (leaves), *Bauhinia malabarica* (shoots, seeds & leaves), *B. purpurea* (flowers & fruits), *B. racemosa* (seeds), *Bombax ceiba* (fruits & buds), *Capparis zeylanica* (fruit), *Cardiospermum halicacabum* (leaves & young shoots), *Cassia auriculata* (leaves), *C. occidentalis* (leaves), *C. tora* (leaves), *Cayratia auriculata* (leaves), *C. pedata* (stem), *C. trifolia* (leaves), *Ceiba pentandra* (seeds, flowers), *Celosia argentea* (leaves), *Chlorophytum tuberosum* (leaves), *Clerodendrum serratum* (tubers), *Commelina benghalensis* (leaves), *C. maculata* (shoot & leaves), *Corchorus olitorius* (leaves), *Cordia dichotoma* (leaves & fruits), *Crinum viviparum* (bulbs), *Digera muricata* (leaves), *Ensete superbum* (inflorescences, buds & fruits), *Ehretia laevis* (bark powder), *Euphorbia hirta* (leaves and tender shoots), *Ficus benghalensis* (ripe fruits), *F. racemosa* (ripe fruits), *F. religiosa* (ripe fruits), *Gisekia pharnaceoides* (leaves), *Holarrhena pubescens* (flowers & seeds), *Indigofera cordifolia* (seeds), *I. linifolia* (seeds), *Ipomoea marginata* (leaves), *Leptadenia reticulata* (leaves and tender shoots), *Madhuca longifolia* var. *latifolia* (seeds and flowers), *Melia azedarach* (ripe fruits), *Meyna laxiflora* (green fruits), *Morinda citrifolia* (green and ripe fruits), *Murraya koenigii* (leaves), *Murdannia nudiflora* (seeds), *Nymphaea pubescens* (roots, petioles, peduncles, shoots & fruits), *Oxalis corniculata* (leaves), *Pavetta crassicaulis* (flowers), *Phoenix sylvestris* (leaf buds and ripe yellow fruits), *Polygala arvensis* (leaves), *Premna obtusifolia* var. *pubescens* (leaves and tender shoots), *Rivea hypocrateriformis* (leaves and tender shoots), *Santalum album* (seeds), *Sesbania grandiflora* (seeds), *Solanum nigrum* (leaves and young shoots), *S. virginianum* (unripe fruits), *Tamarindus indica* (leaves and seeds), *Tonningia axillaris* (seeds), *Tribulus terrestris* (leaves and shoots), *Vigna radiata* var. *sublobata* (seeds), *V. trilobatus* (seeds), *V. vexillata* (tubers) *and Wattakaka volubilis* (leaves).

II. Plants used as fish poison :

Abrus precatorius (seeds), *Acacia pennata* (fruits), *Alangium salvifolium* (bark and root), *Albizia procera* (bark), *Ammannia baccifera* (leaves), *Barringtonia acutangula* (bark), *Capparis decidua* (root), *Casearia elliptica* (sap), *C. graveolens* (fruits and bark),

Catunaregam spinosa (bark & fruits), *Diospyros montana* (root), *Euphorbia fusiformis* (latex), *E. tirucalli* (latex), *Gnidia glauca* (leaves and bark), *Hydnocarpus pentandra* (fruit), *Madhuca longifolia* var. *latifolia* (bark), *Maesa indica* (leaves and bark), *Mundulea sericea* (seeds), *Ougeinia oojeinensis* (bark), *Sapindus laurifolius* (fruits), *Securinega virosa* (whole plant), *Trichosanthes cucumerina* (plant juice) and *Walsura trifoliata* (fruit pulp).

III. Plants yielding fermented drinks :

Acacia ferruginea (bark), *A. leucophloea* (bark), *Agave americana* (juice of plant), *Anacardium occidentale* (fleshy receptacle), *Borassus flabellifer* (spadix sap), *Calotropis gigantea* (milky latex), *Caryota urens* (spadix sap), *Cassia tora* (seed decoction), *Cocos nucifera* (spadix sap), *Eleusine coracana* (grains), *Glossocardia bosvallea* (whole plant), *Madhuca longifolia* var. *latifolia* (flowers), *Oryza sativa* (grains), *Phoenix sylvestris* (stem juice), *Saccharum officinarum* (stem juice), *Sorghum bicolor* (seeds) and *Syzygium cumini* (fruits).

IV. Sacred Plants :

Acacia catechu, Achyranthes aspera, Aegle marmelos, Albizia lebbeck, Amaranthus tricolor, Areca catechu, Azadirachta indica, Bauhinia purpurea, B. racemosa, Benincasa hispida, Bridelia retusa, Butea monosperma, Calotropis gigantea, Capparis zeylanica, Cassia fistula, Cassia tora, Chlorophytum tuberosum, Crotalaria juncea, Cucumis sativus, Curcuma longa, Cynodon dactylon, Desmostachya bipinnata, Drypetes roxburghii, Eclipta prostrata, Elaeocarpus sphaericus, E. tuberculatus, Emblica officinalis, Ensete superbum, Euphorbia ligularia, Ficus amottiana, F. benghalensis, F. racemosa, F. religiosa, Ipomoea pes-caprae, Leea macropyylla, Limonia acidissima, Mangifera indica, Musa paradisiaca, Nelumbo nucifera, Neolamarckia cadamba, Nerium oleander, Nyctanthes arbor-tristis, Nymphaea pubescens, Ocimum americanum, O. tenuiflorum, Pandanus odoratissimus, Plumeria alba, Prosopis cineraria, Santalum album, Saraca asoca, Sesbania grandiflora, Smithia sensitiva, Solena amplexicaulis, Tagetes erecta, Trichosanthes tricuspidata, Wrightia tinctoria and Ziziphus mauritiana.

V. Wild plants yielding edible fruits :

Aegle marmelos, Alangium salvifolium, Allophylus serratus, Ampelocissus latifolia, Antidesma ghaesembilla, Artocarpus hirsutus, A. lakoocha, Bombyx micranthus, Bridelia retusa, B. squamosa,

Buchanania lanzan, Canthium dicoccum var. umbellatum, Capparis brevispina, C. decidua, C. spinosa, Careya arborea, Carissa congesta, Cassia absus, Catunaregam spinosa, Cayratia trifolia, Cordia dichotoma, Dillenia pentagyna, Diospyros melanoxylon, D. montana, D. nigrescens, Ficus amplissima, F. exasperata, F. racemosa, F. virens, Flacourtia indica, F. montana, Garcinia gummi-gutta, G. xanthochymus, Glycosmis arborea, Gmelina arborea, Grewia flavescens, G. tiliifolia, Memecylon umbellatum, Mesua ferrea, Miliusa tomentosa, Mukia maderaspatana, Neolamarckia cadamba, Nothopegia racemosa, Olax scandens, Pavetta crassicaulis, Salvadora persica var. wightiana, Schleichera oleosa, Schrebera swietenioides, Tamilnadia uliginosa, Trewia nudiflora, Tylophora dalzellii, Xantolis tomentosa, Ziziphus oenoplia and *Z. rugosa.*

VI. Wild plants used as fodder :

Acacia nilotica ssp. indica, A. torta, Actinodaphne angustifolia, Ailanthus excelsa, Albizia lebbeck, A. procera, Alysicarpus longifolius, A. rugosus, Andropogon pumilis, Apluda mutica, Argyreia nervosa, Balanites aegyptiaca, Bauhinia vahlii, B. variegata, Boswellia serrata, Brachiaria eruciformis, Boswellia serrata, Cassia fistula, Catunaregam spinosa, Celastrus paniculatus, Chloris barbata, C. virgata, Chrysopogon fulvus, Clerodendrum serratum, Cocculus hirsutus, Crotalaria hebecarpa, C. juncea, Cynodon dactylon, Dactyloctenium aegyptium, Dalbergia lanceolaria, D. latifolia, Derris scandens, Desmodium velutinum, Dichanthium annulatum, D. caricosum, D. foveolatum, Digitaria ciliaris, Dinebra retroflexa, Echinochloa colona, Erythrina stricta, Ficus exasperata, Garuga pinnata, Grewia tilliifolia, Haldina cordifolia, Hardwickia binata, Heteropogon contortus, Ischaemum indicum, I. pilosum, Iseilema laxum, I. prostratum, Kydia calycina, Martynia annua, Nervilea plicata, Pueraria tuberosa, Prosopis cineraria, Rhizophora mucronata, Salix tetrasperma, Smithia sensitiva, Streblus asper, Tephrosia purpurea, Thelepaepale ixiocephala, Thelepogon elegans, Themeda tremula, Urochloa panicoides and U. ramosa.

VII. Narcotic plants :

Cannabis sativa, Datura metel, Lobelia nicotianaefolia, Nicotiana tabacum, Paspalum scrobiculatum and Piper betle.

VIII. Plants used for wrapping bidis :

Bauhinia racemosa (leaves) and *Diospyros melanoxylon* (leaves).

IX. Plants used in gum extraction

Acacia nilotica ssp. *indica, Anogeissus latifolia, Boswellia serrata, Butea monosperma, Cochlospermum religiosum, Lannea coromandelica and Sterculia urens.*

X. Plants used for making musical instuments

Dendrocalamus strictus and *Lagenaria siceraria.*

XI. Plants used in basket making :

Carvia callosa, Dendrocalamus strictus and *Nyctanthus arbor-tristis.*

XII. Plants used as cordage :

Agave sisalana (leaves & stem fibre), *Aspidopterys cordata* (stem fibre), *Careya arborea* (bark fibre), *Cissus quadrangularis* (stem fibre), *Cissus repens* (stem fibre) *and Dichrostachys cinerea* var. *indica* (stem fibre).

WASTELAND DEVELOPMENT IN MAHARASHTRA

According to World Development Indicators 1998 (World Bank), out of the total land area of India which is 29,73,000 sq km, 57% are crop lands, 4% are permanent pasture lands, 39% are other lands. In Maharashtra, out of the total land area of 30.7 m ha, crops occupy 18.2 m ha, forests 6.4 m ha and other lands 6.1 m ha. Almost 5 m ha of other lands are lying without any vegetation cover, susceptible to erosion, drought and progressive land degradation. They are known as wastelands and are unable to support crop production but have the potential for biomass production. `Wastelands' are lands which does not give enough economic return or is otherwise useless. They are normally uncultivated, uninhabited and barren lands lacking moisture, with poor soil and are not conducive to regeneration of vegetation. Recently 'wastelands' are defined as those which are 1) ecologically unstable, 2) whose top soil has nearly or completely been lost and 3) develops toxicity in the zone of roots, so essential for the growth of plants. According to National Wasteland Development Board set up under the Ministry of Environment & Forests `Wasteland' is that land which is degraded and is presently lying unutilised except as current fallows due to different constrains. These wastelands are futher classified into culturable and unculturable wastelands. Culturable

wastelands is a land which is capable or has the potential for development of vegetation cover and is not being used because of various constrains. In Maharashtra the following categories of culturable lands have been recognised.

1. Gullies and ravinous lands :

The gullies are formed as a result of localised surface runoff and is the first stage of excessive land dissection followed by networking which leads to the development of ravinous lands. Such wastelands are predominant in the eastern slopes of Western Ghats (districts of Pune, Satara, Sangli, Dhule and Nasik) and some parts of Chandrapur, Gadchiroli and Bhandara districts.

2. Salt affected land :

It is the land that has adverse effects on the growth of most of the plants due to presence of excess soluble or exchangeable sodium. Such lands are occuring in Sangli, Solapur, Eastern Kolhapur, Yavatmal, Buldhana and parts of Pune district.

3. Shifting cultivation areas :

It is the result of cyclical land use consisting of felling trees and burning forest areas for growing cash crops. This results in excessive soil loss leading to land degradation. Such shifting cultivation practices are predominant in the districts of western ghats where tribal population is more. It is found in Nasik, Thane, Raigad, Sindhudurg, Ratnagiri, Kolhapur, Pune and also in some parts of Chandrapur, Gadchiroli and Akola districts.

4. Degraded forest lands :

These are lands as notified unde the Forest Act and are with various types of forest cover in which denudation of vegetation cover is less than 20% of canopy cover. They occur all over Maharashtra.

5. Degraded pasture/ grazing lands :

They are found in non forest area whether or not they are permanent pastures or meadows and have become degraded due to lack of proper soil conservation and drainage measures. Such lands are formed practically all over Maharashtra.

6. Strip lands :

These are long narrow strips of lands on either sides of transportation networks (rail and road) and canal bunds which are hospitable for the growth of vegetation cover.

7. Sands :

They are those which have stabilized accumulation of sand insitu or transported in coastal riverine or inland areas. Such lands occur mainly in Sindhudurg, Raigad, Ratnagiri districts, parts of Solapur district and other arid zones.

8. Mining and Industrial wastelands:

Mining wastelands are lands where large scale mining operations bring about the degradation of land and resultant mine dumps. They are developed in eastern districts like Chandrapur, Nagpur, Bhandara, Gadchiroli and some parts of Ratnigiri. Industrial wastelands are those which are subject to degradation caused by large scale industrial discharge. They are found throughout Maharashtra.

CAUSES OF FORMATION OF WASTELANDS :

Cattle are encroaching more and more forest lands for grazing and finally develops them into wastelands. Over exploitation of existing forest areas to meet social requirements of fuel, fodder and timber of the rural people is also a major reason for formation of wastelands. Similarly lack of proper soil conservation and watershed management, lack of planning for extraction from forests on sustainable basis and various developmental activities are also responsible for the formation of wastelands.

ROLE OF PLANTS IN RECLAMATION OF WASTELANDS:

The most inexpensive way to prevent soil from being washed away or wind erosion is to keep it covered with vegetation. On wastelands, a cover with grasses, legumes, shrubs and trees should be grown and maintained. If cutting and grazing are prohibited, the land may slowly recover on its own and may eventually become productive. For reclamation and afforestation of any wasteland, the choice of species of grasses and other plants should be such that the demand for input is the least and attention needed is almost negligible. They should have deep and large root system, preferably hard and fast growing. The trees should be coppicing, pallarding, encouraging the growth of grasses and weeds under their canopy, besides being economically importnt. Such species help in reconstructing the lost topsoil and prevent further soil erosion. Once the top soil is stabilised, community formation starts in a natural way. As this is a slow process, the main plantations must be supplemented with grasses, fast growing annuals, nitrogen fixing plants, etc. to enhance the process of colonisation and biomass formation. It is also very important to use the

economically important species as per the need of local populations on priority basis for wasteland reclamation and development.

The following are some plants that can be grown for wasteland reclamation in Maharashtra.

1. Acacia auriculiformis

Useful for arid, semiarid, saline, alkaline, ravines, lateritic soils and coastal sand dunes as a soil binder, suitable for grassy banks and degraded hill slopes. It is also a good shade and avenue tree. It is also a reasonably good fire wood tree.

2. A. farnesiana

It is recommended for arid and semi-arid soil, saline and alkaline soils. It makes good fence. It is an important nitrogen fixing plant. Also used as fuel wood.

3. A. leucophloea

It is useful for the arid and saline banks, gullies and ravines, sandy loams with 250-400 mm annual rainfall. It conserves moisture, fixes nitrogen. It is useful as wind breaks, fodder and fuel wood.

4. A. nilotica ssp. indica

It is highly recommended for various types of wastelands as it improves the porocity and productivity of the soil and water supply of wells in surrounding areas. It is used as shelter belts, avenue trees. It is an important nitrogen fixing species particularly in dry regions.

5. Aegle marmelos

Recommended for ravines, arid regions and wind breaks. Leaves are used as fodder.

6. Agave americana

It can be grown on various types of wastelands. It is a good soil holder, prevents erosion of bunds, railway embankments and barren slopes. It is recommended for social forestry.

7. A. sisalana

It is extremely drought resistant. It is recommended for barren hill slopes and mine soils as well as lignite.

8. Ailanthus excelsa

As it is fast growing and suitable for various types of wastelands it is recommended for anti erosion on eroded gullies and semi-arid areas. Also planted as avenue tree for deep shade.

9. Albizia amara

It is used for reclamation of wastelands in drier areas, as shelter belts and wind breaks. It is an excellent fuel wood. Leaves are sometimes used as fodder.

10. A. lebbeck

Suitable in various types of wastelands. It is used as shade trees, shelter belts, wind breaks, and for green manure. It is a source of good fire wood. Leaves yield a nutritious palatable fodder.

11. Alycicarpus rugosus

It can be grown mixed with *Dichanthium annulatum*. It can be planted on a variety of light and medium heavy soils with good drainage, recommended for sand stabilization in coastal regions. Also it fixes nitrogen. Leaves are highly palatable and is a good fodder.

12. Anacardium occidentale

Planted for afforestation on barren, denuded areas, coastal saline sands. It is also a good soil binder. It is also a good source of revenue.

13. Annona reticulata

It can be grown on various types of wastelands but not suitable for alkaline or saline soils. It can be grown in hilly tracts and rocky areas. It's fruits are edible.

14. A. squamosa

It can be grown on many types of soils, does not withstand alkalinity or salinity. It can be grown on hilly tracts, rocky areas, recommended for agroforestry. Its fruits are edible.

15. Azadirachta indica

It is a fast growing sturdy tree and can be established without irrigation in hot and dry regions, planted for reclaming acidic soils, especially on mining wastelands. A very useful tree.

16. Bauhinia racemosa

It is useful for checking soil erosion in arid zones.

17. Bombax ceiba

It is suited for afforestation of new grounds, grasslands, gullies and ravines, degraded forest lands. Leaves are used as fodder.

18. Boswellia serrata

It is valuable for afforestation, can be grown in semi-rocky soils. It can be planted as wind breaks and shelter belts.

19. Butea monosperma

It is recommended for reclamation and afforestation of inundated, badly drained, waterlogged or saline banks and also in arid zones. Leaves are lopped for feeding buffaloes.

20. Calophyllum inophyllum

It is recommended for protection from erosion along coasts. It can be planted for wind breaks in controlling sand drift.

21. Cassia auriculata

It is recommended for afforestation and reclamation of arid and semi-arid areas. It is a good soil binder. Leaves can be used as manure to improve alkaline soils.

22. C. fistula

It is recommended for afforestation in arid and semiarid areas, degraded forest lands, gullies, ravines and hill sides. It is used as green manure.

23. Casuarina equisetiformis

It is extensively cultivated on wastelands for reclamation and for fuel. It is suitable for windbreaks on seashores and it produces greater biomass. It is a source of good firewood. It retains heat for a long time.

24. Dalbergia latifolia

It can grown on poor dry stony soils, water logged soils and grassy banks. It is recommended for wind breaks and shade. Leaves are lopped for firewood.

25. D. sissoo

It is recommended for gullies, ravines and mining sites. It can be grown on saline and alkaline soils. It is excellent for firewood and suitable for charcoal. A good timber species.

26. Dichrostachys cinerea var. indica

It is recommended for afforestation. It is well adapted for arid and dry regions as cover. It is a source of good fuelwood.

27. Dodonea viscosa

It is a good soil binder. It is very useful for reclothing denuded tracts and slopes where soils are poor and dry. It is recommended for hedges for controlling sand drift areas and for social forestry.

28. Emblica officinalis

It can be grown successfully in salt affected soils, suitable for bauxite mined and dry areas, recommended for agro and social forestry for its valuable fruits.

29. Eucalyptus spp.

It can be used for reclamation and development of different types of wastelands. Some promising species of *Eucalyptus* for plantations are *E. camaldulensis, E. eugenioides, E. globosus, E. gomphocephala, E. hemipholia, E. occidentalis* and *E. paniculata,* etc.

30. Euphorbia ligularia

They can be planted on exposed, degraded hill slopes and plateaus for reclamation, hedge and wind break.

31. E. nivulia

They are found as undergrowth of dry deciduous low forests and on dry and rocky places. Often grown as hedges in sandy areas as soil binder.

32. Gmelina arborea

It is recommended for rocky soils in medium rainfall areas, also for hills, grassy banks, gullies, ravines and degraded forest lands. Leaves are considered as good fodder.

33. Grevillea robusta

It is recommended for lateritic soils, hillsides, moist areas, suitable for mined areas as shelter belts. It is moderately good for fodder.

34. Holarrhena pubescens

It is important for reclothing barren hill slopes.

35. Holoptelea integrifolia

It can be grown on rocky debris, gullies and ravines. Also recommended for block planting in social forestry. It is a very good fuel wood tree.

36. Ipomoea aquatica

It is suitable for reclamation of marshy lands. It is relished by cattle and pigs as good fodder. Leaves used as fish food.

37. I. pes-caprae

It is useful as soil binder and recommended for sands, coastal sands and mangrove regions.

38. Jatropha curcas

It is planted mainly to prevent water erosion. It is recommended to grow as shelterbeds and used as green manure.

39. Justicia adhatoda

It grows everywhere and recommended from rocky to sandy areas including denuded hill tops. Wood is used for brick burning and rab.

40. Leucaena latisiliqua

A multipupose and ideal tree for wastelands, basically planted to check soil erosion and reclamation. It is suitable for water retention of soil, as fodder and fuel.

41. Madhuca longifolia var. latifolia

It is recommended for saline and alkaline soils, water logged areas and black soils. It is a good fuel wood.

42. Melia azedarach

It is well suited for afforestation. It is recommended for ravines and mined sites. Also planted as an ornamental shade tree.

43. Moringa oleifera

It is recommended for gullies and ravines, also for agro and social forestry.

44. Morus alba

It acts as a soil protector, promotes clean growth of species like Sissoo.

45. Oujeinia oojeinensis

It is suitable for arid and semi-arid regions. Production of numerous root suckers on or near surface ground greatly help in clothing unstable steep banks and hill sides, etc. It is a useful host for lack insect.

46. Parkinsonia aculeata

It is useful for afforestation of dry sand dunes, arid and semi-arid areas as shelter belts and wind breaks. It is recommended for social forestry. It is used as fuel wood, makes good charcoal.

47. Pithecellobium dulce

It is recommended specially for denuded areas as shelter belts and wind breaks. It is a good fuel wood. Leaf is a good fodder.

48. Pongamia pinnata

It is commonly planted for afforestation especially in watershed, arid, semi-arid and moist or water logged areas, checks erosion. It is commonly used as fuel wood.

49. Ricinus communis

It can be grown on various types of soils, withstands dry aid climate, heavy rains and floods, but susceptible to frost. It is recommended for agro forestry and social forestry. Dried stems and wells are highly combustible fuels.

50. Samanea saman

It can be grown on dry and barren lands. It is suitable for reclaming swampy areas and grassy banks, fixes nitrogen. It is a good shade tree. Tender leaves are used as fodder. It is a good host for lac insect.

51. Sesbania cannabina

Due to vigorous root system, the plant can be grown on almost any type of soil, withstands high rainfall and competition from weeds. It is recommended for social forestry. It is used as green manure. As fodder it is suitable for poultry and cattle.

52. Stylosanthes procumbens

It is suitable for semi-arid tracts. It is a highly palatable pasture legume available throughout the year.

Grasses and sedges have special importance in reclamation and further development of wastelands. Many grasses are perennials and their rootstocks survive under adverse conditions such as in sand, water logged areas and banks of various watercourses where they help in prevention of soil erosion. Grasses are hardy, drought-frost resistant, also establish with minimum moisture. Grasses produce large biomass and hold the soil together, the biomass gives sufficient cover and mulch and creates favourable microclimate.

The following are some of the grasses and sedges which can be used for reclamation and development of wastelands in Maharashtra.

1. *Andropogon pumilus*
2. *Apluda nutica*
3. *Aristida adscensionis*
4. *Arundinella nepalensis*
5. *Cenchrus biflorus*
6. *C. ciliaris*
7. *C. setigerus*
8. *Chloris barbata*
9. *Cymbopogon citratus*
10. *C. martinii*
11. *Cynodon dactylon*
12. *Cyperus bulbosus*
13. *C. iria*
14. *C. rotundus*
15. *Dichanthium annulatum*
16. *Diplachne fusca*
17. *Echinochloa colona*

18. *E. crusgalli*

19. *Eragrostiella bifaria*

20. *Heteropogon contortus*

21. *Juncellus laevigatus*

22. *Panicum antidotale*

23. *P. miliaceum*

24. *Saccharum spontaneum*

25. *Spinifex littoreus*

26. *Vetiveria zizanioides*

The above species of plants are only selective and a lot more can be added for wasteland reclamation and development.

FOREST BIOTA

The forests provide home for wild animals, particularly the deer, antelopes and wild pigs and the carnivores which live on the former. The best forests in Yavatmal-Chandrapur area of Vidarbha also have plentiful wild-life. The forests of Western ghats and Satpuda ranges are of some importance for forest purpose, but have little wildlife. The forests of Western ghats have perhaps been denuded almost completely of wild life. There is general reduction in various types of wild life. The Nilgiri and Blackbuck have particularly disappeared from all parts of the state. Sambhar, Chousangha and Chinkara which were plentiful at one time have become rare in several parts of the state. Some of the factors causing reduction in wildlife are enumerated below :

1) Extension of cultivation and reduction of forest area and grass lands.

2) Misuse of crop protection guns for killing birds and animals.

3) Large scale pouching for meat, skins, feathers, etc. by villagers and for organised trade.

4) Disturbance of wildlife in their natural habitat owing to the increased human activities for collection of firewood, leaves, forest produce, etc.

5) Use of pesticides and poisons.

6) Shooting permits to VIPs and consequences resulting in shooting of wilf life.

Already black bucks (distribution is fragmented), spotted deer, sambhar and wild pigs have been wiped out in large areas of the state and carnivores whose native food is formed of them are bound to go the same way either directly or after clashing with human interests in some form or the other. Sloth beer (Aswal) is rarely found. The Indian Bison and Giant Squirrel are restricted to western ghats. The tiger once found in all districts of Maharashtra are now restricted to eastern districts of Vidarbha and in south-west Maharashtra. Very recently a royal striped tiger was spotted in Bhimashankar sanctuary. It might have lost its way from neighbouring thick jungles of northern Maharashtra along the edge of the Western Ghats. Two snakes viz., Malabar Pit viper and large scaled shield tail are endemic to western ghats of Maharashtra. Flying lizards (Draco) and Shamelion are rare lizards. Nearly 17 species of birds are endemic to North Sahyadris. Some examples are Malabar crested lark, Malabar gray horn bill, pented bush quail and Sahyadri yellow browed bul-bul. The following table gives the number of species of different animal forms occurring in India and Maharashtra.

Animal Forms	No. in India	No. in Maharashtra
Mammals	320	85
Reptiles	440	100
Birds	1,200	466-500
Insects	50,000	30,000
Fishes	1,400	600
Amphibians	140	29

Following is a list of some of the common species (with zoological and Marathi names) of different animal forms occurring in Maharashtra (Source Maharashtra State Gazetteers Fauna Series 1974) :

Mammals

Axis axis (Chital), *Bos gaurus* (Gawa), *Boselaphus tragocamelus* (Nilgai), *Cauis aureus* (Kolha), *Cervus unicolor* (Sambhar), *Cnon alpinus* (Raan-kutra), *Felis bengalensis* (Waghya-manjar), *F. chaus* (Ran-manjar), *Funambullus palmarum* (Khar), *Gazella gazella* (Chinkara), *Herpestes edwardsi* (Mongoose), *Hyaena hyaena* (Taras), *Hystrix indica* (Salindar, Salu), *Lepus nigricollis* (Sasa), *Manis crassicaudata* (Khawlya manjar), *Mellivora capensis* (Chandi Aswal), *Melursus ursinus* (Aaswal), *Muntiacus muntjak* (Bhekar), *Panthera pardus* (Bibtya), *Panthera tigris* (Wagh), *Paradoxurus hermaphorditis* (Ul-manjar), *Petaurista petaurista* (Udan-khar), *Presbytis entellus* (Wanar), *Rattus rattus* (Undir), *Sus scrofa* (Raan dukkar) and *Tetracerus quadricornis* (Chowsinga).

Aves (Birds)

Accipiter nisus (Bahiri sasana), *Acridotheres tristis-tristis* (Myna), *Amaurornis phoenicurus* (Pankombdi), *Ardea alba* (Motha bagla), *Bubo bubo* (Motha ghubad), *Babulcus ibis-coromandus* (Gaibagla), *Centropus sinensis-parroti*, *Centropus sinensis-parroti* (Bharadwaj), *Clamator jacobinus* (Chatak), *Columba livia* (Kabutar), *Copsychus saularis* (Dayal), *Corvus splendens* (Kawal), *Dicrurus adsimilis* (Kotwal), *Eudynamys scolopacea* (Kokil), *Falco peregrinus-peregrinator* (Sasana), *Francolinus pictus* (Jangli Titar), *Gallus sonneratii* (Ran kombda), *Grus antigone* (Saras Crane), *Gyps bengalensis* (Gidhad), *Halcyon sonyrnensis* (Khandya), *Milvus migrans* (Ghar), *Orthotomus sutorius* (Shimpi), *Pavo cristatus* (Mor), *Pessex domesticus* (Chinni), *Petronia xanthocolis* (Ran chimni), *Podiceps ruficollis-capensis* (Pandubi), *Psittacula krameri* (Popat), *Pycnonotus cafer* (Bulbul), *Spilornis cheela* (Sarp gamd), *S. cirrhatus* (Sasani garud), *Tadorna ferruginea* (Chakrawak), *Terosiphona paradisi* (Shahi bulbul), *Treron phoenicoptera* (Hariyal) and *Vanellus indicus-indicus* (Titwi).

Reptiles

Buncarus caeruleus (Manjar), *Calotes versicolor* (Sarda), *Crocodylus palustris* (Magar), *Lissemys punctata* (Kasar), *Najanaja kaouthia* (Naag), *Ptyas mucosus* (Dhaman), *Python molurus* (Ajgar), *Varanus bengalensis* (Ghorpad) and *Vipara russella* (Ghmas).

Amphibians

Bufo malanostictus (Common toad [Beduk]), *Philautus glandulosus* (Tree frog), *Rana cynophlyctis-cyanophlyctis* (skipper frog), *R. rufescens* (Indian Burrowing frog) and *R. tigerana* (Indian Bull frog).

Fishes (Pisces)

Anguilla anguilla (Aheer), *Channa gachua* (Dhok, Dokrya), *Cyprinus carpio* (Sonerimasa), *Eleutheronema tetradactylus* (Rawas), *Harpodon nehereus* (Bombil), *Hippocampus trimaculatus* (Ghoda masa, Seafish), *Labeo rohita* (Rohu), *Mastacembelus armatus* (Vam), *Muraenesox talebon* (Vam), *Pampus argenteus* (Paplet), *Parastromateus niger* (Halwa), *Pseudotropius antherinoides* (Sura), *Puntius kolus* (Kolshi), *Rastrelliger kanagurta* (Bangda), *Scomberumorus commerson* (Surmai), *Strongylura crocodilus* (Tol) and *Tor khudree* (Mahasheer).

Butterflies

Danaus chrysippus (Common tiger), *Euploea core* (Common crow), *Junonia hierta* (Yellow pansy) and *Neptis hyalus* (Common sailor).

The above list is only indicative and not exhaustive.

KEY TO FAMILIES

(P. V. Prasanna)

1. Leaves usually dorsiventral and reticulately veined; seeds contain two cotyledones (Dicotyledones):

2. Perianth usually 2-seriate, outer sepaloid, inner petaloid :

3. Petals free; stamens free from petals :

4. Sepals free from ovary :

5. Stamens indefinite; carpels free or sunk in the torus :

6. Plants aquatic; leaves peltate; flowers > 20 cm across :

7. Ovules 1-2; seeds exalbuminous ... NELUMBONACEAE

7. Ovules many; seeds albuminous ... NYMPHAEACEAE

6. Terrestrial plants; leaves not peltate; flowers < 20 cm across :

8. Flowers bisexual;ovary apocarpous :

9. Climbing herbs or undershrubs ... RANUNCULACEAE

9. Trees or shrubs:

10. Carpels in many whorls ... MAGNOLIACEAE

10. Carpels not in many whorls :

11. Flowers usually greenish; carpels often stalked ... ANNONACEAE

11. Flowers yellow or white; carpels sessile ... DILLENIACEAE

8 Flowers unisexual; ovary syncarpous ... MENISPERMACEAE

5. Stamens usually definite (many in RESEDACEAE); carpels united :

12. Ovary on elongated gynophore ... CAPPARACEAE

12. Ovary not on elongated gynophore :

13. Ovary 2-celled; fruit a siliqua ... BRASSICACEAE

13. Ovary 1-celled; fruit capsular :

14. Leaves exstipulate :

15. Plants with milky juice ... PAPAVARACEAE

15. Plants without milky juice ... RESEDACEAE

14. Leaves stipulate :

16. Trees and shrubs :

17. Leaves palmately lobed. ... COCHLOSPERMACEAE

17. Leaves simple :

18. Thorns usually present; sepals persistent. ... FLACOURTIACEAE

18. Thorns absent; sepals deciduous ... BIXACEAE

16. Herbs (with the exception of PITTOSPORACEAE where they are trees) :

19. Ovary 1- locular :

20. Sepals 5; petals 5, similar ... VIOLACEAE

20. Sepals 2; petals 4, dissimilar ... FUMARIACEAE

19. Ovary usually 2- locular, rarely 1 or more locular :

21. Sepals and petals usually 5 :

22. Flowers irregular, papilionaceous like; seeds arillate ... POLYGALACEAE

22. Flowers regular, not papilionaceous like; seeds exarillate ... PITTOSPORACEAE

21. Sepals and petals 2-5 :

23. Herbs :

24. Succulents; stem nodes promimently hairy; stamens as many as petals ... PORTULACACEAE

24. Plants not succulents; stem nodes glabrous; stamens twice as many as petals ... CARYOPHYLLACEAE

23. Plants usually shrubs or trees :

25. Leaves minute, scaly ... TAMARICACEAE

25. Leaves not scaly :

26. Petals clawed ... XANTHOPHYLLACEAE

26. Petals not clawed :

27. Sepals valvate :

28. Leaves digitate ... BOMBACACEAE

28. Leaves usually simple or lobed :

29. Epicalyx present ... MALVACEAE

29. Epicalyx absent :

30. Plants stellately hairy; seeds occasionaly winged ... STERCULIACEAAE

30. Plants not stellately hairy; seeds wingless :

31. Petals ciliate or laciniate ... ELAEOCARPACEAE

31. Petals not as above :

32. Herbs; petals base clawed; fruits spically horned, shortly prickled ... BYTTNERIACEAE

32. Shrubs or trees, rarely herbs :

33. Leaves opposite; stipules intrapetiolar, persistent; petals with double ligule inside ... ERYTHROXYLACEAE

33. Leaves alternate; stipules not intrapetiolar, deciduous; petals without ligule inside ... TILIACEAE

27. Sepals imbricate :

34. Plants with resinous sap ... DIPTEROCARPACEAE

34. Plants without resinous sap:

35. Leaves alternate :

36. Branches hooked; leaves stipulate:

37. Calyx accrescent in fruit; fruit a indehiscent nut ... ANCISTROCLADACEAE

37. Calyx dedicuous ; fruits capsular, septicidally splitting ... LINACEAE

36. Branches not hooked; leaves exstipulate ... THEACEAE

35. Leaves opposite or whorled :

38. Fruits prickly ... ZYGOPHYLLACEAE

38. Fruits not prickly :

39. Lianas; petals fimbriate ... MALPIGHIACEAE

39. Herbs, shrubs or trees (not lianas); petals entire:

40. Plants with yellowish or greenish juice; leaves exstipulate; stamens many; fruits indehiscent, baccate ... CLUSIACEAE

40. Plants without yellowish or greenish juice; leaves stipulate; stamens equal or twice as many as petals; capsules septicidal ... ELATINACEAE

4. Sepals usually adnate to the ovary :

41. Ovary superior :

42. Disc usually annular, adnate to the stamens or reduced to glands:

43. Stamens as many as petals or fewer :

44. Flowers irregular; dorsal sepal spurred ... BALSAMINACEAE

44. Flowers regular; dorsal sepal not spurred ... GERANIACEAE

43. Stamens twice as many as petals or numerous :

45. Armed trees ... BALANITACEAE

45. Unarmed trees, shrubs or sometimes herbs :

46. Leaves peltate; petals clawed ... TROPAEOLACEAE

46. Leaves not peltate; petals not clawed:

47. Disc enlarged in fruit ... OCHNACEAE

47. Disc not enlarged in fruit :

48. Leaves often gland dotted :

49. Leaves decussate, dark punctate ... HYPERICACEAE

49. Leaves alternate, abounds in pellucid glands with essential oil ... RUTACEAE

48. Leaves not as above :

50. Flowers bisexual; stamens connate:

51. Herbs ... OXALIDACEAE

51. Shrubs or trees :

52. Leaves simple; petals 2-lobed .. DICHAPETALACEAE

52. Leaves compound, if simple then filaments united into a tube; petals entire :

53. Petals usually connivent ... AVERRHOACEAE

53. Petals free :

54. Bark papery; disc annular ... FLINDERSIACEAE

54. Bark corky; disc cupular or tubular... MELIACEAE

50. Flowers usually polygamous, sometimes bisexual; stamens free :

55. Trees with balsaminous sap; seeds exalbuminous ... BURSERACEAE

55. Trees not as above; seeds albuminous ... SIMAROUBACEAE

42. Disc usually cupular, free :

56. Corolla urceolate ... OPILIACEAE

56. Corolla not urceolate :

57. Fruit 1–celled ... ICACINACEAE

57. Fruit 3–5–celled :

58. Leaves exstipulate ... AQUIFOLIACEAE

58. Leaves stipulate :

59. Disc free; petals densely hairy within ... OLACACEAE

59 Disc adnate to the calyx tube or lining it; petals not as above:

60. Flowers regular :

61. Racemes paniculate, umbellate or spicate; stamens opposite to petals :

62. Plants tendrillar, juicy ... VITACEAE

62. Plants non tendrillar, not juicy :

63. Stipules minute or absent; petals cucullate ... RHAMNACEAE

63. Stipules distinct, sheathing adnate to petiole; petals not cucullate ... LEEACEAE

61. Racemes dichasial; stamens alternating with petals ... CELASTRACEAE

60. Flowers often irregular :

64. Leaves stipulate; disc lobed ... STAPHYLEACEAE

64. Leaves exstipulate; disc flat :

65. Petals often bearded or squamate within ... SAPINDACEAE

65. Petals not as above :

66. Style single; fruits elongated ... MORINGACEAE

66. Styles 2-3; fruits not elongated :

67. Plants with resinous juice; anther filaments usually subulate ... ANACARDIACEAE

67. Plants without resinous juice; anther filaments usually clavate or flattened, rarely subulate ... SABIACEAE

41. Ovary peri or epigynous (inferior):

68. Carpels usually free, if united then (ovary) 1-celled :

69. Plants insectivorous ... DROSERACEAE

69. Plants non-insectivorous :

70. Branchlets and leaves succulent; carpels with hypogynous scales ... CRASSULACEAE

70. Branchlets and leaves not succulent; carpels devoid of scales :

71. Small herbs :

72. Aquatic or marshy herbs; fruits drupaceous ... HALORAGACEAE

72. Mesophytic herbs; fruit a capsule ... VAHLIACEAE

71. Trees, shrubs, climbing shrubs or sometimes herbs :

73. Leaves exstipulate :

74. Leaves simple, opposite ... HYDRANGEACEAE

74. Leaves 1–3–foliolate or imparipinnate, alternate ... CONNARACEAE

73. Leaves stipulate :

75. Stamens many; fruits achenes, berries or drupes, rarely capsular ... ROSACEAE

75. Stamens twice as many as petals or fewer; fruit a legume or loment :

76. Flowers actinomorphic; perianth segments valvate in bud ... MIMOSACEAE

76. Flowers zygomorphic; perianth segments imbricate in bud :

77. Corolla papilionaceous, descendingly imbricate ... FABACEAE

77. Corolla not as above, ascendingly imbricate ... CAESALPINIACEAE

68. Carpels united :

78. Mangroves :

79. Petals bifid or fimbriate; stigma capitate ... RHIZOPHORACEAE

79. Petals absent or if present not as above; stigma umbrauculiform ... SONNERATIACEAE

78. Non-mangroves :

80. Ovary 1-celled ... COMBRETACEAE

80. Ovary 2 or more celled :

81. Stamens as many as petals :

82. Calyx tube free or partiall adnate to the ovary; anther connectives appendaged ... MELASTOMATACEAE

82. Calyx tube wholly adnate to the ovary; anther connectives not appendaged ... ONAGRACEAE

81. Stamens usually numerous ; (definite in a few members of LYTHRACEAE)

83. Flowers solitary; petals crinkled ... LYTHRACEAE

83. Flowers not solitary; petals not crinkled :

84. Leaves opposite, usually gland dotted ... MYRTACEAE

84. Leaves alternate, not gland dotted :

85. Inflorescence cauliflorous; fruits cannon ball like ... LECYTHIDACEAE

85. Inflorescence other than cauliflorous; fruits otherwise :

86. Trees; leaves apically clustered ... BARRINGTONIACEAE

86. Herbs, shrubs or climbers; leaves not apically clustered :

87. Young twigs winged; petals crumpled in bud ... PUNICACEAE

87. Young twigs devoid of wings; petals not crumpled in bud :

88. Ovules on parietal placentation :

89. Plants tendrillar :

90. Flowers with distinct corona between petals and stamens; stamens usually 5; fruits baccate or capsular ... PASSIFLORACEAE

90. Flowers without corona; stamens usually 3-4, sinuous or conduplicate; fruit a fleshy berry ... CUCURBITACEAE

89. Plants non-tendrillar :

91. Herbs or subshrubs; leaves stipulate :

92. Petioles with discoid foliar glands; petals clawed ... TURNERACEAE

92. Petioles without such glands; petals not clawed :

93. Monoecious, succulent, terrestrial herbs; stamens numerous ... BEGONIACEAE

93. Aquatic herbs; stamens 4 ... TRAPACEAE

91. Tall trees, buttressed at base; leaves exstipulate ... TETRAMELACEAE

88. Ovules on axile or basal placentation :

94. Calyx free or rarely adnate to the ovary :

95. Stems fleshy and flat, areolate; leaves reduced to spines or bristles ... CACTACEAE

95. Stems herbaceous or woody, if fleshy then not flattened; leaves not reduced as above :

96. Leaves exstipulate; stamens 5-20 ... AIZOACEAE

96. Leaves stipulate; stamens 3-5 ... MOLLUGINACEAE

94. Calyx tube always adnate to the ovary :

97. Aromatic herbs; leaves usually much dissected; fruits mericarps ... APIACEAE

97. Non-aromatic shrubs or trees; leaves not much dissected as above; fruits usually drupaceous :

98. Leaves usually stipulate; ovary 1–many celled ... ARALIACEAE

98. Leaves exstipulate; ovary 1–4–celled :

99. Branches more or less spinescent; stamens 2-4 times as many as petals ... ALANGIACEAE

99. Branches unarmed; stamens 4-5 ... MASTIXIACEAE

3. Petals usually united; stamens inserted on the corolla :

100. Flowers epigynous :

101. Leaves usually opposite, stipulate :

102. Stipules inter / intra petiolar and conspicuous. ... RUBIACEAE

102. Stipules lateral, inconspicous. ... CAPRIFOLIACEAE

101. Leaves usually alternate, exstipulate :

103. Inflorescence a capitulum; calyx reduced to pappus; ovary 1-celled ... ASTERACEAE

103. Inflorescence other than capitulum; calyx not reduced as above; ovary 2-many locular :

104. Corolla irregular, bilipped; anthers connate around style. ... LOBELIACEAE

104. Corolla regular or slightly oblique; anthers free :

105. Leaves fleshy; style with a cup shaped indusium ... GOODENIACEAE

105. Leaves not fleshy; style without indusium :

106. Capsule dehisces circumscissile ... SPHENOCLEACEAE

106. Capsule dehisces at base or along sides ... CAMPANULACEAE

100. Flowers hypogynous :

107. Ovary 1- celled :

108. Corolla salverform; placentation basal ... PLUMBAGINACEAE

108. Corolla rotate, campanulate or infundubiliform; placentation free central:

109. Trees, shrubs or climbing; leaves gland dotted ... MYRSINACEAE

109. Herbs; leaves not gland dotted ... PRIMULACEAE

107. Ovary 2 to many–celled :

110. Stamens more than the number of corolla lobes :

111. Stamens free from corolla ... EBENACEAE

111. Stamens inserted on the corolla :

112. Plants with watery sap; fruits drupaceous ... SYMPLOCACEAE

112. Plants with milky latex; fruit a berry ... SAPOTACEAE

110. Stamens as many as corolla lobes or fewer ;

113. Corolla actinomorphic :

114. Leaves usually alternate, if opposite then ovary 4-celled :

115. Marshy or aquatic plants :

116. Leaves peltate; calyx and corolla lobes induplicate - valvate, corolla with fimbriate scales ... MENYANTHACEAE

116. Leaves elliptic oblong; corolla lobes elliptic - oblong and without fimbriate scales ... HYDROPHYLLACEAE

115. Terrestrial plants :

117. Corolla lobes plicate; fruits capsules or rarely berries :

118. Ovary many ovuled; fruit usually a berry or capsule ... SOLANACEAE

118. Ovary usually with 2-ovules or rarely 1-4 in each cell; fruits capsular :

119. Leafless parasitic vines; stems wiry ... CUSCUTACEAE

119. Leafy non-parasitic, erect twiners or trailers; stems usually not as above ... CONVOLVULACEAE

117. Corolla lobes imbricate or contorted; fruits drupaceous ... BORAGINACEAE

114. Leaves opposite or whorled, sometimes radical :

120. Plants scapose ... PLANTAGINACEAE

120. Plants non-scapose :

121. Branchlets pendulous; ovary 1-celled ... SALVADORACEAE

121. Branchlets spreading; ovary 2-celled :

122. Stamens 2 ... OLEACEAE

122. Stamens as many as corolla lobes:

123. Carpels united :

124. Leaves exstipulate; ovules on parietal placentation ... GENTIANACEAE

124. Leaves stipulate; ovules on axile placentation :

125. Trees; stipules represented by a raised line; stigma raised on style ... LOGANIACEAE

125. Shrubs; stipules not as above; stigma sessile ... BUDDLEJACEAE

123. Carpels usually free :

126. Gynostegium present; follicles divaricate :

127. Stamens united in a ring; pollen grains in pollinia ... ASCLEPIADACEAE

127. Stamens free; pollen grains granular ... PERIPLOCACEAE

126. Gynostegium absent; follicles usually cohering ... APOCYNACEAE

113. Corolla usually zygomorphic :

128. Parasitic or insectivorous plants :

129. Slender, semiaquatic, insectivorous plants; stamens 2 ... LENTIBULARIACEAE

129. Stout, terrestrial parasitic plants; stamens 4 ... OROBANCHACEAE

128. Plants non-insectivorous or parasitic (sometimes partial parasites) :

130. Leaves pinnately compound; fruits enlarged, woody ... BIGNONIACEAE

130. Leaves usually simple; fruits not enlarged and woody:

131. Inflorescence scapose; leaf margine serrate ... GESNERIACEAE

131. Inflorescence non-scapose; leaf margins usually entire:

132. Fruits capsular; placentation axile:

133. Placenta swollen; seeds with inconspicuous funicle ... SCROPHULARIACEAE

133. Placenta not swollen; seeds with distinct funicle:

134. Calyx annular, minute or 10-16-toothed ... THUNBERGIACEAE

134. Calyx 5-6-partite or 2-lipped ... ACANTHACEAE

132. Fruits usually drupaceous, pyrene or nutlets, rarely capsules; placentation basal :

135. Corolla ventricose; stigmas 2-lobed :

136. Flowers in racemes, usually with glands at bases of pedicels; fruit a capsule ... PEDALIACEAE

136. Flowers solitary, without glands at bases of pedicels; fruit a pyrene with two hooks at apex ... MARTYNIACEAE

135. Corolla not ventricose; stigmas entire or bifid :

137. Plants usually aromatic; calyx bilabiate; style gynobasic; ovary 4-lobed ... LAMIACEAE

137. Plants non or scarcely aromatic; calyx not bilabiate; style terminal; ovary entire :

138. Flowers in dense spikes and in lax cymes: ovules on axile placentation ... VERBENACEAE

138. Flowers in dense capitate cymes; ovules on free central placentation :

139. Mangroves; leaves coriaceous; calyx 5-partite; seeds viviparous ... AVICENNIACEAE

139. Non mangroves; leaves not coriaceous; calyx 4-8-lobed; seeds not viviparous ... SYMPHOREMATACEAE

2. Perianth 1-seriate (apetalous), 2-seriate (monochlamydeous) or absent (achlamydeous) :

140. Flowers usually bisexual :

141. Parasites :

142. Branches terete; leaves reduced to small scales or absent; perianth limb tubular ... LORANTHACEAE

142. Branches filiform; leaves not reduced; perianth limb campanulate (*Cassytha*) ... LAURACEAE

141. Autophytes :

143. Aquatic plants, anchored to rocks (lithophytes); stem thalloid :

144. Flowers with sepaloid perianth segments ... TRISTICHACEAE

144. Flowers naked ... PODOSTEMACEAE

143. Terrestrial or marshy plants; stem not thalloid :

145. Perianth lobes plicate ... NYCTAGINACEAE

145. Perianth lobes not plicate :

146. Stamens adnate to stylar column; ovary inferior ... ARISTOLOCHIACEAE

146. Stamens free; ovary superior:

147. Stipules present and ochraceous ... POLYGONACEAE

147. Stipules absent or inconspicuous :

148. Seeds exalbuminous :

149. Branchlets with silvery or brown scales; stamens epiphyllous ... ELAEAGNACEAE

149. Branchlets without such scales; stamens free :

150. Stamens usually accompanied by glands, anther dehices by valvular lids ... LAURACEAE

150. Stamens not accompanied by glands, anthers dehices by slits ... THYMELAEACEAE

148. Seeds albuminous :

151. Perianth scarious and dry ... AMARANTHACEAE

151. Perianth membranous, herbaceous :

152. Flowers 4-merous; fruits with 4 curved spines at tip ... PETIVERIACEAE

152. Flowers 5-merous; fruits not as above :

153. Stems twining; bracteoles adnate to the perianth ... BASELLACEAE

153. Stems not twining; bracteoles free from perianth ... CHENOPODIACEAE

140. Flowers usually unisexual, if bisexual then perianth absent :

154. Leaves usually reduced to scales :

155. Parasitic plants, herbs or shrubs; perianth lobes distinct :

156. Achlorophyllous root parasitic herbs ... BALANOPHORACEAE

156. Chlorophyllous stem parasites, shrubs ... VISCACEAE

155. Non parasitic trees; perianth lobes indistinct ... CASUARINACEAE

154. Leaves developed, not reduced:

157. Aquatic plants; leaves whorled and dichotomously cleft into filiform segments ... CERATOPHYLLACEAE

157. Terrestrial plants; leaves not whorled as above:

158. Inflorescence a cyathium; ovary usually 2 to many-celled ... EUPHORBIACEAE

158. Inflorescence other than cyathium; ovary usually 1-celled :

159. Inflorescence catkin like spike; perianth absent :

160. Trees; seeds with deciduous, silky penicillate hairs ... SALICACEAE

160. Climbers; seeds glabrous ... PIPERACEAE

159. Inflorescence other than catkin; perianth present:

161. Ovary inferior or semi-inferior :

162. Leaves cordiform; stamens inserted at the bottom of calyx; fruits winged ... HERNANDIACEAE

162. Leaves other than cordiform; stamens epiphyllous; fruits not winged ... SANTALACEAE

161. Ovary superior :

163. Stamens united into a column ... MYRISTICACEAE

163. Stamens free :

164. Stipules absent or inconspicuous; stamens inflexed in bed :

165. Trees with milky latex; style bifid ... MORACEAE

165. Herbs, shrubs or trees with watery sap; style undivided ... URTICACEAE

164. Stipules present; stamens not inflexed in bud :

166. Trees with simple leaves ... ULMACEAE

166. Subshrubs with palmately compound leaves ... CANNABACEAE

1. Leaves usually isobilateral and parallel veined; seeds contain 1-cotyledon (Monocotyledones) :

167. Perianth 2- seriate, the segments of both corolline, rarely herbaceous :

168. Seeds minute or inconspicuous :

169. Flowers zygomorphic; median petals produced into a lip (labellum); stamens and styles united into a column ... ORCHIDACEAE

169. Flowers actinomorphic; median petal not produced into labellum; stamens and styles separate :

170 Aquatic plants; flowers usually unisexual, enclosed by persistent, peduncled spathes ... HYDROCHARITACEAE

170. Terrestrial or marshy plants; flowers bisexual, not spathaceous ... BURMANNIACEAE

168. Seeds conspicuous :

171. Ovary superior :

172. Inflorescence of heads supported by rigid bracts ... XYRIDACEAE

172. Inflorescence other than heads, not supported by bracts :

173. Perianth series well differentiated into outer calycine, inner corolline ... COMMELINACEAE

173. Perianth series corolline and dry :

174. Aquatic herbs; inflorescence subtended by spathe like leaf sheath ... PONTEDERIACEAE

174. Terrestrial or marshy plants; inflorescence not as :

175. Climbing shrubs :

176. Leaves reticulately veined; fruit berry ... SMILACACEAE

176. Leaves parallel veined; fruit drupaceous ... FLAGELLARIACEAE

175. Erect herbs :

177. Inflorescence scapose, subtended by spathaceous bracts .. ALLIACEAE

177. Inflorescence usually racemose, not subtended by spathaceous bracts ... LILIACEAE

171. Ovary inferior :

178. Flowers usually actinomorphic :

179. Leaves radical; flowers with long cylindric thread like bracteoles ... TACCACEAE

179. Leaves cauline; flowers not with thread like bracteoles :

180. Climbers; flowers unisexual; fruits winged ... DIOSCOREACEAE

180. Plants erect; flowers usually bisexual; fruits wingless :

181. Plants xerophytic, arborescent; leaves fibrous; flowers in large panicles ... AGAVACEAE

181. Plants other than xerophytic, herbaceous; leaves not fibrous; flowers in umbels or racemes :

182. Leaves plicate; inflorescence spicate, racemose or rarely solitary, not surrounded by an involucre of membranous bracts .. HYPOXIDACEAE

182. Leaves not plicate; inflorescence umbellate, surrounded by an involucre of membranous bracts (sometimes reduced to a single bracteate flower) ... AMARYLLIDACEAE

178. Flowers prominently zygomorphic :

183. Fertile stamens 5 :

184. Leaves and bracts spirally arranged; fruit fleshy, indehiscent ... MUSACEAE

184. Leaves and bracts distichous; fruits not fleshy, dehiscent :

185. Outer tepal (which is next to the axis) large and other tepals small, connate into a cymbiform structure; seeds exarillate .. HELICONIACEAE

185. Outer tepal equal to other inner tepals, the inner two lateral tepals form distinct, sagittate structure; seeds arillate ... STRELITZIACEAE

183. Fertile stamen 1, the other stamens transformed into petal like staminodes :

186. Petiole pulvinous, ovary with 1 fertile cell; ovule solitary ... MARANTACEAE

186. Petiole not pulvinous; ovary with 3 fertile cells; ovules many :

187. Aromatic plants; sepals united, tubular; anthers 2-celled ... ZINGIBERACEAE

187. Non-aromatic plants; sepals free; anther 1-celled ... CANNACEAE

167. Perianth series both calycine or if the inner series corolline then its segments not longer than those of the outer ones :

188. Perianth usually 2-seriate, trimerous :

189. Both perianth series calycine; seeds with copious albumen :

190. Terrestrial trees or scandent shrubs; leaves plicate or pinnatisect; drupes with fibrous pericarp ... ARECACEAE

190. Marshy herbs; leaves linear or terete or sometimes reduced to sheaths; fruit a 3-valved capsule without fibrous pericarp ... JUNCACEAE

189. Single series of perianth calycine; seeds exalbuminous

191. Plants laticiferous; fruits 6-7 follicles, dehiscent; ovules on partical placentation ... BUTOMACEAE

191. Plants not laticiferous; fruits 3 or more achenes, indehiscent; ovules on basal placentation ... ALISMATACEAE

188. Perianth absent or reduced to scales, bristles or lodicules or if perianth herbaceous or hyaline then segments either not regularly 3-merous or rarely 6 in 2 rows :

192. Inflorescence of heads or spikelets consisting of solitary flowers in the axils of glumaceous bracts :

193. Flowers borne in capitulum, always unisexual :

194. Perianth segments present; stamens more than one; anthers usually black coloured ... ERIOCAULACEAE

194. Perianth absent; stamen only one per capitulum; anthers red coloured ... HYDATELLACEAE

193. Flowers in spikelets, uni or bisexual, rarely dioecious :

195. Stems 3-angled, without nodes; leaves tristichous with closed sheaths; flowers in the axils of single bracts ... CYPERACEAE

195. Stems terete or 2-edged, nodose; leaves distichous; flowers enclosed between lemmas and paleas ... POACEAE

192. Inflorescence of many or few flowered spadices, spike or racemes or if flowers solitary then not in the axils of glumes :

196. Plant body free floating, thalloid ... LEMNACEAE

196. Plant body not floating, well differentiated :

197. Marshy or riparian plants :

198. Plants arborescent; leaves armed, apex caudate ... PANDANACEAE

198. Plants herbaceous; leaves unarmed, apex not as above :

199. Spadices with large spathes; perianth absent ... ARACEAE

199. Spikes not spathaceous; perianth slender hairy ... TYPHACEAE

197. Aquatic plants :

200. Erect or free floating or sometimes submerged :

201. Leaves radical; spathes present; perianth segments 1-8; stamens 6 or more ... APONOGETONACEAE

201. Leaves cauline; perianth of 4-clawed segments; spathes absent; stamens 4 ... POTAMOGETONACEAE

200. Plants submerged :

202. Marine or brownish water plants; flowers enclosed by leaf sheaths ... RUPPIACEAE

202. Fresh or brackish water plants; flowers not enclosed by leaf sheaths :

203. Perennials; stigma dilated ... ZANNICHELLIACEAE

203. Annuals; stigma not dilated ... NAJADACEAE

RANUNCULACEAE

(S.Y. Kamble)

1. Woody climbers; leaves opposite :
   2. Flowers apetalous; terminal leaflet normal; achenes sessile ... CLEMATIS
   2. Flowers with petals and sepals; terminal leaflet modified into a tendril; achenes stipitate ... NARAVELIA
1. Herbs; leaves alternate :
   3. Flowers irregular; posterior sepal spurred; petals 2–4 ... DELPHINIUM
   3. Flowers regular; sepals petaloid, not spurred; petals absent ... THALICTRUM

CLEMATIS L.

1. Filaments hairy ... *C. wightiana*
1. Filaments glabrous :
   2. Flowers more than 2.5 cm across :
      3. Flowers purple ... *C. smilacifolia*
      3. Flowers white ... *C. heynei*
   2. Flowers less than 2.5 cm across :
      4. Flowers 1.0–1.5 cm across; connectives not prolonged beyond anther lobes ... *C. gouriana*
      4. Flowers 1.5–2.5 cm across; connectives prolonged beyond anther lobes ... *C. hedysarifolia*

Clematis gouriana Roxb. ex DC. Syst. Nat. 1: 138. 1818; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 4. 1872; Cooke, Fl. Pres. Bombay 1: 2. 1958 (Repr.); M.A. Rau in Sharma et al. Fl. India 1: 64. 1993. *'Moriyel', 'Morvel', 'Shendvel'.*

Climbers; stems grooved. Leaves uni–bi–or tripinnate; leaflets 2–12 x 1–4 cm, ovate, toothed, rounded or cordate at base; petioles slender. Flowers yellowish, in branched panicles; peduncles and pedicels pubescent; sepals 4, obovate or oblong; filaments linear. Achenes ovoid, hairy, tails feathery.

Fls. & Frts. : October–November.

Illus. : Wight, Ic. tt. 933 & 934. 1845; Gupta in Bull. Natn. Bot. Gard. Lucknow 54: t. 9. 1961 & 80: t. 27. 1963.

Distrib.: In thickets along the ghats, frequent. Aurangabad, Buldhana, Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

C. hedysarifolia DC. Syst. Nat. 1: 148. 1818 & Prodr. 1: 6. 1824 (excl Bot. Reg. t. 599); Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 4. 1872; Cooke, Fl. Pres. Bombay 1: 3. 1958 (Repr.); A.S. Rao in Bull. Bot. Surv. India 6: 19, t. 1 & 2. (1964) 1965; Sant. Ibid. 59.; M.A. Rau in Sharma et al. Fl. India 1: 66. 1993. *C. naravelioides* O. Ktze. in Verh. Bot. Vern. Prov. Brandenb. 26: 119. 1888. *'Bendrichivel', 'Morvel'*

Woody climbers; younger parts puberulous. Leaves pinnate; leaflets 3–5, 4–12 x 2–6 cm, ovate–lanceolate, acuminate at apex, irregularly toothed along margins; petioles twining, c 7 cm long. Flowers in many–flowered panicles; pedicels pubescent; sepals 4, ovate or oblong, deflexed; filaments ligulate. Achenes ovoid, compressed, hairy, tails feathery.

Fls. & Frts. : October–December.

Illus. : Gupta in Bull. Natn. Bot. Gard. Lucknow 54: t. 12. 1961; A.S. Rao, op. cit.

Distrib. : Infrequent in moist deciduous forests. Ahmednagar, Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

Notes : A.S. Rao (op. cit.) has clearly shown that, Dasgam, 1° South of Bombay is the type locality and that the type collector was A.P. Hove. Hook. f. (op. cit.) and O. Ktze. (op. cit.) had some misconceptions and they were of the opinion that Hove collected it at Pegu. Santapau (op. cit.) supported the veiw of A.S. Rao and further discussed the taxonomy and nomenclature of this species.

C. heynei M.A. Rau in Sharma et al. Fl. India 1: 67. 1993. *C. triloba* Heyne ex Roth, Nov. Pl. Sp. 251. 1821 non Thunb. 1794; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 3. 1872; Cooke, Fl. Pres. Bombay 1: 2. 1958 (Repr.). *Banda, 'Mogra–bel', 'Morvel'. 'Ranjai'.*

Climbers with tomentose branches; stems sulcate. Leaves simple or ternate, entire or 1–7–lobed; lamina 2.5–5.0 cm long, ovate, acute at apex, rounded at base; petioles c 8 cm long, slender. Flowers c 4.5 cm across, in axillary, corymbose panicles; bracts foliaceous; sepals 4–6, oblong–ovate, spreading; stamens 0.6–2.0 cm long. Achenes silky–villous, ovoid, compressed, tails long, feathery.

Fls. & Frts. : September–November.

Illus. : Gupta in Bull. Natn. Bot. Gard. Lucknow 54: t. 18. 1961.

Distrib. : Common in deciduous forests.

C. smilacifolia Wall. Pl. As. Rar. 13: 402. 1820; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 3. 1872; Cooke, Fl. Pres. Bombay 1: 2. 1958 (Repr.); M.A. Rau in Sharma et al. Fl. India 1: 75. 1993.

Climbers; stems sulcate. Lower leaves 8–20 x 2.5–15.0 cm ovate, rounded or cordate at base, shortly serrate, 5–7– nerved; petioles twining, c 15 cm long; upper leaves smaller, narrower. Flowers in axillary panicles; pedicels c 7 cm long; sepals 4–5, purple inside, c 2.5 cm long, oblong; filaments linear. Achenes compressed, ovoid, puboscent, tails feathery.

Fls. & Frts. : October–November.

Illus. : Gupta in Bull. Natn. Bot. Gard. Lucknow 54: t. 13. 1961.

Distrib. : Scattered in moist deciduous forests. Dhule, Kolhapur, Raigad, Ratnagiri, Sindhudurg, Thane.

C. wightiana Wall. ex Wight & Arn. Prodr. 2. 1834; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 5. 1872; Cooke, Fl. Pres. Bombay 1: 3. 1958 (Repr.); M.A. Rau in Sharma et al. Fl. India 1: 80. 1993.

Woody climbers with appressed hairy branches. Leaves pinnate; leaflets 3–5, silky villous on either side, orbicular, cordate, with nerves and veins prominent; petioles c 15 cm long. Flowers c 5.5 cm across, in panicles; bracts foliaceous, lobed; sepals 4, golden yellow, c 2 x 1 cm, ovate; stamens shorter than sepals. Achenes densely silky, with long feathery tails, ovoid, compressed.

Fls. & Frts. : January–February.

Illus. : Wight, Ic. t. 935. 1845; Gupta in Bull. Natn. Bot. Gard. Lucknow 54: t. 19. 1961.

Distrib. : Occasional in deciduous forests. Ahmednagar, Nasik, Pune, Satara, Thane.

DELPHINIUM L.

Delphinium malabarium (Huth) Munz in J. Arnold Arbor. 49: 106, f. 42. 1968; M.A. Rau in Sharma et al. Fl. India 1: 96. 1993. *D. dasycaulon* Fres. var. *malabaricum* Huth, Bot. Jahrb. 20: 435. 1895; Mukherjee in Bull. Bot. Surv. India 2: 294. 1960. *D. dasycaulon* auct. non Fres. 1837; Hook f. & Thoms. in Hook. f. Fl. Brit. India 1: 25. 1872; Cooke, Fl. Pres. Bombay 1: 5. 1958 (Repr.).

1. Spur in flowers c 12 mm long; follicles glabrous; seeds glabrous ... var. *ghaticum*

1. Spur in flowers c 8 mm long; follicles strigose; seeds papillose ... var. *malabaricum*

var. **malabaricum.**

Perennial herbs with woody rhizomes; stems 0.5–2.0 m high, slender, glabrous or strigose in the inflorescence, branches hollow, terete. Radical leaves 15–30 cm across, reniform, 5–6-lobed; cauline leaves deeply divided; petioles sheathing. Flowers light blue, in racemes; bracts subulate; pedicels as long as flowers; sepals c 2 cm long, marked with white hairy spot; spur conical, recurved, hairy outside; upper petal cartilaginous, lower 2-lobed; stamens 6–7 mm long, filaments dilated at base; carpels 3, c 13 mm long including style.

Fls. & Frts. : August–October.

Illus. : Munz, op. cit.

Distrib. : Infrequent along moist regions in deciduous forests. Ahmednagar, Pune, Raigad, Satara, Thane.

var. **ghaticum** Billore in Indian Forester 99 : 436, f. 6. 1973; M.A. Rau in Sharma et al. Fl. India 1: 97. 1993.

Erect, perennial herbs, 0.6–1.0 m high, covered with soft yellowish pubescence all over, indumentum of two types, more of yellowish, erect hairs with ± broad bulging bases and tapering apices terminated by rounded tips. Inflorescence of 1-few, rather dense-flowered racemes; lower bracts leafy, 2–3-fid, 2–5 cm long, upper linear, 0.5–1.7 cm long; bracteoles 2, subulate; pedicels divergent, c 2 cm long, densely hairy; sepals bright blue with a whitish or pale yellow subterminal spot; petals pale bluish, upper laminae oblique, lower laminae blue, round; filaments c 6 mm long; styles c 3 mm long. Follicles 3, oblong; seeds c 0.5 mm long, ovoid.

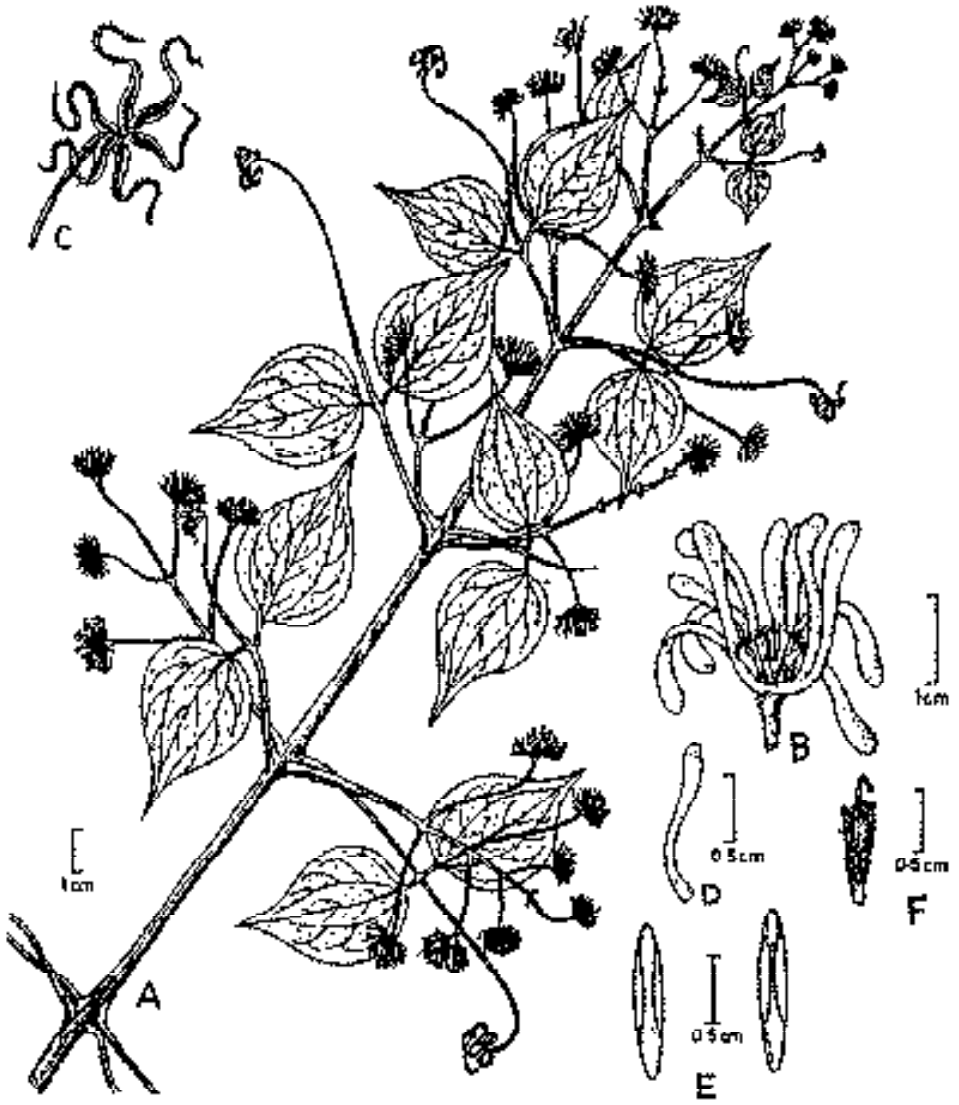
Fls. & Frts. : September–November.

Illus. : Billore, op. cit.

Distrib. : Rare in deciduous forests. Pune, Thane.

NARAVELIA DC. (nom. cons.)

Naravelia zeylanica (L.) DC. Syst. Nat. 1: 167. 1818; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 7. 1872; Cooke, Fl. Pres. Bombay 1: 4. 1958 (Repr.); M.A. Rau in Sharma et al. Fl. India 1: 106, f. 15. 1993. *Atragene zeylanica* L. Sp. Pl. 542. 1753.



Naravelia zeylanica (L.) DC. A-branch; B-flower; C-achenes with twisted tails; D-petal; E-stamens; F-carpel

Climbing shrubs. Leaflets ovate, acuminate, entire or toothed; petioles c 3.5 cm long. Flowers 1.2–2.0 cm across; sepals 4–5, caducous, ovate–oblong, pubescent; petals 6–12, linear–spathulate, longer than sepals; filaments ligulate. Achenes hairy, with long feathery tails.

Fls. & Frts. : October–December.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 17, f. 6. 1990; M.A. Rau in Sharma et al. op. cit.

Distrib. : Occasional in moist deciduous forests along ghats. Kolhapur, Ratnagiri, Sindhudurg.

THALICTRUM L.

1. Stems grooved; stipules membranaceous; stamens as long as sepals; achenes narrow, oblong ... *T. dalzellii*

1. Stems flattened; stipules fimbriate; stamens longer than sepals; achenes compressed ... *T. obovatum*

Thalictrum dalzellii Hook. Ic. Pl. 9, t. 868. 1852; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 13. 1872; Cooke, Fl. Pres. Bombay 1: 4. 1958 (Repr.); M.A. Rau in Sharma et al. Fl. India 1: 134. 1993.

Rigid herbs, c 1 m high. Leaves 3–foliolate, uppermost usually 1–foliolate, suborbicular or reniform, margins crenately irregularly lobed and toothed; petioles c 5 cm long, petiolules c 2.5 cm long. Flowers white, c 0.7 cm across, in leafy panicles; sepals 4, narrowly oblong, as long as stamens. Achenes less than 0.4 cm long, shortly stalked, with a hooked tip.

Fls. & Frts. : August–September.

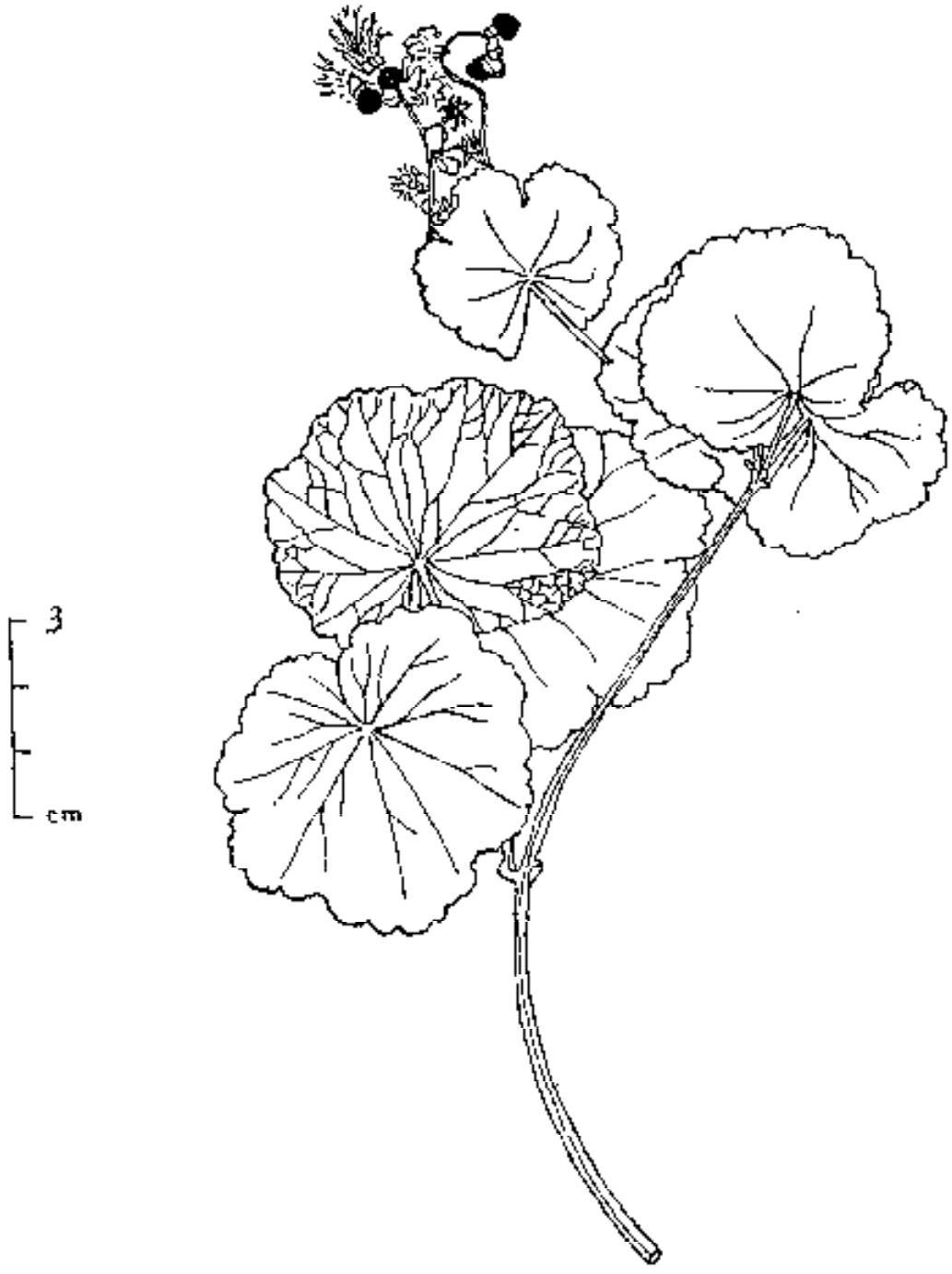
[illegible]; J. Bhattacharya in Sharma et al. Fl. India 3: 33. 1993.

Illus. : Vartak in J. Univ. Poona (Sci. & Tech.) 18: 77, t. 1. 1959; Gandhi in Sald. & Nicola. Fl. Hassan Dt. 61, figs. 11A, Aa, Ab. 1978 (Repr. ed.).

Distrib. : Apparently rare in hilly areas. Ahmednagar, Pune, Satara, Sindhudurg.

T. obovatum Blatt. in J. & Proc. As. Soc. Bengal (n.s.) 26: 339. 1930; M.A. Rau in Sharma et al. Fl. India 1: 138. 1993.

Erect herbs, c 45 cm high; stems consulcate. Leaves trifoliolate except topmost one or two-foliolate, slightly sheathing at base; leaflets c 3 cm across, round or kidney shaped, crenately irregularly lobed and



Thalictrum dalzellii Hook.

dentate along margins; stipules adnate to petiole, united on back, c 1 cm long, oblong. Flowers 8–9 mm across in small leafy panicles crowded at ends of branches; sepals usually 4, white, broadly obovate; stamens many.

Fls. & Frts. : July–August.

Distrib. : Apparently rare. Satara.

CULTIVATED SPECIES :

Clematis flammula L. Sp. Pl. 544. 1753; Almeida, Fl. Mah. 1: 1. 1996.

Climbers, slender, vigorous. Leaves bipinnate; leaflets 2–5 pairs, ternate, 1.5–4.0 cm long, ovate, shortly acute, obtuse or apiculate at apex. Flowers many, white, fragrant, 1.5–2.0 cm across, in axillary and terminal panicles. Fruiting style plumose.

Fls. : January.

Distrib. : Cultivated in gardens (Almeida, op. cit.).

C. recta L. Sp. Pl. 544. 1753; Almeida, Fl. Mah. 1: 2, t. 19. 1996.

Climbers, vigorous. Leaves imparipinnate; leaflets 1–2 pairs, 2.5–7.0 cm long or sometimes longer, ovate, acute or apiculate at apex, tapering, rounded or subcordate at base, sometimes lobed, entire along margins. Flowers white, fragrant, 2–5 cm across, in panicles. Fruiting style plumose.

Fls. : July.

Illus. : Almeida, op. cit.

Distrib. : Grown in gardens. Bombay (Almeida, op. cit.).

Notes : It is a native of Europe & Australia.

Delphinium ajacis L. Sp. Pl. 539. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 27. 1872; Ugemuge Fl. Nagpur Dt. 46. 1986; Almeida, Fl. Mah. 1: 4. 1996.

Annual herbs, c 50 cm high. Leaves pinnate. Flowers blue, in long racemes. Fruit a follicle, many–seeded.

Fls. & Frts : October–December.

Distrib. : Cultivated in gardens as an ornamental plant. (Ugemuge, op. cit.; M.R. Almeida, op. cit.).

Nigella sativa var. **indica** (Roxb.) DC. Syst. Nat. 1: 330. 1817; M.A. Rau in Sharma et al. Fl. India 1: 108. 1993. *N. indica* Roxb. Fl. Ind. 2: 646. 1824. *'Kala-jeera'*.

Stems erect, hispid or glabrous. Leaves decompound; segments linear, divergent. Flowers with involucre; sepals white; petals shortly stipitate, deeply 2-cleft; carpels 5, as long as stamens. Follicles united longitudinally, tuberculate on back with subequal beak. Seeds ovoid to subtrigonous, rugulose-tuberculate.

Fls. & Frts. : January–December.

Distrib. : Widely cultivated for its seeds, occasionally found naturalised. Nagpur.

DILLENIACEAE

(P. Venkanna & P.V. Prasanna)

DILLENIA L.

1.	Nerve endings of leaves with small tufts of hairs :		
2.	Anthers opening by longitudinal slits	...	*D. pentagyna*
2,	Anthers opening by apical pores	...	*D. aurea*
1.	Nerve endings of leaves not as above	...	*D. indica*

Dillenia aurea J.E. Sm. in Exot. Bot. 2: 65, t. 92, f. 93. 1806; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 37. 1872; Hoogl. in Blumea 7: 128. 1952; N. C. Majumdar in Fasc. Fl. India 2: 5, f. 1–5. 1979 & in Sharma et al. Fl. India 1: 153, f. 21. 1993.

Deciduous trees, 10–15 m high. Leaves 20–40 x 10–25 cm, elliptic-oblong, base rounded to truncate, margins spinulose-denticulate. Flowers solitary or rarely in pairs, 10–12 cm across; sepals coriaceous, ciliate along margins; petals golden yellow, obovate; inner stamens with reflexed apex. Fruits orange-yellow, subglobose, 3.0–3.2 cm across. Seeds obovoid, glossy, dark brown, surrounded by viscid pulp.

Fls. & Frts. : March–July.

Illus. : N.C. Majumdar, op. cit.

Distrib. : Rare in deciduous forests. Chandrapur.

D. indica L. Sp. Pl. 535. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 36. 1872 p.p.; Cooke, Fl. Pres. Bombay 1: 6. 1958 (Repr.); Hoogl. in Blumea 7: 108. 1952; N.C. Majumdar in Fasc. Fl. India 2:6, t. 1. 1979 & in Sharma et al. Fl. India 1: 155, f. 22. 1993. *'Mota–Karmal'*.

Evergreen trees, 8–10 m high. Leaves crowded at branch ends, 20–30 x 10–12 cm, oblong–lanceolate, apex acuminate, margins serrate, teeth abruptly mucronate, pubescent on upper surface and nerves. Flowers axillary, solitary, c 15 cm across; pedicels c 8 cm long; sepals orbicular, concave, thick and fleshy; petals oblong. Fruits 8–10 cm across, hard. Seeds many, reniform, black.

Fls. & Frts. : June–September.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 9, f. 7. 1909; N.C. Majumdar, op. cit.

Distrib. : Infrequent, found along streams. Amravati, Pune, Raigad, Ratnagiri, Sindhudurg, Thane.

D. pentagyna Roxb. Pl. Cor. 1: 21, t. 20. 1795; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 38. 1872; Cooke, Fl. Pres. Bombay 1: 6. 1958 (Repr.); Hoogl. in Blumea 7: 117. 1952; N.C. Majumdar in Fasc. Fl. India 2: 7. 1979 & in Sharma et al. Fl. India 1: 156. 1993. *'Kalla'*, *'Karanbidi'*, *'Karmal'*, *Karmvel'*, *'Karval'*, *'Sua'*.

Deciduous trees with straggling branches, 15–20 m high; young parts shining and silky. Leaves 70–80 x 15–20 cm, obovate, apex obtuse, margins dentate. Flowers 2.5–3.0 cm across, fascicled on leafless branches; sepals ovate, obtuse; petals yellow, oblong lanceolate. Fruits 2.5–3.0 cm across, pendulous, fleshy with closed sepals, purplish–black, shining. Seeds 1 or 2.

Fls. & Frts. : March–June.

Illus. : Bedd. Fl. Sylv. t. 104. 1869; Ic. Roxb. Fasc. 1, t. 2. 1964 (Repr. ed.).

Distrib. : Frequent in open forests.

CULTIVATED SPECIES :

Delima sarmentosa L. Syst. ed. 10, 1076. 1759; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 31. 1872; Almeida, Fl. Mah. 1: 7. 1996.

Woody climbers. Leaves 7–12 cm long, ovate or broadly lanceolate, obtuse or acute at apex, crenate or serrate along margins, appressed pilose. Flowers white, in panicles. Follicles 1–seeded.

Fls. & Frts. : February–April.

Distrib. : Cultivated in gardens. Bombay (M.R. Almeida, op. cit.).

Notes. : It is a native of China.

Dillenia suffruticosa (Griff.) Hook. f. & Thoms. in Hook. f. Fl. Brit. India, 1: 35. 1872; Hoogl. in Blumea 7: 70. 1952; Almeida, Fl. Mah. 1: 8. 1996. *Wormia suffruticosa* Griff. Notul. 4: 706. 1854 & Ann. Mus. Lugd. Bat. I: 315, t. 649, f. 1. 1854.

Large shrubs or small trees; young parts floccose. Leaves ovate or elliptic–lanceolate, acute or rounded at both ends, sharply toothed along margins, coriaceous, glabrous with scattered hairs on veins beneath. Flowers c 10 cm across, bright yellow, in leaf opposed, simple or forked racemes; sepals persistent. Carpels 7; seeds 3–5 in each carpel.

Fls. & Frts. : December–February.

Distrib. : Cultivated in gardens. Bombay (Almeida, op. cit.).

MAGNOLIACEAE

(M. J. Kothari)

Magnolia grandiflora L. Syst. ed. 10, 1082. 1759; **Almeida, Fl.** Mah. 1: 9. 1996. *'Kavathi champae'.*

Trees, medium sized, evergreen. Leaves oblong, subacute, tapering at base, coriaceous. Flowers large, fragrant. Fruits an etario of follicles. Seeds red, arillate.

Fls. & Frts. : December–February.

Distrib. : Cultivated in gardens. Bombay, Sindhudurg (Almeida, op. cit.).

M. pumila Andrews, Bot. Rep. t. 226. 1802; Almeida, Fl. Mah. 1 : 9. 1996. *'Kauthi–champa'.*

Shrubs. Leaves 13–20 x 8–12 cm, ovate or ovate–oblong, acute or acuminate at apex, rounded or tapering at base, coriaceous. Flowers solitary, 7–8 cm across.

Fls. : October–February.

Distrib. : Cultivated in gardens. Bombay. (Almeida, op. cit.).

Michelia champaca L. Sp. Pl. 536. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 42. 1872; Cooke, Fl. Pres. Bombay 1: 8. 1958 (Repr.); Nooteb. in Blumea 31: 113. 1985; Raju in Sharma et al. Fl. India 1: 175. 1993. *'Champa'*, *'Kud–champa'*, *'Pivla–champa'*, *'Son–chapha'*.

Evergreen trees. Leaves 6.5–20.0 x 3.2–7.0 cm, elliptic–oblong or lanceolate, coriaceous, glabrescent. Flowers bright–yellow, fragrant, solitary, axillary. Follicles c 2 cm long, oblong, grey with brownish spots. Seeds orbicular, reddish–brown.

Fls. & Frts. : April–September.

Illus. : Wight, Illus. 1: 14, tt. 5 & 6. 1840; Talb. For. Fl. Bombay Pres. & Sind 1: 12, f. 8. 1909; Khanzada & Khani in Nasir & Ali, Fl. W. Pak. 64: 2, f. 1. 1974.

Distrib. : Usually planted as an ornamental tree near temples, rivers and gardens for it's flowers.

Talauma mutabilis Bl. Fl. Jav. Magnol. 35. 1828; Almeida, Fl. Mah. 1: 10. 1996. *'Khauthi–champa'*.

Shrubs or small trees. Leaves elliptic or lanceolate, acuminate at apex, acute at base, glabrous above, hairy below. Flowers large, white. Fruits indehiscent, ovoid, 9–12–carpellate, tuberculed, beaked.

Fls. & Frts. : December–February.

Distrib. : Cultivated in Bombay gardens (Almeida, op. cit.).

ANNONACEAE

(S.K. Mudaliar & V.P. Prasad)

1. Anther cells concealed by the overlapping connectives :
   2. Petals imbricate in bud; ovules 2–many ... UVARIA
   2. Petals valvate in bud; ovules 1–6 :
      3. Ovules 2–6, 1–seriate, on the ventral sutures :
         4. Climbing or scandent shrubs ... DESMOS
         4. Erect trees ... MELOGYNE

3. Ovule 1, rarely 2, basal :

5. Inner and outer whorls of petals present ... POLYALTHIA

5. Inner whorl of petals minute or absent ... ANNONA

1. Anther cells not concealed by the connectives :

6. Inner petals mitriform, vaulted over stamens and carpels ... OROPHEA

6. Inner petals not mitriform, nor vaulted over stamens and carpels :

7. Petals unequal (inner ones larger than outer) ... MILIUSA

7. Petals subequal :

8. Sepals and petals valvate ... ALPHONSEA

8. Sepals and petals imbricate ... SAGERAEA

ALPHONSEA Hook. f. & Thoms.

Alphonsea lutea (Roxb.) Hook. f. & Thoms. Fl. Ind. 153. 1855 & in Hook. f. Fl. Brit. India 1: 89. 1872; Mitra in Sharma et al. Fl. India 1: 209, f. 31. 1993. *Uvaria lutea* Roxb. Cor. Pl. 1: t. 36. 1795 & Fl. Ind. 2: 666. 1832.

Trees with brown-pubescent young branches. Leaves ovate, oblong or elliptic, obtusely acuminate at apex, sparsely pubescent beneath. Flowers in dense axillary fascicles; sepals 3, connate, tomentose outside; petals 6 (3+3), ovate, acute at apex, tomentose outside. Carpels broadly ovoid, obtuse at both ends, puberulous. Seeds 3–6.

Fls. & Frts. : Not known from Maharashtra.

Illus. : Mitra, op. cit.

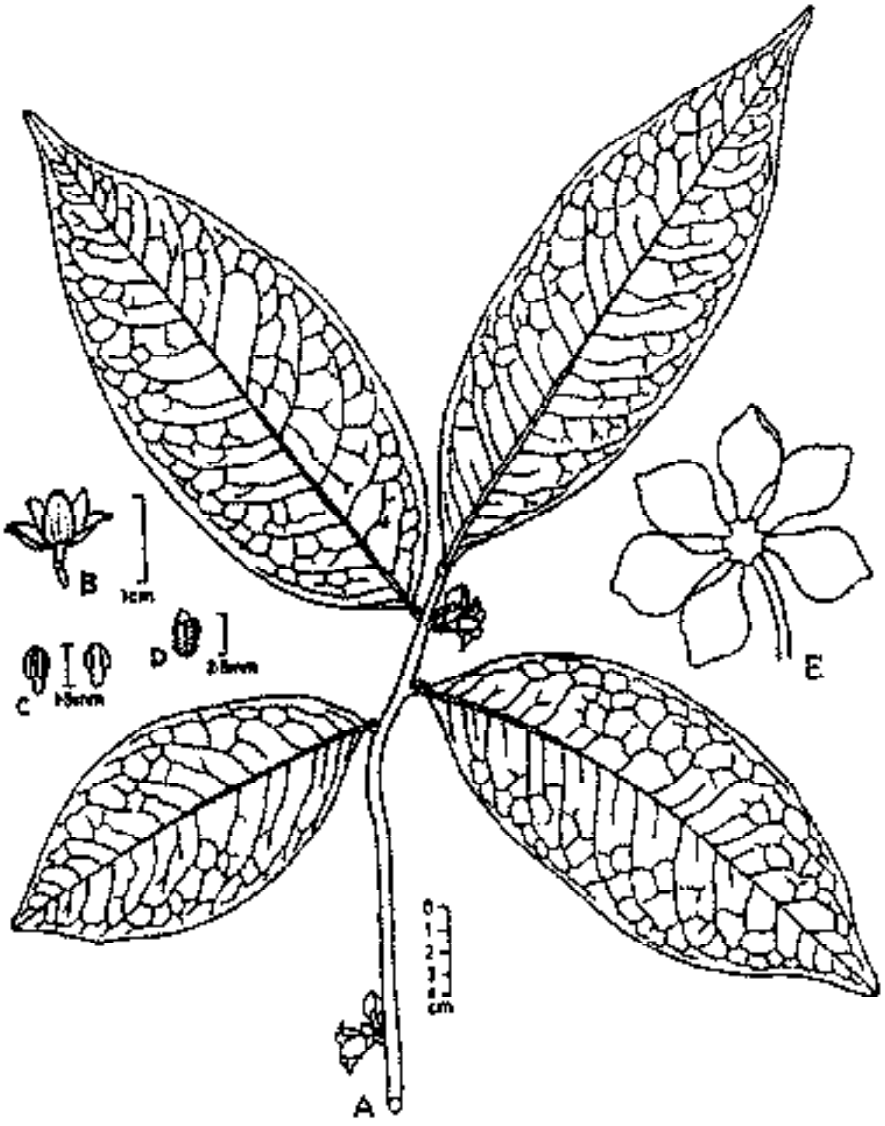
Distrib. : Maharashtra, without exact locality (Mitra, op. cit.).

ANNONA L.

1. Ripe fruits green, bullate ... *A. squamosa*

1. Ripe fruits brownish red, smooth ... *A. reticulata*

Annona reticulata L. Sp. Pl. 537. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 78. 1872; Cooke, Fl. Pres. Bombay 1: 15. 1958 (Repr.); Mitra in Sharma et al. Fl. India 1: 207. 1993. *'Ramphal'*.



Alphonsea lutea (Roxb.) Hook. f. & Thoms. : A-Twig with flowers; B-Flower; C-Stamens, front and back views; D-Carpel; E-Ripe carpels.

Trees, c 4 m tall. Leaves 15–20 x 4.5–7.0 cm, oblong–lanceolate, minutely pellucid–punctate beneath, apex acute. Flowers greenish–yellow, solitary, leaf opposed; sepals triangular, tomentose; petals in 2 whorls of 3 each, outer petals c 3.0 x 0.6 cm, tomentose on both surfaces. Fruits syncarpous, yellowish–red. Seeds smooth, black.

Fls. & Frts. : July–November.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 28, f. 18. 1909.

Distrib. : A native of Tropical America. Usually cultivated but also occurs as an escape.

A. squamosa L. Sp. Pl. 537. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 78. 1872; Cooke, Fl. Pres. Bombay 1: 15. 1958 (Repr.); Mitra in Sharma et al. Fl. India 1: 207. 1993.*'Aant', 'Sitaphal'*.

Trees, c 4 m tall. Leaves 6–8 x 2.5–4.5 cm, oblong–lanceolate, glaucous beneath, pellucid–punctate. Flowers green, solitary, leaf opposed or 2–4–together on a short extra–axillary branchlet; pedicels 1.5–2.0 cm long; sepals connate at base; petals pubescent, 3 outer 2.5 cm long. Fruits yellowish–green. Seeds brownish–black, polished, oblong, c 2.0 x 0.5 cm.

Fls. : March–August. *Frts.* : April–December.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 27, f. 17. 1909; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4 : t. 2. 1988.

Distrib. : Indigenous in West Indies, naturalized throughout Asia, cultivated throughout for its edible fruits; also occurs as an escape.

DESMOS Lour.

1. Petals 1.0 cm broad; bracts on pedicel linear ... *D. chinensis*

1. Petals 0.5 cm broad; bracts on pedicel cordate ... *D. lawii*

Desmos chinensis Lour. Fl. Cochinch. 352. 1790; Sinclair in Gard. Bull. Singapore 14: 266. 1955; Raiz. in Indian Forester 84: 480. 1958; Mitra in Sharma et al. Fl. India 1: 257, f. 41. 1993. *Unona discolor* Vahl, Symb. Bot. 2: 63, t. 36. 1791; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 59. 1872; Cooke, Fl. Pres. Bombay 1: 12. 1958 (Repr.).

Scandent shrubs. Leaves 15–25 x 2.5–7.0 cm, oblong–lanceolate, apex acuminate, base rounded–cordate, old leaves glabrous or hairy on nerves above, shining, lower surface glaucous, finely pubescent.



Desmos chinensis Lour. : A-Branch with flower; B-Flower with petals removed; C-Stamens; D-Carpel; E-Fruit

Flowers yellow or greenish–yellow, leaf–opposed. Carpels shining black, minutely pubescent, 1–7–jointed.

Fls. & Frts. : July–October.

Illus. : Bedd. Ic. t. 51. 1874; Mitra, op. cit.

Distrib. : Rare, in moist deciduous forests. Sindhudurg (Cooke, op. cit.).

D. lawii (Hook. f. & Thoms.) Safford in Bull. Torr. Bot. Club 39: 506, 1912; Mitra in Sharma et al. Fl. India 1: 261. 1993. *Unona lawii* Hook. f. & Thoms. Fl. Ind. 132. 1855 & in Hook. f. Fl. Brit. India 1: 59. 1872; Cooke, Fl. Pres. Bombay 1: 12. 1958 (Repr.).

Lianas. Leaves 6–11 x 2.3–3.5 cm; petioles 0.4 cm long, brown hairy up to the mid–rib, on lateral nerves and along margins. Flowers solitary, scented, greenish–yellow or yellow, 12–15 cm across; sepals ovate–acuminate, tomentose outside; petals hairy. Carpels short stalked, globose or ovoid, apiculate, 1–3–jointed.

Fls. : March–June. *Frts.* : August–November.

Illus. : Bedd. Ic. t. 73. 1874; Talb. For. Fl. Bombay Pres. & Sind 1: 21, f. 13. 1909.

Distrib. : Rare in semi–evergreen forests. Sindhudurg (Cooke, op. cit.) & Almeida, Fl. Savantwadi 1: 34. 1990.

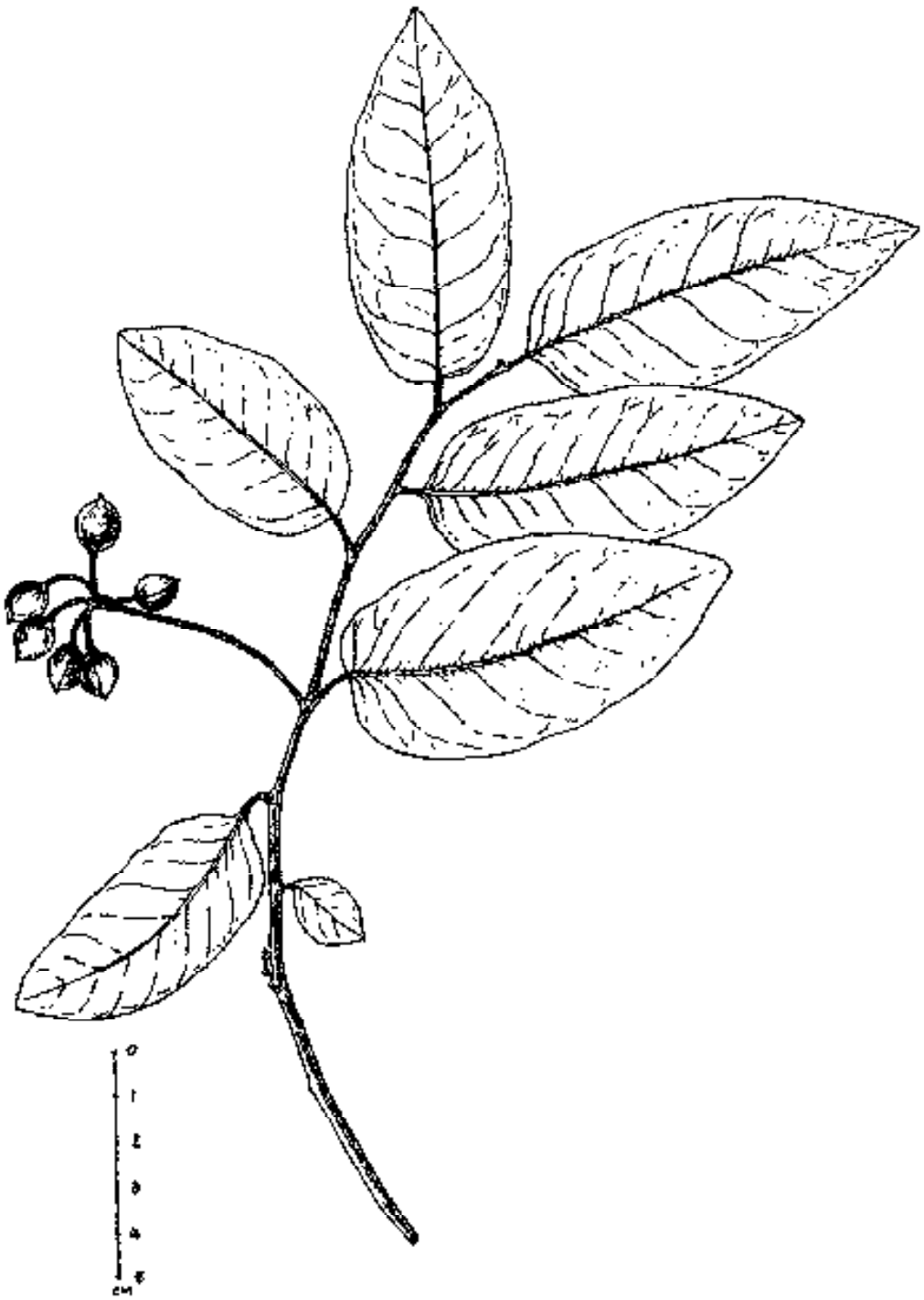
MEIOGYNE Miq.

Meiogyne pannosa (Dalz.) Sinclair in Sarawak Mus. J. 5: 604. 1951; Raiz. in Indian Forester 84: 495. 1958; Mitra in Sharma et al. Fl. India 1: 266. 1993. *Unona pannosa* Dalz. in Hook. J. Bot. & Kew Gard. Misc. 3: 207. 1851; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 58. 1872; Cooke. Fl. Pres. Bombay 1: 11. 1958 (Repr.).

Trees, 3–5 m tall. Leaves 3.5–10.5 x 2–5 cm, elliptic acuminate at apex; petioles 0.4–0.8 cm long. Flowers cream coloured, densely hirsute, 3.5–5.0 cm long, axillary, solitary and sessile; sepals 3, green, connate at base; petals 3 + 3, velvetty–tomentose. Carpels 10–12, each one c 1.25 cm long, velvetty–tomentose, apex acute.

Fls. & Frts. : October–April.

Illus. : King in Ann. Roy. Bot. Gard. Calc. 4: 55, t. 72. 1893; Talb. For. Fl. Bombay Pres. & Sind 1: 19, f. 12. 1909.



Desmos lawii (Hook. f. & Thoms.) Safford

Distrib. : Infrequent in moist deciduous or semi–evergreen forests. Kolhapur, Pune, Ratnagiri, Satara, Sindhudurg.

MILIUSA Leschen. ex A.DC.

1. Sepals and outer petals ovate; ovules 1–2 ... *M. velutina*

1. Sepals and outer petals linear - lanceolate; ovules 4-6 ... *M. tomentosa*

Miliusa tomentosa (Roxb.) Sinclair in Gard. Bull. Singapore 14: 378. 1955; Sant. in Bull. Bot. Surv. India 3: 20. (1961) 1962; Mitra in Sharma et al. Fl. India 1: 221. 1993. *Uvaria tomentosa* Roxb. Pl. Cor. 1: 31, t. 35. 1795. *Saccopetalum tomentosum* Hook. f. & Thoms. Fl. Ind. 152. 1855 & in Hook. f. Fl. Brit. India 1: 88. 1872; Cooke, Fl. Pres. Bombay 1: 17. 1958 (Repr.). *'Hoom', 'Humb'. 'Minmara', 'Thoska'.*

Deciduous trees, 8–10 m tall; young shoots densely tomentose. Leaves 10.5–14.0 x 4.0–7.5 cm, elliptic–ovate or elliptic–lanceolate, apex acute, base subacute. Flowers axillary, solitary or fascicled, all parts tomentose; sepals 0.5 x 0.1 cm, lanceolate; petals–outer 3 resembling calyx, inner much larger, erect with saccate base, fused at first, later becoming free. Carpels succulent, stalked, purple.

Fls. & Frts. : February–April.

Illus. : King in Ann. Roy. Bot. Gard. Calc. 4 (3): t. 207. 1893; Matthew. Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 5. 1988.

Distrib. : Frequent in moist deciduous forests.

Notes. : Although Baillon (Hist. des. Plantes 244. 1871) has reduced *Saccopetalum* to *Miliusa,* most of the floras maintained these two genera as distinct. The species with several ovules and saccate petals were described and assigned to *Saccopetalum* Bennet. Sinclair (op. cit.) after critically examining the species belonging to both these genera found that there seems to be no relation between the number of ovules and saccate or non–saccate character and hence did not find any usefulness in retaining *Saccopetalum* distinct from *Miliusa.*

M. velutina (Dunal) Hook. f. & Thoms. Fl. Ind. 151. 1855 & in Hook. f. Fl. Brt. India 1: 87. 1872; Witt, List. 1. 1908; Mitra in Sharma et al. Fl. India 1: 222. 1993. *Uvaria velutina* Dunal, Anon. 91. 1817; Almeida. Fl. Mah. 1: 15. 1996. *'Karai', 'Kari'.*

Trees, c 10 m tall; young branches tomentose. Leaves c 8 x 5 cm, ovate, shining, acute or obtuse at apex. Flowers yellow, few, in leaf opposed cymes. Fruitlets subglobose, purple.

Fls. & Frts. : April–July.

Illus. : Bedd. Fl. Sylv. t. 37. 1870; King in Ann. Roy. Bot. Gard. Calc. 4: t. 206. 1893.

Distrib. : Amravati, (Almeida, op. cit.), Yavatmal (Witt, op. cit.).

Orophea Bl.

Orophea zeylanica Hook. f. & Thoms. Fl. India 111. 1855 & in Fl. Brit. India 1: 90. 1872 emend. Kebler in Blumea 33: 62. 1988; Mitra in Sharma et al. Fl. India 1: 229. 1993. *O. malabarica* Sasidharan & Sivar. in Blumea 35 : 269, f. 1. 1990.

Small trees or shrubs with yellow–pubescent young branches. Leaves ovate or elliptic–oblong, shortly and obtusely acuminate at apex, pale beneath. Flowers solitary or 2–3–together, axillary or extra–axillary; sepals 3, ovate–orbicular, acute at apex, connate at base; petals 6 (3+3). Mature carpels globose, c 9.5 mm across. Seeds 1–2.

Fls. & Frts. : Not known from Maharashtra.

Illus. : Sasidharan & Sivar. op. cit.

Distrib. : Maharashtra, without exact locality (Mitra, op. cit.).

Polyalthia Bl.

1. Flowers in cymes; nerves of leaves parallel and raised on lower surface ... *P. fragrans*

1. Flowers not as above, solitary to few on tubercles of the trunk; nerves of leaves not parallel or raised on lower surface :

   2. Leaves obtuse at base; flowers greenish or yellow; berries purple ... *P. suberosa*

   2. Leaves acute to acuminate or cuneate at base; flowers green; berries red. ... *P. cerasoides*

Polyalthia cerasoides (Roxb.) Bth. & Hook. f. ex Bedd. Fl. Sylv. t. 1. 1869; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 63. 1872; Cooke, Fl. Pres. Bombay 1: 14. 1958 (Repr.); Mitra in Sharma et al. Fl. India 1: 270. 1993. *Uvaria cerasoides* Roxb. Pl. Cor. 1: 30, t. 33. 1795. *'Hoom', 'Humb', 'Vabbina'.*

Trees, c 3 m tall; young shoots densely tomentose. Leaves 10–20 x 5.0–6.5 cm, elliptic–lanceolate. Flowers fascicled on short peduncles; sepals small, orbicular, tomentose; petals in 2 whorls of 3 each, tomentose, outer 2.5–3.5 cm long, oblong or ovate, inner ones c 1.4 x 0.4 cm, linear or lanceolate, base saccate. Fruits globose, stalk c 2 cm, 1–seeded.

Fls. & Frts. : March–May.

Illus. : Bedd. op. cit.

Distrib. : Infrequent in deciduous forests. Bombay, Chandrapur, Pune, Raigad, Satara, Sindhudurg, Thane.

P. fragrans (Dalz.) Bedd. Fl. Sylv. t. 74. 1871 & Ic. t. 54. 1874; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 63. 1872; Cooke, Fl. Pres. Bombay 1: 13. 1958 (Repr.); Mitra in Sharma et al. Fl. India 1: 271. 1993. *Guatteria fragrans* Dalz. in Hook. J. Bot. & Kew Gard. Misc. 3: 206. 1851.

Trees up to 13 m tall. Leaves 11.5–24.0 x 5.5–11.0 cm, elliptic–ovate to elliptic–lanceolate, acute to acuminate at apex, base cuneate; petioles 0.5–0.7 cm long. Flowers greenish, fragrant, all floral parts tomentose; sepals small, orbicular; petals 2.5–3.5 cm long. Carpels 2.5–3.5 cm long, ovoid, oblique. Seeds orbicular–ovoid.

Fls. & Frts. : October–May.

Illus. : Bedd. op. cit.; Talb. For. Fl. Bombay Pres. & Sind 1: 23, f. 15. 1909.

Distrib. : Occasional in semi–evergreen forests. Sindhudurg (Cooke, op. cit.) & S. M. Almeida, Fl. Savantwadi 1: 35. 1990.

P. suberosa (Roxb.) Bth. & Hook f. in Thw. Enum. Pl. Zeyl. 394. 1864; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 65. 1872; Mitra in Sharma et al. Fl. India 1: 278. 1993. *Uvaria suberosa* Roxb. Pl. Cor. t. 34. 1795 & Fl. Ind. 2: 667. 1832.

Trees or shrubs, c 3 m tall. Leaves 2–6 x 2.0–2.5 cm coriaceous, elliptic–ovate or oblong, apex obtuse or rounded. Flowers terminal and axillary, c 1 cm across; calyx c 0.3 x 0.2 cm, tomentose; petals yellow, in whorls of 3 each, oblong or lanceolate, inner c 0.8 x 0.3 cm. Carpels 20–25 in a cluster, globose. Seeds solitary.

Fls. & Frts. : April.

Illus. : Bedd. Ic. t. 56. 1874; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 4. 1988.

Distrib. : Frequent in deciduous forests. Chandrapur.

SAGERAEA Dalz.

Sageraea laurifolia (Grah.) Blatt. in J. Bombay nat. Hist. Soc. 34: 294. 1931; Sant.in Rec. Bot. Surv. India 16 (1) : 3. 1967 (3rd Rev. ed.); Mitra in Sharma et al. Fl. India 1: 282, f. 44. 1993. *Guatteria laurifolia* Grah. Cat. Bombay Pl. 4. 1839. *Bocagea dalzellii* Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 92. 1872; Cooke, Fl. Pres. Bombay 1: 18. 1958 (Repr.) p.p. *'Andi', 'Har-kinjal, 'Kiland', 'Sager', 'Undi'.*

Trees, 6–12 m tall, evergreen. Leaves 8.0–17.5 x 4.5–6.2 cm, elliptic, or elliptic–lanceolate or oblong–lanceolate, coriaceous, shining, apex subacute, base rounded. Flowers creamish. Fruits c 2.5 cm across, globular, wrinkled when dry.

Fls. & Frts. : October–April.

Illus. : Bedd. Ic. t. 42. 1874 (*Sageraea dalzellii*); Talb. For. Fl. Bombay Pres. & Sind 1: 32, f. 23. 1909 (*Sageraea laurina* Dalz. in Kew J. Bot. 3: 207. 1851); Mitra in Sharma et al. op. cit.

Distrib. : Occasional in semi–evergreen forests. Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

UVARIA L.

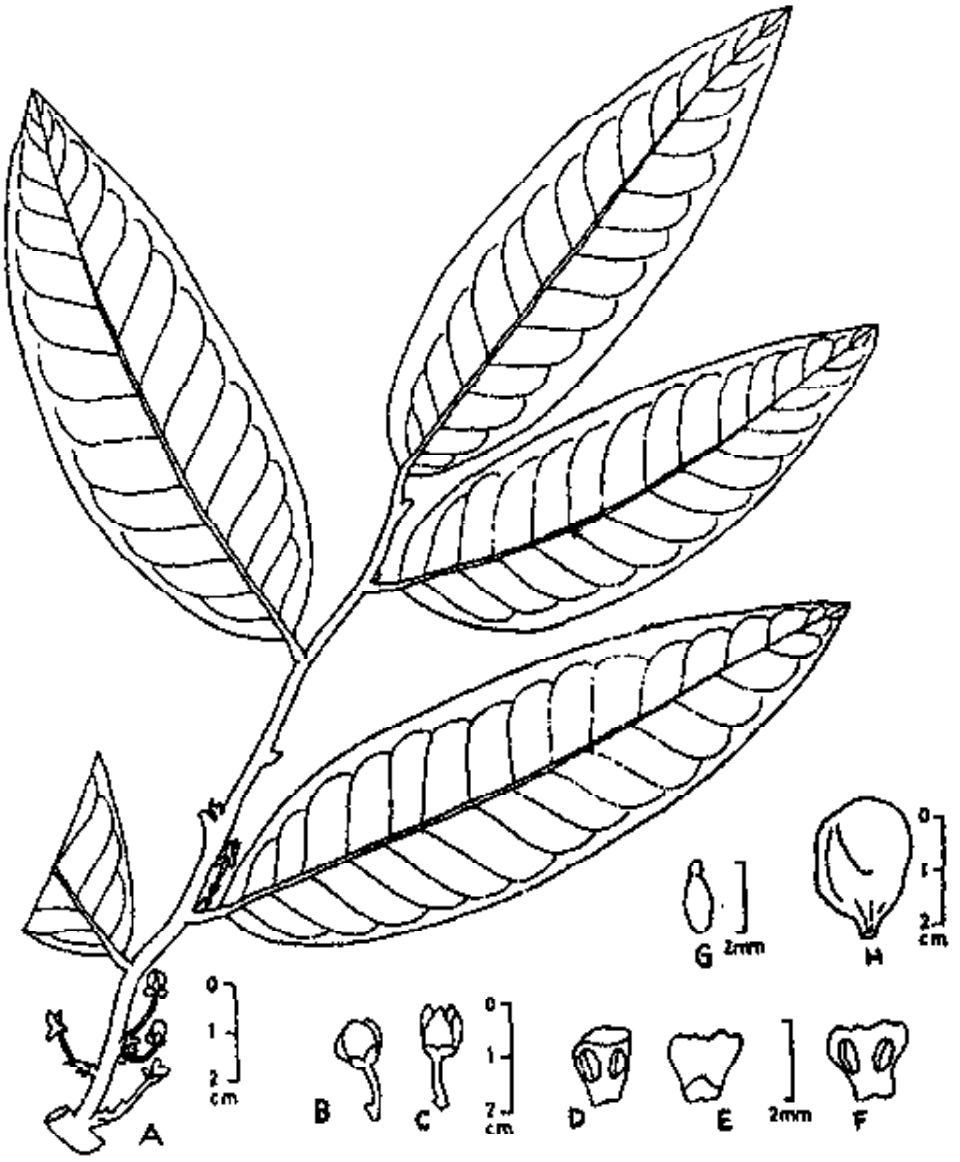
1. Pedicels 2–3 cm long; petals rotund–ovate; ripe carpels uniseriate; stalk 5–8 cm long, slender ... *U. narum*

1. Pedicels 1.0–1.5 cm long; petals ovate; ripe carpels biseriate; stalk 3.2–4.5 cm long, stout ... *U. hookeri*

Uvaria hookeri King in Ann. Roy. Bot. Gard. Calc. 4: 28, t. 22. 1893; Cooke, Fl. Pres. Bombay 1: 10. 1958 (Repr.); Talb. For. Fl. Bombay Pres. & Sind 1: 16, f. 10. 1909; Mitra in Sharma et al. Fl. India 1: 291. 1993. *U. narum* Wall. ex Hook. f. var. *macrophylla* Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 50. 1872.

Climbing shrubs. Leaves 15.0–22.5 x 3.8–5.5 cm, ovate to ovate–lanceolate, apex acute or slightly acuminate, base rounded, margins repand, thickened. Flowers solitary, terminal or leaf–opposed, 2.5–5.0 cm across. Carpels 2.5–5.0 cm long, ovoid, tapering to the end. Seeds in 2 rows of c 6 each.

Fls. & Frts. : March–May.



Sageraea laurifolia (Grah.) Blatt. : A-Flowering twig; B-Bud; C-Flower; D, E & F - Stamens (E-Sterile); G-Carpel; H-Ripe carpel.

Illus. : King, op. cit.; Talb. op. cit.

Distrib. : Forests of W. Ghats (King, op. cit.) and Konkan (Talb. op. cit.).

Notes. : This species was united with *U. narum* under var. *macrophylla* in Fl. Brit. India but King in his 'Annonaceae of British India considered it to be distinct and named it as *U. hookeri*. It differs from *U. narum* in having biseriate seeds, carpels tapering at one end, larger leaves and flowers and longer and thicker stalks to the carpels. Cooke (op. cit.) had also reported this species from the forests of the Western ghats based on the authority of King.

U. narum (Dunal) Bl. Fl. Java 5. 1828; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 50. 1872; Cooke, Fl. Pres. Bombay 1: 9. 1958 (Repr.); Mitra in Sharma et al. Fl. India 1: 292. 1993.*Unona narum* Dunal, Monogr. Farm. Annon. 99. 1817.*'Saplival'*.

Scandent shrubs, stellately pubescent. Leaves 12–24 x 3.0–6.5 cm, oblong–lanceolate, apex acute to acuminate, base subcuneate. Flowers solitary, terminal, reddish. Carpels 2–3 x 1.5–2.0 cm, ovoid–oblong, shallowly constricted between seeds, green when young, ripens red. Seeds in a single row, usually 4–5.

Fls. & Frts. : May–October.

Illus. : King in Ann. Roy. Bot. Gard. Calc. 4: 27, t. 21. 1893; Talb. For. Fl Bombay Pres. & Sind 1: 15, f. 9. 1909.

Distrib. : Frequent along the ghats. Kolhapur, Raigad, Satara, Sindhudurg.

CULTIVATED SPECIES :

Annona muricata L. Sp. Pl. 1: 536. 1753; Mitra in Sharma et al. Fl. India 1: 206. 1993; Almeida, Fl. Mah. 1: 11, f. 1996. *'Mansphal'*.

Small trees with glabrous branches. Leaves obovate–oblong, acuminate at apex. Flowers solitary, axillary; sepals 3, triangular, glabrous, persistent; petals 6 (3+3) glabrous, yellow. Fruits muricate, covered with long curved spines, dull green. Seeds many, reddish–brown.

Fls. & Frts. : April–October.

Illus. : Almeida, op. cit.

Distrib. : Native of Tropical America. Occasionally cultivated.

Artabotrys hexapetalus (L.f.) Bhandari in Baileya 12 : 147. 1964; Mitra in Sharma et al. Fl. India 1: 251, f. 40. 1993. *Annona hexapetala* L.f. Suppl. Pl. 270. 1781. *Artabotrys odoratissimus* R. Br. in Bot. Reg. 5: t. 423. 1820; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 54. 1872. *'Hira-champa', 'Madanmast'.*

Bushy shrubs with puberulous young branches. Leaves oblong-lanceolate, acuminate at apex. Flowers solitary or in pairs on hooked peduncles, drooping, fragrant. Ripe carpels ovoid or narrowly obovoid, apiculate at apex, yellow when ripe. Seeds 1 or 2, deeply grooved.

Fls. : April–July; *Frts.* : September–February.

Illus. : Mitra, op. cit.

Distrib. : Native of Tropical Asia. Cultivated for the fragrant flowers. Common throughout.

Cananga odorata (Lam.) Hook. f. & Thoms. Fl. Ind. 130. 1855 & in Hook. f. Fl. Brit. India 1: 56. 1872; Almeida, Fl. Mah. 1: 12. 1996. *Uvaria odorata* Lam. Encycl. 1: 595. 1789.

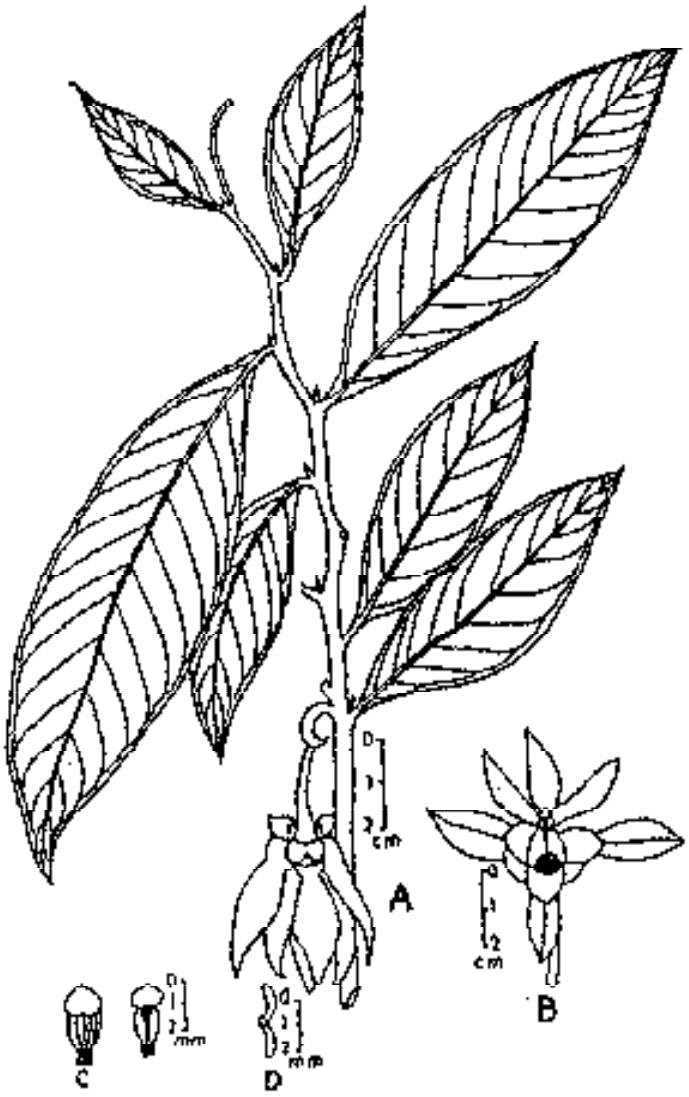
Tall trees. Leaves 10–18 cm long, ovate, oblong, finely acuminate at apex, rounded at base, wavy along margins, puberulous. Flowers in clusters of 3, c 7 cm long, drooping, yellow, fragrant. Carpels c 12 together–long stalked, 1–2 cm long, ovoid or obovoid, ripens black, 6–12 seeded.

Fls. & Frts. : Throughout the year.

Distrib. : Cultivated in gardens. Bombay, Ratnagiri (Almeida, op. cit.).

Polyalthia longifolia (Sonn.) Thw. Enum. Pl. Zeyl. 398. 1864; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 62. 1872; Cooke, Fl. Pres. Bombay 1: 13. 1958 (Repr.); Mitra in Sharma et al. Fl. India 1: 274. 1993. *Uvaria longifolia* Sonn. Voy. Ind. 2: 233, t. 131. 1782. *'Ashok', 'Dedbari'.*

Trees with straight trunk and greyish-brown bark. Leaves oblong-lanceolate to narrowly lanceolate, gradually long-acuminate at apex, with undulate margins. Flowers greenish-yellow, in clusters from axil of fallen leaves; sepals 3; petals 6. Ripe carpels ovoid to ellipsoid, obtuse at both ends, yellowish, ultimately reddish or black. Seed 1.



Artabotrys hexapetauls (L.f.) Bhandari ; A-Flowering twig; B-Flower; C-Stamens, front and back views; D-Carpel.

Fls. : March–May; *Frts.* : July–September.

Illus. : Wight Ic. t. 1. 1838 (*Guatteria longifolia* Wall. Cat. 6442. 1832).

Distrib. : This is a native of Tropical Asia. Commonly cultivated throughout in gardens.

SPECIES EXCLUDED :

Uvaria lurida Hook. f. & Thoms. Fl. Ind. 1: 101. 1855 & in Hook. f. Fl. Brit. India 1: 51. 1872; Mitra in Sharma et al. Fl. India 1: 291. 1993.

Birdwood (1897) included this species in the Catalogue of the Flora of Matheran & Mahabaleshwar, probably based on wrongly identified specimens. Actual distribution of this species in the country is East, North–East and Andaman and Nicobar Islands (Mitra, op. cit. 292). Hence it is excluded from the state flora of Maharashtra.

MENISPERMACEAE

(B.G. Kulkarni)

1. Leaves peltate :
   2. Female bracts foliaceous, cordate ... CISSAMPELOS
   2. Female bracts not as above :
      3. Flowers on old stems; stamens free ... DIPLOCLISIA
      3. Flowers not on old stems; stamens connate :
         4. Sepals connate ... CYCLEA
         4. Sepals free ... STEPHANIA
1. Leaves not peltate :
   5. Seeds horse–shoe shaped :
      6. Petals cuneate; drupes pedicellate ... TILIACORA
      6. Petals auricled; drupes sessile ... COCCULUS
   5. Seeds not as above
      7. Style scar terminal; stamens free ... TINOSPORA
      7. Style scar basal; stamens connate ... ANAMIRTA

ANAMIRTA Colebr.

Anamirta cocculus (L.) Wight & Arn. Prodr. 1: 446. 1834; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 98. 1872; Forman in Kew Bull.

32: 329. 1978; Pramanik in Sharma et al. Fl. India 1: 311. 1993. *Menispermum cocculus* L. Sp. Pl. 340. 1753. *Anamirta paniculata* Colebr. in Trans. Linn. Soc. 13: 66. 1822; Cooke, Fl. Pres. Bombay 1: 20. 1958 (Repr.). *'Kakaphal', 'Kakmari', 'Vatoli'.*

Dioecious stragglers, bark glaucous. Leaves 15–25 x 10–15 cm, broadly ovate, dark green above, pale beneath, apex obtuse, base truncate or subacute; petioles swollen at base and apex. Panicles c 50 cm long on old wood. Flowers 0.6 cm across, pale greenish–yellow. Drupes 0.8–1.2 cm across, white, turning black.

Fls. & Frts. : December–February.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 38, f. 24. 1909 (*Anamirta paniculata*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 11. 1982.

Distrib. : Scattered in moist deciduous forests. Kolhapur, Nasik, Sindhudurg.

CISSAMPELOS L.

Cissampelos pareira L. var. **hirsuta** (Buch.–Ham. ex DC.) Forman in Kew Bull. 22: 356. 1968; Gang. in Sharma et al. Fl. India 1: 317. 1993. *C. hirsuta* Buch.–Ham. ex DC. Syst. Nat. 1: 535. 1817. *C. pareira* L. Sp. Pl. 1031. 1753 p.p.; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 103. 1872; Cooke, Fl. Pres. Bombay 1: 24. 1958 (Repr.). *'Kuruphad', 'Pahadmul', 'Tahadvel', 'Tannivel'.*

Climbing undershrubs, softly tomentose. Leaves 3–5 x 2–4 cm, ovate to orbicular, glabrous or sparsely pubescent above, pale and pubescent on nerves below, apex rounded, base truncate or subcordate. Male flowers in corymbose cymes, 4–6 cm long; calyx and corolla–lobes 4 each; stamens 4; female flowers in racemes; calyx and corolla lobes 1 each; stigma lobed. Drupes 2–4 mm across, ovoid, scarlet.

Fls. & Frts. : August–October.

Illus. : Mahesh. Illus. Fl. Delhi f. 2. 1966; Gandhi in Sald. & Nicols. Fl. Hassan Dt. 65, f. 12 B. 1976.

Distrib. : Common in deciduous forests in plains.

COCCULUS DC. (nom. cons.)

1. Leaves at length glabrous; male flowers in axillary fascicles; sepals, glabrous ... *C. pendulus*

1. Leaves villous; male flowers in axillary short panicles; sepals hairy ... *C. hirsutus*

Cocculus hirsutus (L.) Theob. in Mason, Burma ed. Theob. 2: 657. 1883; Mabberley in Taxon 34: 155. 1985; Forman in Kew Bull. 43: 400. 1988; Gang. in Sharma et al. Fl. India 1: 318. 1993. *Menispermum hirsutum* L. Sp. Pl. 341. 1753. *Cocculus villosus* (Lam.) DC. Syst. Nat. 1: 525. 1817; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 101. 1872; Cooke, Fl. Pres. Bombay 1: 22. 1958 (Repr.). *'Jaljamni', 'Karrom', 'Para–vel', 'Vasan–vel'.*

Climbing undershrubs; stems and branches hirtsute. Leaves 2–5 x 1.5–3.5 cm, ovate or oblong–ovate, softly pubescent or villous on both surfaces, apex obtuse and mucronate, base truncate or subcordate. Male flowers 0.3 cm across; calyx and corolla lobes 6 each; female flowers in axillary fascicles, c 0.4 cm across; calyx and corolla as in males. Drupes 0.2–0.4 cm across, ripens reddish.

Fls. & Frts. : January–March.

Illus. : Talb. For Fl. Bombay Pres. & Sind 1: 42, f. 26. 1909 (*Cocculus villosus*); Matthew, Illus Fl. Tamilnadu Carnatic 2: t. 13. 1982.

Distrib. : In dry deciduous forests, common throughout.

Notes. : So far this combination had been attributed to Diels (in Engl. Pflanzenr. 46: 236. 1910). Mabberley (op. cit.) has unearthed William Theobald's combination which has been made in his edition of Mason's *The Natural products of Burmah* (1883).

C. pendulus (J. R. & G. Forst.) Diels in Engl. Pflanzenr. 4, 94: 237, f. 78. 1910; Gang. in Sharma et al. Fl. India 1: 320. 1993. *Epibaterium pendulum* J. R. & G. Forst. Char. Gen. 108, t. 54. 1776. *Cocculus loeba* (Del.) DC. Syst. Nat. 1 : 529. 1817; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 102. 1872; Cooke, Fl. Pres. Bombay 1: 23. 1958 (Repr.).

Climbing undershrubs, branches glaucous. Leaves 2–4 x 1–2 cm, variable, elliptic, linear–elliptic or ovate–oblong, 3–nerved, apex obtuse–mucronate, base rounded or cuneate. Male flowers c 0.25 cm across, on tubercles; female flowers solitary, c 0.25 cm across. Drupes c 0.6 cm across, obovoid, compressed.

Fls. & Frts. : November–February.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 43, f. 27. 1909 *(Cocculus loeba).*

Distrib. : Occasional in deciduous forests. Ahmednagar, Nasik, Pune.

CYCLEA Arn. ex Wight

1. Calyx globose or broadly campanulate, with 4–8 short teeth, hairy ... *C. peltata*

1. Calyx campanulate, divided nearly to base with 4–5 lobes, glabrous ... *C. fissicalyx*

Cyclea fissicalyx Dunn in Gamble, Fl. Pres. Madras 1: 31. 1915 [1: 22. 1957 (Repr. ed.); & in Kew Bull. 1916: 60. 1916; Blatt. in J. Bombay nat. Hist. Soc. 31: 557. 1926; Sant. in Rec. Bot. Surv. India 16(1): 5. 1967 (3rd Rev. ed.); Gang. in Sharma et al. Fl. India 1: 324. 1993. *C. peltata* Miers, Contr. Bot. 3: 236. 1874; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 104. 1872; Cooke, Fl. Pres. Bombay 1: 25. 1958 (Repr.) (non Hook. f. & Thoms. nec. Diels).

Climbing shrubs. Leaves 6.5–11.0 x 9.5–13.0 cm, deltoid or ovate, margins ciliate, Flowers minute; male flowers in axillary and slender panicles; female flowers in racemose–panicles, shorter than male ones. Drupes pilose.

Fls. & Frts. : December–February.

Distrib. : Rare. Nasik, Pune, Sindhudurg.

C. peltata (Lam.) Hook. f. & Thoms. Fl. Ind. 201. 1855 & in Hook. f. Fl. Brit. India 1: 104. 1872 p.p.; Cooke, Fl. Pres. Bombay 1: 25. 1958 (Repr.); Sant. & Janardh. in Bull. Bot. Surv. India 10: 368. (1968) 1969; Gang. in Sharma et al. Fl. India 1: 325. 1993. *Menispermum peltatum* Lam. Encycl. 4: 96. 1797. *Cyclea burmanni* (D.C.) Hook. f. & Thoms. op. cit. & in Hook. f. op. cit.; Cooke, op. cit. *'Pakar'*.

Herbaceous twiners; young parts pubescent. Leaves 6–12 x 4–8 cm, oblong–elliptic, apex acuminate or shortly mucronate, base subcordate or hastate, glabrous and shining above, pubescent beneath. Flowers in axillary panicles; males: calyx and corolla 6 each; females: calyx and corolla 1 each. Drupes 0.3–0.5 cm across, obovoid, whitish–green when ripe.

Fls. & Frts. : September–February.

Illus. : Talb For. Fl. Bombay Pres. & Sind 1: 46, f. 29. 1909 (*Cyclea burmanni*); Diels in Engl. Pflanzenr. 46: 310, t. 93, f. L to O. 1910.

Distrib. : Frequent in moist deciduous forests. Ahmednagar, Bombay, Kolhapur, Nasik, Pune, Raigad, Satara, Sindhudurg, Thane.

DIPLOCLISIA Miers

Diploclisia glaucescens (Bl.) Diels in Engl. Pflanzenr. 46: 225, t. 77. 1910; Pramanik in Sharma et al. Fl. India 1: 327. 1993. *Cocculus glaucescens* Bl. Bijdr. 25. 1825. *C. macrocarpus* Wight & Arn. Prodr. 13. 1834; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 101. 1872; Cooke, Fl. Pres. Bombay 1: 22. 1958 (Repr.). *"Ramrakh"*.

Extensive climbers; young parts glabrous. Leaves 4–10 x 4–12 cm, broadly ovate to suborbicular, glaucous beneath, apex obtuse, base truncate or subcordate. Flowers yellowish–green, 0.25–0.3 cm across in drooping panicles; calyx and corolla lobes 6 each. Drupes 2.0–2.5 cm long, obovoid, compressed, kidney–shaped.

Fls. & Frts. : January–May.

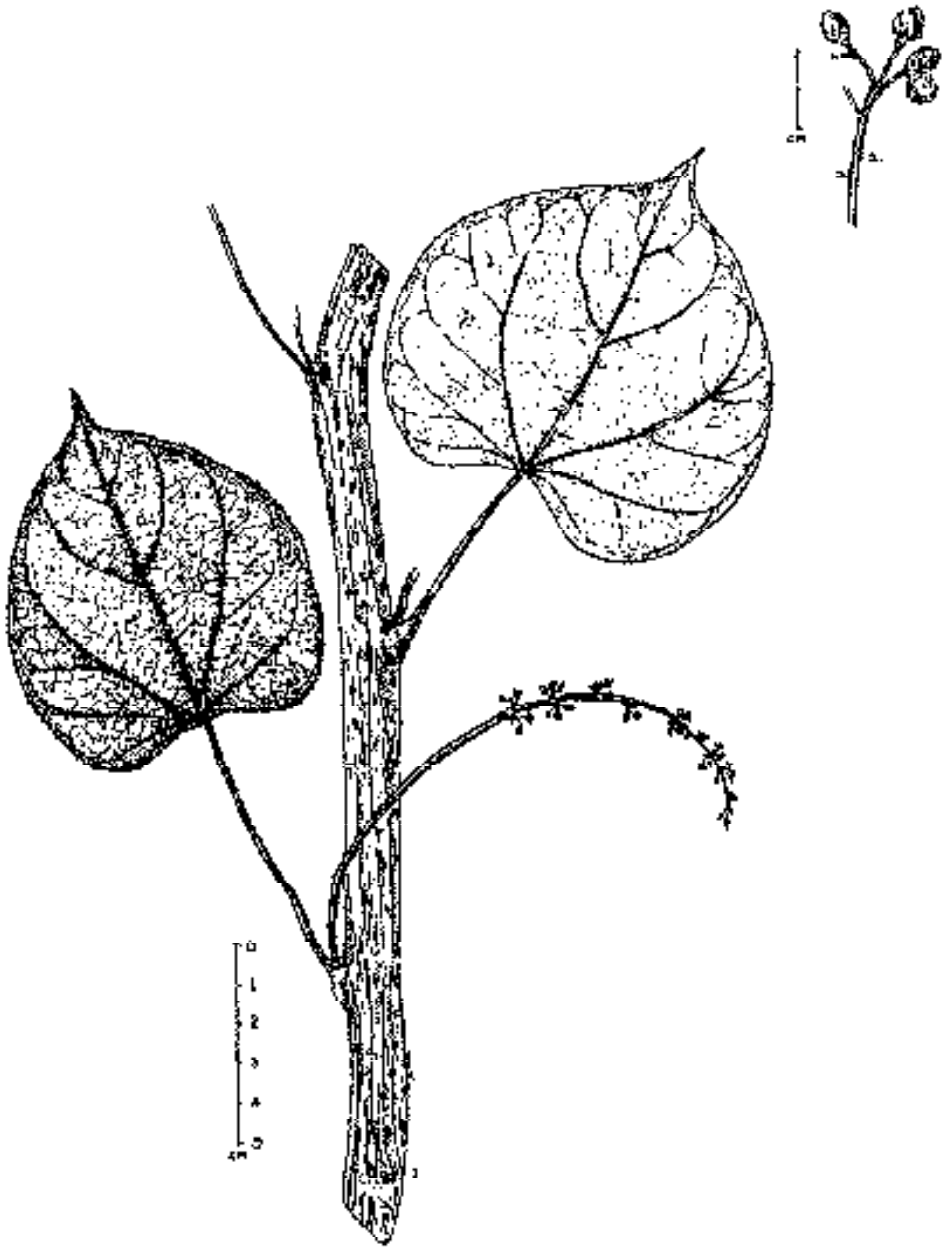
Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 40, f. 25. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: tt. 15 & 961 c, d. 1982.

Distrib. : Frequent in moist deciduous forests. Ahmednagar, Bombay, Kolhapur, Pune, Raigad, Satara, Sindhudurg, Thane.

STEPHANIA Lour.

Stephania japonica (Thunb.) Miers in Ann. Mag. Nat. Hist. 3, 18: 14. 1866; Forman in Kew Bull. 11: 49. 1956 & in Ibid. 43: 380. 1988; Gang. in Sharma et al. Fl. India 1: 335. 1993. *Menispermum japonicum* Thunb. Fl. Jap. 193. 1784. *Stephania hernandifolia* (Willd.) Walp. Rep. 1: 96. 1842; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 103. 1872; Cooke, Fl. Pres. Bombay 1: 23. 1958 (Repr.). *'Pahad–vel', 'Patal'*.

Slender twiners with tuberous roots. Leaves 4–8 x 3.5–6.0 cm, ovate, apex shortly acuminate, base rounded or shallowly cordate. Flowers greenish–yellow in umbellate heads; sepals and petals similar in both sexes; males with biseriate sepals; females: sepals and petals 3–5 each. Drupes 0.4–0.8 cm across, globose, red.



Tinospora cordifolia (Willd.) Miers ex Hook. f. & Thoms.
A- Habit; B- Fruits

Fls. & Frts. : June–September.

Illus. : Wight, Ic. t. 939. 1845; Talb. For. Fl. Bombay Pres. & Sind 1: 44, f. 28. 1909; Matthew Illus Fl. Tamilnadu Carnatic 2: t. 17. 1982.

Distrib. : Infrequent in moist deciduous forests. Ahmednagar, Kolhapur, Nagpur, Pune, Satara, Sindhudurg, Thane.

TILIACORA Colebr.

Tiliacora acuminata (Lam.) Miers in Ann. & Mag. Nat. 2, 7: 39. 1851; Forman in Kew Bull. 30: 90. 1975; Pramanik in Sharma et al. Fl. India 1: 343. 1993. *Menispermum acuminatum* Lam. Encycl. 4: 101. 1797. *Tiliacora racemosa* Colebr. in Trans. Linn. Soc. 13: 67. 1821; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 99. 1872; Cooke, Fl. Pres. Bombay 1: 21. 1958 (Repr.).

Large climbing shrubs; branches ash–coloured. Leaves 5–14 x 3–7 cm, oblong–ovate, shining above, pale beneath, apex acuminate, base rounded or cordate, margins wavy. Flowers yellow, dioecious or polygamous in axillary panicles; males 2–7 at apex of inflorescence; females solitary. Drupes 1.0–1.5 cm long, oblong.

Fls. & Frts. : January–February.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 18. 1982.

Distrib. : Rare in moist deciduous forests. Konkan (Cooke op. cit.), Pune.

TINOSPORA Miers.

Nicolson & Suresh (1986) have discussed in detail about the nomenclatural status of the genus *Tinospora*. The genus *Tinospora* has been described by Miers in Ann. Mag. Nat. Hist. 2, 7: 35, 38. 1851. Loureiro has described *Campylus* in his Fl. Cochinch. 113. 1790. Because their types are regarded as congeneric, under the revised Art. 10.1 and 10.2 of the ICBN and the principle of priority *Campylus* Lour. (1790) must replace *Tinospora* Miers (1851). Nicolson & Suresh have argued in favour of conservation of *'Tinospora'*.

1. Stems and leaves glabrous; drupes globose ... *T. cordifolia*

1. Stems and leaves hairy; drupes ellipsoid ... *T. sinensis*

Tinospora cordifolia (Willd.) Miers ex Hook. f. & Thoms. Fl. Ind. 184. 1855 & in Hook. f. Fl. Brit. India 1: 97. 1872; Cooke, Fl. Pres.

Bombay 1: 20. 1958 (Repr.); Sant. & Janardh. in Bull. Bot. Surv. India 10: 368. (1968) 1969; Pramanik in Sharma et al. Fl. India 1: 347. 1993. *Menispermum cordifolium* Willd. Sp. Pl. 4: 826. 1806. *'Gul-vel'*.

Extensive climbers; bark green, corky. Leaves 5.0–8.5 cm, as broad as long, sometimes reniform; petioles 3–4 cm long. Flowers greenish-yellow, 5–8 mm across; males fascicled; females solitary or in racemes. Drupes 5–6 mm across, orange-red when ripe.

Fls. & Frts. : January–August.

Illus. : Wight, Ic. tt. 485 & 486. 1843 [*C. cordifolius* (Willd.) DC. Syst. Nat. 1: 518. 1824]; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 19. 1982.

Distrib. : Common in deciduous forests and also planted.

T. sinensis (Lour.) Merr. in Sunyatsenia 1: 193. 1934 & in Trans. Amer. Philos. Soc. Philad. n.s. 24: 148. 1935; Sant. & Janardh. in Bull. Bot. Surv. India 10: 368. (1968) 1969; Pramanik in Sharma et al. Fl. India 1: 349. 1993. *Campylus sinensis* Lour. Fl. Cochinch 113. 1790. *Tinospora malabarica* (Lam.) Miers in Ann. & Mag. Nat. Hist. 2, 7: 38. 1851 & Contrib. 3: 32. 1864; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 96. 1872; Cooke, Fl. Pres. Bombay 1: 19. 1958 (Repr.).

Straggling shrubs; bark dirty green, warty. Leaves 8–12 cm, as long as broad or broader than long, ovate-cordate, apex acuminate, base truncate or cordate; petioles 9–11 cm long. Flowers greenish-yellow, 5–7 mm across in racemes from bare branches. Drupes 0.9–1.2 cm across, orange-red when ripe.

Fls. & Frts. : January–May.

Illus. : Diels in Engl. Pflanzenr. 46: 133, f. 49 A–C. 1910.

Distrib. : Scattered, infrequent in deciduous forests. Bombay, Pune, Satara, Sindhudurg, Thane.

CULTIVATED SPECIES :

Cocculus laurifolius DC. Prodr. 1: 100. 1824; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 101. 1872; Gang. in Sharma et al. Fl. India 1: 319. 1993.

Small trees, 2–5 m tall; stem stout, branches drooping. Leaves ovate-elliptic or elliptic-lanceolate, 5–15 x 2–4 cm, coriaceous, strongly 3 ribbed, obtuse or subacute at base, caudate-acuminate at apex.

Flowers pale yellow, in axillary panicles; petals smaller than sepals. Male flowers : petals emarginate. Female flowers: staminodes 6. Drupes globose, compressed, 0.6 cm across.

Fls. & Frts. : April–October.

Distrib : Cultivated in gardens Pune.

NYMPHAEACEAE

(S. Moorthy)

NYMPHAEA L. (nom. cons.)

1. Leaves entire or obtusely sinuate, glabrous on both surfaces; anther apex acute ... *N. nouchali*

1. Leaves sharply irregularly sinuate toothed, densely pubescent beneath; anther apex obtuse :

   2. Sepals obtuse at apex, 5–10–ribbed ... *N. rubra*

   2. Sepals acute at apex, not ribbed ... *N. pubescens*

Nymphaea nouchali Burm. f. Fl. Ind. 120. 1768; Mitra in Sharma et al. Fl. India 1: 430. 1993. *N. stellata* Willd. Sp. Pl. 2: 1153. 1799; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 114. 1872; Cooke, Fl. Pres. Bombay 1: 27. 1958 (Repr.). *'Uplia Kamal'*.

Aquatic herbs; root stocks short, ovoid, acute. Leaves 20–30 x 15–25 cm, orbicular or elliptic, peltate, green above, purplish below; petioles slender. Flowers white or red, 7–15 cm across, solitary. Nutlets globular. Seeds longitudinally striate.

Fls. & Frts. : Almost throughout the year.

Illus. : Wight, Ic. t. 178. 1839 (*N. stellata*); Subram. Aq. Ang. 113, f. 1. 1962; Mahesh. Illus. Fl. Delhi f. 3. 1966; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 22. 1982.

Distrib. : Frequent in shallow tanks and ponds.

Notes : Maheshwari (1980) has discussed about the synonymies of *N. nouchali* and *N. pubescens* along with their notable taxonomic features. Seeds are said to be eaten in times of scarcity.

N. pubescens Willd. Sp. Pl. 2: 1154. 1799; Mitra in Sharma et al. Fl. India 1: 431. 1993. *N. lotus* auct. non L. 1753; Hook. f. & Thoms. Fl.

Ind. 241. 1855 & in Hook. f. Fl. Brit. India 1: 114. 1872 p.p. *N. lotus* var. *pubescens* (Willd.) Hook. f. & Thoms. op. cit. & Hook. f. op. cit.; Cooke, Fl. Pres. Bombay 1: 27. 1958 (Repr.). *'Kamal'*.

Aquatic herbs; root stocks short, erect, roundish, tuberous. Leaves 15–25 cm across, orbicular or reniform–sagittate, deeply cordate, base sinus 5–8 cm deep, nigro–punctate above, velvety pubescent and prominently veined beneath. Flowers red, pale rose or white, 7–20 cm across, solitary. Nutlets c 3 cm across, fleshy, globose. Seeds ovoid, rough.

Fls. & Frts. : Throughout the year.

Illus. : Engl. & Prantl, Pflanzenf. 3(2): 8, f. 9, A, B. 1888; Subram. Aq. Ang. 114, f. 2. 1962.

Distrib. : Frequent in tanks and ponds.

Notes : Flowers said to open in the mornings only.

N. rubra Roxb. ex Salisb. Parad. Lond. 1, t. 14. 1805; Mitra in Sharma et al. Fl. India 1: 432. 1993; Almeida, Fl. Mah. 1: 28. 1996. *N. lotus* auct. non L. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 114. 1872 p.p. *'Kumud'*, *'Saluk'*.

Rootstock tuberous. Leaves peltate, 15–25 cm across, orbicular or reniform, glabrous and often nigro–punctate above, velvety–pubescent and prominently veined beneath. Flowers solitary, 8–20 cm across, red, pale rose or white. Fruits globose, c 3 cm across, fleshy. Seeds ovoid, rough, arillate.

Fls. & Frts. : Throughout the year.

Distrib. : Bombay, Pune (Almeida, op. cit.).

CULTIVATED SPECIES :

N. nouchali var. **cyanea** (Hook. f. & Thoms.) Almeida, Fl Mah. 1: 28. 1996. *N. stellata* var. *cyanea* Hook. f. & Thoms. Fl. Ind. 1: 243. 1855 & in Hook. f. Fl. Brit. India 1: 114. 1872.

Leaves roundish, peltate, obtuse, margins entire or wavy, lower surface deep purple in colour. Flowers pale blue. Berries globose, c 1.5 cm across, 10–12–celled.

Fls. & Frts. : Throughout the year.

Distrib. : In private gardens. Bombay & Thane (Almeida, op. cit.).

NELUMBONACEAE

(S. Moorthy)

NELUMBO Adans.

Nelumbo nucifera Gaertn. Fruct. 1: 73, t. 19, f. 2. 1788; Subram. Aq. Ang. 8, 116, f. 4. 1962; Mitra in Sharma et al. Fl. India 1: 441. 1993. *Nelumbium speciosum* Willd. Sp. Pl. 2: 1258. 1799; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 116. 1872; Cooke, Fl. Pres. Bombay 1: 28. 1958 (Repr.). *'Kamal', 'Kankadi'.*

Aquatic herbs; rhizomes slender elongate, creeping, branched. Leaves 0.3–0.9 m across, glossy or waxy, glaucous beneath, radiatingly reticulate. Flowers white or rosy, 10–25 cm across, solitary, erect or cernuous; scape sheathing, as long as petioles. Ripe carpels 1.25 cm long, ovoid, glabrous; nutlets smooth.

Fls. & Frts. : July–October.

Illus. : Wight, Illus. 1. t. 9. 1840 (*Nelumbium speciosum*); Subram. op. cit.; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 21. 1982.

Distrib. : Frequently found in tanks and ponds, often in temple tanks.

PAPAVERACEAE

(K. Madhusudan Rao)

ARGEMONE L.

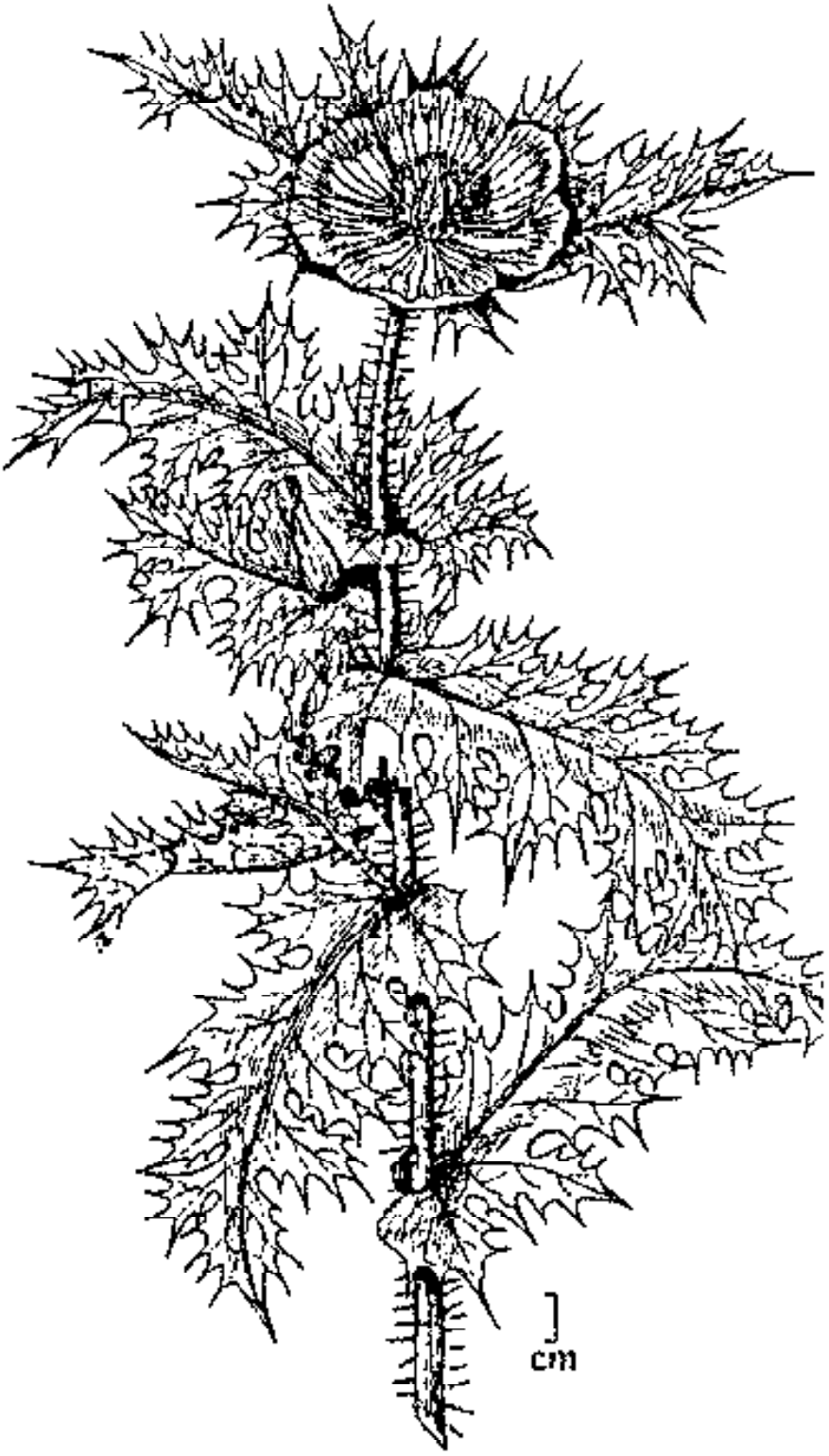
Argemone mexicana L. Sp. Pl. 508. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 117. 1872; Cooke, Fl. Pres. Bombay 1: 29. 1958 (Repr.); Debnath & Nayar in Sharma et al. Fl. Ind. 2: 2, f. 1. 1993. *'Pivla dhotra'.*

Annual, prickly herbs, 30–100 cm tall. Leaves radical and cauline, 5–10 x 2.5–4.0 cm, bluish–green, variegated white, spiny along margins and on veins, sessile. Flowers bright yellow, 3–4 cm across, solitary, terminal. Capsules 2–3 cm long, spinous. Seeds numerous, black, globose.

Fls. & Frts. : Throughout the year.

Illus. : Wight, Illus. 2: t. 11. 1840; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 23. 1982; Debnath & Nayar, op. cit.

Distrib. : A weed in waste places and common throughout.



Argemone mexicana L.

CULTIVATED SPECIES :

Papaver rhoeas L. Sp. Pl. 507. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 117. 1875; Debnath & Nayar in Sharma et al. Fl. India 2: 31. 1993; Almeida, Fl. Mah. 1: 30. 1996. *'Jangli Mudricka'*.

Annual herbs, 0.3–1.0 m high, hispid or glabrescent, erect and branched. Leaves lanceolate, coarsely toothed, rarely almost entire, sometimes pinnatifid. Flowers small, solitary, terminal c 5 cm across, deep purple–scarlet white. Capsules campanulate, 1–2 cm long. Seeds dark brown.

Fls. & Frts. : May–March.

Distrib. : Usually under cultivation. Nagpur, Pune.

P. somniferum L. Sp. Pl. 1: 508. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 117. 1872; Debnath & Nayar in Sharma et al. in Fl. India 2: 32. 1993. *'Aphu,' 'Khus–Khus', 'Posta'*.

Herbs, annual, robust, 0.5–1.0 m high. Leaves 15–25 x 8–15 cm, ovate–oblong, shallowly pinnatifid, cordate at base, acute at apex. Flowers white or pale purple. Capsules globose or ovoid. Seeds globose, white or grey–brown or grey–black.

Fls. & Frts : April–August.

Illus. : Debnath & Nayar, Poppies Ind. Reg. 111, f. 40. 1986.

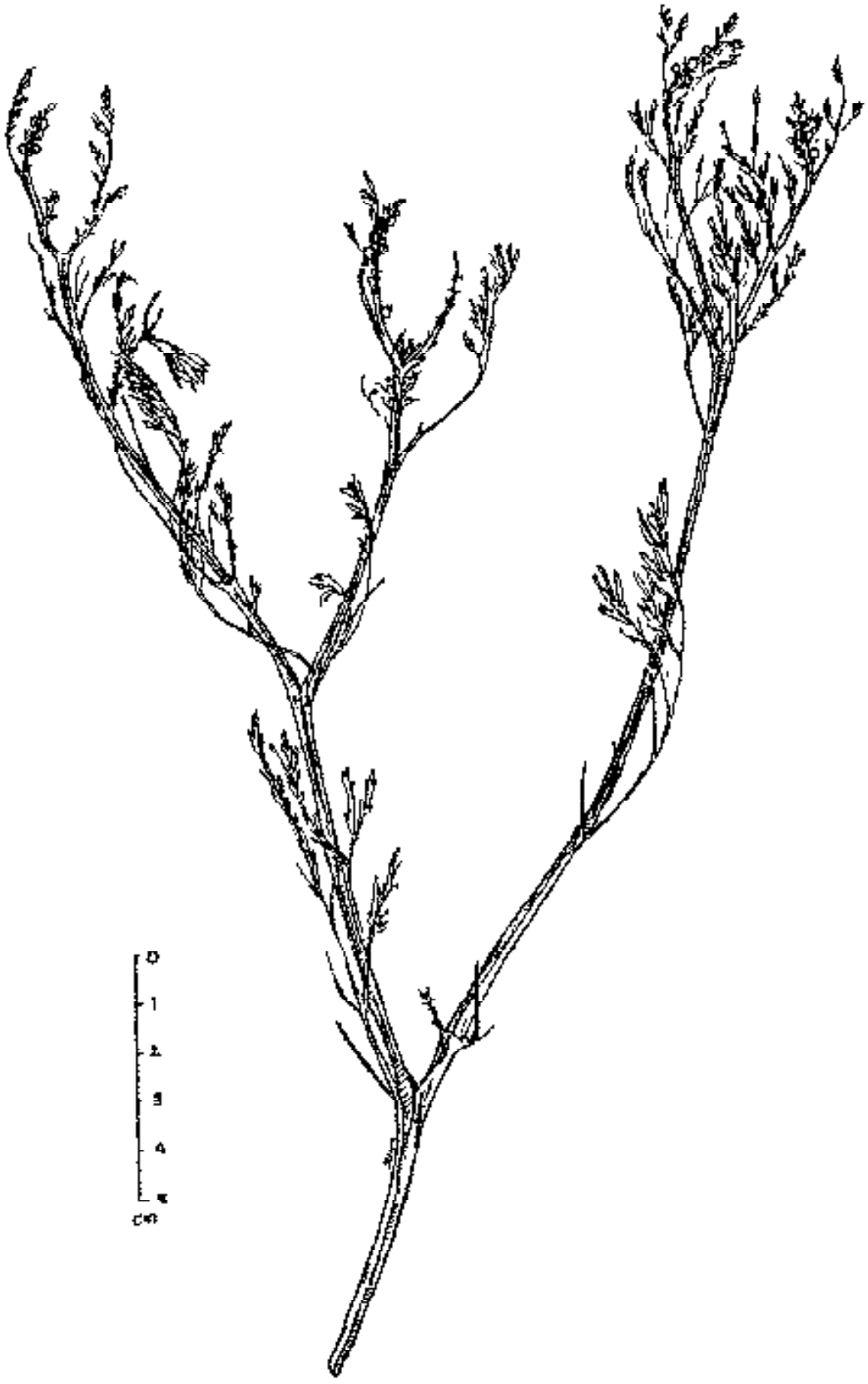
Distrib. : It is widely cultivated and also grown in gardens for the poppy seeds used as food and to produce an oil which is used for making medicines, candles and soaps. Pune.

FUMARIACEAE

(S.G. Pradhan)

FUMARIA L.

Fumaria indica (Haussk.) Pugsley in J. Linn. Soc. Bot. 44: 313. 1919; Ellis & Balakr. in Sharma et al. Fl. India 2: 84. 1993. *F. vaillantii* var. *indica* Haussk. in Flora 56: 443. 1873. *F. parviflora* ssp. *vaillantii* (Lois.) Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 128. 1872; Cooke, Fl. Pres. Bombay 1: 30. 1958 (Repr.). *'Pitapada'*.



Fumaria indica (Haussk.) Pugsley

Herbs, diffuse, 7–20 cm tall, glabrous or sparsely hairy. Leaves multifid with linear–acute, mucronate segments. Flowers white or pale pink with purple tips, in 2.5–6.0 cm long lax racemes, bracteate. Capsules c 1 mm across, globose, faintly verrucose.

Fls. & Frts. : January–February.

Illus : Mahesh. Illus. Fl. Delhi f. 4. 1966.

Distrib. : Infrequent, found in cultivated fields and waste places. Akola, Dhule, Jalgaon, Nanded, Osmanabad, Parbhani, Pune (Cooke, op. cit.).

BRASSICACEAE (CRUCIFERAE)

(S.G. Pradhan)

1. Fruits oblong, cylindric or linear :
   2. Leaves simple ... FARSETIA
   2. Leaves compound or variously lobed :
      3. Petals clawed :
         4. Petals yellow with brown or violet veins ... ERUCA
         4. Petals white or yellowish–white, without coloured veins :
            5. Fruits beaked ... BRASSICA
            5. Fruits not beaked :
               6. Fruits linear, curved ... SISYMBRIUM
               6. Fruits linear–lanceolate ... CARDAMINE
      3. Petal not clawed :
         7. Seeds muricate ... NASTURTIUM
         7. Seeds not muricate ... RORIPPA
1. Fruits suborbicular, ovoid or obcordate :
   8. Leaves simple :
      9. Flowers purple, petals not clawed ... SCHOUWIA
      9. Flowers white; petals clawed :
         10. Pedicels filiform; fruits 0.5–0.7 cm across ... IBERIS
         10. Pedicels not filiform; fruits 1.0–1.5 cm across ... THLASPI
   8. Leaves compound or variously lobed :

11.	Basal leaves rosulate	...	GAPSELLA
11.	Basal leaves not rosulate :		
12.	Fruits winged	...	LEPIDIUM
12.	Fruits not winged :		
13.	Petals clawed; seeds verrucose	...	COCHLEARIA
13.	Petals not clawed; seeds smooth	...	CORONOPUS

BRASSICA L.

1.	Upper leaves toothed; beak of fruits 5–10 mm long	...	*B. juncea*
1	Upper leaves entire; beak of fruits 4 mm long	...	*B. nigra*

Brassica juncea (L.) Czern. & Coss. in Consp. Fl. Chark. 8. 1859; Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 157. 1872; Cooke, Fl. Pres. Bombay 1: 37. 1958 (Repr.); Hajra et al. in Sharma et al. Fl. India 2: 134. 1993. *Sinapis juncea* L. Sp. Pl. 668. 1753. *'Mohri'*, *'Rai'*.

Annual erect herbs. Basal leaves oblong–lanceolate, lyrate–pinnatifid, margins toothed; middle leaves oblong–ovate; upper ones narrowly–lanceolate with toothed margins. Flowers bright yellow, 6–7 cm across. Fruits torulose, 2–5 cm long, beaked. Seeds globose.

Fls. & Frts. : March–May.

Distrib. : Commonly cultivated for seeds, may be found as an escape around fields and wastelands.

B. nigra (L.) Koch in Roehl. Deutschl. Fl. ed. 3, 4: 713. 1838; Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 156. 1872; Hajra et al. in Sharma et al. Fl. India 2: 136. 1993. *Sinapis nigra* L. Sp. Pl. 668. 1753. *'Kali Rai'*.

Annual erect herbs. Lower leaves lyrate, deeply pinnatifid to pinnatisect; upper narrowly elliptic or lanceolate, margins entire, sessile or subsessile, smaller. Flowers bright yellow, ebracteate in branched racemes. Fruits oblong, beaked, torulose.

Fls. & Frts. : September–December.

Distrib. : Commonly cultivated for fruits, may be found as an escape.

CAPSELLA Medik. (nom. cons.)

Capsella bursa-pastoris (L.) Medik. Pflanzenf. Gatt. 1: 85. 1792; Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 159. 1872; Cooke, Fl. Pres. Bombay 1: 34. 1958 (Repr.); Bhaumik in Sharma et al. Fl. India 2: 189. 1993. *Thlaspi bursa-pastoris* L. Sp. Pl. 647. 1753.

Herbs, c 15 cm tall; stems erect, glabrous or hairy. Radical leaves 4.5–8.0 x 1.2–2.5 cm, oblong or oblanceolate, margins toothed or pinnatifid; cauline ones 2.5–5.0 cm long, oblong–lanceolate, amplexicaul or sagittate at base. Flowers white, in corymbs, soon elongating into racemes. Pods 8 x 5–6 mm, terete. Seeds ellipsoid.

Fls. & Frts. : January–February.

Distrib. : Occassional weed of cultivated field. Satara.

CARDAMINE L.

Cardamine trichocarpa Hochst. ex A. Rich. Tent. Fl. Abyss. 1: 18. 1847; Hajra & Chowdhary in Sharma et al. Fl. India 2: 117. 1993. *C. subumbellata* Hook. ex Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 138. 1872; Cooke, Fl. Pres. Bombay 1: 32. 1958 (Repr.). *C. scutata* Thunb. in Trans. Linn. Soc. London 2 : 339. 1794; Almeida, Fl. Mah. 1 : 37. 1996.

Herbs, 10–25 cm tall. Leaves 5.0–8.5 cm long; leaflets 5–7, 0.8 x 1.0 cm, ovate to suborbicular, obliquely acuminate at base, margins crenate or lobed, radical leaves seldom present. Flowers yellow, in corymbs. Pods 1.8–2.4 cm long, linear–lanceolate, 4–8–seeded.

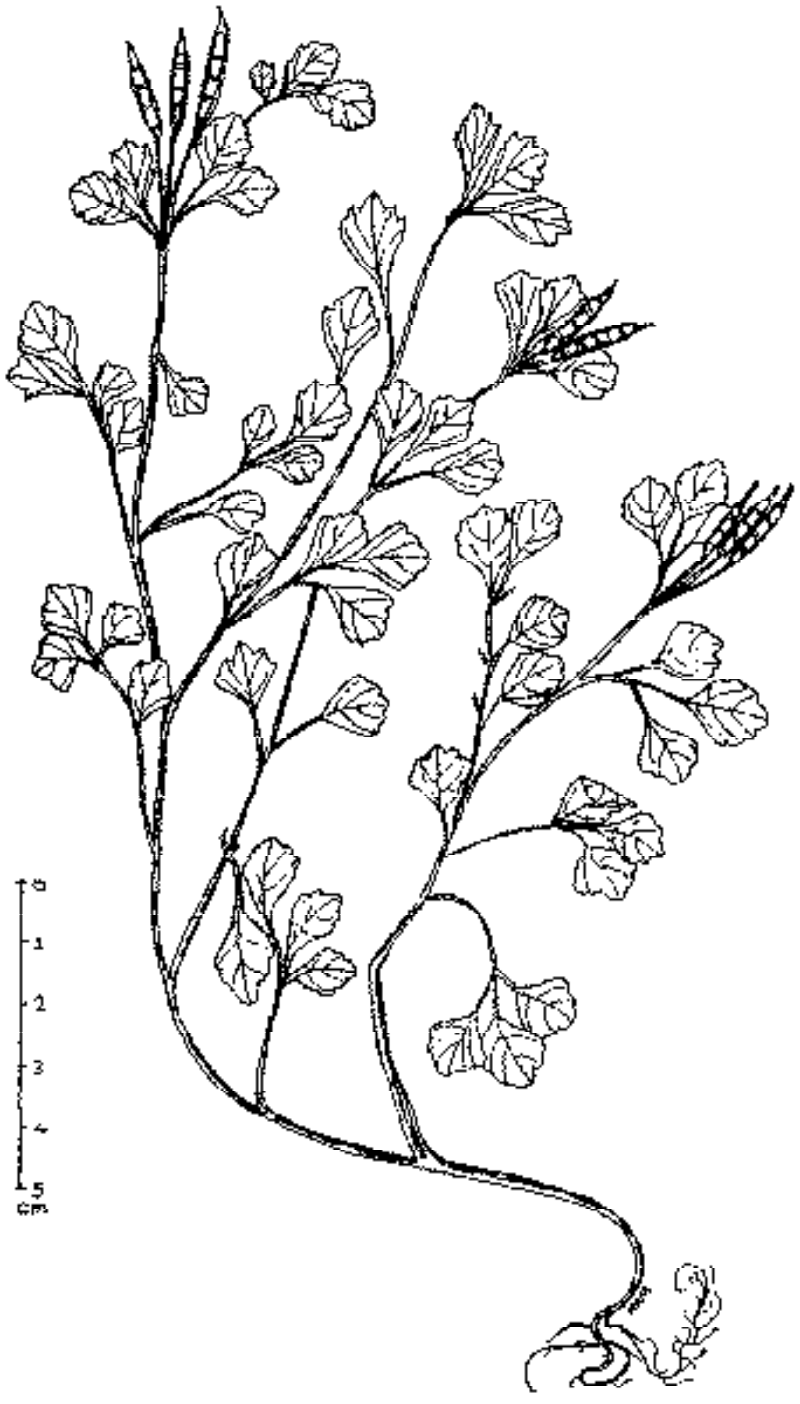
Fls. & Frts. : July–August.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 26. 1982.

Distrib. : Frequent in open situations along ghats.

COCHLEARIA L.

Cochlearia cochearioides (Roth) Sant. & Mahesh. in J. Bombay nat. Hist. Soc. 54: 804. 1957; Bhaumik in Sharma et al. Fl. India 2: 191. 1993. *Alyssum cochlearioides* Roth, Nov. Pl. Sp. 322. 1821. *Cochlearia flava* Buch.–Ham. ex Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 145. 1872.



Cardamine trichocarpa Hochst. ex A. Rich.

Annual herbs. Stems glabrous, erect. Leaves lanceolate in outline, pinnatifid, auricled at base, upto 12 cm long. Flowers small, yellow, numerous in racemes. Fruits globose. Seeds many.

Fls. & Frts. : December–March.

Distrib. : Rare in moist places. Amravati, Nagpur.

CORONOPUS L. (nom. cons.)

Coronopus didymus (L.) J.E. Sm. Fl. Brit. 2: 691. 1800; Bhaumik in Sharma et al. Fl. India 2: 182. 1993 & Mant. 1: 92. 1767. *Lepidium didymum* L. Syst. 2: 433. 1754. *Senebiera pinnatifida* DC. in Mem. Soc. Hist. Nat. Paris 144, t. 9. 1799; Cooke, Fl. Pres. Bombay 1: 35. 1958 (Repr.).

Annual herbs, 15–40 cm tall; stems diffuse or procumbent. Leaves of two types: radical leaves 4.5–9.5 cm long, pinnate, pinnae 6–10 pairs with dentate margins; cauline leaves 1.8–2.5 cm long, pinnatifid to pinnatisect with dentate segments. Flowers in leaf–opposed corymbs; petals white when present. Pods 0.15 x 0.2 cm, didymous, notched at base and apex, compressed. Seeds reniform, hairy, punctulate.

Fls. & Frts. : February–April.

Illus. : Mahesh. Illus. Fl. Delhi f. 5. 1966.

Distrib. : Occasional in open situations. Aurangabad, Kolhapur, Nagpur, Pune, Satara.

ERUCA Mill.

Eruca sativa Mill. Gard. Dict. ed. 8. no. 1. 1768; Hook. f. & T. And. in Hook. f. Fl. Brit. India. 1: 158. 1872; Cooke, Fl. Pres. Bombay 1: 33. 1958 (Repr.); Hajra et al. in Sharma et al. Fl. India. 2: 143. 1993. *'Safed–Sarsu'.*

Herbs, c 25–20 cm tall. Leaves lyrately lobed and pinnatifid; margins sinuate–dentate. Flowers white or yellow. Pods c 2.5 cm long, beaked. Seeds subglobose; 2–seriate, flattened. with violet veins, 1.5–2.0 cm across.

Fls. & Frts. : February–April.

Distrib. : Common throughout as weed of cultivation (Cooke, op. cit.).

FARSETIA Desv.

Farsetia jacquemontii Hook. f. & Thoms. in J. Linn. Soc. Bot. 5: 148. 1861; Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 140. 1872; Cooke, Fl. Pres. Bombay 1: 33. 1958 (Repr.); Debnath in Sharma et al. Fl. India 2: 96, f. 16 B. 1993; Almeida, Fl. Mah. 1: 39. 1996.

Shrubs, 15–45 cm tall, base woody. Leaves 1–6 cm long, linear, sessile. Racemes c 15–flowered, lax. Flowers c 1 cm across, orange–yellow or pale purple. Siliqua 2–5 cm long, oblong–linear, compressed, valves membranous.

Fls. & Frts. : April–December.

Illus. : Debnath in Sharma et al. op. cit.

Distrib. : Bombay (Almeida, op. cit.).

IBERIS L.

Iberis amara L. Sp. Pl. 649. 1753; Bailey, Man. Cult. Pl. ed. 2. 441. 1949; Bole & Almeida in J. Bombay nat. Hist. Soc. 77: 456. 1981.

Annual herbs; stems erect or ascending, 10–40 cm tall, branched in the upper part. Lower leaves petioled, pinnatipartite with linear–lanceolate to oblong–oblanceolate, subacute to obtuse segments; upper leaves sessile, cuneate. Flowers c 0.2 cm long, in corymbose–racemes. Pods 0.4–0.45 x 0.35–0.4 cm, rounded–ellipsoid, slightly retuse with acute or acuminate, diverging lobes. Seeds 0.2 x 0.1 cm, narrowly margined.

Fls. & Frts. : January–April.

Distrib. : It s a native of Europe. Cultivated but often met with as an escape, as a weed. Bombay, Nagpur, Pune, Satara.

LEPIDIUM L.

1. Siliqua ellipsoid, longer than pedicel; stamens 6; seeds wingless ..... *L. sativum*

1. Siliqua suborbicular, shorter than pedicel; stamens 2; seeds winged ..... *L. virginicum*

Lepidium sativum L. Sp. Pl. 644. 1753; Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 159. 1872; Cooke, Fl. Pres. Bombay 1: 37. 1958 (Repr.); Bhaumik in Sharma et al. Fl. India 2: 206. 1993; Almeida, Fl. Mah. 1: 39, f. 1996. *'Aliv', 'Assalia'*.

Annual herbs upto 50 cm tall. Stems erect, glabrous. Basal leaves with long petioles, pinnate to bipinnate; cauline leaves sessile, pinnate; upper most leaves linear and entire. Flowers white, in elongating racemes. Fruit a siliqua, deeply notched at the top. Seeds reddish–brown.

Fls. & Frts. : December–January.

Distrib. : Commonly cultivated in the state but also found as an escape. Akola, Bombay, Ahmednagar, Osmanabad, Pune, Ratnagiri, Satara, Sindhudurg.

L. virginicum L. Sp. Pl. 645. 1753; Naik, Fl. Marathwada 1 : 100. 1998. *L. ruderale* auct. pl. non L. 1753; Hook. f. & T. And. in Hook. f. Fl. Brit. India 1 : 160. 1872.

Erect, annual herbs, 10-45 cm tall, often hairy. Leaves pinnatisect, the lower lyrate-pinnatifid with dentate segments, upper ones linear-lanceolate, irregularly serrate, all covered with long appressed hairs. Flowers 1–2 mm across, white-pinkish. Siliqua 5 x 3 mm, oblong. Seeds reddish-brown, c 1 mm across.

Fls. & Frts. : September-January.

Distrib. : Aurangabad (Naik, op. cit.).

NASTURTIUM R. Br. (nom. cons.)

Nasturtium officinale R. Br. in Ait. Hort. Kew ed. 2, 4: 111. 1812; Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 133. 1872; Cooke, Fl. Pres. Bombay 1: 31. 1958 (Repr.); Hajra & Chowdhery in Sharma et al. Fl. India 2: 125. 1993.

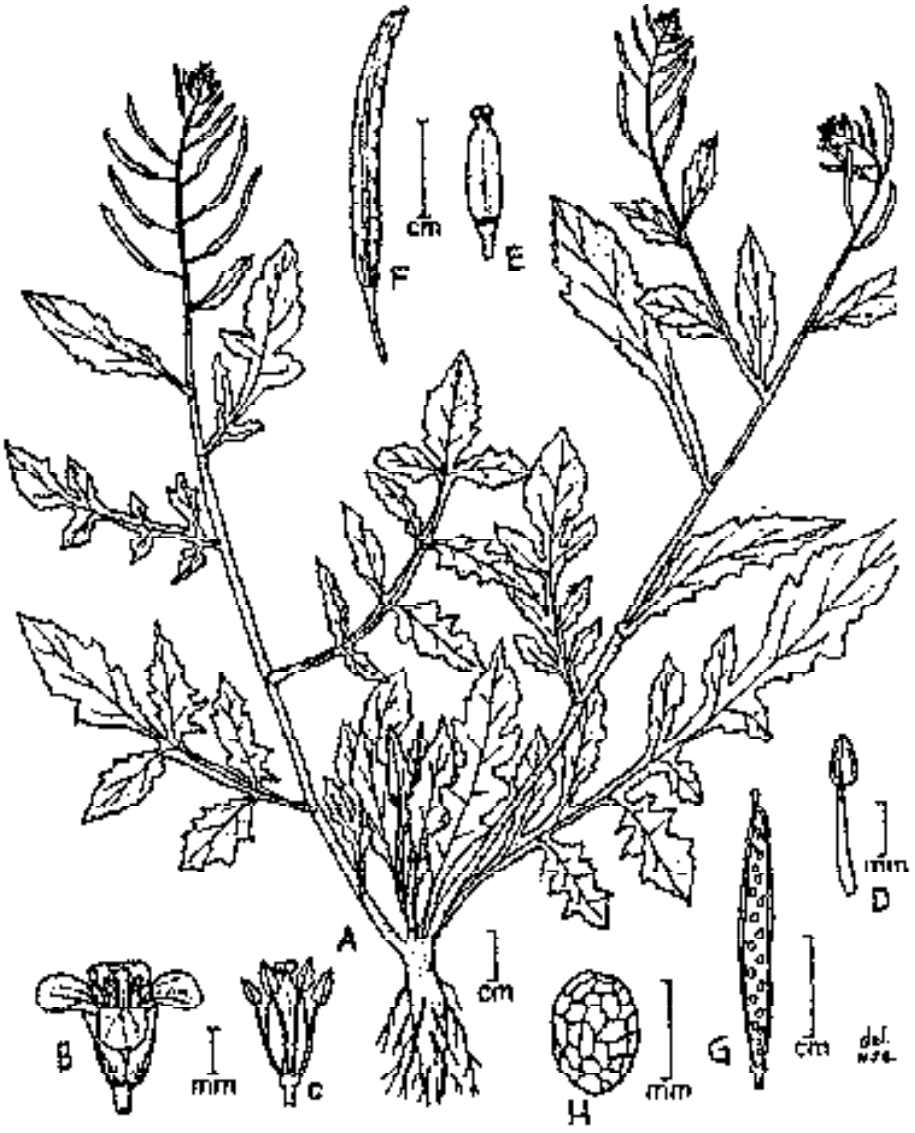
Perennial herbs. Stems floating, rooting at nodes. Leaves lyrate–pinnate, 1–12 cm long; lower ones petioled, upper ones with sub orbicular, terminal leaflet and elliptic lateral ones. Flowers white, c 0.3 cm across; pedicles c 1 cm long in fruits. Fruits upcurved 0.8–2.5 cm long. Seeds ovoid, 2–seriate.

Fls. & Frts. : March–July.

Distrib. : Rare along water courses. Satara.

RORIPPA Scop.

1. Mature fruits 1–2 cm long ... *R. indica*



Rorippa indica (L.) Hiern : A-Plant; B-Flower; C-Flower with perianth removed; D-Stamen; E-Ovary; F-Fruit; G-Seeds attached to septum; H-Seed

Rorippa indica (L.) Hiern. Cat. Afr. Pl.Welw. pt. 1: 26. Aditt. & Corr. 1896; Sant. & Wagh in Bull. Bot. Surv. India 5: 108. (1963) 1964; Hajra & Chowdhery in Sharma et al. Fl. India 2: 129, f. 22. 1993. *Sisymbrium indicum* L. Mant. l: 93. 1767. *Nasturtium indicum* (L.) DC. Syst. Nat. 2: 199. 1821; Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 134. 1872; Cooke, Fl. Pres. Bombay 1: 31. 1958 (Repr.).

Erect herbs, 15–45 cm tall, glabrous or hairy, much branched. Leaves: lower ones c 7.5 x 2.5 cm, petioled, broadly lobed or pinnatifid; upper leaves subsessile, subentire at apex with partly dentate margins. Flowers yellow, in terminal racemes. Pods 1.0–1.8 cm long, subterete, many–seeded. Seeds ellipsoid.

Fls. & Frts. : December–June.

Illus. : Tadulingam & Venkatanarayana, Handb. S. Indian Weeds, 72, f. 27. 1955 [Rev.ed. (*Nasturtium indicum*)]; Hajra & Chowdhery in Sharma et al. op. cit.

Distrib. : Common in wet places.

R. montana (Hook. f. & Thoms.) Small. Fl. SE. United States ed. 2: 1336. 1913; Hajra & Chowdhery in Sharma et al. Fl. India 2: 321. 1993. *Nasturtium montanum* Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 134. 1872.

Herbs, upto 45 cm tall. Stems erect, usually glabrous. Basal leaves petiolate, obovate–oblong, margins sinuate–pinnatifid, 4–10 x 1–3 cm; upper leaves ovate, sessile to subsessile, 1–6 x 0.5–2 cm. Flowers in racemes. Fruits cylindric. Seeds 60–80, pitted. uniseriate.

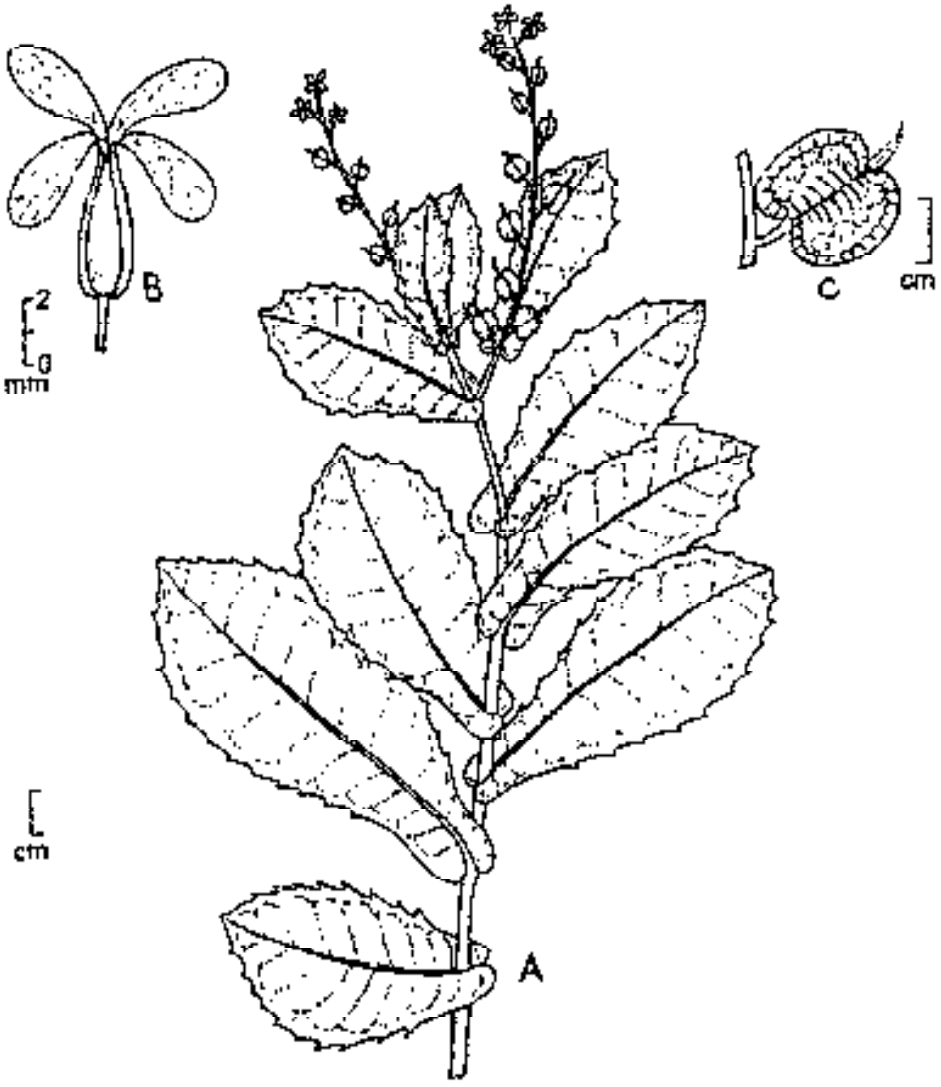
Fls. & Frts. : December–March.

Distrib. : Rare as a weed near water courses. Satara.

SCHOUWIA A.P. DC. (nom. cons.)

Schouwia purpurea (Forssk.) Schweinf. in Bull. Herb. Boiss. App. 2: 183, n. 486; 1896; Hajra, Chowdhery & Bhaumik in Sharma et al. Fl. India 2: 147. 1993. *Subularia purpurea* Forssk. Fl. Aeg.–Arab. 117. 1775. *Schouwia arabica* (Vahl) DC. Syst. Nat. 2: 644. 1821 & Prodr. 1: 224; 1824; A.S. Rao in Bull. Bot. Surv. India 5. 265, t. 1. 1963.

Annual herbs, 25–75 cm tall; stems dichotomously branched from the base. Leaves alternate, 2–4 x 1.5–6.0 cm, oblong–ovate to ovate–cordate. Flowers purple, c 0.6 cm long, in congested corymbs, at



Schouwia purpurea (Forssk.) Schweinf. : A-Plant, upper portion; B-Flower; C-Fruit.

length becoming elongated racemes. Siliqua 2–3 cm across, subellipsoid to orbicular–cordate, emarginate, beaked. Seeds many, 2–seriate, globose.

Fls. & Frts. : February–March.

Illus. : A.S. Rao, op. cit.

Distrib. : Weed in fallow fields. Ahmednagar, Jalgaon, Pune, Ratnagiri.

SISYMBRIUM L.

1. Petals 2.5–4.0 mm long; siliqua 2.5–4.0 cm long ... *S. iria*

1. Petals 6–9 mm long; siliqua 5–8 cm long ... *S. brassiciforme*

Sisymbrium brassiciforme C.A. Mey. in Ledeb. Fl. Alt. 3: 129. 1831; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 150. 1872 p.p.; Sant. in Rec. Bot. Surv. India. 16(1): 8. 1967 (3rd Rev. ed.); Hajra et al. in Sharma et al. Fl. India 2: 243. 1993.

Annual herbs, 50–80 cm tall. Stems erect. Lower leaves ovate–oblong to lanceolate, runcinate, lobes with toothed margins, upper leaves linear, hastate at base, sessile to subsessile. Flowers light yellow, in many–flowered racemes. Fruits 5–9 cm long. slender, curved. Seeds oblong.

Fls. & Frts. : March–April.

Distrib. : Usually cultivated but can be found as an escape. Pune (Sant. op. cit.).

S. iria L. Sp. Pl. 659. 1753; Hook. f. & T. And. in Hook. f. Fl. Brit. India, 1: 150. 1872; Hajra et al. in Sharma et al. Fl. India 2: 243. 1993; Almeida, Fl. Mah. 1: 42. 1996.

Annual herbs, 20–25 cm all, erect. Radical leaves petioled, numerous in rosettes, pinnatipartite; cauline leaves runcinate, pinnatifid. Racemes c 30 cm long, 50–80–flowered; flowers c 3 mm across, yellow. Siliqua c 1 mm broad, slightly upcurved. Seeds 20–40 in each cell.

Fls. & Frts. : September–October.

Distrib. : Rare weed in Bombay gardens (Almeida, op. cit.).

THLASPI L.

Thlaspi arvense L. Sp. Pl. 646. 1753; Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 162. 1872; Cooke, Fl. Pres. Bombay 1: 35. 1958 (Repr.); Bhaumik in Sharma et al. Fl. India 2: 211. 1993.

Herbs, 25–45 cm tall. Stems glabrous, corymbosely branched. Leaves : radical ones 2–6 x 1–2 cm, oblong–obovate, petioled, attenuate at base, obtuse at apex; cauline leaves oblong–lanceolate, amplexicaul at base, subacute to acute at apex, margins dentate. Flowers in racemes. Fruits 1.5–1.8 cm across, orbicular, flat, winged, notched at apex, reticulate.

Fls. & Frts. : March–April.

Distrib. : Ahmednagar, not common. A weed of cultivation.

CULTIVATED SPECIES :

Brassica napus L. Sp. Pl. 666. 1753; Hajra et al. in Sharma et al. Fl. India 2: 135. 1993; Almeida. Fl. Mah. 1: 33 1996. *B. campestris* L. ssp. *napus* (L.) Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 156. 1872; Cooke, Fl. Pres. Bombay 1: 36. 1958 (Repr.). *'Pivli–Rai', 'Sassam'.*

Herbs; stems erect, 0.3–1.5 m high, branches erecto–patent. Basal leaves distinctly petiolate, lyrate–pinnatisect, lower leaves lyrate–pinnatifid, the upper more or less entire. Racemes laxly corymbose. Flowers yellow. Pods 5.0–8.8 x 0.3–0.4 cm, linear, curved in the upper part, beak flattened, straw–coloured or purple. Seeds globose, purple–brown, black near hilum, minutely reticulate, aveolate.

Fls. & Frts. : October–December.

Distrib. : Pune (Almeida, op. cit.).

B. oleracea L. Sp. Pl. 667. 1753; Cooke, Fl. Pres. Bombay 1: 37. 1958 (Repr.); Hajra et al. in Sharma et al. Fl. India 2: 136. 1993.

Glabrous herbs, 30–100 cm tall. Leaves fleshy, lower ones petioled, lyrately pinnatipartite with suborbicular terminal lobe, cordate at base, obtuse at apex, margins dentate or crenate, upper leaves sessile, lanceolate to oblong–lanceolate, often subamplexicaul at base. Flowers in simple or panicled racemes. Petals clawed. Fruits erect, linear, 1–2 cm long, beaked.

The following varieties are cultivated in the State.

var. **botrytis** L. Sp. Pl. 667. 1753; Hajra et al. in Sharma et al. Fl. India 2: 137. 1993. *'Cauliflower', 'Phul–Kobi'.*

Herbs, Stems moderately tall. Leaves shallowly lobed, higher leaves enclosing inflorescence, rachis of inflorescence and pedicels thickened. Flowers and buds fleshy.

Fls. & Frts : October-February.

Distrib. : Cultvated in many parts for its flowers which are used as vegetable.

var. **capitata** L. Sp. Pl. 667. 1753; Hajra et al. in Sharma et al. Fl. India 2: 137. 1993. *'Kobi', 'Patta-gobi'.*

Stems condensed until flowering. Leaves prominently nerved, densely packed into a subglobose head. Flowers 1.0–1.5 cm across, yellow. Siliqua cylindrical, 1–seeded.

Fls. & Frts. : Throughout the year.

Distrib. : Cultivated in many parts for leaves which is used as vegetable.

var. **gongylodes** L. Sp. Pl. 667. 1753; Hajra et al. in Sharma et al. Fl. India 2: 137. 1993. *B. caulorapa* sensu Naik, Fl. Marathwada 1 : 97. 1998 non Pasq.*'Gant–gobhi', 'Naval–col'.*

Stems are fleshy, subglobosely thickened.

Fls. & Frts. : Throughout the year.

Distrib. : Cultivated throughout for its stem as vegetable.

B. rapa L. Sp. Pl. 666. 1753; Hajra et al. in Sharma et al. Fl. India 2: 138. 1993; Almeida, Fl. Mah. 1: 35. 1996. *B. campestris* ssp. *rapa* Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 156. 1872; Cooke, Fl. Pres. Bombay 1: 36. 1958 (Repr.).

ssp. **rapa.** *'Shalgam'.*

Biennial herbs with tuberous roots; stems c 100 cm tall, hairy below. Leaves lyrately pinnatifid, 10–30 cm long, middle and upper leaves sessile, halfway clasping the stem with cordate base. Racemes 30–40–flowered, corymbose above; flowers 0.6–1.0 cm across, golden yellow. Siliqua 3.5–8.0 x 0.2–0.3 cm, linear, subcordate, beak valves membranaceous. Seeds 8–12 in each locule, globose c 3 mm across, pale yellowish–brown.

Fls. & Frts. : March–April.

Distrib. : Cultivated for vegetable. Bombay (Almeida, op. cit.).

ssp. **campestris** (L.) Clapham in Fl. Brit. Isle ed. 2: 124. 1962; Hajra et al. in Sharma et al. Fl. India 2: 138, f. 23. 1993; Almeida, Fl. Mah. 1: 36. 1996. *B. campestris* L. Sp. Pl. 666. 1753; Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 156. 1872; Cooke, Fl. Pres. Bombay 1: 36. 1958 (Repr.).

Annual herbs; stems 50–80 cm high. Basal leaves pinnatifid, often auricled, petioled, upper oblong or lanceolate. Racemes densely corymbose. Pods 3.8–8.0 x 0.2–0.3 cm, linear, with membranous valves. Seeds globose, purplish–brown, black near hilum, reticulate–alveolate.

Fls. & Frts. : October–December.

Illus. : Hajra et al. in Sharma et al. op. cit.

Distrib. : Cultivated in some parts, also naturalised around fields, wastelands, etc. Aurangabad.

Cheiranthus cheiri L. Sp. Pl. 661. 1753; Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 132. 1872; Hajra et al. in Sharma et al. Fl. India 2 : 178. 1993; Almeida, Fl. Mah. 1: 37. 1996.

Perennial herbs, c 80 cm high, pubescent. Basal leaves rosulate, 5–10 cm long, oblong–lanceolate, entire or minutely denticulate, shortly petioled, cauline leaves smaller, subsessile. Flowers c 2 cm across, mostly yellow coloured, in long terminal racemes. Fruits 4–7 x 0.3–0.5 cm. Seeds suborbicular, slightly winged at apex.

Fls. & Frts. : March–May.

Distrib. : Cultivated in gardens. Bombay (Almeida, op. cit).

Notes. : It is a native of Britain and Switzerland.

Raphanus sativus L. Sp. Pl. 669. 1753; Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 166. 1872; Cooke, Fl. Pres. Bombay 1: 137 1958 (Repr.); Hajra et al. in Sharma et al. Fl. India 2: 145. 1993.

var. **sativus.** *'Mula'*

Annual or biennial herbs with thick white taproot. Leaves : lower ones lyrate, pinnatifid, long petioled, 3–5–jugate with broadly ovate terminal lobe, margins crenate; upper leaves oblong or lanceolate, much smaller, margins entire, dentate or lobed, sessile or subsessile. Flowers in many–flowered racemes, 2–6 cm long. Siliqua oblong–ellipsoid to oblong, terete.

Fls. & Frts. : November–February.

Distrib. : Widely cultivated as vegetable.

var. **caudatus** (L.) Hook. f. & T. And. in Hook. Fl. Brit. India 1: 166. 1872; Cooke, Fl. Pres. Bombay 1: 37. 1958 (Repr.); Hajra et al. in Sharma et al. Fl. India 2: 146. 1993. *'Gajar'.*

Fls. & Frts. : November–April.

Distrib. : Tap root is reddish and sweet. It is widely cultivated for edible roots.

Sinapis alba L. Sp. Pl. 668. 1753; Hajra et al. in Sharma et al. Fl. India 2: 149, f. 25. 1993; Almeida. Fl. Mah. 1: 42. 1996. *Brassica alba* (L.) Rabenh. Fl. Lusatica 1: 154. 1839; Hook. f. & T. And. in Hook. f. Fl. Brit. India 1: 157. 1872.

Annual herbs, erect, 25–70 cm high. Lower leaves lyrate–pinnatipartite, 2–3 jugate, petiolate; upper leaves petiolate, membranous. Racemes 35–50, rarely c 100–flowered; flowers yellow. Pods 2.0–3.7 x 0.3–0.4 cm, broadly cylindric, torulose, hispid, beaked. Seeds globose, 1.5–2.0 mm across, pale yellow, testa minutely alveolate.

Fls. & Frts. : September–December.

Illus. : Hajra et al. in Sharma et al. op. cit.

Distrib. : Bombay (Almeida, op. cit.).

CAPPARACEAE

(A.N. Londhe)

1. Armed shrubs or trees ... CAPPARIS
1. Unarmed herbs, shrubs or trees :
    2. Herbs ... CLEOME
    2. Shrubs or trees :
        3. Erect trees ... CRATEVA
        3. Climbing or straggling shrubs :
            4. Sepals in one whorl; stamens 12–20 ... MAERUA
            4. Sepals in two whorls; stamens 4–6 ... CADABA

Cadaba Forssk.

1. Sepals narrowly lanceolate; stamens 4 ... *C. fruticosa*
1. Sepals ovate; stamens 5 ... *C. linearifolia*

Cadaba fruticosa (L.) Druce in Rep. Bot. Exch. Cl. Soc. Brit. Isles 3: 415. 1914; Sant. & Wagh in Bull. Bot. Surv. India 5: 105. 1964; Raghavan in Sharma et al. Fl. India 2: 250. 1993. *Cleome fruticosa* L. Sp. Pl. 671. 1753. *Cadaba indica* Lam. Encycl. 1: 544. 1785; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 172. 1872; Cooke, Fl. Pres. Bombay 1: 45. 1958. (Repr.). *C. farinosa* Forssk. Fl. Aeg.–Arab. 68. 1775; Hook. f. & Thoms in Hook. f. op. cit. 173.*'Kalasakal', 'Kalitaka'.*

Unarmed scandent shrubs. Leaves 0.9–4.0 x 0.4–1.5 cm, elliptic–oblong, apex obtuse, mucronate, base rounded, margins entire. Flowers dirty–white in one sided racemes with few flowers, terminal; petals spathulate. Gynophore 2.0–2.5 cm long. Fruits 2.5–3.0 x 0.5 cm, cylindric, dehiscent. Seeds many.

Fls. & Frts. : December–April.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 50, f. 31. 1909.

Distrib. : Frequent in deciduous forests.

C. linearifolia (Grah.) Almeida, Fl. Mah. 1: 43. 1996. *Nieburia linearifolia* Grah. Cat. Bombay Pl. 8. 1839.

Small trees, 3.0–5.0 m tall; branches rigid with young parts generally glandular. Leaves 2.5 cm long, broadly obovate or orbicular. Flowers c 1 cm across, in terminal dense corymbs.

Fls. : January–February.

Distrib. : Dhule, Thane (Almeida, op. cit.).

Capparis L.

1. Flowers red ... *C. decidua*
1. Flowers not as above :
    2. Inflorescence corymbose :
        3. Stipular thorns present :
            4. Flowers 10–12 cm across ... *C. moonii*
            4. Flowers 3–6 cm across ... *C. cleghornii*
        3. Stipular thorns absent ... *C. grandis*

2. Inflorescence not as above :

5. Flowers supra–axillary or axillary and supra axillary :

6. Thorns hooked :

7. Climbing shrubs; gynophore 2 cm long ... *C. tenera*

7. Spreading, prostrate shrubs; gynophore 5.0–7.5 cm long ... *C. murrayana*

6. Thorns straight :

8. Upper petals with a yellow or purplish blotch; ovary densely hairy ... *C. brevispina*

8. Upper petals not as above; ovary glabrous ... *C. zeylanica*

5. Flowers not as above :

9. Flowers bright yellow ... *C. grandiflora*

9. Flowers not as above :

10. Leaves orbicular or elliptic :

11. Leaves bifarious, close; flowers in umbels ... *C. rotundifolia*

11. Leaves not as above; flowers solitary ... *C. spinosa*

10. Leaves not as above :

12. Leaves narrow–oblong; flowers greenish–yellow ... *C. divaricata*

12. Leaves and flowers not as above :

13. Stipular spines well developed ... *C. sepiaria*

13. Stipular spines minute or absent ... *C. rheedei*

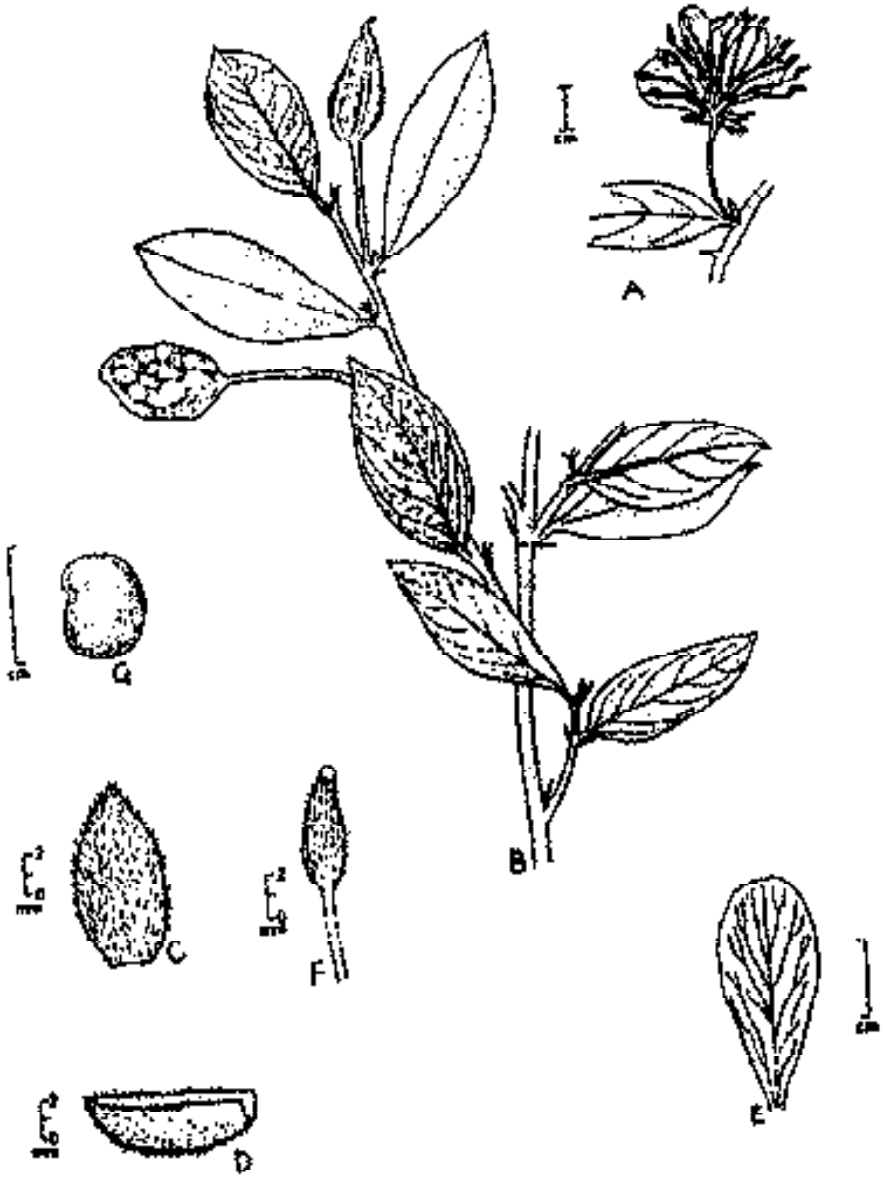
Capparis brevispina DC. Prodr. 1: 246. 1824; Jocobs in Blumea 12: 437. 1965; Raghavan in Sharma et al. Fl. India 2: 260, f. 43. 1993. *C. zeylanica* sensu Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 174. 1872 non L. 1762; Cooke, Fl. Pres. Bombay 1: 47. 1958 (Repr.). *'Govind–phal', 'Wagati'.*

Shrubs or small trees c 4 m tall. Leaves 3–6 x 1.5–3.5 cm, elliptic to oblong, apex obtuse or subacute, base acute or cuneate. Flowers white or creamy, drying pink, solitary and axillary or 2–3–together, 3–4 cm across, pedicels 1–4 cm long; gynophore 1.0 – 2.5 cm long. Fruits 4–6 x 2–3 cm, irregularly ovoid, pointed or blunt. Seeds many.

Fls. & Frts. : February–Septemer.

Illus. : Raghavan in Sharma et al. op. cit.

Distrib. : Frequent in deciduous forests.



Capparis brevispina DC. : A-Solitary axillary flower; B-Fruiting twig; C-Outer sepal; D-Inner sepal; E-Petal; F-Pistil; G-Seed.

C. cleghornii Dunn ex Gamble, Fl. Pres. Madras 1: 46. 1915 [1: 33. 1957 (Repr.)]; Jacobs in Blumea 12: 445. 1965; Raghavan in Sharma et al. Fl. India 2: 263, f. 44. 1993; Almeida, Fl. Mah. 1: 45. 1996. *C. roxburghii* auct. non DC. 1824; Hook. f. & Thoms. in Hook f. Fl. Brit. India, 1: 175. 1872 p.p.; Cooke, Fl. Pres. Bombay 1: 49. 1958 (Repr. ed.). *C. moonii* var. *tomentosa* Blatt. & Hallb. in J. Bombay Nat. Hist. Soc. 31: 905. 1927. *'Wagati'*.

Large woody climbers; young branches fuscous or hoary–pubescent. Leaves 4–6 x 2.5–4.0 cm, oblong or obovate, acute or shortly acuminate at apex, narrowed or cuneate at base, shining, pale beneath. Flowers white, purple on ageing, 3.5–4.5 cm across, in 6–10–flowered corymbs, at the end or on short axillary branches. Fruits 4–5 cm across, globose, dark purple, umbonate. Seeds numerous.

Fls. & Frts. : August–October.

Illus. : Raghavan in Sharma et al. op. cit.

Distrib. : Bombay and Sindhudurg (Almeida, op. cit).

C. decidua (Forssk.) Edgew. in J. Linn. Soc. 6: 184. 1862; Jacobs in Blumea 12: 424. 1965; Raghavan in Sharma et al. Fl. India 2: 265. 1993. *Sodada decidua* Forssk. Fl. Aeg.–Arab. 81. 1775. *Capparis aphylla* Roth, Nov. Pl. Sp. 238. 1821; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 174. 1872; Cooke, Fl. Pres. Bombay 1: 49. 1958 (Repr.). *'Nepti'*.

Armed, scandent, shrubs. Leaves on young branches only, 5–10 x 2–4 cm, linear–oblong, acute–spine tipped, stipular thorns, sharp, straight, orange–yellow. Flowers in corymbs, on older shoots. Fruits ovoid, beaked, many–seeded.

Fls. & Frts. : Throughout the year.

Illus. : Mahesh. Illus. Fl. Delhi. f. 12. 1966.

Distrib. : Frequent in dry deciduous forests.

C. divaricata Lam. Encycl. 1: 606. 1785; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 174. 1872; Cooke, Fl. Pres. Bombay 1: 48. 1958 (Repr.); Jacobs in Blumea 12: 515. 1965; Raghavan in Sharma et al. Fl. India 2: 266. 1993. *C. stylosa* DC. Prodr. 1: 246. 1824; Almeida, Fl. Mah. 1: 49. 1996. *'Pachunda'*.

Armed shrubs. Leaves 4.5 x 0.5–1.0 cm, narrowly oblong, apex obtuse or retuse, base rounded. Flowers axillary, solitary; pedicels 1–2 cm long; sepals ovate, tomentose; petals oblong, greenish–yellow; gynophore 2 cm long. Fruits 5 cm across, subglobose, apiculate.

Fls. & Frts. : February–September.

Illus. : Wight. Ic. t. 889. 1844–1845; Talb. For. Fl. Bombay Pres. & Sind 1: 56, f. 35. 1909.

Distrib. : Frequent in deciduous forests. Ahmednagar, Aurangabad, Beed, Jalna, Kolhapur, Latur, Osmanabad, Pune, Raigad, Satara.

C. grandiflora Wall. ex Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 174. 1872; Jacobs in Blumea 12: 455. 1965; Naik, Fl. Osmanabad. 37. 1979; Raghavan in Sharma et al. Fl. India 2: 273. 1993.

Shrubs. Leaves 1.8–2.0 x 1 cm, ovate, apex acute, midrib pubescent beneath. Flowers solitary; outer sepal concave, inner rounded; petals c 2.5 cm long, obovate; gynophore 2 cm long, ovary globose, stigma capitate, pilose. Fruits ovoid.

Fls. & Frts. : March–April.

Illus. : Wight Ic. t. 1047. 1846.

Distrib. : Occasional in deciduous forests. Beed, Osmanabad (Naik, op. cit.).

C. grandis L. f. Suppl. Pl. 263. 1781; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 176. 1872; Cooke, Fl. Pres. Bombay 1: 50. 1958 (Repr.); Jacobs in Blumea 12: 456. 1965; Raghavan in Sharma et al. Fl. India 2: 274. 1993. *'Kautel', 'Pachara, 'Pachundi'.*

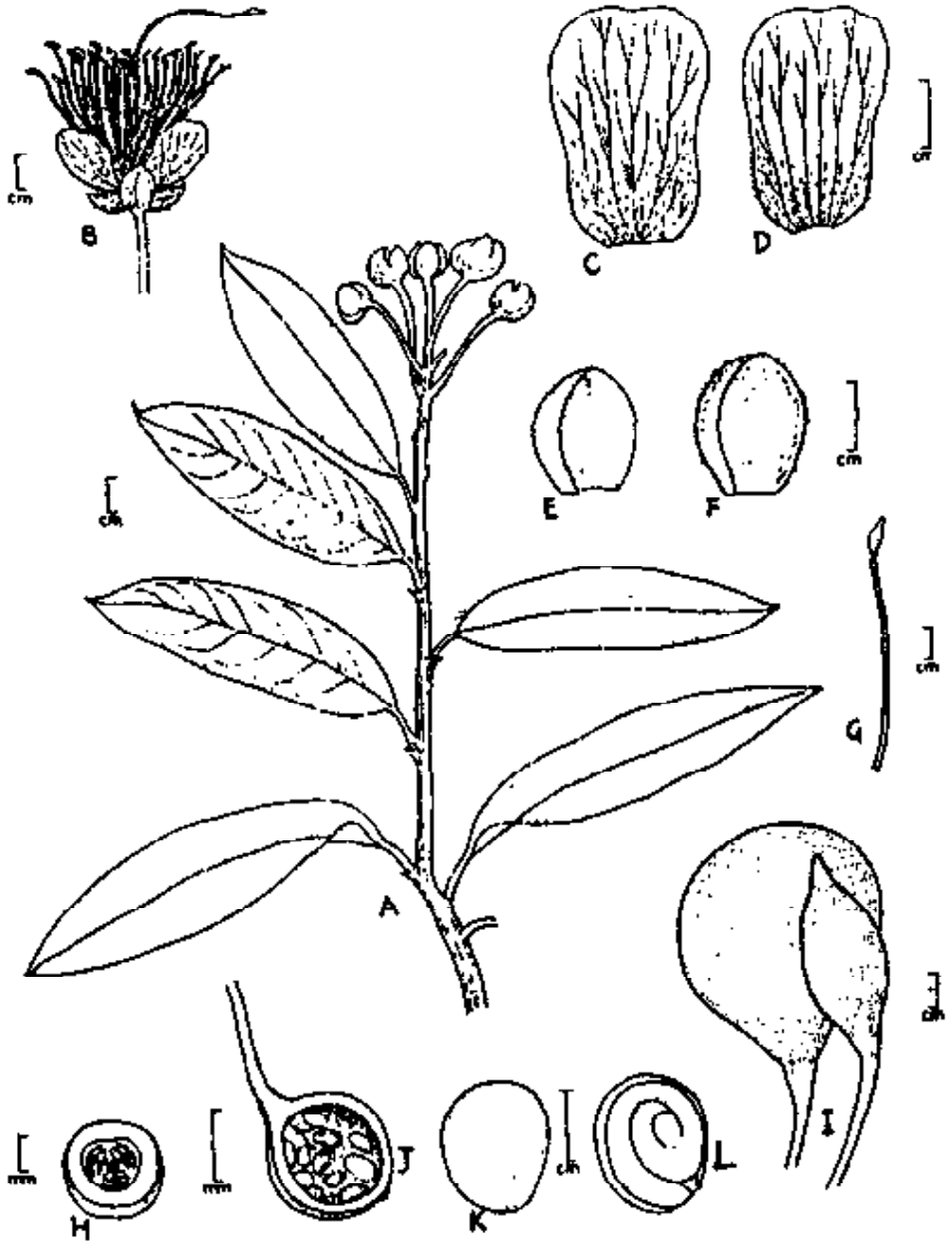
Trees, 3–4 m tall; young branches olive–green, tomentose. Leaves 3–6 x 2.0–3.5 cm, elliptic–obovate, young pubescent, older glabrous or subglabrous, apex obtuse. Flowers white; outer sepals boat shaped, covered with olive–green pubescence outside, inner ciliate. Fruits subglobose, 2 cm across.

Fls. & Frts. : April–January.

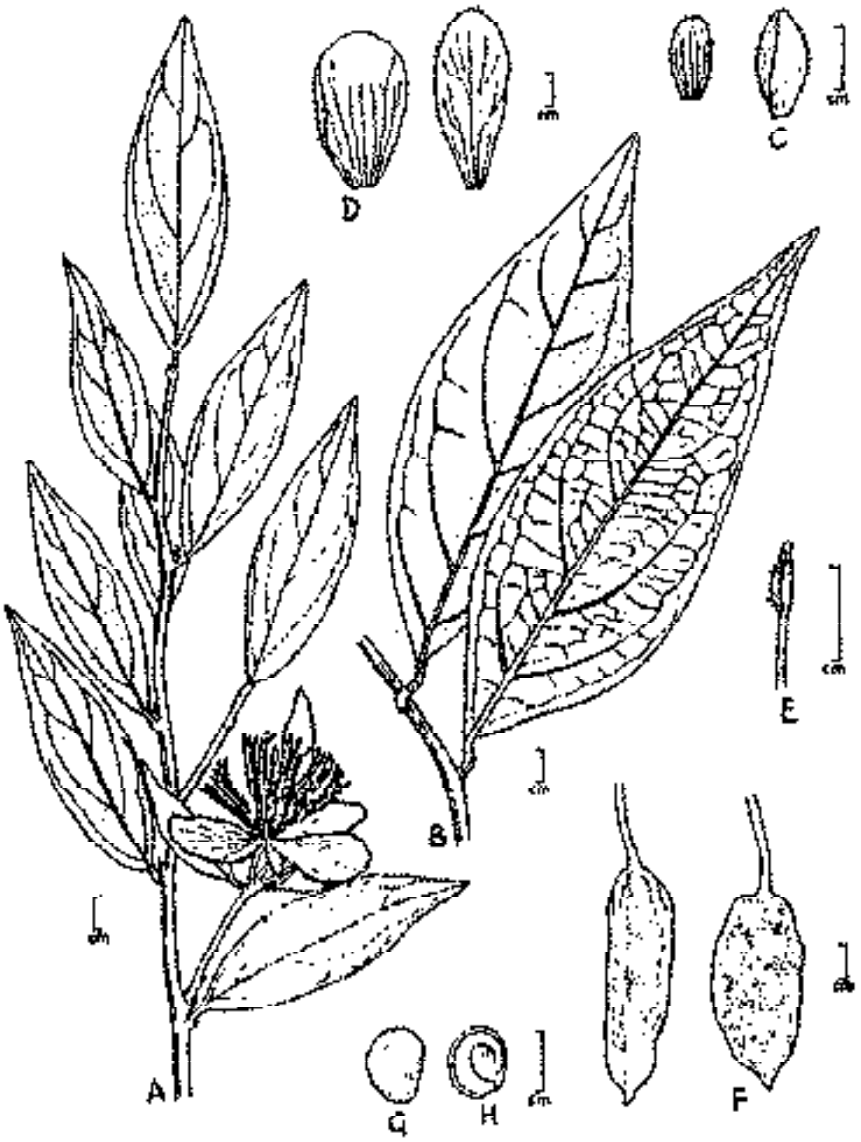
Illus. : Wight Ic. t. 21. 1838; Talb. For. Fl. Bombay Pres. & Sind 1: 60, f. 38. 1909.

Distrib. : Frequent in deciduous forests.

C. moonii Wight, Illus. 1: 35. 1840; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 175. 1872; Cooke, Fl. Pres. Bombay 1: 49. 1958 (Repr.); Jacobs in Blumea 12: 472. 1965; Raghavan in Sharma et al. Fl. India 2: 277, f. 49. 1993. *'Garab dudi', 'Poorwi', 'Wagati', 'Waghati'.*



Capparis moonii Wight : A-Flowering twig; B-Flower; C-Outer sepal; D-Inner sepal; E-Outer petal; F-Inner petal; G-Pistil; H-T.S.of ovary; I-Mature and immature fruits; J-L.S. of immature fruit; K-Seed; L-Seed opened, showing embryo.



Capparis rheedei DC : A-Flowering twig; B-Leaves of lower branches; C-Inner and outer sepals; D-Outer and inner petals; E-Ovary; F-Fruits; G-Seed; H-Seed with testa removed, showing embryo.

Extensive climbers with shining branches. Leaves 5–14 x 2–5 cm, elliptic–oblong, with callous tip; stipular spines short, stout, hooked. Flowers white, in terminal corymbs. Fruits subglobose, 5–10 cm across pointed. Seeds many.

Fls. & Frts. : November–July.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 59, f. 37. 1909.

Distrib. : Frequent in moist deciduous forests along ghats. Bombay, Kolhapur, Pune, Ratnagiri, Satara, Sindhudurg.

C. murrayana Grah. Cat. Bombay Pl. 9. 1839; Almeida, Fl. Mah. 1: 47, t. 42. 1996. *C. spinosa* sensu Hook. f. & Thoms. in Hook. f. Fl. Brit. India, 1: 173. 1872 p.p. non L. 1753; Cooke, Fl. Pres. Bombay 1: 47. 1958 (Repr.) p.p. *'Kabar', 'Kalvari'*.

Shrubs, diffuse, prostrate. Leaves 1–4 cm across, orbicular or broadly ovate–obovate, apex retuse or sometimes acute, mucronate, base rounded or cuneate, margins entire. Flowers white, axillary, solitary. Fruits 2.5–5.0 cm long, obovoid, ribbed, ripens red. Seeds globose, brown.

Fls. & Frts. : January–March.

Illus. : Almeida, op. cit.

Distrib. : Ahmednagar, Raigad, Ratnagiri & Satara (Almeida, op. cit.).

C. rheedei DC. Prodr. 1: 246. 1824 (as *rheedii*); Nicols. in Bull. Bot. Surv. India 17: 161. 1975; Raghavan in Sharma et al. Fl. India 2: 285, f. 53. 1993. *C. heyneana* Wall. ex Wight & Arn. Prodr. 25. 1834; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 174. 1872; Cooke, Fl. Pres. Bombay 1: 48. 1958 (Repr.). *'Chavruka'*.

Shrubs or small trees, 2–4 m tall erect. Leaves 7–15 x 2.5–5.0 cm, ovate, lanceolate, apex acute. Flowers solitary or in short racemes; gynophore 2–4 cm long; ovary tomentose. Fruits 1.0–2.5 cm across, ovoid, beaked.

Fls. & Frts. : March–August.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 55, f. 34. 1909; Raghavan in Sharma et al. op. cit.

Distrib. : Occasional along ghats of Konkan (Cooke, op. cit.).

C. rotundifolia Rottl. in Neue. Schr. Ges. Naturf. Fr. Berlin 4: 185. 1803; Jacobs in Blumea 12: 485. 1965; Raghavan in Sharma et al. Fl. India 2: 287. 1993. *C. pedunculosa* Wall. ex Wight & Arn. Prodr. 27.

1834; Hook. f. & Thoms. in Hook. f. Fl. Brit. India. 1: 176. 1872; Cooke, Fl. Pres. Bombay 1: 50. 1958 (Repr.). *C. longispina* Hook. f. & Thoms. in Hook. f. op. cit. *C. pedunculosa* var. *longispina* (Hook. f. & Thoms.) Trim. Handb. Fl. Ceylon 1: 63. 1893; Cooke, op. cit. 51. *'Kakkaltee', 'Kolisna'*.

Erect shrubs', young shoots pubescent. Leaves 4.5 x 2.5 cm, orbicular or elliptic, ovate, apex acute or obtuse, shining above; stipular spines long, straight. Flowers white; gynophore 2.0–2.5 cm long, filiform. Fruits globose.

Fls. & Frts. : January–August.

Illus. : Talb. For. Fl. Bombay Pres. & Sind. 1: 61, f. 39. 1909.

Distrib. : Frequent along the ghats. Ahmednagar, Kolhapur, Nasik, Osmanabad, Pune, Raigad, Ratnagiri, Sangli, Satara, Sindhudurg.

C. sepiaria L. Syst. Nat. ed. 10, 2: 1071. 1759; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 177. 1872; Cooke, Fl. Pres. Bombay 1: 51. 1958 (Repr.); Jacobs in Blumea 12: 489. 1965; Raghavan in Sharma et al. Fl. India. 2: 289. 1993. *'Kanthtara', 'Pachra', 'Pachuda'*.

Woody climbers. Leaves 2–3 x 1–2 cm, ovate–elliptic or obovate, apex obtuse, emarginate. Flowers white, in axillary umbels; gynophore c 1 cm long, filiform. Fruits globose, 1–2 cm across, smooth, dry when ripe. Seeds embedded in fleshy pulp.

Fls. & Frts. : February–September.

Illus. : Mahesh. Illus. Fl. Delhi f. 13. 1966.

Distrib. : Frequent in deciduous forests.

C. spinosa L. Sp. Pl. 503. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 173. 1872; Cooke, Fl. Pres. Bombay 1: 47. 1958 (Repr.); Jacobs in Blumea 12: 418. 1965; Raghavan in Sharma et al. Fl. India 2: 294. 1993. *'Kabra', 'Kalavri'*.

Armed, scandent shrubs, 3–5 m tall. Leaves 1–3 cm across, orbicular or ovate, sometime obovate, apex retuse or acute, base cuneate or rounded, entire; stipular spines two, hooked, orange. Flowers white, axillary; gynophore 5–7 cm long. Fruits 5–7 cm long, obovoid, ribbed. Seeds many, globose, smooth, brown.

Fls. & Frts. : January–March.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 53, f. 32. 1909.

Distrib. : Infrequent in deciduous forests. Ahmednagar, Amravati, Aurangabad, Nasik, Pune, Raigad, Satara, Thane.

C. tenera Dalz. in Hook. Kew J. Bot. 2: 41. 1850; Hook. f. Fl. Brit. India, 1: 179. 1872; Cooke, Fl. Pres. Bombay 1: 51. 1958 (Repr.); Jacobs in Blumea 12: 497. 1965; Raghavan in Sharma et al. Fl. India 2: 297. 1993.

Woody climbers. Leaves 2.5–6.0 x 1.0–2.5 cm, membranous, ovate, lanceolate, apex acuminate; stipular thorns short, hooked. Flowers white, 0.75–1.0 cm across; gynophore 1.0–1.5 cm long, filiform. Fruits 0.3–0.5 cm across, fusiform–ovoid, 3–4–seeded.

Fls. & Frts. : April–August.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 64, f. 42. 1909.

Distrib. : Rare, along ghats. Konkan (Cooke op. cit.), Satara (Lisboa in J. Roy. Asiat. Soc. (Bombay) 15: 209. 1883).

C. zeylanica L. Sp. Pl. ed. 2, 720. 1762; Jacobs in Blumea 12 : 505. 1965; Raghavan in Sharma et al. Fl. India. 298. 1993. *C. horrida* L. f. Suppl. Pl. 264. 1781; Hook. f. & Thoms. in Hook f. Fl. Brit. India 1: 178. 1872; Cooke, Fl. Pres. Bombay 1: 47. 1958 (Repr.). *'Govind–phal', 'Toratti', 'Wagati'.*

Scandent shrubs. Leaves 5–7 x 2.0–3.5 cm, elliptic or ovate–elliptic, apex acute or obtuse, margins entire. Flowers white, solitary, axillary or 2–3 together, 3–5 cm across; pedicels 2–4 cm long; gynophore 1–2 cm long. Fruits 4–6 x 2–3 cm, irregularly ovoid, pointed or blunt. Seeds many.

Fls. & Frts. : February–April.

Illus. : Wight, Ic. t. 173. 1839; Talb. For. Fl. Bombay Pres. & Sind 1: 63, f. 41. 1909. *(C. horrida);* Matthew, Illus. Fl. Tamilnadu Carnatic 2: t 32. 1982.

Distrib. : Frequent in deciduous forests.

Notes : The description of *"C. zeylanica"* by Hook. f. & Thoms. in Hook. f. Fl. Brit. India pertains to *C. brevispina* DC. an error followed in many floras. Unaware that Linnaeus had earlier described the species based on Hermann collection from Sri Lanka, the younger Linnaeus had described *C. horrida* based on a collection by Koenig also from Sri Lanka. Wight & Arnott (in Prodr. Fl. Pen. Ind. Or. 1: 25–26. 1834) had correctly interpreted both the species but failed to realise that both belong to the same species.

CLEOME L.

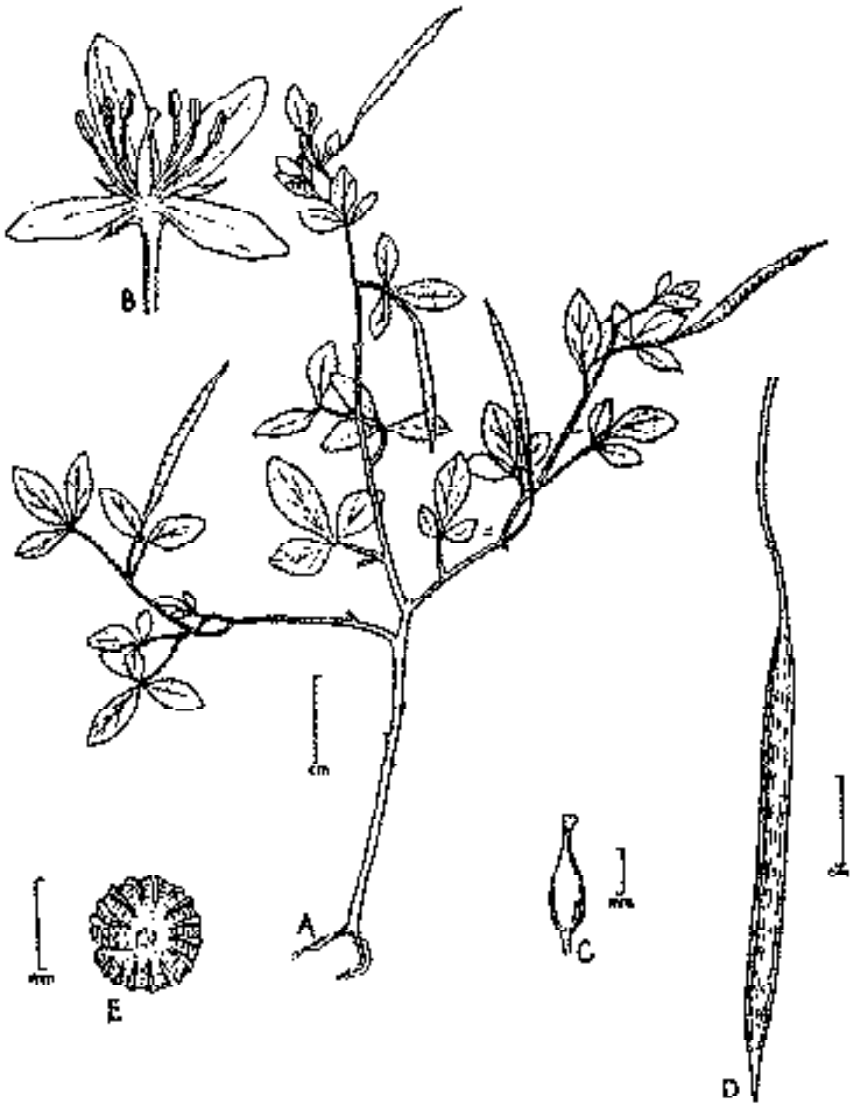
1. Stamens 6 or less :
   2. Flowers yellow; leaves and capsules papillose ... *C. scaposa*
   2. Leaves, flowers and capsules not as above :
      3. Androgynophore 5–10 mm long ... *C. gynandra*
      3. Androgynophore or gynophore less than 3 mm long or absent :
         4. Leaves simple ... *C. monophylla*
         4. Leaves compound :
            5. Gynophore absent ... *C. aspera*
            5. Gynophore present :
               6. Fruits 3–5 cm long, attenuated at base; seeds yellowish–brown to almost orange ... *C. burmanii*
               6. Fruits 5.0–7.5 cm long, tapering at both ends; seeds dull black ... *C. rutidosperma*
1. Stamens more than 10 :
   7. Leaves simple ... *C. simplicifolia*
   7. Leaves compound :
      8. Plants glabrous or glandular hairy; flowers yellow :
         9. Plants glabrous; leaflets linear to filiform ... *C. angustifolia*
         9. Plants glandular hairy; leaflets not as above ... *C. viscosa*
      8. Plants with scale like or bulbous based hairs; flowers pink or purple :
         10. Plants with scale like hairs; flowers purple ... *C. felina*
         10. Plants with bulbous based hairs; flowers pink ... *C. chelidonii*

Cleome angustifolia Forssk. Fl. Aegypt.–Arab. 120. 1775; Raghavan in Sharma et al. Fl. India 2: 302. 1993; Almeida, Fl. Mah. 1: 53. 1996. *C. tenella* L. f. Suppl. 300. 1781; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 169. 1872.

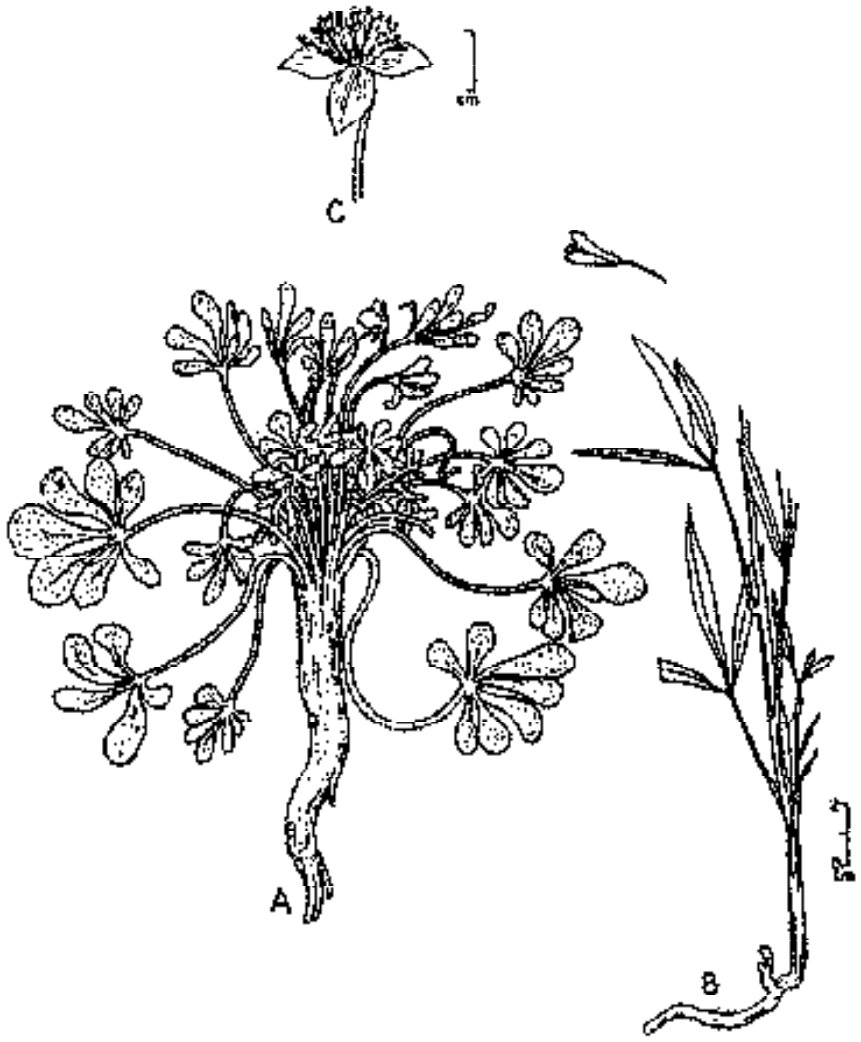
Herbs, c 10 cm tall. Leaves 3–foliolate; leaflets 1.2–2.0 x 0.2 cm, linear. Flowers purple, c 3 mm across, in lax, 2–5–flowered racemes. Capsules 1.5–5.0 x 0.2 cm, linear. Seeds suborbicular, ridges transverse.

Fls. & Frts. : October–January.

Distrib. : Maharashtra (Raghavan in Sharma et al. op. cit.; Almeida, op. cit.).



Cleome burmannii Wight & Arn. : A-Fruiting plant; B-Flower; C-Pistil; D-Capsule; E-Seed.



Cleome chelidonii L. f. A-Plant with basal rosette of leaves and woody root stock; B-Apical erect portion of plant with linear and lanceolate leaves; C-Flower

C. aspera Koen. ex DC. Prodr. 1: 241. 1824; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 169. 1872; Cooke, Fl. Pres. Bombay 1: 41. 1958 (Repr.); Jacobs in Steenis, Fl. Males. 1, 6: 105. 1960; Raghavan in Sharma et al. Fl. India 2: 303. 1993.

Erect annuals; stems, petioles and nerves on leaves beneath covered with prickle-like hairs with triangular bases. Leaves 3-foliolate; leaflets up to 2.5 x 0.5 cm, linear-oblong, ovate-lanceolate or lanceolate, more or less sessile. Flowers in racemes; bracts simple or 3-foliolate. Capsules subteretc, striate, tapering at both ends. Seeds subglobose, yellowish-brown, sharply ridged.

Fls. & Frts. : August-September.

Illus. : Wight, Ic. t. 287. 1840.

Distrib. : Occassional in open areas. Chandrapur.

C. burmanni Wight & Arn. Prodr. 22. 1834; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 170. 1872; Raghavan in Sharma et al. Fl. India 2: 304, f. 57. 1993.

Herbs. 20–40 cm tall; annual. Stems and leaves glabrous and with scattered minute prickles. Leaves 3-foliolate; leaflets ovate-oblong or obovate. Flowers white, rarely purple, axillary, solitary; gynophores c 1 cm long. Capsules subterete, striate. Seeds 10–15, reddish-brown.

Fls. & Frts. : August-October.

Illus. : Raghavan in Sharma et al. op. cit.

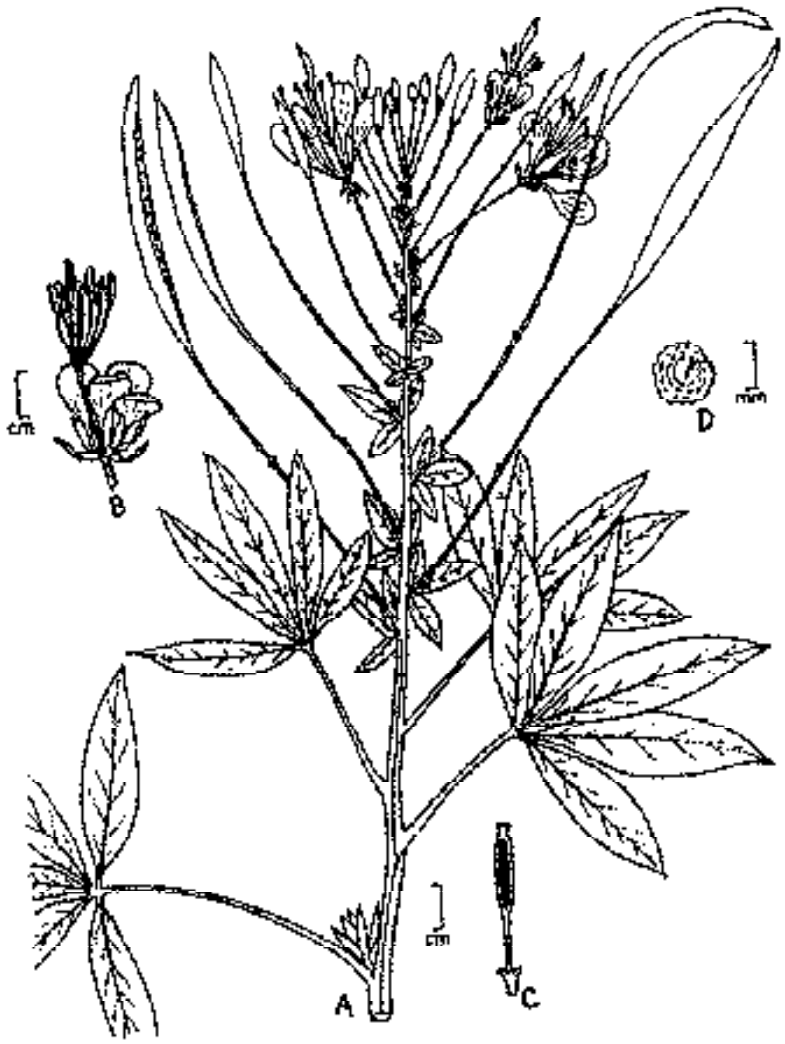
Distrib. : Weed in cultivated lands. Bombay.

C. chelidonii L. f. Suppl. Pl. 300. 1781; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 170. 1872; Cooke, Fl. Pres. Bombay 1: 42. 1958 (Repr.); Jacobs in Steenis Fl. Males 1, 6: 102. 1960; Raghavan in Sharma et al. Fl. India 2: 306, f. 58. 1993.

Annual herbs, 30–60 cm tall, striate. Leaves 3–7-foliolate below and simple above; leaflets 2–5 x 0.5–0.7 cm, oblong-obovate below and narrow-linear above. Flowers in axillary and terminal racemes. Capsules 5–8 cm long, cylindric, slender, tapering at both ends. Seeds yellowish-brown.

Fls. & Frts. : July-October.

Illus. : Wight, Ic. t. 319. 1840 (Polanisia chelidonii (L.f.) DC. Prodr. 1: 242. 1824); Raghavan in Sharma et al. op. cit.



Cleome gynandra L. A-Flowering shoot; B-Flower; C-Ovary, l.s.; D-Seed

Distrib. : Frequent, often cultivated, found as an escape.

C. felina L. f. Suppl. Pl. 300. 1781; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 170. 1872; Malhotra & Moorthy in J. Bombay Nat. Hist. Soc. 77: 361, figs. 1–6. 1980; Raghavan in Sharma et al. Fl. India 2: 308. 1993.

Annual erect herbs, 30–60 cm tall. Leaves 3–foliolate; leaflets 1.0–2.5 cm long, obovate, apex obtuse. Flowers axillary, solitary; calyx and corolla bristly outside. Capsules 2.3x0.5 cm.

Fls. & Frts. : August–September.

Illus. : Malhotra & Moorthy, op. cit.

Distrib. : Rare in dry, open areas. Chandrapur, Pune, Thane.

C. gynandra L. Sp. Pl. 671. 1753; Iltis in Brittonia 12: 284. 1960; Jacobs in Steenis, Fl. Males. 1, 6: 101. 1960. *Gynandropsis pentaphylla* (L.) DC. Prodr. 1: 238. 1824; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 171. 1872; Cooke, Fl. Pres. Bombay 1: 42. 1958 (Repr.). Raghavan in Sharma et al. Fl. India 2: 309, f. 59. 1993. *'Pandri–Tilwan'*.

Annual herbs; 20–80 cm tall. Leaves 3–5–foliolate; leaflets 2–7 x 1.5–3.0 cm, obovate or elliptic–obovate, obtuse–acuminate, base cuneate, margins crenate or dentate. Flowers in corymbose–racemes; sepals glandular–pubescent; petals white with narrow claw; ovary glandular, gynandrophore c 1 cm long. Capsules 3–10 x 0.3–0.5 cm, tapering at both ends. Seeds muricate, dark brown, globular.

Fls. & Frts. : June–March.

Illus. : Mahesh. Illus. Fl. Delhi f. 110, 1966; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 34. 1982; Raghavan in Sharma et al. op. cit.

Distrib. : Common throughout in waste places.

Notes : There is no specimen named *Cleome gynandra* at the Linnean herbarium. After the first edition of Species Plantarum, the species has been omitted in the subsequent editions, hence the only plate cited by Linnaeus i.e. plate 24 of Rheede's Hort. Malab. 9: 1689 was designated as type by Iltis (op. cit.). However the cultivated plant at BM–CLIFF is the type of *C. pentaphylla* L.

C. monophylla L. Sp. Pl. 672. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 168. 1872; Cooke, Fl. Pres. Bombay 1: 39. 1958 (Repr.); Raghavan in Sharma et al. Fl. India 2: 312. 1993.

Annual hairy herbs, 20–60 cm tall. Leaves 2.5–5 x 0.5 cm, ovate–lanceolate, apex acute or acuminate, base subcordate or rounded. Flowers pink, in racemes; sepals ciliate; petals clawed. Capsules 5–10 x 0.5 cm, cylindric, beaked, hairy gynophore short or absent. Seeds rugose.

Fls. & Frts. : August–September.

Distrib. : Frequent in open areas. Amravati, Aurangabad, Chandrapur, Nagpur, Nanded, Pune, Sindhudurg.

C. rutidosperma DC. Prodr. 1: 241. 1824; Jacobs in Steenis, Fl. Males. 1, 6: 104. 1960; Raghavan in J. Econ. Tax. Bot. 5. 465. 1984 & in Sharma et al. Fl. India 2: 313. 1993; Almeida, Fl. Mah. 1: 55, f. 1996.

Annual herbs, 0.25–1.0 m tall; stem angular, thinly bristly. Leaves compound; leaflets 3, gradually reduced upwards, central leaflet 3.0–3.5 x 1.5–2.5 cm, ovate or oblong, apex acute, ciliate along margins. Flowers in leafy racemes; calyx hairy; gynophore less than 0.15 cm long or absent. Capsules linear, beaked.

Fls. & Frts. : September–November.

Distrib. : Rare. Bombay, Sindhudurg, Thane.

C. scaposa DC. Prodr. 1: 239. 1824; Jafri in Fl. W. Pak. 34: 30. 1973; Raghavan in Sharma et al. Fl. India 2: 314. 1993. *C. papillosa* Steud. Nomencl. Bot. ed. 2, 1: 382. 1840; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 168. 1872; Cooke, Fl. Pres. Bombay 1: 39. 1958 (Repr.). *C. gracilis* Edgew. in J. Asiat. Soc. Bengal 16: 111. 1847.

Herbs, 15–20 cm tall. Branches with scabrid glandular hairs. Leaves simple, 1–2 x 0.5–1.0 cm, elliptic–ovate or orbicular, scabrid, cordate or rounded at base, margins entire; petioles of lower leaves 0.5–1.0 cm long and that of upper shorter. Flowers in racemes. Capsules 2–3 x 0.12–0.15 cm, slender. Seeds granulate, brownish–black.

Fls. & Frts. : September–October.

Illus. : Bhandari, Fl. Indian Desert 38, f. 8. 1990 [Rev. ed. (C. gracilis)].

Distrib. : Occasional in open, rocks & plains. Dhule, Jalgaon, Pune.

C. simplicifolia (Camb.) Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 169. 1872; Cooke, Fl. Pres. Bombay 1: 40. 1958 (Repr.);

Raghavan in Sharma et al. Fl. India 2: 314. 1993. *Polanisia simplicifolia* Camb. in Jacq. Voy. Bot. 4: 20, t. 20. 1844. *C. asperrima* Blatt. in J & Proc. Asiat. Soc. Bengal n.s. 26: 340. 1937.

Annual herbs, 20–60 cm tall; stems angled, scabrid–strigose. Leaves 2–4 x 1–2 cm, obovate or oblong–lanceolate, linear–oblong or oblong–elliptic, obtuse or subacute at apex, tapering at base, densely strigose with scaly hairs. Flowers 4–5 mm across, violet or pink, solitary in axils of leafy bracts forming lax, few–flowered racemes. Capsules 1.5–3.5 x 0.5 cm long, beaked, striate, compressed, slightly toruloso. Seeds yellowish–brown, turning black.

Fls. & Frts. : March–December.

Illus. : Wight, Ic. t. 1072. 1842 (*Cleome burtporensis* Munro ex Wight).

Distrib. : Common throughout.

C. viscosa L. Sp. Pl. 672. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 170. 1872; Cooke, Fl. Pres. Bombay 1: 41. 1958 (Repr.); Illtis in Brittonia 12: 281. 1960; Jacobs in Steenis, Fl. Males. 1, 6: 103. 1960; Raghavan in Sharma et al. Fl. India 2: 317. 1993. *'Pivli–Tilwan'*.

Annual erect herbs, c 1 m tall. Leaves 3–5–foliolate; leaflets elliptic, oblong or obovate, apex acute or obtuse. Flowers axillary, in lax racemes; sepals glandular–pubescent outside. Capsules 5–7 x 0.5 cm, hairy, striate, tapering at both ends. Seeds subglobose.

Fls. & Frts. : Mostly throughout the year.

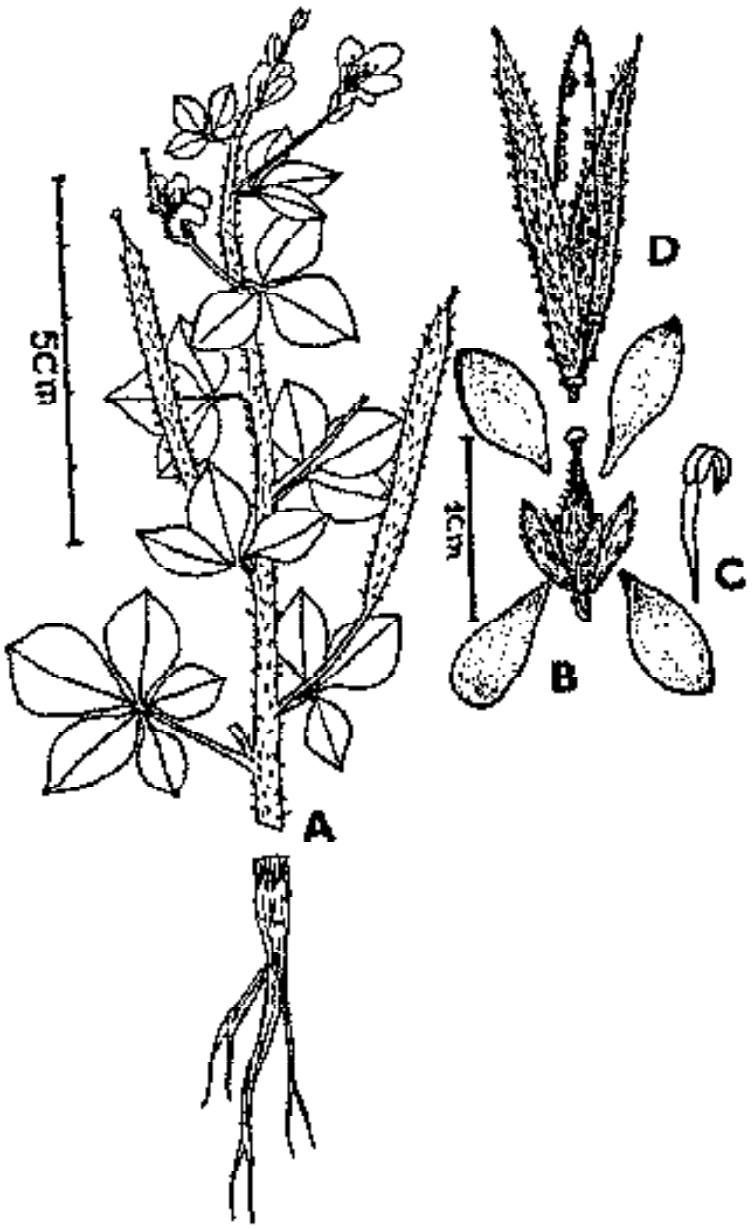
Illus. : Wight, Ic. t. 2. 1838 [*Polanisia icosandra* (L.) Wight. & Arn. Prodr. 22. 1834]; Mahesh. Illus. Fl. Delhi f. 9. 1966.

Distrib. : Common throughout.

CRATEVA L. (CRATAEVA)

1.	Leaves abruptly acuminate; berries globose	...	*C. adansonii ssp. odora*
1.	Leaves not as above; berries ovoid	...	*C. magna*

Crateva adansonii ssp. **odora** (Buch.–Ham.) Jacobs in Blumea 12: 198. 1964; Raghavan in Sharma et al. Fl. India 2: 322. 1993. *C. odora* Buch.–Ham. in Trans. Linn. Soc. 15: 118. 1827. *C. religiosa* var. *roxburghii* (R. Br.) Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 172. 1872; Cooke, Fl. Pres. Bombay 1: 45. 1958 (Repr.). *'Vaivarana'*, *'Wairoda'*.



Cleome viscosa L.
A-Habit; B-Floral parts dissected; C-Stamen; D-Fruit dehiscing

Trees, 5–10 m tall. Leaves 3–foliolate; leaflets 8–10 x 5–6 cm, ovate or obovate, margins entire. Flowers whitish, in densely flowered corymbs; sepals petaloid, ovate; petals with narrow claw. Berries 3.5 cm across. Seeds brownish.

Fls. & Frts. : March–May.

Illus. : Wight in Hook. Ic. Pl. t. 178 (137). 1837 (*C. roxburghii* R. Br. in Denh. & Clapp. Narr. Trav. Disc. Afr. app. 244. 1826); Mahesh. Illus. Fl. Delhi. f. 14. 1966.

Distrib. : Infrequent along stream banks. Bombay, Chandrapur, Kolhapur, Nagpur, Pune, Sindhudurg, Sholapur, Thane; also planted in gardens and Mosques in Marathwada.

C. magna (Lour.) DC. Prodr. 1: 243. 1824; Jacobs in Steenis, Fl. Males. 1, 7 : 822. 1976; Raghavan in Sharma et al. Fl. India 2: 324. 1993. *Capparis magna* Lour. Fl. Cochinch. 1: 331. 1790. *Crateva religiosa* var. *nurvala* (Buch.–Ham.) Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 172. 1872; Cooke, Fl. Pres. Bombay 1: 44. 1958 (Repr.). Jacobs in Blumea 12: 194. 1964. *'Katar lingad', 'Varun'.*

Trees, c 5 m tall. Leaves 3–foliolate; leaflets 8–15 x 5–6 cm, ovate–lanceolate, base attenuate, margins entire. Flowers greenish–white, in corymbs; sepals petaloid. Berries 3–5 cm across, woody, smooth.

Fls. & Frts. : March–May.

Illus. : Bedd. Fl. Sylv. S. India t. 116. 1871 (*C. religiosa* auct. non Forst. f. 1786); Chakraverty et al in Beaut. Trees & Shrubs of Calcutta p. 45. 1984.

Distrib. : Occasional along the streams. Ahmednagar, Bombay, Ratnagiri, Sindhudurg, Thane.

MAERUA Forssk.

Maerua oblongifolia (Forssk.) A. Rich. in Guill. & Perr. Fl. Seneg. Tent. 1: 32, t. 5. 1831; Raghavan in Sharma et al. Fl. India 2: 331. 1993. *Capparis oblongifolia* Forssk. Fl. Aeg.–Arab. 99. 1775. *Maerua arenaria* (DC.) Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 171. 1872. *M. ovalifolia* (DC.) Camb. in Jacq. Voy. Bot. 23, t. 24. 1844; Cooke, Fl. Pres. Bombay 1: 43. 1958 (Repr.). *'Kaba', 'Kalwari'.*

Climbing unarmed shrubs. Leaves simple, 2.5–5.0 x 1.0–2.5 cm, elliptic–oblong, apex obtuse or retuse, mucronate. Flowers greenish–yellow, in corymbs; calyx ovate, acute, hooded at apex with short horn

behind the hood and the pubescent margins. Fruits moniliform, c 0.5 cm long, pale brown (elongate, knotted berry), each berry 1–seeded. Seeds echinate.

Fls. & Frts. : November–March.

Illus. : Mahesh. Illus. Fl. Delhi, f. 11. 1966.

Distrib. : Frequent in deciduous forests.

CULTIVATED SPECIES :

Cleome speciosa Raf. Fl. Ludovic 86. 1817; Lisboa in J. Roy. Asiat. Soc. (Bombay) 15: 209. 1883; Jacobs in Steenis, Fl. Males. 1, 6: 101. 1960; Bole & Almeida in J. Bombay Nat. Hist. Soc. 77: 456. 1981; Raghvan in Sharma et al. Fl. India 2: 316. 1993. *Gynandropsis speciosa* DC. Prodr. 1: 238. 1824; Cooke, Fl. Pres. Bombay 1: 43. 1958 (Repr.).

Herbs, c 1 m high. Leaves 3–5–foliolate; leaflets elliptic–obovate, base cuneate, apex acuminate. Flowers rose–coloured, in dense racemes. Capsules 5–8 cm long, pubescent. Seeds muricate.

Fls. & Frts. : April–May.

Distrib. : Cultivated in gardens as an ornamental plant. Ahmednagar, Bombay, Nasik, Pune, Ratnagiri, Satara, Sindhudurg.

RESEDACEAE

(P. Lakshminarasimhan)

Reseda odorata L. Syst. ed. 10, 2: 1046. 1759; Cooke, Fl. Pres. Bombay. 1: 53. 1958 (Repr.); Balakr. & Premanath in Sharma et al. Fl. India 2: 341. 1993; Almeida, Fl. Mah. 1: 58. 1996.

Annual or perennial herbs, 10–25 cm high, erect but later becoming decumbent. Leaves oblanceolate–obovate, entire, sometimes notched. Flowers yellowish–white, fragrant, in terminal spikes. Capsules subglobose, c 1.1 x 1.0 cm, nodding.

Fls. & Frts. : March–May.

Distrib. : Cultivated in gardens (Cooke, op. cit.).

VIOLACEAE

(Archana Godbole & Sujit Kumar Das Das)

1. Leaves subsessile; sepals not produced at base; petals unequal in size; seeds longitudinally ribbed ... HYBANTHUS
1. Leaves long petioled; sepals pouched or produced at base; petals equal or subequal in size; seeds smooth ... VIOLA

HYBANTHUS Jacq.

Hybanthus enneaspermus (L.) F. v. Muell. Fragm. Phyt. Austr. 10: 81. 1876; S.P. Banerjee & B.B. Pramanik in Fasc. Fl. India 12: 2, figs. 1–b. 1983 & in Sharma et al. Fl. India 2: 343, f. 64. 1993. *Viola enneasperma* L. Sp. Pl. 937. 1753. *Ionidium heterophyllum* Vent. Jard. de la Malm. fol. 27. 1803; Cooke, Fl. Pres. Bombay 1: 55. 1958 (Repr.). *I. suffruticosum* (L.) R. & S. Syst. Veg. 5: 394. 1819; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 185. 1872. *'Ratan–Paras'*.

Perennial herbs with ascending branches, 30–35 cm high. Leaves alternate, 2.5–5.0 cm long, subsessile; stipules minute, gland tipped, subulate. Flowers axillary, solitary, reddish–pink; pedicels shorter than leaves; sepals lanceolate, acute, keeled; petals larger than sepals, lowest with a long claw. Capsules c 0.75 cm across, subglobose. Seeds ovoid, acute, longitudinally ribbed, yellowish–white.

Fls. & Frts. : October–January.

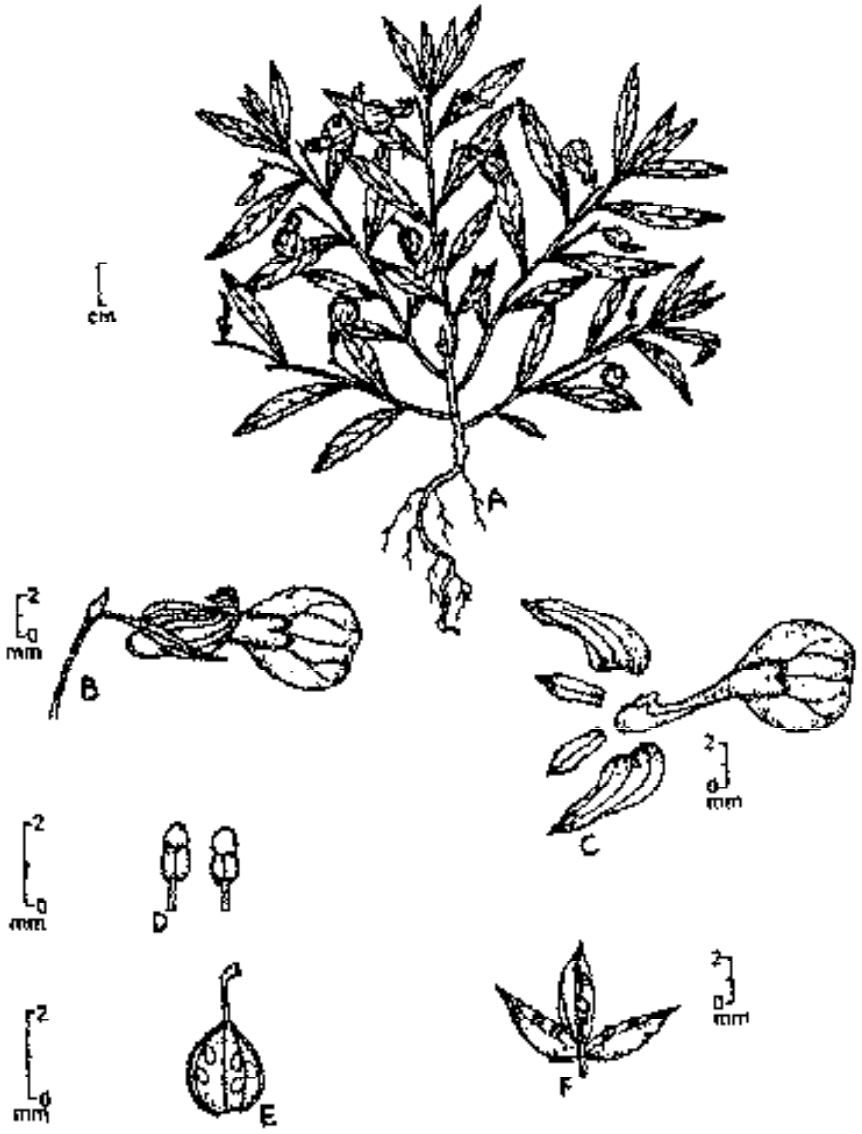
Illus. : Wight, Ic. t. 308. 1840 (*I. suffruticosum*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 37. 1982; S.P. Banerjee & Pramanik, op. cit.

Distrib. : Common in open areas.

VIOLA L.

Viola betonicifolia J. E. Sm. in Rees, Cyclop. 37: Viola n. 7. 1817; S.P. Banerjee & B.B. Pramanik in Fasc. Fl. India 12: 14. 1983 & in Sharma et al. Fl. India 2: 355, f. 67 i. 1993. *V. patrinii* sensu Hook. f. & Thoms. in Hook. f. Brit. India 1: 183. 1872 p.p. non DC. 1824.

Perennial herbs, unbranched, 8–20 cm high. Leaves in a rosette, 2–8 x 1–3 cm, linear–lanceolate to triangular–ovate, glabrous to more or less pubescent; petioles 4–10 cm long, usually winged above; stipules 5–10 mm long, ovate–lanceolate, sparsely short–fimbriate. Flowers up to 1.5 cm across, lilac, with darker veins; sepals c 8 mm long, oblong;



Hybanthus enneaspermus (L.) F. v. Muell. : A-Plant; B-Flower; C-Petals; D-Stamens; E-Pistil; F-Capsule, dehiseed.

petals up to 1 cm long, oblong–ovate, spur 2–4 mm long. Capsules up to 1 cm long, ellipsoid–oblong, glabrous. Seeds rounded–ovoid, shiny.

Fls. & Frts. : January–June, often extending throughout the year.

Illus. : S.P. Banerjee & B.B. Pramanik in Sharma et al. op. cit.

Disrib. : Usually in grasslands, river banks and damp grounds. Maharashtra (S.P. Banerjee & B. B. Pramanik in Sharma et al. op. cit.).

CULTIVATED SPECIES :

Viola odorata L. Sp. Pl. 934. 1753; Hook. f. & Thom. in Hook. f. Fl. Brit. India 1: 184. 1872 p.p.; S.P. Banerjee & B.B. Pramanik in Fasc. Fl. India 12: 29. 1983 & in Sharma et al. Fl. India 2: 369, f. 67 f. 1993.

Annual or perennial herbs, prostrate; root–stock stout, articulated; stem short, stolons 15–20 cm long, slender. Leaves 1.5 –3.5 x 2–4 cm, orbicular–reniform to broadly ovate, glabrous or strigose; petioles 2–8 cm long; stipules ovate–lanceolate to subulate–lanceolate, glabrous, glandular–toothed. Flowers 1.0–1.5 cm across, violet or white, tinged with purple; sepals c 7 x c 2 mm, ovate, obtuse; petals obovate, orbicular, lateral ones bearded or not, spur c 5 mm long, cylindric–obtuse; stamens 5, lower two spurred; ovary strigose. Capsules c 5 mm across, globose, hirsute.

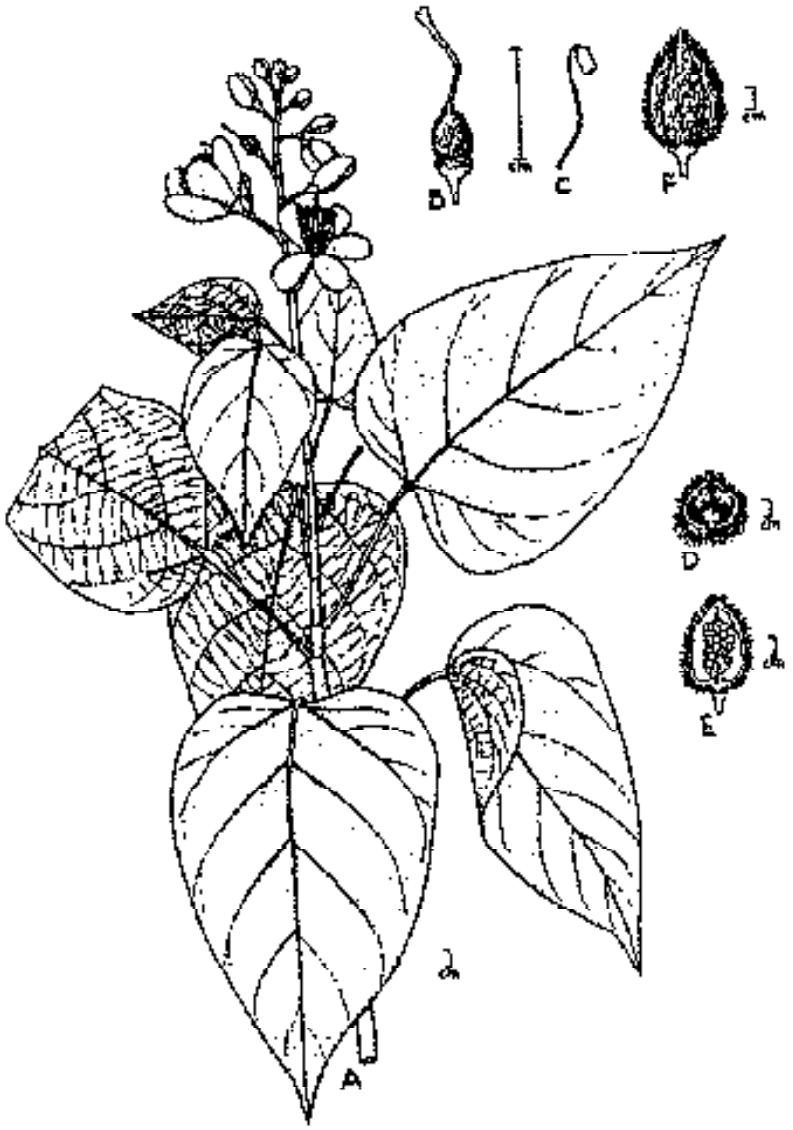
Fls. & Frts. : March–August.

Illus. : S.P. Banerjee & B.B. Pramanik in Sharma et al. op. cit.

Distrib. : Ornamental, cultivated in gardens. Pune, Satara.

V. tricolor L. Sp. Pl. 935. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 182. 1872; S.P. Banerjee & B.B. Pramanik in Fasc. Fl. India 12: 36. 1983 & in Sharma et al. Fl. India 2: 377, f. 67 e. 1993.

Annual, biennial or perennial herbs, glabrous or puberulous, c 80 cm high; stem erect, diffusely branched from base. Leaves 1.5–4.0 x 0.5–1.5 cm, variable, ovate–lanceolate; petioles 1.0–2.5 cm long, often winged above; stipules deeply pinnately lobed, foliaceous, lanceolate. Flowers c 4.5 cm across, multicoloured or a mixture of yellow, blue, purple and violet; sepals 7–15 x 2–5 mm, linear–lanceolate, subulate; petals orbicular–obovate, one to two times as long as broad, spur straight, 5–8 mm long; style geniculate at base; stigma laterally beaked, hairy. Capsules 8–12 mm long, ellipsoid or ovoid, acute.



Bixa orellana L. : A-Twig; B-Ovary; C-Stamen; D-T.s. of ovary; E-L.s. of Ovary; F-Fruit.

Fls. & Frts. : November–June.

Illus. : S.P. Banerjee & B.B. Pramanik in Sharma et al. op. cit.

Distrib. : Cultivated as an ornamental plant. Aurangabad, Bombay, Pune, Sindhudurg.

BIXACEAE

(D. L. Shirodkar)

BIXA L.

Bixa orellana L. Sp. Pl. 512. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 190. 1872; Cooke, Fl. Pres. Bombay 1: 56. 1958 (Repr.); Balakr. in Sharma et al. Fl. India 2: 381, f. 70. 1993; Almeida, Fl. Mah. 1: 59. 1996. *'Kesri'*, *'Shendri'*.

Small, evergreen trees. Leaves 10–20 x 6–12 cm, ovate, acute or acuminate at apex, truncate or subcordate at base. Flowers white or pink, 5 cm across, in terminal panicles; pedicels pubescent. Capsules ovoid or subglobose, clothed with long, soft prickles. Seeds trigonous, rounded and grooved on the back, pulp red.

Fls. & Frts. : July–November.

Illus. : Balakr. in Sharma et al. op. cit.

Distrib. : It is a native of Tropical America. Commonly cultivated.

COCHLOSPERMACEAE

(M.J. Kothari)

COCHLOSPERMUM Kunth ex DC. (nom. cons.)

Cochlospermum religiosum (L.) Alst. Handb. Fl. Ceyl. 6: 14. 1931; Paul & Nayar in Nayar et al. Fasc. Fl. India 19 : 16. 1988; Balakr. in Sharma et al. Fl. India 2 : 383, f. 71. 1993. *Bombax religiosum* L. Sp. Pl. 552. 1753. *Cochlospermum gossypium* (Cav) DC. Prodr. 1: 527. 1824; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 190. 1872; Cooke, Fl. Pres. Bombay 1: 56. 1958 (Repr.). *'Chaor'*, *'Ganeri'*, *'Gogal'*.

Deciduous trees, 10–20 m high. Leaves 4–22 cm across, digitately lobed, lobes 3–5, white–tomentose beneath, lobes acuminate; petioles

10–18 cm long. Flowers bright yellow, 3.5–10.0 cm across, in terminal panicles. Capsules 8–10 x 4–6 cm, broadly ellipsoid or obovate, ribbed. Seeds chocolate brown, densely silky hairy.

Fls. & Frts. : February–April.

Illus. : Bedd. Fl. Sylv. t. 171. 1872; Talb. For. Fl. Bombay Pres. & Sind 1: 71, f. 45. 1909 (*Cochlospermum gossypium*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 39. 1982; Paul & Nayar in Nayar et al. op. cit. 17 (colour photo) & 18, f. 3; Balakr. in Sharma et al. op. cit.

Distrib. : Common in hilly, deciduous forests, often planted in gardens and near temples for its flowers.

FLACOURTIACEAE

(C. R. Jadhav)

1. Petals present :
   2. Stamens numerous ... SCOLOPIA
   2. Stamens 4–5 :
      3. Flowers unisexual (plants dioecious), solitary or in small axillary racemes ... HYDNOCARPUS
      3. Flowers bisexual, in long, axillary panicles ... HOMALIUM
1. Petals absent :
   4. Flowers unisexual; fruit a berry ... FLACOURTIA
   4. Flowers bisexual; fruit a capsule ... CASEARIA

CASEARIA Jacq.

1. Branchlets and leaves tomentose or pubescent ... *C. tomentosa*
1. Branchlets and leaves glabrous :
   2. Pedicels and calyx glabrous ... *C. championii*
   2. Pedicels (at least below articulations) and calyx hairy :
      3. Leaves entire and revolute along margins; reticulum smooth to touch ... *C. rubescens*
      3. Leaves shallowly crenate along margins; reticulum coarse to touch ... *C. graveolens*

Casearia championii Thwaites, Enum. Pl. Zeyl. 19.1858; Mitra in Sharma et al. Fl. India 2: 391.1993. *C. esculenta* auct. non Roxb. 1832; C.B. Cl. in Hook. f. Fl. Brit. India 2: 592. 1879 p.p.; Cooke, Fl. Pres. Bombay 1: 553.1958 (Repr.) p.p. *'Khul khulta', 'Kirmira', 'Modi'.*

Trees, 5–9 m tall; stems and branches lenticelled. Leaves 15–18 x 2.5–6.5 cm, elliptic–oblong to elliptic–lanceolate, apex acuminate, base tapering, margins entire or serrate. Flowers greenish, in axillary clusters; calyx lobes 4 or 5, 0.2 x 0.2 cm, suborbicular. Capsules 1.2–2.6 x 1.0–1.7 cm, ellipsoid, 2–3 (usually 3)–valved, yellowish–orange. Seeds many, aril large, fleshy.

Fls. & Frts. : February–July.

Illus. : Bedd. Fl. Sylv. t. 208. 1872; Ic. Roxb. Fasc. 7, t. 24. 1976 [Repr. ed. *(Casearia esculenta)*].

Distrib. : Frequent in moist deciduous forests. Dhule, Kolhapur, Nasik, Raigad, Satara, Sindhudurg.

C. graveolens Dalz. in Hook. J. Bot. & Kew Gard. Misc. 4: 107. 1852; C.B. Cl. in Hook. f. Fl. Brit. India 2: 592. 1879; Cooke, Fl. Pres. Bombay 1: 553. 1958 (Repr.); Mitra in Sharma et al. Fl. India 2: 394.1993. *'Bokhada', 'Kirmira', 'Pandhri–Karai', 'Rivil'.*

Small trees, 5–8 m tall; stems and branches lenticelled. Leaves 4–23 x 3–13 cm, broadly elliptic, base usually rounded, apex obtuse or short acuminate. Flowers green, in axillary clusters on leafless branches; sepals deeply lobed, lobes 5, 0.1–0.2 cm long, green, oblong, obtuse. Capsules 1.5–2.5 x 1 cm, ellipsoid, 3–valved, yellow. Seeds upto 12, ovoid, compressed, with red aril.

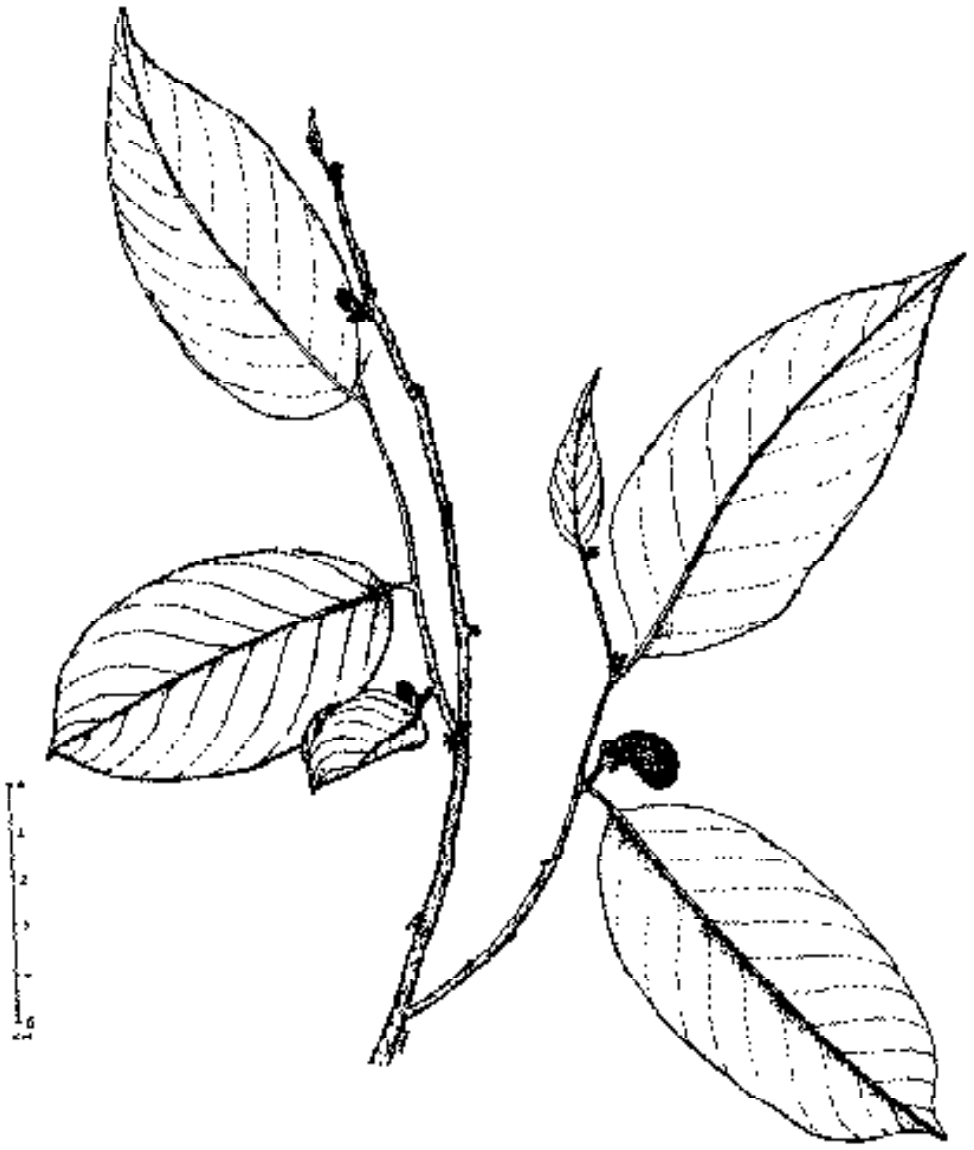
Fls. & Frts. : February–September.

Illus. : Lakshminarasimhan & Sharma, Fl. Nasik Dt. 75, f. 2. 1991.

Distrib. : Frequent in deciduous forests.

C. rubescens Dalz. in Hook. J. Bot. & Kew Gard. Misc. 4: 108. 1852; C. B. Cl. in Hook. f. Fl. Brit. India 2: 593. 1879; Cooke, Fl. Pres. Bombay 1: 554. 1958 (Repr.); Mitra in Sharma et al. Fl. India 2: 396. 1993(as *'rubens'*).

Shrubs, 3–5 m tall; stems and branches lenticelled, pale. Leaves 10–20 x 4.0–9.3 cm, elliptic–oblong, base subacute. Flowers greenish, 0.15–0.20 cm across, in axillary clusters. Capsules 2–3 cm long, angled.



Casearia rubescens Dalz.

Fls. & Frts. : February–May.

Distrib. : Occasional in moist deciduous forests. Sindhudurg.

C. tomentosa Roxb. Fl. Ind. 2: 421. 1832; C.B. Cl. in Hook. f. Fl. Brit. India 2: 593. 1879; Cooke, Fl. Pres. Bombay 1: 554. 1958 (Repr.); Mitra in Sharma et al. Fl. India 2: 397. 1993. *C. elliptica* Willd. Sp. Pl. 2: 628. 1799 nom. superfl. (based on *Anavinga lanceolata* Lam.). *'Chilla', 'Karei'.*

Trees, 4.5–10.0 m tall; stems and branches lenticelled; bark ash coloured. Leaves 6.4–20.6 x 3.0–7.5 cm, elliptic–oblong, apex acute or acuminate, margins entire or serrulate. Flowers greenish–white, in short, axillary clusters; calyx deeply lobed, lobes 0.3–0.4 x 0.1–0.2 cm, broadly elliptic, obtuse. Capsules 1.7–3.0 x 0.8–1.0 cm, ellipsoid, 3–valved. Seeds arillate.

Fls. & Frts. : January–May.

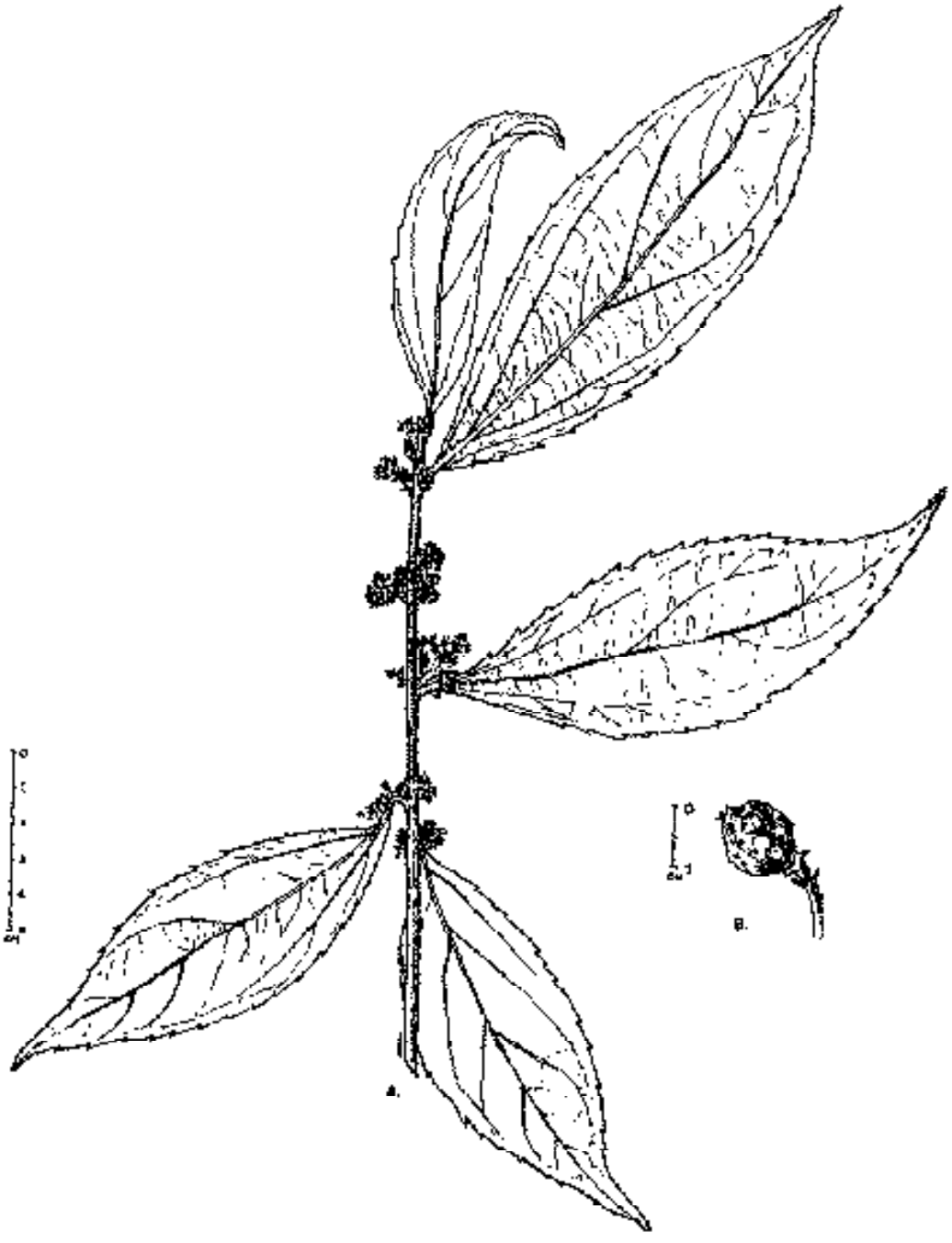
Illus. : Wight, Ic. t. 1849. 1852 (*Casearia elliptica*);Collett, Fl. Siml. 197, f. 59. 1902; Ic. Roxb. Fasc. 7, t. 25. 1976 (Repr. ed.); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 40. 1982.

Distrib. : Frequent in deciduous forests. Aurangabad, Chandrapur, Dhule, Gadchiroli, Nagpur, Pune, Nasik, Ratnagiri, Sindhudurg, Thane, Yavatmal.

FLACOURTIA L' Herit.

1.	Styles absent (stigma sessile)	...	*F. latifolia*
1.	Styles distinct and conspicuous :		
2.	Young twigs often densly tomentose, sometimes minutely puberulous; leaves turning brown on drying	...	*F. montana*
2.	Young twigs glabrous or glabrescent; leaves not turning brown	...	*F. indica*

Flacourtia indica (Burm. f.) Merr. Interpr. Rumph. Herb. Amb. 377. 1917; Sleumer in Steenis, Fl. Males 1,5 : 76. 1954 & Blumea 30 : 241. 1985; Mitra in Sharma et al. Fl. India 2 : 402. 1993. *Gmelina indica* Burm. f. Fl. Ind. 132, t. 39, f. 5. 1768. *Flacourtia ramontchi* L' Herit. Stirp. Nov. 3. 59, t. 30 & 30 b. 1785; Hook. f. & Thoms. in Hook f. Fl. Brit. India 1: 193. 1872, excl. var *latifolia;* Cooke, Fl. Pres. Bombay 1: 59. 1958 (Repr.). *F. ramontchi* var. *occidentalis* Hook. f. & Thoms.in Hook. F. op. cit.; Cooke, op.cit. *F. ramontchi* var. *sapida* (Roxb.) Hook. f. & Thoms. in Hook. f. op. cit.; Cooke, op. cit. *F. sepiaria* Roxb. Pl. Cor. 1:



Flacourtia montana Grah.
A-Habit; B-Fruit

48, t. 68. 1796; Hook. f. & Thoms.in Hook. f. op. cit. 194; Cooke, op. cit. 60. *F. occidentalis* Blatt. in J. Bombay nat. Hist. Soc. 31: 914. 1927. *F. sepiaria* var. integrifolia Blatt. op. cit. *'Anthrun', 'Bhenkal', 'Galgughar', "Girgot', 'Gurgoti', Karkaeer', 'Paker', 'Panavla', 'Parhenkal'.*

Shrubs or small trees, 1.5–6.0 m tall, deciduous thorny; young twigs glabrous. Leaves 2–11 x 2–8 cm, usually clustered towards apices on older branches, highly variable in shape, size and indumentum, broadly elliptic, ovate or obovate, apex acute, acuminate or retuse, margins crenate or subentire. Flowers in axillary, bracteate, short, puberulous, racemes or terminating in short, thorny twigs. Male flowers c 0.3 cm across, greenish–yellow, sepals ovate, hairy inside. Female flowers: ovary globular, styles 3–5 (–6), radiating, free or slightly connate at base. Berries 0.6–1.2 x 0.2–0.8 cm ellipsoid, ribbed, dark purple or red when ripe.

Fls. & Frts. : January–July.

Illus. : Wight, Ic. t. 85. 1839; Talb. For. Fl. Bombay Pres. & Sind 1: 77, f. 50. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 41. 1982 *(Flacourtia ramontchi)* & Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 14.1988.

Distrib : Common throughout.

F. latifolia (Hook. f. & Thoms.) T. Cooke, Fl. Pres. Bombay 1: 56.1901 [1: 59. 1958 (Repr.)]; Mitra in Sharma et al. Fl. India 2: 405. 1993. *F. ramontchii* var. *latifolia* Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 193. 1872. *'Tambat'.*

Trees deciduous; main stem armed at base, usually unarmed above. Leaves 4.5–10.0 x 3.0–7.5 cm, broadly elliptic, ovate or oblanceolate, apex acuminate or sometimes acute or obtuse, margins coarsely crenate, shiny, glabrous except along midrib. Flowers in pubescent, bracteate, lax or in clustered racemes, yellowish–green. Berries 0.6–0.8 cm across, subglobose, with obscurely, bilobed with 3(–4) sessile stigmas at top.

Fls. & Frts. : March–July.

Distrib. : In moist deciduous forests along ghats. Nasik, Pune, Satara.

F. montana Grah. Cat. Bombay Pl. 10. 1839; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 192. 1872; Cooke, Fl. Pres. Bombay 1: 58. 1958 (Repr.); Mitra in Sharma et al. Fl. India 2: 406. 1993. *'Attak' 'Champari', 'Chapar', 'Chaprin', 'Tar–bor'.*

Trees, 5–15 m tall; stems thorny. Leaves 6–22 x 3.0–9.6 cm, ovate or broadly elliptic to oblong–elliptic, base acute or rounded, margins crenate, tomentose along midrib and nerves beneath. Flowers in densely pubescent, bracteate, fascicled racemes, unisexual. Berries 0.8 x 2.5 cm, globose, obtusely ribbed, reddish–purple when ripe, edible.

Fls. & Frts. : November–April.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 75, f. 48. 1909.

Distrib. : Frequent in semi–evergreen,moist deciduous forests along ghats. Aurangabad, Bombay, Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

HOMALIUM Jacq.

Homalium ceylanicum (Gardn.) Bth.in *J.* Proc. Linn. Soc. Bot. 4: 35. 1860 (as "*zeylanicum*") ;C. B. Cl. in Hook. f. Fl. Brit. India 2: 596. 1879; Cooke, Fl. Pres. Bombay 1: 555. 1958 (Repr.); Mitra in Sharma et al. Fl. India 2: 410.1993. *Blackwellia ceylanica* Gardn. in Calc. J. Nat. Hist. 7: 452. 1847.

Trees, 10–15 m tall, evergreen; bark smooth, grey, lenticellate. Leaves 7–10 x 4–7 cm, elliptic or elliptic–oblong, apex acuminate with twisted acumen, margins crenate–serrate or dentate. Flowers greenish–white, 0.3–0.4 cm across, in long panicles, arranged in numerous clusters along a slender rachis; calyx lobes 4–5, pubescent; petal lobes 4–5, obovate.

Fls. : February–May.

Illus. : Wight, Ic. t. 1851. 1852 (*Homalium tetrandra*); Bedd. Fl. Sylv. t. 210. 1872; Talb. For. Fl. Bombay Pres. & Sind. 2: 72, f. 331. 1911.

Distrib. : Infrequent in ghat forests. Sindhudurg.

HYDNOCARPUS Gaertn.

1. Sepals 4; petals 8; stamens 15–many ... *H. kurzii*
1. Sepals, petals & stamens 5 each ;
   2. Branchlets stellately puberulent; leaves entire, glabrous, reticulum distinctly elevated and foveolate ... *H. alpina*
   2. Branchlets simply puberulent; leaves serrate to remotely crenato–serrate, rarely subentire, minutely appressed pubescent at least along midrib and veins beneath, reticulum neither elevated nor foveolate ... *H. pentandra*

Hydnocarpus alpina Wight. Ic. Pl. Ind. Or. t. 942.1845; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 197. 1872; Deb et al. in Bull. Bot. Surv. India 20: 32. 1978; Mitra in Sharma et al. Fl. India 2: 418, fig. 76 & 77.1993. *'Kastel'*.

Trees, 10–30 m tall, evergreen, buttressed when old; bark cream–coloured outside; twigs glabrous. Leaves variable, ovate–lanceolate, elliptic, ovate–oblong or broadly ovate, base cuneate or subround, apex acuminate, entire, reddish when young. Male flowers 1.5–2.0 cm across, greenish–white, few in cymose fascicles on axillary, tomentose peduncles, sepals conate at base. Female flowers solitary, axillary, rarely binate; staminodes 5. Berries ovoid–globose or globose, 5–7 cm across; pericarp woody brownish tomentose.

Fl. & Frts. : February –April, probably throughout the year.

Illus. : Mitra in Sharma et al. op. cit.

Notes : The inclusion of this species is based on Deb et al. op. cit.

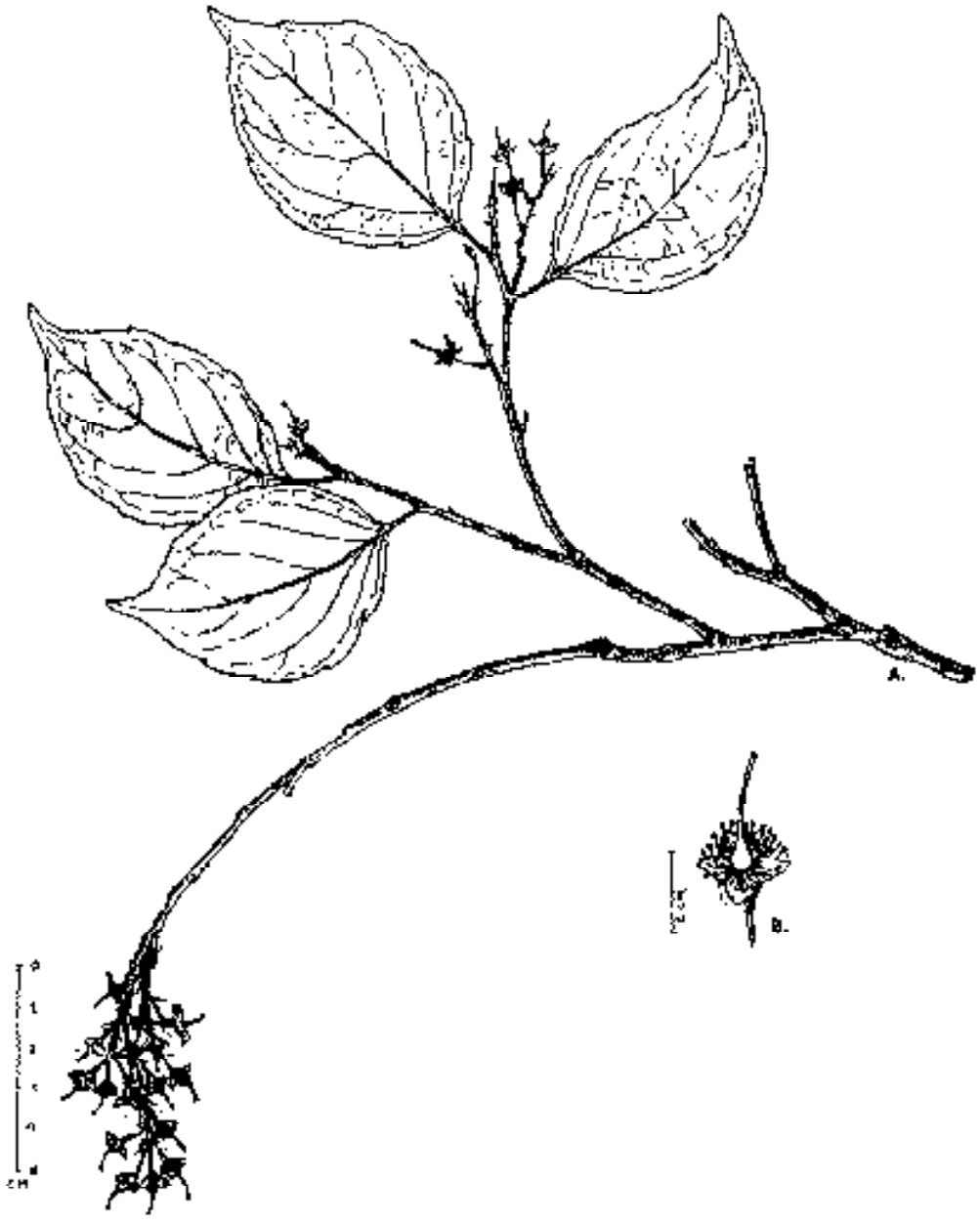
H. kurzii (King) Warb. in Engler & Prantl, Pflanzenfam. 3, 60 : 21, f. M-N (fig. erroneo sub *Gynocardia odorata*). 1893; Deb. et al. in Bull. Bot. Surv. India 20: 32. 1978; Mitra in Sharma et al. Fl. India 2: 421. 1993. *Taraktogenos kurzii* King in J. Asiat. Soc. Bengal 59 (2): 123. 1890. *'Chaulmoogra'*.

Trees, 10–20 m tall; branches hanging; bark grey, brown or blackish outside. Leaves bifarious, lanceolate, oblong–lanceolate or elliptic, base cuneate or rounded, apex acuminate or obtuse, margins entire. Male flowers 8–12 mm across, pale yellow, 3–5 each in two compact fascicles atop a common peduncle. Female flowers 2–5 in compact fascicles atop a long peduncle or solitary; staminodes 10–16. Berries globose, 8–10 cm across, reddish–brown, velvety tomentose.

Fls. & Frts. : February–November, probably throughout the year.

Notes : This species is included here on the basis of distributional report from Maharashtra State by Deb et al. op. cit.

H. pentandra (Buch.–Ham.) Oken, Allg. Naturgesch. 3, (2): 1381. 1841; Mitra in Sharma et al. Fl. India 2: 422. 1993. *Chilmoria pentandra* Buch.–Ham. in Trans. Linn. Soc. Lond. 13: 501. 1822. *Hydnocarpus wightiana* Bl. Rumph. 4: 22. 1848; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 196. 1872; Cooke, Fl. Pres. Bombay 1: 60. 1958 (Repr.). *'Kadu–Kavath'*, *'Kantel'*, *Kastel'*, *'Keti'*, *Kobased'*, *'Kowti'*.



Scolopia crenata (Wight & Arn.) Clos
A–Habit; B–Flower

Trees, 15–20 m tall. Leaves 8–20 x 3.0–7.2 cm, oblong or oblong–ovate, coriaceous, margins serrate. Flowers pentamerous; sepals brown, outer 3 larger, ovate; petals oblong or orbicular, margins softly hairy; stamens in bisexual flowers, abortive. Berries 5–7 cm across, globose, ovoid, tomentose, hard.

Fls. & Frts. : March–August.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 79, f. 53. 1909.

Distrib. : Frequent in deciduous forests. Bombay, Kolhapur, Ratnagiri, Sindhudurg.

SCOLOPIA Schreb. (nom. cons.)

Scolopia crenata (Wight & Arn.) Clos in Ann. Sci. Nat. Bot. 4. 8: 250. 1857; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 191. 1872; Cooke, Fl. Pres. Bombay 1: 57. 1958 (Repr.); Mitra in Sharma et al. Fl. India 2: 430. 1993. *Phoberos crenatus* Wight & Arn. Prodr. 29. 1834.

Small trees. Leaves 2–15 x 2.5–6.0 cm, ovate, apex acute or acuminate, base narrowed, margins with minute, distant glandular teeth. Flowers pinkish, small, numerous, in axillary panicles; calyx lobes 5–6, fleshy; petals obovate. Fruits globose or ovoid, pointed.

Fls. & Frts. : March.

Illus. : Bedd. Fl. Sylv. t. 78.1871; Talb. For. Fl. Bombay Pres. & Sind. 1: 74, f. 47. 1909; Matthew, Fl. Tamilnadu Carnatic 2: t. 42. 1982.

Distrib. : Rare, along ghats. 'Konkan' (Cooke, op. cit.).

CULTIVATED SPECIES :

Flacourtia inermis Roxb. Pl. Cor. 3: 16, t. 222. 1811; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1; 192. 1872; Mitra in Sharma et al. Fl. India 2: 407. 1993.

Small trees, unarmed. Leaves oblong–ovate, ovate–lanceolate or elliptic. Flowers bisexual, in short racemose fascicles. Berries globose, red.

Notes : Probably a native of Malaya. Cultivated for acidic fruits in 'Bombay Island' (Blatt. 1927).

F. jangomas (Lour.) Raeusch. Nomencl. Bot. ed. 3. 290. 1797; Sleumer in Steenis, Fl. Males. 1, 5: 72. 1954; Mitra in Sharma et al. Fl. India 1: 403. f. 73. 1993. *Stigmarota jangomas* Lour. Fl. Cochinch. 2:



Pittosporum dasycaulon Miq.
A- Fruiting twig; B-Flowering twig.

634. 1790. *Flacourtia cataphrata* Roxp. ex Willd. Sp. Pl. 4: 830. 1806; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 193. 1872; Cooke, Fl. Pres. Bombay 1: 58. 1958 (Repr.).

Small trees, deciduous; branches white dotted. Leaves 5–10 x 2.5–4.3 cm, ovate to ovate–lanceolate, crenate–serrate along margins. Flowers in racemes, 0.3–0.5 cm across, greenish–white. Berries subglobose, reddish–purple when ripe.

Fls. Frts. : June–December.

Illus. : Mitra in Sharma et al. op.cit.

Distrib. : Cultivated in Sindhudurg.

Notes : Berries are pleasantly acidic, eaten raw and made into jelly (Mitra in Sharma et al. op. cit.).

Oncoba routledgei Sprague in Gard. Chron. Ser. III. xlix. 323. 1911 & in Kew Bull. 262.1911.

Shrubs. c. 3 m high, spines strong, axillary. Leaves alternate, oblong or elliptic–oblong, crenate–serrate, short petioled, nearly glabrous. Flowers c 5 cm across, one or two together on old wood, white, fragrant.

Notes : A native of Uganda. Grown sometimes in Pune for the bloom.

PITTOSPORACEAE

(M.J. Kothari)

PITTOSPORUM Banks ex Soland. (nom. cons.)

1. Young branches, inflorescence and capsules densely tomentose ... *P. dasycaulon*

1. Young branches, inflorescence and capsules glabrous ... *P. wightii*

Pittosporum dasycaulon Miq. in Anal. Bot. Ind. 3: 5. 1850; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 199. 1872; Cooke, Fl. Pres. Bombay 1: 62. 1958 (Repr.); Nayar & Giri in Fasc. Fl. India 6: 6. 1980 & in Sharma et al. Fl. India 2: 442, f. 83. 1993.*'Gapsundi', 'Ikali'*.

Large shrubs or small trees, 4–8 m high. Leaves 1.7–8.0 x 0.8–2.5 cm, lanceolate, apex acute or acuminate, glabrous above, pubescent on midrib beneath. Flowers yellowish–white, fragrant, in dense terminal corymbs. Capsules globular, compressed, blackish–pink, 2–valved, 5–6 seeded.

Fls. & Frts. : November–January.

Illus. : Talb. For. Fl. Bombay Pres. & Sind. 1: 82, f. 54. 1909, Nayar & Giri in Sharma et al. op cit.

Distrib. : Rare along W. ghats. Satara, Sindhudurg.

P. wightii A.K. Mukherjee in J. Econ.Tax. Bot. 5: 50. 1984. *P. floribundum* Wight & Arn. Prodr. 154. Oct. 1834 (non Wight & Arn. ex Royle June, 1834); Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 199. 1872 p.p.; Cooke, Fl. Pres. Bombay 1: 61. 1958 (Repr.) p.p. *P. nepaulensis* sensu Nayar & Giri in Fasc. Fl. India 6: 8. 1980 p.p. & in Sharma et al. Fl. India 2: 445. 1993. *'Vikhara', 'Yekadia', 'Yekdi'.*

Large shrubs or small trees, 3–5 m tall. Leaves 7.5–12.3 x 2.4–6.2 cm, lanceolate or oblong–lanceolate, apex acute or acuminate, margins undulate. Flowers yellow, many, in much branched terminal corymbs. Capsules pisiform, dark–green.

Fls. & Frts. : April–September.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 43. 1982.

Distrib. : Common along the W. ghats, Kolhapur, Pune, Ratnagiri, Satara, Sindhudurg.

Notes : *P. floribundum* Wight & Arn. ex Royle (June 1834) applies to the Himalayan plants as the description of Royle shows and is different from *P. floribundum* of Wight & Arnott (Oct. 1834) which applies to the peninsular Indian plants only. Therefore, the name *P. floribundum* of Wight & Arnott thus happens to be later homonym of *P. floribundum* of Royle and remain without any other valid name. Hence a new name *P. wightii* has been proposed for the Peninsular Indian plants which differs from *P. nepaulensis* (DC.) Rend. & Wils. as Himalayan plant as given by Mukherjee (op. cit. 50).

POLYGALACEAE

(P. Lakshminarasimhan & P. Venkanna)

1. Leaves amplexicaul; flowers in spikes; stamens 4–5: capsules toothed ... SALOMONIA

1. Leaves not as above; flowers in racemes; stamens 8; capsules entire ... POLYGALA

POLYGALA L.

1. Shrubs ... *P. arillata*
1. Herbs :
   2. Flowers pink or purple :
      3. Wing sepals broader below middle, subacute to acuminate at apex ... *P. bulbothrix*
      3. Wing sepals broader above middle, acute to obtuse at apex :
         4. Capsules glabrous ... *P. irregularis*
         4. Capsules ciliate along margins towards apex ... *P. persicariifolia*
   2. Flowers yellow :
      5. Sepals caducous ... *P. furcata*
      5. Sepals persistent :
         6. Wing sepals broader above middle, obtuse at apex ... *P. erioptera*
         6. Wing sepals broader below middle, acute–acuminate at apex :
            7. Racemes longer than leaves ... *P. elongata*
            7. Racemes shorter than leaves :
               8. Weak herbs; caruncle appendages subequal ... *P. arvensis*
               8. Stout woody herbs; caruncle appendages equal ... *P. linarifolia*

Polygala arillata Buch.–Ham. ex D. Don, Prodr. Fl. Nepal 199. 1825; Bennett in Hook. f. Fl. Brit. India 1: 200. 1872 p.p; S.K. Mukherjee in Bull. Bot. Soc. Bengal 12: 31. 1960; Banerjee in Sharma et al. Fl. India 2: 457, f. 86. 1993.

Erect shrubs, 2–3 m tall. Leaves 12–15 x 2–4 cm, elliptic–lanceolate, apex acute or acuminate; petioles c 1 cm long. Flowers in 7–10 cm long, axillary or terminal, pendulous racemes; calyx lobes 5, outer 3 lobes unequal, elliptic, inner 2 lobes winged, elliptic–obovate, petaloid; corolla lobes 3, laterals c 0.3 cm long, slightly shorter than keel, oblong, connate with keel to half the length, keel crested, appendages forked and notched. Capsules suborbicular, margins winged.

Fls. & Frts. : October–March.

Illus. : Wight, Ic. t. 946. 1846; Chandrab. & Nair in Proc. Indian Acad. Sci. (Pl. Sci.) 90: 112, figs. 6–10. 1981; Banerjee in Sharma et al. op. cit.

Distrib. : Found occasionaly in semi–evergreen forests. Raigad.

P. arvensis Willd. Sp. Pl. ed. 3 (2): 876. 1802; Burtt in Notes Roy. Bot. Gard. Edinb. 32: 404. 1973; Banerjee in Sharma et al. Fl. India 2: 460, f. 87.1993. *P. chinensis* auct. non L. 1753; Bennett in Hook f. Fl. Brit. India 1: 204. 1872 p.p.; Cooke, Fl. Pres. Bombay 1: 64. 1958 (Repr.); S.K. Mukherjee in Bull. Bot. Soc. Bengal 12 : 38. 1960; Adema in Blumea 14: 269, f. 15. 1966. *P. jacobii* sensu Kulkarni & Singh in Curr. Sci. 42: 359. 1973 non Chandrab. 1967. *'Phutani'*.

Diffuse herbs c 15 cm tall. Leaves 1–2 x 0.5–0.7 cm, sessile, elliptic, ovate, suborbicular or linear, acute at both ends. Flowers few in short lateral racemes; pedicels short; calyx lobes 5, unequal, outer 3 lobes ovate, inner (wings) 2, each falcate; corolla lobes 3; laterals c 2 cm long, obovate, connate with keel; staminal sheath and filaments c 0.5 cm long. Capsules c 0.4 cm long. Seeds with winged, mostly linear appendages.

Fls. & Frts. : July–December.

Illus. : Adema, op. cit.; Mahesh. Illus. Fl. Delhi f. 16. 1966; Chandrab. & Nair in Proc. Indian Acad. Sci. (Pl. Sci.) 90: 125, figs. 67–71. 1981; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 15. 1988; Banerjee in Sharma et al. op. cit.

Distrib. : A weed in open situations. Common throughout.

Notes : According to Burtt (1973), Indian yellow flowered species which is misidentified as *P. chinensis* L. is actually *P. arvensis* Willd. When he studied the type specimen of *P. chinensis* L. it turned out to be *P. glomerata* Lour. He therefore recommends to abandon the name *P. chinensis* L. and the two plants may be known as P. arvensis Willd. and *P. glomerata* Lour. respectively. Kulkarni & Singh, op. cit. had reported *P. jacobii* Chandrab. from Junnar (Maharashtra State). Subsequently T. S. Nayar in J. Econ. Tax. Bot. 5: 247–248. 1984 has pointed out the erroneous identity of *P. arvensis* as *P. jacobii* and stated that *P. jacobii* does not occur in Maharashtra.

P. bulbothrix Dunn in Gamble, Fl. Pres. Madras 1: 58. 1915 [1: 42. 1967 (Repr.)] & in Bull. Misc. Inf. Kew 1916: 13. 1916; Banerjee in Sharma et al. Fl. India 2: 462. 1993; Almeida, Fl. Mah. 1: 69. 1996.

Annual herbs, up to 20 cm high; branches hispid. Leaves 0.6–1.5 x 0.3–0.6 cm, elliptic, oblong or obovate, obtuse at apex, subacute or cuneate at base, entire along margins. Racemes axillary or extra axillary; flowers 4–7 cm long. Capsules c 4 mm long, suborbicular, emarginate, ciliate. Seeds c 2.5 mm long, dark, pilose, appendages 3.

Fls. & Frts. : September–December.

Distrib. : Aurangabad (Almeida, op. cit.).

P. elongata Klein. in Willd. Sp. Pl. 3 (2): 879. 1802; Bennett in Hook. f. Fl. Brit. India 1: 203. 1872 p.p.; Cooke, Fl. Pres. Bombay 1: 64. 1958 (Repr.); S.K. Mukherjee in Bull. Bot. Soc. Bengal 12: 36. 1960; Adema in Blumea 14: 273, f. 18. 1966; Banerjee in Sharma et al. Fl. India 2: 466. 1993.

Herbs, 15–25 cm tall. Leaves 1.3 x 0.3 cm, linear–lanceolate, apex obtuse or emarginate, base attenuate. Flowers in terminal, 8–10 cm long racemes; calyx lobes 5, outer 3 lobes ovate, acute, ciliate, wings falcate; corolla lobes 3, laterals c 0.5 cm long, obovate, connate with keel, keel crest 2–lobed with forked appendages. Capsules oblong, unequal sided.

Fls. & Frts. : July–October.

Illus. : Adema, op. cit.; Chandrab. & Nair in Proc. Indian Acad. Sci. (Pl. Sci.) 90: 126, figs. 72–76. 1981; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 16. 1988.

Distrib. : Occasional in wastelands and in dry fields as a weed. Amravati, Bhandara, Chandrapur, Nanded, Pune, Ratnagiri, Sindhudurg, Thane.

P. erioptera DC. Prodr. 1: 326. 1824; Bennett in Hook. f. Fl. Brit. India 1: 203. 1872; Cooke. Fl. Pres. Bombay 1: 63. 1958 (Repr.); S.K. Mukherjee in Bull. Bot. Soc. Bengal 12: 47. 1960; Banerjee in Sharma et al. Fl. India 2: 467, f.89. 1993.

Herbs, 15–20 cm tall, annual, appressed hairy, branched from base. Leaves 0.1– 2.5 x 0.1–0.3 cm, minutely simple hairy on both sides, Inflorescence of few–flowered racemes, axillary or extra–axillary. Capsules c 0.3 x 0.2 cm, oblong–ellipsoid, emarginate, densely hairy. Seeds oblong, densely pilose, strophioles obscurely 3–lobed.

Fls. & Frts. : August–October.

Illus. : Chandrab. & Nair in Proc. Indian Acad. Sci. (Pl. Sci.) 90: 122, figs. 51–56. 1981; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 17. 1988; Banerjee in Sharma et al. op. cit.

Distrib. : A weed in open situations, common throughout.

P. furcata Royle, Illus. Bot. Himal. 3 : 78, t. 19 B. (1–4). 1834; Banerjee in Sharma et al. Fl. India 2: 469. 1993. *P. triphylla* var. *glaucescens* (Royle) Bennett in Hook. f. Fl. Brit. India 1: 201. 1872 p.p.

Erect herbs, c 25 cm high; stem narrowly winged in upper portion. Leaves 1– 6 x 0.5–3.5 cm, ovate–lanceolate, pubescent above, acute at apex, attenuate at base. Flowers c 5 mm long, yellow. Capsules 2.5 x 2.0 mm, obovoid, truncate or emarginate at apex. Seeds shiny black with white hairs, caruncle hood. shaped, usually with 2 membranous appendages, white.

Fls. & Frts. : June–December.

Notes : This species is included on the authority of Banerjee in Sharma et al. op. cit.

P. irregularis Boiss. Diagn. 1, 1: 8. 1842. & Fl. Orient 1: 469. 1867; Cooke, Fl. Pres. Bombay 1: 65. 1958 (Repr.); Naithani, Fl. Pl. India, Nepal & Bhutan 51. 1990; Banerjee in Sharma et al. Fl. India 2: 472. 1993.

Spreading herbs, c 45 cm long, base woody. Lower leaves 15–20 x 2–3 mm, obovate, upper leaves 12–40 x 3–5 mm, linear–oblong, mucronate at apex, attenuate at base. Flowers 5–12 mm long, pink or purple, in terminal lax racemes. Capsules obliquely obovoid or orbicular, emarginate, winged. Seeds sericeous, crowned with bulbous based hairs, caruncle lateral, 2–lobed, inconspicuous.

Fls. & Frts. : December– October.

Notes : This species is included here on the authority of Naithani, op. cit. & Banerjee in Sharma et al. op. cit. Cooke op. cit. has reported it from Kathiawar in Gujarat and Sind (now in Pakistan).

P. linarifolia Willd. Sp. Pl. 3: 877. 1803 (*'linearifolia'*); Adema in Blumea 14: 274, f. 19. 1966; Banerjee in Sharma et al. Fl. India 2: 476, f. 92. 1993. *P. chinensis* var. *linarifolia* (Willd.) Chodat in Mem. Soc. Phys. Nat. Hist. 31 (2): 386. 1893.

Herbs, erect, prostrate or ascending, c 35 cm high, branches tomentose. Leaves 4–5 x 0.5–1.0 cm, linear–lanceolate, apiculate at apex, strongly single nerved. Flowers 5–7 mm long, yellow, in leaf opposed racemes. Capsules obcordate, emarginate at apex. Seed caruncle 3–lobed.

Fls. & Frts. : April–November.

Illus. : Adema, op. cit.; Banerjee in Sharma et al. op. cit.

Notes : This species is included on the authority of Banerjee in Sharma et al. op. cit.

P. persicariifolia DC. Prodr. 1: 326. 1824; Bennett in Hook. f. Fl. Brit. India 1: 202. 1872 *("persicariaefolia");* Cooke, Fl. Pres. Bombay 1: 63. 1958 (Repr.); S.K. Mukherjee in Bull. Bot. Soc. Bengal 12: 45. 1960; Adema in Blumea 14: 265, f. 9. 1966; Banerjee in Sharma et al. Fl. India 2: 480. 1993.

Herbs, c 30 cm tall. Leaves 4.5 x 0.5–0.8 cm, linear–oblong, apex acute, base subacute, sparsely pubescent beneath. Flowers in 10–12 cm long, lateral and terminal racemes; pedicels 0.2–0.3 cm long; calyx lobes 5; outer 3 lobes subequal, oblong, suborbicular, puberulous; corolla lobes 3, united below with staminal sheath, laterals equalling keel, obliquely oblong, keel crested with linear appendages. Capsules c 0.5 x 0.4 cm, enclosed by wings, ciliate.

Fls. & Frts. : August–October.

Illus. : Wight, Ic. t. 49. 1838 (*P. persicariifolia*) & Illus. t. 22A. 1840; Adema, op. cit. (*P. wallichiana* Wight); Ramam. in Sald. & Nicols. Fl. Hassan Dt. 411, f. 81A–Ad. 1976; Chandrab. & Nair in Proc. Indian Acad. Sci. (Pl. Sci.) 90: 116, figs. 26–30. 1981; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 18. 1988.

Distrib. : Common in gravelly moist situations. Ahmednagar, Aurangabad, Kolhapur, Nasik, Pune, Raigad, Satara.

EXCLUDED SPECIES :

P. triflora L. Sp. Pl. 705. 1753; Almeida, Fl. Mah. 1: 71. 1996. *P. chinensis* var. *triflora* (L.) Bennett in Hook. f. Fl. Brit. India 1: 204. 1872; Blatt. in J. Bombay Nat. Hist. Soc. 34: 302. 1930.

Notes : Almeida, op. cit. has reported this species for Maharashtra without mentioning the exact locality. Bennett in Hook. f. op. cit. has given the distribution as Western Peninsula. Blatter, op. cit. has given the distribution of this species as S. M. Country: Badami, which is in Karnataka State. This species has not been included by Banerjee in Sharma et al. Fl. India 2: 450–493. 1993.

SALOMONIA Lour. (nom. cons.)

Salomonia ciliata (L.) DC. Prodr. 1: 334. 1824; Bennett in Hook. f. Fl. Brit. India 1: 206. 1872; Banerjee in Sharma et al. Fl. India 2: 490, f. 97. 1993. *Polygala ciliata* L. Sp. Pl. 705. 1753. *Salomonia oblongifolia* DC. Prodr. 1: 334. 1824; Bennett in Hook. f. op. cit. 207. *Polygala canarana* Bennett in Hook. f. op. cit.

Herbs, annual, 10–15 cm high; stems erect, furrowed. Leaves small, c 1.0 x 0.3 cm, sessile, cordate, ciliate. Spikes dense, 5 cm long; flowers sessile, pink; petals lanceolate, ciliate. Capsules 2–celled, broader than long, margins with red filiform teeth. Seeds black, shining, with small membranous strophiole.

Fls. & Frts. : August – December.

Illus. : Wight, Illus. 1: t. 22 B & C 1840 (*S. obovata* Wight); Banerjee in Sharma et al. op. cit.

Distrib. : Rare along streams, Chandrapur; Ratnagiri; Sindhudurg.

XANTHOPHYLLACEAE

(P. Venkanna & P. V. Prasanna)

XANTHOPHYLLUM Roxb. (nom. cons.)

Xanthophyllum bombayanum Chodat in Bull. Herb. Boiss. 4: 263. 1896–1900; Blatt. in J. Bombay Nat. Hist. Soc. 34: 303. 1930.

Trees, 8–12 m high. Leaves c 12 x 6 cm, broadly elliptic, coriaceous, apex acute, secondary nerves ascending. Flowers in racemes, rhachis of racemes stout; sepals pubescent; petals purple; stamens pilose at base, united with petals; ovary stipitate, like style pilose. Capsules broadly ovoid, 3.8 cm broad, subapiculate, rugose with warts.

Fls. & Frts. : March–August.

Notes : Blatter op.cit. gives the distribution of this plant as endemic to Bombay. According to Almeida (Fl. Maharashtra 1: 72. 1996) "Chodat described this species on the basis of the specimen in the Boisser's herbarium at Kew. Boisser's Bombay Plants are collected from Sind (formerly belonging to Bombay Presidency but now in Pakistan). Therefore, this species should be eliminated from list of plants found in Maharashtra State. Banerjee & Balakrishnan in Sharma et al. Fl. India 2: 494–499. 1993 have not mentioned this species.

CARYOPHYLLACEAE

(D. L. Shirodkar)

1. Stipules present :
   2. Styles 5, free; capsules 5–valved ... SPERGULA
   2. Styles 3, fused; capsules 3–valved :
      3. Petals bifid; leaves cordate at base ... DRYMARIA
      3. Petals not bifid; leaves not cordate at base :
         4. Sepals keeled ... POLYCARPON
         4. Sepals not keeled ... POLYCARPAEA
1. Stipules absent :
   5. Sepals free :
      6. Petals entire :
         7. Styles 4 to 5 ... SAGINA
         7. Styles usually 3 ... ARENARIA
      6. Petals bifid :
         8. Styles usually 5 ... CERASTIUM
         8. Styles usually 3 ... STELLARIA
   5. Sepals united :
      9. Styles 3; capsules 3–6–valved ... SILENE
      9. Styles 2; capsules 4–valved ... VACCARIA

ARENARIA L.

Arenaria neelgherrensis Wight & Arn. Prodr. 43: 1834. Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 239.1874; N. C. Majumdar in Sharma et al. Fl. India 2: 513. 1993.

Herbs, annual, much branched, procumbent. Leaves subsessile, obovate or elliptic, obtuse at apex, glabrous. Flowers solitary, axillary or in small terminal cymes with leafy bracts; sepals ovate, acute, scarious margined with dorsal pubescent nerve; petals longer as sepals. Seeds transversly striate.

Fls. & Frts. : June–August.

Illus. : Wight Ic. t. 949. 1845.

Distrib. : Maharashtra (N. C. Majumdar in Sharma et al. op. cit.).

CERASTIUM L.

Cerastium glomeratum Thuill. Fl. Par. ed. 2: 226. 1799; Cooke, Fl. Pres. Bombay 1: 67. 1958 (Repr.); N. C. Majumdar in Sharma et al. Fl. India 2: 523 1993. *C. vulgatum* L. Fl. Suess. ed. 2: 158. 1755 p.p.; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 228. 1874. *C. vulgatum* var. *glomerata* (Thuill.) Edgew. & Hook. f. in Hook. f. op. cit.

Annual herbs, covered with glandular, simple hairs. Leaves sessile or subsessile; lower leaves spathulate; upper ones elliptic or obovate. Flowers white, in corymbose–cymes; sepals hairy, lanceolate, acute; petals equal in length to sepals or a little longer. Capsules longer than sepals. curved upwards, cylindric or conic–ovoid. Seeds tuberculate, yellowish–brown.

Fls. & Frts. : September.

Illus. : Wight, Ic. t. 948. 1845 (*C. vulgatum*).

Distrib. : Rare. Pune.

DRYMARIA Schultes

Drymaria villosa Cham. & Schlect. in Linnaea 5: 232. 1830; N. C. Majumdar in Sharma et al. Fl. India 2: 533. 1993; Pradhan in J. Econ. Tax. Bot. 19: 541, figs. 1–6. 1995.

Annual, prostrate herbs; stems villous or hirsute. Leaves opposite, orbicular. Flowers in paniculate cymes; petals auriculate bifid; stamens 5, connate at base; ovary ovoid to globose; styles 3 fid to half of the length. Seeds tubercled.

Fls. & Frts. : April–October.

Illus. : Pradhan, op. cit.

Distrib. : Rare. Satara.

POLYCARPAEA Lam. (nom. cons.)

Polycarpaea corymbosa (L.) Lam. Encyl. 2: 129. 1797; Edgew. & Hook f. in Hook f. Fl. Brit. India 1: 245. 1874; Cooke, Fl. Pres. Bombay 1: 70. 1958 (Repr.); N.C. Majumdar in Sharma et al. Fl. India 2: 549. 1993. *Achyranthes corymbosa* L. Sp. Pl. 205. 1753.

1. Leaves flat; sepals scarious ... var. *corymbosa*

1. Leaves not flat; sepals reddish–brown ... var. *aurea*

var. **corymbosa.**

Herbs, annual, 15–30 cm tall, dichotomously branched; young branches hoary–tomentose. Leaves whorled, 0.5–1.5 x 0.1 cm, linear. Flowers many, in densely branched, terminal cymes; bracts long; sepals lanceolate, acute, much exceeding the petals and capsules. Capsules 3–valved. Seeds obovoid, tubercled.

Fls. & Frts. : August–February.

Illus. : Wight, Ic. t. 712. 1840–1843; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 46. 1982 *(Polycarpaea corymbosa).*

Distrib. : Common in open areas.

var. **aurea** (Wight & Arn.) Wight, Illus. 2: 44, t. 110. 1850; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 245. 1874; Cooke, Fl. Pres. Bombay 1: 70. 1958 (Repr.); N. C. Majumdar in Sharma et al. Fl. India 2: 551. 1993. *P. aurea* Wight & Arn. in Ann. Nat. Hist. 1, 3: 91. 1839.

Much branched herbs from a woody base branches hoary–tomentose. Flowers in dense, terminal, branched cymes. Capsules 3–valved.

Fls. & Frts. : August–January.

Illus. : Wight, op. cit.

Distrib. : Rare. in rocky crevices. Konkan (Cooke, op. cit.).

POLYCARPON L.

Polycarpon prostratum (Forssk.) Aschers. & Schweinf. in Ost. Bot. Zeitschr. 39: 128. 1889 in Obs.; N. C. Majumdar in Sharma et al. Fl. India 2: 553, f. 114. 1993. *Alsine prostrata* Forssk. Fl. Aeg.–Arab. 207. 1775. *Polycarpon loeflingiae* (Wight & Arn.) Bth. & Hook. f. ex. Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 245. 1874 nom. illeg.; Cooke, Fl. Pres. Bombay 1: 69. 1958 (Repr.).

Herbs, annual or perennial; branches dichotomous, pubescent. Leaves c 1 x 0.1 cm, linear–oblong or spathulate, glabrous or pubescent; stipules scarious. Flowers many, in dichotomous cymes, terminal or axillary, green; bracts ovate, acute; sepals ovate–oblong, acute, keeled on the back; petals shorter than the sepals, truncate, toothed at apex. Capsules thin walled, enclosed in the sepals. Seeds many, sybcylindric, rough, pale brown.

Fls. & Frts. : July–January.

Illus. : Mahesh. Illus. Fl. Delhi f. 20. 1966; Ramam. in Sald. & Nicols. Fl. Hassan Dt. 98, f. 18 B–Ba. 1976; N.C. Majumdar in Sharma et al. op. cit.

Distrib. : Frequent in open areas.

SAGINA L.

Sagina japonica (Swartz) Ohwi in J. Jap. Bot. 13: 438. 1937; T.S. Nayar in J. Econ. Tax. Bot. 5: 1171, f. A–J. 1984; N.C. Majumdar in Sharma et al. Fl. India 2: 558. 1993. *Spergula japonica* Swartz in Ges. Naturf. Freunde Berl. Neue Schr. 3: 164, t. 1–2. 1801. *S. procumbens* sensu Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 243. 1874 p.p. non L. 1753.

Herbs, c 4.5 cm long, slender, erect or rarely ascending. Leaves subulate, c 1 cm long. Flowers c 3 cm across, pentamerous (rarely tetramerous). Capsules c 0.2 cm long, elliptic or ovoid. Seeds reniform, minutely tuberculate, brown.

Fls. & Frts. : October–December.

Illus. : T.S. Nayar, op. cit.

Distrib. : Occasional. Bombay gardens (Cultivated), Satara.

SILENE L.

Silene noctiflora L. Sp. Pl. 419. 1753; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 218. 1874; Cooke, Fl. Pres. Bombay 1: 67. 1958 (Repr.); N. C. Majumdar in Sharma et al. Fl. India 2 : 593. 1993.

Herbs, annual, c 60 cm tall, dichotomously branched. Lower leaves obovate–oblong; upper narrowly lanceolate. Flowers white, few in dichotomous cymes; sepals hairy or viscous, cylindric, inflated, truncate at base; petals white, tinged with rose color from inside. Capsules c 2.5 cm long, ovoid, conical. Seeds globose–reniform, convex on the back, tubercled.

Fls. & Frts. : December–January.

Distrib. : Rare, as weed of cultivation. Pune (Cooke. op.cit.).

Notes : Usually grown as an ornamental.

SPERGULA L.

1.	Flowers white	...	*S. arvensis*
1.	Flowers purple	...	*S. rosea*

Spergula arvensis L. Sp. Pl. 440. 1753; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 243. 1874; Cooke, Fl. Pres. Bombay 1: 69. 1958 (Repr.); N.C. Majumdar in Sharma et al. Fl. India 2: 578, f. 117. 1993.

Herbs, erect, annual, 6–25 cm tall. Leaves whorled, c 4 cm long, linear-subulate, semiterete, spreading. Flowers small, in terminal, forked cymes, white; sepals ovate, obtuse, slightly shorter than the petals. Capsules longer than the sepals, subglobose or globose, opening by 5 valves. Seeds many, tubercled, small, black.

Fls. & Frts. : February–April.

Illus. : Ugemuge, Fl. Nagpur Dt. f. 12. 1986; N.C. Majumdar in Sharma et al. op. cit.

Distrib. : Occasional weed in cultivated fields. Akola, Nagpur, Nanded, Thane.

Spergula rosea Blatt. in J. & Proc. As. Soc. Beng. 26: 341. 1930.

Herbs, annual. Leaves opposite, subulate, stipulate; stipules long-setaceous. Flowers in panicled cymes; sepals ovate, lanceolate acute, unequal; petals long clawed, spathulate or narrowly oblanceolate, obtuse, longer than the sepals, pink in colour; stamens alternate with petals; styles linear; stigma minute. Capsules ovoid–globose to pyriform, 1-celled.

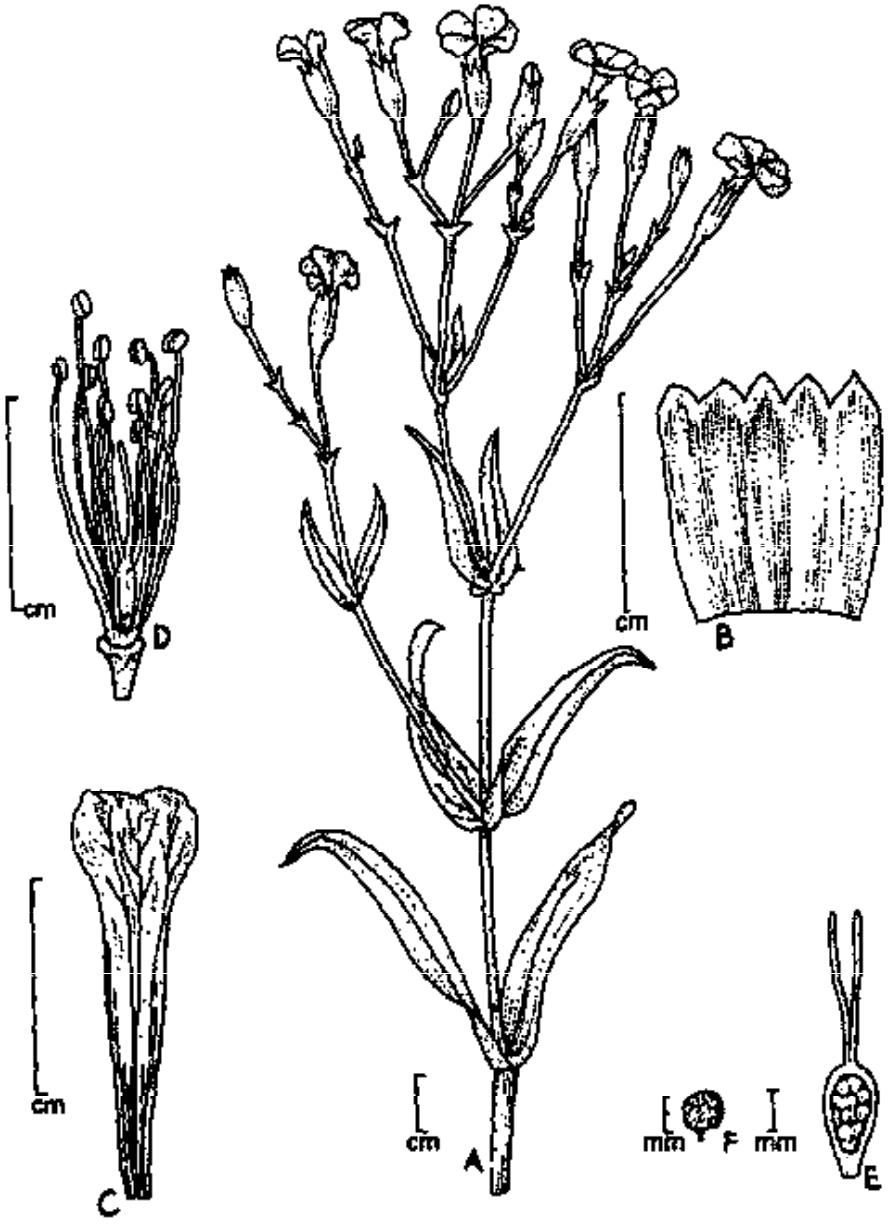
Fls. & Frts. : October.

Distrib. : Rare. Nasik (Blatt. op. cit.).

Notes : Majumdar in Sharma et al. (Fl. India 2: 595. 1993) excluded this species due to the absence of any specimen including the type.

STELLARIA L.

Stellaria media (L.) Vill. Hist. Pl. Dauph. 3: 615. 1789 p.p.; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 230. 1874; Cooke, Fl. Pres. Bombay 1: 68. 1958 (Repr.). *Alsine media* L. Sp. Pl. 272. 1753. p.p.; N. C. Majumdar in Sharma et al. Fl. India 2: 585. 1993.



Spergula arvensis L. : A-Flowering shoot; B-Flower; C-Sepal; D-Petal; E-Stamens; F-Pistil

Herbs, annual c 5 cm long, procumbent, dichotomously branched. Lower leaves ovate, c 2.5 cm long; upper leaves sessile, elliptic–oblong. Flowers white, many, in dichotomous, axillary cymes; sepals lanceolate, subobtuse, hairy or glandular; petals shorter than the sepals or absent. Capsules ovoid, longer than the sepals, 3–valved. Seeds many, tubercled, brown.

Fls. & Frts. : March–April.

Illus. : Wight, Ic. t. 947. 1845 (*Alsine media*); Mahesh. Illus. Fl. Delhi f. 17. 1966.

Distrib. : Occasional. Occuring as weed in cultivation. Pune, Satara, Thane.

VACCARIA Wolf

Vaccaria pyramidata Medik. Phil. Bot. 1: 96. 1789; N.C. Majumdar in Sharma et al. Fl. India 2: 593 f. 118. 1993.*Saponaria vaccaria* L. Sp. Pl. 409. 1753; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 217. 1874; Cooke, Fl. Pres. Bombay 1: 66. 1958 (Repr.). *'Sabani'*.

Herbs, annual, c 60 cm tall, robust. Leaves c 7.0 x 1.5 cm, lower leaves oblong, apex acute; upper leaves oblong–lanceolate, apex acute or acuminate. Flowers in axillary or terminal, corymbose cymes; bracts foliaceous; calyx more or less tubular, ventricose in fruit; petals rosy, obovate, slightly emarginate, claw shortly exserted. Capsules c 1.2 cm long, broadly ovoid, Seeds globose, granulate, black.

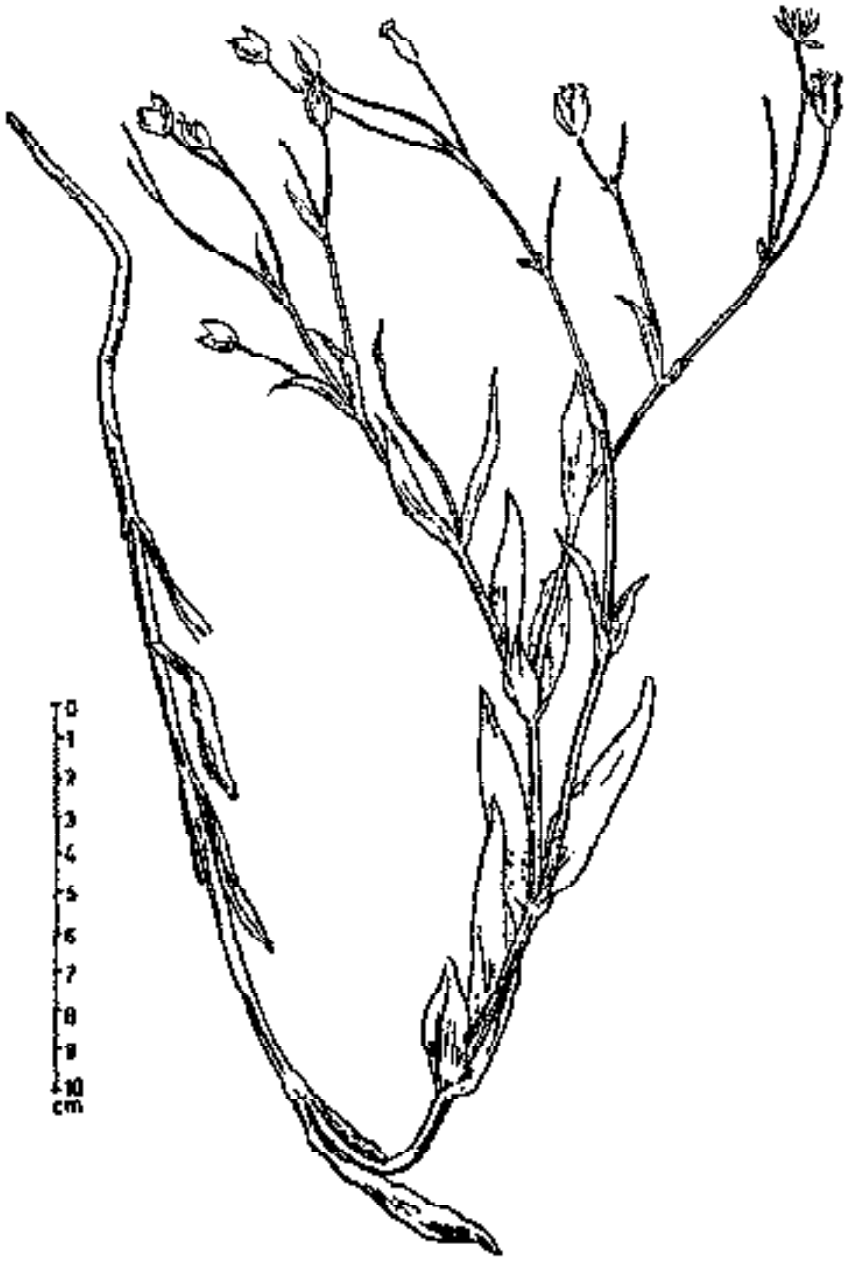
Fls. & Frts. : December–June.

Illus. : Lakshminarasimhan & Sharma, Fl. Nasik Dt. f. 3. 1991; N. C. Majumdar in Sharma et al. op. cit.

Distrib. : Common weed of cultivation. Akola, Aurangabad, Bombay, Kolhapur, Nagpur, Nasik, Osmanabad, Pune, Raigad, Satara, Yavatmal.

CULTIVATED SPECIES :

Dianthus caryophyllus L. Sp. Pl. 411.1753; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 214. 1874; N.C. Majumdar in Sharma et al. Fl. India 2: 528. 1993.



Vaccaria pyramidata Medik.

Herbs, erect, perennial, glabrous; stems stout, jointed. Leaves opposite, channelled, 5–nerved; cauline ones are linear, recurved. Flowers in lax, paniculate cymes, rose–purple or white; calyx cylindrical, smooth, 5–toothed, scarious–winged; petals dentate and crenate. Capsules ovoid. Seeds pyriform, granulate.

Fls. & Frts. : May- June.

Distrib. : Probably a native of S. Europe. Pune, Satara, Sindhudurg.

D. chinensis L. Sp. Pl. 411. 1753; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 215. 1874; N. C. Majumdar in Sharma et al. Fl. India 2: 528, f. 107. 1993. India 1: 213. 1874.

Herbs, erect, perennial; stems branched, tetrangular. Leaves linear–lanceolate, 3–5–nerved; radical ones are long. Flowers solitary or in lax cymes, pink to purple or white; calyx subcylindrical seven nerved; petals serrate, incurved along margins, barbulate. Capsules subsessile, ovoid. Seeds granulate.

Fls. & Frts. : February–March.

Illus. : N. C. Majumdar in Sharma et al. op. cit.

Distrib. : It is a native of East Asia. Planted in gardens. Aurangabad, Nagpur, Osmanabad, Pune.

D. plumarius L. Sp. Pl. 411. 1753; N. C. Majumdar in Sharma et al. Fl. India 2: 527. 1993; Almeida, Fl. Mah. 1: 73. 1996.

Annual herbs, 15–30 cm high, caespitose. Basal leaves 3–10 cm long, narrowly linear, acute, keeled, margins finely serrulate. Flowers rose–pink, 3.5 cm across.

Fls. : August–December.

Distrib. : Cultivated in gardens. Aurangabad (Almeida, op. cit.).

Notes : It is a native of Europe.

Gypsophila paniculata L. Sp. Pl. 407. 1753; Almeida, Fl. Mah. 1: 74. 1996.

Tall, perennial herbs, c 1 m high. Leaves linear–lanceolate, acute at apex, usually single nerved. Flowers small, in many–flowered panicles.

Fls. : March.



Portulaca oleracea L.

Distrib. : Bombay (Almeida op. cit.).

Silene armeria L. Sp. Pl. 420. 1753.

Herbs, erect, annual, glabrous or minutely puberulent. Leaves ovate-lanceolate to oblong, subcordate and clasping at base. Flowers in terminal, peduncled, compound cymes, pink or rose coloured; calyx-club-shaped; petals emarginate, crowned with narrow scales.

Distrib. : A native of S. Europe. Cultivated at Pune.

Notes : N.C. Majumdar in Sharma et. al. Fl. India 2:593. 1993 has excluded this species.

PORTULACACEAE

(K. Madhusudan Rao)

1.	Flowers solitary or fascicled	...	PORTULACA
1.	Flowers in racemes or panicles	...	TALINUM

PORTULACA L.

1.	Nodal appendages present :			
	2.	Leaves opposite:		
		3.	Sepals obtuse at the apex; style thickened at apex	... *P. meridiana*
		3.	Sepals rounded at the apex; style slender 4–fid	... *P. quadrifida*
	2.	Leaves alternate	...	*P. tuberosa*
1.	Nodal appendages absent		...	*P. oleracea*

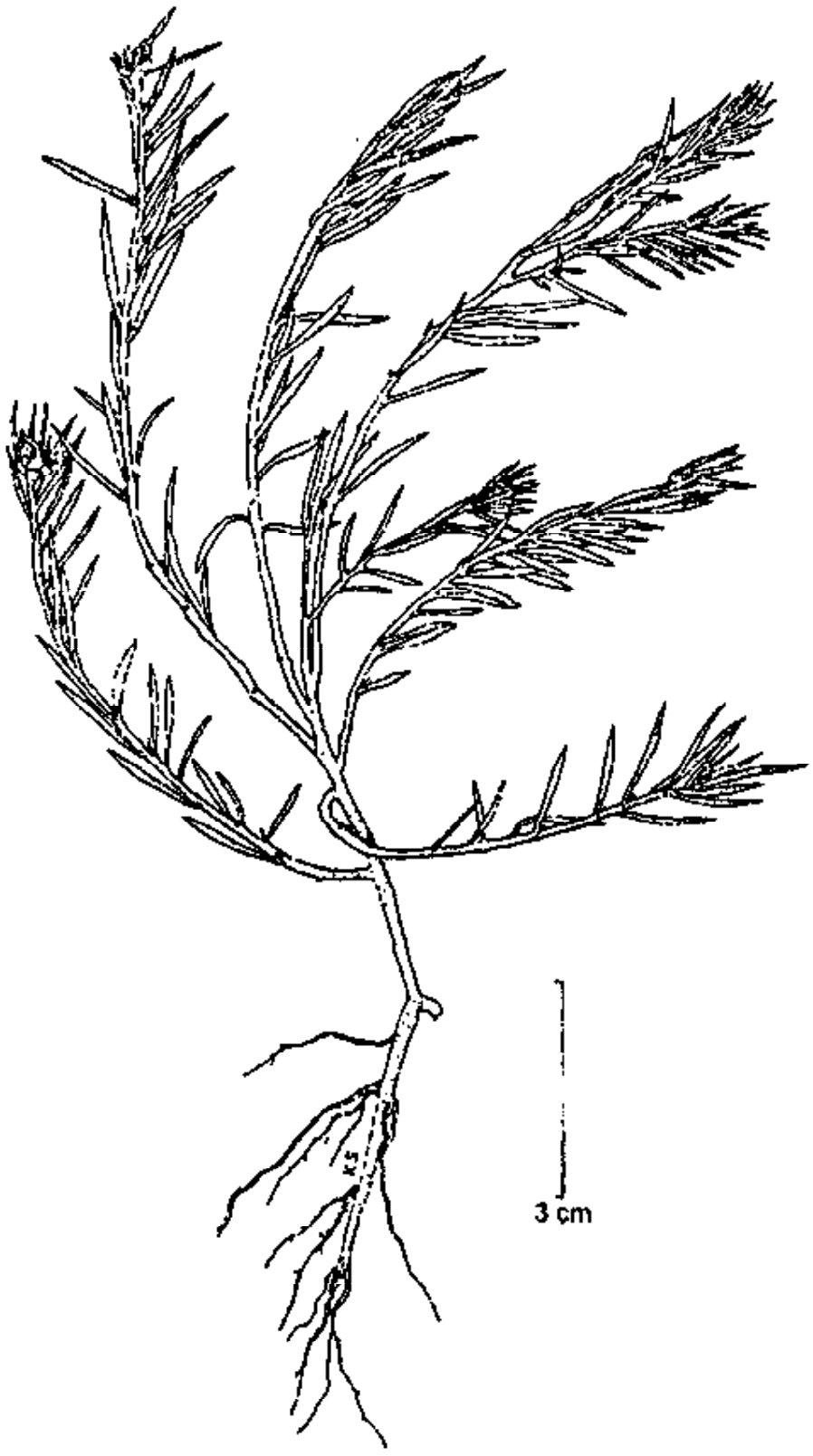
P. meridiana L. f. Suppl. 248. 1871; Almeida, Fl. Mah. 1: 77. 1996.

Annual herbs, prostrate, succulent; stems rooting at nodes. Leaves fleshy, elliptic–lanceolate. Flowers yellow, terminal, solitary, subsessile. Capsules conical–ovoid. Seeds many, reniform, verrucose, tubercles blunt.

Fls. & Frts. : October–December.

Distrib. : Bombay (Almeida, op. cit.).

P. oleracea L. Sp. Pl. 445. 1753; T. Dyer in Hook. f. Fl. Brit. India 1: 246. 1874; Cooke, Fl. Pres. Bombay 1: 72. 1958 (Repr.); Geesink in



Portulaca tuberosa Roxb.

Blumea 17: 292. 1969; M.K.V. Rao in Sharma et al. Fl. India 3: 4, f. 1. 1993. *'Bhuigoli'. 'Kurfah', 'Mhotighol'.*

Succulent herbs. Leaves alternate, opposite, subopposite or whorled, ovate, sessile. Flowers yellow, terminal, solitary or fascicled. Capsules 0.5–0.7 cm long, ovate–oblong. Seeds many, brown, granulate or tuberculate.

Fls. & Frts. : Throughout the year.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 49. 1982; M.K.V. Rao in Sharma et al. op cit.

Distrib. : Very common as a weed in waste places and cultivated fields.

P. quadrifida L. Mant. 1: 73. 1767; T. Dyer in Hook. f. Fl. Brit. India 1: 247. 1874; Cooke, Fl. Pres. Bombay 1: 72. 1958 (Repr.).; Geesink in Blumea 17: 290. 1969; M.K.V. Rao in Sharma et al. Fl. India 3: 6. 1993. *'Bhuichauli', 'Khatechanval', 'Ranghol'.*

Herbs, prostrate; branches radially spreading. Leaves sessile, fleshy. Flowers yellow, terminal. Capsules c 0.4 cm long, ovoid or conical. Seeds brown, horizontally ribbed.

Fls. & Frts. : Throughout the year.

Illus. : Wight, Illus. t. 109. 1850.

Distrib. : Frequent as a weed in waste places and cultivated fields.

P. tuberosa Roxb. Fl. Ind. 2: 464. 1832; T. Dyer in Hook. f. Fl. Brit. India 1: 247. 1874; Cooke, Fl. Pres. Bombay 1: 73. 1958 (Repr.); M.K.V. Rao in Sharma et al. Fl. India 3: 7, f. 2. 1993. *'Jangli–gajar'.*

Herbs, radially spreading. Leaves 1.0–2.5 cm long, sessile, oblong. Flowers yellow, solitary. Capsules ovoid, shining. Seeds blackish–brown, granulate or minutely tubercled.

Fls. & Frts. : August–December.

Illus. : M.K.V. Rao in Sharma et al. op. cit.

Distrib. : Bombay (cultivated in gardens), infrequent along river beds. Dhule, Thane.

TALINUM Adans. (nom. cons.)

Talinum portulacifolium (Forssk.) Aschers. ex Schweinf. in Bull. Herb. Boiss. 4. Append. 2: 172. 1896; M.K.V. Rao in Sharma et al. Fl. India 3: 9. 1993. *Orygia portulacifolia* Forssk. Fl. Aeg.–Arab. 103. 1775. *Talinum cuneifolium* (Vahl) Willd. Sp. Pl. 2: 864. 1799; T. Dyer in Hook. f. Fl. Brit. India 1: 247. 1874; Cooke, Fl. Pres. Bombay 1: 73. 1958 (Repr.).

Herbs; branches slender. Leaves 2.0–4.5 x 1.0–2.5 cm, fleshy, obovate. Flowers purple, in panicles. Capsules 0.6–0.8 cm broad, round. Seeds compressed, ribbed.

Fls. & Frts. : November–January.

Distrib. : Frequent on hill tops. Bombay, Pune, Satara.

CULTIVATED SPECIES :

Portulaca pilosa L. Sp. Pl. 1 : 445. 1753; Geesink in Blumea 17 : 295. 1969. *P. pilosa* var. *hortualis* Bailey, Man. Cult. Pl. 365. 1949; Naik, Fl. Osmanabad 45. 1979.

subsp. **pilosa.**

Herbs, 10–20 cm long, spreading, densely hairy at nodes. Leaves sub-terete, lanceolate, 0.5–1.0 cm long. Flowers pink, solitary, terminal. Capsules ovoid. Seeds black. striate.

Fls. & Frts. : October–December.

Distrib. : Aurangabad, Osmanabad, Parbhani.

subsp. **grandiflora** (Hook) Geesink in Blumea 17 : 297. 1969. *P. grandiflora* Hook. in Bot. Mag. n. s. 3 : t. 2885. M. K. V. Rao in Sharma et al. 3 : 3. 1993. *P. pilosa* ssp. *grandiflora* (Hook) Geesink in Blumea 17: 297. 1969 & in Steenis, Fl. Males. 1, 7: 131. 1971.

Herbs, prostrate or ascending. Leaves 2.5 cm long, terete, scattered. Flowers 2.5 cm across. Capsules thin, ovoid or conical. Seeds minute, tuberculate, reniform.

Fls. & Frts. : Throughout the year.

Illus. : Bailey, Man. Cult. Pl. 364, f. 6. 1949.

Distrib. : Cultivated as ornamental herb.

TAMARICACEAE

(K. Madhusudan Rao)

TAMARIX L.

1. Flowers unisexual ... *T. dioica*
1. Flowers bisexual :
   2. Stamens 5 :
      3. Flowers usually in interrupted spikes ... *T. aphylla*
      3. Flowers in racemose panicles ... *T. indica*
   2. Stamens 10 ... *T. ericoides*

Tamarix aphylla (L.) Karst. Deutsch. Fl. 641. 1880–1883; Shetty & Pandey in Sharma et al. Fl. India 3: 22. 1993; Almeida, Fl. Mah. 1 : 80. 1996. *Thuja aphylla* L. Cent. Pl. 1: 32. 1756 p.p. *Tamarix articulata* Vahl, Symb. Bot. 2: 48, t. 32. 1791 nom. illeg.; T. Dyer in Hook. f. Fl. Brit. India 1: 249. 1874; Cooke, Fl. Pres. Bombay 1: 75. 1958 (Repr.).

Trees, 4–6 m tall with reddish or dark–purple, rough bark. Leaves minute, reduced to sheath, free part triangular. Flowers pale to brightrosy–purple, in 10–15 cm long panicles. Capsules long, conical, glabrous.

Fls. & Frts. : August–September.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 51. 1982.

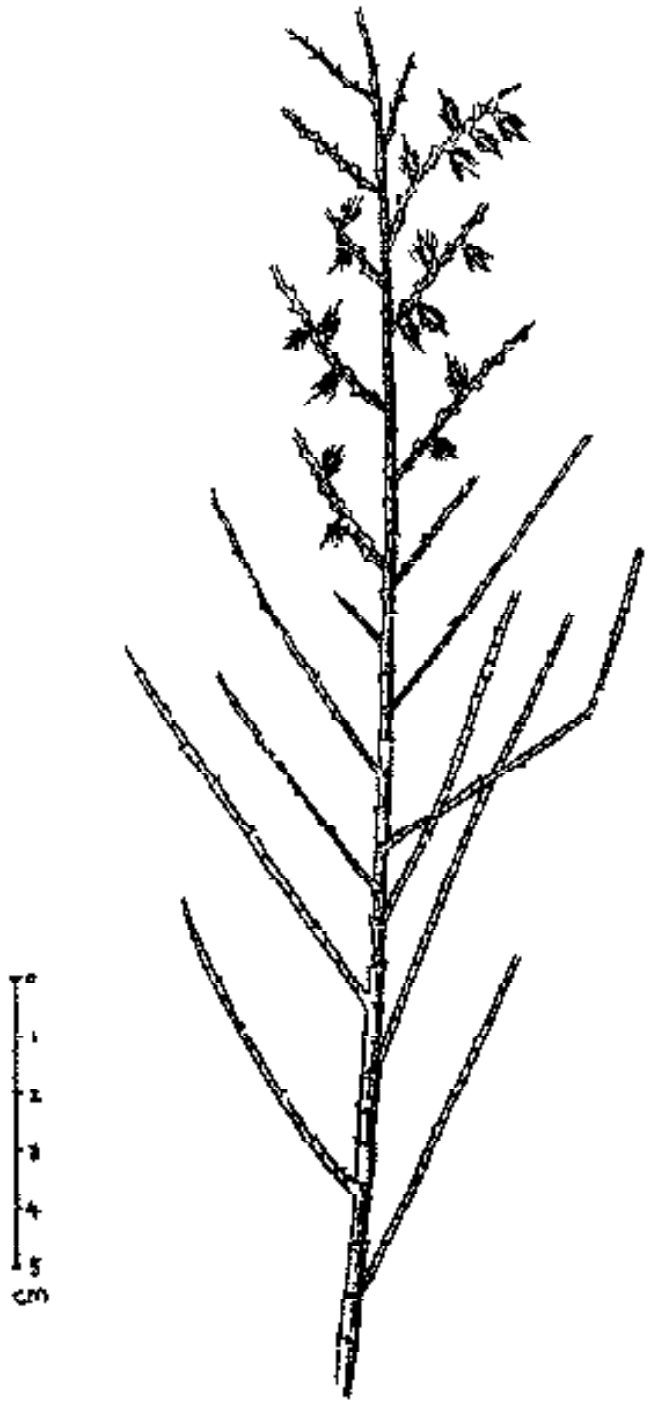
Distrib. : Bombay (Cultivated tree, on alluvial sandy soils), Marathwada (Almeida, op. cit.).

T. dioica Roxb. ex. Roth, Nov. Pl. Sp. 185. 1821; T. Dyer in Hook. f. Fl. Brit. India 1: 249. 1874; Cooke, Fl. Pres. Bombay 1: 75. 1958 (Repr.); Shetty & Pandey in Sharma et al. Fl. India 3: 24. 1993. *'Gaz', 'Jhau', 'Lal Jhau'.*

Trees, 3–6 m tall. Leaves minute, scaly, sheathing. Flowers bright rosy–purple, 0.2–0.3 cm across, in racemes, spirally arranged on rhachis. Capsules 3.5–5.0 mm long, oblong, with persistent sepals, staminodes and subpersistent petals.

Fls. & Frts. : April–August.

Illus. : Mahesh. Illus. Fl. Delhi f. 21. 1966.



Tamarix indica Willd.

Distrib. : Frequent along river beds. Dhule, Marathwada, Ratnagiri, Thane.

T. ericoides Rottl. in Ges. Naturf. Fr. Berl. Neue Schr. 4: 214. 1803; T. Dyer in Hook. f. Fl. Brit. India 1: 249. 1874; Cooke, Fl. Pres. Bombay 1: 76 1958 (Repr.); Shetty & Pandey in Sharma et al. Fl. India 3: 25. 1993. *'Jhau', 'Kada', 'Sarat', 'Sarub', 'Sherni'.*

Bushy shrubs, 1.5–2.5 m tall; bark cracked. Leaves minute, scaly, ovate. Flowers pale to bright rosy in 2.5 cm long, terminal, branched spikes. Capsules 0.5–1.0 cm long, beaked, pale brown. Seeds oblong with pale white hairs.

Fls. & Frts. : October–February.

Illus. : Wight, Ic. t. 22. 1838; Talb. For. Fl. Bombay Pres. & Sind 1: 87, f. 56. 1909.

Distrib. : Common along wet beds of rivers.

T. indica Willd. in Ges. Naturf. Freunde Berlin Neue Schr. 4: 214. 1803; Shetty & Pandey in Sharma et al. Fl. India 3: 25, f. 8. 1993; Almeida, Fl. Mah. 1: 81. 1996. *T. gallica* var. *indica* (Willd.) Ehrenb. in Linnaea 2: 276. 1827; T. Dyer in Hook. f. Fl. Brit. India 1: 248. 1874; Cooke, Fl. Pres. Bombay 1: 75. 1958 (Repr.). *T. gallica* auct. non L. 1753; T. Dyer in Hook. f. Op. cit. *T. troupii* Hole in Indian Forester 45: 247. 1919. *'Jhau', 'Jhau rajhad', 'Lai'.*

Trees or shrubs, 3–4 m tall; bark rough. Leaves 0.1 cm long, triangular, acuminate at apex. Flowers rose coloured, 0.2–0.25 cm across, in terminal, 10–18 cm long spikes. Capsules 0.25–0.35 cm long, ovoid. Seeds densely hairy at apex.

Fls. & Frts. : August–March.

Distrib. : Rare along stream banks. Bombay; Khandesh & Thane (Almeida, op. cit.), Yavatmal.

ELATINACEAE

(Archana Godbole & Sujit Kumar Das Das)

1. Plants erect; flowers fascicled, pentamerous; sepals with a strong midrib ... BERGIA

1. Plants prostrate; flowers solitary, trimerous; sepals not as above ... ELATINE

BERGIA L.

1. Plants glandular–pubescent :
   2. Flowers 2–8 in cymes; stamens 10 ... *B. suffruticosa*
   2. Flowers few to many in axillary fascicles; stamens usually 5 ... *B. ammannioides*
1. Plants glabrous or nearly so :
   3. Herbs; stipules eglandular ... *B. capensis*
   3. Undershrubs; stipules glandular ... *B. aestivosa*

Bergia aestivosa Wight & Arn. Prodr. 41. 1834; T. Dyer in Hook. f. Fl. Brit. India 1: 251. 1874; Pardeshi & Pokle in Bull. Bot. Surv. India 16: 162. 1977; J. Bhattacharya in Sharma et al. Fl. India 3: 33. 1993. *Elatine aestivosa* (Wight & Arn.) Wight, Ic. t. 222. 1839.

Under shrubs, c 1 m tall, glandular–pubescent. Leaves subsessile, often fascicled in axils, oblong–lanceolate to elliptic, apex obtuse, glandular on both sides; stipules linear. Flowers solitary or in axillary fascicles of 2 to 6 or 8; pedicels as long as sepals; sepals obovate, acute; petals obovate–oblong, entire; anther filaments dilated below. Capsules 5–celled. Seeds minute, slightly curved, dark brown, shining.

Fls. & Frts. : October–November.

Illus. : Wight, op. cit.

Distrib. : Infrequent along the river banks. Aurangabad (Pardeshi & Pokle, op. cit.).

B. ammannioides Roxb. ex Roth, Nov. Pl. Sp. 219. 1821;T. Dyer in Hook. f. Fl. Brit. India 1: 251. 1874; Cooke, Fl. Pres. Bombay 1: 77. 1958 (Repr.); Ramam. in Sald. & Nicols. Fl. Hassan Dist. 122, f. 25. 1976; J. Bhattacharya in Sharma et al. Fl. India 3: 33. 1993.

Herbs, erect annuals, 10–30 cm tall, often with decumbent branches, glandular–hairy. Leaves 1–2 x 0.2–0.7 cm, elliptic–lanceolate. Flowers minute, red, in dense axillary clusters. Capsules dark red, 5–valved. Seeds numerous, pale brown.

Fls. & Frts. : November–February.

Illus. : Ic. Roxb. 1, t. 11. 1964 (Repr. ed.); Mahesh. Illus. Fl. Delhi f. 22. 1966; Ramam. in Sald. & Nicols. op.cit.; Matthew Illus. Fl. Tamilnadu Carnatic 2: t. 52. 1982.

Distrib. : Common weed of harvested rice fields.

B. capensis L. Mant. 2: 241. 1771; Cooke Fl. Pres. Bombay 1: 78. 1958 (Repr.); Subr. Aqu. Ang. 10, f. 6. 1962; J. Bhattacharya in Sharma et al. Fl. India 3: 34, f. 11. 1993. *B. verticillata* Willd. Sp. Pl. 2: 770. 1779;T. Dyer in Hook. f. Fl. Brit. India 1: 252. 1874.

Herbs, succulent, c 30 cm high; stems pink, rooting from lower nodes. Leaves elliptic–lanceolate, narrowed at both ends; stipules triangular, acute. Flowers in few to many–flowered, axillary clusters. Capsules globose, 5–valved, apiculate. Seeds minute, transversly rugose, dark brown.

Fls. & Frts. : October.

Illus. : Subr, op. cit.; J. Bhattacharya in Sharma et al. op. cit.

Distrib. : Occassional along margins of tanks and harvested rice fields. Bombay, Nanded, Raigad, Ratnagiri, Sindhudurg.

B. suffruticosa (Del.) Fenzl, Denksch. Bot. Ges. 3: 183. 1841; J. Bhattacharya in Sharma et al. Fl. India 3: 36. 1993; Naik, Fl. Marathwada 1 : 129. 1998. *Lancretia suffruticosa* Del. Fl. Egypt. 69, t. 25. 1812. *Bergia odorata* Edgew. in J. Asiat. Soc. Bengal 7: 765. 1838; T. Dyer in Hook. f. Fl. Brit. India 1: 251. 1874; Cooke, Fl. Pres. Bombay. 1: 77. 1958 (Repr.).

Shrubs, aromatic, decumbent, with opposite branches. Leaves 5–18 x 2–10 mm, elliptic–ovate or oblong–lanceolate, narrowed at base, obtuse or subacute at apex, crenate or serrulate, densely pubescent; stipules linear–lanceolate. Flowers whitish–pink; pedicels 1.0–1.5 mm long; sepals 2–8 x 3.5 mm, ovate–oblong, acute, pubescent; petals as long as or slightly longer than sepals, obovate–oblong, obtuse; filaments dilated at base. Capsules ovoid, whitish–pink. Seeds numerous, minute, oblong–ellipsoid.

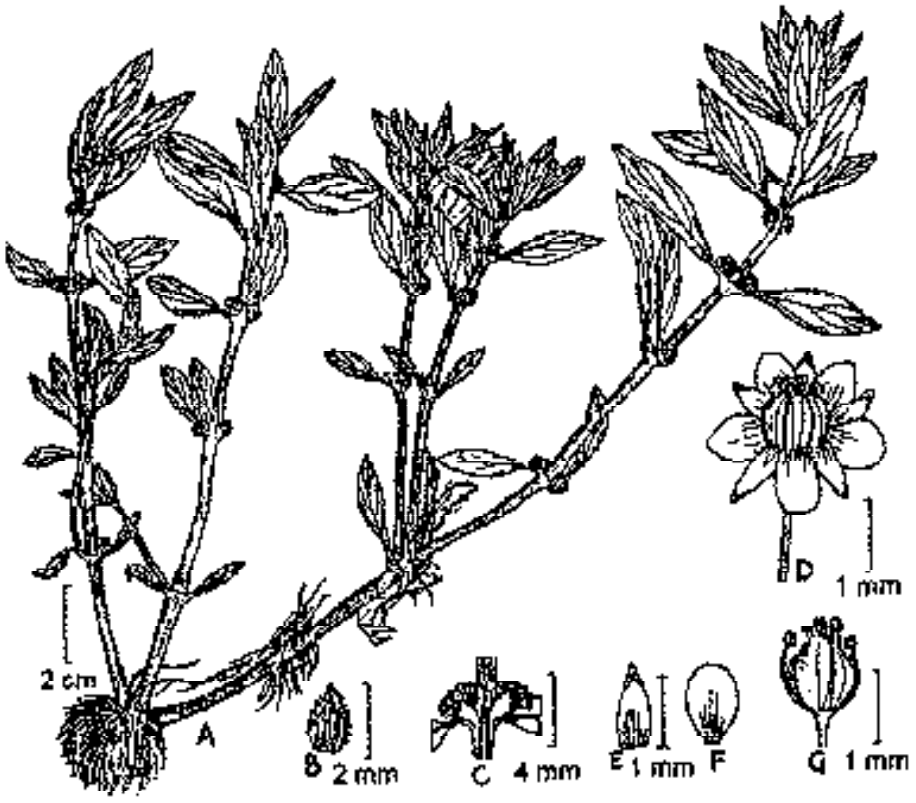
Fls. & Frts. : October–February.

Distrib. : Rare along river banks or in sandy beds. Aurangabad, Nanded & Parbhani (Naik, op. cit.).

ELATINE L.

1. Flowers sessile; stamens longer than sepals ... *E. triandra*
1. Flowers subsessile or pedicelled; stamens shorter than sepals ... *E. ambigua*

Elatine ambigua Wight in Hook. Bot. Misc. 2: 103, Suppl. t. 5. 1831; T. Dyer in Hook. F. Fl. Brit. India 1: 251. 1874; B.M. Sharma in Ind. J. For. 12: 236; f. A–E. 1989; J. Bhattacharya in Sharma et al. Fl. India 3: 39, f. 13. 1993.



Bergia capensis L. : A-Habit; B-Stipule; C-Nodal part of branch showing inflorescences; D-Flower; E- Sepal; F-Petal; G-Flower with sepals and petals removed

Herbs, prostrate, 1–4 cm high; stems terete, rooting at nodes. Leaves 2–5 x 0.5–2 mm, elliptic to oblong–lanceolate, narrowed into a flattened short petiole at base, obtuse at apex; stipules 1 mm long, ovate–triangular, acute. Flowers axillary, solitary at alternating nodes; sepals 3, 0.5–1 mm long, oblong; petals 3, 1.5 x 1 mm, ovate–oblong; stamens 3; ovary 3–loculed. Capsules globose. Seeds oblong, with hexagonal reticulations.

Fls. & Frts. : February–April.

Illus. : B.M. Sharma, op. cit.; J. Bhattacharya in Sharma et al. op. cit.

Distrib. : Maharashtra (J. Bhattacharya in Sharma et al. op. cit.).

Elatine triandra Schk. Bot. Handb. 1: 345, t. 109 b, f. 3. 1791; Subr. Aqu. Ang. 10. 1962; J. Bhattacharya in Sharma et al. Fl. India 3: 42, f. 14. 1993. *E. americana* Arn. in Edinb. J. Nat. Sci. 1: 431. 1830; T.Dyer in Hook. f. Fl. Brit. India 1: 250. 1874.

Herbs, prostrate, with ascending branches. Leaves 0.5–1.0 cm long, opposite, ovate–lanceolate, minutely scabrid; stipules scarious, acute. Flowers minute; petals twice as long as sepals. Capsules c 2 mm across, depressed, subglobose. Seeds 10–12, slightly curved.

Fls. & Frts. : August–October.

Illus. : J. Bhattacharya in Sharma et al. op cit.

Distrib. : Rare, submerged, creeping hydrophyte in tanks. Pune.

HYPERICACEAE

(M.J. Kothari)

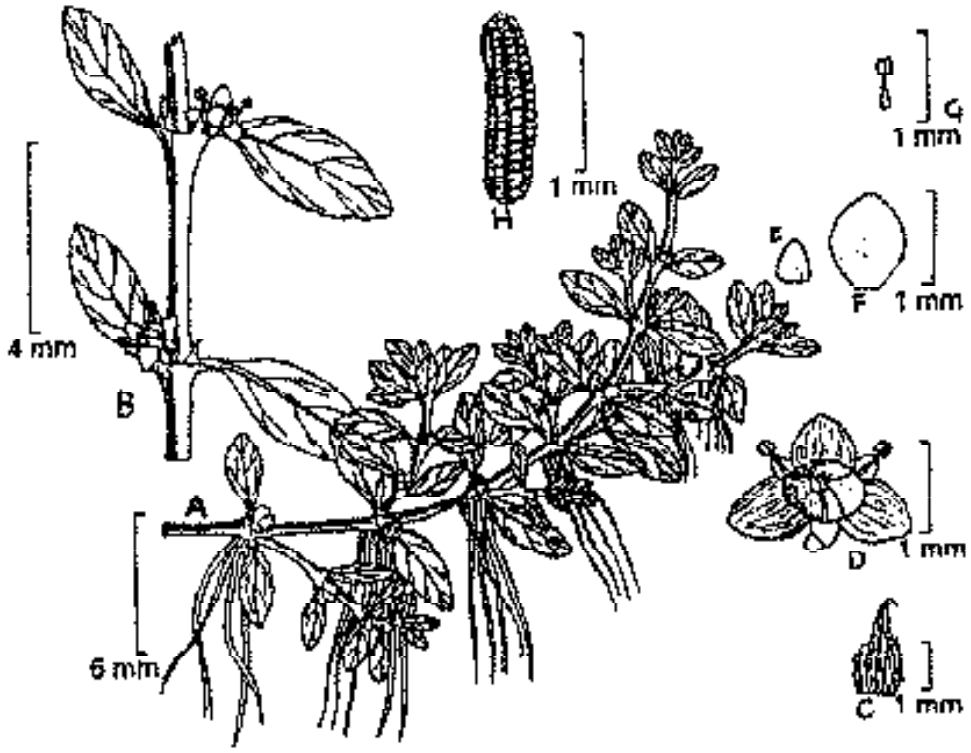
HYPERICUM L.

1. Shrubs; flowers large, 3.5–8.0 cm across, showy ... *H. mysurense*

1. Herbs; flowers small, 8–10 mm across ... *H. japonicum*

Hypericum japonicum Thunb. ex. Murr. Syst. Veg. ed. 14: 702. 1784; T. Dyer in Hook. f. Fl. Brit. India 1: 256. 1874; Cooke, Fl. Pres. Bombay 1: 79. 1958 (Repr.); Robson in Bull. Br. Mus. Nat. Hist. (Bot.) 20: 122. 1990; S.N. Biswas in Sharma et al. Fl. India 3: 69, f. 25. 1993.

Annual herbs, 6–30 cm high, rooting at nodes, dichotomously branched. Leaves sessile, 3–9 x 1–5 mm, elliptic–ovate or oblanceolate, obtuse–rounded at apex, cordate–amplexicaul to attenuate at base,



Elatine triandra Schkuhr : A-Habit; B-Part of branch showing flowering nodes; C-Stipule; D-Flower; E-Sepal; F-Petal; G-Stamen; H-Seed.

pellucid punctate along margins. Flowers yellow, 1–many, in dichasial or monochasial cymes; sepals and petals persistent. Capsules c 4 mm long, ovoid. Seeds oblong.

Fls. : Almost throughout the year; *Frts.* : November–February.

Illus. : S.N. Biswas in Sharma et al. op. cit.

Distrib. : Maharashtra (S.N. Biswas in Sharma et al. op. cit.).

H. mysurense Wall. ex Wight & Arn. Prodr. 99. 1834; T. Dyer in Hook. f. Fl. Brit. India 1: 253. 1874 (*'mysorense'*); Cooke, Fl. Pres. Bombay 1: 79. 1958 (Repr.); Robson in Bull. Br. Mus. Nat. Hist. (Bot.) 12: 210. 1985; S.N. Biswas in Sharma et al. Fl. India 3: 71, f. 26. 1993. *Norysca mysorensis* (Wight & Arn.) Wight Ic. t. 56. 1838.

Much branched shrubs, 1.2–2.5 m high. Leaves many, decussate, oblong–lanceolate, apex acute, amplexicaul at base. Flowers 1–3, bright golden–yellow, in terminal cymes. Capsules 5–valved with long beaks. Seeds cylindric oblong.

Fls. & Frts. : Throughout the year.

Illus. : Wight, Ic. op. cit. (*Norysca mysorensis*); S.N. Biswas in Sharma et al. op. cit.

Distrib. : Rare on hills in 'Konkan' (Cooke op. cit.).

CULTIVATED SPECIES :

H. monogynum L. Sp. Pl. ed. 2, 1107. 1763; S.N. Biswas in Sharma et al. Fl. India 3: 84. 1993; Almeida, Fl. Mah.1: 84. 1996. *H.salicifolium* Siev. & Zucc. Abb. Acad. Manh 4 (2): 162. 1843; T. Dyer in Hook. f. Fl. Brit. India. 1: 253. 1874.

Shrubs c 60 cm tall. Leaves sessile, elliptic, obtuse at apex, minutely pellucid–punctate. Flowers c 5 cm across, yellow.

Fls.: January.

Distrib. : Cultivated in gardens. Bombay (Almeida, op. cit.).

CLUSIACEAE (GUTTIFERAE)

(Archana Godbole & Sujit Kumar Das Das)

1. Lateral veins reticulate; stigmas sessile or subsessile :

   2. Plants with yellow or reddish juice; flowers yellow or green ... GARCINIA

2.	Plants without yellow or reddish juice; flowers white to pale purple	...	MAMMEA
1.	Lateral veins parallel; stigmas on slender styles :		
3.	Leaves glaucous beneath; flowers 2–8 cm across	...	MESUA
3.	Leaves not as above; flowers *c* 1.5 cm across	...	CALOPHYLLUM

CALOPHYLLUM L.

1.	Branchlets terete; flowers 1.0 to 1.5 cm across; petals present	...	*C. inophyllum*
1.	Branchlets 4–angled; flowers 0.6–0.8 cm across; petals absent	...	*C. apetalum*

Calophyllum apetalum Willd. Ges. Naturf. Fr. Berl. Mag. Neu. 5: 79. 1811; N.P. Singh in Sharma et al. Fl. India 3: 88. 1993. *C. wightianum* Wall. ex Planch. & Triana in Ann. Sci. Nat. Bot. 4, 15: 256. 1861; T. And. in Hook. f. Fl. Brit. India 1: 274. 1874; Cooke. Fl. Pres. Bombay 1: 86. 1958 (Repr.). *'Bobbi', 'Irai'.*

Trees with yellowish bark. Leaves c 10 x 4 cm, oblong–obovate, coriaceous, obtuse or retuse at apex, rounded at base. Flowers white, in axillary racemes, up to 6.5 cm long; sepals 4, biseriate, petaloid, orbicular. Drupes 1.5 cm long, ellipsoid, red on maturity.

Fls. & Frts. : December.

Illus. : Wight, Ic. t. 106. 1839 *(C. decipiens);* Bedd. Fl. Sylv. t. 90. 1871 (*Calophyllum wightianum*).

Distrib. : Found along river banks in semi–evergreen forests, uncommon. Ratnagiri, Sindhudurg.

C. inophyllum L. Sp. Pl. 513. 1753; T. And. in Hook. f. Fl. Brit. India 1: 273. 1874; Cooke, Fl. Pres. Bombay 1: 84. 1958 (Repr.); N.P. Singh in Sharma et al. Fl. India 3: 92. 1993. *'Surangi', 'Undi', 'Wumaka'.*

Trees with grey, smooth bark. Leaves c 15 x 10 cm, oblong–elliptic, coriaceous, obtuse or retuse at apex, rounded at base; petioles c 2 cm long. Flowers in axillary racemes, up to 15 cm long; pedicels c 3.2 cm long; sepals 4; petals 4, orbicular, white; stamens numerous. Drupes globose, 3 cm across, smooth, yellow on maturity.

Fls. & Frts. : December–January.

Illus. : Wight, Illus. t. 77. 1840.

Distrib. : Common along sandy shores.

GARCINIA L.

1. Flowers pentamerous:
   2. Leaves more than thrice as long as broad, more then 20 cm long ... *G. xanthochymus*
   2. Leaves less than twice as long as broad and less than 15 cm long :
      3. Flowers less than 1.2 cm across ... *G. spicata*
      3. Flowers more than 1.6 cm across ... *G. talbotii*
1. Flowers tetramerous :
   4. Fruits 6–8–grooved; ovary 8–11–locular ... *G. gummi–gutta*
   4. Fruits smooth; ovary 4–8–locular ... *G. indica*

Garcinia gummi–gutta (L.) Robson in Brittonia 20: 103. 1968; N.P. Singh in Sharma et al. Fl. India 3: 109. 1993. *Cambogia gummi–gutta* L. Gen. Pl. ed. 5, 522. 1754. *Garcinia cambogia* (Gaertn.) Desr. in Lam. Encyl. 3: 701. 1792; T. And. in Hook. f. Fl. Brit. India 1: 261. 1874; Cooke, Fl. Pres. Bombay 1: 81. 1958 (Repr.); Mahesh. in Bull. Bot. Surv. India 6: 128. (1964) 1965.

1. Stamens 15–20; ovary 8–10–locular ... var. *gummi–gutta*
1. Stamens c 35; ovary 4–locular ... var. *conicarpa*

var. **gummi–gutta**.*'Dharambe'*.

Trees, up to 20 m tall. Leaves 7–12 x 2–5 cm, elliptic–lanceolate or oblong, obtuse or acute at apex, cuneate at base. Male flowers 3–5 in short axillary fascicles; stamens inserted on a prominent receptacle, forming a globular head. Female or bisexual flowers larger than male, 1–3 in terminal and axillary fascicles; staminodes subequidistant, connate at base or grouped in fascicles; stigmatic rays 8–10, linear. Berries globose, 6–8–grooved, grooves ending about the middle, 6–8–seeded.

Fls. & Frts. : January–May.

Illus. : Bedd. Fl. Sylv. t. 121. 1839 *(Garcinia cambogia)*; Talb. For. Fl. Bombay Pres. & Sind 1: 92, f. 48. 1909.

Distrib. : Occasional in semi–evergreen to evergreen forests of Western Ghats at 400–900 m. Bombay, 'Konkan' (Cooke op. cit.).

var. **conicarpa** (Wight) N.P. Singh in Sharma et al. Fl. India 3: 110. 1993. *G. conicarpa* Wight, Ic. t. 121. 1839 & Illus. 1: 125. 1840. *G.*

cambogia var. *conicarpa* (Wight) T. And. in Hook. f. Fl. Brit. India 1: 262. 1874. *G. darwiniana* Keshav. et al. in Curr. Sci. 56: 425, f. 3. 1987.

Leaves broader beyond the middle or linear–oblong or lanceolate–oblong. Stamens inserted on a short, convex torus; filaments short; rudimentary pistil absent; stigmatic rays 4, grooved on the top. Berries ovoid or conical, 4–grooved, 4–seeded with angular furrows.

Fls. & Frts. : March–January.

Illus. : Wight, op. cit.; Keshav. et al. op. cit.

Distrib. : Maharashtra (N.P. Singh in Sharma et al. op. cit.).

G. indica (Du Petit–Thou.) Choisy in DC. Prodr. 1: 561. 1824; T. And. in Hook. f. Fl. Brit. India 1: 261. 1874; Cooke, Fl. Pres. Bombay 1: 80. 1958 (Repr.); Mahesh. in Bull. Bot. Surv. India 6: 127. (1964) 1965; N.P. Singh in Sharma et al. Fl. India 3: 113. 1993. *Brindonia indica* Du Petit–Thou. in Dict. Sci. Nat. 5: 339. 1804. *'Amsol', 'Bhinda', 'Bhiran', 'Bhirand', 'Katambi', 'Kokam', 'Kokambi', 'Ratamba'.*

Trees, 10–20m tall; branches drooping. Leaves c 10 x 5 cm, ovate–oblong, elliptic–lanceolate, red when young, acute or abruptly acuminate at apex, narrowed at base; petioles 0.7 cm long. Flowers axillary or terminal, solitary or fascicled; male flowers 4–8; outer sepals smaller than inner; stamens on a short column, anthers 2–celled, dehiscing longitudinally; female flowers usually solitary; terminal staminodes c 20 in phalanges; stigma 4–8–rayed. Berries globose, 3 cm across, orange–pink when ripe. Seeds 5–8, compressed.

Fls. & Frts. : November–February.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 91, f. 57. 1909.

Distrib. : Frequent in evergreen and deciduous forests along coast and windward side of Western Ghats (up to 400 m). Amravati, Bombay, Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

G. spicata (Wight & Arn.) Hook. f. in J. Linn. Soc. 14: 486. 1875; Cooke Fl. Pres. Bombay 1: 83. 1958 (Repr.); Mahesh. in Bull. Bot. Surv. India 6: 112. (1964) 1965; N.P. Singh in Sharma et al. Fl. India 3: 125. 1993. *Xanthochymus spicatus* Wight & Arn. Prodr. 1: 102. 1834. *Garcinia ovalifolius* var. *spicata* (Wight & Arn.) T. And. in Hook. f. Fl. Brit.. India 1: 269. 1874 non Oliver, 1868. *'Haldi', 'Jangli–ramphal', 'Tavir'.*

Trees, 8–15 m tall; branches angular. Leaves broadly elliptic–oblong, coriaceous, apex obtuse or retuse, rarely subacute; lateral veins c 18 pairs, prominent on both surfaces. Male flowers in axils of fallen leaves; sepals orbicular, ciliate; stamens opposite to petals. Female flowers in fascicles; staminodes 5; ovary 3–4–locular, stigma 5–lobed. Berries oblong, smooth, dark green, 1–3–seeded.

Fls. & Frts. : March–May.

Distrib. : Rare in semi–evergreen forests. Ahmednagar, Ratnagiri, Sindhudurg.

G. talbotii Raiz. ex Sant. in Rec. Bot. Surv. India 16. (1): 14. 1960; Mahesh. in Bull. Bot. Surv. India 6: 113. (1964) 1965; N.P. Singh in Sharma et al. Fl. India 3: 127. 1993. *G. ovalifolius* var. *macrantha* T. And. in Hook. f. Fl. Brit. India. 1: 269. 1874. *G. spicata* var. *macrantha* T. Cooke, Fl. Pres. Bombay 1: 79. 1901 [1: 83. 1958 (Repr.)]. *'Limboi', 'Pansara', 'Tavir'.*

Trees, 5–10 cm high; branchlets angular. Leaves c 14 x 7 cm, coriaceous, broadly oblong, obtuse, rounded at base; lateral nerves 16–18 pairs, prominent on both surfaces, anastomosing; petioles c 1.5 cm long. Male flowers in congested short fascicles, 1.8 cm across; sepals and petals 5 each, greenish–white; stamens in 5 phalanges, antipetalous, anthers 2–celled. Female flowers in fascicles; ovary globose, 3–4–locular, stigma 3–lobed, spreading. Beries 4–6 cm across. oblong, yellow.

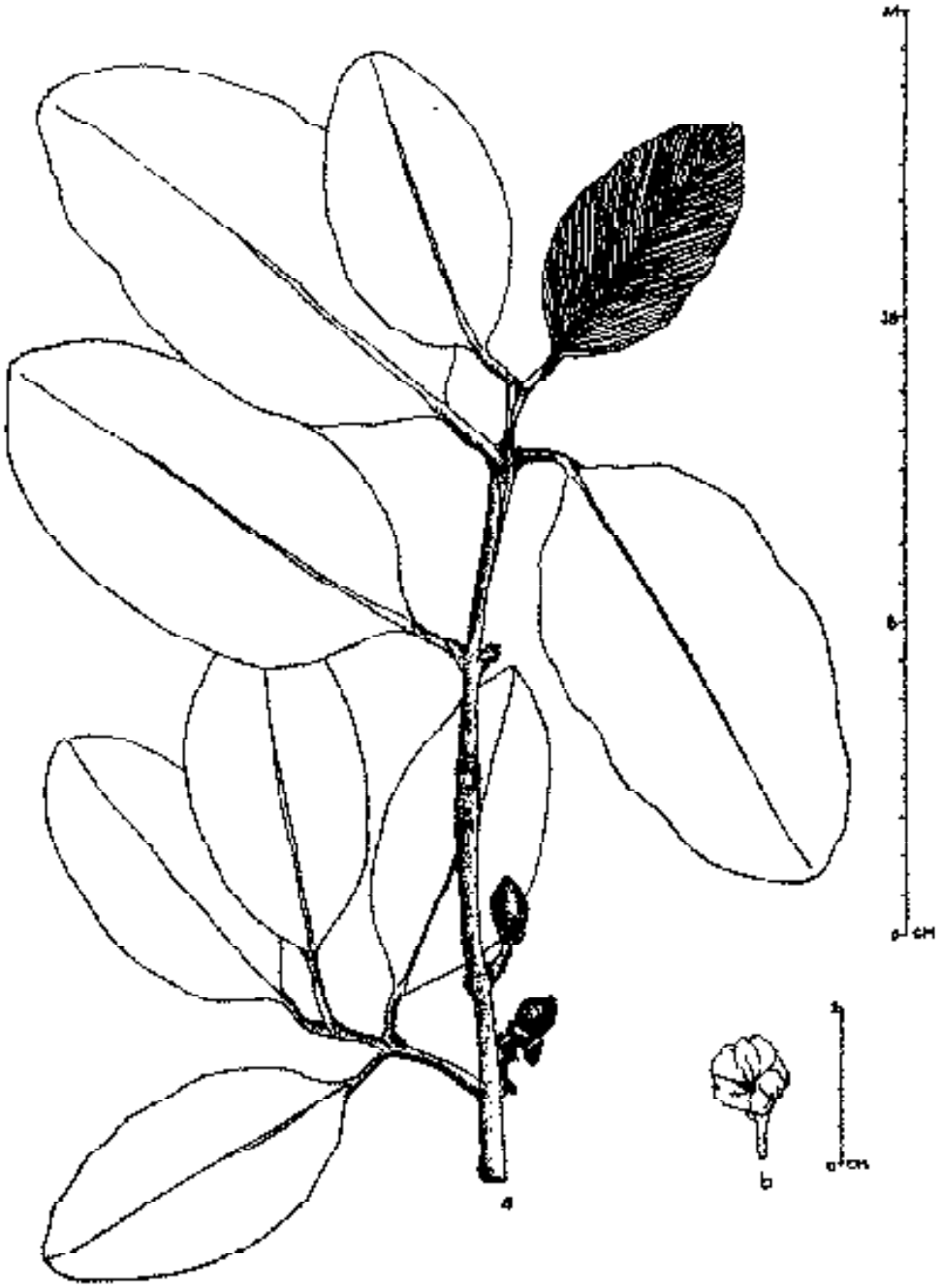
Fls. & Frts. : December–January.

Distrib. : Frequent in semi–evergreen to evergreen forests of Western Ghats. Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

G. xanthochymus Hook. f. ex T. And. in Hook. f. Fl. Brit. India 1: 269. 1874; Cooke, Fl. Pres. Bombay 1: 82. 1958 (Repr.); Mahesh. in Bull. Bot. Surv. India 6: 114. (1964) 1965; N.P. Singh in Sharma et al. Fl. India 3: 129. 1993. *'Dharambo', 'Jhrambi', 'Ota'.*

Trees, up to 10 m high; branchlets angular. Leaves oblong–lanceolate, acute, rounded at base. Male flowers fascicled on old wood, pedicellate, c 2 cm long; sepals 5, ciliate along margins; petals 5, white; stamens in 5 phalanges, each with 3–5 stamens, anthers 2–celled. Female flowers fascicled on old wood; staminodes in 5 phalanges, stigmas 5, spreading. Berries subglobose, yellow with age, c 6 cm across. Seeds 1–4, oblong.

Fls. & Frts. : February–May.



Garcinia talbotii Raiz. ex Sant. : A-Fruiting twig; B-Flower

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 95, f. 60. 1909.

Distrib. : Occasional near streams in semi–evergreen to wet deciduous forests. Bombay, Kolhapur, Nagpur, Pune, Sindhudurg.

MAMMEA L. emend. De Wilde

Mammea suriga (Buch.–Ham. ex Roxb.) Kosterm. in Comm. For. Res. Inst. Indonesia Bogor 72: 23, f. 19. 1961; N.P. Singh in Sharma et al. Fl. India 3: 132. 1993. *Calophyllum suriga* Buch.–Ham. ex Roxb. Fl. Ind. 2: 608. 1832; T. And. in Hook. f. Fl. Brit. India 1: 276. 1874. *Ochrocarpus longifolius* Bth. & Hook. f. ex T. And. in Hook. f. op. cit. 270; Cooke, Fl. Pres. Bombay 1: 84. 1958 (Repr.). *'Nagkesar', 'Punnag', 'Surang', 'Suringi', 'Tambra'.*

Trees, 10–20 m tall. Leaves c 2.2 x 6.8 cm, oblong, thickly coriaceous, obtuse or retuse or acuminate at apex, subcordate at base; petioles c 1.2 cm long. Flowers in fascicles in axils of fallen leaves; pedicels 1 cm long; bracts numerous; calyx bursting into 2 valves, inflexed during flowering; petals white; rudimentary stamens many in female flowers. Berries obliquely ovoid, c 3.5 cm long.

Fls. & Frts. : February–March.

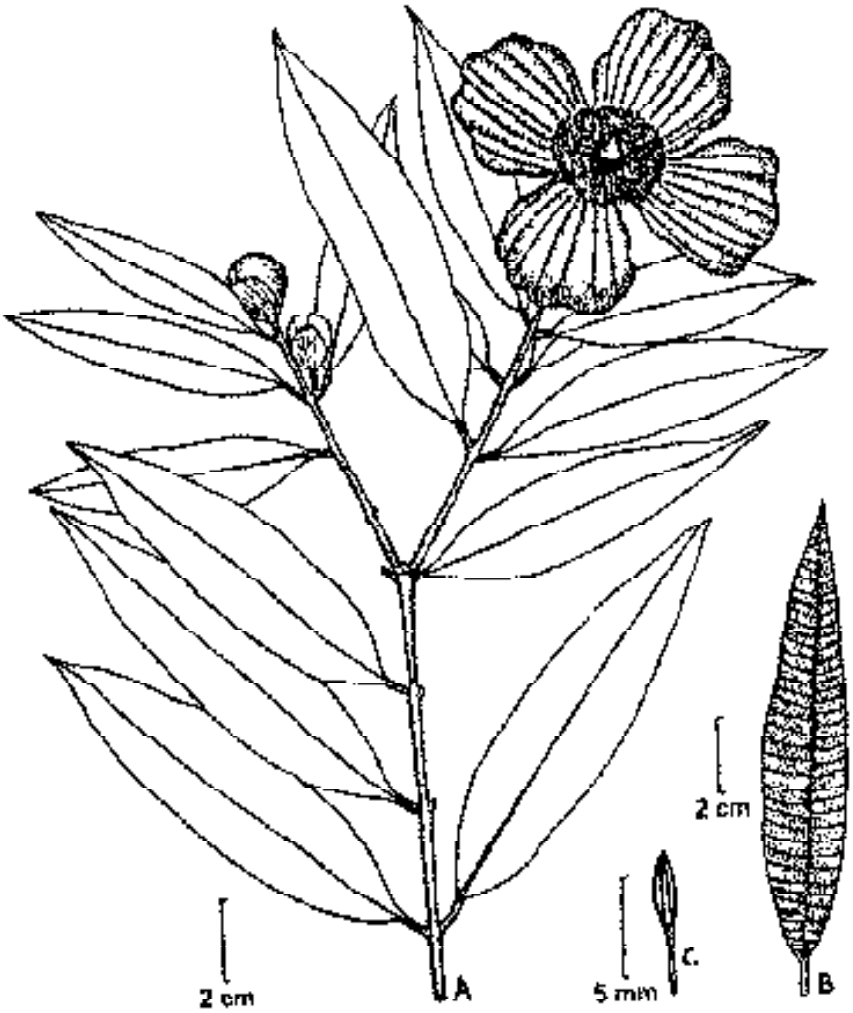
Illus. : Talb. For. Fl. Bombay Pres. & Sind. 1: 98, f. 61. 1909 *(Ochrocarpus longifolius);* Kosterm. op. cit.

Distrib. : Frequent in evergreen ghat forests. Bombay, Kolhapur, Pune, Raigad, Ratnagiri, Sindhudurg, Thane.

MESUA L. emend. Kosterm.

Mesua ferrea L. Sp. Pl. 515. 1753; T. And. in Hook. f. Fl. Brit. India 1: 277. 1874; Cooke, Fl. Pres. Bombay 1:86. 1958 (Repr.); Stevens in Taxon 35: 353. 1986; N.P. Singh in Sharma et al. Fl. India 3: 136. 1993. *Calophyllum nagassarium* Burm. f. Fl. Ind. 121. 1768. *Mesua roxburghii* Wight, Ill. 1: 127. 1840. *M. nagana* Gardner in Calcutta J. Nat. Hist. 8: 4. 1847. *M. nagassarium* (Burm. f.) Kosterm. in Ceylon J. Sci. Biol. Ser. 12: 71. 1976; Steevens in J. Arnold Arbr. 61: 682. 1980. *M. speciosa* Choisy in DC. Prodr. 1: 562. 1824; Wight, Ic. t. 961. 1845. *M. coromandeliana* Wight Ic. t. 117. 1839; Bedd. Fl. Sylv. t. 64. 1870. *M. pedunculata* Wight Ic. t. 119. 1839. *'Nagchampa', 'Nagchapha', 'Thorachmpa'.*

Trees, 5–20 m tall, trunk straight, up to 3 m in girth, oleoresin aromatic; bark smooth, ash–coloured. Leaves very variable, 5–16 x 1–5 cm, elliptic–oblong, oblong–lanceolate or lanceolate, somewhat acute at



Mesua ferrea L. : A-Flowering branch; B-Leaf; C-Seed

base, acuminate or cuspidate at apex, pale green above, glaucous beneath. Flowers white, 8–10 cm across, shortly pedicellate; sepals orbicular, 1–2 cm across, densely pilose; petals 4, obovate or obcordate, 2.0–4.5 cm long; stamens numerous, yellow, forming a globose mass; ovary 5–7 mm long, ovoid, bilocular; style as long as or longer than ovary; stigma peltate. Drupes woody, ovoid with a conical point, surrounded by enlarged sepals, pericarp bi–valved. Seeds 1–4, smooth, dark brown testa.

Fls. & Frts. : March–May.

Illus. : Wight, op. cit.; Bedd. op. cit.

Distrib. : Frequent in semi–evergreen forests. Amravati, Bombay, Kolhapur, Ratnagiri, Satara, Sindhudurg.

CULTIVATED SPECIES :

Calophyllum polyanthum Wall. ex Choisy, Descr. Guttif. Inde 43. 1849 & in Mem. Soc. Phys. Hist. Nat. Geneve 12: 423. 1851; T. And. in Hook. f. Fl. Brit. India 1: 274. 1874; N.P. Singh in Sharma et al. Fl. India 3: 94, f. 31. 1993; Almeida, Fl. Mah. 1: 85. 1996. *C. tomentosum* auct. non Wight, 1840; T. And. in Hook. f. op. cit. 274 p.p.; Cooke, Fl. Pres. Bombay 1: 85. 1958 (Repr.). *'Poon'*.

Tall trees; young shoots, buds and panicles clothed with rusty tomentum. Leaves 7.5–12.0 x 3–5 cm, oblong–lanceolate, coriaceous, apex acuminate, base acute. Flowers 1–2 cm across, in terminal panicles and in racemes or panicles from axils of upper leaves. Fruits c 2 cm long, obliquely ovoid, pointed.

Fls. & Frts. : March–May.

Illus. : N.P. Singh in Sharma et al. op. cit.

Distrib. : Cultivated. Bombay (Almeida, op. cit.).

Clusia rosea Jacq. Enum. Pl. Carib. 34. 1760; N.P. Singh in Sharma et al. Fl. India 3: 147. 1993; Almeida, Fl. Mah. 1: 86. 1996.

Evergreen trees, 6–10 m tall. Leaves obovate or spathulate, apex truncate or emarginate, base cuneate. Flowers rosy pink or white, c 5 cm across, solitary or in 3–flowered cymose clusters. Capsules globose, c 7 cm across. Seeds with red aril.

Fls. & Frts. : March–April.

Distrib. : Cultivated. Bombay (Almeida, op. cit.).

Notes : It is a native of Central America.

Garcinia livingstonei T. And. in J. Linn. Soc. 9: 203. 1867; N.P. Singh in Sharma et al. Fl. India 3: 147. 1993; Almeida, Fl. Mah. 1: 88. 1996.

Trees with robust branches; bark grey, rugose, Leaves 6–12 x 3.0–4.8 cm, obovate or elliptic, acute or cuneate at base, rounded or shortly apiculate at apex; petioles 6–8 mm long, channelled above. Male flowers white, in short axillary fascicles on raised protuberances; sepals 4, 2 x 2 mm, orbicular, coriaceous; petals 4 or 5, c 6 mm long; stamens c 24, below angular disc. Female flowers similar to male flowers; ovary 3 mm long, bilocular; stigmas convex, hardly lobed. Berries almost globose, smooth; pericarp thin, pulp edible. Seeds oblong.

Fls. & Frts. : September–November.

Distrib. : Cultivated. Bombay (Almeida, op. cit.).

Notes : Fruits are edible while the pericarp and pulp are used in preparing fermented beverages.

G. mangostana L. Sp. Pl. 443. 1753; T. And. in Hook. f. Fl. Brit. India 1: 260. 1874; N.P. Singh in Sharma et al. Fl. India 3: 148. 1993.

Trees with pyramidal or conical crown, 20–25 m tall; bark dark brown or black, yellow, smooth. Leaves 15–25 x 6–12 cm, elliptic to elliptic–oblong, acute–obtuse or rotundate at base, acute or shortly acuminate at apex, thickly coriaceous; petioles 2.0–2.5 cm long, stout. Male flowers rare, pale green or creamy yellow; sepals 4, coriaceous, orbicular; petals 4, ovate; stamens indefinite; rudimentary pistil discoid. Bisexual flowers solitary or geminate; sepals 4, orbicular, persistent; petals 4, purple, orbicular, fleshy; stamens many; ovary globular, 4–8–locular. Berries dark purplish–brown, smooth, surrounded by enlarged sepals at base; pericarp thick, spongy. Seeds up to 8, oblong, laterally compressed.

Fls. & Frts. : Almost throughout the year.

Distrib. : This species prefers wet humid climate. Cultivation attempted in Maharashtra (N.P. Singh 1993).

Rheedia floribunda Planch. & Triana in Ann. Sci. Nat. 4, 14: 319. 1860; N.P. Singh in Sharma et al. Fl. India 3: 150. 1993.

Small trees with terete branches. Leaves elliptic, obtuse at base, acute at apex; petioles 1.5–2.0 cm long. Pseudobisexual flowers white, in axillary fascicles; sepals 2, orbicular; petals 4–5, obovate; stamens 15–20; ovary somewhat ovate, 3–4–locular, stigma 3–4–lobed.

Distrib. : Cultivated in Victoria Gardens. Bombay.

Notes : A native of Brazil.

THEACEAE

(P. Venkanna & P.V. Prasanna)

GORDONIA Ellis (nom. cons.)

Gordonia obtusa Wall. ex Wight & Arn. Prodr. 87. 1834; T. Dyer in Hook. f. Fl. Brit. India 1: 291. 1874; Cooke, Fl. Pres. Bombay 1: 88. 1958. (Repr.); A. S. Chauhan & T. K. Paul in Sharma et al. Fl. India 3 : 162, f. 39. 1993.

Tall trees. Leaves 5–10 x 2.5–3.7 cm, elliptic–lanceolate, obtuse, often emarginate at apex, acute at base, crenulate. Flowers white, c 3.7 cm across, solitary and axillary or crowded at branch endings; sepals silky outside; petals pubescent outside. Capsules 2.5–3.0 x 1.5 cm, oblong, valves deeply sulcate towards apex. Seeds terminated by a leafy wing.

Fls. : May–June. *Frts.* : November–January.

Illus. : A.S. Chauhan & T.K. Paul in Sharma et al. op. cit.

Notes : Cooke (op. cit.) has mentioned that this species is distributed along the Konkan and Ghats. This species has not been again collected from Konkan by recent workers, although all the districts from Konkan have been explored (Billore, 1972; S. M. Almeida, 1983–1986 & 1990; Kulkarni, 1988 & Kothari & Moorthy, 1993). Talbot (For. Fl. Bombay Pres. & Sind 1: 106. 1909) give the distribution as Western Peninsula from the Konkan Southwards at an elevation of 750–2100 m; common on the Nilgiris. However, he comments that 'this species, has not yet been found in the Bombay Presidency as far as I know' Chauhan & Paul op. cit. have probably followed Cooke while giving distribution as Maharashtra, Karnataka and Tamilnadu.

CULTIVATED SPECIES :

Camellia japonica L. Sp. Pl. 2: 698. 1753; A.S. Chauhan & T.K. Paul in Sharma et al. Fl. India 3: 192. 1993. *'Garden Camellia'.*

Evergreen shrubs or small trees, c 12 m tall. Leaves ovate, lustrous. Flowers 7–13 cm across, red; petals 5–7, spherical. Seeds c 2 cm wide, globose.

Distrib. : Satara.

C. sinensis (L.) O. Ktze. in Acta Hort. Petrop. 10: 195. 1887; Bole & Almeida in J. Bombay nat. Hist. Soc. 77: 458. 1981; S.M. Almeida, Fl. Savantwadi 1: 56. 1990; A.S. Chauhan & T.K. Paul in Sharma et al. Fl. India 3: 159, f. 38. 1993. *Thea sinensis* L. Sp. Pl. 515. 1753. *'Chaha'.*

Shrubs, c 30 m tall. Leaves 4–18 x 2–6 cm, elliptic–oblong, cuspidate–acuminate at apex, cuneate at base. Flowers 2.5–4.0 cm across; calyx ciliolate. Capsules 10–15 x 15–25 cm, ovoid, 3–seeded. Seeds brown or reddish–brown.

Fls, & Frts. : June–January.

Illus. : A.S. Chauhan & T.K. Paul in Sharma et al. op. cit.

Distrib. : Satara (Bole & Almeida, op. cit.), Sindhudurg (S.M. Almeida, op. cit.).

Eurya japonica Thunb. Nov. Gen. Pl. 68. 1783; T. Dyer in Hook. f. Fl. Brit. India, 1: 284. 1874 p.p.; Cooke, Fl. Pres. Bombay 1: 87. 1958 (Repr. ed.); A.S. Chauhan & T.K. Paul in Sharma et al. Fl. India 3: 184, f. 49. 1993; Almeida, Fl. Mah. 1: 91. 1996.

Shrubs, c 5 m tall. Leaves 5–10 cm long, lanceolate, apex acuminate, base acute, margins serrate. Flowers white, in axillary fascicles of 1–3. Fruits 4–6 mm long, ovoid or subglobose, tipped with persistent style.

Fls. & Frts. : Throughout the year.

Distrib. : Bombay garden (Almeida, op. cit.), Konkan (Cooke, op. cit.).

Stewardia pseudocamellia Maxim in Bull. Acad. Petersb. 11: 429. 1867; Almeida, Fl. Mah. 1: 92. 1996.

Shrubs upto 15 cm tall; bark red, peeling off in flakes. Leaves 2–8 cm long, elliptic to elliptic–lanceolate, apex acuminate, margins minutely serrate. Flowers 5–6 cm across. Capsules c 2 cm long, ovoid.

Fls. & Frts. : Throughout the year.

Distrib. : Bombay gardens (Almeida, op. cit.).

DIPTEROCARPACEAE

(P. Venkanna & P. Lakshminarasimhan)

1. Calyx scarcely enlarged in fruit; lobes reflexed ... VATERIA
1. Calyx much enlarged in fruits; lobes erect :
   2. Stamens numerous ... DIPTEROCARPUS
   2. Stamens 10–15 ... HOPEA

DIPTEROCARPUS Gaertn. f.

Dipterocarpus turbinatus Gaertn. f. Fruct 3: 51, t. 188. 1805; T. Dyer in Hook. f. Fl. Brit. India 1: 295. 1874; Cooke, Fl. Pres. Bombay 1: 89. 1958 (Repr.); K.P. Janardh. in Sharma et al. Fl. India 3: 219. 1993. *'Challan'.*

A tall tree. Leaves 12.5–30.0 x 6.2–15.0 cm, ovate, acute or shortly acuminate at apex, rounded or acute at base, entire or sinuate–crenate along margins; lateral nerves 14–18 pairs. Flowers white, tinged with red, c 7.5 cm across, in axillary, 3–8–flowered racemes. Fruits c 2.5 cm across, subglobose, pubescent.

Fls. & Frts. : December–March.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 108, f. 65. 1909.

Notes : Dyer in Hook. f. (op. cit.) has included Konkan (cultivated?) under distribution. Cooke (op. cit. 90) has cited Konkan based on Stocks collection. This species has not been again collected by any of the recent workers even though Konkan area has been well explored (Billore, 1972; Almeida, 1983–1986 & 1990; Kulkarni, 1988 & Kothari & Moorthy, 1993). Janardhanan in Sharma et al. (op. cit.) has given the distribution of this species as North–East India.

HOPEA Roxb. (nom. cons.)

Hopea ponga (Dennst.) Mabb. in Taxon 28: 587. 1979; K.P. Janardh. in Sharma et al. Fl. India 3: 230. 1993. *Artocarpus ponga*

Dennst. Schluss. Hort. Malab. 15, 18, 30. 1818. *Hopea wightiana* Wall. ex Wight & Arn., Prodr. 85. 1834; T. Dyer in Hook. f. Fl. Brit. India 1: 309. 1874; Cooke, Fl. Pres. Bombay 1: 91. 1958 (Repr.). *'Kalhoni', 'Kavsi'.*

A large tree. Leaves 12.5–20.0x5.0–7.5 cm, oblong or ovate–oblong, obtuse or subacute at apex, rounded at base; lateral nerves 7–10. Flowers pink, secund, in axillary panicles; sepals ovate, obtuse; petals oblong, acute, pubescent outside. Nuts c 1.2 cm long, ovoid, apiculate, surrounded by accrescent calyx, 7–9–nerved.

Fls. & Frts. : March–September.

Illus. : Bedd. Fl. Sylv. t. 96. 1871; Talb. For. Fl. Bombay Pres. & Sind 1: 112, f. 67: 1909 (*Hopea wightiana*).

Notes : Cooke (op. cit) recorded this species from S. Konkan and N. Kanara. However this species has not been reported from Maharashtra after Cooke, even though all the districts of Konkan region have been well explored. Janardhanan in Sharma et al. (op. cit. 231) have given Western ghats as distribution which includes Maharashtra also.

VATERIA L.

Vateria indica L. Sp. Pl. 515. 1753; T. Dyer in Hook. f. Fl. Brit. India 1: 313. 1874; Cooke, Fl. Pres. Bombay 1: 92. 1958 (Repr.); K.P. Janardh. in Sharma et al. Fl. India 3: 245. 1993. *V. malabarica* Bl. Mus. Bot. Lugd.– Bat. 2: 29. 1856. *'Dhup'.*

Large trees, 20–30 m high, bark white; young branches clothed with stellate hairs. Leaves 15–27 x 12–15 cm, elliptic–oblong, apex acuminate, base rounded or cordate. Panicles 10–12 cm long; flowers 0.6–0.7 cm across, white. Capsules oblong, fleshy, 2–4 cm long, 3–valved, valves 1–seeded.

Fls. & Frts. : April–May.

Illus. : Wight, Illus. 1: 88, t. 36. 1840; Bedd. Fl. Sylv. t. 84. 1871; Talb. For. Fl. Bombay Pres. & Sind 1: 114, f. 68. 1909 *(V. malabarica).*

Distrib. : Rare in semi–evergreen forests. Sindhudurg (S.M. Almeida, Fl. Savantwadi 1: 56. 1990).

CULTIVATED SPECIES :

Shorea robusta Roxb. ex Gaertn. f. Suppl. Carp. 3: 48, t. 186. 1805; T. Dyer in Hook. f. Fl. Brit. India 1: 306. 1874; K.P. Janardh. in Sharma et al. Fl. India 3: 237, f. 62. 1993; Almeida, Fl. Mah. 1: 93. 1996.

Trees, c 20 m tall. Leaves 15–25 x 10–15 cm, ovate–oblong, apex acuminate, base cordate; lateral nerves c 12 pairs; stipules pubescent. Flowers pale yellow, in lax, terminal or axillary panicles, clothed with velvetty pubescence; ovary pubescent. Fruits winged, wings linear, 10–nerved.

Fls. & Frts. : January–May.

Distrib. : Introduced as an ornamental tree. Amravati (Almeida, op. cit.).

ANCISTROCLADACEAE

(P. Venkanna & P.V. Prasanna)

ANCISTROCLADUS Wall. (nom. cons.)

1.	Leaves more than 4 times as long as wide	...	*A. attenuatus*
1.	Leaves less than 4 times as long as wide	...	*A. heyneanus*

Ancistrocladus attenuatus T. Dyer in Hook. f. Fl. Brit. India 1: 300. 1874; S. Das in Sharma et al. Fl. India 3; 254. 1993.

Scandent shrubs, 6–12 m long. Leaves 10–40 x 3–7 cm, sessile, oblanceoate to linear, apex acute or acuminate, base cuneate. Panicles terminal, repeatedly dichotomous with stout divaricate divisions; calyx lobes accrescent in fruits. Fruit a nut.

Fls. & Frts. : January–May.

Distrib. : Occasional in moist deciduous forests. Raigad.

A. heyneanus Wall. ex Grah. Cat. Pl. Bombay 28. 1839; T. Dyer in Hook. f. Fl. Brit. India 1: 299. 1874; Cooke, Fl. Pres. Bombay 1: 93. 1958 (Repr.); S. Das in Sharma et al. Fl. India 3: 254, f. 68. 1993. *'Kardal', 'Karotal'.*

Large climbing shrubs, 6–8 m long, with hooked branches. Leaves 6–15 x 2.5–7.5 cm, elliptic–lanceolate or oblanceolate, coriaceous, crowded at ends of branches. Flowers 1.5 cm across, creamy–yellow, in lax terminal panicles. Fruits with 5 unequal, accrescent spathulate calyx wings, obovoid, brown.

Fls. & Frts. : January–June.

Illus. : Wight, Ic. t. 1987–88. 1853.

Distrib. : Occasional in moist deciduous forests. Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

MALVACEAE

(P. Venkanna & Sujit Kumar Das Das)

1. Carpels as many as style branches :
   2. Fruit a capsule :
      3. Stipules simple :
         4. Epicalyx segments winged ... KYDIA
         4. Epicalyx segments not as above :
            5. Stigams capitate or globose :
               6. Calyx persistent :
                  7. Capsules winged ... FIORIA
                  7. Capsules not winged :
                     8. Epicalyx segments filiform ... BOMBYX
                     8. Epicalyx segments not filiform ... HIBISCUS
               6. Calyx deciduous ... ABELMOSCHUS
            5. Stigmas lobed ... THESPESIA
      3. Stipules laciniate or completely divided into 2 or 3 segments ... DECASCHISTIA
   2. Fruit a schizocarp, breaking into mericarps at maturity :
      9. Stigmas decurrent on the adaxial side of the style :
         10. Epicalyx segments free ... MALVA
         10. Epicalyx segments connate at base ... ALTHAEA
      9. Stigmas apical or nearly so, capitate, discoid or obliquely truncate :
         11. Seeds 2 or more in each mericarp:
            12. Stems erect, stout; mericarps more or less pointed, mucronate or aristate at apex ... ABUTILON
            12. Stems ascending, weak; mericarps rounded at apex ... HERISSANTIA
         11. Seeds 1 in each mericarp :
            13. Epicalyx present ... MALVASTRUM
            13. Epicalyx absent ... SIDA

1. Carpels half as many as style branches :
   14. Flowers with foliaceous bracts ... MALACHRA
   14. Flowers without foliaceous bracts :
      15. Mericarps glochidiate ... URENA
      15. Mericarps not glochidiate ... PAVONIA

ABELMOSCHUS Medik.

1. Epicalyx segments 6–16, linear to lanceolate :
   2. Capsules ovoid to oblong :
      3. Capsules exserted; epicalyx segments 6–10 (rarely 12) ... *A. moschatus*
      3. Capsules included; epicalyx segments 10–16 ... *A. crinitus*
   2. Capsules long fusiform ... *A. tuberculatus*
1. Epicalyx segments 4–6, ovate :
   4. Calyx lageniform in bud; epicalyx falling before corolla expansion ... *A. ficulneus*
   4. Calyx ovoid in bud; epicalyx falling after dehiscence of capsule :
      5. Epicalyx segments free, shorter than capsule ... *A. manihot*
      5. Epicalyx segments connate at base, as long as capsule ... *A. angulosus*

Abelmoschus angulosus Wall. ex Wight & Arn. Prodr. 53. 1834; Borss. in Blumea 14: 104. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 68. 1988; Paul in Sharma et al. Fl. India 3: 301. 1993; Sivar. et al. in Rheedea 4: 4, figs. 1 & 4 a–b. 1994. *Hibiscus angulosus* (Wall. ex Wight & Arn.) Steud. Nom. ed. 2, 1: 758. 1840; Mast. in Hook. f. Fl. Brit. India 1: 341. 1874; Cooke, Fl. Pres. Bombay 1: 118. 1958 (Repr.).

Herbs or undershrubs, c 2.5 m tall; young branches with simple and stellate hairs. Leaves 3–15 cm across, 3–7–lobed. Flowers with deep purple centre, rarely white–yellow, solitary; epicalyx accrescent, 4–5–parted. Capsules ovoid, 3.0–4.5 x 1.5–2.0 cm. Seeds 3–4 mm long, blackish, with minute hairs in concentric rings.

Fls. & Frts. : November–February.

Illus. : Wight, Ic. t. 951. 1845; Sivar. op. cit.

Distrib. : Rare in moist deciduous forests. Raigad, Satara.

A. crinitus Wall. Pl. As. Rar. 1: 39, t. 44. 1830; Borss. in Blumea 14: 103. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India. 19: 70, f. 14.1988; Paul in Sharma et al. Fl. India, 3: 302, f. 84. 1993. *H. cancellatus* Roxb. Fl. Ind. 3: 201. 1832 non L. f.; Mast. in Hook. f. Fl. Brit. India 1: 342. 1874. *'Pahadi–Bhendi'.*

Erect, densely hispid or hirsute herbs, c 11 m tall; root tuberous. Leaves 10–15 x 7–13 cm, roundish, cordate at base, crenate–toothed at margins, obtusely 5–angled and palmately 5–7–lobed, upper leaves sagittate. Epicalyx 2–5 cm long. Flowers 10–12 cm across, purple in centre. Capsules c 4 cm long, ovoid, furrowed. Seeds many, reniform.

Fls. & Frts. : August–December.

Illus. : Paul & Nayar, op. cit.

Distrib. : Frequent in wastelands. Aurangabad, Chandrapur, Nagpur, Nanded.

A. ficulneus (L.) Wight & Arn.ex Wight, Cat. 14. 1834; Borss. in Blumea 14: 101. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 73, f. 15. 1988; Paul in Sharma et al. Fl. India 3: 304, f. 85. 1993. *Hibiscus ficulneus* L. Sp. Pl. 695. 1753; Mast. in Hook. f. Fl. Brit. India 1: 340. 1874; Cooke, Fl. Pres. Bombay 1: 117. 1958 (Repr.). *'Jangli Bhendi'.*

Herbs or undershrubs, 0.5–2.0 m high; young branches simple hairy. Leaves 2–12 cm across, palmately 3–5–lobed, apex rounded or obtuse, base rounded. Epicalyx segments 5–6, 0.5–1.0 cm long; calyx 3 mm long, corolla white, with deep purple centre, 1.5–2.0 cm across. Capsules ovoid, 2.0–4.5 x 1.5–2.0 cm. Seeds c 3 mm across, blackish,stellate hairy in concentric rings throughout.

Fls. & Frts. : September–March.

Illus. : Wight, Ic. t. 154. 1839; Paul & Nayar, op. cit.

Distrib. : Common in deciduous forests and on bunds around fields and hedges.

A. manihot (L.) Medik. Malv. 46. 1787, ampl. Hochr. in Candollea 2: 87. 1924; Borss. in Blumea 14: 95. 1966; Paul & Nayar in Fasc. Fl. India 19: 74. 1988; Paul in Sharma et al. Fl. India 3: 304. 1993. *Hibiscus manihot* L. Sp. Pl. 696. 1753; Mast. in Hook. f. Fl. Brit. India 1: 341. 1874.

Hochreutiner (Ann. Cons. Jard. Bot. Geneve 4: 153–155. 1900) recognized 4 varieties under this species based on variable leaf

characters. However Borssum Waalkes (Blumea 14: 97–99. 1966) recognised two subspecies viz., ssp. *manihot* includes all cultivated forms and ssp. *tetraphyllus* (Roxb. ex Horn.) Borss. covering wild ones.

1. Stems covered with prickly hairs ... ssp. *tetraphyllus*
1. Stems not as above ... ssp. *manihot*

ssp. **manihot.** *'Ram–bhendi'.*

Herbs or undershrubs, glabrous or densely hispid. Leaves 5–30 cm across, mostly 3–9–lobed, base cordate, margins dentate or serrate; petioles 2.5–23.0 cm long. Pedicels 1–4 cm long; epicalyx segments 4–6; calyx 2–3 x 0.5–2.0 cm; corolla yellow with a small purple centre. Capsules 3–7 x 1.5–2.5 cm, acuminate with 5 prominent costa. Seeds 3–4 cm long with stellate hairs in concentric rings.

Fls. & Frts. : July–December.

Distrib. : Mostly cultivated in S E Asia, naturalised in India. Bombay, Bhandara, Buldhana, Chandrapur, Dhule, Nasik, Osmanabad, Raigad, Ratnagiri, Pune.

ssp. **tetraphyllus** (Roxb. ex Horn.) Borss. in Blumea 14: 97. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 75. 1988; Paul in Sharma et al. Fl. India 3: 306. 1993. *Hibiscus tetraphyllus* Roxb. ex Horn. Hort. Hafn. 661. 1815; Mast. in Hook. f. Fl. Brit. India 1: 341. 1874; Cooke, Fl. Pres. Bombay 1: 118. 1958 (Repr.).

1. Epicalyx segments densely clothed with soft hairs; seeds reniform ... var. *pungens*
1. Epicalyx segments hispid along margins with stiff hairs; seeds almost globose :
    2. Epicalyx caducous, small, segments 4–6, ovate –lanceolate, distantly arranged; seeds 4.5 mm across ... var. *megaspermus*
    2. Epicalyx persistent, segments 4, large, broadly ovate, overlapping; seeds c. 3 mm across ... var. *tetraphyllus*

var. **tetraphyllus.** *'Ran–bhendi'.*

Under shrubs, 1.0–1.5 m tall. Leaves 4–15 x 3–10 cm, ovate or orbicular, 3–5–angled or lobed, prickly on the nerves beneath, cordate at base. Flowers 4–6 cm across, solitary, axillary; calyx connate, splitting on one side, villous; corolla orange–yellow with a purple centre. Capsules 3.0–4.5 x 2 cm, ovoid–oblong, silky tomentose when young. Seeds globose, brown.

Fls. & Frts. : October–January.



Abelmoschus manihot (L.) Medik. ssp. **tetraphyllus** (Roxb. ex Horn.) Borss. var. **tetraphyllus**

Illus. : Ic. Roxb. Fasc. 3, t. 5. 1968 (Repr. ed.); Talb. For. Fl. Bombay Pres. & Sind 1: 123, f. 74. 1909 (*Hibisus tetraphyllus*).

Distrib. : Common in deciduous forests throughout.

var. **megaspermus** Hemadri in Bull. Bot. Surv. India 11: 338. (1971) 1972; Hemadri & Bhargavan in Bull. Bot. Surv. India 24: 158. (1982) 1983; Paul in Sharma et al. Fl. India 3: 307. 1993. *'Jangli bhendi', 'Ran–bhendi'.*

Woody herbs, 70–80 cm tall; stems sparsely stiff hairy. Leaves shallowly or deeply 3–7–lobed. Flowers axillary, solitary or subracemose towards branch endings; corolla with purple centre. Capsules 5–angled, setose. Seeds 4–5 cm across, yellowish–brown hairy.

Fls. & Frts. : October–January.

Distrib. : Occasional along shady hill slopes. Ahmednagar, Pune.

var. **pungens** (Roxb.) Hochr. in Candollea 2: 87. 1924; Borss. in Blumea, 14: 97. 1966; Paul in Sharma et al. Fl. India, 3: 307. 1993; Almeida, Fl. Mah. 1: 98. 1996; Naik, Fl. Marathwada 1: 132. 1998. *Hisiscus pungens* Roxb. Fl. Ind. 3: 213. 1832; Mast. in Hook. f. Fl. Brit. India 1: 341. 1874.

Annual or perennial erect herbs; branches bristly and with scattered black dots. Leaves 12–20 cm long, cordate or roundish, deeply palmately 7–lobed, lobes oblong, acuminate, toothed, upper ones 3–lobed. Peduncles 2–5 cm long, racemose. Corolla yellow with purple centre, c 12 cm across. Capsules short.

Fl. & Frts. : September–October.

Distrib. : Rare, under the shade of hll forests. Bombay (Almeida, op. cit.), Nanded (Naik op. cit.).

A. moschatus Medik. Malv. 46. 1787, ampl. Hochr. in Candollea 2: 86 1924; Borss. in Blumea 14 : 91. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 77, f. 16. 1988; Paul in Sharma et al. Fl. India 3: 308, f. 86. 1993. *Hibiscus abelmoschus* L. Sp. Pl. 696. 1753; Mast. in Hook. f. Fl. Brit. India 1: 342. 1874; Cooke, Fl. Pres. Bombay 1: 118. 1958 (Repr.). *'Kasturi–bhendi'.*

Annual herbs, c 3 m high. Leaves 4–18 x 3–20 cm, polymorphic, angular or 3–7–palmilobed to palmiparted; upper leaves narrower, base hastate or sagittate. Calyx 1.5–3.0 cm long; corolla c 10 cm across, yellow with dark purple centre. Seeds 3–4 mm long, concentrically ribbed, glabrous or minutely stellate hairy.

Fls. & Frts. : July–December.

Illus. : Wight; Ic. t. 399. 1843; Paul & Nayar, op. cit.

Distrib. : Common in deciduous forests. Sometimes cultivated for it's fragrant seeds.

A. tuberculatus Pal & Sing in Bot. Gaz. 113. 458. 1952; Shah & Badrinath in J. Econ. Tax. Bot. 6: 122. 1985; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 78. 1988; Paul in Sharma et al. Fl. India, 3: 308. 1993; Naik, Fl. Marathwada 1 : 133. 1998.

Herbs or undershrubs, c 1 m high, strigose, with simple hairs. Leaves 4–12 x 5–15 cm, lower and middle leaves 5–7–lobed, upper 3–5–lobed, palmatisect. Epicalyx segments 9–17; corolla yellow or white with deep purple centre. Capsules densely tubercled. Seeds densely villous.

Fls. & Frts. : October–February.

Distrib. : Rare in deciduous forests and gravelly soil in open grass lands around cultivated fields. Nanded (Naik op. cit.), Thane (Shah & Badrinath, op. cit.).

ABUTILON Mill.

1.	Stipules broadly ovate to triangular, at base slightly auriculate	...	*A. auritum*
1.	Stipules linear to subulate or rarely linear–lanceolate, linear–filiform :		
2.	Mericarps 5–10 :		
3.	Mericarps 8–10	...	*A. ramosum*
3.	Mericarps 5:		
4.	Calyx lobes 0.7–1.0 cm long, connate below middle	...	*A. persicum*
4.	Calyx lobes c 2 cm long, connate in middle	...	*A. ranadei*
2.	Mericarps more than 10, usually 15–25 :		
5.	Carpels truncate, with 2 awns	...	*A. theophrasti*
5.	Carpels not as above :		
6.	Carpels pointed or with distinct mucro :		
7.	Schizocarps c 1 cm across	...	*A. bidentatnm*
7.	Schizocarps 1.5–2.5 cm across	...	*A. indicum*
6.	Carpels obtuse, without a mucro :		

8.	Stems, petioles and pedicles viscidly short glandular hairy	...	*A. hirtum*
8.	Stems, petioles and pedicles not as above	...	*A. pannosum*

Abutilon auritum (Wall. ex Link) Sweet, Hort. Brit. ed. 1, 53. 1826; Mast. in Hook. f. Fl. Brit. India 1: 328. 1874; Borss. in Blumea 14: 164. 1966. *Sida aurita* Wall. ex Link, En. Hort. Berol 2: 206. 1822.

Erect, stout undershrubs, 1–3 m high; stems, petioles and pedicels with minute stellate hairs. Leaves 2–20 x 1.5–20.0 cm, orbicular to broadly ovate. Flowers yellow to light orange with purple veins; staminal column c 8 mm long. Schizocarp exceeding calyx, 1.0–1.2 x 1.2–1.7 cm, mericarps tardily separating, oblong. Seeds reniform, 2.0–2.5 mm across, brown–black.

Fls. & Frts. : October–January.

Distrib. : Occasional on hill tops. Pune.

A. bidentatum Hochst. ex Rich. Tent. Fl. Abyss. 1: 68. 1847; Mast. in Hook. f. Fl. Brit. India 1: 326. 1874; Cooke, Fl. Pres. Bombay 1: 102. 1958 (Repr.); Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 81, f. 17. 1988; Paul in Sharma et al. Fl. India 3: 261, f. 70. 1993; Naqshi et al. in Ann. Miss. Bot. Gard. 75: 1519. 1988. *A. pakistanicum* Jafri & Ali in Fl. Karachi 220. 1996; Paul & Nayar in Nayar et al. op. cit. 90; Paul in Sharma et al. op. cit. 268. *A. cornutum* Dalz. ex T. Cooke, Fl. Pres. Bombay 1: 98. 1901 [1: 104. 1958 (Repr.)] non Sweet, 1830.

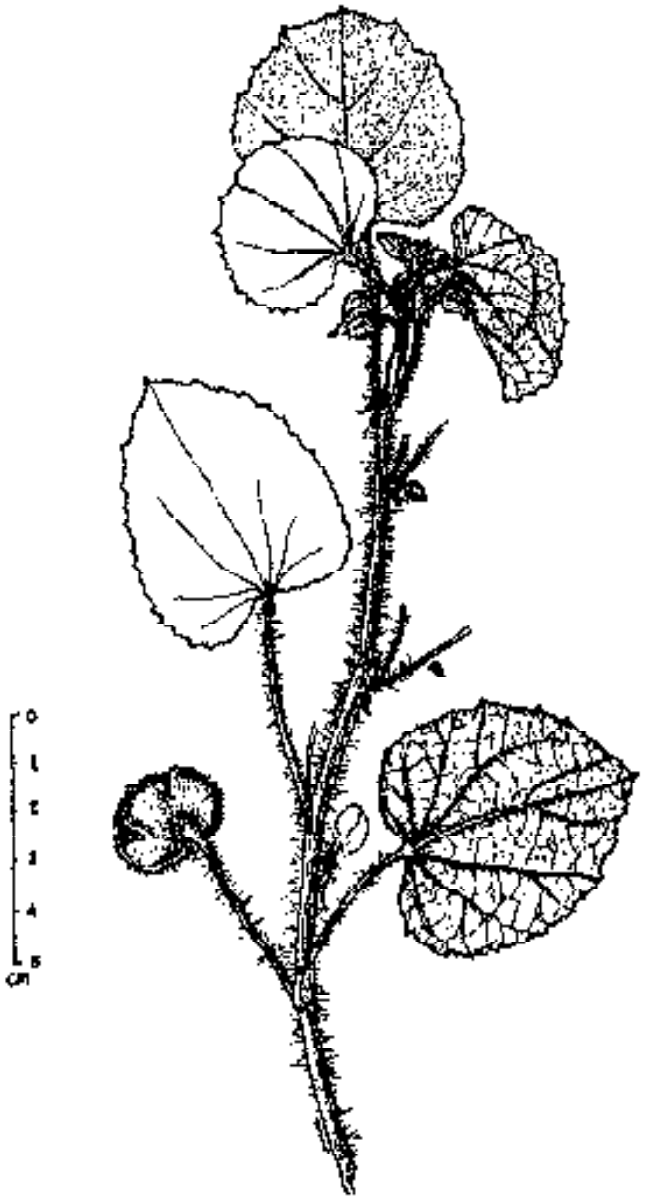
Herbs, suffruticose, canescent–tomentose with stellate hairs. Leaves broadly ovate, deeply cordate at base, acute–acuminate at apex, crenate–dentate at margins, rarely 3–angular. Flowers solitary, axillary; calyx 5–lobed, accrescent, lobes lanceolate, reflexed in fruit; corolla pale yellow to yellow, petals 7–9 mm long, obovate. Mericarps 13–16 (15–25), acute–acuminate, awn 1–2 mm long. Capsules ovoid. Seeds 3 per mericarp, sparsely pilose with stellate hairs.

Fls. & Frts. : August–April.

Illus. : Paul & Nayar, op. cit.

Distrib. : Rare. Ahmednagar, Beed, Bombay, Jalna, 'Konkan' (Cooke, op. cit.), Latur, Osmanabad, Pune.

A. hirtum (Lam.) Sweet, Hort. Brit. ed. 1, 53. 1826; Borss. in Blumea 14: 168. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 84, f. 18. 1988; Paul in Sharma et al. Fl. India 3: 264, f. 71. 1993. *Sida hirta* Lam. Encycl. 1: 7. 1783. *Abutilon graveolens* (Roxb. ex Horn.) Wight & Arn. in Wight, Cat. 13. 1833; Mast. in Hook. f. Fl. Brit. India



Abutilon indicum (L.) Sweet ssp. **'indicum'**

1: 327. 1874; Cooke, Fl. Pres. Bombay 1: 103. 1958 (Repr.). *A. graveolens* var. *hirtum* (G. Don) Mast. in Hook. f. op. cit. 327.

1. Leaves orbicular–ovate, serrulate or denticulate ... var. *hirtum*
1. Leaves ovate, irregularly and deeply serrate ...var. *heterotrichum*

var. **hirtum.** *'Barkanghi'.*

Undershrubs, c 2 m high, much branched, with long spreading, scattered hairs. Leaves 2.5–12.0 x 3.5–13.0 cm, orbicular–ovate, margins serrulate or dentate. Flowers solitary, axillary; calyx campanulate, free up to middle; corolla orange–yellow with a purple centre, stellate pubescent outside. Schizocarps 1–2 cm across, globular. Seeds brownish–black.

Fls. & Frts. : October–April.

Illus. : Paul & Nayar, op. cit.

Distrib. : Common in deciduous forests in open situations.

var. **heterotrichum** (Hochst. ex Mattei) Cuf. in Bull. Jard. Bot. De L' letal 29(1): 536. 1959; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 87. 1988; Paul in Sharma et al. Fl. India 3: 264. 1993. *Abutilon heterotrichum* Hochst. ex Mattei in Bull. Ort. Bot. Palermo n.s. 1(2): 90. 1915.

Distrib. : Maharashtra.

A. indicum (L.) Sweet, Hort. Brit. 54. 1826; Mast. in Hook. f. Fl. Brit. India 1: 326. 1874; Cooke, Fl. Pres. Bombay 1: 102. 1958 (Repr.); Borss. in Blumea 14: 170.1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 87. 1988; Paul in Sharma et al. Fl. India 3: 266. 1993. *Sida indica* L. in Torner, Cent. Pl. 2: 26. 1756. & Amoen. Acad. 4: 324. 1759.

1. Calyx shorter than schizocarp, spreading at maturity; mericarps shortly acuminate at apex ... ssp. *indicum*
1. Calyx about as long as schizocarp, appressed; mericarps long acute at apex ... ssp. *guineense*

ssp. **indicum.** *'Mudra', 'Petari'.*

Herbs or undershrubs, c 3 m high. Leaves 1.5–7.0 x 1.0–6.5 cm, ovate–suborbicuar, apex acute or acuminate, base cordate. Flowers solitary, axillary; calyx 5–8 mm across; corolla yellow to orange, 1.5–2.5 cm across. Schizocarps globular. Seeds brownish–black.

Fls. & Frts. : September–April.

Illus. : Wight, Ic. t. 12. 1838; Tadul. & Venkat. Handb. S. Indian Weeds 105, f. 40. 1955 (Rev. ed.).

Distrib. : Found in open situations along roadsides. Common throughout.

ssp. **guineense** (Schum.) Borss. in Blumea 14: 175. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 88. 1988; Paul in Sharma et al. Fl. India 3: 267. 1993. *Sida guineense* Schum. in Kongl. Danske Vidensk. Sesk. Skr. 4: 81. 1829. *Abutilon asiaticum* (L.) Sweet, Hort. Brit. ed. 1: 53. 1826; Mast. in Hook. f. Fl. Brit. India 1: 326. 1874; Cooke, Fl. Pres. Bombay 1: 102. 1958 (Repr.).

Herbs or undershrubs; stems with dense woolly hairs. Leaves more or less scabrid on upper surface. Corolla large. Mericarps long, acute with woolly stellate hairs on dorsal surface.

Fls. & Frts. : October–November.

Distrib. : Rare in open situations. 'Bombay' (Cooke, op. cit.).

A. pannosum (Forst. f.) Schlect. Bot. Zeit. 9: 828. 1851; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 90. 1988; Paul in Sharma et al. Fl. India 3: 268. 1993. *Sida pannosa* Forst. f. in Comm. Phys. Soc. Reg. Goett. 1787: 62. 1789. *Abutilon muticum* (Delile ex DC.) Sweet, Hort. Brit. ed. 2: 65. 1830; Mast. in Hook. f. Fl. Brit. India 1: 327. 1874; Cooke, Fl. Pres. Bombay 1: 102. 1958 (Repr.). *A. glaucum* (Cav.) Sweet, Hort. Brit. ed. 1, 54. 1827. *'Karandi', 'Kasili'.*

Tomentose undershrubs, c 2 m high. Leaves 2–8 x 2.0–7.9 cm, irregularly toothed. Flowers solitary, axillary; calyx campanulate, deltoid to ovate; corolla yellow, with deep brown centre, 1.5–2.0 cm across. Mericarps 20–25, each c 6–10 x 5 mm, reniform with awns. Seeds 2–3 per mericarp, c 1.5 mm across, brownish.

Fls. & Frts. : October–March.

Illus. : Cav. Ic. 1: 8, t. 11. 1785 *(Sida glauca).*

Distrib. : Found in open situations; common throughout.

A. persicum (Burm. f.) Merr. in Philip. J. Sci. 19: 364. 1921; Borss. in Blumea 14: 163. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 91, f. 19. 1988; Paul in Sharma et al. Fl. India 3: 269, f. 72. 1993. *Sida persica* Burm. f. Fl. Ind. 148, t. 47. f. 1. 1768. *Abutilon*

polyandrum (Roxb.) Wight & Arn. ex Wight, Cat. 12. 1833 non G. Don 1831; Mast. in Hook. f. Fl. Brit. India 1: 325. 1874; Cooke, Fl. Pres. Bombay 1: 101. 1958 (Repr.). *'Madan-mast', 'Maddam'*.

Undershrubs, 1.5 –3.0 m high, viscid, with minute stellate hairs. Leaves 3–22 x 0.5–17.0 cm, lower leaves orbicular, upper leaves ovate to lanceolate, margins crenate to serrate, 5–9–nerved. Flowers solitary, axillary or partly in terminal panicles or racemes; calyx stellate; corolla yellow, 3 –4 cm across. Schizocarps campanulate, 14–17 mm across; mericarps 5, oblong. Seeds 4 –6 in each mericarp, reniform, c 2.5 mm across, blackish-brown.

Fls. & Frts. : November–April.

Illus. : Paul & Nayar, op. cit.; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 34. 1982.

Distrib. : Frequent in ghat forests. Ahmednager, Bhandara, Bombay, Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

A. ramosum (Cav.) Guill. & Perr. in Guill. et al. Fl. Seneg. Tent. 1: 68. 1830; Mast. in Hook. f. Fl. Brit. India, 1: 328. 1874; Cooke, Fl. Pres. Bombay, 1: 103. 1958 (Repr.); Paul in Sharma et al. Fl. India 3: 271, f. 73. 1993; Almeida, Fl. Mah. 1: 102. 1996. *Sida ramosa* Cav. Diss. 1: 28, t. 6, f. 1. 1785.

Undershrubs, 1.0–1.5 m high, erect; bark ash–coloured, minutely hairy. Leaves 5–12 cm across, cordate, angular, often subtrilobate. Corolla yellow. Schizocarps c 1 x 1 cm; mericarps c 9 mm long, acute, mucronate, 2–3–seeded. Seeds c 2 mm across, reniform, brownish–black.

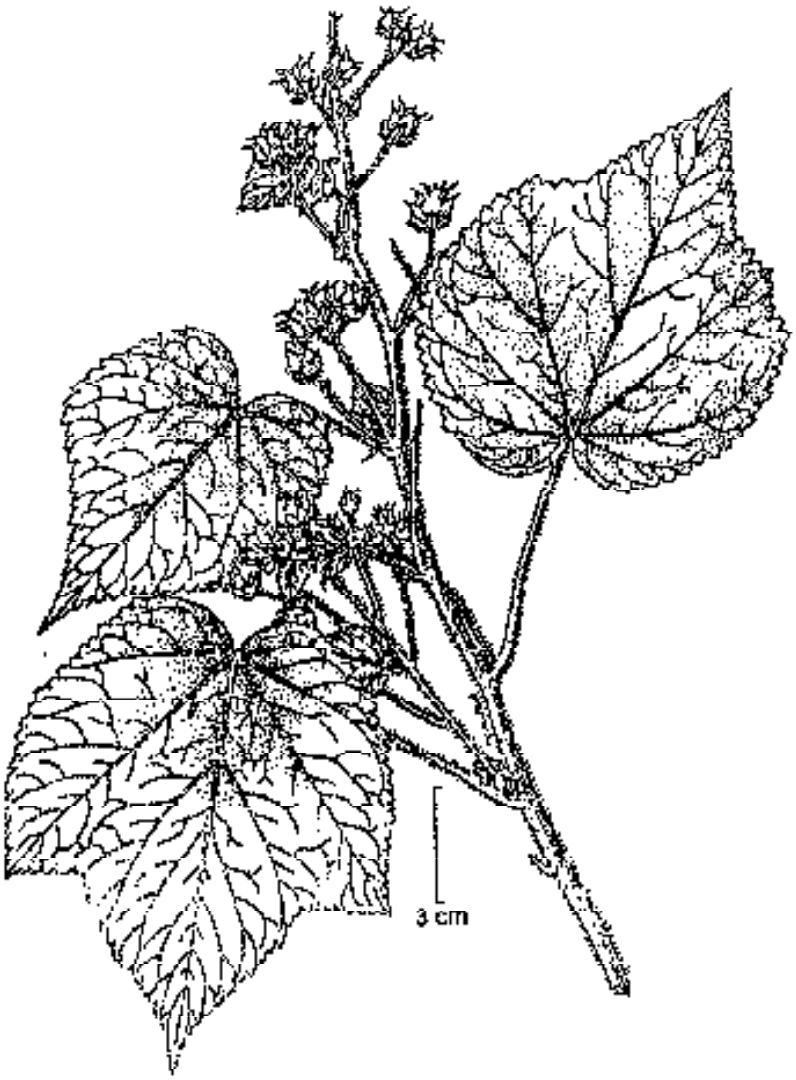
Fls. & Frts. : December–March.

Illus. : Paul in Sharma et al. op. cit.

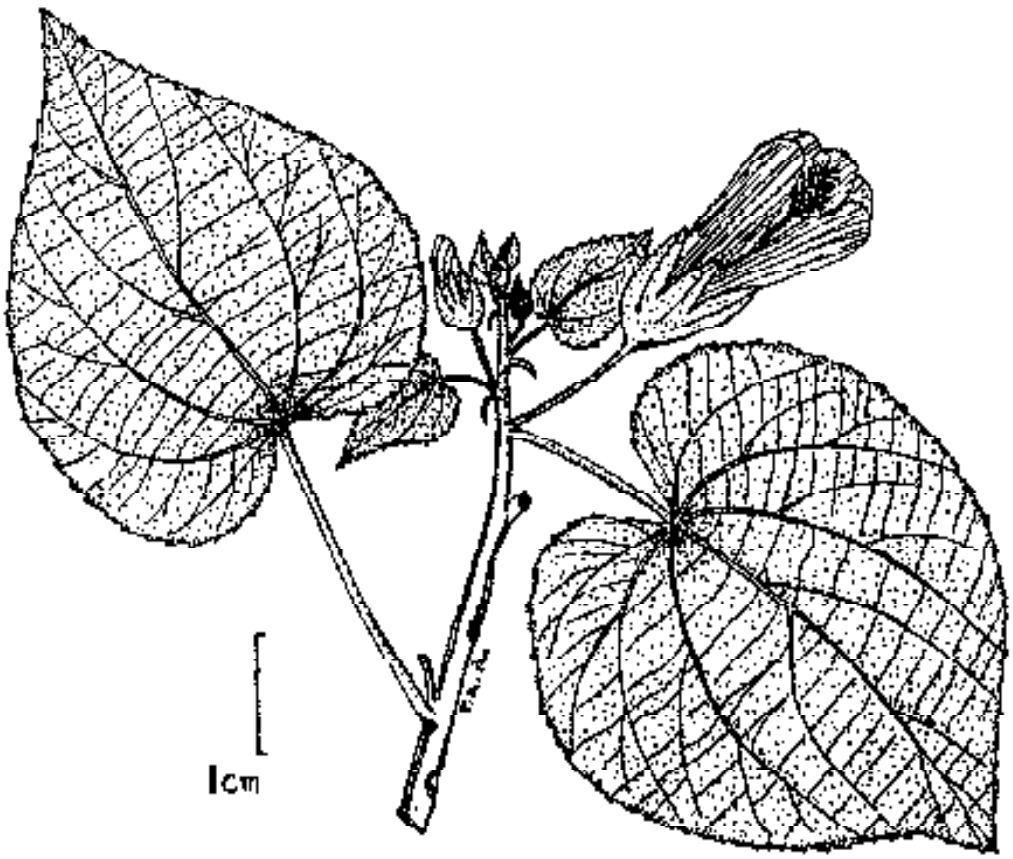
Distrib. : Bombay (Almeida, op. cit.).

A. ranadei Woodr. et Stapf in Kew Bull.1894: 99. 1894; Cooke, Fl. Pres. Bombay 1: 101. 1958 (Repr.); Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 95. 1988; Paul in Sharma et al. Fl. India 3: 273. 1993.

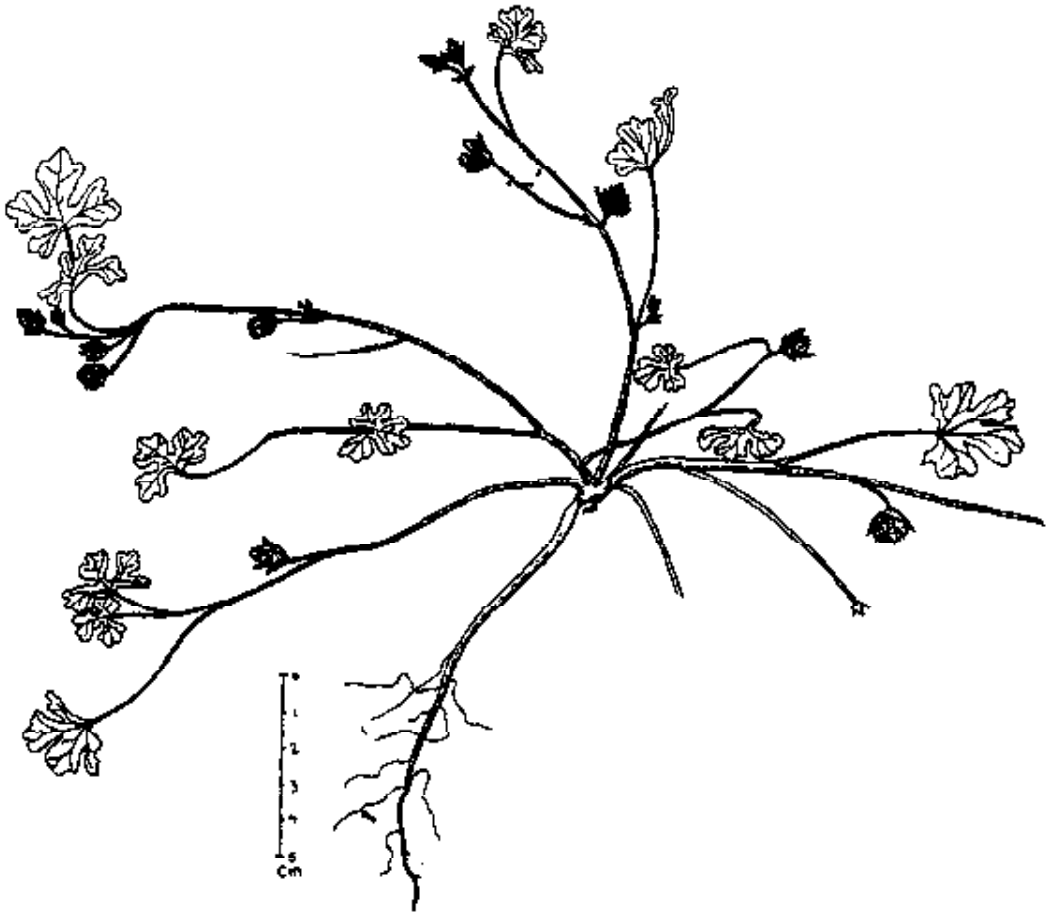
Undershrubs, c 120 cm high; young parts, densely pubescent. Leaves 4–20 x 3–15 cm, ovate, 7–11–nerved, both sides stellate hairy, crenate–dentate at margins. Flowers solitary, axillary; calyx c 1.5 cm across, campanulate, each lobe with 3 prominent nerves; corolla c 2.5 cm across, orange–yellow; staminal column c 2 cm long; carpels 5, mucronate, densely hairy throughout.



Abution ramosum (Cav.) Guill. & Perr.



Abutilon ranadei Woodr. & Stapf



Althaea ludwigii L.

Fls. & Frts. : November–January.

Illus. : Paul & Nayar, Red data Book Indian Plants 1: 199, f. 1987.

Distrib. : Endangered and endemic along northern parts of W. ghats. Kolhapur, Ratnagiri, Satara.

A. theophrasti Medik. Malv. 28. 1787; Borss. in Blumea, 14: 166. 1966; Paul in Sharma et al. Fl. India 3: 274. 1993; Almeida, Fl. Mah. 1: 103. 1996.

Annual herbs. Leaves 7–10 cm long, orbicular–cordate, acuminate at apex, dentate along margins, villose on both surfaces, hispid along nerves. Flowers in terminal, leafless panicles; petals yellow. Mericarps oblong, hispidulous or pubescent, dehiscing along dorsal sutures. Seeds covered with tufts of stellate hairs.

Fls. & Frts. : September–October.

Distrib. : Nasik (Almeida, op. cit.).

Althaea L.

Althaea ludwigii L. Mant. 98. 1767; Mast. in Hook. f. Fl. Brit. India 1: 319. 1874; Cooke, Fl. Pres. Bombay 1: 95. 1958 (Repr.); Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 101. 1988; Paul in Sharma et al. Fl. India 3: 354. 1993.

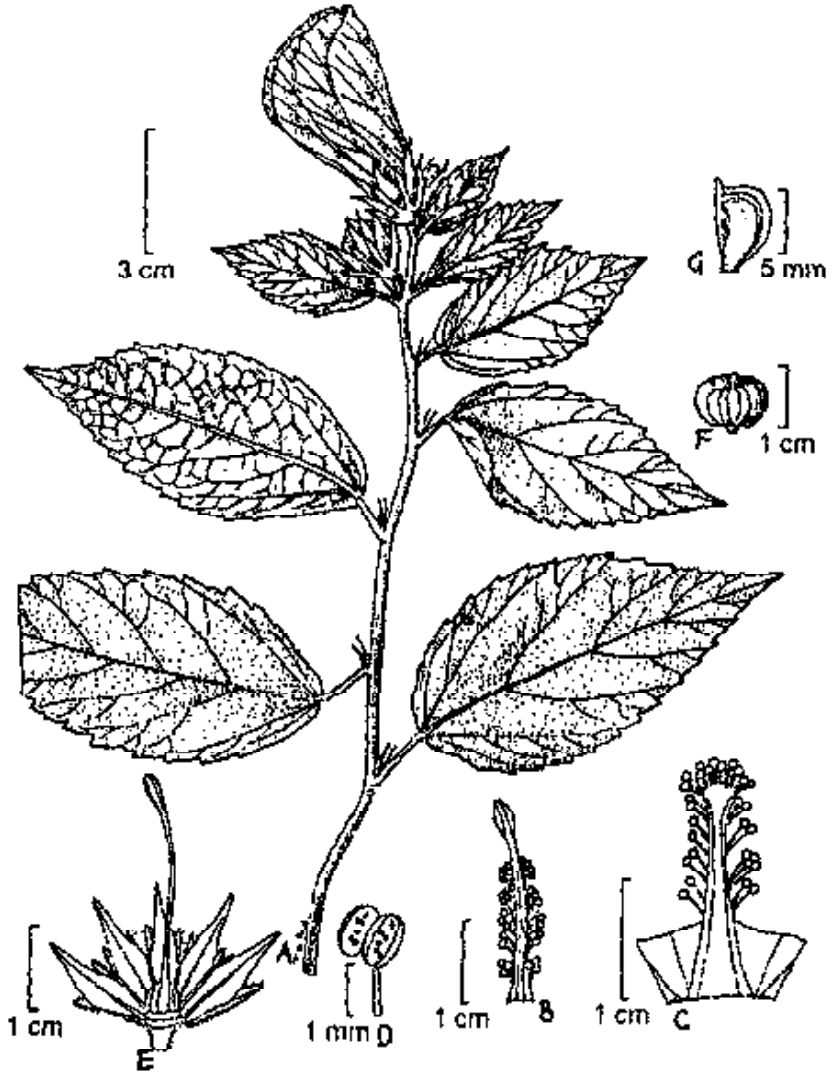
Herbs, annual, prostrate. Leaves 0.5–1.5 x 0.8–1.8 cm, lobed, lobes wedge–shaped, each lobe 3–5–fid. Flowers axillary, solitary or in fascicles; epicalyx cupular, segments 7–9; calyx as long as epicalyx, accrescent; corolla white, exceeding calyx. Schizocarps 4–6 mm across, mericarps 8–9, wrinkled at sides. Seeds 1 mm across, brownish–black.

Fls. & Frts. : January–March.

Distrib. : Occassional along hill slopes in dry deciduous forests. Nagpur, Nasik, Pune.

Bombyx Medik.

Bombyx micranthus (L.f.) Riedl. in Rech. f. Fl. Iran. 120: 34. 1976. *Hibiscus micranthus* L. f. Suppl. 308. 1781; Mast. in Hook. f. Fl. Brit. India 1: 335. 1874; Cooke, Fl. Pres. Bombay 1: 113. 1958 (Repr. ed.); Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 137, f. 29. 1988; Paul in Sharma et al. Fl. India 3: 330, f. 92. 1993. *H. ovalifolius* (Forssk.) Vahl, Symb. Bot. 1: 40. 1790.



Decaschistia crotonifolia Wall. ex Wight & Arn. : A-Flowering part of branch; B-Androecium with projecting stigma; C-Sectioned staminal column showing attachment to petal; D-Stamen; E-Flower dissected with petals and staminal column removed; F-Fruit; G-Seed in a locule.

Erect, weak, suffruticose undershrubs, 0.5–2.0 m high. Leaves 1.5–4.5 x 0.5–3.5 cm, ovate or elliptic–obovate. Flowers terminal and axillary, solitary; corolla white, sometimes tinged with pink at apex. Capsules globose, puberulous. Seeds. 2–3 in each cell, clothed with long, cottony hairs.

Fls. & Frts. : June–October.

Illus. : Tadul. & Venkat. Handls. S. Indian Weeds 111, f. 43. 1955 (Rev. ed.); Mahesh. Illus. Fl. Delhi f. 29. 1966; Paul & Nayar, op. cit.

Distrib. : Very common on open hill slopes.

DECASCHISTIA Wight & Arn.

1. Middle & lower leaves deeply trilobed; seeds pubescent ... *D. trilobata*

1. Middle & lower leaves not lobed, ovate or ovate–lanceolate; seeds glabrous ... *D. crotonifolia*

Decaschistia crotonifolia Wall. ex Wight & Arn. Prodr. 52. 1834; Mast. in Hook. f. Fl. Brit. India 1: 332. 1874; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 104, f. 21. 1988; Paul in Sharma et al. Fl. India 3: 296, f. 82. 1993.

Shrubs, c 2 m high; stems and branches densely whitish stellate tomentose. Leaves 3–4 x 1.5–8.0 cm, ovate–lanceolate, cordate–roundate at base, acute at apex; petioles 1–4 cm long, densely stellate–pubescent. Flowers solitary, axillary or 2–5 in terminal clusters by reduction of upper leaves; epicalyx segments 5–10 x 1.0–1.5 mm, linear, connate at base, densely pubescent on both surfaces; calyx campanulate, divided to the middle, lobes 10–15 x 3–5 mm, persistent; corolla with dark maroon centre, petals 3–4 x 2.5 cm, obovate, densely stellate–pubescent outside, glabrous inside; staminal column c 2 cm long; ovary ovoid with 10 carpels. Capsules 1.5–2.0 x 1.0–1.5 cm, enclosed in the calyx, densely stellate pubescent. Seeds c 4 x 2.5 mm, reniform, glabrous.

Fls. & Frts. : March–November.

Illus. : Wight, Ic. t. 42. 1840.

Distrib. : In deciduous forests of Western Ghats. Maharashtra without exact locality (Paul in Nayar et al. op. cit.).



Decaschistia trilobata Wight

D. trilobata Wight, Ic. t. 88. 1840; Mast. in Hook. f. Fl. Brit. India 1: 332. 1874; Cooke, Fl. Pres. Bombay 1: 109. 1958 (Repr.); Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 106, f. 22. 1988; Paul in Sharma et al. Fl. India 3: 300, f. 83. 1993.

Shrubs; young parts tomentose. Upper leaves 3.0 –6.5 x 1–5 cm, lanceolate or oblong–lanceolate, lower deeply trilobed, lobes 4–8 x 1.0–2.5 cm, lanceolate, oblong–lanceolate, densely pubescent on both sides. Flowers solitary, axillary; calyx lobes 8–12 x 5–7 mm, distinctly 3–nerved; corolla c 4 cm across, yellow. Capsules 8–10 x 10–15 mm densely hairy. Seeds c 5 x 3 mm, reniform, stellate pubescent.

Fls. & Frts. : October- December.

Illus. : Wight, op. cit.; Paul & Nayar, op. cit.; Nayar et al. Red Data Book of Indian Plants 2: 151, f. 1988.

Distrib. : Frequent in moist deciduous forests. Kolhapur, Ratnagiri, Sindhudurg.

FIORIA Mattei

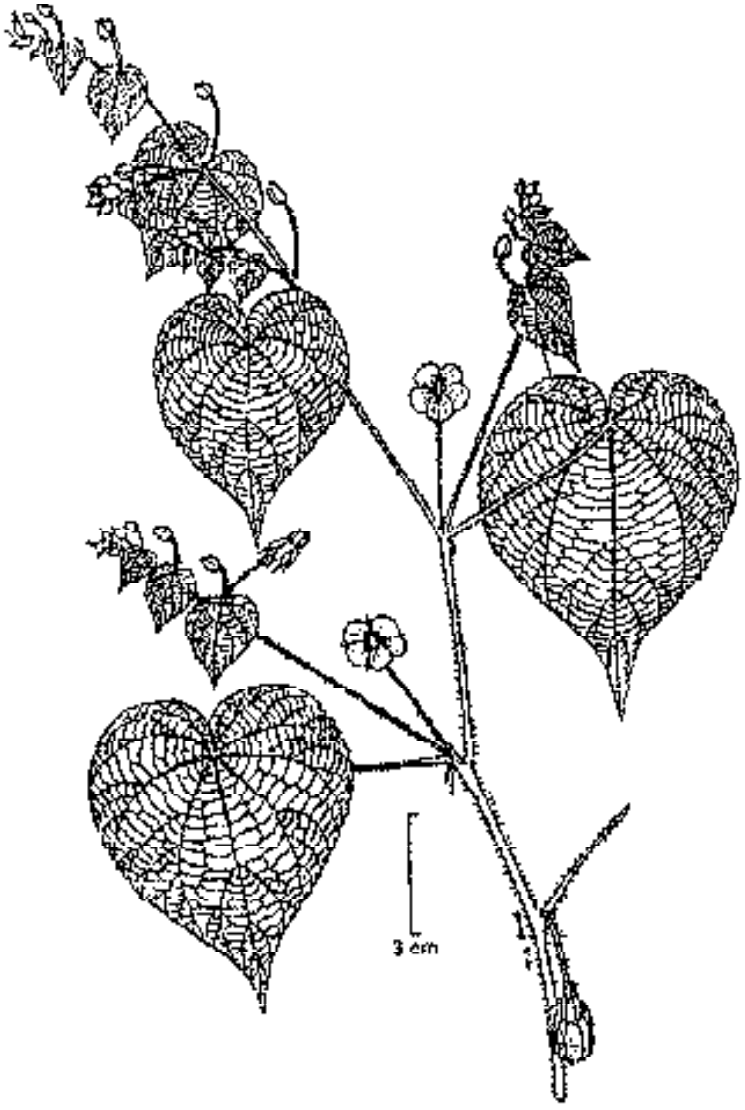
Fioria vitifolia (L.) Mattei, Boll. Reale. Orto. Bot. Giardino Color. Palermo 2: 71. 1916; Kundu & Biswas in Bull. Bot. Surv. India 16: 125. 1977; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 109, f. 23. 1988; Paul in Sharma et al. Fl. India 3: 310, f. 87. 1993. *Hibiscus vitifolius* L. Sp. Pl. 696. 1753; Mast. in Hook. f. Fl. Brit. India 1: 338. 1874; Cooke, Fl. Pres. Bombay 1: 115. 1958 (Repr.); Borss. in Blumea 14: 82. 1966; Rakshit & Kundu in Bull. Bot. Surv. India 12: 166. (1970) 1972. *Kosteletzkya vitifolia* (L.) Almeida & Patil in J. Bombay nat. Hist. Soc. 93: 111. 1996. *'Van–Kapus'*.

Erect undershrubs, 1.0–1.5 m high. Leaves 2.5–15.0 x 2–12 cm, 3–7–lobed. Flowers solitary, axillary; epicalyx segments 7–12; calyx lobes 0.5–1.5 x 0.6–1.0 cm, ovate–deltoid; corolla yellow with purple centre. Capsules c 1.5 cm across, truncate, beaked. Seeds 0.3 cm long, brown verruculose.

Fls. & Frts. : April–December.

Illus. : Tadul. & Venkat. Handb. S. Indian Weeds 115, f. 45. 1955 (Rev. ed.); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 62. 1982 (*Hibiscus vitifolius*); Paul & Nayar, op. cit.

Distrib. : Common on hill slopes.



Hertsantia crispa (L.) Medik.

Notes : Mattei (op. cit.) treated *Hibiscus vitifolius* L. under the genus *Fioria* based mainly on its conspicuous, scarious, strongly veined winged fruits, a unique character absent in the genus *Hibiscus* L.

HERISSANTIA Medik.

Herissantia crispa (L.) Medik. Phil. Bot. 1: 90. 1789; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 108, f. 24. 1988; Paul in Sharma et al. Fl. India 3: 276, f. 74. 1993. *Sida crispa* L. Sp. Pl. 685. 1753. *Abutilon crispum* (L.) Medik. Malv. 29. 1787; Mast. in Hook. f. Fl. Brit. India 1: 327. 1874; Cooke, Fl. Pres. Bombay 1: 103. 1958 (Repr.); Borss. in Blumea 14: 161. 1966; Almeida, Fl. Mah. 1: 100. 1996.

Herbs, up to 1.5 m high, pubescent. Leaves 2–10 x 1.5–8 cm, ovate, cordate at base, acuminate at apex, crenate to serrate, stellate hairy on both surfaces; stipules 3–6 mm long, filiform. Flowers solitary, axillary, pedicels jointed above middle; calyx c 8 mm across, campanulate, lobes 4–7 x 2.0–2.5 cm, ovate to linear–triangular or lanceolate, densely stellate hairy; corolla c 4.5 mm across, white or pale yellow; staminal column 2.0–2.5 mm long, glabrous. Schizocarps 10–15 mm across, globular; mericarps 10–15, inflated, membranous, shiny at maturity. Seeds 2–3, 1.5–2.0 mm across, reniform, covered with hairs.

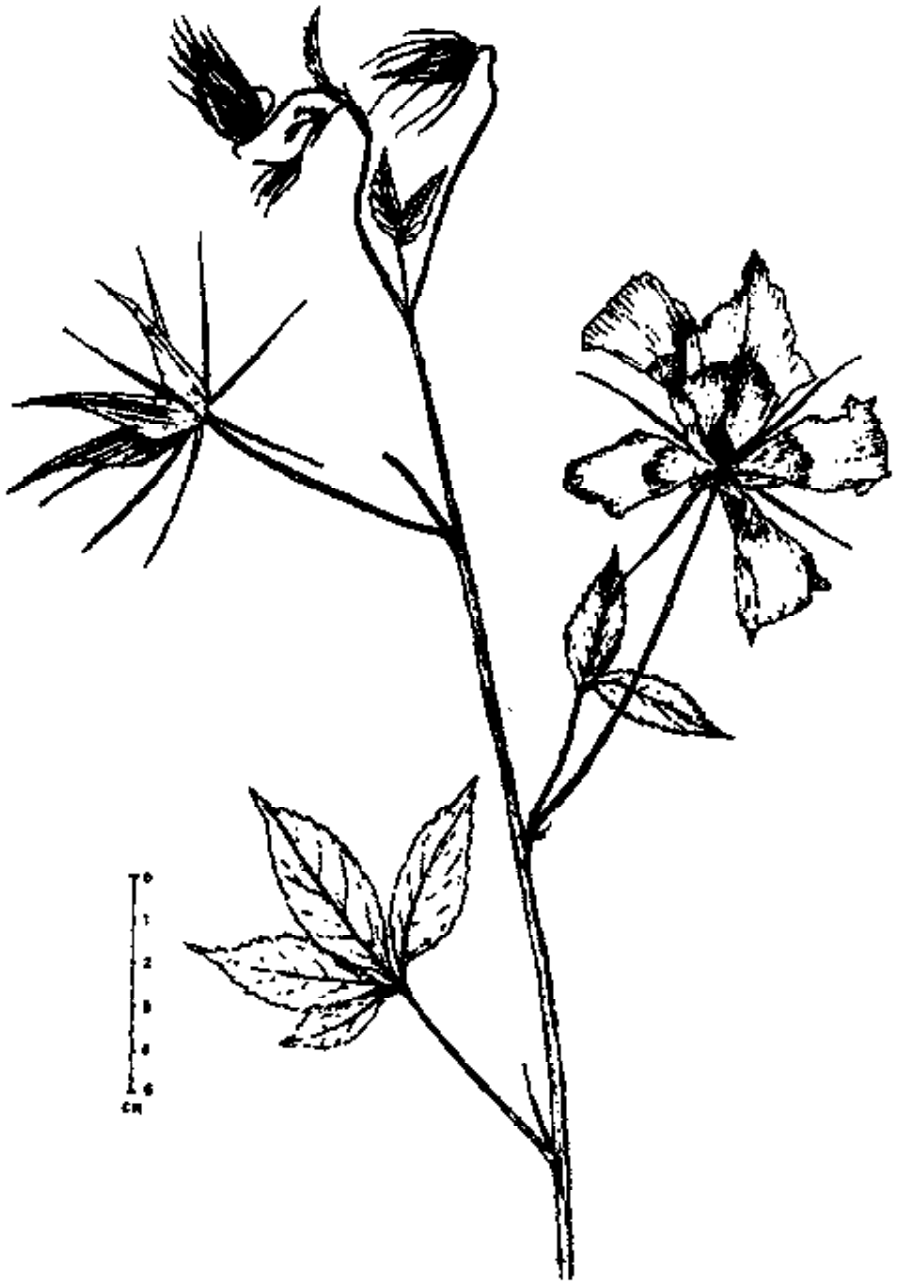
Fls. & Frts. : July–February.

Illus. : Wight Ic. t. 68. 1838 (*Abutilon crispum*), Paul in Sharma et al. op. cit.

Distrib. : Marathwada (Almeida, op. cit.), Western ghats & Deccan plateau (Paul in Sharma et al. op. cit.).

HIBISCUS L. (nom. cons.)

1. Trees ... *H. tiliaceus*
1. Herbs, undershrubs or shrubs :
   2. Stems with prickles or bristles :
      3. Stipules foliaceous ... *H. surattensis*
      3. Stipules not foliaceous :
         4. Calyx lobes broadly lanceolate, apex acute to acuminate ... *H. hispidissimus*
         4. Calyx lobes ovate to deltoid, apex long acuminate ... *H. radiatus*
   2. Stems without prickles or bristles :



Hibiscus cannabinus Garcke

5. Segments of epicalyx very short, often caducous ... *H. lobatus*

5. Segments of epicalyx distinctly long, persistent. :

6 Seeds hairy :

7. Seeds tomentose with short hairs ... *H. panduraeformis*

7. Seeds covered with long silky, ferrugineus hairs :

8. Leaves with nectaries on veins; peduncles jointed above middle; calyx lobes 3–10 mm long ... *H. hirtus*

8. Leaves without nectaries on veins; peduncles jointed at or below middle; calyx lobes 10–22 mm long ... *H. talbotii*

6. Seeds glabours or tubercled :

9. Calyx more or less inflated, covering the capsule ... *H. trionum*

9. Calyx not inflated. :

10. Pedicels much shorter than petioles, inarticulate; epicalyx segments usually 5 ... *H. lunariifolius*

10. Pedicels as long or longer than petioles, articulate; epicalyx segments 8–10 :

11. Leaves unlobed or shallowly 3-lobed, lobation up to the middle of lamina; epicalyx segements 5 mm long ... *H. obtusilobus*

11. Leaves deeply 3–5-lobed, lobation up to the base of lamina; epicalyx segments 2.0–3.5 cm long ... *H. caesius*

Hibiscus caesius Garcke in Oest. Bot. Zeit. 7: 850. 1849; Cooke, Fl. Pres. Bombay 1: 116. 1958 (Repr.); Rakshit & Kundu in Bull. Bot. Surv. India 12: 173. (1970) 1972; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 126, f. 25. 1988; Paul in Sharma et al. Fl. India 3: 334, f. 93. 1993. *H. gibsonii* Stocks ex Harv. & Sond. Fl. Cap. 2: 587. 1861–62; Mast. in Hook. f. Fl. Brit. India 1: 339. 1874.

Erect herbs, 1.5–2.0 m high; stems sparsely covered with bristles and prickles.Leaves deeply 3–5-lobed, lobes 2.0–7.5 x 1–3 cm, lower surface stellate pubescent, margins serrate. Flowers solitary, axillary; epicalyx segments 8–10, 2.0–3.5 cm long, becoming spineacent in fruit; calyx fused below middle; persistent corolla yellow with purple centre. Capsules ovoid, enclosed within calyx. Seeds c 3 mm across, reniform.

Fls. & Frts. : September–October.

Illus. : Paul & Nayar, op. cit.; Lakshminarasimhan & Sharma, Fl. Nasik Dt. 87, f. 4. 1991.

Distrib. : Rare along foot hills. Ahmednagar, Aurangabad, Dhule, Jalna, Nasik, Pune, Ratnagiri, Sindhudurg.

H. hirtus L. Sp. Pl. 694. 1753; Mast. in Hook. f. Fl. Brit. India 1: 335. 1874; Cooke, Fl. Pres. Bombay 1: 113. 1958 (Repr.); Borss. in Blumea 14: 75. 1966; Rakshit & Kundu in Bull. Bot. Surv. India 12: 170. (1970) 1972; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 130. 1988; Paul in Sharma et al. Fl. India 3: 329. 1993.

Undershrubs, 1.0–1.5 m high; stems rough with stiff, minute stellate hairs. Leaves 2.5–7.0 x 1.0–6.5 cm, ovate, often 3–lobed, irregularly toothed, stellate hairy on both surfaces. Flowers solitary, axillary, 1.5–2.5 cm across; epicalyx segments 6–8, free, lanceolate to linear; calyx narrowly campanulate, slightly accrescent, 5–fid; corolla white or pink, rotate. Capsules 5–valved, globose, shorter than calyx. Seeds cottony, 2–3 per cell, reniform, c 3.5 mm long, black.

Fls. & Frts. : November–January.

Illus. : Cav. Diss. 3: 157, t. 67, f. 2. 1787 (*H. phoeniceus* Cav.).

Distrib. : Frequent in dry regions. Dhule, Nagpur, Pune, Ratnagiri, Satara, Sindhudurg.

H. hispidissimus Griff. Not. Pl. Asiat. 4: 521. 1854; Pradeep & Sivar. in Taxon 40: 637. 1991. *H. furcatus* Roxb. ex DC. Prodr. 1: 448. 1824 non Willd. 1809; Mast. in Hook. f. Fl. Brit. India 1: 335. 1874; Cooke, Fl. Pres. Bombay 1: 112. 1958 (Repr.). *H. aculeatus* Roxb. Fl. Ind. 3: 206. 1832 non Walter 1788; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 123. 1988; Paul in Sharma et al. Fl. India. 3: 323. 1993.

Rambling, suffruticose undershrubs, c 1.5 m high. Leaves entire or palmately 3–5–lobed, margins crenate–dentate. Flowers solitary, axillary, 5–10 cm across; epicalyx with 8–12 segments, hispid; calyx deeply 5 cleft, 3–nerved; corolla yellow with purple centre. Capsules c 1.5 cm long, ovoid. Seeds reniform, 4–5 mm across, brown.

Fls. & Frts. : September–February.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 119, f. 71. 1909 & Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 36. 1988 (*H. furcatus.*).

Distrib. : Frequent in moist deciduous forests along ghats. Bombay, Kolhapur, Nasik, Pune, Satara, Sindhudurg, Thane.

H. lobatus (J. A. Murr.) O. Ktze. Rev. Gen. Pl. 3: 19. 1898; Borss. in Blumea 14: 77. 1966; Rakshit & Kundu in Bull. Bot. Surv. India 12: 169. (1970) 1972; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 133, f. 27. 1988; Paul in Sharma et al. Fl. India 3: 336, f. 95. 1993. *Solandra lobata* J. A. Murr. Comm. Soc. Reg. Sci. Goetting 6: 20, t. 1. 1785. *Hibiscus solandra* L' Herit. Stirp. Nov. 1: 103, t. 49. 1788; Mast. in Hook. f. Fl. Brit. India 1: 336. 1874; Cooke, Fl. Pres. Bombay 1: 114. 1958 (Repr.).

Annual herbs, 0.5–1.5 m high; stems rarely with stellate hairs. Leaves 2–10 x 1.5–7.5 cm, orbicular to ovate, margins serrate to crenate. Flowers solitary, axillary, rarely in racemes by reduction of upper leaves; epicalyx segments 6–8; calyx 5–8 mm across, campanulate to rotate, 5–fid; corolla white or yellow, 1.3–1.8 cm across. Capsules 10–15 mm long with 1.5–2.0 mm long rostrum. Seeds 3–4 in each locule, 1.3 mm across, black.

Fls. & Frts. : July–January.

Illus. : J. A. Murr. op. cit; Paul & Nayar, op. cit.

Distrib. : Common throughout in open situations.

H. lunariifolius Willd. Sp. Pl. 3: 811. 1800; Mast. in. Hook. f. Fl. Brit. India 1: 338. 1874; Cooke, Fl. Pres. Bombay 1: 115. 1958 (Repr. ed.); Borss. in Blumea 14: 80. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 135, f. 28. 1988; Paul in Sharma et al. Fl. India 3: 334, f. 94. 1993.

Herbs or undershrubs, 2–4 m high; stems sparsely to densely stiff yellow stellate hairy. Leaves 1–15 x 0.5–19.0 cm, orbicular to ovate, rarely lanceolate, lower leaves 3–5–lobed, broadly cordate or rounded at base, acute to acuminate at apex, coarsely serrate to dentate, sparsely or densely hairy on both surfaces. Flowers solitary, axillary or in racemes; epicalyx segments 5–10, usually 5, 10–20 x 1–2 mm, linear to narrowly lanceolate, minutely hairy or glabrescent, persistent; corolla yellow with a dark purple centre, petals stellate–pubescent outside, glabrous inside. Capsules 2.0–2.5 x 1.5–1.8 cm, globose to obovoid with a rostrum of 3–5 mm. Seeds many, 2.0–2.5 mm long, reniform, black.

Fls. & Frts. : September–November.

Illus. : Paul & Navar. op. cit.

Distrib. : In dry deciduous forest. Maharashtra (Paul in Sharma et al. op. cit.).

H. obtusilobus Garcke in Oester, Bot. Zeit. 7: 837. 1849; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 141. 1988; Paul in Sharma et al. Fl. India 3: 336. 1993. *H. amblyocarpus* Hechst. ex Webb. Fragm. Fl. Aethiop. 45. 1854; Rakshit & Kundu in Bull. Bot. Surv. India 12: 174. (1970) 1972. *H. punctatus* Dalz. in Dalz. & Gibs. Bombay Fl. 20. 1861; Mast. in Hook. f. Fl. Brit. India 1: 340. 1874; Cooke, Fl. Pres. Bombay 1: 116. 1958 (Repr.).

Annual, suffruticose undershrubs, c 1 m high; stems stellate hairy, glutinous. Leaves rounded–ovate, unequally 3–lobed, lobes 2.5–10.0 x 1.5–6.0 cm, middle lobe longer. Flowers solitary, axillary or sub–panicled; epicalyx segments 8–10, c 5 mm long; calyx campanulate, connate below, lobes deltoid–lanceolate, tomentose, persistent; corolla white or pale pink. Capsules c 1 cm long, beaked, densely stellate pubescent outside. Seeds 2 mm across, reniform, muricated, black.

Fls. & Frts. : August–December.

Distrib. : Rare in open situations. Bombay, Thane.

H. panduraeformis Burm. f. Fl. Ind. 151, t. 47, f. 2. 1768; Mast. in Hook. f. Fl. Brit. India 1: 338. 1874; Cooke, Fl. Pres. Bombay 1: 115. 1958 (Repr.); Borss. in Blumea 14: 79. 1966; Rakshit & Kundu in Bull. Bot. Surv. India 12: 172. (1970) 1972; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 142. 1988; Paul in Sharma et al. Fl. India 3: 339. 1993.

Annual herbs, 1.8–4.5 m high; stems stellate–velutinous to tomentose. Leaves 4–15 cm long, shallowly 3–5–lobed, margins irregularly toothed, silky hairy both surfaces. Flowers solitary, axillary, 4–6 cm across; calyx 1.5–2.0 cm long, 5–lobed, hispid; corolla yellow with dark purple centre. Capsules shorter than calyx, 1.5 cm long, ovoid, densely hairy outside. Seeds 2.0–2.5 mm long, reniform, brown.

Fls. & Frts. : October–January.

Illus. : Tadul. & Venkat. Handb. S. Indian Weeds 113, f. 44. 1955 (Rev. ed.).

Distrib. : Common in open situations.

H. radiatus Cav. Diss. 3: 150, t. 54, f. 2. 1787; Mast. in Hook. f. Fl. Brit. India 1: 335. 1874; Cooke, Fl. Pres. Bombay 1: 112. 1958 (Repr.); Borss. in Blumea 14: 60. 1966; Rakshit & Kundu in Bull. Bot.

Surv. India 12: 162. (1970) 1972; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 146, f. 30. 1988; Paul in Sharma et al. Fl. India 3: 327, f. 90. 1993.

Undershrubs, c 1.8 m high; stems with bulbous based, retrose prickles. Leaves 2–12 x 1.5–12.0 cm, broadly ovate to oblong, deeply 3–5–parted. Flowers solitary, axillary; pedicels pubescent below joint; epicalyx segments 10, free, spreading, accrescent, ciliate by bulbous based bristles; calyx stellate to campanulate, 5–parted; corolla c 8 cm across, yellow with a dark purple centre. Capsules 2.0–2.5 x 1.5 cm, ovoid, with a short beak. Seeds 4 mm across, scabrous, brown.

Fls. & Frts. : August–February.

Illus. : Paul & Nayar, op. cit.

Distrib. : Found along ghats in deciduous forests. 'Ratnagiri' (Cooke, op. cit.).

H. surattensis L. Sp. Pl. 696. 1753; Mast. in Hook. f. Fl. Brit. India 1: 334. 1874; Cooke, Fl. Pres. Bombay 1: 112. 1958 (Repr.); Borss. in Blumea 14: 57. 1966; Rakshit & Kundu in Bull. Bot. Surv. India 12: 160. (1970) 1972; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 153, f. 32. 1988; Paul in Sharma et al. Fl. India 3: 327, f. 91. 1993.

Erect or trailing herbs with slender branches, 0.5–2.0 m long. Leaves 4.5–10.0 x 5.0–14.5 cm, orbicular to elliptic, 3–5–palmilobed, margins coarsely serrate; petioles and pedicels covered densely with recurved prickles. Flowers yellow with dark purple centre, axillary, solitary; calyx chartaceous, campanulate, rigid; staminal column much shorter than corolla, glandular hairy. Capsules 12–15 x 10–12 mm, ovoid to globose, hispid outside. Seeds reniform, 3.0–3.5 mm across, stellate–hairy.

Fls. & Frts. : September–February.

Illus. : Wight, Ic. t. 197. 1839; Paul & Nayar, op. cit.

Distrib. : Rarely found in waste places. Bombay, Pune.

H. talbotii (Rakshit) Paul & Nayar in Bull. Bot. Surv. India 22. 198. (1980)1982 & in Nayar et al. Fasc. Fl. India 19: 156. 1988; Paul in Sharma et al. Fl. India 3: 331. 1993. *H. hirtus* var. *talbotii* Rakshit in Sci. & Cult. 27: 193, f. 2. 1961. & in Bull. Bot. Surv. India 12: 170. (1970) 1972.*'Dupari'*.

Hairy undershrubs, 1– 2 m high. Leaves 7–12 x 2.5–6.0 cm, ovate, oblong–lanceolate, 3–lobed, central lobe bigger than laterals, hairy on both surfaces. Flowers 1.0–2.5 cm across, axillary or in terminal

panicles; epicalyx segments 6–9, linear; calyx 5–lobed, lobes lanceolate, densely hairy; corolla 1.6–2.5 x 0.5–0.7 cm, hairy outside. Capsules globose, 5–valved, hairy. Seeds c 3 mm long, reniform, densely covered with whitish wolly hairs.

Fls. & Frts. : November–June.

Illus. : Rakshit, op. cit.

Distrib. : Common along lower ghats, endemic to Maharashtra and Karnataka only.

H. tiliaceus L. Sp. Pl. 694. 1753; Mast. in Hook. f. Fl. Brit. India 1: 343. 1874; Cooke, Fl. Pres. Bombay 1: 119. 1958 (Repr.); Borss. in Blumea 14: 30. 1966; Rakshit & Kundu in Bull. Bot. Surv. India 12: 157. (1970) 1972; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 157. 1988; Paul in Sharma et al. Fl. India 3: 322. 1993. *'Bela pata'*.

Trees, 5–10 m high, much branched; trunk fairly smooth; twigs stellate–hairy. Leaves 3–20 x 1.5–20.0 cm, thinly coriaceous, stellate–tomentose below, base cordate. Flowers solitary or in lax racemes, yellowish inside, base purplish. Capsules 2.5 x 1.5 cm, woody. Seeds reniform, minutely warty.

Fls. & Frts.: August–April.

Illus. ; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 41. 1988.

Distrib. : Usually found along sea coast, often cultivated. Bombay, Pune, Ratnagiri, Sindhudurg.

H. trionum L. Sp. Pl. 697. 1753; Mast. in Hook. f. Fl. Brit. India 1: 334. 1874; Cooke, Fl. Pres. Bombay 1: 111. 1958 (Repr.); Rakshit & Kundu in Bull. Bot. Surv. India 12: 168. (1970) 1972; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 158. 1988; Paul in Sharma et al. Fl. India 3: 341. 1993.

Trailing, annual herbs, 30–60 cm high with simple and few stellate hairs. Leaves 2. 5– 7.5 cm long, lower leaves orbicular, lobed or unlobed, upper leaves palmately 3–5–lobed, hairy on both surfaces. Flowers solitary, axillary, yellow with dark purple centre; calyx campanulate, inflated, membranous. Capsules oblong, obtuse, hairy. Seeds many, more or less reniform, mature ones glandular–papillose, rugose.

Fls. & Frts. : July–January.

Illus. : Sald. & Ramesh in Sald. **Fl. Karnataka** 1: 253, f. 33 A. 1984.

Distrib. : Found occasionally along moist places. Ahmednagar, Aurangabad, Bombay, Chandrapur, Nanded, Nasik, Parbhani, Pune.

KYDIA Roxb.

Kydia calycina Roxb. Pl. Cor. 3: 12, t. 215. 1811; Mast. in Hook. f. Fl. Brit. India 1: 348. 1874; Cooke, Fl. Pres. Bombay 1: 100. 1958 (Repr.); Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 160. 1988; Paul in Sharma et al. Fl. India. 3: 344. 1993. *'Bhoti', 'Illya', 'Potari', 'Varas', 'Warung'.*

Moderate sized trees, 15–20 m high; young branches with stellate tomentum. Leaves 4–12 x 3.5–15.0 cm, 3–lobed, palminerved. Flowers in panicles, polygamous; epicalyx segments 4–6, connate below, persistent, stellate–pubescent; calyx cup shaped, persistent; corolla 17 mm across, white. Capsules c 5 mm across, 3–celled, globose. Seeds c 3 x 2 mm, reniform–ellipsoid.

Fls. & Frts.: September–February.

Illus. : Ic. Roxb. Fasc. 2: Pl. 6. 1968 (Repr. ed); Wight, Ic. tt. 879–880. 1844–45; Bedd. Fl. Sylv. t. 3. 1869; Talb. For. Fl. Bombay Pres. & Sind 1: 128, f. 78. 1909; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 42. 1988.

Distrib. : Common in deciduous forests.

MALACHRA L.

Malachra capitata (L.) L. Syst. Nat. ed. 12, 2: 458. 1767; Mast. in Hook. f. Fl. Brit. India 1: 329. 1874; Cooke, Fl. Pres. Bombay 1: 105. 1958 (Repr.); Borss. in Blumea 14: 146. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 163, f. 33. 1988; Paul in Sharma et al. Fl. India 3: 367, f. 104. 1993. *Sida capitata* L. Sp. Pl. 685. 1753. *'Ran–ambadi', 'Ran–bhendi'.*

Undershrubs, 0.5–2.0 m tall, with stellate hairs. Leaves 3–14 x 4–20 cm, orbicular to suborbcular, angular or lobed; stipules filiform, broadly ovate to orbicular. Flowers in heads, 2–5–together, encircled by 3–4 leafy bracts; calyx cupular, lobes 6.0 x 1.5 cm, oblong to deltoid; corolla c 1.5–2.5 cm across, bright yellow. Schizocarps 5–6 mm across, obpyriform, mericarps 5, each c 3 x 2 mm, trigonous. Seeds c 2.5 mm long, trigonous.

Fls. & Frts. : April–December.

Illus. : Paul & Nayar, op. cit.

Distrib. : Mostly grows in grass fields and in waste places. Bhandara, Bombay, Chandrapur, Kolhapur, Nagpur, Nanded, Pune, Raigad, Ratnagiri, Thane.

MALVA L.

1. Segments of epicalyx ovate or ovate–oblong:
   2. Stems glabrescent, stout; flowers normally more than 5 in each fascicle; petals 3–5 times longer than calyx ... *M. mauritiana*
   2. Stems pubescent to glabrescent, slender; flowers 1–4 in each fascicle; petals 3 times longer than calyx ... *M. sylvestris*
1. Segments of epicalyx linear to lanceolate :
   3. Dorsal surface of mericarps distinctly reticulate with keeled angles ... *M. parviflora*
   3. Dorsal surface of mericarps smooth or finely ridged, with angles not keeled ... *M. neglecta*

Malva mauritiana L. Sp. Pl. 689. 1753; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 168, f. 34. 1988; Paul in Sharma et al. Fl. India 3: 357, f. 99. 1993. *M. sylvestris* var. *mauritiana* (L.) Boiss. Fl. Or. 1: 819. 1867; Mast. in Hook. f. Fl. Brit. India 1: 320. 1874; Cooke, Fl. Pres. Bombay 1: 96. 1958 (Repr.).

Erect herbs or undershrubs, c 2 m tall; stems stout, glabrescent. Leaves 3.0–8.5 x 2–6 cm, orbicular, 3–5–lobed, truncate or shallowly cordate at base, obtuse or rounded at apex, crenate. Flowers 5–15 in axillary fascicles; epicalyx segments 3–4 x 2 mm, ovate to ovate–oblong; calyx lobes 5–6 x 3 mm, ovate–lanceolate to ovate or oblong, free up to the middle, accrescent in fruit; petals dark pink to purple, 1.5–2.5 x 1.5–2.0 cm, claw hairy. Mericarps 10–14, 1.5–2.0 mm across, reticulate. Seeds c 1.5 mm across, reniform, blackish–brown.

Fls. & Frts. : October–May.

Illus. : Paul & Nayar, op. cit.

Distrib. : It is an ornamental usually grown in gardens and also found as an escape. Aurangabad, Bombay, Nagpur.

M. neglecta Wallr. in Syll. Pl. Nov. Ratisb. 1: 140. 1824; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 169, f. 35. 1988; Paul in Sharma et al. Fl. India 3: 359, f. 100. 1993. *M. rotundifolia* L. Sp. Pl. 688. 1753; Mast. in Hook. f. Fl. Brit. India 1: 320. 1874; Cooke, Fl. Pres. Bombay 1: 96. 1958 (Repr.). *'Chandiri', 'Khabasi', 'Khaparkutti'.*

Herbs, erect or prostrate, 15–60 cm long. Leaves 0.6–2.2 x 1.5–5.0 cm, reniform, shallowly 5–7–lobed, crenate, stipules 4–6 x 2–3 mm, obliquely–triangular. Flowers 2–5 in axillary lax fascicles; epicalyx segments 2–4 x 1.0–1.5 mm, linear to lanceolate, persistent; calyx connate in middle, slightly accrescent, deltoid, persistent; corolla c 1 cm across, pale lilac to whitish. Mericarps 12–14, each c 2 mm across.

Fls. & Frts. : April–September.

Illus. : Paul & Nayar, op. cit.

Distrib. : Grows rarely in dry waste places. Ahmednagar, Bombay.

M. parviflora L. in Hojer, Demonstr. Pl. Hort. Ups. 18. 1753 & Amoen. Acad. 3: 416. 1756; Mast. in Hook. f. Fl. Brit. India 1: 321. 1874; Cooke, Fl. Pres. Bombay 1: 96. 1958 (Repr.); Borss. in Blumea 14: 149. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 171, f. 36. 1988; Paul in Sharma et al. Fl. India 3: 361, f. 101. 1993. *'Gogi–sag', 'Narr'.*

Annual, semierect or prostrate herbs, 15–45 cm high. Leaves 1.5–7.0 cm broad, orbicular to reniform, slightly 3–7 –lobed, margins crenate–serrate; stipules 1–3 mm long, lanceolate to deltoid, hairy. Flowers many in compact fascicles; epicalyx segments c 5 mm long, ciliate; calyx cupular, accrescent; corolla bluish–white, 3–7 x 2–3 mm. Mericarps 10, reniform. Seeds 1.5–2.0 mm in across, brownish–black.

Fls. & Frts. : October–March.

Illus. : Mahesh. Illus. Fl. Delhi f. 25. 1966; Paul & Nayar, op. cit.

Distrib. : Found in waste places. Ahmednagar, Beed, Kolhapur, Pune.

M. sylvestris L. Sp. Pl. 689. 1753; Mast. in Hook. f. Fl. Brit. India 1: 320. 1874; Borss. in Blumea 14: 130. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 174, f. 37. 1988; Paul in Sharma et al. Fl. India 3: 363, f. 37. 1988; Paul in Sharma et al. Fl. India 3: 363, f. 102. 1993.

Perennial or biennial herbs, up to 2 m high; stems erect to decumbent. Leaves 1.5–8 x 1–11 cm, reniform to suborbicular, cordate, 3–7–lobed, lobes semicircular to oblong, obtuse at apex, crenate, glabrous or sparsely simple hairy beneath. Flowers 1–4 in axillary fascicles; epicalyx segments 3–5 x 1.5–2.0 mm, ovate; calyx divided to the middle, lobes 3–7 x 2–4 mm, triangular, densely hirsute outside, ciliate along margins, glabrous at base inside, persistent; corolla dark purple or violet, petals 1.5–2.5 x 0.5–1.0 cm, obovate, glabrous, basal margins tufted with simple hairs. Mericarps 10, hairy or glabrous. Seeds 1.5–2.0 mm long, reniform, glabrous, brownish–black.

Fls. & Frts. : August–March.

Illus. : Paul & Nayar, op. cit.

Distrib. : Found in Tropical to temperate forests between 600 and 3000 m. Satara, Nagpur.

MALVASTRUM A. Gray (nom. cons.)

Malvastrum coromandelianum (L.) Garcke in Bonplandia 5: 295. 1857; Borss. in Blumea 14: 152. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 180, f. 39. 1988; Paul in Sharma et al. Fl. India 3: 277, f. 75. 1993. *Malva coromandeliana* L. Sp. Pl. 687. 1753. *Malvastrum tricuspidatum* (R. Br.) A. Gray. Pl. Wright 1: 16. 1852; Mast. in Hook. f. Fl. Brit. India 1: 321. 1874.

Erect herbs, c 1 m high, stems, petioles & pedicels with 4–armed appressed stellate hairs pointing up and downwards. Leaves 4–7 cm long, ovate–oblong, margins coarsely serrate or dentate. Flowers solitary, axillary, 5 cm across; epicalyx segments 4–7 x 0.5–1.0 mm, scattered with 4–armed stellate hairs; calyx 6–8 mm long, slightly accrescent; corolla yellow, obliquely obovate. Schizocarps globular, c 2 mm long, mericarps 10–14, radially c 2.5 mm long, curved. Seeds one in each mecricarp.

Fls. & Frts. : June–December.

Illus. : Tadul. & Venkat. Handb. S. Indian Weeds 99, f. 38. 1955 (Rev. ed.); Mahesh. Illus. Fl. Delhi f. 26. 1966; Paul & Nayar, op. cit.

Distrib. : It is a native of south America. Naturalized in waste places gardens and n barreu fields.

PAVONIA Cav. (nom. cons.)

1. Leaves without nectaries; flowers axillary, solitary; pedicels 10–60 mm long :
   2. Segments of epicalyx 5, shortly connate at base :
      3. Mericarps echinate all over; epicalyx segments lanceolate ... *P. glechomifolia*
      3. Mericarps with distinct serrulate crest and 3–4 prickles on each side; epicalyx segments ovate ... *P. procumbens*
   2. Segments of epicalyx 8–14, free :
      4. Mericarps with 3 stout horns & 4 basal protuberances ... *P. grewioides*
      4. Mericarps without horns :

	5. Mericarps winged at angles	...	*P. zeylanica*
	5. Maricarps not winged at angles	...	*P. odorata*
1.	Leaves with nectaries or veins beneath; flowers in axillary or terminal clusters; pedicles 1–5 mm long	...	*P. repanda*

Pavonia glechomifolia (A. Rich.) Garcke ex Schewin. f. Beitr. Fl. Aethiop. 1: 54. 1867; Mast. in Hook. f. Fl. Brit. India 1: 330. 1874 p.p.; Cooke, Fl. Pres. Bombay 1: 107. 1958 (Repr.); Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 191, f. 43. 1988; Paul in Sharma et al. Fl. India 3: 372, f. 106 c–d. 1993. *Lebretonia glechomifolia* A. Rich. Tent. Fl. Abyss. 1: 54. 1874.

Undershrubs, up to 1.5 m high; stems purple with scattered stellate hairs. Leaves 1.2–3.5 x 1.4–3.0 cm, ovate–cordate, entire or 3–angled, acute at apex, dentate irregularly, stellate–hairy on both surfaces. Flowers solitary, axillary; epicalyx segments 5, connate at base, 16–18 x 3–4 mm, lanceolate, hairy; calyx 6–10 mm long, 5–lobed, 6–10 x 4–5 mm, deltoid–ovoid, acute, gland–tipped hairs on outside, sparsely pubescent inside; corolla yellow with dark purple centre, petals 12–15 x 7–10 mm, rhomboid–obovate, more or less rounded at apex, ciliate at base. Mericarps c 4 mm long, pyriform, dorsally longitudinally carinate. Seeds 3 x 2 mm, pyriform, sparsely hairy towards base & hilum, brown.

Fls. & Frts. : September–February.

Illus. : Paul & Nayar, op. cit.

Distrib. : Maharashtra without exact locality (Paul in Sharma et al. op. cit.).

P. grewioides Hochst. ex Boiss. Fl. Or. 1: 837. 1867; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 191, f. 44. 1988; Paul in Sharma et al. Fl. India 3: 372, f. 106 e–g. 1993. *P. propinqua* Garcke in Schweinf. Beitr. Fl. Aethiop. 1: 55. 1867; Cooke, Fl. Pres. Bombay 1: 109. 1958 (Repr.). *P. ceratocarpa* Dalz. ex Mast. in Hook. f. Fl. Brit. India 1: 331. 1874; Cooke op cit. 108.

Undershrubs, up to 45 cm long, with woody stems; stems, petioles and pedicels densely stellate–pubescent, ultimately glabrescent. Leaves 2–6 x 1.2 cm, oblong, truncate or cordate at base, obtuse at apex, serrate, stellate–pubescent on both surfaces, densely beneath. Flowers solitary, axillary or in clusters at the apices of stems; epicalyx segments 8–10, free, 8–10 x 1 mm, linear, hairy outside, glabrous inside; calyx campanulate, 5–lobed, lobes more or less connate to the middle, 8 x 5 mm, ovate, acute, densely hairy outside, densely appressed with hairs

towards apex and margin inside; corolla yellow, turning red, petals 15 x 13 mm, obovate,obtuse or truncate, stellate–hairy towards apex outside, glabrous inside. Mericarps c 5 mm high, pyriform, woody, muricated with 3 stout horns and 4 basal wing–like appendages, glabrous. Seeds c 1.5 mm across, reniform, glabrous, brownish.

Fls. & Frts. : August–November.

Illus. : Paul & Nayar, op. cit.

Distrib. : In dry deciduous forests up to 608 m. Maharashtra (Paul in Sharma et al. op. cit.).

P. odorata Willd. Sp. Pl. 3: 837. 1800; Mast. in Hook. f. Fl. Brit. India 1: 331. 1874; Cooke, Fl. Pres. Bombay 1: 108. 1958 (Repr.); Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 193, f. 47. 1988; Paul in Sharma et al. Fl. India 3: 373, f. 108 b. 1993.

Undershrubs, c 1 m high. Leaves 3–5 x 2.0–3.5 cm, orbicular–ovate, obscurely 3–5–lobed, middle lobe longer, margins irregularly dentate. Flowers axillary, solitary; pedicels 1.5–4.0 cm long; epicalyx segments 10–12, free, ciliolate, persistent; calyx c 3 mm across; lobes 4.0 x 1.5 mm, ovate–lanceolate; corolla pink. Schizocarps pubescent, mericarps 5, each c 4 x 2 mm. Seeds 2 mm long, reniform, minutely papillose.

Fls. & Frts. : August–February.

Illus. : Paul & Nayar, op. cit.; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 44. 1988.

Distrib. : A common weed in open areas. Chandrapur, 'Konkan' (Cooke, op. cit.).

P. procumbens (Wall. ex Wight & Arn.) Walp. Rep. Bot. Syst. 1: 301. 1824 non Casaretto, 1842; Borss. in Blumea 14: 135, f. 17. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 194, f. 42. 1988; Paul in Sharma et al. Fl. India 3: 374, f. 106 a–b. 1993. *Lebretonia procumbens* Wall. ex Wight & Arn. Prodr. 47. 1834.

Herbs or undershrubs, procumbent or spreading; stems, petioles and pedicels more or less covered with stellate hairs, also with scattered, short gland–hairs. Leaves 2–10 x 1.5–9.0 cm, orbicular to ovate, often 3–lobed, cordate at base, obtusely acuminate at apex, coarsely crenate to serrate, glabrescent. Flowers solitary, axillary; epicalyx rotate, segments 5, shortly connate at base, 5–10 x 3–6 mm, ovate, acuminate at base, acute to acuminate at apex, stellate hairy on both surfaces; calyx campanulate, connate up to the middle, lobes 5–8 x

3–4 mm, ovate to lanceolate, densely stellate–hairy outside, glabrous inside; corolla yellow, petals c 14 x 12 mm, obovate, rounded at apex, ciliate at base, scattered stellate–hairy outside, glabrous inside. Mericarps 5, 5 x 3 mm, obovoid, each with a median, dorsal serrulate crest and 3–4 lateral stout ridges on either side, sparsely ferruginous stellate–hairy or glabrous. Seeds c 2 mm across, reniform, angular, glabrous, brownish–black.

Fls. & Frts. : August–December.

Illus. : Wight, Ic. t. 4. 1838 *(Lebretonia procumbens);* Paul & Nayar et al. op. cit.; Paul in Sharma et al. op. cit.

Distrib. : In dry deciduous forests and arid areas. Maharashtra without exact locality (Paul in Sharma et al. op. cit.).

P. repanda (Roxb. ex Smith) Spreng. Syst. Veg. 3: 98. 1826; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 196, f. 45. 1988; Paul in Sharma et al. Fl. India 3: 377, f. 107. 1993. *Urena repanda* Roxb. ex Smith in Rees, Cyclop. 37. n. 6. 1819; Mast. in Hook. f. Fl. Brit. India 1: 330. 1874.

Perennial, much branched herbs; stems, petioles and pedicels densely stellate–hairy. Leaves 3–8 x 2.5–10.0 cm, ovate to ovate–rounded, rarely 3–5 or 7–lobes, upper leaves sometimes lanceolate, cordate at base, acute at apex, repand–serrate, stellate–pubescent on both surfaces. Flowers solitary, axillary, ultimately in terminal clusters; epicalyx cup–shaped, segments 5, connate up to middle, 10–15 x 5–10 mm, donsely stellate hairy outside, sparsely stellate hairy inside; calyx campaulate, lobes connate up to the middle, acute to acuminate, densely stellate hairy outside, sparsely toward apex inside; petals pink with darker centre, 2–3 mm long, oblong–ovoid, densely hairy towards apical portion outside, glabrous inside. Mericarps 4 x 2.5 mm, oblong–ovoid, unarmed, glabrous. Seeds 3 x 2 mm, oblong–ovoid, glabrous, brownish–black.

Fls. & Frts. : September – December.

Illus. : Paul & Nayar, op. cit.

Distrib. : Western peninsula (Hook. f. op. cit.).

Notes. : Hook. f. op. cit. states the western peninsula as distribution for this species. But precise locality is not known. Hence, it is likely to occur in the Maharashtra State also.

P. zeylanica (L.) Cav. Diss. 3: 134, t. 48, f. 2. 1787; Mast. in Hook. f. Fl. Brit. India 1: 331. 1874; Cooke, Fl. Pres. Bombay 1: 108. 1958 (Repr.); Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 198, f. 46. 1988; Paul in Sharma et al. Fl. India 3: 377, f. 108a. 1993. *Hibiscus zeylanicus* L. Sp. Pl. 699. 1753.

Undershrubs, c 1 m high, stellate pubescent; stems with numerous decumbent branches towards apex. Leaves 1–4 x 0.8–3.5 cm, orbicular to obvoid, deeply 3–5–lobed, sparsely stellate hairy on both surfaces. Flowers solitary, axillary; epicalyx segments 10, ciliate, persistent; calyx campanulate; corolla pale pink or pinkish–white. Schizocarps globular, pubescent, mericarps 5, each c 4 x 3 mm. Seeds reniform.

Fls. & Frts. : July–December.

Illus. : Mahesh. Illus. Fl. Delhi f. 28. 1966; Paul & Nayar, op cit.

Distrib. : A frequent weed in open places. Ahmednager, Aurangabad, Chandrapur, Jalna, Nagpur, Nanded, Pune.

SIDA L.

1. Styles and mericarps 5 :
   - 2. Leaves penninerved; mericarps with prominent reticulation, awned ... *S. schimperiana*
   - 2. Leaves palminerved; mericarps smooth, mucronate :
     - 3. Erect herbs or undershrubs ... *S. mysorensis*
     - 3. Prostrate slender herbs ... *S. cordata*

1. Styles and mericarps 6–12 :
   - 4. Stipules of each pair different, one linear to lanceolate, the other linear to filiform and shorter ... *S. acuta*
   - 4. Stipules not as above :
     - 5. Stems with 1–2 spiny emergences at base of petiole ... *S. spinosa*
     - 5. Stems without any spiny emergences :
       - 6. Mericarps indehiscent ... *S. ovata*
       - 6. Mericarps dehiscent :
         - 7. Calyx velutinous to glabrous ... *S. rhombifolia*
         - 7. Calyx tomentose ... *S. cordifolia*

Sida acuta Burm. f. Fl. Ind. 147. 1768; emend K. Schum. Fl. Bras. 12 (3): 326. 1891; Cooke, Fl. Pres. Bombay 1: 98. 1958 (Repr.); Borss. in Blumea 14: 186. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 202, f. 49. 1988; Paul in Sharma et al. Fl. India 3: 281, f. 76. 1993. *S. carpinifolia* Mast. In Hook f. Fl. Brit. India 1: 323. 1874 non L. f. 1781. *'Bala', 'Jangli-methi', 'Lahan chikana', Tupkadi'.*

Branched undershrubs, 0.5–2.0 m high, pubescent when young, glabrescent later. Leaves 1–9 x 0.5–2.5 cm, elliptic–lanceolate or ovate–oblong, serrate at margins. Flowers solitary, axillary or in clusters of 2–3; calyx 5–6 mm across, slightly accrescent; corolla 8–10 mm across, light yellow. Mericarps 6–10, c 4 mm long. Seeds c 2 mm long, dark brown.

Fls. & Frts. : September–December.

Illus. : Wight, Ic. t. 95. 1838; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 68. 1982; Paul & Nayar, op. cit.

Distrib. : A common weed in waste places, fallow fields, road sides, etc.

S. cordata (Burm. f.) Borss. in Blumea 14: 182. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 206, f. 50. 1988. Paul in Sharma et al. Fl. India 3 : 283, f. 77. 1993. *Melochia cordata* Burm. f. Fl. Ind. 143. 1768. *Sida humilis* Cav. Diss. 5: 277, t. 134, f. 2. 1788; Mast. in Hook. f. Fl. Brit. India 1: 322. 1874. *S. humilis* var. *veronicifolia* (Lam.) Mast. in Hook. f. op. cit. 322. *S. veronicifolia* Lam. Encycl. 1: 5. 1783; Cooke, Fl. Pres. Bombay 1: 97. 1958 (Repr.).

Patently hairy herbs, c 50 cm long. Leaves 1–5 x 1–4 cm, orbicular; stipules linear–filiform. Flowers pale yellow, solitary, axillary, ultimately in few–flowered racemes either by development of accessory buds or by replacement of upper leaves; calyx campanulate; corolla 10 mm across. Mericarps tetrahedral with rounded angles. Seeds ovoid, c 2 mm long.

Fls. & Frts. : April–November.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 45. 1988; Paul & Nayar, op. cit.

Distrib. :Found in open situations and sometimes as undergrowth in dry–deciduous forest. Common throughout.

S. cordifolia L. Sp. Pl. 684. 1753; Mast. in Hook. f. Fl. Brit. India 1: 324. 1874; Cooke, Fl. Pres. Bombay 1: 99. 1958 (Repr.); Borss. in Blumea 14: 199. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 207. 1988; Paul in Sharma et al. Fl. India 3: 285. 1993. *'Bala'*.

Villous undershrubs, 0.5–1.0 m high, with an unpleasant smell. Leaves 1–7 x 0.5–5.5 cm, ovate–oblong, rarely orbicular, margins serrate to crenate; stipules filiform, 3–10 mm long. Flowers axillary, mostly solitary, sometimes in clusters of 2–5; calyx 5–8 mm across, segments triangular; corolla 12–15 mm across, pale yellow to nearly white, ciliate at base. Mericarps 8–10, 3.0–3.5 mm long, flattened–trigonous. Seeds flattened reniform, brown or black.

Fls. & Frts. : April–November

Illus. : Matthew, Fur. Illus. Fl. Tamilandu Carnatic 4: t. 46. 1988.

Distrib. : Frequent in open situations. Amravati, Bhandara, Bombay, Chandrapur, Kolhapur, Nagpur, Nanded, Pune, Ratnagiri, Sindhudurg.

S. mysorensis Wight & Arn. Prodr. 59. 1834; Mast. in Hook. f. Fl. Brit. India 1: 322. 1874; Borss. in Blumea 14: 180. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 209, f. 51. 1988; Paul in Sharma et al. Fl. India 3: 286, f. 78. 1993. *S. glutinosa* Roxb. Fl. Ind. 3: 172. 1832, non Commers. ex Cav. 1785; Cooke, Fl. Pres. Bombay 1: 97. 1958 (Repr.).

Erect, viscid undershrubs, c 90 cm hgih. Leaves 1.5–8.0 x 1–7 cm, ovate, hairy on both surfaces, margins serrate to crenate, 5–11–nerved at base. Flowers axillary, initially solitary, finally in condensed racemes or panicles; calyx widely campanulate, 4.5–5.0 mm across; corolla 10–12 mm across, yellow. Seeds ovoid, faintly trigonous.

Fls. & Frts. : October–February.

Illus. : Paul & Nayar, op. cit.; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 47. 1988.

Distrib. : Common in open situations.

Notes. : *S. mysorensis* Wight & Arn. is endemic to tropical Asia. *S. glutinosa* Commers. ex Cav. with which the former is often confused is a native of Tropical America. However, it is preferable to place Indian specimens under the home *S. mysorensis* if they possess palmately veined leaves (Borss. op. cit.)

S. ovata Forssk. Fl. Aeg.–Arab. 124. 1775; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 211, f. 57. 1988; Paul in Sharma et al. Fl. India 3: 288, f. 81 c–d. 1993. *S. grewioides* Guill. & Perr. in Guill. et al. Fl. Seneg. Tent. 1: 71. 1830; Mast. in Hook. f. Fl. Brit. India. 1: 323. 1874; Cooke, Fl. Pres. Bombay 1: 98. 1958 (Repr.).

Undershrubs, c 30 cm high, much branched, grey–tomentose. Leaves 1.5–5.0 x 1–4 cm, ovate–oblong, apex obtuse, base rounded; stipules c 1 cm long, stellate pubescent. Flowers axillary, solitary or sometimes paired; calyx 5–8 mm across, campanulate, lobes 5–7 x 3.5 mm; corolla yellow or yellowish–white, obliquely truncate. Schizocarps c 5 mm across, mericarps 8, 3–4 mm across. Seeds 2 mm across, blackish.

Fls. & Frts. : July–February.

Illus. : Paul & Nayar, op. cit.

Distrib. : Rare in open situations. Ahmednagar, Aurangabad, Beed, Bombay, Buldhana, Dhule, Jalna & Pune.

Sida rhombifolia L. Sp. Pl. 684. 1753 emend. Mast in Hook. f. Fl. Brit. India 1: 323. 1874; Borss. in Blumea 14: 193, t. 21 a–c 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 212, f. 52. 1988; Paul in Sharma et al. Fl. India 3: 289, f. 79. 1993. *S. rhombifolia* var. *rhomboidea* (Roxb. ex Fleming) Mast. in Hook. f. op. cit. 324. *S. rhombifolia* var. microphylla (Cav.) Mast. in Hook. f. op. cit. 324; Almeida, Fl. Mah. 1: 126. 324. 1996. *S. rhombifolia* var *obovata* Wall. ex Mast. in Hook. f. op. cit.

1. Erect herbs or undershrubs; Leaves ovate–oblong, rhomboid or lanceolate; pedicels longer than petioles; corolla 1.0–1.8 cm across ... ssp. *rhombifolia*

1. Prostrate or ascending undershrubs; leaves obovate to orbicular; pedicels as long as petioles; corolla 2.0–2.5 cm across. ... ssp. *retusa*

ssp. **rhombifolia.**

Herbs or undershrubs, 0.8–1.0 m high. Leaves 1–8 x 0.7–4.0 cm, ovate–oblong, often more or less rhomboid, margins serrate to crenate towards apex. Flowers axillary, solitary or in clusters of 2–5; corolla yellow to pale orange. Mericarps 7–12, 2–awned towards apex. Seeds c 2 mm across, brown or black.

Fls. & Frts. : July–December.

Illus. : Mahesh. Illus. Fl Delhi f. 24. 1966; Borss. op. cit.; Paul & Nayar, op. cit.

Distrib. : Weed in waste places, roadsides etc. Common throughout.

ssp. **retusa** (L.) Borss. in Blumea 14: 198, f. 21 e–h. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 216, f. 53. 1988; Paul in Sharma et al. Fl. India 3: 289. 1993. *S. retusa* L. Sp. Pl. ed. 2, 961. 1763. *S. rhombifolia* var. *retusa* (L.) Mast. in Hook. f. Fl. Brit. India 1: 324. 1874; Cooke, Fl. Pres. Bombay 1: 99. 1958 (Repr.). *'Ati–bala', 'Bala', 'Jangli–methi'.*

Prostrate or ascending undershrubs. Leaves ovate–orbicular to ovate, crenate, rhomboid–truncate with dentate apex. Flowers yellow. Seeds brownish–black.

Fls. & Frts. : July–December.

Illus. ; Borss. op. cit.; Paul & Nayar, op. cit.

Distrib. : Common weed in open situations. Ahmednagar, Bombay, Nasik, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

S. schimperiana Hochst. ex A. Rich. Fl. Abyss. 1: 66. 1847; Mast. in Hook. f. Fl. Brit. India 1: 322. 1872; Paul in Sharma et al. Fl. India, 3: 292, 80 a–b. 1993. *S. cuneifolia* Roxb. Fl. Ind. 3: 170. 1832; Almeida, Fl. Mah. 1: 125. 1996.

Undershrubs, woody; rootstock thick; branches repeatedly forked. Leaves 1.2 cm long, oblong, retuse at apex, cuneate at base, sparingly covered with stellate hairs. Flowers solitary, axillary; petals pink. Carpels 5, subglobose, ultimately dehiseing along inner edges, beak short connivent.

Fls. & Frts. : August–November.

Illus. : Paul in Sharma et al. op. cit.

Distrib. : A rare weed in Deccan (Almeida, op. cit.).

S. spinosa L. Sp. Pl. 683. 1753; Mast. in Hook. f. Fl. Brit. India 1: 323, 1874; Cooke, Fl. Pres. Bombay 1: 98. 1958 (Repr.); Borss. in Blumea 14: 191. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 218, f. 55. 1988; Paul in Sharma et al. Fl. India 3: 292, f. 80 c–e. 1993. *S. alba* L. Sp. Pl. ed. 2. 960. 1762.

Undershrubs, c 60 cm high, much branched, cinereous with minute stellate hairs. Leaves 0.6–3.0 x 0.4–2.5 cm, oblong, ovate or lanceolate, regularly serrate; stipules linear, 2–4 mm long. Flowers axillary, solitary or in clusters of 2–5; calyx widely campanulate; corolla small, yellow. Mericarps 5, trigonous, 2–3 mm long. Seeds ovoid, obscurely trigonous, dull brown–black.

Fls. & Frts. : March–December.

Illus. : Tadul. & Venkat. Handb. S. Indian Weeds 101, f. 39. 1955 (Rev. ed.); Mahesh. Illus. Fl. Delhi f. 23. 1966; Paul & Nayar, op. cit.; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4. t. 49. 1988.

Distrib. : Common weed in waste places & fallow fields.

THESPESIA Soland. ex Corr. (nom. cons.)

1. Leaves with a linear nectary on midrib beneath, usually 3–5–lobed; seeds numerous ... *T. lampas*

1. Leaves not as above; seeds 2–4 per cell :

   2. Outer layer of capsule dehiscent; seeds with short clavate or bulbous hairs ... *T. populneoides*

   2. Capsule indehiscent; seeds with simple hairs ... *T. populnea*

Thespesia lampas (Cav.) Dalz. & Gibs. Bombay Fl. 19. 1861; Mast. in Hook. f. Fl. Brit. India 1: 345. 1874; Borss. in Blumea 14: 116. 1966; Paul & Nayar in Nayar et. al. Fasc. Fl. India 19: 222, f. 58. 1988; Paul in Sharma et al. Fl. India 3: 350, f. 98. 1993. *Hibiscus lampas* Cav. Diss. 3: 154, t. 56, f. 2. 1787. *Thespesia macrophylla* Bl. Bijdr. 73. 1825. Cooke, Fl. Pres. Bombay 1: 121. 1958 (Repr.). *Azanza lampas* (Cav.) Alef. in Bot. Zeit. 19: 298. 1861. *'Chichindur', 'Ranbhendi'.*

Shrubs, 0.5–2.5 m high; young shoots densely stellate–tomentose, glabrescent later. Lower leaves 6–12 cm across, orbicular, deeply 3–5 lobed; upper leaves 5–20 x 2–22 cm, broadly ovate to oblong; stipules small, lanceolate to subulate, stellate–hairy. Flowers solitary, axillary or in long stalked racemes of 1–5 flowers in each by replacing the upper leaves; epicalyx segments 5, free; calyx cyathiform; corolla yellow with dark purple centre, campanulate. Capsules 2–3 x 1.5–2.0 cm, ovoid to globose. Seeds black.

Fls. & Frts. : June–December.

Illus. : Wight, Ic. t. 5. 1838 (*Hibiscus lampas*); Paul & Nayar, op. cit.; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 5: t. 50. 1988.

Distrib. : Widely distributed in deciduous and semi-evergreen forests, common throughout.

Notes : Earlier workers treated *T. lampas* under the genus *Hibiscus* L. But recently Exell & Hillcoat (Contr. Fl. Mozamb. 2: 58. 1954) reinstated the genus *Azanza* Alefeld, on the basis of the connate style, appearing as monostylus and transferred *T. lampas* to *Azanza*. Subsequently Borssum (op.cit.) after the study of a wide range of material from Malesia treated this taxon with a distinct sectional status on the basis of presence of nectary in midrib, connate style and dehiscent capsule.

T. populnea (L.) Soland. ex Corr. in Ann. Mus. Herb. Paris. 9: 290, t. 8, f. 1. 1807; Mast. in Hook. f. Fl. Brit. India 1: 345. 1874; Cooke, Fl. Pres, Bombay 1: 121. 1958 (Repr.); Borss. in Blumea 14: 106. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 225. 1988; Paul in Sharma et al. Fl. India 3: 352. 1993. *Hibiscus populneus* L. Sp. Pl. 694. 1753. *'Bhendi-kazed'*, *'Paras bhendi'*, *'Paras pimpal'*, *'Paravhajhads'*.

Moderate sized trees, 5–10 m high; twigs covered with minute scales, glabrescent. Leaves 5–20 x 5.5–15.0 cm, orbicular, deltoid, deeply cordate; stipules lanceolate to subulate, 3–10 mm long, scaly. Flowers axillary, solitary, 4–8 cm across; epicalyx segments 3, caducous; calyx coriaceous, cupular, densely scaly; crolla cmpanulate, light yellow with a dark purple centre, finally orange. Fruits 2.0–4.5 cm across, globose, faintly 5–angled. Seeds obovoid, angular.

Fls. & Frts. : February–September.

Illus. : Wight, Ic. t. 8. 1838; Matthew, Illus Fl. Tamilnadu Carnatic 2: t. 69. 1982.

Distrib. : Wild along sea-shore and commonly cultivated along rood sides.

T. populneoides (Roxb.) Kostel. Allg. Med. Pharm. Fl. 5: 1861. 1836; Forsberg & Sachet in Smith, Contrib. Bot. No. 7: 10, f. 3, 4, 6. 1972; Banerjee in J. Bombay nat. Hist. Soc. 83: 271. 1986; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 226. 1988; Paul in Sharma et al. Fl. India 3: 353. 1993. *Hibiscus populneoides* Roxb. Fl. Ind. ed. Carey 3: 190. 1832.

Small trees, 3–8 m high; twigs densely covered with brownish lepidote giving coppery appearance. Leaves 5–20 x 5.5–15.0 cm, deltoid to subcordate, 7 nerved at base; stipules subulate to lanceolate, early caducous. Flowers solitary, axillary; epicalyx segments 3, 1–2 mm long,

triangular–ovate, early caducous; calyx 8–10 mm long, cupular with 5 minute teeth; corolla 5–6 cm long, campanulate, light yellow with dark purple centre. Capsules globose. Seeds c 10 x 6 mm, obovoid, angular.

Fls. & Frts. : May–January.

Illus. : Forsberg & Sachet, op. cit.

Distrib. : Rarely found along coastal regions. Thane.

Notes : This taxon is allied to *T. populnea* (L.) Soland ex Corr. (1807) but differs in having copper coloured leaves with shallowly cordate to subtruncate base, longer pedicel without articulation, outer layer of fruit dehiscent and seeds with short clavate or bulbous hairs.

URENA L.

Urena lobata L. Sp. Pl. 692. 1753, sensu lat. Mast. in Hook. f. Fl. Brit. India 1: 329. 1874; Cooke, Fl. Pres. Bombay 1: 106. 1958 (Repr.); Borss. in Blumea 14: 138. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 228, f. 59. 1988; Paul in Sharma et al. Fl. India 3: 380, f. 109. 1993.

U. lobata L. and *U. sinuata* L. are treated as two distinct species in most of Indian floras on the basis of the degree of lobation of leaf margins. After critical study of wide range of material of both the taxa, Hochreutiner (*Ann. Cons. Jard. Bot. Geneve* 5: 134. 1901) and Borssum (op. cit.) treated them as subspecies.

1. Plants stout; leaves shallowly lobed; fruits with cupular epicalyx ... ssp. *lobata*

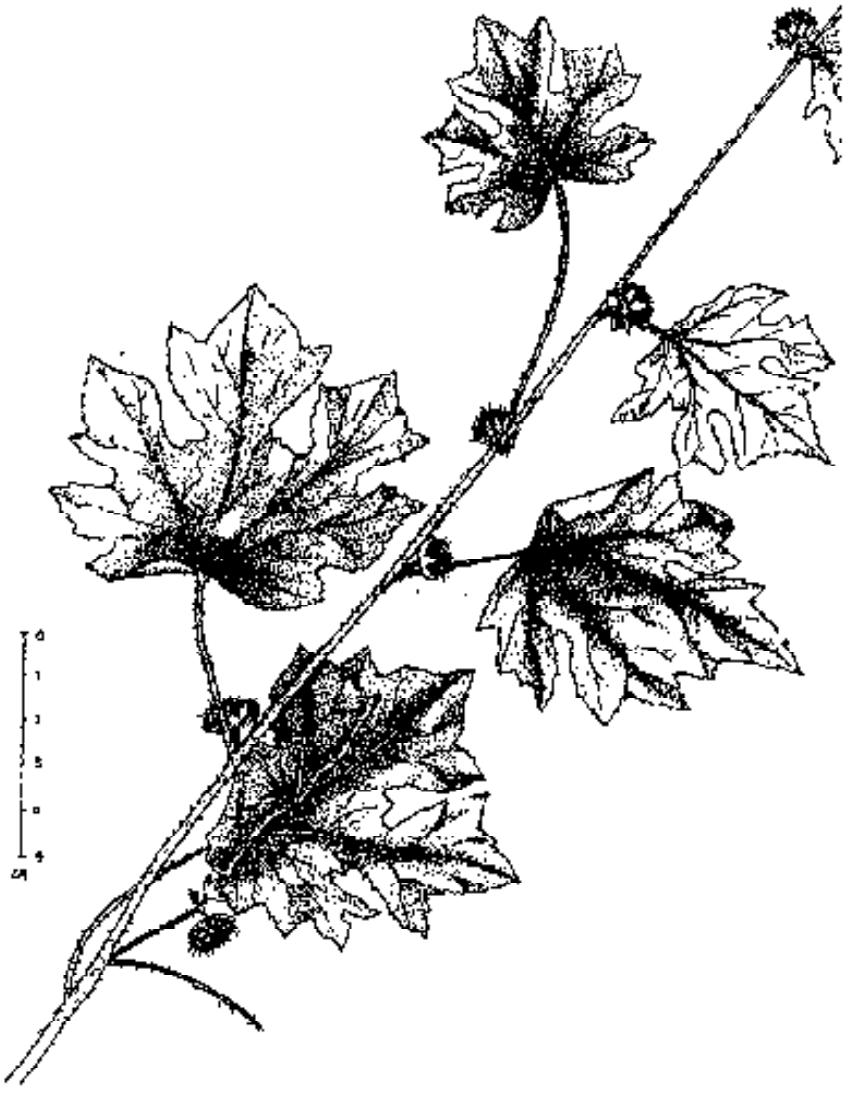
1. Plants slender; lower leaves deeply lobed; fruits with spreading epicalyx ... ssp. *sinuata*

ssp. **lobata** *'Van–bhende'.*

Annual or erect perennial undershrubs, 0.5–2.0 m high. Leaves 1–12 x 0.5–12.5 cm, ovate to orbicular, entire, angular or shallowly lobed. Flowers pink in axillary clusters. Capsules pubescent, spiny, spines with 2 curved bristles. Seeds reniform.

Fls. & Frts. : April–December.

Illus. : Mahesh. Illus. Fl. Delhi f. 27. 1966; Paul & Nayar in Nayar et al. op. cit.



Urena lobata L. ssp. **sinuata** (L.) Borss. var. **sinuata.**

Distrib. : Common in waste places and also along roadside. Amravati, Bhandara, Kolhapur, Nagpur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

ssp. **sinuata** (L.) Borss. in Blumea 14: 142. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 230, f. 60 1988; Paul in Sharma et al. Fl. India 3: 382, f. 110. 1993. *U. sinuata* L. Sp. Pl. 692. 1753; Mast. in Hook. f. Fl. Brit. India 1: 329. 1874; Cooke, Fl. Pres. Bombay 1: 106. 1958 (Repr.). *'Jangli kapus', 'Ran–Kapas'.*

1.	Leaves palmatifid to palmatiparted	...	var. *sinuata*
1.	Leaves angular to palmilobed	...	var. *glauca*

var. **sinuata.**

Erect undershrubs. Leaves variable, sinuately lobed. Flowers pinkish or light purple. Schizocarps globular, covered with glochidia. Seeds reniform.

Fls. & Frts. : July–December.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 51. 1988; Paul in Sharma et al. Fl. India 3: 383, f. 110. 1993.

Distrib. : Common in deciduous forest and also along open situations. Amravati, Ahmednagar, Chandrapur, Kolhapur, Raigad, Ratnagiri, Satara, Thane.

var. **glauca** (Bl.) Borss. in Blumea 14: 144. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19. 232. 1988; Paul in Sharma et al. Fl. India 3: 382. 1993. *U. lappago* Smith var. *glauca* Bl. Bijdr. 2: 65. 1825. *U. scabriuscula* DC. Prodr. 1: 441. 1824; S.M. Almeida, Fl. Savantwadi 1: 63. 1990. *U. lobata* L. var. *scabriuscula* (DC.) Mast. in Hook. f. Fl. Brit. India 1: 329. 1874; Cooke, Fl. Pres. Bombay 1: 106. 1958 (Repr.). *U. lobata* ssp. *lobata* var. *viminea* sensu Kulkarni, Fl. Sindhudurg 45. 1987 non (Cav.) Gurke, 1892. *U. lobata* var. *lappago* (Sm.) Almeida, Fl. Mah. 1 : 128. 1996.

Fls. & Frts. : September–December.

Distrib. : Amravati (Almeida, op. cit.), Sindhudurg (Cooke, op. cit.).

CULTIVATED SPECIES :

Abelmoschus esculentus (L.) Moench. Meth. Pl. 617. 1794; Borss. in Blumea 14: 100. 1966; Paul & Nayar in Nayar et al. Fl. Fasc. Fl. India 19: 71. 1988; Paul in Sharma et al. India 3: 385. 1993. *Hibiscus esculentus* L. Sp. Pl. 696. 1753; Mast. in Hook. f. Fl. Brit. India 1: 343. 1874; Cooke, Fl. Pres. Bombay 1: 119. 1958 (Repr.) *'Bhendi', 'Ram–turai'.*

Herbs or undershrubs, 0.5–2.0 m high; stems and branches scattered with short stiff hairs, ultimately glabrescent. Leaves 4–20 x 4–25 cm, cordate at base, lamina variously dissected. Epicalyx segments 7–10, 5–10 x 1.0–2. 5 mm; calyx 2–3 cm long; petals yellow or whitish–yellow with dark purple centre, up to 5 cm long. Capsules 5–20 cm long. Seeds 3–5 mm, warty, glabrous, dark brown.

Fls. & Frts. : Almost throughout the year.

Distrib. : Cultivated in most districts of the state for its fruits which are used as vegetable. The species Asiatic in origin.

Abutilon striatum Dicks. ex Lindl. Bot. Reg. Misc. Nat. 39. 1839; Cooke, Fl. Pres. Bombay 1: 104. 1958 (Repr.); Borss. in Blumea 14: 162. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 96. 1988; Paul in Sharma et al. Fl. India 3: 273. 1993 *Sida striata* (Dicks. ex Lindl.) D. Dietr. Syn. Pl. 4: 852. 1847.

Shrubs, 1–2 m high; branchlets, petioles and pedicels densely stellate hairy, rarely glabrous. Leaves 2–12 x 1–10 cm, orbicular to broadly ovate, cordate, 3–5–lobed or parted. Flowers solitary, axillary, mostly nodding; calyx campanulate, slightly inflated at base, lobes 5–10 x 5–8 mm, deltoid, stellate–tomentose on both surfaces, densely papillose at base inside; petals orange or pink with purple veins, 2.5–4.0 x 2–3 cm, obliquely obovate. Mericarps 8–11, 15 x 6 mm, reniform, rounded at apex. Seeds 7–9.

Fls. & Frts. : January–April.

Distrib. : Cultivated as an ornamental in the Gardens for its orange showy flowers. Bombay, Chandrapur, Nasik, Pune, Raigad.

Alcea rosea L. Sp. Pl. 687. 1753; Naqshi et al. in Ann. Miss. Bot. Gard. 75: 1516. 1988; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 98. 1988; Paul in Sharma et al. Fl. India 3: 386. 1993. *Althaea rosea* (L.) Cav. Diss. 2: 91, t. 28, f. 1, 1786; Mast. in Hook. f. Fl. Brit. India 1: 319. 1874; Cooke, Fl. Pres. Bombay 1: 95. 1958 (Repr.); Borss. in Blumea 14: 151. 1966.

Herbs, 1.5–2 m high, stellate hairy, ultimately glabrescent. Leaves 3–13 x 3.5–12.0 cm, orbicular–cordate, 5–7–lobed; petioles 2–18 cm long. Flowers solitary, axillary, or in terminal racemes; epicalyx segments 6–7, 1.0–1.5 x 0.3–0.5 cm, ovate–lanceolate; calyx lobes 15–20 x 5–10 mm, ovate to ovate–lanceolate; petals 4–7 cm long, variously coloured. Mericarps 20–40, c 4 mm across, longitudinally sulcate.

Fls. : January–March.

Distrib. : Cultivated in the Gardens for its showy flowers. Ahmednagar, Aurangabad, Nagpur, Osmanabad, Pune, Sindhudurg.

Gossypium arboreum L. Sp. 693. 1753; Mast. in Hook. f. Fl. Brit. India 1: 347. 1874; Cooke, Fl. Pres. Bombay 1: 125. 1958 (Repr.); Borss. in Blumea 14: 121. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 112. 1988; Paul in Sharma et al. Fl. India 3: 387. 1993. *'Kapas', 'Rui'.*

var. **arboreum.** *'Devakapas', 'Narma'*

Annual or perennial shrubs, 1–2 m high; branches hairy. Leaves ovate to orbicular, cordate at base, palmatiparted with linear to; lanceolate segments, deeply 5–7–lobed. Flowers solitary, axillary; epicalyx segments 1.5–3.0 x 1.0–1.25 cm, ovate, accrescent; calyx 5 mm long, cupular, 5–dentate at tip; corolla pale yellow, with or without purple centre or sometimes totally red or purple, petals 3–4 cm long, obovate. Capsules 1.5–2.5 cm across, rounded to ovoid or globular with 3–4 mm long beak, outside densely pitted and glabrous. Seeds 5–10 per locule, 5–7 mm across; with floss & fuzz, floss copious, white or rusty.

Distrib. : Cultivated in Ahmednagar, Bombay, Nagpur, Osmanabad (Naik, 1979), Pune, Sindhudurg (S.M. Almeida, 1990).

var. **obtusifolium** (Roxb.) Roberty in Candollea 13: 38. 1950, ampl; Borss. in Blumea 14: 122. 1966; Paul in Sharma et al. Fl. India 3: 388. 1993. *G. obtusifolium* Roxb. Fl. Ind. 3: 183. 1832. *G. herbaceum* var. *obtusifolium* (Roxb.) Mast. in Hook. f. Fl. Brit. India 1: 437. 1874.

Leaves palmatilobed to palmatifid with obovate, ovate or oblong segments.

Distrib. : Cultivated for its floss. Chandrapur.

var. **wightianum** (Watt.) Almeida, Fl. Mah. 1: 106. 1996. G. *obtusifolium* var. *wightiamum* Watt, Wild and Cult. Cotton 143–53, tt. 21–22. 1907 & in Kew Bull. 1926: 23. 1926. G *herbaceum* var. *wightianum* (Todd.) T. Cooke, Fl. Pres. Bombay 1: 116. 1901 [1:124. 1958 (Repr.)].

Shrubs. Leaves ovate–rotund, 3–5–lobed, lobes ovate–oblong, acute. Corolla yellow with purple base. Capsules ovoid, acute, 4–celled with 8 seeds in each cell. Seeds velvetty.

Fls. & Frts. : September–December.

Distrib. : Bombay (Almeida, op. cit.).

G. barbadense L. Sp. Pl. 693. 1753; Mast. in Hook. f. Fl. Brit. India 1: 347. 1874; Cooke, Fl. Pres. Bombay 1: 125. 1958 (Repr.); Borss. in Blumea 14: 127. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 114. 1988; Paul in Sharma et al. Fl. India 3: 388. 1993.

var. **barbadense.**

Undershrubs or much branched shrubs, glabrous or the young parts more or less pubescent. Leaves orbicular to ovate, cordate at base, deeply 3–5–lobed. Flowers solitary, axillary; epicalyx segments orbicular to ovate, laciniate; calyx cupular, truncate or with 5, obtuse teeth; corolla pale yellow with a purple tinge, petals obovate. Capsules ovoid, beaked. Seeds ovoid with long, white, floss & fuzz.

Fls. & Frts. : Throughout the year.

Distrib. : Occasionally cultivated in Bhandara, Bombay, Chandrapur, Pune, Sindhudurg (S.M. Almeida, 1990).

var. **acuminatum** (Roxb.) Mast. in Hook. f. Fl. Brit. India 1: 347. 1874. *G. acuminatum* Roxb. Fl. Ind. 3: 186. 1832.

Shrubs, branched. Leaves 3–7–lobed. Involucral bracts deeply laciniate. Corolla yellow with purple base. Capsules ovoid, acuminate, cells 7–9–seeded.

Fls. & Frts. : November–December.

Distrib. : Rarely cultivated in Bombay.

G. herbaceum L. Sp. Pl. 693. 1753; Mast. in Hook f. Fl. Brit. India 1: 346. 1874; Cooke, Fl. Pres. Bombay 1: 123. 1958 (Repr.); Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 115. 1988; Paul in Sharma et al. Fl. India 3: 389. 1993. *G. herbaceum* var. *acerifolium* sensu Naik, Fl. Marathwada 1 : 137. 1998 non (Guill. & Perr.) Chevalier, 1939. *'Kapus', 'Kapas,' 'Devdopus'.*

Herbs or undershrubs, more or less hairy. Leaves ovate–rounded, cordate at base, palmately 3–5 or sometimes 7–lobed. Flowers solitary, axillary; epicalyx segments 1–2 cm long, ovate–cordate, slightly connate

at base, divided across the top into 7–9 long lanceolate teeth; calyx 7–10 mm long, truncate or undulate; corolla yellow with purple centre, petals obovate. Capsules 3–4 cm long, oblong–obtuse, 4–loculed. Seeds 5–7 per locule, 5–8 x 3–6 mm, ovoid with floss and fuzz.

Distrib. : It is cultivated for its floss. Ahmednagar, Amravati, Chandrapur, Jalgaon, Nagpur, Osmanabad, Pune, Thane.

G. hirsutum L. Sp. 975. 1753; Borss. in Blumea 14: 123. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 115. 1988; Paul in Sharma et al. Fl. India 3: 389. 1993. *G. herbaceum* var. *hirsutum* L. Sp. Pl. 975. 1753; Mast. in Hook. f. Fl. Brit. India 1: 347. 1874; Cooke, Fl. Pres. Bombay 1: 124. 1958 (Repr.). *'Kapus, 'Kapas'*.

Herbs or undershrubs; stems much branched, greenish–red, densely hairy or glabrous. Leaves 3–10 x 3–15 cm, orbicular, cordate at base, mostly 3– lobed, sometimes partially 5–lobed, lobes ovate to triangular. Flowers solitary, axillary; epicalyx segments 2–4 x 1–3 cm, broadly ovate to triangular. Flowers solitary, axillary; epicalyx segments 2–4 x 1–3 cm, broadly ovate, cordate at base, laciniate, teeth 7–12, linear to lanceloate; calyx cupular, 4–5 mm across, with 5 rounded acuminate segments, nectaries distinct on veins; corolla yellow to yellowish–white, rarely with purple centre; petals 4–6 x 3–4 mm, obovate. Capsules 3–4 x 2–3 cm, ovoid or globular. Seeds 3–5 mm long, ovoid, with copius floss and fuzz.

Distrib. : It is cultivated in Nagpur, Pune, Osmanabad.

G. hirsutum var. **religiosa** Watt, Wild and Cult. Cotton 201–4, tt. 32–33. 1907; Almeida, Fl. Mah. 1: 107. 1996. *G. herbaceum* var. *religiosum* Mast. in Hook. f. Fl. Brit. India 1: 347. 1874; Cooke, Fl. Pres. Bombay 1: 124. 1958 (Repr.).

Perennial herbs, diffuse. Leaves 3–5–lobed, hairy, lobes triangular, acute. Involucral bracts deeply laciniate; corolla yellow or yellowish–white. Capsules 4–5–celled, oblong.

Fls. & Frts. : August–December

Distrib. : Aurangabad, Khandesh, Pune & Thane (Almeida, op. cit.).

G. stocksii Mast. in Hook. f. Fl. Brit. India 1: 346. 1874; Cooke, Fl. Pres. Bombay, 1: 123. 1958 (Repr.); Paul in Sharma et al. Fl. India 3: 313. 1993; Almeida, Fl. Mah. 1: 107. 1996. *'Hiragundi–Kapas'*.

Shrubby, often climbing. Leaves 2–6 cm across, orbicular, cordate, 3–lobed, tomentose with black glandular dots. Pedicels axillary, jointed, 1–flowered; corolla yellow with purple base. Capsules 3 to 5–valved. Seeds wedge shaped, cottony.

Fls. & Frts. : December.

Distrib. : Pune (Cooke, op. cit.).

Hibiscus cannabinus L. Syst. Nat. ed. 10. 2: 1149. 1759; Mast. in Hook. f. Fl. Brit. India 1: 339. 1874; Cooke, Fl. Pres. Bombay 1: 116. 1958 (Repr.); Borss. in Blumea 14: 63. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 127. 1988; Paul in Sharma et al. Fl. India 3: 324. 1993. *'Ambada', 'Ambadi'.*

Annual or perennial herbs; stems prickly, glabrous. Leaves unlobed, upper ones palmatilobed to parted, 3–5 or 7–lobed, lobation up to the middle of lamina, lobes linear, elliptic to lanceolate, acuminate, glabrous. Flowers solitary, axillary or in racemes; epicalyx segments 7–8, up to 1.5 cm long, connate or adnate to the calyx base, sparsely covered with stiff prickles; calyx lobes free almost to the base, lanceolate, acute, tomentose outside, glabrous inside; corolla yellow with a purple centre, petals glabrous. Capsules 2 x 1.5 cm, ovoid to globose, beaked, densely hairy outside, glossy inside. Seeds reniform, dotted with minute stellate scales, brown.

Fls. : January.

Distrib. : Common throughout.

H. elatum Sw. Prodr. 102. 1788 & in Fl. Ind. Occ. 2: 1218. 1809; Almeida, Fl. Mah. 1: 110 1996.

Trees, medium sized; young shoots pubescent. Leaves 14 x 16 cm, orbicular to ovate–orbicular, acute–acuminate at apex, cordate with a shallow sinus at the base, grey–pubescent beneath. Inflorescences of 2–few–flowered racemes; corolla light buff coloured with yellow tinge on underside. Capsules olive–green, septicidal, oblong–ovoid, 3.5 x 2 cm, apiculate. Seeds few, reniform.

Fls. & Frts. : October–December.

Distrib. : Cama hospital compound & Victoria garden in Bombay (Almeida, op. cit.).

H. mutabilis L. Sp. Pl. 694. 1753; Mast. in Hook. f. Fl. Brit. India 1: 344. 1874; Cooke, Fl. Pres. Bombay 1: 120. 1958 (Repr.); Borss. in Blumea 14: 66. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 147. 1988; Paul in Sharma et al. Fl. India 3: 390. 1993.

var. **mutabilis.**

Shrubs, bushy; branches tomentose. Leaves 10–20 cm in diam., sub orbicular, cordate, palmately 3–7–lobed, lobes triangular, acute or acuminate at apex, dentate or crenate at margins, densely pubescent beneath, glabrate or sparsely pubescent above, long petioled. Flowers solitary, axillary, or subcorymbose at tip; epicalyx segments 8–12, linear–lanceolate; calyx lobes connate up to middle, lobes 3–4 x 1 cm, ovate–lanceolate, acuminate, pubescent; petals 5 or multiples of 5, 6–8 cm long, suborbicular, sparsely hairy outside, glabrous inside, with long stellate hairs at base. Capsules 2.5 cm long, glabrous or subglobose, pubescent. Seeds 2 mm long, reniform, hispid, brownish.

Fls. & Frts. : September–December.

Distrib. : The stem yields a fibre of inferior quality. Pune, Sindhudurg.

Notes : A Native of E. Tropical Africa.

var. **nana** Blatt.; Almeida, Fl. Mah. 1: 112. 1996.

Flowers small.

Fls. : September–November.

Distrib. : Cultivated in Bombay gardens (Almeida, op. cit.).

H. platanifolius (Willd.) Sweet, Hort. Brit. 2: 51. 1827; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 143. 1988; Paul in Sharma et al. Fl. India 3: 338. 1993; Almeida, Fl. Mah. 1: 113. 1996. *Pavonia platanifolia* Willd. in Ges. Naturf. Freunde Berlin Mag. Neuesten 4: 220. 1810. *Hibiscus collinus* Roxb. Fl. Ind. 3: 199. 1832; Mast. in Hook. f. Fl. Brit. India 1: 338. 1874; Cooke, Fl. Pres. Bombay 1: 114. 1958 (Repr.).

Shrubs or small trees, much branched, branchlets pubescent; bark glabrous. Leaves 12.5 x 10 cm, cordate, palmately 3–5–lobed, lobes elliptical, acute to acuminate at apex, irregularly toothed, glabrous except on veins beneath. Flowers solitary, axillary; pedicels jointed near apex, hairy; epicalyx segments 5, 8 or 10, connate at base, lanceolate, acuminate, pubescent; calyx 5–lobed, lobes ovate, acute, pubescent; corolla pink with deep purple centre, rarely yellow, petals 4–6 x 3–4 cm, hairy outside, glabrous inside. Capsules c 2 cm in diam., globose, slightly pointed, densely covered with fulvous hairs. Seeds 4–5 mm long, subspherical, glabrous, brownish.

Fls. & Frts. : August–April.

Distrib. : Bombay (Almeida, op. cit.), 'Konkan' (Cooke, op. cit.), Pune.

H. rosa – sinensis L. Sp. Pl. 694. 1753; Mast. in Hook. f. Fl. Brit. India 1: 344. 1874; Cooke, Fl. Pres. Bombay 1: 120. 1958 (Repr.); Borss. in Blumea 14: 72. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 13: 147. 1988; Paul in Sharma et al. Fl. India 3: 391. 1993. *'Jasud', 'Jaswand'.*

Shrubs; stems woody, without prickles. Leaves 5–11 x 3–6 cm, ovate or ovate–lanceolate, tapering at base, acuminate at apex, serrate to dentate or crenate at margins, glabrous on both sides or with a few minute stellate hairs on the veins beneath. Flowers solitary, axillary; pedicels jointed above the middle; epicalyx segments 5–8, lanceolate, connate at base, sparsely pubescent; calyx campanulate, lobes 1.5–2.0 cm long, lanceolate, stellate & glandular–pilose outside; corolla c 8 cm in diam., tubular below, red, petals obovate. Capsules globose, rarely formed.

Fls. & Frts. : Throughout the year.

Distrib. : It is introduced to India from Mauritius, cultivated for its showy blood red coloured flowers. Almost throughout the State.

H. sabdariffa L. Sp. Pl. 695. 1753; Mast. in Hook. f. Fl. Brit. India 1: 340. 1874; Cooke, Fl. Pres. Bombay 1: 117. 1958 (Repr.); Borss. in Blumea 14: 64. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 148. 1988; Paul in Sharma et al. Fl. India 3: 391. 1993. *'Lal–Ambadi', 'Patwa', 'Tambdi–Ambadi'.*

Erect herbs; stems unarmed. Leaves 5–10 x 0.5–1.8 cm, polymorphic, cuneate at base, usually palmately 3–5–lobed or lower leaves sometimes entire, lobes lanceolate, ovate or oblong, acute at apex, glabrous, middle lobe often longer, glandular on the midrib beneath. Flowers solitary, axillary or in racemose panicles; epicalyx segments 8–12, lanceolate to oblong–elliptic, persistent; calyx campanulate, green or purple, smooth or with few bristles, persistent; corolla yellow with a purple centre, petals 4–5 cm long. Capsules 1.5 cm across, ovoid, beaked, hairy. Seeds reniform, covered with minute stellate hairs, black–brown.

Fls. : October–December.

Distrib. : It is a native of tropical Africa & Asia. The stem yields Rozella hemp which is strong and silky. The fleshy calyx is edible, cultivated throughout the state.

Hibiscus schizopetalus (Mast.) Hook. f. in Curtis. Bot. Mag. 3: 36, t. 6524. 1880; Borss. in Blumea 14: 73. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 150. 1988; Paul in Sharma et al. Fl. India 3: 392. 1993. *H. rosa–sinensis* L. var. *schizopetalus* Mat. in Gard. Chron. n.s. 12: 272, f. 45. 1879.

Shrubs; stems woody; branches glabrous. Leaves 2–8 x 1–4 cm, ovate–elliptic, cuneate at base, acute at apex, serrate toward apex, glabrous. Flowers solitary, axillary, pendulous; epicalyx segments 6–7, 1–2 mm long, subulate, minutely ciliate; calyx tubular, spathaceous, 2–4–lobed, ciliate outside, glabrous inside; petals scarlet or reddish–white, 4–7 cm long, laciniate; ovary pear shaped, hairy, stigmas capitate.

Fls. & Frts. : Throughout the year.

Distrib. : A native of Africa. Commonly cultivated in gardens. Bombay, Chandrapur, Nagpur, Osmanabad, Pune, Ratnagiri, Sindhudurg, Thane.

H. syriacus L. Sp. Pl. 695. 1753; Mast. in Hook. f. Fl. Brit. India 1: 344. 1874; Cooke, Fl. Pres. Bombay 1: 121. 1958 (Repr.) ; Borss. in Blumea 14: 75. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 155. 1988; Paul in Sharma et al. Fl. India 3: 393. 1993.

Shrubs, bushy. Leaves 4–7 x 1.5–6.0 cm, ovate to rhomboid–ovate, more or less 3–lobed, cuneate at base, acute at apex, repand–toothed, pubescent when young. Flowers solitary, axillary; epicalyx segments 6–8, linear, sparsely hairy; calyx 10–20 mm long, connate up to middle, lobes oblong, acute, sparsely stellate hairy; corolla lilac–blue, with dark purple eye, petals obovate, ciliate. Capsules oblong, obtuse, or abruptly short beaked, sparsely hispid. Seeds pilose.

Fls. & Frts. : June–October.

Distrib. : Amravati, Bombay, Chandrapur, Pune.

Notes : Indigenous to China.

H. tiliaceus ssp. **hastatus** (L.f.) Borss. in Blumea, 14: 36. 1966; Paul in Sharma et al. Fl. India 3: 322. 1993; Almeida, Fl. Mah. 1: 117. 1996. *H. hastatus* L.f. Suppl. 310. 1781 non Cav. 1787. H. *tricuspis* Banks ex Cav. 3: 152, t. 55, f. 2. 1787; Mast in Hook. f. Fl. Brit. India, 1: 344. 1874.

Trees; young branches covered with white stellate hairs. Leaves trilosed, 10–15 x 7 cm, globrescent above, glandular with

bulbous-based hairs beneath, lobes lanceolate. Inflorescence of terminal racemes. Corolla with yellow with purple base. Capsules spuriously 10-celled.

Fls. & Frts. : October–December.

Distrib. : Cultivated in Victoria garden, Bombay (Almeida, op. cit).

Malvaviscus arboreus Cav. Diss. 3: 131, t. 48, f. 1. 1787; Borss. in Blumea 14: 132. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 197. 1988; Paul in Sharma et al. Fl. India 3: 393. 1993. *Hibiscus malvaviscus* L. Sp. Pl. 694. 1753.

var. **arboreus.**

Shrubs, often scrambling or tailing. Leaves usually palmilobed. Flowers solitary, axillary; epicalyx segments 5–10, shortly connate, lanceolate to spathulate; calyx without nectaries; corolla usually scarlet, showy, petals erect. Schizocarp initially with a fleshy layer, ultimately drying and breaking up into indehiscent mericarps.

Distrib. : It is a native of Tropical America, grown in gardens. Ahmednagar, Bombay, Jalgaon, Pune, Thane.

var. **penduliflorus** (Mocino & Sesse ex DC.) Schery in Ann. Miss. Bot. Gard. 29: 223. 1942; Borss. in Blumea 14: 133. 1966; Paul & Nayar in Nayar et al. Fasc. Fl. India 19: 179. 1988; Paul in Sharma et al. Fl. India 3: 394. 1993; Almeida Fl. Mah. 1: 121. 1996. *M. penduliflorus* Mocino & Sesse ex DC. Prodr. 1: 445. 1824. *M. conzattii* Greenman in Publ. Field Mus. Nat. Hist. Chicago (Bot.) 2: 333. 1912; Naik, Fl. Osmanabad 47. 1973; S.M. Almeida, Fl. Savantwadi 1: 63. 1990. *'Michi Jaswand'*.

Shrubs, often scrambling or trailing. Leaves entire or palmately lobed. Flowers axillary, solitary; corolla large and showy, scarlet.

Fls. : Throughout the year.

Distrib. : It is a a native of Tropical America, grown in gardens. Nagpur, Osmanabad, Ratnagiri, Sindhudurg.

BOMBACACEAE

(S. Moorthy)

1. Armed; bark grey; stamens many ... BOMBAX
1. Unarmed; bark greenish; stamens 5 ... CEIBA

BOMBAX L.

The typification of the genus has been discussed in detail by Chatterjee & Raizada (1954), Furtado (1939), Robyns (1961, 1963) and Nicolson (1979).

1.	Trunk prickly; leaflets lanceolate; filaments fluttered ...	*B. ceiba*
1.	Trunk rarely prickly; leaflets obovate; filaments filiform ...	*B. insigne*

Bombax ceiba L. Sp. Pl. 511. 1753; Robyns in Taxon 10: 157. 1961 & in Bull. Jard. Bot. Bruxelles 33: 88, f. 7. 1963; Nayar & Biswas in Sharma et al. Fl. India 3: 398, f. 111. 1993. *B. malabaricum* DC. Prodr. 1: 479. 1824; Mast. in Hook. f. Fl. Brit. India 1: 349. 1874; Cooke, Fl. Pres. Bombay 1: 127. 1958 (Repr.). *'Kate– saveri', 'Savar'.*

Trees, 20–30 m tall; trunk buttressed. Leaves 12–15 cm long, 5–7–foliolate; leaflets 5–17 x 1.5–4.5 cm, apex caudate, cuspidate or acuminate, base acute, entire. Flowers 6–8 cm long, 12–15 cm across, red, solitary, paired or clustered near ends of leafless branchlets. Capsules 10–13 cm long, ovoid–oblong, loculicidal, 5–locular. Seeds c 0.9 cm long, numerous, ovoid, packed in white cotton.

Fls. & Frts. : February–June.

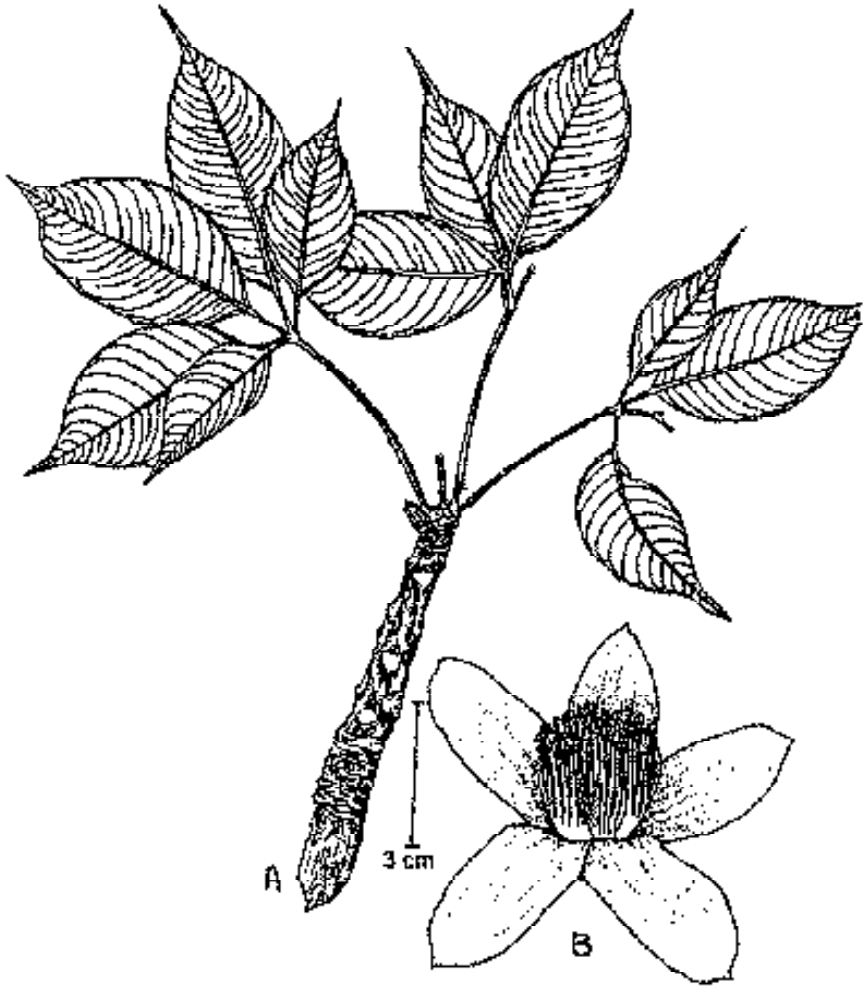
Illus. : Bedd. Fl. Sylv. t. 82. 1871; Talb. For. Fl. Bombay Pres. & Sind 1: 130–131, ff. 79 & 80. 1909; Matthew Illus. Fl. Tamilnadu Carnatic 2: t. 71. 1982 (*B. malabaricum*); Nayar & Biswas in Sharma et al. op. cit.

Distrib. : Common throughout the State in deciduous forests. Sometimes planted.

B. insigne Wall. Pl. Asiat. Rar. 1: 71, tt. 79 & 80. 1830; Mast. in Hook. f. Fl. Brit. India 1: 349. 1874; Cooke, Fl. Pres. Bombay 1: 128. 1958 (Repr.); Robyns in Bull. Jard. Bot. Brux. 32: 112. 1963; Nayar & Biswas in Sharma et al Fl. India 3: 398. 1993. *Salmalia insignis* (Wall.) Schott & Engl. Melet. Bot. 35. 1832. *'Savar', 'Shalmali'.*

Trees; branches sometimes prickly. Leave 3–7–foliolate; leaflets 10–15 cm long, apex shortly abruptly acuminate, base attenuate. Flowers scarlet or white, solitary, scattered on leafless branches. Capsules 15–25 cm long, obtusely 5–angular.

Fls. & Frts. : February –June.



Bombax ceiba L. : A-Leafy twig; B-Flower

Distrib. : Less commonly found than the preceding species in deciduous forests of the State. Aurangabad, Kolhapur, Pune, Raigad, Ratnagiri, Sindhudurg, Thane.

CEIBA Mill. emend. Gaertn.

Ceiba pentandra (L.) Gaertn. Fruct. Sem. Pl. 2: 244, t. 133. 1791; Robyns in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 1: 70. 1980; Nayar & Biswas in Sharma et al Fl. India 3: 400, f. 112. 1993. *Bombax pentandrum* L. Sp. Pl. 511. 1753. *Eriodendron pentandrum* (L.) Kurz in J. Asiat. Soc. Bengal 43: 113. 1874. *E. anfractuosum* DC. Prodr. 1: 479. 1824; Mast. in Hook. f. Fl. Brit. India 1: 350. 1874; Cooke, Fl. Pres. Bombay 1: 128. 1958(Repr.). *'Kapok tree', 'Pandhari–Savar, 'Safed savara', 'Salmali', 'Shameula'.*

Trees, 15–25 m. Leaves 15–25 cm long; leaflets 5–8, 5–13 cm long, lanceolate, glaucous beneath, apex cuspidate, base acute, entire. Flowers 4–5 cm across, dirty white, appearing along with young leaves at ends of branches. Capsules fusiform, blunt, lined with long, white, silky hairs. Seeds c 0.6 x 0.3 cm, pyriform, black, enveloped in silky wool.

Fls. & Frts.: January–June.

Illus. : Wight, Ic. t. 400. 1840. Bedd. Fl. Sylv. t. 4, f. 2. 1871 (*E. anfractuosum*); Matthew, Illus. Fl. Tamilnadu Carnatic t. 963 d. 1982 & Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 52. 1988; Nayar & Biswas in Sharma et al. op. cit.

Distrib. : Less common in deciduous forests of the State, often found planted. Aurangabad, Bombay, 'Khandesh' (Cooke, op. cit.), Nagpur, Pune.

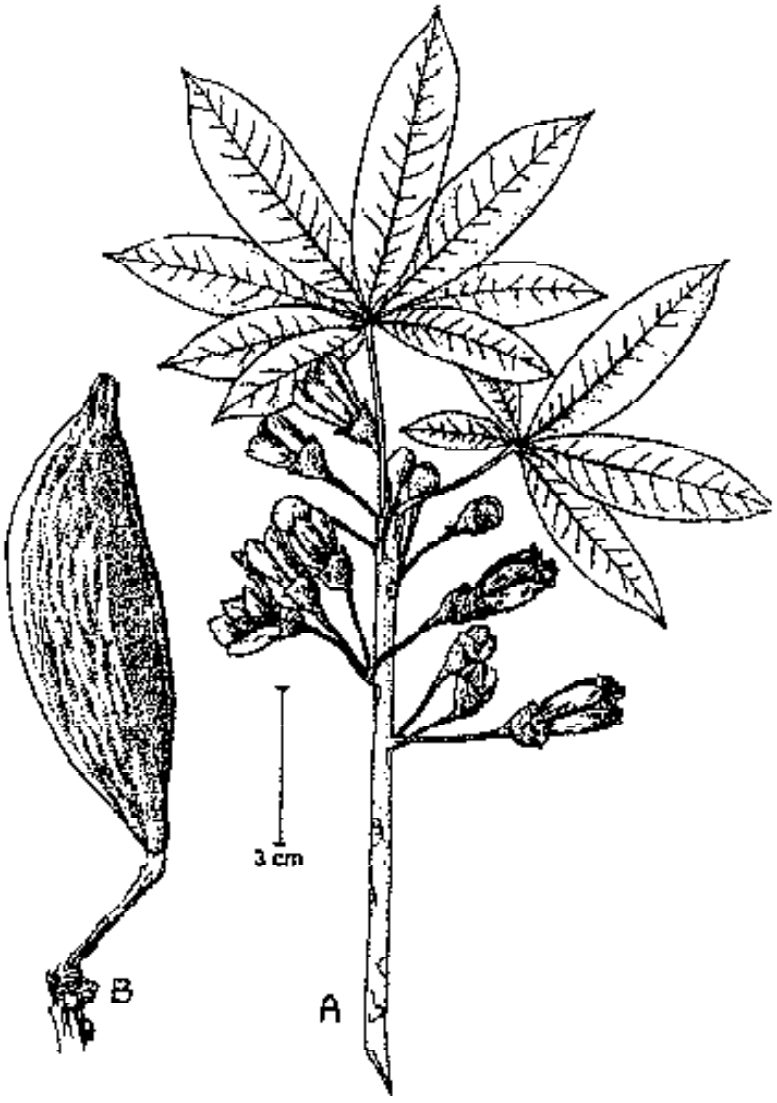
Notes : A native of Tropical America.

CULTIVATED SPECIES :

Adansonia digitata L. Sp. Pl. 1190. 1753; Mast. in Hook. f. Fl. Brit. India 1: 348. 1874; Cooke, Fl. Pres. Bombay 1: 126. 1958 (Repr.); Nayar & Biswas in Sharma et al. Fl. India 3: 404. 1993. *'Gorakh–amla', 'Gorakh–chinch'.*

Trees, trunks often stout. Leaves digitate, glabrous; leaflets 3–9, ovate-oblong, 5–10 x 2.5–5.5 cm, acute or obtuse. Flowers white on long pedicels reaching 20 cm. Fruits densely hairy. Seeds blackish, reniform.

Fls. & Frts. : May–October.



Ceiba pentandra (L.) Gaertn. : A-Flowering part of branch; B-Fruit.

Illus. : Schum. in Engl. & Prantl, Pflanzenfam. 3(6): 59, f. 28. 1892.

Distrib. : Planted along road–sides and grown in gardens.

Notes : A native of tropical Africa introduced in India. The fruits are said to have cooling effect.

Chorisia ventricosa Nees & Mart. in Nov. Act. Nat. Cuvr. 11: 102, t. 9. 1823; Almeida, Fl. Mah. 1: 131. 1996.

Trees, c 15 m tall; stems spiny. Leaves digitately compound; leaflets lanceolate. Flowers yellowish–brown, solitary, 6–8 cm across. Capsules pear shaped. Seeds with silky floss.

Fls. & Frts. : October–December.

Distrib. : Occasional. Bombay, Thane (Almeida, op. cit.).

Notes : It is a Native of Brazil.

Pachyra aquatica Aubl. Pl. Guin. 2: 276, tt. 291 & 292. 1775; Almeida, Fl. Mah. 1: 131. 1996.

Deciduous trees. Leaves simple or palmate, with stellate hairs. Flowers showy, solitary or fascicled, axillary or leaf–opposed. Fruits capsular. Seeds smooth.

Fls. & Frts. : July–December.

Distrib. : Victoria garden, Bombay (Almeida, op. cit.).

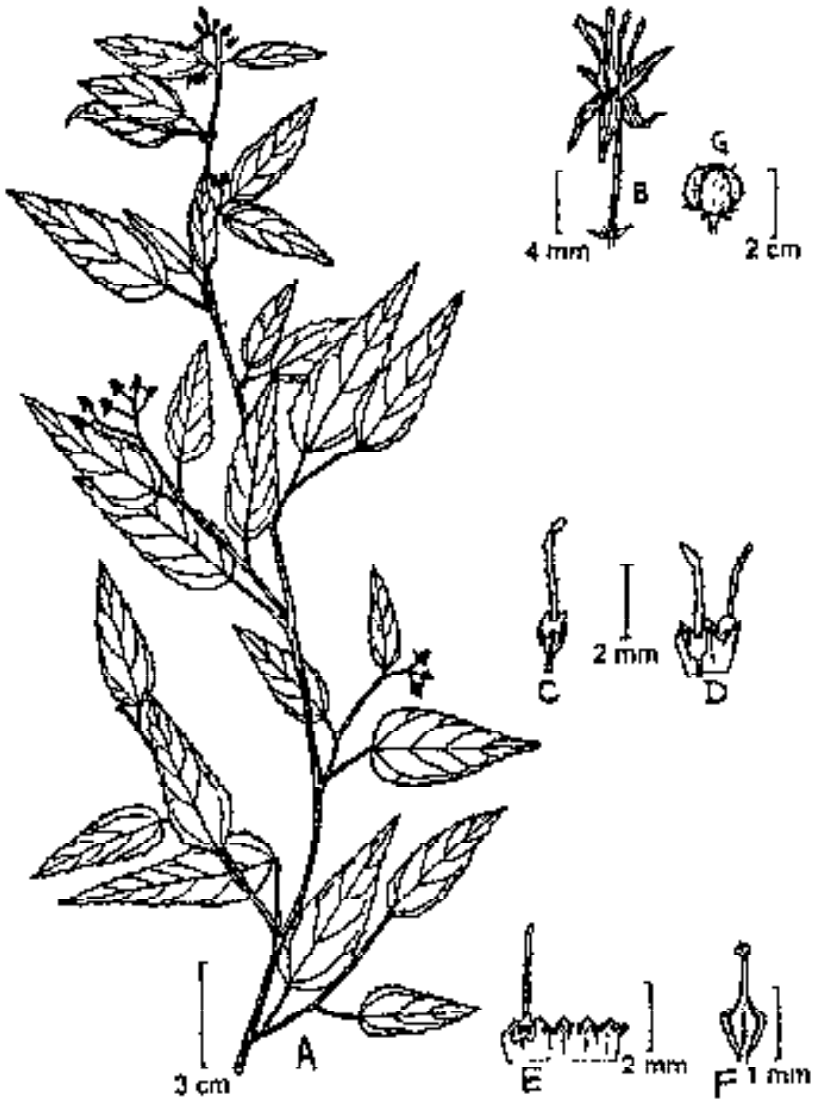
Pseudobombax ellipticum (H.B. & K.) Dugand in Caldasia 2: 65. 1943; Almeida, Fl. Mah. 1: 132. 1996. *Bombax ellipticum* H.B. & K. Nov. Gen. et Sp. 5: 299. 1825.

Deciduous trees. Leaves 5–foliolate; leaflets 6–17 x 3.5–9.5 cm, apex obtuse or rarely acute, nerves with stellate pubescence beneath. Flowers white, c 11 cm long, solitary or in clusters; petals pubescent and silvery within, glaucous and yellowish–brown without. Fruit a loculicidally septifragal capsule, 12 x 4.5 cm, linear–ovoid, filled with cottony flos. Seeds ovoid, 7–8 cm across.

Fls. & Frts. : January–June.

Distrib. : Cultivated. Bombay (Almeida, op. cit.).

Notes. : A native of Mexico.



Byttneria herbacea Roxb. : A-Flowering part of branch; B-Flower; C-Petal showing hooded limb and long appendage; D-Staminal column showing position of petals covering the stamens; E-Split staminal column showing inner series of stamens; F-Pistil; G-Fruit.

BYTTNERIACEAE

(S. Moorthy)

BYTTNERIA Loefl. (nom. cons.)

Byttneria herbacea Roxb. Pl. Cor. 1: t. 29. 1795; Mast. in Hook. f. Fl. Brit. India 1: 376. 1874; Malick in Sharma et al. Fl. India 3: 412, f. 115. 1993.

Herbs, prostrate spreading; root–stocks woody. Leaves 2–4 x 1–2 cm, oblong, ovate–lanceolate, base obtuse or subcordate, apex acute or acuminate, irregularly dentate, sparsely hairy, more so along margins, glabrous below. Flowers purple in axillary or terminal umbellate cymes. Capsules c 0.8 cm across, globose, shortly prickled, apically horned, septicidally 5–valved. Seeds 5, 0.5 cm, long, ovoid, angular, muricate.

Fls. & Frts. : August–October.

Illus. : Wight, Ic. t. 488. 1841; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 72. 1982; Malick in Sharma et al. op. cit.

Distrib. : Occurs on rocky or gravelly slopes. Chandrapur, Konkan (Mast. in Hook. f. op. cit.).

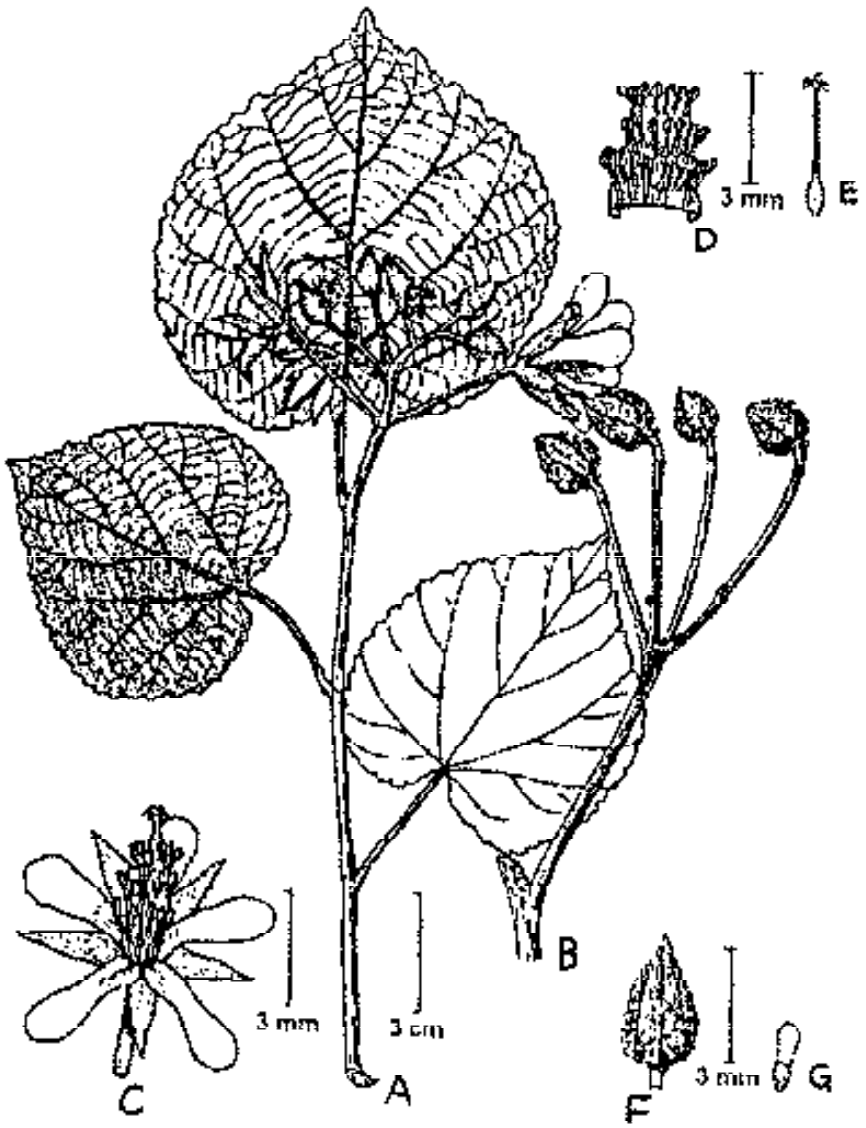
Notes. : Malick op. cit. did not mention Maharashtra state in the distribution.

STERCULIACEAE

(S. Moorthy)

1. Herbs :
   - 2. Flowers pink; calyx shortly or obscurely lobed ... MELOCHIA
   - 2. Flowers yellow; calyx deeply lobed ... WALTHERIA

1. Shrubs or trees :
   - 3. Petals 5 :
     - 4. Follicles spirally twisted ... HELICTERES
     - 4. Follicles or capsules not twisted :
       - 5. Staminodes present ... PTEROSPERMUM
       - 5. Staminodes absent ... ERIOLAENA
   - 3. Petals absent :
     - 6. Anthers 5 ... HERITIERA
     - 6. Anthers 10 or more :



Eriolaena hookeriana Wight & Arn. : A-Flowering part of branch; B-Part of infructescence; C-Flower; D-Androecium; E-Pistil; F-Fruit; G-Seed.

7.	Flowers orange; ovules 2 per cell; follicles thin walled	...	FIRMIANA
7.	Flowers flesh coloured; ovules many per cell; follicles woody	...	STERCULIA

ERIOLAENA A. P. DC.

1.	Involucral bracts entire or toothed, not multisect	...	*E. quinquelocularis*
1.	Involucral bracts multisect :		
2.	Peduncles few flowered	...	*E. stocksii*
2.	Peduncles many flowered :		
3.	Involucral bracts sub–pinnatifid; sepals linear–oblong; style glabrous	...	*E. candollei*
3.	Involucral bracts entire or toothed at margins; sepals lanceolate; style pubescent	...	*E. hookeriana*

Eriolaena candollei Wall. Pl. Asiat. Rar. 1: 51, t. 64. 1830; Mast. in Hook. f. Fl. Brit. India 1: 370. 1874; Cooke, Fl. Pres. Bombay 1: 140. 1958. (Repr.); Malick in Sharma et al. Fl. India 3: 415. 1993. *'Bothi', 'Hadang'.*

Trees, 12–15 m high. Leaves 12–18 x 7–13 cm, broadly ovate, glabrous or with a few stellate hairs above, grey tomentose beneath, apex acute or acuminate, base cordate, crenate–dentate. Flowers c 3.5 cm across, yellow, in corymbose cymes. Capsules 5 cm long, woody, ovoid, acute, beaked, 10–valved, valves usually villous at inner margins. Seeds numerous, winged.

Fls. & Frts. : March–June.

Illus. : Wall. op. cit.

Distrib. : In deciduous forests. Dhule, 'Konkan' (Cooke, op. cit.), Pune, Satara, Sindhudurg.

E. hookeriana Wight & Arn. Prodr. 70. 1884; Mast. in Hook. f. Fl. Brit. India 1: 370. 1874; Cooke, Fl. Pres. Bombay 1: 139. 1958 (Repr.); Malick in Sharma et al. Fl. India 3: 415, f. 116. 1993. *'Bhondia–Dhaman' 'Bother', 'Bute'.*

Shrubs or trees. Leaves 10.0–12.5 cm long, as broad as long, roundish, thinly coriaceous, dotted with small tufts of stellate hairs above, finely pubescent beneath, apex acuminate, base cordate, irregularly dentate. Flowers 3.7–5.0 cm across, in many–flowered cymes. Capsules ovoid–oblong, pointed, 10–valved, pubescent. Seeds winged.

Fls. & Frts. : March–May.

Illus. : Bedd. Fl. Sylv. t. 5, f. 2. 1871; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 73. 1982; Malick in Sharma et al. op. cit.

Distrib. : Frequent in deciduous forests. Akola, Amravati, Aurangabad, Chandrapur, Dhule, 'Konkan' (Cooke, op. cit.)., Nanded, Parbhani, Pune, Raigad, Yavatmal.

E. quinquelocularis (Wight & Arn.) Wight, Ic. t. 882. 1844–45; Mast. in Hook. f. Fl. Brit. India 1: 371. 1874; Cooke, Fl. Pres. Bombay 1: 140. 1958 (Repr.); Malick in Sharma et al. Fl. India 3: 418. 1993. *Microchlaena quinquelocularis* Wight & Arn. Prodr. 71. 1834. *'Badjar–dhaman,' 'Bothi', 'Buti', 'Varing'.*

Trees, c 5 m high. Leaves 3.5–9.0 x 1–7 cm, orbicular, upper surface with small tufts of stellate hairs, lower surface softly tomentose, apex acuminate, base cordate. Flowers 5 cm across, yellow, solitary or 2–5, in short racemes. Capsules c 3.5 cm long, pointed. Seeds numerous, winged.

Fls. & Frts. : May–July.

Illus. : Wight, op. cit. (cf. Cooke, op. cit. for remarks).

Distrib. : In moist deciduous forests. Akola, Bombay, Dhule, Jalgaon, Kolhapur, Nagpur, Nasik, Pune, Satara, Sindhudurg, Thane.

Notes : Malick op. cit. gives credit to Cleghorn, Gen. Index 36. 1856 for the combination while Wight, Ic. t. 882. 1844–45 is prior to Cleghorn, 1856 and hence the above treatment.

E. stocksii Hook. f. & Thoms. ex Mast. in Hook. f. Fl. Brit. India 1: 370. 1874; Cooke, Fl. Pres. Bombay 1: 139. 1958 (Repr.); Malick in Sharma et al. Fl. India 3: 419. 1993.

Trees; bark purplish. Leaves 7.5–12.5 x 6.2–10.0 cm, orbicular, dotted above with stellate hairs, finely pubescent beneath, apex shortly and bluntly acuminate, base deeply cordate, irregularly crenate, 5–7–nerved. Flowers 3.7–5.0 cm across, in lax, axillary racemose cymes near top of a long peduncle.

Fls. & Frts. : July–October.

Distrib. : In deciduous forests. Dhule, Raigad.

Notes : Cooke, op. cit. expresses doubt that this species is scarcely, if at all distinct from *E. hookeriana*. Further he states that there are two good specimens of *E. stocksii* in Herb. Kew, ticketed "Konkan,

Stocks", but there are no fruits on either, it is impossible to say whether the species should be maintained as separate or merged with *E. hookeriana*. However Verghese et al. reported it from Dhule in J. Econ. Tax. Bot. 14(3): 642. 1990 and Malick op. cit. treated it as distinct and hence included here as distinct species.

FIRMIANA Marsili

1. Leaf–lobes acuminate; flowers orange-red; indumentum thick ... *F. colorata*

1. Leaf–lobes long–acuminate; flowers scarlet red; indumentum sparse ... *F. subglabra*

Firmiana colorata (Roxb.) R. Br. in Bennett & Brown, Pl. Jav. Rar. 235. 1844; Kosterm. in Reinwardtia 5: 386. 1961; Malick in Sharma et al. Fl. India 3: 420, f. 117. 1993. *Sterculia colorata* Roxb. Pl. Cor. 1: 26, t. 25. 1795 & Fl. Ind. 3: 146. 1832; Mast. in Hook. f. Fl. Brit. India 1: 359. 1874; Cooke, Fl. Pres. Bombay 1: 133. 1958 (Repr.). *S. rubicunda* Wall. ex Mast. op. cit. 360. *'Bhaikoi', 'Bharkoi','Kaushil', 'Khowsey', 'Supli'.*

Trees, 8–10 m tall. Leaves 9–14 x 12–18 cm, broadly ovate, palmately 5–7–lobed, apex obtuse or acute to acuminate, base deeply cordate. Flowers 2 x 1.2 cm, orange–red in 5–7 cm long inflorescence. Follicles 5, 4–7 cm long, oblong, stipitate, strongly nerved. Seeds ovoid, compressed, smooth.

Fls. & Frts. : February–May.

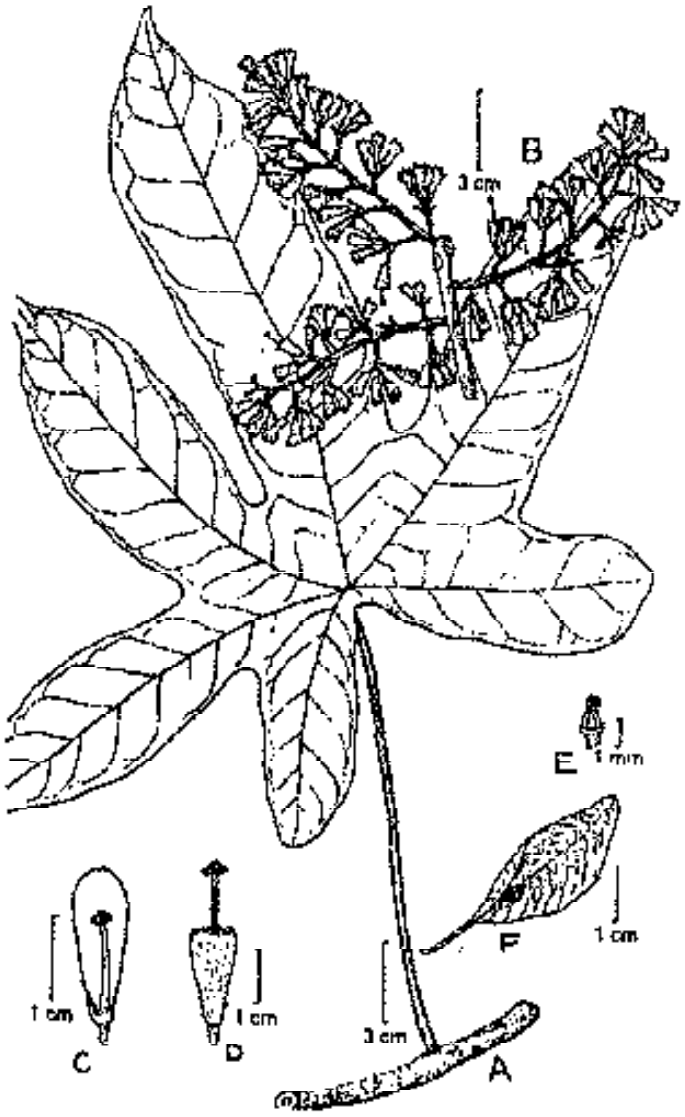
Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 140, ff. 85 & 86. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 74. 1982; Malick in Sharma et al. op. cit.

Distrib. : In deciduous forests. Bombay, Dhule, Pune, Raigad, Ratnagiri, Sindhudurg, Thane.

Notes : The flowers are very bright colourd, showy and can be recognised from for off distance also.

F. subglabra (Abraham & Dutt) Kosterm. in Blumea 34: 118. 1989. *F. colorata* var. *subglabra* Abraham & Dutta in Indian Forester 107. 364. 1981; Almeida, Fl. Mah. 1: 137. 1996. *'Kaushi', 'Supli'.*

Trees, 4–5 m tall. Leaves 12.5–16.5 x 14–21 cm, base deeply cordate, usually 3–lobed, occasionally 5–lobed, lobes broadly triangular, acuminate. Flowers 1.5–2.0 x 0.4–0.6 cm, deep scarlet, salver shaped, glabrous in short panicles appearing before leaves. Follicles 7–9 x



Firmiana colorata (Roxb.) R. Br. : A-Part of branch with a leaf; B-Part of inflorescence; C-Sectional view of male flower; D-Male flower after anthesis with exserted column; E-Pistil; F-Fruit.

3.0–3.5 cm, membranous, leaf–like with conspicuous reticulate venation, elliptic–oblong, apex mostly retuse, rarely entire or apiculate, dehiscing longitudinally, stalk 1.0–1.2 cm long. Seeds usually 2, 1 cm long, 0.6–0.7 cm thick, ellipsoid–oblong, brown or yellowish, reticulate when dry.

Fls. & Frts. : March–May.

Illus. : Abraham & Dutt. op. cit. 365.

Distrib. : Growing in suburban areas. Bombay.

HELICTERES L.

Helicteres isora L. Sp. Pl. 963. 1753; Mast. in Hook. f. Fl. Brit. India 1: 365. 1874; Cooke, Fl. Pres. Bombay 1: 136. 1958 (Repr.); Malick in Sharma et al. Fl. India 3: 426. 1993. *'Ati', 'Kewan', 'Murudseng'.*

Shrubs, 2–3 m tall; young shoots stellate hairy. Leaves bifarious, 7.5–13.5 x 5–8 cm, oblong–obovate clothed with stellate hairs on both surfaces, apex short acuminate, base subcordate–subacute, irregularly serrulate. Flowers 2.5–4.0 cm long, bright red, distinctly bilabiate in axillary clusters of 2–6–together. Follicles 5, c 5 cm long, beaked, stellately tomentose. Seeds numerous, angular, wrinkled.

Fls. & Frts. : August–December.

Illus. : Wight, Ic. t. 180. 1839; Talb. For. Fl. Bombay Pres. & Sind 1: 146, f. 89. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 76. 1982.

Distrib. : In deciduous forests, common throughout the state.

Notes. : The fruits are said to be highly medicinal. Maheshwari (1985) while studying the ethnobotany of the tribe Tharus of Kheri district, Uttar Pradesh have found that this species is extensively used by the tribals for fibre, drugs, craft and fuel purposes.

HERITIERA Ait.

Heritiera littoralis Dryand. ex W. Ait. Hort. Kew ed. 1, 3: 546. 1789; Mast. in Hook. f. Fl. Brit. India 1: 363. 1874; Cooke, Fl. Pres. Bombay 1: 134. 1958 (Repr.); Kosterm.in Reinwardtia 4: 473, ff. 1 & 2. 1959. Malick in Sharma et al Fl. India 3: 429. 1993; Almeida Fl. Mah. 1: 138. 1996. *'Koland', 'Sundri', 'Sundrichand'.*

Trees; bark longitudinally furrowed; young parts scaly. Leaves 12.5–20.0 x 5–10 cm, elliptic–oblong, glabrous above, minutely silvery scaly beneath, apex acute or obtuse, base rounded or acute. Flowers unisexual; females rather larger than males in tomentose, much branched, drooping, axillary panicles in upper axils, shorter than the leaves. Ripe carpels 1–3, 2.5–7.5 cm long, broadly ovoid, thick, woody, smooth or tubercled, dorsal margins with a broad keel or wing. Seeds c 2.5 cm long.

Fls. & Frts. : July–October.

Illus. : Bedd. Fl. Sylv. 75, t. 11, f. 6. 1870; K. Schum. in Engl. & Prantl, Pflanzenf. 3(6): 99, f. 51. 1893; Kosterm. op. cit.

Distrib. : Rare. Evergreen tree along the coasts of 'S. Konkan' (Cooke, op. cit.). Also cultivated in Victoria garden, Bombay (Almeida, op. cit.).

Notes. : Graham in his Catalogue of Bombay Pl. 18. 136. 1839 cites the locality for this species as 'Konkan' based on Nimmo. Talb. For. Fl. Bombay Pres. & Sind (1909) cites Dalz. & Gibs. Bombay Fl. 22. 1861, who themselves failed to locate the plant (Cooke, op. cit.). Wight & Arn. Prodr. Fl. Orient. 63. 1834 also say "of them we have not seen the specimens". However Rao, T. A. in Bull. Bot. Surv. India 13: 198. 1971. cited the species for Maharashtra under West Coast (based on earlier reports without a precise locality. Later workers like Almeida (1990), Billore Ph.D. Thesis Type script 1972, Kothari & Moorthy (1993), Kulkarni (1988) who covered the Konkan area did not report this species from their area or from any other locality in Maharshtra State. However, Vartak, (1966) Enum. Fl. Gomantak, repors it from only Kala naddi area (Karnataka State) from where Cooke & Talbot also reported. So it is apparent that 'S. Konkan' of Nimmo may be referable to Kala naddi area only. Malick, op. cit. gave Marathi names for the species but not mentioned Maharashtra State in the distribution data. Hence its occurrence in the present Maharashtra State is very much doubtful.

MELOCHIA L.

1	Capsules depressed–globose	...	*M. corchorifolia*
1.	Capsules acutely 5–angled	...	*M. pyramidata*

Melochia corchorifolia L. Sp. Pl. 675. 1753; Mast. in Hook. f. Fl. Brit. India 1: 374. 1874; Cooke, Fl. Pres. Bombay 1: 142. 1958 (Repr.); Robyns in Ann. Missouri Bot. Gard. 51: 83. 1964; Malick in Sharma et al. Fl. India 3: 441. 1993.

Herbs, upto 1 m tall. Leaves 2.5–6.3 x 0.6–4.0 cm, ovate–oblong, sometimes obscurely 3–lobed, glabrous or with a few scattered stellate hairs, apex acute, base acute, obtuse or truncate, margins serrate. Flowers c 1 cm across in terminal densely crowded clusters. Capsules depressed–globose, hispid. Seeds angled, mottled black–grey.

Fls. & Frts. : April–November.

Illus. : Mahesh. Illus. Fl. Delhi f. 30. 1966; Mathew, Illus. Fl. Tamilnadu Carnatic 2: t. 80. 1982.

Distrib. : Common throughout in open situations, generally in moist clayey soils.

M. pyramidata L. Sp. Pl. 674. 1753; Mast. in Hook. f. Fl. Brit. India 1: 374. 1874; S. M. Almeida & C.S. Lattoo in J. Bombay nat. Hist. Soc. 81: 528. 1984.

Herbs, 0.5–1.0 m tall, erect; stems terete. Leaves 5.0–5.5 x 2.0–3.3 cm, simple, alternate, ovate–lanceolate, base obtuse, apex acute, crenate along the margins. Flowers purple with yellow base in 4–6–flowered, glandular pubescent, leaf–opposed, umbel like cymes. Capsules broadly pyramidal, obtuse at base, longitudinally 5–winged; wings dilated towards base, 0.6–0.8 cm long, thin–walled, greenish yellow, with red patches, stellately hairy, dehiscing longitudinally. Seeds dark–brown, roughly triangular.

Fls. & Frts. : October–June.

Illus. : S. M. Almeida & Lattoo, op. cit. 529, ff. 1–6.

Distrib. : Along wastelands. Bombay.

Notes. : Mast. op. cit. recorded it as an introduced weed in India without any description or distribution. S. M. Almeida & Lattoo op. cit. recorded it for Maharashtra state from Bandra & Chembur stating that it is an introduced Tropical American Weed.

PTEROSPERMUM Schreb. (nom. cons.).

1. Leaves abruptly triangular at apex; bracteoles entire ... *P. diversifolium*
1. Leaves often cut into several lobes; bracteoles laciniate ... *P. reticulatum*

Pterospermum diversifolium Bl. Bijdr. 88. 1825; Mast. in Hook. f. Fl. Brit. India 1: 367. 1874; S.K. Chandra in Sharma et al. Fl. India 3: 449. 1993. *P. glabrescens* Wight & Arn. Prodr. 1: 69. 1834; Mast. in Hook. f. op. cit. 369.

Trees. Leaves cuneate-obovate, base 5–nerved, shortly pubescent on the abaxial surface; stipules palmate, persistent. Flowers large. Capsules large, oblong, 5–angled, beaked.

Fls. & Frts. : December–May.

Illus. : Van Rheede, Hort. Malab. 6, t. 58. 1686.

Distrib. : In moist deciduous forests. Infrequent. Bombay (cultivated), Pune, Sindhudurg.

P. reticulatum Wight & Arn. Prodr. 69. 1834; Mast. in Hook. f. Fl. Brit. India 1: 369. 1874; Cooke, Fl. Pres. Bombay 1: 138. 1958 (Repr.); S.K. Chandra in Sharma et al. Fl. India 3: 451. 1993.

Trees. Leaves 8.7–15.0 x 5.0–7.5 cm, cuneate–oblong, the underside covered with cream–coloured mealy tomentum dotted with darker minute stellate hairs, apex acuminate–attenuate, divided into several acute lobes or coarse teeth, base oblique and subcordate. Flowers 1–3 , in the upper axils. Capsules upto 8.7 cm long, ovoid, stellately pubescent. Seeds 4 in each cell, prominently veined, dark brown, wing papery, oblique, falcate.

Fls. & Frts. : December–February.

Distrib. : Rare in semi–evergreen forests. 'Western Ghats' (Cooke, op. cit.); Pune (Planted.).

STERCULIA L.

1. Leaves palmately lobed :
   - 2. Follicles armed with sharp, stinging hairs ... *S. urens*
   - 2. Follicles rusty–villous without stinging hairs ... *S. villosa*
1. Leaves entire :
   - 3. Calyx lobes linear–lanceolate, connivent ... *S. balanghas*
   - 3. Calyx lobes broadly ovate, spreading :
     - 4. Leaves glabrous; follicles lanceolate ... *S. roxburghii*
     - 4. Leaves glabrescent above, rusty stellate–pubescent beneath; follicles obovoid ... *S. guttata*

Sterculia balanghas L. Sp. Pl. 1007. 1753; Mast. in Hook. f. Fl. Brit. India 1: 358. 1874; Almeida, Fl. Mah. 1: 145. 1996.

Trees, 10–15 m tall; young parts rusty tomentose. Leaves 12–15 x 8 cm, oblong–ovate or lanceolate, apex obtuse or acuminate, base

rounded, pubescent beneath. Panicles as long as leaves, stellately hairy. Follicles 8 cm long, woody, oblong–acuminate, covered with rusty tomentum. Seeds oblong, black.

Fls. & Frts. : December–March.

Illus. : Wight. Ic. t. 30. 1840.

Distrib. : Sindhudurg (Almeida, op. cit.).

S. guttata Roxb. ex. DC. Prodr. 1: 482 1824; Mast. in Hook. f. Fl. Brit. India 1: 355. 1874; Cooke, Fl. Pres. Bombay 1: 132. 1958 (Repr.); Malick in Sharma et al. Fl. India 3: 462, f. 127. 1993. *'Golder, 'Kukar', 'Vandri'.*

Trees, 15–20 m tall; bark slightly cracked. Leaves 15–20 x 7–12 cm, ovate to oblong, apex acuminate, base rounded or subcordate. Flowers 1.5–2.5 cm across, in 8–14 cm long, tawny tomentose panicles. Follicles 1–5, 6 x 11 cm, bright red or deep orange when ripe. Seeds 2 x 1 cm, ellipsoid or oblong, black.

Fls. & Frts.: January–June.

Illus. : Wight, Ic. t. 487. 1841; Bedd. Fl. Sylv. t. 105. 1871; Ic. Roxb. Fasc. 2; 28, f. 13. 1968 (Repr. ed.); Malick in Sharma et al. op. cit.

Distrib. : In moist deciduous and semi–evergreen forests. along the ghats. Ahmednagar, Bombay, Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

S. roxburghii Wall. Pl. As. Rar. 3: 39, t. 262. 1832; Mast. in Hook. f. Fl. Brit. India. 1: 356. 1874; Malick in Sharma et al. Fl. India 3: 468, f. 130. 1993; Almeida, Fl. Mah. 1: 146. 1996.

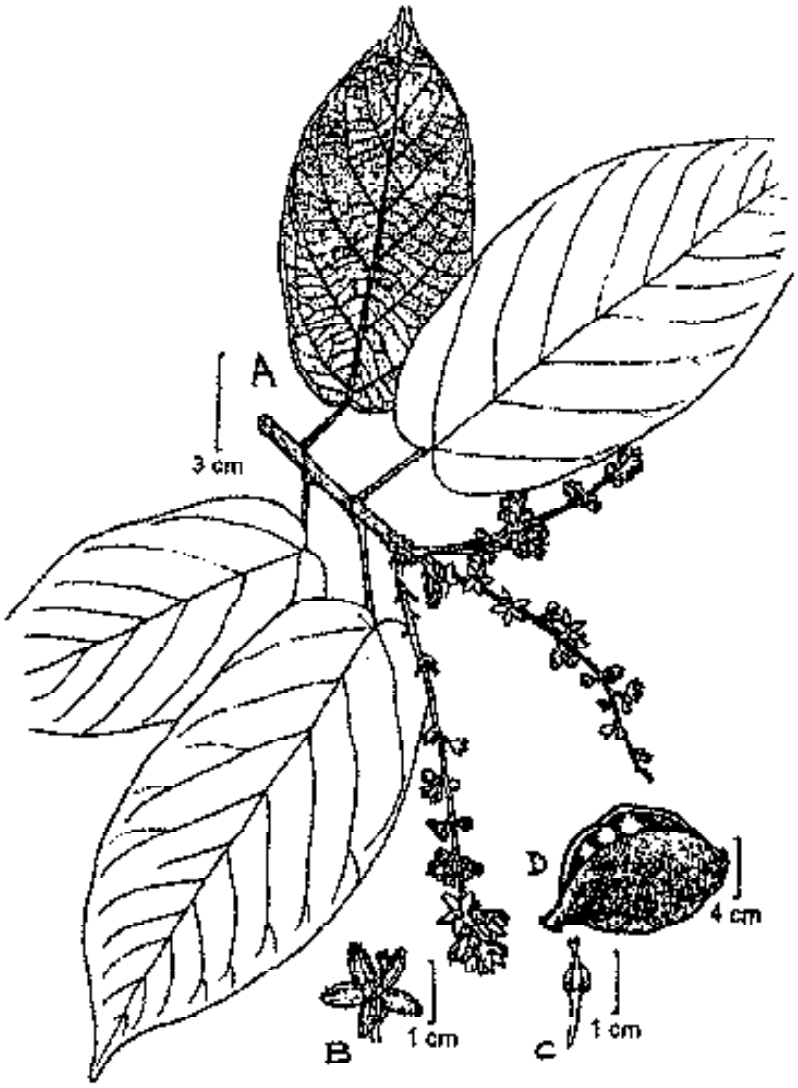
Trees. Leaves clustered at ends of branches, 12 x 4 cm, linear–oblong to elliptic, often ovate–obovate to lanceolate, apex acuminate, apiculate. Inflorescence of racemes, upto 6 cm long. Flowers c 1 cm across, solitary; perianth brick red. Follicles pink, 1–5, 5.0–7.5 x 1.8–2.2 cm, compressed, beaked. Seeds 4–8, ovoid.

Fls. & Frts. : December–January.

Illus. : Malick in Sharma et al. op. cit.

Distrib. : Bombay (Almeida op. cit).

S. urens Roxb. Pl. Cor. 1: 25, t. 24. 1795; Mast. in Hook. f. Fl. Brit. India 1: 355. 1874; Cooke, Fl. Pres. Bombay 1: 131. 1958 (Repr.); Malick in Sharma et al. Fl. India 3: 470. 1993. *'Kad', 'Kadai', 'Kandol', 'Karanunji', 'Kaudal;, 'Keonji', 'Pandruk', 'Santali', 'Telnec'.*



Sterculia guttata Roxb. : A-Flowering part of branch; B-Male flower; C-Female flower with sepals and petals removed; D-Fruit

Trees, c 10 m high; young parts pubescent, bark white, smooth, papery. Leaves 20–23 cm long, as broad as long, crowded at tips of branches, shallowly palmately 5–lobed, scabrid above, velvety beneath, apex caudate–acuminate, base cordate. Flowers 6–9 mm across in branched, glandular–pubescent, terminal panicles appearing before leaves. Follicles 4–6, c 2.5 x 1.5 cm, oblong. Seeds 3–6, oblong, dark.

Fls. & Frts. : December–May.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 137, f. 83. 1909.

Distrib. : In deciduous forests. Common throughout the state.

S. villosa Roxb. ex DC. Prodr. 1: 483. 1824; Mast. in Hook. f. Fl. Brit. India 1: 355. 1874; Cooke, Fl. Pres. Bombay 1: 132. 1958 (Repr.); Malick in Sharma et al. Fl. India 3: 472. 1993; Almeida, Fl. Mah. 1 : 147. 1996. *'Kudal', 'Kuthada', 'Sardol'.*

Trees, 4–5 m high. Leaves 25–45 cm across, deeply 3–7–lobed, lobes long–acuminate, base cordate. Flowers in much branched, rusty–pubescent, panicled racemes and crowded at ends of naked branches. Follicles c 5 cm long, oblong, villous with brown hairs. Seeds oblong, smooth, black.

Fls. & Frts. : January–may.

Illus. : Almeida, op. cit. facing p. 147.

Distrib. : In deciduous forests. Amravati, Bombay, Pune, Raigad, Ratnagiri, Sindhudurg.

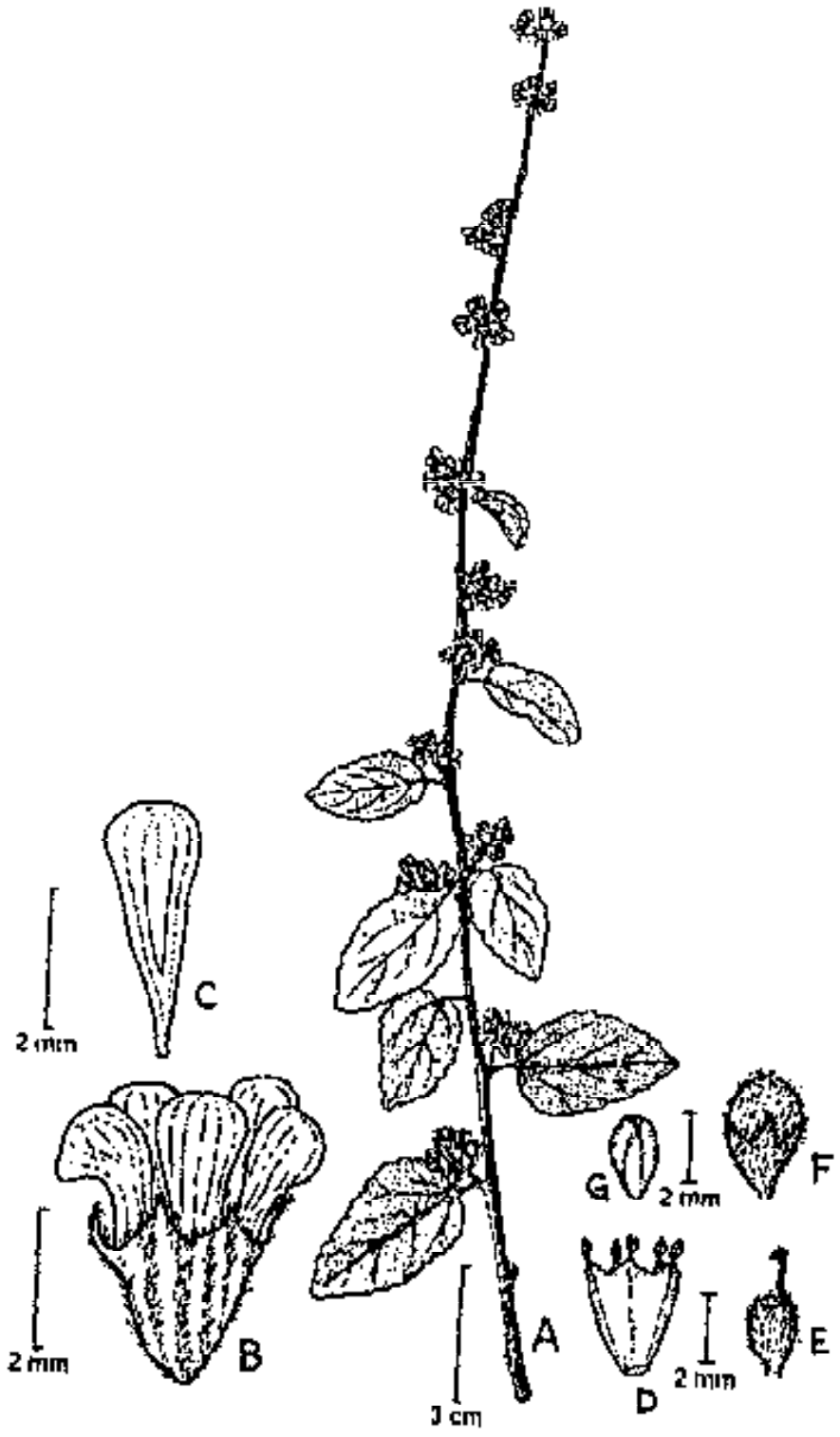
WALTHERIA L.

Waltheria indica L. Sp. Pl. 673, 1753; Mast. in Hook. f. Fl. Brit. India 1: 374. 1874; Cooke, Fl. Pres. Bombay 1: 144. 1958 (Repr.); Malick in Sharma et al. Fl. India 3: 473, f. 131. 1993.

Herbs, 0.5–1 m high, perennials; stems terete, softly canopubescent. Leaves 3–5 x 2.0–2.5 cm, ovate or ovate–oblong, softly wooly on both surfaces, apex acute, base obtuse, rounded or subcordate, margins crenate–serrate. Flowers 0.3–0.4 cm across, in dense, axillary or terminal compact clusters. Capsules 0.2–0.3 cm across, obconical, enclosed in calyx, 2–valved. Seeds 0.15 cm long, solitary, obconical, smooth or wrinkled, black.

Fls. & Frts. : August–December.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 83. 1982; Malick in Sharma et al. op. cit.



Waltheria indica L. : A-Flowering part of branch; B-Flower; C-Petal; D-Staminal cup; E-Pistil; F-Fruit; G-Seed.

Distrib. : In open situations. Common throughout.

CULTIVATED SPECIES :

Abroma angusta (L.) L. f. Suppl. 341. 1781 (*'Ambroma'*); Mast. in Hook. f. Fl. Brit. India 1: 375. 1874; Cooke, Fl. Pres. Bombay 1: 144. 1958 (Repr.); Malick in Sharma et al. Fl. India 3: 409. 1993. *Theobroma angusta* L. Syst. 233. 1767. *'Ulat–Kambal'*.

Shrubs or trees, 2–4 m tall; branches downy to velvety. Leaves 10–25 x 5–20 cm, ovate–lanceolate to ovate–oblong, base cordate, apex acute to acuminate, repand–denticulate, glabrescent above, tomentose beneath. Flowers 5 cm across, dark red, few, in leaf–opposed, subterminal, or axillary, peduncled cymes. Capsules upto 4 cm long, obpyramidal, membranous, 5 angled, truncate at apex, 5–valved, valves villous at the edges. Seeds many, c 3 x 2 mm, obovate, enveloped in a light cottony wool.

Fls. & Frts. : December–May.

Illus. : Schum. in Engl. & Prantl, Pflanzenfam. 3(6): 85, f. 44 A–C. 1893.

Distrib. : Grown in gardens as an ornamental. Pune.

Notes : Bark yields fibre.

Dombeya acutangula Cav. Diss. 3: 123, t. 38, f. 2. 1787; Malick in Sharma et al. Fl. India. 3: 473. 1993; Almeida, Fl. Mah. 1: 134. 1996; Naik, Fl. Marathwada 1 : 154. 1998.

Shrubs or small trees. Leaves crowded at ends of branches, 7.5–10.0 cm across, round–cordate, shallowly 3–5–lobed or entire. Flowers white or reddish, in many flowered, 2 parted cymes; ovary densely tomentose.

Fls : December–January.

Distrib. : Native of Tropical Africa. Grown in gardens for its showy flowers. Bombay (Almeida, op. cit.), Marathwada (Naik op. cit.).

D. calantha K. Schum. in Engl. Monogr. Afrok. Pflanzenfam. 5: 28. 1900; Malick in Sharma et al Fl. India 3: 475. 1993.

Shrubs. Leaves 8–35 x 7–18 cm, usually 3–5–lobed, base cordate, apex acuminate, coarsely toothed, pubescent on both surfaces. 7–nerved. Flowers rose coloured, 3–5 cm across, in axillary peduncled corymbs. Capsules loculicidally dehiscent.

Fls. & Frts. : Almost throughout the year.

Distrib. : Grown in gardens as an ornamental. Aurangabad, Bombay, Nagpur, Pune.

Notes : The flowers are showy and mildly fragrant.

D. cayeuxii Andre, Rev. Hort. 544. 1897; Naik, Fl. Marathwada 1: 155. 1998.

Shrubs, 3–5 m tall; young parts and under surface of leaves velvety tomentose. Leaves 6–9 x 6.5–10.0 cm, ovate, apex acuminate, base cordate, crenate–serrate along margins. Flowers 2–3 cm across, deep pink in axillary lax, pendulous, corymbose racemes.

Fls. : December–February

Distrib. : Grown in gardens in Marathwada (Naik op. cit.).

D. mastersii Hook. in Bot. Mag. t. 5639. 1867; Malick in Sharma et al. Fl. India 3: 475. 1993.

Shrubs. Leaves orbicular. Flowers white or pinkish–white. Capsules 5–celled. Seeds rugose.

Fls. & Frts. : Almost throughout the year.

Distrib. : Grown in gardens. Pune.

D. natalensis Sond. in Linnaea 234: 17. 1850; Almeida, Fl. Mah. 1: 134. 1996.

Shrubs. Leaves cordate, apex acute, toothed along margins, with minute, stellate pubescence. Umbels 4–8–flowered; flowers white, sweet scented.

Fls. : October–December.

Distrib. : Cultivated in gardens (Almeida, op. cit.).

Notes : It is a native of Natal.

D. spectabilis Bojer in Ann. Sci. Nat. Bot. 2, 18: 191. 1842; Malick in Sharma et al. Fl. India 3: 476. 1993; Almeida, Fl. Mah. 1: 134. 1996.

Trees, small. Leaves cordate, orbicular or oblong, apex acute, undulate along margins, 5–9–nerved, rough above and rusty or whitish pubescent beneath; petioles downy. Flowers 2 cm across, white, in many–flowered, much–branched, axillary and terminal cymes.

Fls. : December–January.

Distrib. : Bombay gardens (Almeida, op. cit.).

Guazuma ulmifolia Lam. Encycl. 3: 52. 1789; Robyns in Ann. Miss. Bot. Gard. 51: 102. 1964. Malick in Sharma et al Fl. India 3: 424. 1993. *Theobroma guazuma* L. Sp. Pl. 782. 1753. *Guazuma tomentosa* H. B. & K. Nov. Gen. Pl. Sp. 5: 320. 1826; Mast. in Hook. f. Fl. Brit. India 1: 375. 1874; Cooke, Fl. Pres. Bombay 1: 144. 1958 (Repr.). *'Rudrakshi'*.

Trees, upto 15 m tall. Leaves 6–17 x 3–9 cm, ovate–oblong, oblong–lanceolate, sometimes falcate, base obliquely cordate, apex rounded to shortly acuminate, irregularly serrate, scabrid to glabrescent above, pubescent beneath. Flowers yellow, in large, terminal and axillary panicles. Capsules upto 3 cm across, oblong–globose, woody, septicidally 5–valved, tubercled. Seeds many, 0.1 cm across, globose.

Fls. & Frts. : March–October.

Illus. : Bedd. Fl. Sylv. t. 107. 1871; Malick in Sharma et al. op. cit. 423, f. 118.

Distrib. : Planted in gardens and along road sides. Aurangabad, Bombay, Kolhapur, Nagpur, Pune.

Notes : The flowers are showy and the plant yields good fibre used in rope making. It is a Native of Tropical America.

Hildegardia populifolia (Roxb.) Schott. & Endl. Melet. Bot. 33. 1832; Malick in Sharma et al. Fl. India 3: 432. 1993. *Sterculia populifolia* (*'populnifolia'*) Roxb. Fl. Ind. 148. 1832; Mast. in Hook. f. Fl. Brit. India 1: 361. 1874; Cooke, Fl. Pres. Bombay 1: 134. 1958 (Repr.).

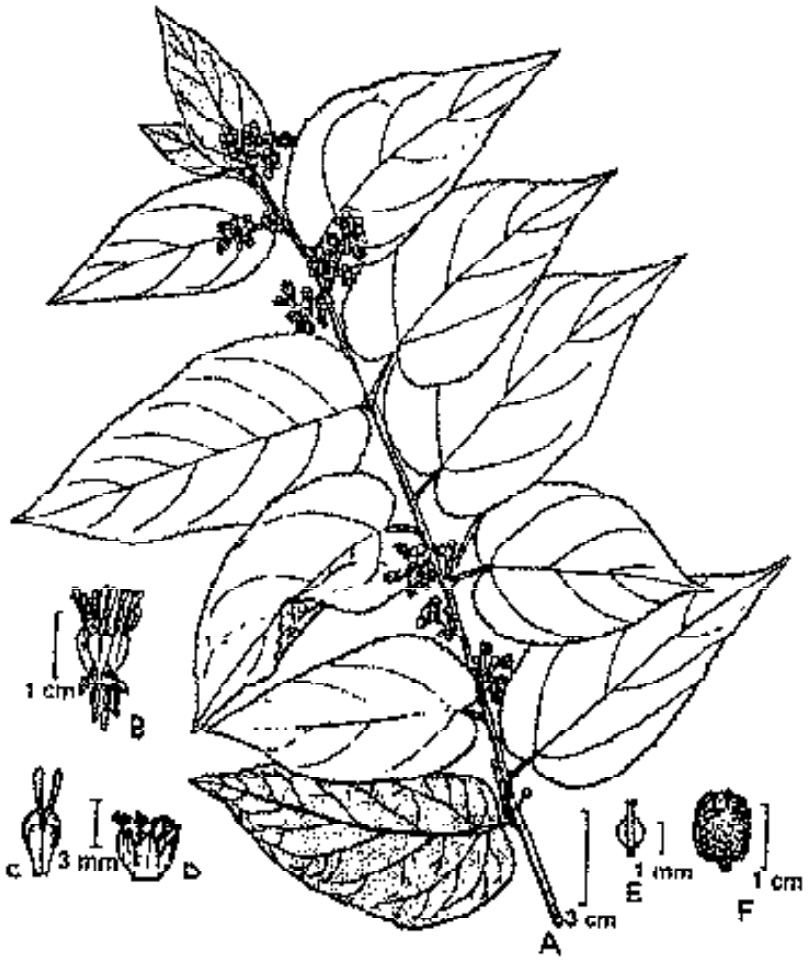
Trees, upto 20 m tall; branchlets angular. Leaves reniform, base cordate–deeply cordate, apex acuminate, entire, membranous. Flowers scarlet, polygamous, in axillary and terminal, upto 15 cm long panicles. Follicles 5, upto 10 x 5 cm, oblique, inflated, papery, strongly veined, obtuse, stalks upto 4 cm long. Seeds 2, c 1.3 cm long, ovoid–oblong.

Fls. & Frts. : April–June.

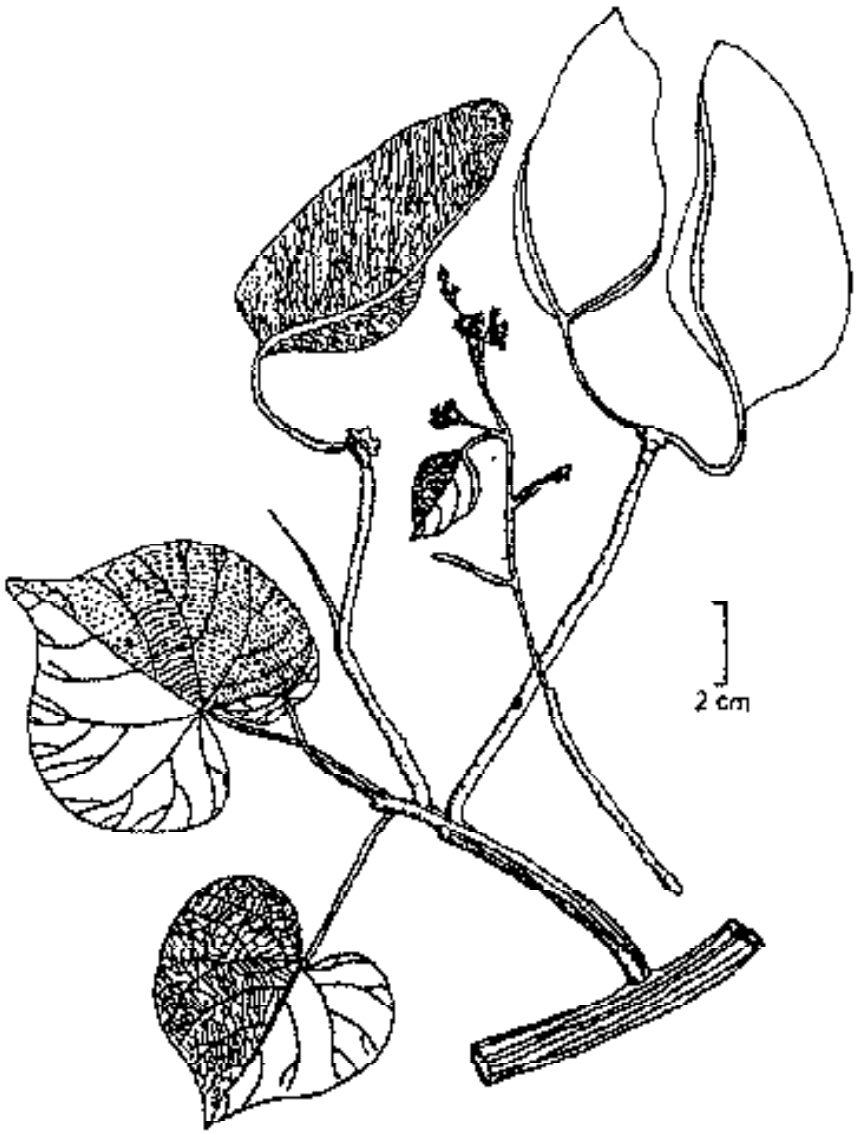
Illus. : Malick, op. cit. 433, f. 120.

Distrib. : Cultivated. Pune (Cooke, op. cit.).

Notes : Malick op. cit. did not mention Maharashtra in distribution data.



Guazuma ulmifolia Lam. : A-Flowering part of branch; B-Flower; C-Petal; D-Staminal column; E-Pistil; F-Fruit.



Hildegardia populifolia (Roxb.) Schott & Endl.

Kleinhovia hospita L. Sp. Pl. ed. 2, 1365. 1765; Mast. in Hook. f. Fl. Brit. India 1: 364. 1874; Cooke, Fl. Pres. Bombay 1: 135. 1958 (Repr.); Malick in Sharma et al. Fl. India 3: 434. 1993.

Trees, much branched. Leaves 10–15 x 7.5–12.5 cm, broadly ovate or suborbicular, base cordate, apex acuminate, palmately 3–5–nerved. Flowers pinkish or rosy, in large, terminal panicles. Capsules membranous, inflated. Seeds one in each cell, roundish, tubercled.

Fls. & Frts. : July–December.

Illus. : Bedd. Fl. Sylv. 23, t. 4, f. 4. 1871.

Distrib. : Planted in gardens. Aurangabad, Bombay, Kolhapur, Nagpur, Pune.

Notes : Flowers fragrant. It is a native of Moluccas.

Melhania magnifolia Blatt. & Hallb. in J. Bombay Nat. Hist. Soc. 26: 228. 1918; Malick in Sharma et al. Fl. India 3: 440. 1993.

Undershrubs, somewhat spreading. Leaves 7–11 x 3–5 cm, narrowly lanceolate to ovate–oblong, base cordate or roundish, apex obtuse to subacute, irregularly crenate–dentate, densely stellately velvety above, white wooly tomentose beneath. Flowers orange–yellow, 1–5, in axillary and terminal 4–5 cm long peduncled cymes. Capsules 10–15 cm across, densely tomentose. Seeds 4–5 in each locule, more or less rhomboid, rugose, angular.

Fls. & Frts. : December.

Distrib. : Planted in gardens in Maharashtra state.

M. futteyporensis Munro ex Mast. in Hook. f. Fl. Brit. India 1: 373. 1874; Patunkar in J. Econ. Tax. Bot. 14: 484. 1990; Malick in Sharma et al. Fl. India 3: 438. 1993. *M. tomentosa* Stocks ex Mast. var. *major* Blatt. & Hallb. in J. Bombay Nat. Hist. Soc. 26. 228. 1918 *('Maior'). M. futteyporensis* Munro ex Mast. var *major* (Blatt. & Hallb.) Sant. in J. Bombay Nat. Hist. Soc. 56: 278. 1959.

Undershrubs, canopubescent. Leaves 7–15 x 3.5 cm, ovate–lanceolate or oblong–lanceolate, base cordate, apex acute or subacuminate, unequally serrate, stellate–pubescent; petioles 2.5–5.5 cm long, terete. Flowers yellow, 2–4 in axillary and terminal peduncled cymes. Capsules oblong, villous, 5–veined, loculicidal. Seeds 4 in each locule, tubercled, angled.

Fls. & Frts. : January–June.

Illus. : Patuńkar op. cit. 485, f. 1.

Distrib. : Ample along stream banks locally. Aurangabad.

Notes. : Flowers open in the morning. This species is earlier reported from N.W. India and also from Sindh and Delhi. The present report from Aurangabad by Patunkar expressing himself uncertainty by saying "Probably the distribution may be continuous but because lack of any authentic reports on the floristics of the intervening areas, it cannot be taken as certain." Further K.C. Malick op. cit. also did not include Maharashtra in distribution.

M. tomentosa Stocks ex Mast. in Hook. f. Fl. Brit. India 1: 373. 1874; Cooke, Fl. Pres. Bombay 1: 142. 1958 (Repr.); Malick in Sharma et al. Fl. India 3: 440. 1993. *M abutiloides* Ait. Cat. Pl. Punjab & Sindh 23. 1869 p.p. non Arn. ex Wight (1840).

Shrubs; branches subterete, tomentose. Leaves 2–8 x 0.5–5.0 cm, ovate–elliptic, ovate–oblong or oblong–lanceolate, base cordate or rounded, apex acute, crenate–serrate, thinly stellate hairy above, pale and softly pubescent beneath. Flowers yellow, 2–3, in terminal, peduncled cymes. Capsules c 1 cm across, subglobose to oblong, silky villous. Seeds 2 in each locule, angled, muriculate.

Fls. & Frts. : December.

Distrib. : Planted in gardens in Maharashtra.

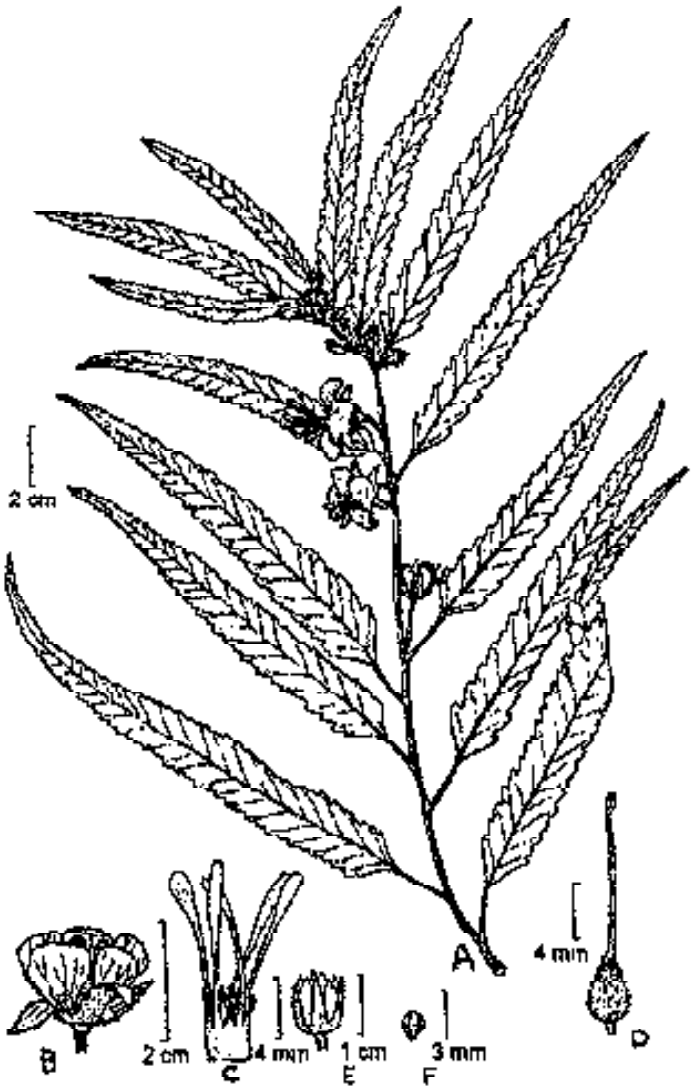
Melochia umbellata (Houtt.) Stapf in Kew Bull. 317. 1913; Malick in Sharma et al. Fl. India 3. 442. 1993. *Visema umbellata* Houtt. Handl. 8: 309, t. 46, f. 3. 1777. *Melochia velutina* Wall. ex Bedd. Fl. Sylv. 35, t. 5, f. 3. 1871; Mast in Hook. f. Fl. Brit. India 1: 374. 1874; Cooke, Fl. Pres. Bombay 1: 143. 1958 (Repr.). *'Methuri'*.

Trees, small; young parts stellately hairy. Leaves 10–18 x 12–15 cm, broadly ovate or suborbicular, base acute, cordate, truncate or subacute, margins serrate, velvety when young, at length loosing much of its pubescence especially on upper surface. Flowers 0.6 cm across, pale pink in many–flowered terminal and axillary corymbose panicles. Capsules upto 1 cm long. deeply 5–lobed, oblong, pilose. Seeds with a thin, papery wing.

Fls. & Frts. : October–March.

Illus. : Bedd. op. cit.

Distrib. : Grown as an ornamental throughout the state.



Pentapetes phoenicea L. : A-Flowering part of branch; B-Flower; C-Staminal column showing stamens and staminodes; D-Pistil; E-Fruit; F-Seed.

Pentapetes phoenicea L. Sp. Pl. 698. 1753; Mast. in Hook. f. Fl. Brit. India 1: 371. 1874; Cooke, Fl. Pres. Bombay 1: 144. 1958 (Repr.); Malick in Sharma et al. Fl. India 3: 443, f. 122. 1993. *'Dupari'*, *'Duparshendri'*.

Herbs, annuals, upto 2 m high, much branched, sparsely stellately hairy. Leaves 7–15 cm long, deltoid or hastate to linear, base deltoid, apex obtuse, strongly crenate–serrate, glabrous above, stellately hairy on the veins beneath. Flowers 2.5–4.0 cm across, scarlet in axillary fascicles. Capsules subglobose, stallately hairy. Seeds 8–12 in two series, obovoid, angular rough.

Fls. & Frts. : August–February.

Illus. : Schum. in Engl. & Prantl, pflanzenfam. 3(6): 77, f. 40 D–E. 1893; Malick op. cit. 444, f. 122.

Distrib. : Planted in gardens. Bombay, Chandrapur, Nagpur, Pune, Thane.

Notes : The attractive flowers said to open at noon and fall on the following early morning.

Pterocymbium tinctorium (Blanco) Merr. in Govt. Lab. Publ. Philip. 27: 24. 1905 & Enum. 3: 57. 1923; Kosterm. in Reinwardtia 1: 43. 1950; Malick in Sharma et al. Fl. India 3: 445–446. f. 123. 1993. *Heritiera tinctoria* Blanco, Fl. Filip. 653. 1837. *Sterculia campanulata* Wall. ex Mast. in Hook. f. Fl. Brit. India 1: 362. 1874 (excl. syn. *Pterocymbium javanicum* Br.)

Trees, 15–20 m tall. Leaves 10–15 x 7–15 cm, broadly ovate or ovate–oblong, base rounded, apex acute to acuminate, entire. Flowers unisexual, pedicelled, pedicels jointed. Follicles 5 or fewer, 5–9 x 1.5–2.5 cm, membranous, boat shaped, 2-lobed. Seeds solitary, c 1 cm long, ovoid to ellipsoid.

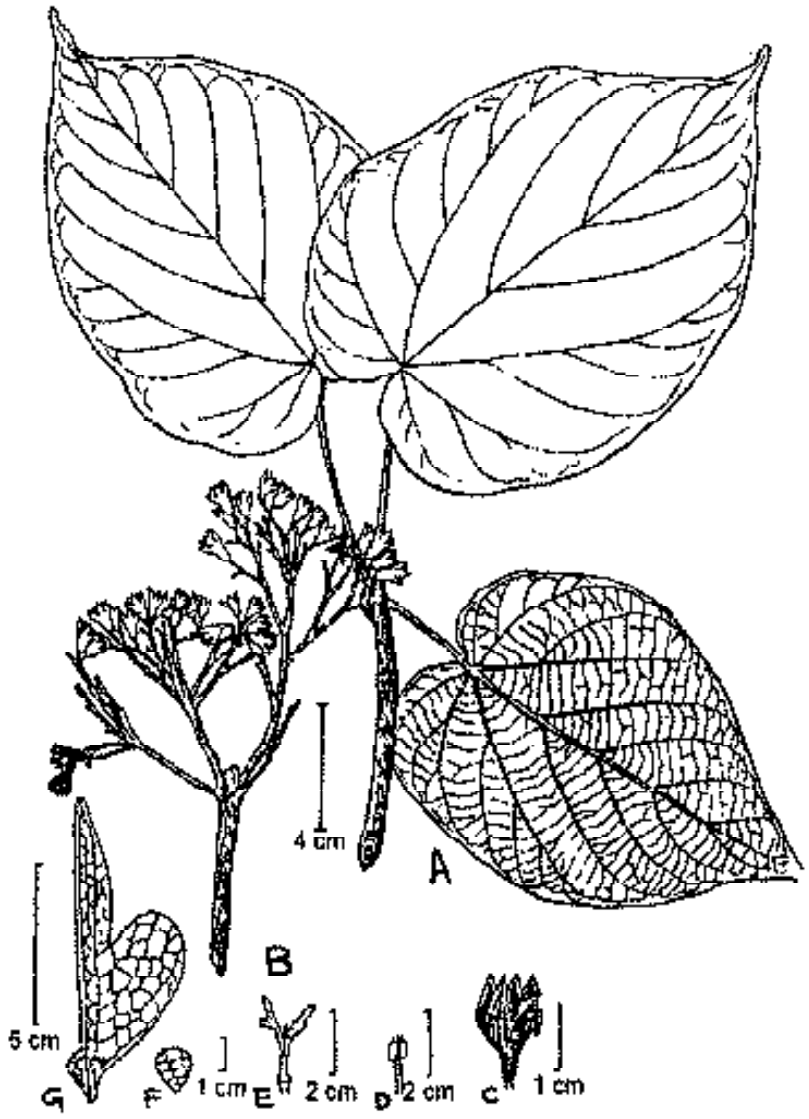
Fls. & Frts. : March–May.

Illus. : Malick, op. cit.

Distrib. : Planted as an ornamental. Pune (Khandala Hotel, Khandala).

Notes : A native of Peru & Java.

Pterospermum acerifolium (L.) Willd. Sp. Pl. 3: 729. 1800; Mast. in Hook. f. Fl. Brit. India 1: 368. 1874; Cooke, Fl. Pres. Bombay 1: 137. 1958 (Repr.); Chandra in Sharma et al. Fl. India 3: 448. 1993.



Pterocymbium tinctorium (Blanco) Merr. : A-Part of branch with leaves; B-Branch with inflorescence; C-Female flower; D-Fertile stamen; E-Gynoecium; F-Seed; G-Fruit with prominent wing.

Pentapetes acerifolia L. Sp. Pl. 698, 1753. *'Kanak champa', 'Karnihar', 'Karnikar', 'Muchkund'.*

Trees, large; bark smooth, ash coloured. Leaves 25–35 x 15–25 cm, orbicular or oblong, entire or variously lobed, cordate or sometimes peltate, glabrous at length above and floccose tomentose beneath. Flowers 12–15 cm across, white, axillary, solitary or in pairs. Capsules 10–15 cm long, 5–angled, woody, brownish–tomentose. Seeds obliquely ovoid, compressed, wing large, thin.

Fls. & Frts. : December–June.

Illus. : Schum. in Engl. Prantl, Pflanzenfam. 3 (6): 93, f. 48. H. 1893.

Distrib. : Probably native of Eastern India. Planted in gardens. Ahmednagar, Amravati, Aurangabad, Bombay, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

Notes : Grown for its tall stem, rich, broad foliage and white fragrant flowers.

P. canescens Roxb. Fl. Ind. 3: 162. 1832. *P. suberifolium* (L.) Lam. Encycl. 3: 136, t. 576, f. 2. 1794 non Willd. 1800; Mast. in Hook. f. Fl. Brit. India 1: 367. 1874; Cooke, Fl. Pres. Bombay 1: 137. 1958 (Repr.); Chandra in Sharma et al. Fl. India 3: 453. 1993. *'Muchakund'.*

Trees, small. Leaves distichous, 6.5–10.0 x 3.0–4.5 cm, oblong, obovate–oblong, base oblique and rounded, acuminate, apex often irregularly angled, glabrous above, clothed with cream coloured tomentum beneath. Flowers white, 3.5–5.0 cm across, axillary. Capsules 3.5–6.5 cm long, ovoid–oblong, tapering at both ends, covered with white tomentum. Seeds with a terminal wing twice as long as seeds.

Fls. & Frts. : December–May.

Distrib. : Planted. Bombay, Pune, S. Konkan (Cooke, op. cit.).

Notes : Grown for its white fragrant flowers.

P. xylocarpum (Gaertn.) Sant. & Wagh in Bull. Bot. Surv. India 5: 108. (1963) 1964; Chandra in Sharma et al. Fl. India 3: 454. 1993; Almeida, Fl. Mah. 1: 143. 1996. *Velanga xylocarpa* Gaertn. Fruct. Sem. Pl. 2: 245, t. 133, f. 2. 1791. *Pterospermum suberifolium* Willd. Sp. Pl. 3: 728. 1800 non Lam. 1794. *P. heyneanum* Wall. ex Wight & Arn. Prodr. 69. 1834; Mast. in Hook. f. Fl. Brit. India 1: 369. 1874.

Trees, 15–20 m. tall; young branches rusty–tomentose. Leaves 10–20 x 6–12 cm, variable in shape, usually oblong–obovate, base cordate, apex acuminate, coarsely toothed or lobed, coriaceous, glabrous above, greyish pubescent beneath. Flowers white, 5 cm across, solitary or 2–3–flowered fascicles. Capsules 5.0–7.5 x 2.0–3.5 cm, oblong to pyriform, narrowed at both ends, obtusely 5–angled, rusty stellate tomentose. Seeds 8–10 in each locule, 0–1 x 0.03 cm, orbicular, winged, wing c 2.2 x 0.8 cm, papery.

Fls. & Frts. : December–February.

Distrib. : Planted in gardens. Bombay, Pune (Almeida, op. cit.).

Pterygota alata (Roxb.) R.Br. in Benn. Pl. Jav. Rar. 234. 1844; Malick in Sharma et al. Fl. India 3: 455. 1993. *Sterculia alata* Roxb. Pl. Cor. 3: 84, t. 287. 1820; Mast. in Hook. f. Fl. Brit. India 1: 360. 1874; Cooke, Fl. Pres. Bombay 1: 133. 1958 (Repr.).

Trees; bark smooth. Leaves 10–25 x 7–18 cm, ovate, base cordate, apex acute or shortly acuminate. Flowers c 2.5 cm across in subpanicled, few flowered racemes arising from old axils of fallen leaves. Follicles 5, c 12.5 cm across, subglobose, clothed with mealy pubescence without, corky within. Seeds c 40, oblong, compressed, winged, wing oblong–obovate, corky.

Fls. & Frts. : November–April.

Illus. : Bedd. Fl. Sylv. t. 230. 1872 (*Sterculia heynii*).

Distrib. : Planted. Bombay, Pune.

Notes : Leaves crowded at the ends of branches and fall before the flowers appear.

Sterculia armata Mast. in Hook. f. Fl. Brit. India 1: 357. 1874; Almeida, Fl. Mah. 1: 144. 1996.

Trees. Leaves crowded at branch endings, 12–15 x 5 cm, oblong, apex acute, base rounded, veins hispidulous. Inflorescence of panicles; sepals pink.

Fls. : February.

Distrib. : Victoria garden, Bombay (Almeida, op. cit.).

S. discolor (F. Muell.) Benth. Fl. Austr. 1: 228. 1863; Almeida, Fl. Mah. 1: 145. 1996. *Brachychiton discolor* F. Muell. Fragm. 1: 1. 1858.

Trees. Leaves c 15 cm across, irregularly 5–7–lobed, white tomentose beneath. Flowers bluish–grey. Follicles c 15 cm long, rusty tomentose.

Fls. : January.

Distrib. : Victoria garden, Bombay (Almeida, op. cit.).

S. foetida L. Sp. Pl. 1008. 1753; Mast. in Hook. f. Fl. Brit. India 1: 354. 1874; Cooke, Fl. Pres. Bombay 1: 131. 1958 (Repr.); Malick in Sharma et al. Fl. India 3: 459, 461, f. 126. 1993. *'Jangli–badam', 'Pun'.*

Trees, large; bark whitish. Leaves digitate; leaflets 5–9, subsessile, 10–18 x 3.5–5.0 cm, oblong–lanceolate, base tapering, apex acute, or acuminate, pubescent when young, at length glabrous on both surfaces. Flowers reddish, c 1 cm across, in erect, 10–20 cm long racemose panicles. Follicles 1–5, 10–13 cm long, boat–shaped, shortly beaked, thick and woody, bright red when ripe, nearly glabrous without, quite glabrous within. Seeds numerous, c 0.6 cm long, ovoid–oblong.

Fls. & Frts. : March–June.

Illus. : Wight, Ic. tt. 181, 364. 1840; Malick in Sharma et al op. cit.

Distrib. : Often planted. Bombay, Konkan (Cooke, op. cit.), Nagpur, Osmanabad, Pune, Satara.

Notes : Flowers have an offensive odour. Fully dehisced and dried empty follicles are used as ornamental after varnishing. Seeds are said to be edible.

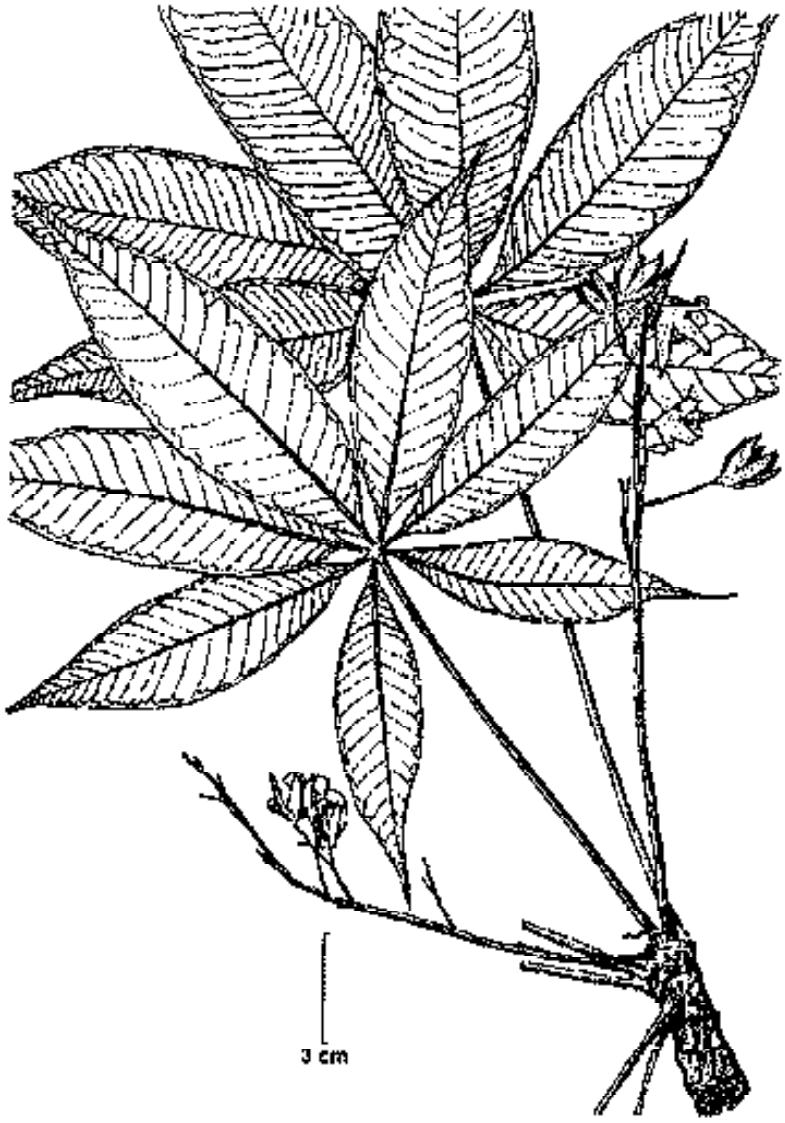
Theobroma cacao L. Sp. Pl. 752. 1753; Malick in Sharma et al. Fl. India 3: 476. 1993.

Trees, 3.5 m tall. Leaves 10–35 x 6–10 cm, elliptic–oblong or obovate–oblong, apex abruptly acuminate, entire, coriaceous. Flowers yellowish or pink, cauliflorous. Drupes c 30 cm long, ellipsoid–ovoid, reddish–yellow, woody, smooth or ribbed, 5–locular. Seeds in 2 rows in each locule, embedded in white, pinkish or brownish mucilaginous aromatic pulp.

Fls. & Frts. : January–May.

Distrib. : Cultivated. Bombay, Sindhudurg.

Notes : The plant yields cocoa of commerce.



Sterculia foetida L.

TILIACEAE

(S. G. Pradhan)

1. Inflorescence a terminal panicle or a paniculate cyme:
   2. Flower buds subglobose or ovoid; sepals *c* 0.6 cm long; fruits wrinkled, globose ... GREWIA
   2. Flower buds oblong; sepals c 3.5 cm long; fruits echinate triquetrous ... ERINOCARPUS
1. Inflorescence of solitary flowers, axillary or terminal umbellate cymes or leaf–opposed cymes :
   3. Petals glandular at base; stamens arising from apex of the torus :
      4. Fruits echinate with hooked prickles ... TRIUMFETTA
      4. Fruits not as above ... GREWIA
   3. Petals not glandular at base; stamens arising from the base of the torus ... CORCHORUS

CORCHORUS L.

1. Capsules globose ... *C. capsularis*
1. Capsules cylindric, elongate and beaked:
   2. Capsules 5–valved ... *C. olitorius*
   2. Capsules 3–4–valved:
      3. Beak entire:
         4. Capsules less than 3.5 cm long:
            5. Capsules glabrous ... *C. depressus*
            5. Capsules hairy:
               6. Leaf–apex acuminate ... *C. urticifolius*
               6. Leaf–apex obtuse ... *C. fascicularis*
         4. Capsules 5–7 cm long:
            7. Capsules glabrous ... *C. trilocularis*
            7. Capsules hairy ... *C. deccanensis*
      3. Beak divided:
         8. Capsules winged ... *C. aestuans*
         8. Capsules not winged ... *C. tridens*

Corchorus aestuans L. Syst. Nat. ed. 10, 2: 1079. 1759; Daniel & Chandrab. in Sharma et al. Fl. India 3: 485. 1993. *C. acutangulus* Lam. Encycl. 2: 104. 1786; Mast. in Hook. f. Fl. Brit. India 1: 398. 1874; Cooke, Fl. Pres. Bombay 1: 160. 1958 (Repr.).



Corchorus aestuans L.

Annual herbs: stems reddish, much branched. Leaves 2.0–5.6 x 1.2–2.3 cm, ovate, glabrous or sparsely hairy on both the surfaces, apex acute. Inflorescence of leaf–opposed cymes. Flowers yellow; petals spathulate. Capsules 1.0–2.5 x 0.1–0.6 cm, 6–angled, 3–winged. Seeds truncate, dark–brown.

Fls. & Frts. : September–November.

Illus. : Wight, Ic. t. 739. 1845 (*C. acutangulus*); Mahesh. Illus. Fl. Delhi f. 35. 1966.

Distrib. : Common throughout as a weed, in open places.

C. capsularis L. Sp. Pl. 529. 1753; Mast. in. Hook. f. Fl. Brit. India 1: 397. 1874; Cooke, Fl. Pres. Bombay 1: 157. 1958 (Repr.); Daniel & Chandrab. in Sharma et al. Fl. India 3: 485. 1995.

Herbs; stems erect, woody. Leaves 3.5–6.5 x 0.5–1.7 cm, lanceolate, acute or acuminate at apex. Flowers yellow, in short-peduncled, leaf–opposed clusters. Capsules 0.6–1.2 cm across, prominently echinate. Seeds few in each cell, wedge–shaped, smooth, brown.

Fls. & Frts. : September–November.

Illus. : Wight, Ic. t. 311. 1840; Mahesh. Illus. Fl. Delhi f. 37. 1966.

Distrib. : Common near wet places.

C. deccanensis H.B. Singh & Viswanathan in Taxon 39: 341. 1990; Daniel & Chandrab. in Sharma et al. Fl. India 3 : 489. 1993; Naik, Fl. Marathwada 1 : 162. 1998. *C. velutinus* Pardeshi in Indian Bot. Repr. 1: 63, f. 1. 1982 non Willd.

Erect, woody, much branched annual herbs, 30–60 cm tall, tomentose. Leaves 1.5 x 0.5–2.5 cm, oblong–lanceolate, truncate or rounded at base, obtuse at apex, margins serrate. Flowers orange–yellow, c 0.5 cm across, 1–2, in leaf–opposed cymes; petals villous at base on both the surfaces; filaments densely clothed with spreading white hairs; ovary villous. Capsules 5–6 cm long, obtusely 3–angled. Seeds black, trigonous, truncate at one end, rounded at other.

Fls. & Frts. : September–January.

Illus. : Pardeshi, op. cit.

Distrib. : Frequent along bunds of fields and in wastelands. Aurangabad & Beed (Naik, op. cit.).

C. depressus (L.) Vicary in J. Asiat. Soc. Bengal 16: 1160. 1847; Daniel & Chandrab. in Sharma et al. Fl. India 3: 486. 1993. *Antichorus depressus* L. Mant. 64. 1767. *Corchorus antichorus* Raeusch. Nom. Bot. ed. 3, 158. 1797; Mast. in Hook. f. Fl. Brit. India 1: 398. 1874; Cooke, Fl. Pres. Bombay 1: 159. 1958 (Repr.). *'Bahuphali', 'Mudhiri'.*

Perennial herbs, much branched, woody. Leaves 0.6–1.5 x 0.5–1.0 cm, roundish–obtuse at base and apex, margins crenate-serrate, 3–nerved. Inflorescence of leaf–opposed cymes. Flowers 0.6–0.8 cm across, yellow. Capsules 10–20 mm long, cylindric, curved, septate. Seeds trigonous, truncate, black.

Fls. & Frts. : September–October.

Illus : Wight, Ic. t. 1073. 1844 (*Corchorus antichorus*); Mahesh. Illus. Fl. Delhi f. 32. 1966.

Distrib. : Occasional on loamy soil along river banks. Ahmednagar, Aurangabad, Nasik, Pune, Satara.

C. fascicularis Lam. Encycl. 2: 104. 1786; Mast. in Hook. f. Fl. Brit. India 1: 398. 1874; Cooke, Fl. Pres. Bombay 1: 159. 1958 (Repr.); Daniel & Chandrab. in Sharma et al. Fl. India 3: 486. 1993. *'Bahuphalli', 'Kiramkuri', 'Motibahuthali'.*

Herbs, suffruticose; stems and branches terete. Leaves 2.2–3.5 x 0.6–1.3 cm, elliptic–oblong, serrate; stipules lanceolate–subulate. Flowers nearly sessile, in leaf–opposed cymes. Capsules c 1.5 cm long, shortly beaked. Seeds wedge–shaped, black, smooth.

Fls. & Frts. : September–December.

Distrib. : Common in drying ditches along roadsides, in fields, etc.

C. olitorius L. Sp. Pl. 529. 1753; Mast. in Hook. f. Fl. Brit. India 1: 397. 1874; Cooke, Fl. Pres. Bombay 1: 158. 1958 (Repr.); Daniel & Chandrab. in Sharma et al. Fl. India 3: 487. 1993. *'Banpat', 'Chichuria', 'Choocha'. 'Motichunch'.*

Herbs, suffruticose. Leaves 3.2–7.5 x 1.7–3.5 cm, elliptic, ovate or ovate–lanceolate, rounded at base, acute at apex, margins serrate. Inflorescence of extra–axillary or leaf– opposed cymes. Flowers yellow; petals oblong–spathulate. Capsules 10–ribbed, transversely partitioned in between valves. Seeds trigonous, black.

Fls. & Frts. : September–December.

Illus. : K. Schum. in Engl. & Prantl, Pflanzenf. 3(6): f. 8A. 1890; Mahesh. Illus. Fl. Delhi f. 33. 1966.

Distrib. : Common throughout as a weed in cultivated fields and gardens.

C. tridens L. Mant. App. 566. 1771; Mast. in Hook. f. Fl. Brit. India 1: 398. 1874; Cooke, Fl. Pres. Bombay 1: 159. 1958 (Repr.); Daniel & Chandrab. in Sharma et al. Fl. India 3: 488. 1993.

Annual herbs, 30–60 cm tall. Leaves 3.5–8.0 x 1.0–2.5 cm, linear–lanceolate or linear–oblong, acute at apex, margins crenate–serrate. Flowers 1–4, subsessile; sepals 0.3 cm long, linear–oblong; petals obovate–oblong. Capsules 2.5–3.5 cm long, 3–valved. Seeds truncate.

Fls. & Frts. : September–October.

Distrib. : Occasional in wet fields. Aurangabad, Bombay, Chandrapur, Nasik.

C. trilocularis L. Syst. Nat. 12: 369. 1764 & Mant. Pl. 77. 1767; Mast. in Hook. f. Fl. Brit. India 1: 397. 1874; Cooke, Fl. Pres. Bombay 1: 158. 1958 (Repr.); Daniel & Chandrab. in Sharma et al. Fl. India 3: 488. 1993. *'Kaduchinch'*.

Annual herbs; stems and branches patently hairy. Leaves 2.3–6.5 x 2.0–2.6 cm, elliptic–oblong or elliptic–lanceolate, acute or obtuse at apex. Inflorescence cymose, peduncled, axillary. Flowers yellow; petals oblong. Capsules straight or curved, scabrous at length, 3–4–valved. Seeds trigonous, black.

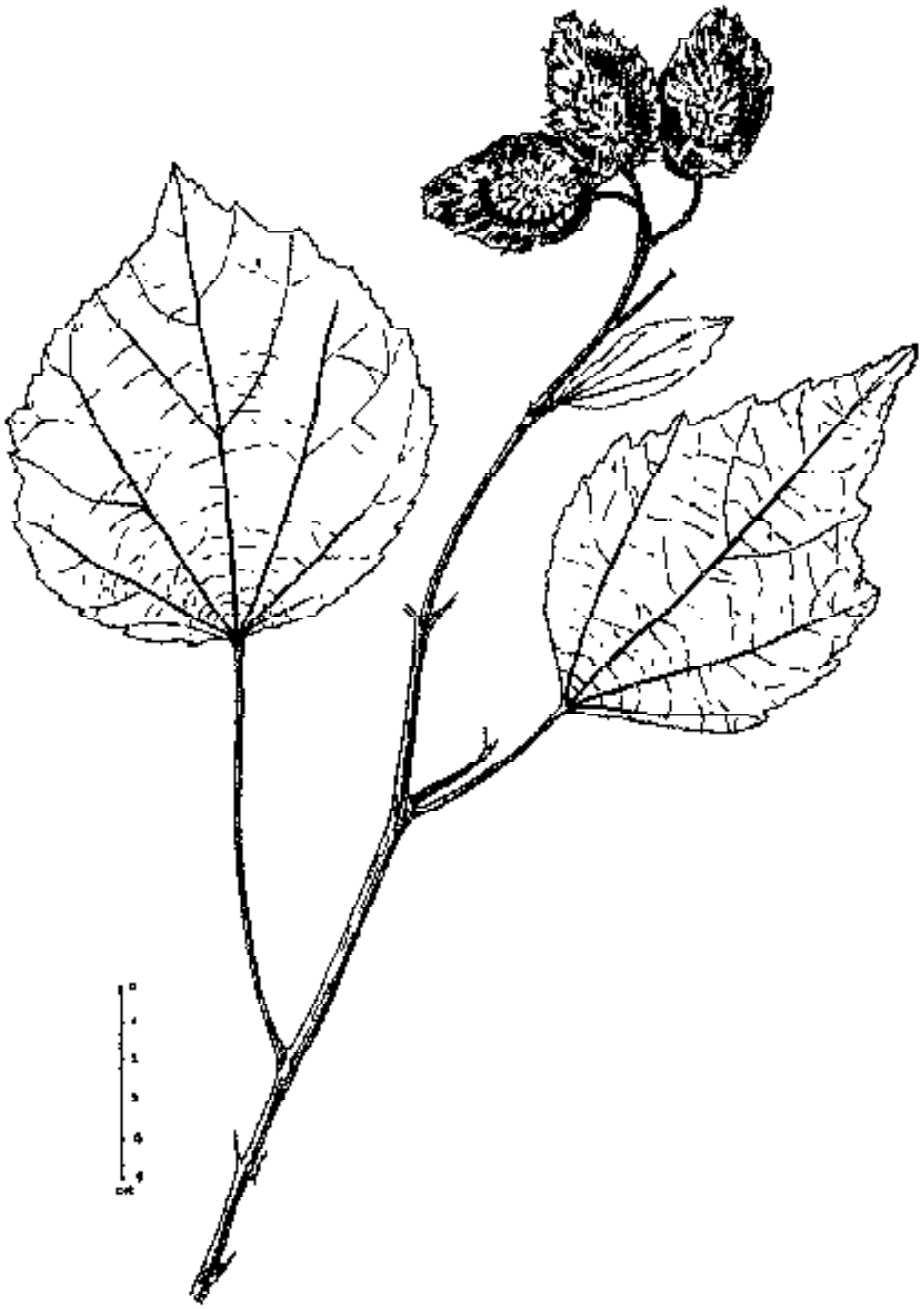
Fls. & Frts. : September–October.

Illus. : Mahesh. Illus. Fl. Delhi f. 34. 1966.

Distrib. : Common weed of wet locations.

C. urticifolius Wight & Arn. Prodr. 73. 1834 (*'urticaefolius'*); Mast. in Hook. f. Fl. Brit. India 1: 397. 1874; Chakrav. in Bull. Bot. Soc. Bengal 5: 79. 1951; Daniel & Chandrab. in Sharma et al. Fl. India 3: 489. 1993.

Undershrubs, c 1 m high. Leaves 2.5–5.0 x 1.5–3.5 cm, strigosely hairy, ovate, lanceolate or ovate–lanceolate, truncate or obtuse at base, acute at apex, margins dentate. Flowers in leaf–opposed cymes. Capsules falcate, c 3 cm long, 3–angular, strigose.



Erinocarpus nimmonii Grah. ex Dalz.

Fls. & Frts. : Throughout the year.

Distrib. : Rare, weed in open situations. Bombay.

ERINOCARPUS Nimmo ex Grah.

Erinocarpus nimmonii Grah. ex Dalz. in Dalz. & Gibs. Bombay Fl. 27. 1861; Cooke, Fl. Pres. Bombay 1: 155. 1958 (Repr.); Daniel & Chandrab. in Sharma et al. Fl. India 3: 490, f. 135. 1993. *E. nimmoanus* Mast. in Hook. f. Fl. Brit. India 1: 394. 1874. *'Chaora', 'Cher', 'Chira', 'Janglibhendi' 'Moduvakh', 'Varing'.*

Trees, c 5 m high. Leaves 4.5–9.5 x 4.3–10.0 cm, orbicular, 5–7–lobed, base cordate. Inflorescence of lax terminal panicles. Flowers yellow; sepals narrowly linear, fulvous, tomentose outside; petals obovate, margins ciliate. Fruits 2.3–4.0 cm long, 1–4–celled, triquetrous, woody, angles winged. Seed 1 in each cell, oblong.

Fls. & Frts. : September–December.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 168, f. 104–105. 1909; Daniel & Chandrab. in Sharma et al. op. cit.

Distrib. : In deciduous forests. This species is endemic to Western Ghats. Bombay, Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

GREWIA L.

1. Flowers in panicles ... *G. nervosa*
1. Flowers in cymes :
    2. Flowers polygamous :
        3. Stamens 20 or less ... *G. helicterifolia*
        3. Stamens 40 or more ... *G. hirsuta*
    2. Flowers bisexual :
        4. Petals bifid or notched at apex :
            5. Petal gland as long as petal ... *G. serrulata*
            5. Petal gland upto half the length of petal (or sometimes absent as in *G. tiliifolia*) :
                6. Stipules foliaceous ... *G. tiliifolia*
                6. Stipules not foliaceous :
                    7. Leaves glabrous or nearly so ... *G. tenax*
                    7. Leaves stellately hairy or tomentose at least on lower surface:

8. Leaves broadly ovate or suborbicular ... *G. asiatica*

9. Peduncles shorter than the petiole ... *G. sclerophylla*

9. Peduncles much longer than the petiole :

8. Leaves not as above :

10. Leaf margins subentire to minutely serrate ... *G. damine*

10. Leaf margins serrate to crenate–serrate :

11. Leaves 3–nerved ... *G. flavescens*

11. Leaves 5–6–nerved ... *G. eriocarpa*

4. Petals entire or slightly emarginate at apex :

12. Stipules foliaceous :

13. Petal gland c 0.5 mm long; stigma 4–lobed ... *G. tiliifolia*

13. Petal gland c 1.5 mm long; stigma lacerate ... *G. villosa*

12. Stipules not foliaceous :

14. Petal gland minute or inconspicuous:

15. Leaves subcordate at base, grey tomentose beneath ... *G. orbiculata*

15. Leaves rounded at base, brown pubescent beneath ... *G. pandaica*

14. Petal gland well developed :

16. Leaves glabrous or nearly so beneath : (some times hairy on nerves) :

17. Sepals woolly tomentose ... *G. rhamnifolia*

17. Sepals variously pubescent:

18. Peduncles c 0.5 cm long ... *G. orientalis*

18. Peduncles well over 1 cm long :

19. Peduncles c 3 cm long; leaf margins glandular serrate ... *G. umbellifera*

19. Peduncles 2.5–11.0 cm long; leaf margins crenate–serrate ... *G. heterotricha*

16. Leaves hoary tomentose beneath :

20. Petals c 1/4 the length of sepal ... *G. abutilifolia*

20. Petals c 1/2 the length of sepal ... *G. rothii*

Grewia abutilifolia Vent. ex A. Juss. in Ann. Mus. Natl. Hist. Nat. 4: 92. 1804; Mast. in Hook. f. Fl. Brit. India 1: 390. 1874 p. p.; Cooke, Fl. Pres. Bombay 1: 152. 1958 (Repr.); Daniel & Chandrab. in Sharma et al. Fl. India. 3: 493. 1993. *G. aspera* Roxb. Fl. Ind. 2: 591. 1832; Almeida, Fl. Mah. 1: 155. 1996.*'Chikankarbat', 'Chikan Kharata', 'Kharphulsa', 'Kirmith'.*

Shrubs, straggling, upto 4 m high; young parts stellate–hairy. Leaves 8.3–13.5 x 5–11 cm, roundish–ovate, scabrous and stellately hairy, acute or acuminate at apex, margins entire or shallowly lobed. Inflorescence of umbellate cymes. Flowers yellow. Drupes dark green, c 1 cm in diam., obscurely 4–lobed, wrinkled.

Fls. & Frts. : February–November.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 165, f. 102. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 86. 1982.

Distrib. : Common throughout in deciduous forests.

G. asiatica L. Mant. Pl. 122. 1767; Mast. in Hook. f. Fl. Brit. India 1: 386. 1874; Daniel & Chandrab. in Sharma et al. Fl. India 3: 494. 1993. *G. subinaequalis* DC. Prodr. 1: 511. 1824; Narayanasw. & Rolla Rao in J. Indian Bot. Soc. 29: 178. 1950. *'Phalsi'.*

Small trees. Leaves 7.5–16.0 x 6.0–12.5 cm, acute or subacuminate at apex, obliquely cordate or rounded at base. Flowers yellow, bracteate in umbellate cymes; gland of the petal with white hairy margins. Drupes globsoe, 1–2–lobed, hairy.

Fls. & Frts. : April–June.

Illus. : Narayanasw. & Rolla Rao, op. cit.

Distrib. : Cultivated for its edible fruits, also wild on hill slopes. Amravati, Aurangabad, Beed, Bombay, Nagpur, Osmanabad, Pune, Sindhudurg, Yavatmal.

G. damine Gaertn. Fruct. 2: 113. 1791; Narayanasw. & Rolla Rao in J. Indian Bot. Soc. 29: 187. 1950; Daniel & Chandrab. in Sharma et al. Fl. India 3: 496. 1993. *G. salvifolia* Heyne ex Roth, Nov. Pl. Sp. 239. 1821; Mast. in Hook. f. Fl. Brit. India 1: 386. 1874 p.p.; Cooke, Fl. Pres. Bombay 1: 149. 1958 (Repr.). *'Barkudi', 'Bihul', 'Khanota'.*

Shrubs, 2.7–3.0 m tall, woody. Leaves 1.5–7.0 x 1.2–3.0 cm, ovate–oblong or ovate–lanceolate. Inflorescence of umbellate cymes. Flowers yellow. Drupes 0.4–0.5 cm across, sparsely pubescent, 2–4–lobed, green when young.

Fls. & Frts. ; June–December.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 159, f. 97. 1909 (*G. salvifolia*).

Distrib. : Occasonal on hill slopes in scrub jungles. Akola, Amravati, Aurangabad, Beed, Bombay, Nagpur, Nasik, Yavatmal.

G. eriocarapa A. L. Juss. in Ann. Mus. Natl. Hist. Nat. 4: 93. 1804; Daniel & Chandrab. in Sharma et al. Fl. India 3: 497. 1993. *G. elastica* Royle, Ill. Bot. Himal. Mts. 1: 104, t. 22. 1834. *G. asiatica* var. *vestita* (Wall. ex Brandis) Mast. in Hook. f. Fl. Brit. India 1; 387. 1874. *G. mesopoda* Burrett in Noizbl. Bot. Gart. Berlin–Dablem 9: 633. 1926; Narayansw. & Rolla Rao in J. Ind. Bot. Soc. 29: 179. 1950.

Trees, upto 20 m high. Leaves 7–12 x 5–10 cm, obliquely ovate, oblong–ovate to elliptic, rounded or subcordate at base, acuminate at apex, margins crenae–serrate. Flowers yellow, in axillary cymes; pedicels upto 1 cm long. Drupes 0.5–1.0 cm across, faintly 2–4–lobed, pubescent.

Fls. & Frts. : February–May.

Distrib. : Maharashtra (Daniel & Chandrab. op. cit.). Occasionally also planted in Pune.

G. flavescens A. Juss. in Ann. Mus. Natl. Hist. Nat. 4: 91. 1804; Narayanasw. & Rolla Rao in J. Indian Bot. Soc. 29: 187. 1950; Daniel & Chandrab. in Sharma et al. Fl. India 3: 498. 1993. *G. pilosa* Wight & Arn. Prodr. 1: 78. 1834 non Lam. 1789; Mast. in Hook. f. Fl. Brit. India 1: 388. 1874; Cooke, Fl. Pres. Bombay 1: 151. 1958 (Repr.). *G. carpinifolia* sensu Mast. in Hook. f. op. cit. 387 non A. L. Juss. 1804. *'Ghor Dhaman', 'Khatakhati', 'Kirmani'*.

Shrubs, 1.5–4.0 m tall; branches hairy. Leaves 2.5–9.0 x 1.5–4.0 cm, ovate or ovate–oblong, 3–nerved. Inflorescence umbellate. Flowers yellow; petals pilose at apex; anthers with a few simple hairs on back. Drupes 0.6–1.0 cm across, glabrous, entire or 2–4–lobed.

Fls. & Frts. : June–December.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 162, f. 99. 1909 (*G. pilosa*).

Distrib. : Common in deciduous forests.

G. helicterifolia Wall. ex G. Don, Gen. Hist. 1: 548. 1831. Daniel & Chandrab. in Sharma et al. Fl. India 3: 500. 1993. *G. polygama* auct.

non Roxb. 1832; Mast. in Hook. f. Fl. Brit. India 1: 391. 1874; Cooke. Fl. Pres. Bombay 1: 153. 1958 (Repr.); Narayanasw. & Rolla Rao in J. Indian Bot. Soc. 29: 179. 1950; Naik, Fl. Marathwada 1: 169. 1998. *Gauli', 'Gvali'*.

Trees, much branched; young parts velvety tomentose. Leaves 6–9 x 1.5–4.5 cm, oblong–lanceolate, irregularly serrate. Flowers c 1.2 cm across, in axillary umbellate cymes; petals with basal glands in male and hermaphrodite flowers. Drupes c 1.2 cm across, brownish, hairy, obscurely 4–lobed.

Fls. & Frts.: September–November.

Distrib. : Occasional in moist deciduous and semi–evergreen forests, Bombay, Raigad & Ratnagiri (Cooke, op. cit.) and along stream-banks and on hill slopes (Naik, op. cit.).

G. heterotricha Mast. in Hook. f. Fl. Brit. India 1: 385. 1874; Cooke, Fl. Pres. Bombay 1: 148. 1958 (Repr.); Daniel & Chandrab. in Sharma et al. Fl. India 3: 500. 1993; Almeida, Fl. Mah. 1: 156. 1990. *G. umbellata* auct. non Roxb. 1832; Mast. in Hook. f. op. cit. p.p.; Cooke, op. cit., *G. acuminata* sensu S.M. Almeida, Fl. Savantwadi 1: 69. 1990 non A. L. Juss. 1904.

Scandent shrubs; branches thinly stellate–hairy. Leaves 10.0–12.5 x 3.7–5.0 cm, oblong, acuminate at apex, rounded at base, 3–nerved, serrulate along margins. Flowers in axillary, extra–axillary and terminal, umbellate cymes. Drupes purple, stellately hairy, slightly wrinkled, 1–seeded.

Fls. & Frts. : April–January.

Illus. : Wight, Ic. t. 83. 1838 (*G. umbellata*).

Distrib. : Ratnagiri (Almeida, op. cit.), Sindhudurg (S.M. Almeida, op. cit. & Almeida, op. cit.).

G. hirsuta Vahl, Symb. Bot. 1: 34. 1790; Mast. in Hook. f. Fl. Brit. India 1: 391. 1874; Cooke, Fl. Pres. Bombay 1: 153. 1958 (Repr.); Narayanasw. & Rolla Rao in J. Indian Bot. Soc. 29: 179. 1950; Daniel & Chandrab. in Sharma et al. Fl. India 3: 501. 1993. *'Kirmid'*.

Undershrubs, 1–3 m tall, erect, fulvous–hairy. Leaves distichous, 2.5–8.0 x 1.5–3.5 cm, broadly ovate or lanceolate, upper surface glabrescent, lower surface densely villous. Inflorescence of umbellate cymes. Flowers yellow. Drupes 0.4–0.7 cm across, fleshy, wrinkled, slightly 4–lobed with sparse stellate hairs.

Fls. & Frts. : May–November.

Illus. : Wight, Ic. t. 76. 1838.

Distrib. : Common throughout in deciduous forests.

G. nervosa (Lour.) Panigr. in Taxon 34: 702. 1985; Daniel & Chandrab. in Sharma et al. Fl. India 3: 502. 1993. *Fallopia nervosa* Lour. Fl. Cochinch. 336. 1790. *Grewia microcos* L. Syst. Nat. ed. 12, 2: 602. 1767 nom. illeg. superfl.; Mast. in Hook. f. Fl. Brit India 1: 392. 1874; Cooke, Fl. Pres. Bombay 1: 154. 1958 (Repr.). 'Hasoli'.

Straggling shrubs, 3–5 m tall. Leaves 7–15 x 4.5–7.0 cm, ovate–lanceolate, cordate or rounded at base, acuminate at apex. Flowers 1.5 cm across, whitish, in 4–15 cm long, axillary and terminal panicles. Drupes 1.0–1.2 x 0.6–0.8 cm, ripens black, glabrous or subglobose wrinkled.

Fls. & Frts. : June–November.

Illus. : Wight, Ic. t. 84. 1838 (*G. ulmifolia* Roxb. Fl. Ind. ed. 2, 591. 1832 non Salisb. 1796); Talb. For. Fl. Bombay Pres. & Sind 1: 167, f. 103. 1909; Narayanasw. & Rolla Rao, op. cit. 182, f. 2c.

Distrib. : Common, in moist deciduous & semi–evergreen forests. Bombay, Kolhapur, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

G. orbiculata Rottl. in Ges. Naturf. Fr. Berl. Neue Schr. 4: 205. 1803; Mast. in Hook. f. Fl. Brit. India 1: 386. 1874; Cooke, Fl. Pres. Bombay 1: 149. 1958 (Repr.); Daniel & Chandrab. in Sharma et al. Fl. India 3: 504, f. 137. 1993; Naik, Fl. Marathwada 1 : 168. 1948.

Shrubs, upto 1.8 m high; young branches softly pubescent. Leaves 2.5–6.5 x 1.3–3.5 cm, ovate–oblong, suborbicular or obovate, hoary tomentose beneath, velvety above, acute or obtuse at apex, base rounded or cordate, often oblique, margins minutely and irregularly serrate. Flowers yellow, in umbellate cymes. Drupes pilose, slightly 2–lobed; stones 1–2, 2–celled.

Illus. : Wight, Ic. t. 45. 1838 (*G. rotundifolia* A. L. Juss. in Ann. Mus. Natl. Hist. Nat. Paris 4: 92, t. 50, f. 3. 1804); Daniel & Chandrab. in Sharma et al. op. cit.

Distrib. : Rare in hill forests at Aurangabad (Naik op. cit.) & in semi–evergreen forests of 'Konkan' (Cooke, op. cit.).



Grewia orbiculata Rottl.

G. orientalis L. Sp. Pl. 964. 1753; Mast. in Hook. f. Fl. Brit. India 1: 384. 1874; Bole & Almeida in J. Bombay nat. Hist. Soc. 77: 462. 1981. Daniel & Chandrab. in Sharma et al. Fl. India. 3: 506. 1993; Almeida, Fl. Mah. 1: 158. 1996. *G. columnaris* J.E.Sm. in Rees, Cyclop. 17, no. 5. 1811; Mast. in Hook. f. op. cit. 383.; Cooke, Fl. Prcs. Bombay 1: 146. 1958 (Repr.).

Scandent shrubs. Leaves 3.0–9.5 x 1.5–5.5 cm, ovate–elliptic to ovate–lanceolate, obliquely cordate at base, acute to acuminate at apex, margins crenate–serrate. Flowers whitish, in axillary and terminal umbellate cymes. Peduncles upto 0.5 cm long, buds conical to ovoid, brown–tomentose. Drupes 1.0–1.5 cm across, 4–lobed, stiff–hairy.

Fls. & Frts.: June.

Illus. : Wight Ic. t. 44. 1838 (*G. columnaris*).

Distrib. : Bombay (Almeida, op. cit.), Satara (Bole & Almeida, op.cit.).

G. pandaica J. R. Drumm. ex Gamble, Fl. Pres. Madras 65. 1915 [1 : 85. 1957 (Repr.)]; Daniel & Chandrab. in Sharma et al. Fl. India 3 : 506. 1993; Naik, Fl. Marathwada 1 : 169. 1998.

Small trees, up to 5 m tall; young parts grey tomentose. Leaves 2–3 x 2.0–2.5 cm, broadly ovate to orbicular, abruptly narrow and acuminate at apex, rounded or subcordate at base, serrate along margins, grey tomentose beneath. Flowers 8–12 mm across, yellow in axillary and extra-axillary, peduncled cymes. Drupes obovoid, 8-10 mm across, densely tomentose.

Fls. & Frts. : May-September.

Distrib. : Rare in hill forests. Aurangabad (Naik, op. cit.).

G. rhamnifolia Heyne ex Roth, Nov. Sp. Pl. 244. 1821; Daniel & Chandrab. in Sharma et al. Fl. India 3: 507. 1993; Almeida, Fl. Mah. 1: 159. 1996. p.p.; *G. orientalis* auct. non L. 1753; Mast. in Hook. f. Fl. Brit. India 1: 384. 1874 p.p.; Bole & Almeida in J. Bombay nat. Hist. Soc. 77: 462. 1981.

Shrubs, up to 3 m tall, Leaves 2.5–10.5 x 1.5–5.5 cm, rhomboid–ovate or lanceolate, rounded or subcordate at base, acute to acuminate at apex, margins crenate–serrate. Flowers in axillary and terminal umbellate cymes, buds ovoid, ribbed, tomentose. Drupes 1.2–1.3 cm across, faintly 2–4–lobed, subglobose, tomentose.

Fls. & Frts. : June–August.

Distrib. : Bombay & Pune (Almeida, op. cit.).

G. rothii DC. Prodr. 1: 509. 1824; Narayanasw. & Rolla Rao in J. Indian Bot. Soc. 29: 187. 1950; Daniel & Chandrab. in Sharma et al. Fl. India 3: 507. 1993. *G. excelsa* Mast. in Hook. f. Fl. Brit. India 1: 385. 1874 p. p. non Vahl, 1790.

Shrubs or small trees. Leaves 5–12 x 1–5 cm, ovate–oblong or ovate–lanceolate, obtuse at base, acute or acuminate at apex, margins serrate. Flowers in axillary clustered cymes; peduncles 1.5–3.0 cm long, buds subglobose, tomentose. Drupes c 0.5 cm across, glabrous, tomentose.

Fls. & Frts. : July-November.

Distrib. : Rare. Chandrapur, Nagpur, Nanded.

G. sclerophylla Roxb. ex G. Don, Gen. Syst. 1: 550. 1831; Daniel & Chandrab. 3: 509. 1993; Almeida, Fl. Mah. 1: 157. 1996. *G. scabrophylla* Roxb. Fl. Ind. 2: 584. 1832; Mast. in Hook. f. Fl. Brit. India 1: 387. 1874. *'Dhaman', 'Garbheli'.*

Shrubs or undershrubs, villous–tomentose. Leaves 7–19 x 5–12 cm, elliptic–ovate, obovate; stipules subulate, subacute or rounded at base, emarginate or acuminate at apex, margins serrate, tomentose, 3–5–nerved. Flowers white, 1–2, in axillary cymes. Drupes 1.2–1.3 cm across, 2–lobed, depressed globose, stellate–tomentose.

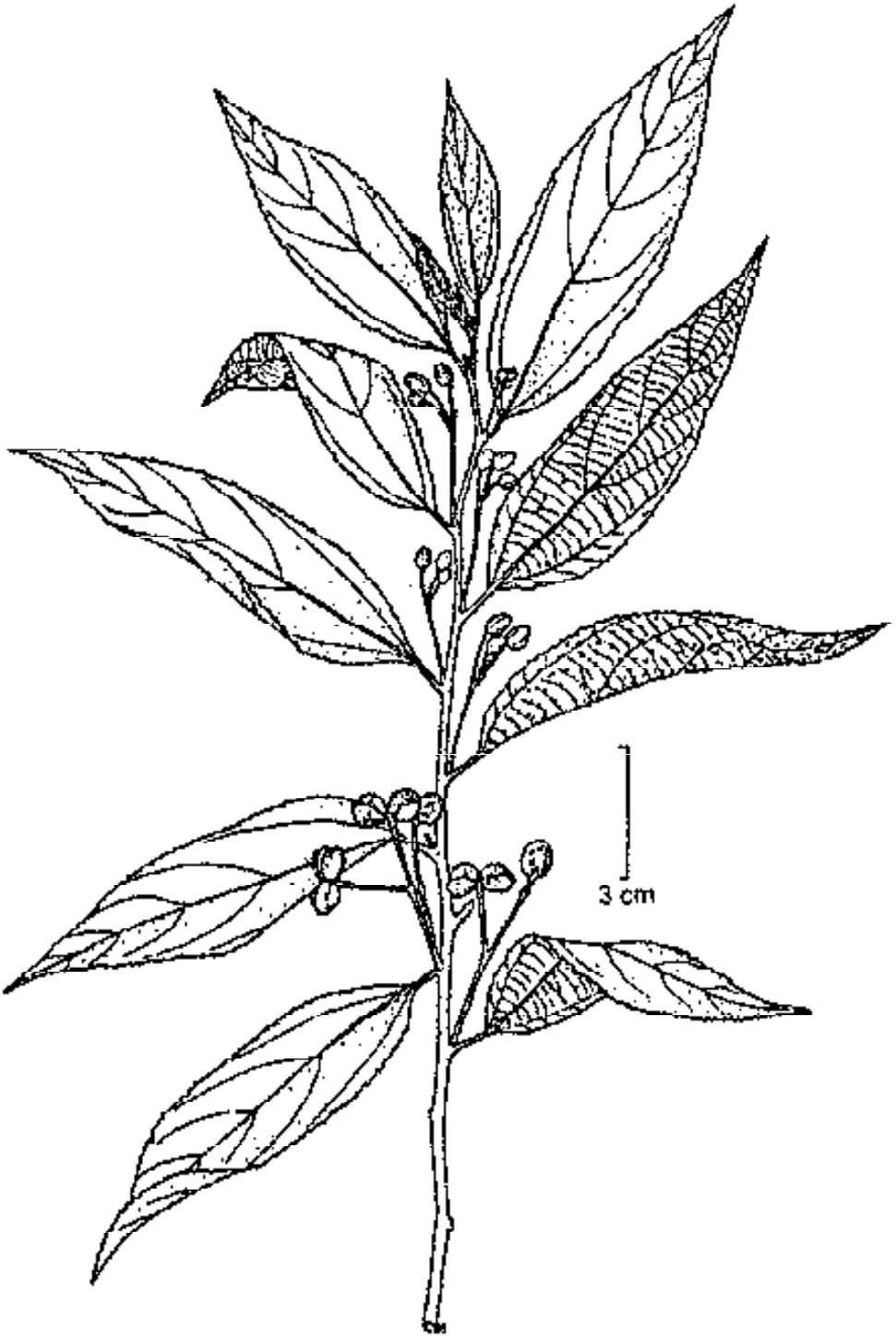
Fls. & Frts. : July–November.

Illus. : Wight. Ic. t. 89. 1838 (*G. scabrophylla*).

Distrib. : Occasional as forest undergrowth. Amravati, Aurangabad, Nagpur, Nanded.

G. serrulata DC. Prodr. 1: 510. 1824; Narayanasw. & Rolla Rao in J. Indian Bot. Soc. 29: 179. 1950; Daniel & Chandrab. in Sharma et al. Fl. India. 3: 509. f. 138. 1993. *G. laevigata* auct. pl. non Vahl 1790; Mast. in Hook. f. Fl. Brit. India 1: 389. 1874; Cooke, Fl. Pres. Bombay 1: 152. 1958 (Repr.). *G. multiflora* auct. non A.L. Juss. 1804; Hook. f. op. cit. 388. *G. disperma* auct. non Rottl. ex Spreng. 1825; Almeida. Fl. Mah. 1: 155. 1996. *G. glabra* Bl. Bijdr. 115. 1825; Narayanasw. & Rolla Rao, op. cit. *'Gulgollop', 'Kala Dhaman', 'Kaori'.*

Trees, 3–5 m tall; branches terete. Leaves 8–16 x 3.5–6.0 cm, ovate–lanceolate, rounded or narrowed at base, acuminate at apex,



Grewia serrulata DC.

3–nerved. Inflorescence of umbellate cymes. Flowers yellow or white; petals c 0.2 cm long. Drupes 0.5–1.0 cm across, deeply 2–lobed, pubescent.

Fls. & Frts. : September–February.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 164, f. 101. 1909; Daniel & Chandrab. in Sharma et al. op. cit.

Distrib. : Frequent in deciduous forests. Bombay, Chandrapur, Kolhapur, Latur, Nasik, Osmanabad, Parbhani, Pune, Raigad, Ratnagiri, Satara, Thane, Yavatmal.

Notes. : In most of the Indian floras, *G. serrulata* DC. is treated under *G. laevigata* Vahl, which is rather a distinct species with eglandular leaves and rounded at base. After critical study of the type material of G. serrulata DC. and G. glabra Bl. by Rolla Rao (Gazett. 1969) it is confirmed that G. serrulata DC. is the earliest valid name for the present taxon.

G. tenax (Forssk.) Fiori in Agric. Colon. 5. (Suppl.): 23. 1912. Narayanasw. & Rolla Rao in J. Indian Bot. Soc. 29: 197. 1950; Daniel & Chandrab. in Sharma et al. Fl. India 3: 511, f. 139. 1993. *Chadara tenax* Forssk. Fl. Aeg.–Arab. 114. 1775. *Grewia populifolia* Vahl, Symb. Bot. 1: 33. 1790; Mast. in Hook. f. Fl. Brit. India 1: 385. 1874; Cooke, Fl. Pres. Bombay 1: 148. 1958 (Repr.). *'Gangi', Gango', 'Gangudi'.*

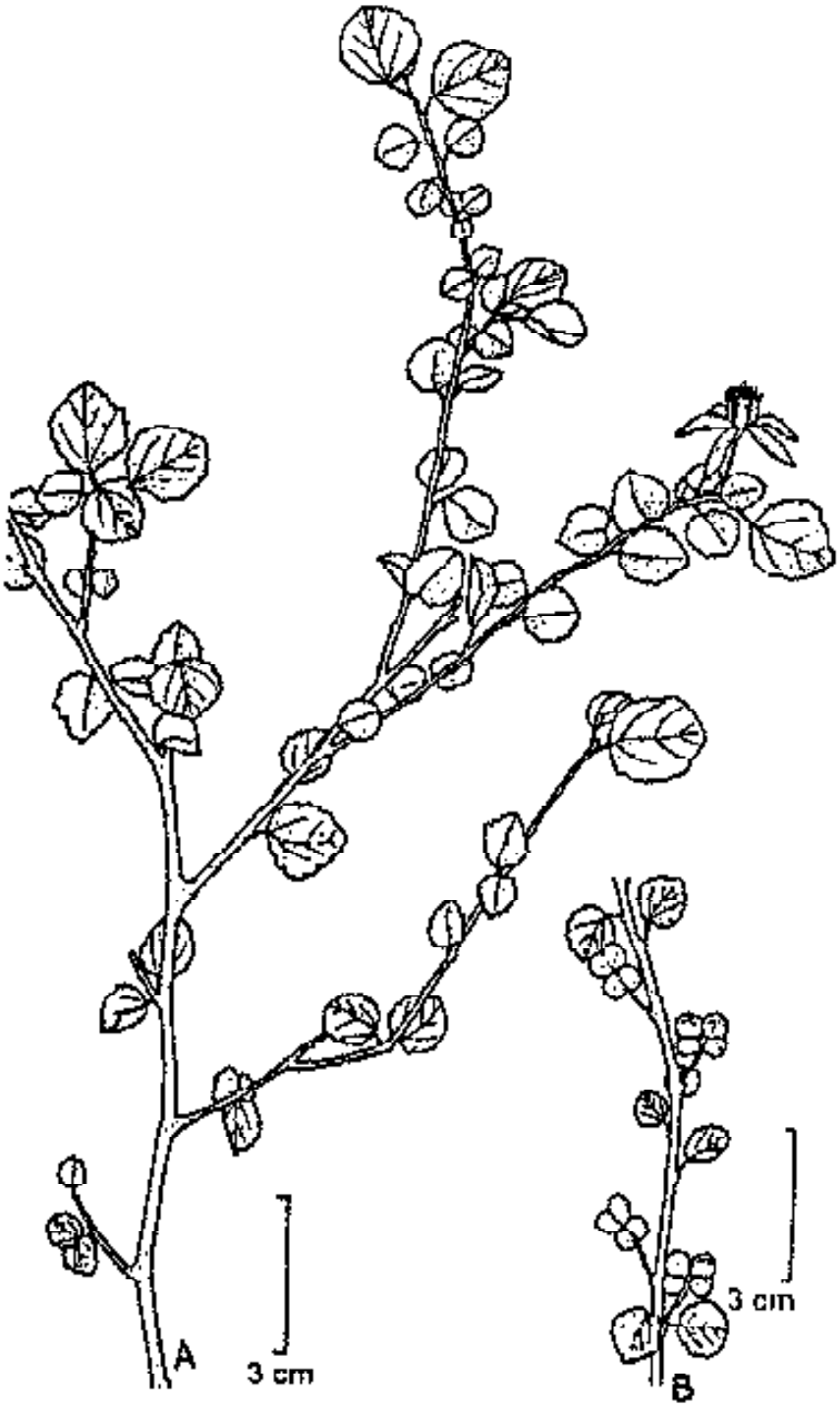
Straggling shrubs, c 2 m tall. Leaves 2.0–4.2 x 1.3–3.5 cm, ovate, obovate or suborbicular, obtuse at base, acute at apex, margins dentate. Flowers white, in axillary or leaf–opposed cymes. Drupes 0.7–1.3 cm across, 2–4–lobed, orange coloured, smooth.

Fls. & Frts. : April–September.

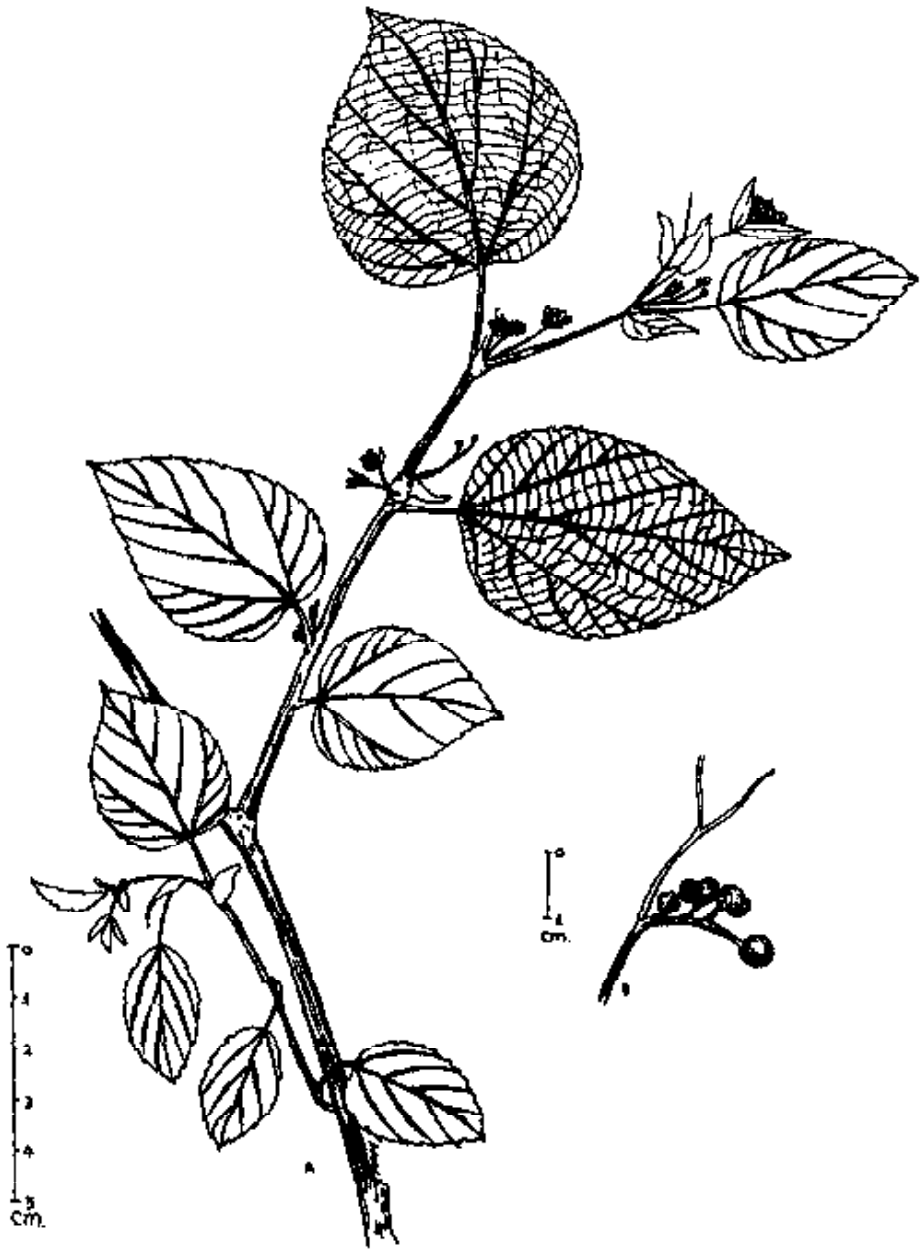
Illus. : Mahesh. Illus. Fl. Delhi f. 31. 1966; Daniel & Chandrab. in Sharma et al. op. cit.

Distrib. : Frequent in dry deciduous forests. Ahmednagar, Aurangabad, Beed, Jalna, Nasik, Sholapur.

G. tiliifolia Vahl, Symb. Bot. 1: 35. 1790; Mast. in Hook. f. Fl. Brit. India 1: 386. 1874 (*'tiliaefolia'*); Cooke, Fl. Pres. Bombay 1: 150. 1958 (Repr.); Daniel & Chandrab. in Sharma et al. Fl. India 3: 511, f. 140. 1993. *G. tiliifolia* Vahl var. *leptopetala* (Brandis) T. Cooke, Fl. Pres. Bombay 1: 142. 1901 [1: 150. 1958 (Repr.)]. *G. inequalis* Bl. Bijdr. 115. 1825; Almeida, Fl. Mah. 1: 185. 1996. *G.inequalis* var. *leptopetala* (T. Cooke) Almeida, op. cit. 186. *'Dhaman', 'Rodgi', 'Sonsaman', 'Tadsal'.*



Grewia tenax (Forssk.) Fiori : A-Flowering part of branch; B-Fruiting part of branch.



Grewia tiliifolia Vahl
A–Habit ; B–Fruit.

Trees, 3.0–8.0 m tall. Leaves 1.5–11.5 x 3.2–6.0 cm, ovate, acuminate at apex, obliquely cordate at base, margins serrate to crenate–serrate, glabrescent above, pubescent or tomentose beneath. Inflorescence of umbellate cymes. Flowers yellow; stamens many; ovary glabrous, hirsute. Drupes 0.5–0.7 cm across, entire or 2–lobed, sparsely hirsute.

Fls. & Frts. : April–September.

Illus. : Bedd. Fl. Sylv. t. 108. 1871; Talb. For Fl. Bombay Pres. & Sind 1: 161, f. 98. 1909.

Distrib. : Common throughout the state in deciduous forests and also in semi–evergreen tracts.

G. umbellifera Bedd. For. Man. Bot. 37. 1871; Mast. in Hook. f. Fl. Brit. India 1: 389. 1874; Cooke, Fl. Pres. Bombay 1: 147. 1958 (Repr.); Narayanasw. & Rolla Rao in J. Indian Bot. Soc. 29: 179. 1950; Daniel & Chandrab. in Sharma et al. Fl. India 3: 513. 1993.

Scandent shrubs. Leaves 7.5–12.5 x 4.5–8.0 cm, lower surface brownish–green, margins entire or crenate–serrate. Flowers 1.0–1.8 cm across, reddish–yellow, in axillary, extra–axillary or leaf–opposed umbellate cymes, 4.5–5.0 cm long, Drupes c 1 x 2 cm, smooth, lobes obovoid.

Fls. & Frts. : October–April.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 156, f. 94. 1909.

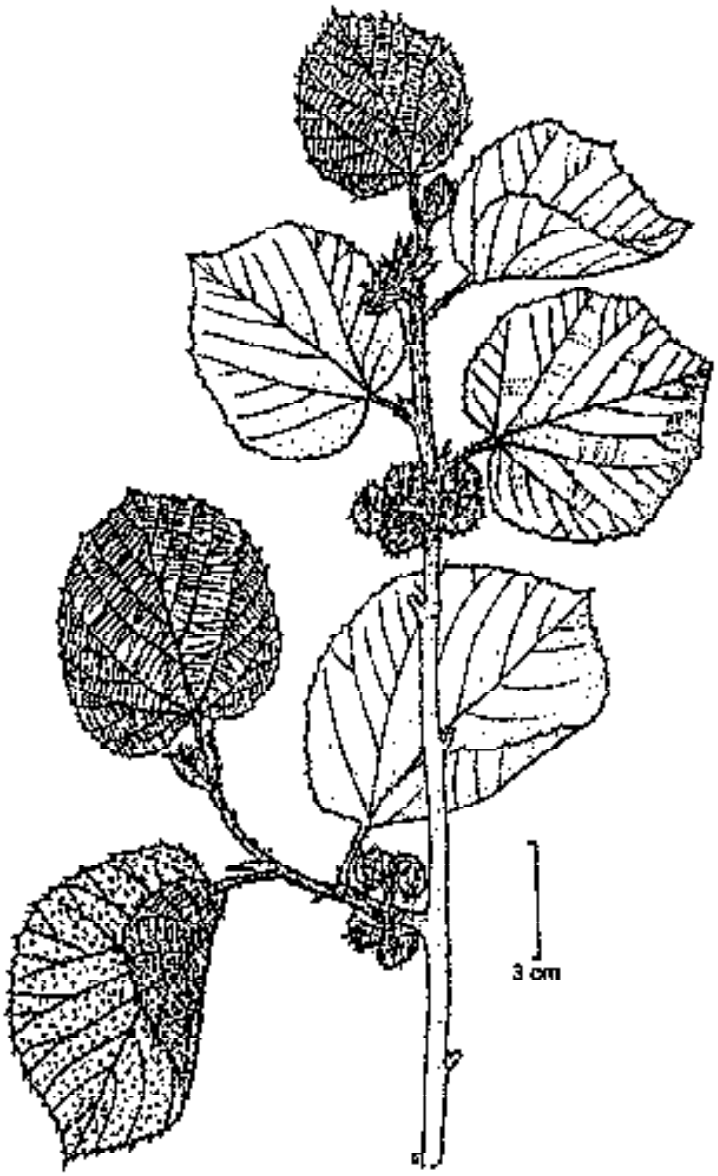
Distrib. : Rare. Kolhapur, Sindhudurg.

G. villosa Willd. in Ges. Naturf. Berl. Neue Schr. 4: 205. 1803; Mast. in Hook. f. Fl. Brit. India 1: 388. 1874; Cooke, Fl. Pres. Bombay 1: 151. 1958 (Repr.); Daniel & Chandrab. in Sharma et al. Fl. India 3: 515, f. 141. 1993. *'Kharmati'*.

Shrubs, c 1.8 m high; branches grey–puberulous. Leaves 3.5–7.5 cm broad, rotund–ovate, subcordate at base, shortly acuminate or rounded at apex, margins crenate–serrate. Flowers dull yellow, in axillary or leaf–opposed cymes. Drupes glabrous, c 1.2 cm across, yellowish–red, stellately hairy; stones 4, 1–2–seeded, smooth, in a sweet edible pulp.

Fls. & Frts. : August–October.

Illus. : Daniel & Chandrab. in Sharma et al. op. cit.



Grewia villosa Willd.

Distrib. : Occasional in hilly terrain and on streem banks. Ahmednagar, Aurangabad, Beed, Jalana, Thane, Pune.

TRIUMFETTA L.

1. Fruits (including spines) 1 cm across or more:
   2. Spines glabrous ... *T. annua*
   2. Spines hispid at base ... *T. pilosa*
1. Fruits (including spines) less than 0.7 cm across :
   3. Leaves orbicular ... *T. malabarica*
   3. Leaves 3–5–lobed :
      4. Spines glabrous ... *T. rhomboidea*
      4. Spines with a line of spreading hairs on upper side ... *T. pentandra*

Triumfetta annua L. Mant. 1: 73. 1767; Mast. in Hook. f. Fl. Brit. India 1: 396. 1874; Daniel & Chandrab. in Sharma et al. Fl. India 3: 518. 1993.

Annual herbs; stems erect, weak, 15–60 cm high, branches softly stellate–hairy. Leaves 5.5–8.5 x 2.3–4.5 cm, ovate, acute or acuminate at apex, simple or bulbous hairy below. Flowers yellow, in axillary clusters. Capsules c 1 cm across, glabrous, 4–celled. Seeds upto 8, dark brown, ovoid, rounded on back.

Fls. & Frts. : September–October.

Distrib. : Common on moist hill slopes and hill tops. Ahmednagar, Bombay, Nasik, Pune, Ratnagiri, Satara, Sindhudurg, Thane.

T. malabarica Koen. ex Rottb. Pl. Hort. Univ. Rar. Prog. 4. 1773; Mabb. in Taxon 33 : 439. 1984. *T. rotundifolia* Lam. Encycl. 3: 421. 1792; Mast. in Hook. f. Fl. Brit. India 1: 395. 1874; Cooke, Fl. Pres. Bombay 1 : 156. 1958 (Repr.); Daniel & Chandrab. in Sharma et al. Fl. India 3 : 521. 1993. *'Ltki', 'Mendul', 'Mendurl'.*

Herbs, 30–45 cm high, suffruticose. Leaves 1.5–3.0 x 1.3 cm, obovate to orbicular, obtuse at base, acute at apex, stellate–hairy above, softly grey–tomentose beneath. Flowers yellow, in leaf-opposed cymes. Capsules 0.5–0.6 cm long, ovoid, to globose, spines pubescent with hooked bristle points.

Fls. & Frts. : May–October.

Distrib. : Common throughout in open situations along roadsides, fallow fields, etc.

T. pentandra A. Rich. in Guill. et al. Fl. Seneg. Tent. 1: 93, t. 19. 1831; Daniel & Chandrab. in Sharma et al. Fl. India 3: 519. 1993. *T. neglecta* Wight & Arn. Prodr. 1: 75. 1834; Mast. in Hook. f. Fl. Brit. India 1: 396. 1874. *T. rhomboidea* var. *pentandra* (A. Rich) J. L. Ellis in Bull. Bot. Surv. India 24: 209. 1983. *'Nichardi'*.

Herbs, annual 13–30 cm tall, hairy. Leaves 1.5–3.5 x 1–3 cm, basal ones rhomboi–ovate, entire or palmately 3–lobed, upper leaves ovate–lanceolate, entire, stellately hairy. Flowers yellow, in extra–axillary, umbellate clusters. Fruits 0.3–0.4 cm across, ovoid or ovoid–oblong. Seeds obconical, brown.

Fls. & Frts. : August–April.

Distrib. : Common throughout.

T. pilosa Roth, Nov. Pl. Sp. 223. 1821; Mast. in Hook. f. Fl. Brit. India 1: 394. 1874; Cooke, Fl. Pres. Bombay 1: 156. 1958 (Repr.); Daniel & Chandrab. in Sharma et al. Fl. India 3: 519. 1993. *'Barjaliajang', 'Nichardi', 'Kutree–wandree'*.

Perennial herbs; branches stellate–hairy. Leaves 5–10 x 2–4 cm, ovate, acute at apex, stellate–hairy on either side. Inflorescence fascicled, axillary and leaf–opposed. Flowers yellow. Capsules c 1.3 cm across, Seeds 8, black, wedge–shaped.

Fls. & Frts. : September–January.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 87. 1982.

Distrib. : Ahmednagar, Amravati, Aurangabad, Bombay, Dhule, Nasik, Pune, Raigad, Satara.

T. rhomboidea Jacq. Enum. Pl. Carib. 22. 1760; Mast. in Hook. f. Fl. Brit. India 1: 395. 1874; Cooke, Fl. Pres. Bombay 1: 156. 1958 (Repr.); Sant. in Bull. Bot. Surv. India 3: 21. (1961) 1962; Daniel & Chandrab. in Sharma et al. Fl. India 3: 520. 1993. *T. tungarensis* Billore in J. Econ. Tax Bot. 3: 621. 1982. *'Thinjhira'*.

Perennial herbs, upto 1.5 m high. Lower leaves 5–7 cm across, leaf surface with simple and stellate hairs, upper leaves shortly petiolate. Flowers bright yellow. Fruits 0.5–0.6 cm across, spines glabrous, bristle points hooked.

Fls. & Frts. : August–April.

Illus. : Wight, Ic. t. 320. 1843 (*Triumfetta angulata* Lam. Encycl. 3: 421. 1789); Tadul. & Venkat. Handb. S. Indian Weeds 116, f. 46. 1955 (Rev. ed.).

Distrib. : Common throughout, in open situations.

CULTIVATED SPECIES :

Berrya cordifolia (Willd.) Burrett in Notizbl. Bot. Gart. Berlin–Dahlem 9: 606. 1926; Daniel & Chandrab. in Sharma et al. **Fl.** India 3: 478, f. 132. 1993; Almieda, Fl. Mah. 1: 148 1996. *Espera cordifolia* Willd. in Ges. Naturf. Freunde Berlin Neue Schriften 3: 450 1801. *Berrya ammonilla* Roxb. Pl. Cor. 3: 60, t. 264. 1819 & Fl. Ind. 2: 639. 1832; Mast. in Hook. f. Fl. Brit. India 1: 383. 1874. *'Chugaran'*.

Trees, upto 3.5 m tall. Leaves 8.0–15 x 4.0–9.0 cm, broadly ovate, apex acuminate, acute or obtuse, base truncate, obtuse or subcordate, margins entire or undulate. Flowers c 1 cm across, in lax, terminal panicles; calyx tube densely pubescent without; petals white or pink; ovary pubescent. Capsules 1.0–1.3 cm across, globose, with persistent calyx and 6–8 wings. Seeds clothed with brown to yellow, caducous bristles.

Fls. & Frts. : May–August.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 84. 1982; Daniel & Chandrab. in Sharma et al. op. cit.

Distrib. : Cultivated. Bombay (Almeida, op. cit.).

Luehea endopogon Turz, En. Bull. Loc. Not. Mosc. 31(1): 225. 1858; Almeida, Fl. Mah. 1: 163. 1996.

Trees, c 3 m high. Leaves 13–15 x 7.5–9.0 cm, elliptic, ovate, acuminate at apex, sharply serrate–dentate along margins, hirsute above, grey–white and tomentose beneath. Flowers white, c 6.5 cm across, solitary, axillary. Fruit a capsule.

Fls. & Frts. : September–November.

Distrib. : Bombay gardens (Almeida, op. cit.).

ELAEOCARPACEAE

(M. J. Kothari)

ELAEOCARPUS L.

1. Anthers terminated by long awns :
   2. Leaves obovate–cuneate ... *E. aristatus*
   2. Leaves ovate–lanceolate ... *E. munroii*
1. Anthers not as above :
   3. Drupes 5–celled ... *E. sphaericus*
   3. Drupes 1–3–celled :
      4. Anthers glabrous ... *E. glandulosus*
      4. Anthers hairy :
         5. Leaves acuminate at apex ... *E. tectorius*
         5. Leaves acute or obtuse at apex :
            6. Leaves cuspidate, serrate; flower buds ovoid–conical, not ribbed ... *E. serratus*
            6. Leaves crenate–dentate; flower buds lanceolate, ribbed ... *E. tuberculatus*

E. aristatus Roxb. Fl. Ind. 2: 599. 1832; Mast. in Hook. f. Fl. Brit. India 1: 405. 1874; Cooke, Fl. Pres. Bombay 1: 162. 1958 (Repr.); Murti in Sharma et al. Fl. India 3: 533, f. 144. 1993.

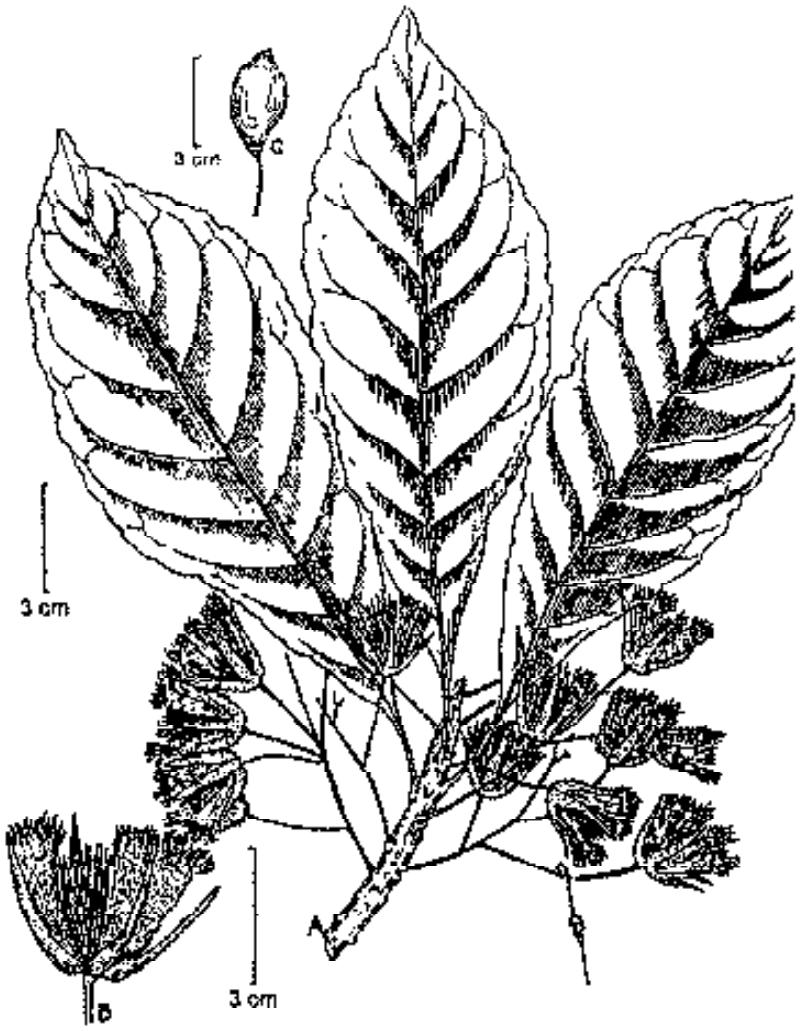
Trees, 4–8 m high. Leaves 20.0–27.5 x 7.5–11.2 cm, apex obtuse, acute or somewhat acuminate, margins crenate–serrate. Flowers numerous. Drupes ellipsoid; stone oblong, pointed at both ends, somewhat rugose, 1–2–celled.

Fls. & Frts. : April–June.

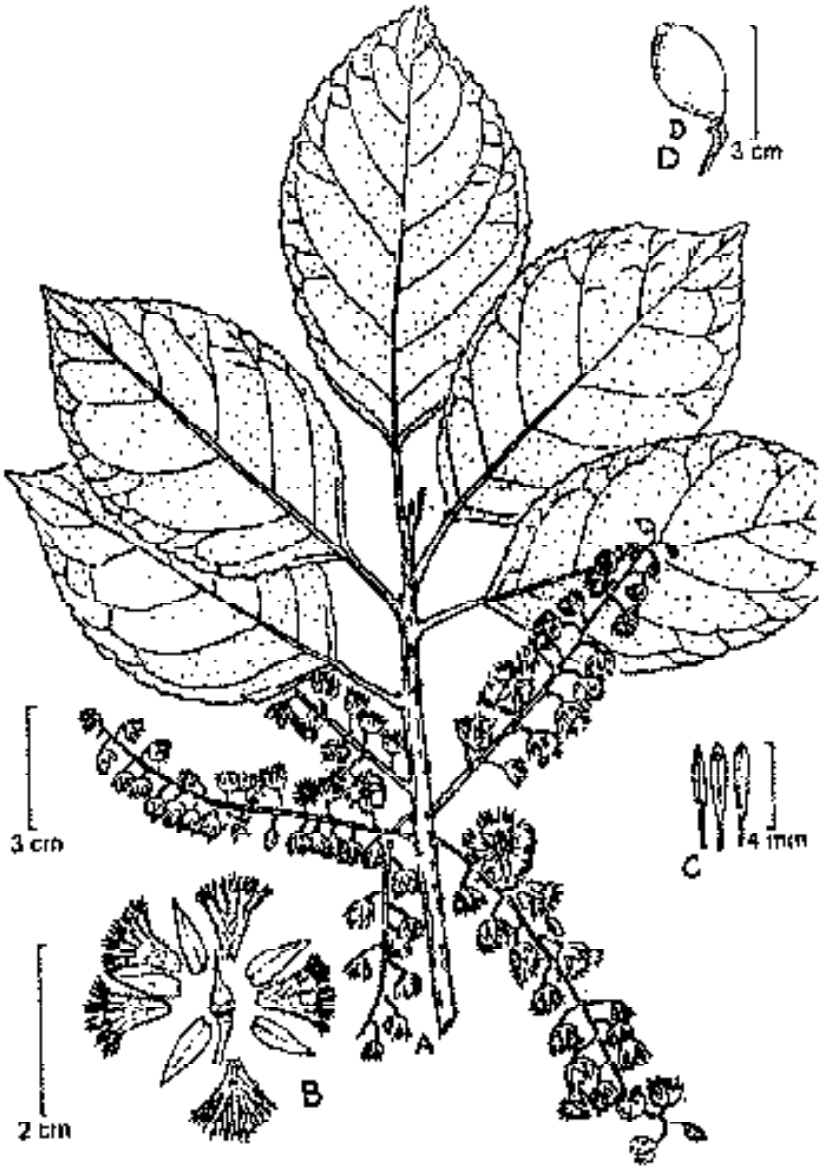
Illus. : Wight Ic. t. 63. 1838 *(Monocera roxburghii)*; Murti in Sharma et al. op. cit.

Distrib. : Rare. 'Konkan' (Cooke, op. cit.).

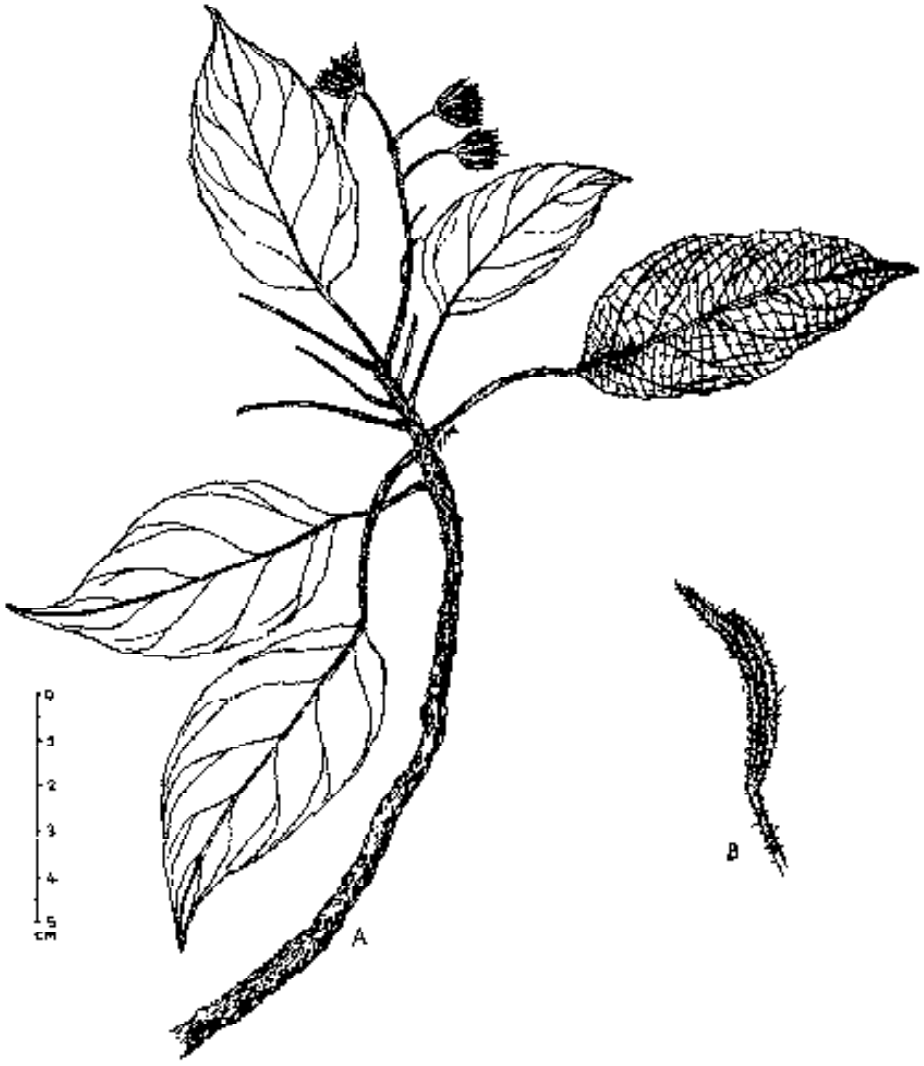
E. glandulosus Wall. ex. Merr. in J. Arnold Arbor. 32: 194. 1951; Tirel & Raynal in Adansonia 2, 20: 175. 1980; Murti in Sharma et al. Fl. India 3: 539, f. 146. 1993. *E. oblongus* Wight & Arn. Prodr. 82. 1834 p.p.; Mast. in Hook. f. Fl. Brit. India 1: 403. 1874; Cooke, Fl. Pres. Bombay 1: 161. 1958 (Repr.); Murti in Sharma et al. Fl. India 3: 539, f. 146. 1993. *'Kasa', 'Kasari'*.



Elaeocarpus aristatus Roxb. : A-Flowering twig; B-Flower; C-Fruit



Elaeocarpus glandulosus Wall. ex Merr. : A-Flowering twig; B-Floral parts; C-Stamens; D-Fruit.



Elaeocarpus munroii (Wight) Mast.
a) Habit; b) Stamen

Trees, 6–8 m high. Leaves 7–10 x 4–6 cm, elliptic, apex acute–acuminate, base cuneate, margins crenate–serrate. Flowers white, in racemes from the axil of fallen leaves; petals fimbriate. Drupes c 2.5 cm long, oblong, narrowed at both ends, 2–seeded.

Fls. & Frts. : March–November.

Illus. : Wight Ic. t. 46. 1838; Talb. For. Fl. Bombay Pres. & Sind 1: 173, f. 107. 1909; Murti in Sharma et al. op. cit.

Distrib. : Along the ghats in semi–evergreen forests, infrequent. Pune, Satara.

E. munroii (Wight) Mast. in Hook. f. Fl. Brit. India 1: 407. 1874; Cooke, Fl. Pres. Bombay 1: 163. 1958 (Repr.). *Monocera munroii* Wight, Ill. 1: 84. 1840 & Ic. t. 952. 1845; Murti in Sharma et al. Fl. India 3: 546, f. 149. 1993.

Trees, 4–8 m high. Leaves 6.2–10.0 x 3–5 cm, apex acuminate, base rounded, acute or subcordate, margins crenate–serrate. Flowers many, white, in racemes. Drupes yellowish, 1–seeded.

Fls. & Frts. : September– November.

Illus. : Wight. op. cit.; Murti in Sharma et al. op. cit.

Distrib. : In semi–evergreen forests, rare. 'Konkan' (Cooke, op. cit.).

E. serratus L. Sp. Pl. 515. 1753; Mast. in Hook. f. Fl. Brit. India 1: 401. 1874; Cooke, Fl. Pres. Bombay 1: 161. 1958 (Repr.); Murti in Sharma et al. Fl. India 3: 553, f. 153. 1993. *E. cuneatus* Wight, Ill. t. 83. 1840; Mast. in Hook. f. op. cit. 402. *'Perinkara'*.

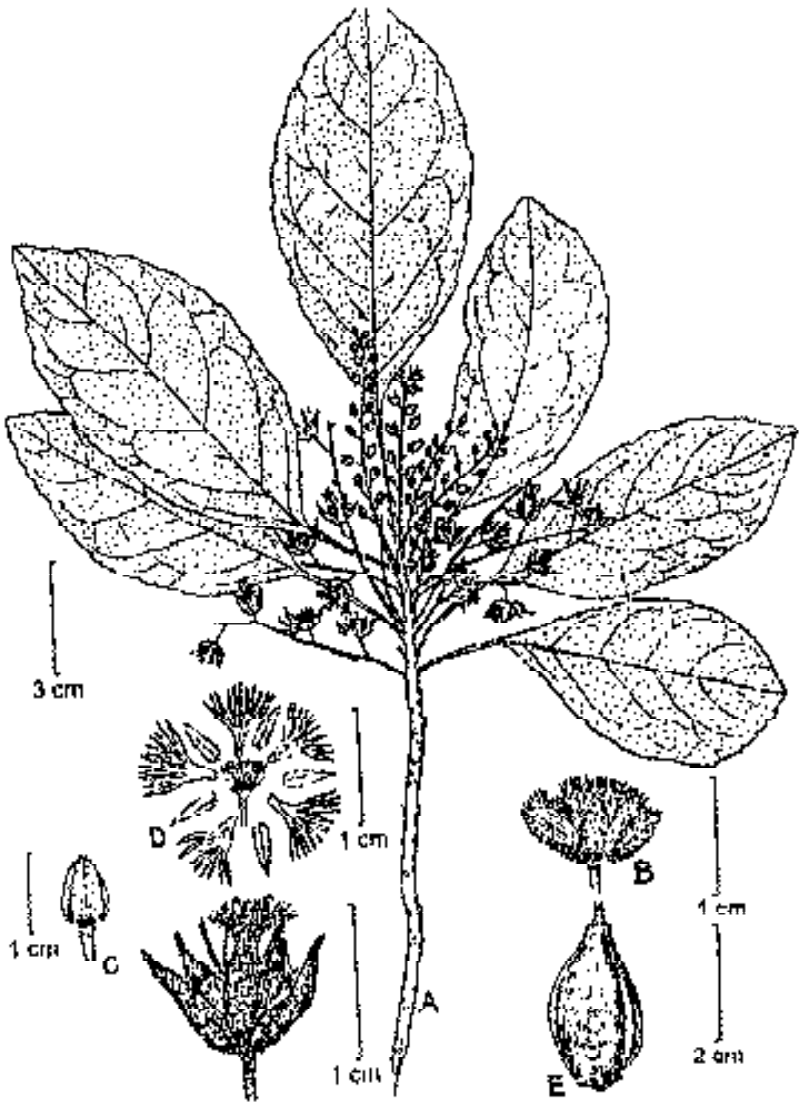
Trees, 10–15 m high. Leaves 5.0–11.2 x 2.5–5.0 cm, elliptic–oblong or obovate, apex obtuse, acute or shortly acuminate, base acute, margins irregularly crenate. Flowers white, in drooping racemes. Drupes oblong, bluntly pointed at apex, greenish–yellow, 1–2–seeded.

Fls. & Frts. : January–March.

Illus.: Talb. For. Fl. Bombay Pres. & Sind 1: 171, f. 106. 1909; Matthew, Illus. Fl. Tamil Nadu Carnatic 2: t. 88. 1982; Murti in Sharma et al. op. cit. 554.

Distrib. : Frequent in semi–evergreen forests. Bombay, Kolhapur, Satara, Sindhudurg.

E. sphaericus (Gaertn.) K. Schum. in Engl. & Prantl. Pflanzenfam. 3(6): 5. 1895; Murti in Sharma et al. Fl. India 3: 555, f.



Elaeocarpus serratus L. : A-Flowering twig; B-Flower; C-Flower bud; D-Floral parts; E-Fruit



Elaeocarpus sphaericus (Geertn.) K. Schum. : A-Fruiting twig; B-Nut; C-Part of inflorescence.



Elaeocarpus tectorius (Lour.) Poir. : A-Flowering twig; B-Flower; C-Fruit.

154. 1993. *Ganitrus sphaerica* Gaertn. Fruct. 2: 271, t. 139. 1791. *Elaeocarpus ganitrus* Roxb. ex G. Don, Gen. Syst. 1: 559. 1831; Mast. in Hook. f. Fl. Brit. India 1: 400. 1874; Cooke, Fl. Pres. Bombay 1: 160. 1958 (Repr.). *'Rudraksh'*.

Trees, 5–10 m high. Leaves 10–15 x 2.5–3.7 cm, oblong–lanceolate, apex acute or acuminate, margins obscurely crenate–serrate. Flowers white, in racemes from old branches. Drupes purple, glabrous or obovoid, 5–seeded.

Illus. : Wight, Ic. t. 66 1838 *(Ganitrus sphaerica);* Talb. For. Fl. Bombay Pres. & Sind 1: 170, f. 105. 1909; Murti in Sharma et al. op cit.

Distrib. : Bombay (Victoria garden), 'Konkan' (Cooke, op. cit.), Pune, Satara (Lisboa in J. Roy. Asiat. Soc. Bombay 15: 209. 1883).

E. tectorius (Lour.) Poir. in Lam. Encycl. Suppl. 2: 704. 1812; Murti in Sharma et al. Fl. India 3: 559, f. 155. 1993. *Craspedum tectorium* Lour. Fl. Cochinch. 336. 1790. *Elaeocarpus leptostachya* Wall. ex C. Muell. Anot. Fam. Elaeocarp. 23. 1849; Mast. in Hook. f. Fl. Brit. India 1: 403. 1874. *E. robustus* Roxb. Fl. Ind. 2: 597. 1832; Mast. in Hook. f. op. cit. 402. p.p.

Trees, 15–35 m high. Leaves 6–24 x 3.0–8.5 cm, elliptic–oblong or ovate–oblong, apex acute–acuminate, base cuneate to rounded, repand–serrate, rusty pubescent when young, glabrous at length. Flowers white, in axillary racemes. Drupes ellipsoid or oblong–ovoid, greenish–yellow, 1–seeded.

Fls. & Frts. : May–October.

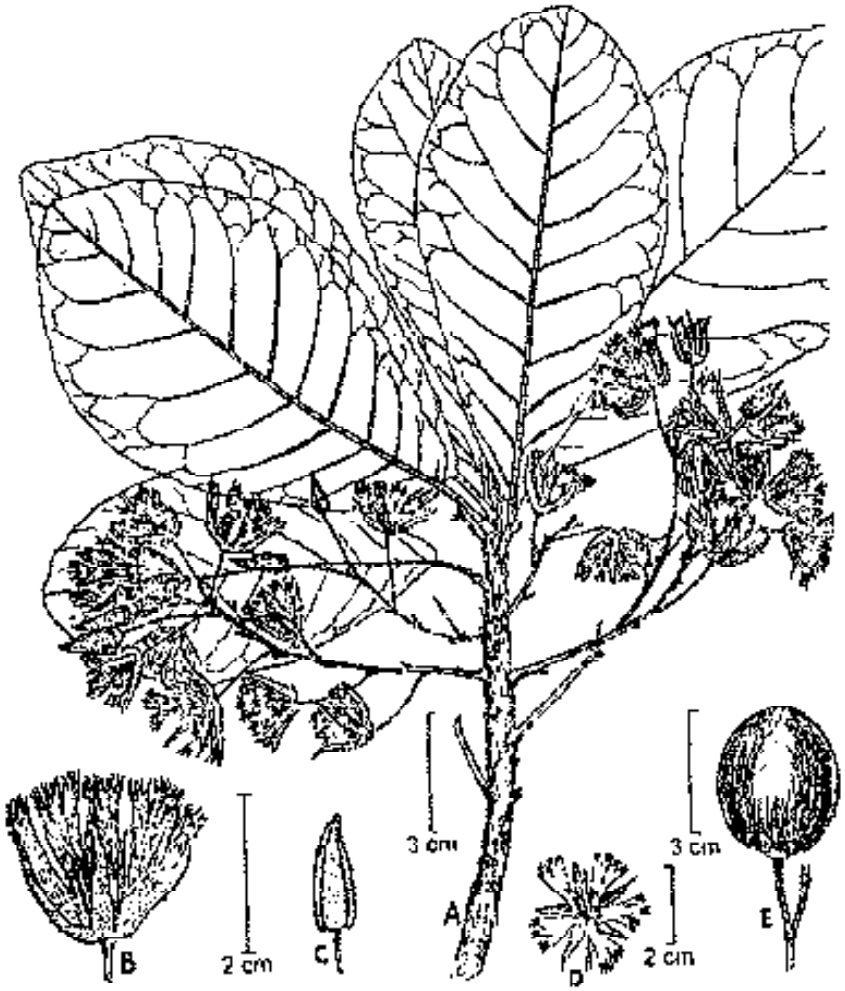
Illus. : Murti in Sharma et al. op. cit. 558, f. 155.

Distrib. : In moist deciduous and evergreen forests between 1500–2000 m. Maharashtra (Murti, op. cit.).

E. tuberculatus Roxb. Fl. Ind. 2: 594. 1832; Mast. in Hook. f. Fl. Brit. India 1: 404. 1874; Cooke, Fl. Pres. Bombay 1: 162. 1958 (Repr.); Murti in Sharma et al. Fl. India 3: 559, f. 156. 1993; Almeida, Fl. Mah. 1: 168. 1996. *'Rudraksha'*.

Trees, 80–90 m high; bark grey and white mottled. Leaves crowded at branch ends, 6–20 x 4–12 cm, obovate, apex rounded, glabrous, hairy on midrib. Flowers in axillary, rufous pubescent, drooping, racemes. Drupes ovoid, smooth.

Fls. & Frts. : December–October.



Elaeocarpus tuberculatus Roxb. : A-Flowering twig; B-Flower; C-Flower bud; D-Fruit.

Illus. : Bedd. Fl. Sylv. t. 113. 1871; Wight, Ic. t. 62. 1838 (*Monocera tuberculata* (Roxb.) Wight & Arn. Prodr. 83. 1834); Murti in Sharma et al. op. cit.

Distrib. : In evergreen forests between 1000–1500 m Sindhudurg (Almeida, op. cit.).

CULTIVATED SPECIES :

Muntingia calabura L. Sp. Pl. 509. 1753; Murti in Sharma et al. Fl. India 3: 570. 1993; Almeida, Fl. Mah. 1: 169. 1996.

Trees, c 4 m tall; branches hairy. Leaves 5–10 x 2–4 cm, oblong–lanceolate, acuminate at apex, obliquely rounded at base, serrate at margins, 3–5–nerved, hairy on upper surface, woolly below. Flowers white, solitary or in pairs. Berries glabrous, ripens pinkish–red. Seeds numerous.

Fls. & Frts. : Throughout the year.

Illus. : Matthew, Illus. Tamilnadu Carnatic 2: t. 89. 1982.

Distrib. : Cultivated in Bombay & Thane (Almeida, op. cit.).

LINACEAE

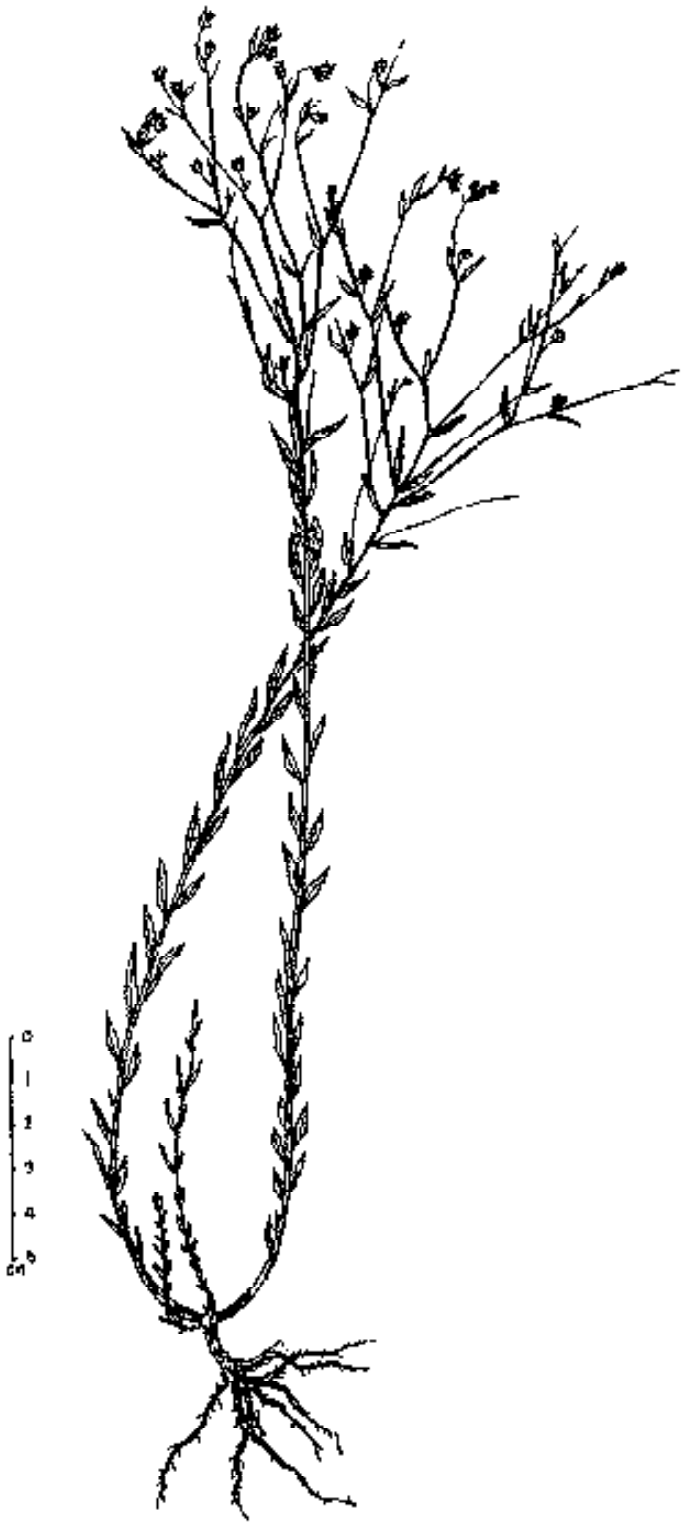
(M. J. Kothari)

1. Erect herbs or undershrubs : stamens as many as petals :
   2. Leaves sessile, mostly one nerved; capsules 5–locular ... LINUM
   2. Leaves petiolate, pinnately nerved; capsules 3–4–locular ... REINWARDTIA
1. Shrubs often climbing by hooks; stamens twice the number of petals ... HUGONIA

HUGONIA L.

Hugonia mystax L. Sp. Pl. 675. 1753 (*'mystrax'*); Hook. f. Fl. Brit. India 1: 413. 1874; Cooke, Fl. Pres. Bombay 1: 166. 1958 (Repr.); Hajra in Fasc. Fl. India 13: 6. 1983 & in Sharma et al. Fl. India 3: 576. 1993.

Scandent shrubs. Leaves 8–10 x 2.5–3.5 cm, elliptic–obovate, hairy on midrib, obtuse or subacute at apex, tapering towards base. Flowers terminal and in upper axils; sepals scarlet fulvous pubescent; petals twisted, alternating with sepals. Fruits globose surrounded by persistent sepals.



Linum mysurense Heyne ex Bth.

Fls. & Frts. : August–October.

Illus. : Wight. Ill. t. 32. 1840; Talb. For. Fl. Bombay Pres. & Sind 1: 177, f. 109. 1909; Matthew, Ill. Fl. Tamil Nadu Carnatic 2: t. 90. 1982.

Distrib. : Rare. Sindhudurg.

LINUM L.

Linum mysurense Heyne ex Bth. apud Lindl. in Bot. Reg. 16: sub. t. 1326. 1830; Hook. f. Fl. Brit. India 1: 411. 1874; Cooke, Fl. Pres. Bombay 1: 164. 1958 (Repr.); Hajra in Fasc. Fl. India 13 : 7. 1983 & in Sharma et al. Fl. India 3: 578. 1993. *'Undri'*.

Erect herbs, 10–40 cm high, usually branched in upper part. Leaves alternate, 0.5–2.0 cm long, elliptic–oblong or obovate, mucronate at apex, tapering at base. Flowers yellow, in terminal, panicled corymbs. Fruits glabrous, surrounded by persistent sepals.

Fls. & Frts. : August–January.

Illus. : Wight. Ill. t. 60. 1840; Fyson, Fl. Nilgiri Pulney Hill tops 2: t. 39. 1915 (Repr. ed. 1974).

Distrib. : Common in open situations like hilly plateau, fields and forest clearings.

REINWARDTIA Dum.

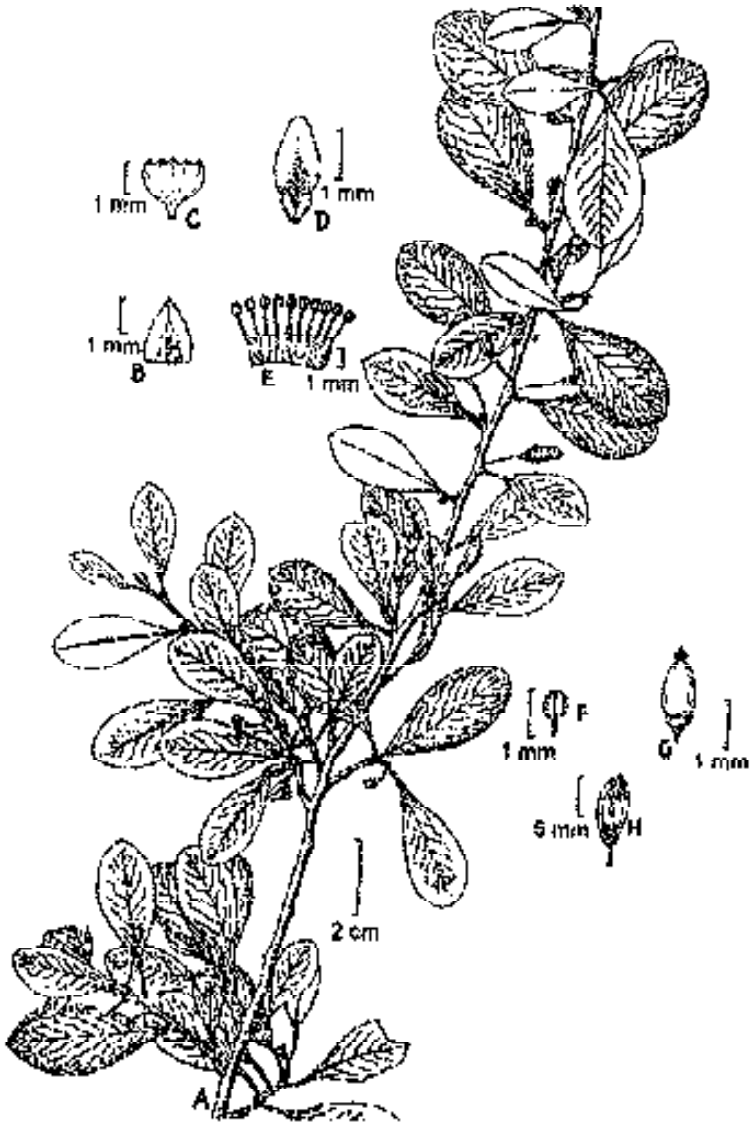
Reinwardtia indica Dum. Comm. Bot. 19. 1822; Hajra in Fasc. Fl. India 13: 11. 1983 & in Sharma et al. Fl. India 3: 581. 1993. *R. trigyna* (Roxb.) Planch. in Hook. Lond. J. Bot. 7: 522, 1848; Hook. f. Fl. Brit. India 1: 412. 1874; Cooke, Fl. Pres. Bombay 1: 165. 1958 (Repr.). *'Abai'*.

Undershrubs, 75–140 cm high; branches terete– angular. Leaves 1.5–3.5 x 0.5–1.3 cm, elliptic–obovate or oblong–lanceolate, acute, rounded or mucronate at apex, narrowed at base. Flowers bright golden–yellow, solitary or in fascicled, axillary racemes or in dense corymbs at the end of branches. Capsules globose.

Fls. & Frts. : January–December.

Illus. : Collet, Fl. Siml. 66, f. 21. 1902; Abdulla in Nasir & Ali, Fl. W. Pak. 21: 2, f. 1 A–D. 1972.

Distrib. : On hill tops, frequent. Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.



Erythroxylum monogynum Roxb. : A-Branch with flower and fruits; B-Stipule; C-Calyx; D-Petal; E-Androecium; F-Stamen; G-Pistil; H-Fruit.

CULTIVATED SPECIES :

Linum usitatissimum L. Sp. Pl. 277. 1753; Hook. f. Fl. Brit. India 1: 410. 1874; Cooke, Fl. Pres. Bombay 1: 164. 1958 (Repr.); Bailey, Man. Cult. Pl. 604. 1949; Hajra in Fasc. Fl. India, 13: 12. 1983 & in Sharma et al. Fl. India. 3: 580. 1993. *'Alsi', Javas'.*

Erect herbs, 30–50 cm high. Leaves 1.2–3 x 1–0.7 cm, linear–lanceolate, acute at apex, tapering at base, glabrous. Flowers blue, in axillary cymes. Capsules ovoid or subglobose, mucronate, glabrous. Seeds brown, shining.

Fls. & Frts. : September– March.

Illus. : Wealth of India 6: 119. ff. 46–47 & t. 4. 1962.

Distrib. : Cultivated, Occasionally found as an escape. Ahmednagar, Akola, Amravati, Bombay, Nagpur, Osmanabad, Pune, Satara, Thane.

ERYTHROXYLACEAE

(M. J. Kothari)

ERYTHROXYLUM P. Br.

Erythroxylum monogynum Roxb. Pl. Cor. t. 88. 1795; Hook. f. Fl. Brit. India 1: 414. 1874; Chatterjee & Sharma in Sharma et al. Fl. India 3: 590, f. 164. 1993.

Shrubs, 2–3 m high. Leaves 2.5–5.0 x 1.0–2.5 cm, elliptic–obovate, apex obtuse or emarginate, base cuneate. Flowers white, axillary, solitary or in fascicles. Drupes c 1 cm long, oblong, red when ripe, 1–seeded.

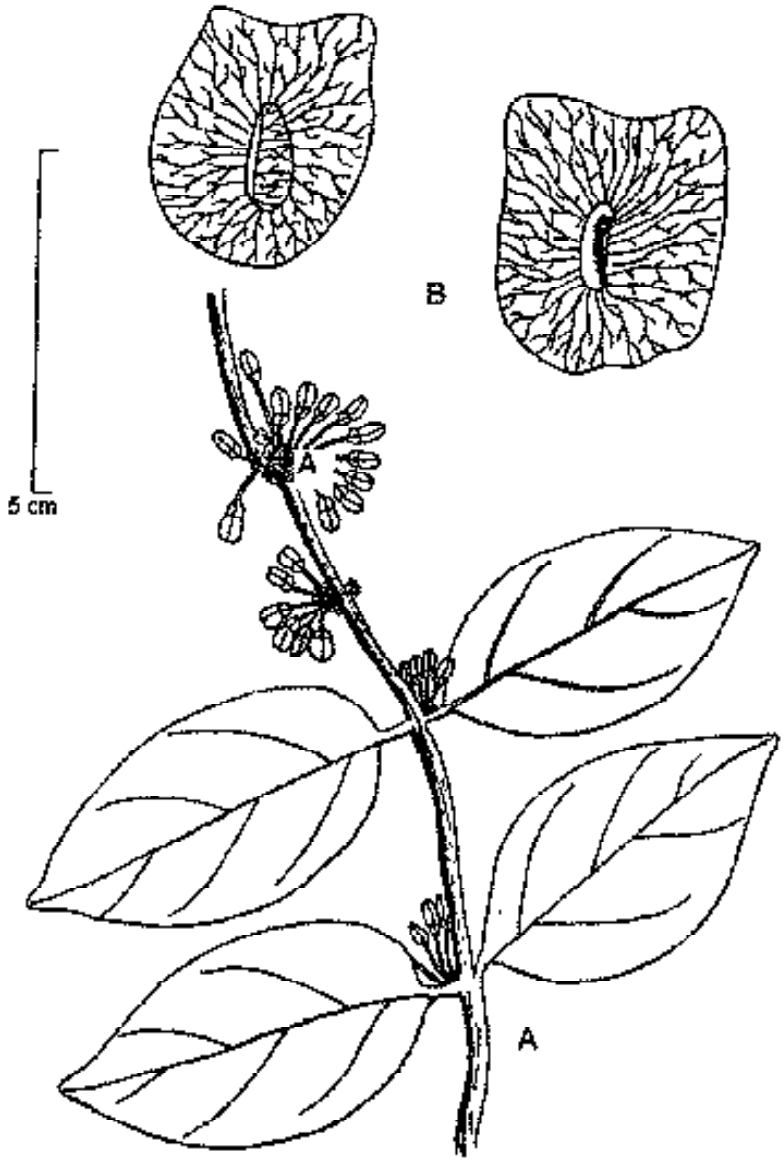
Fls. & Frts. : More or less throughout the year.

Illus. : Bedd. Fl. Sylv. t. 81. 1871 [*E. indicum* (DC.) Bedd.]; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 91. 1982; Chatterjee & Sharma in Sharma et al. op. cit.

Distrib. : In deciduous forests, frequent. Chandrapur.

CULTIVATED SPECIES. :

E. coca Lam. Encycl. 2: 393: 1786; Chatterjee & Sharma in Sharma et al. Fl. India 3: 595. 1993.



Aspidopterys canarensis Dalz. : A-Habit; B-Samara

Shrubs or small trees, pyramidal; young branches warty. Leaves broadly elliptic, dark green above, glaucous beneath. Flowers yellowish–white or greenish. Drupes scarlet red. Seeds subtrigonous.

Fls. & Frts. : Not known.

Distrib. : Native of tropical south America, cultivated in Bombay.

MALPIGHIACEAE

(M. J. Kothari)

1. Climbers; leaves opposite; flowers white with pink tinge; styles 1, rarely 2; calycine gland large ... HIPTAGE
1. Scandent shrubs; leaves alternate; flowers greenish–white; styles 3; calycine gland absent ... ASPIDOPTERYS

ASPIDOPTERYS A. Juss.

1. Nucleus of fruit dorsally winged ... *A. canarensis*
1. Nucleus of fruit not dorsally winged:
   2. Leaves ovate–elliptic, glabrous beneath ... *A. indica*
   2. Leaves orbicular–cordate or elliptic, tomentose beneath:
      3. Leaves cordate, pedicels all over glabrous ... *A. cordata*
      3. Leaves elliptic, pedicels glabrous above articulation ... *A. nutans*

Aspidopterys canarensis Dalz. in Hook. Kew. J. Bot. 3 : 351. 1851; Hook. f. Fl. Brit. India 1: 420. 1874; Cooke, Fl. Pres. Bombay 1: 168. 1958 (Repr.); Almeida, Fl. Mah. 1: 181. 1996; Srivatava in Hajra et al. Fl. India 4: 3, f. 1. 1997.

Climbing shrubs. Leaves 7–10 x 3.5–5.0 cm, elliptic–lanceolate, obtusely acuminate at apex, rounded or subacute at base. Flowers white, pedicellate, in umbelliform racemes. Samaras suborbicular, yellowish–brown, margins entire or lobed towards apex.

Fls. : February–March.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 180. f. 111. 1909; Srivastava in Hajra et al. op. cit.

Distrib. : Rare in evergreen forests. Bombay & Ratnagiri (M.R. Almeida op. cit.).

A. cordata (Heyne ex Wall.) A. Juss. in Ann. Sci. Nat. Bot. 2, 13: 267. 1840; Hook. f. Fl. Brit. India 1: 421. 1874; Cooke, Fl. Pres. Bombay

1: 168. 1958 (Repr.); Srivastava in Hajra et al. Fl. India 4: 5. 1997 (var. *cordata*). *Hiraea cordata* Heyne ex Wall. Pl. As. Rar. 1: 13. 1830. *'Bokadvel, Buryel'.*

Climbers; young parts white–tomentose. Leaves 2.7–13.0 x 0.9–12.8 cm, glabrous above, silky–tomentose beneath, apex acuminate. Flowers green or creamy–yellow, in terminal and axillary panicles. Samaras 1–3 cm across, membranous, orbicular, reticulately veined.

Fls. & Frts. : August–November.

Illus. : Gandhi in Sald. & Nicols. Fl. Hassan Dt. 409, f. B–Bb. 1976.

Distrib. : Common throughout in dry and moist deciduous forests.

A. indica (Willd) Theob. in F. Mason Burmah ed. 3, 2: 599. 1883; Mabb. in Taxon 34: 154. 1985; Almeida, Fl. Mah. 1: 181. 1996. *Triopteris indica* Willd. Sp. Pl. ed. 4(2): 744. 1799; Srivastava in Hajra et al. Fl. India 4 : 8. 1997. *Aspidopteris roxburghiana* A. Juss. in Ann. Sci. Nat. 2(13): 267. 1840; Hook. f. Fl. Brit. India 1: 420. 1874; Cooke, Fl. Pres. Bombay 1: 168. 1958 (Repr.).

Climbing shrubs. Leaves 7–10 x 3.2–5.0 cm, acuminate. Flowers white, in dense, terminal and axillary, rusty–tomentose panicles. Samaras linear–oblong, membranous, yellowish–brown.

Fls. & Frts. : November–December.

Distrib. : Bombay (planted in gardens, Almeida, op. cit.), Pune, 'Satara' (Cooke, op. cit.).

A. nutans (Roxb. ex DC.) A. Juss. in Ann. Sci. Nat. 2, B, 13: 267. 1840; Hook. f. Fl. Brit. India 1: 421. 1874; Koshy & Shah in J. Econ. Tax. Bot. 7: 553. f. 1 a–f (1985) 1986; Almeida, Fl. Mah. 1: 180. 1996; Srivastava in Hajra et al. Fl. India 4 : 9. 1997. *Hiraea nutans* Roxb. ex DC. Prodr. 1: 585. 1824.

1. Pedicels glabrous above articulation ... var. *nutans*

1. Pedicels pubescent to subtomentose above articulation ... var. *wallichi*

var. **nutans.**

Lianas; younger parts tomentose. Leaves 3–9 x 0.7–8.0 cm, glabrescent above, appressed hairy beneath, obtuse, acute or acuminate at apex, rounded and at times oblique at base. Flowers pale–yellow, fragrant, in axillary and terminal panicles.

Fls. : October.

Illus. : Koshy & Shah, op. cit.

Distrib. : Rare in deciduous forests. Nagpur, Thane. (Almeida, op. cit.).

var. **wallichii** (Hook. f.) Niedenzu in Arb. Bot. Inst. Ak. Braunsberg 6: 11. 1915 & in Pflazenrich 91: 28. 1928; Raiz. & Saxena, Fl. Mussorie 1: 86. 1978. *A. wallichii* Hook. f. Fl. Brit. India 1: 421. 1874; Ugemuge, Fl. Nagpur 84. 1986; Srivastava in Hajra et al. Fl. India 4: 12. 1997.

Woody twiners. Leaves ovate, acute or acuminate at apex, subcordate at base. Flowers in a long, lax, graceful panicles. Samaras varibale in shape, narrowed at one end or emarginate.

Fls. & Frts. : October–January.

Distrib. : Occasional in forests. Nagpur.

HIPTAGE Gaertn.

Hiptage benghalensis (L.) Kurz in J. Asiat. Soc. Bengal 43: 136. 1874; Blatt. in J. Bombay nat. Hist. Soc. 34: 893. 1930; Srivastava in Hajra et al. Fl. India 4 :14, f. 4. 1997 (var. *benghalensis). Banisteria benghalensis* L. Sp. Pl. 427. 1753. *Hiptage madablota* Gaertn. Fruct. 2: 169, t. 116, f. 4. 1791 nom. illeg.; Hook. f. Fl. Brit. India 1: 418. 1874; Cooke, Fl. Pres. Bombay 1: 167. 1958 (Repr.). *'Haladvel' 'Madhumalati,' 'Madhvilata'.*

Extensive woody climbers. Leaves 7.5–18.0 x 3.8–9.0 cm, elliptic, coriaceous, shining above, sparsely pubescent beneath, acute or acuminate at apex. Flowers creamy white, throat yellowish, in terminal racemes or panicles. Mericarps 1–3, unequally 3–winged, pubescent.

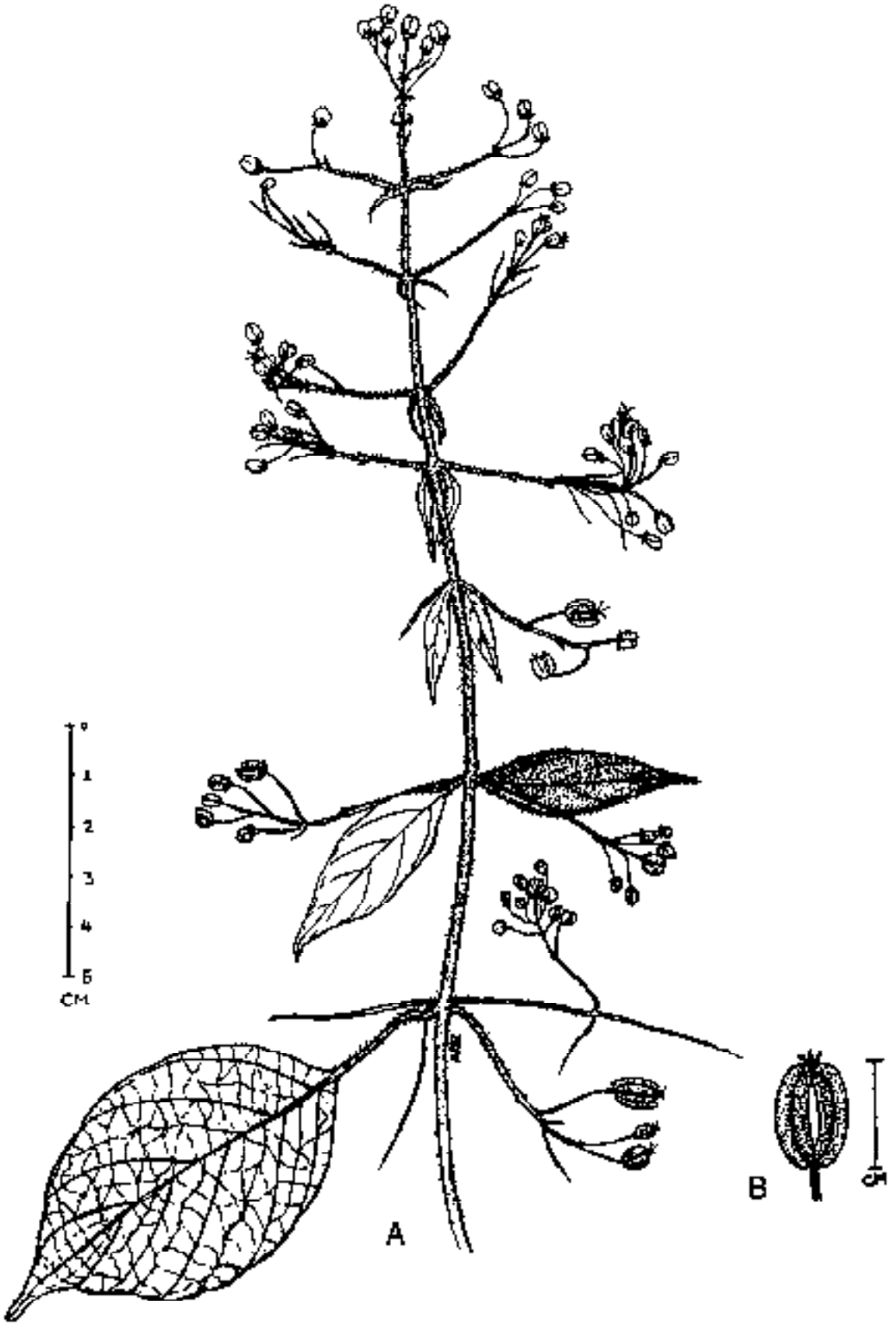
Fls. & Frts. : January–April.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 178, f. 110. 1909; Srivastava in Hajra et al. op. cit.

Distrib. : Native of Eastern India. Common in hilly forests.

CULTIVATED SPECIES :

Heteropteris laevifolia (A. Juss.) Srivastava in Nat. Acad. Sci. Letters 7: 325. 1984 in Hajra et al. Fl. India 4: 32. 1997. *Banisteria laevifolia* A. Juss. in St. Hill. Fl. Bras. Mer. 3 : 82. 1832; Almeida, Fl. Mah. 1: 182. 1996.



Aspidoptergs nutans var. **wallichli** (Hook. f.) Niedenzu
A- Habit; B- Young fruit

Climbers; branches slender, woody, dark brown. Leaves coriaceous, dark–green above and paler beneath, ovate–lanceolate or lanceolate, acute or acuminate at apex, cordate at base, entire along margins. Inflorescence of umbellate panicles, usually trichotomously divided. Flowers yellow, c 1.5 cm across. Samaras silky pubescent, reddish–brown.

Fls. & Frts. : August–October.

Distrib. : Bombay gardens (Almeida op. cit.).

Galphimia gracilis Bartl. in Linnaea 13: 552. 1839. Bailey, Man. Cult. Pl. 614. 1949; Srivastava in Hajra et al. Fl. India 4 : 31. 1997.

Shrubs. Leaves oblong or ovate–lanceolate with 2 glands at base. Flowers yellow in terminal panicles. Fruits globular, brown.

Fls. & Frts. : Almost throught the year.

Distrib. : Native of Mexico to Panàma & W. Indies. Planted in gardens as ornamental. Ahmednagar, Bombay, Nagpur, Nasik, Osmanabad, Pune.

Malpighia coccigera L. Sp. Pl. ed. 2. 426. 1753; Bailey, Man. Cult. Pl. 614. 1949; Srivastava in Hajra et al. Fl. India 4 : 33. 1997.

Shrubs c 90 cm high. Leaves ovate or obovate, spiny, shining above, dull beneath. Flowers pink, solitary. Drupes red, globose.

Fls. & Frts. : February–April.

Distrib. : Native of West Indies. Grown in gardens.

M. glabra L. Sp. Pl. 425. 1753; Bailey, Man. Cult. Pl. 614. 1949; Srivastava n Hajra et al. in Fl. India 4 : 34. 1997.

Shrubs. c 3 m high. Leaves ovate to elliptic–lanceolate, apex acute, margins entire. Flowers rosy in axillary and terminal fascicles. Drupes red or scarlet, ovoid.

Fls. & Frts. : March–April.

Distrib. : It is a Native of Texas. Grown in gardens.

M. punicifolia L. var. **obovata** Niedenzu in Ind. Lect. Lye. Braunsberg 1899 : 8 & in Arbeiten Bot. Inst. Koenigl. Lyceums Hosianun Braunsberg 5: 35. 1914; Srivastava in Hajra et al. Fl. India 4:35. 1997. *M. obovata* H.B. & K. Nov. Gen. & Sp. 5 : 146. 1821; Almeida, Fl. Mah. 1 : 184. 1996.

Shrubs, 4–6 m tall. Leaves generally obovate, rounded and emarginate at apex, obtuse or notched at base. Flowers rose coloured, in sessile clusters. Drupes scarlet, ovoid or subglobose, 1.0 – 1.5 cm across, single or in clusters.

Fls. & Frts. : December–February.

Distrib. : Native of tropical America. Rarely cultivated in Bombay gardens (Almeida, op. cit.).

Stigmophyllon ciliatum (Lam.) A. Juss. in St. Hill. Fl. Brazil Merid. 3: 49. 1832; Almeida, Fl. Mah. 1: 184. 1996; Srivastava in Hajra et al. Fl. India 4 : 36. 1997. *Banisteria ciliata* Lam. Encycl. 1: 369. 1783.

Shrubs, twining. Leaves bright green above, pale beneath, ovate to orbicular–ovate, 4–8 cm long, acuminate at apex, deeply cordate at base, glandular–ciliate along margins. Flowers 3–6, in a cluster.

Fls. : January–April.

Distrib. : It is a Native of Brazil. Cultivated in gardens. Bombay (Almeida, op. cit.).

S. periplocifolium (Desf.) A. Juss. in Malp. Syn. 290. 1840 & in Arch. Mus. Hist. Nat. Par. 3: 380. 1843; Bailey, Man. Cult. Pl. 614. 1949; Srivastava in Hajra et al. Fl. India 4 : 37. 1997. *Banisteria periplocaefolia* Desf. in Tab. Ec. Bot. 136. 1804.

Woody climbers. Leaves elliptic, oblong or linear, margins entire. Flowers yellow, in axillary racemes or corymbs. Samaras 1–3, winged along ventral side.

Fls. & Frts. : February–April.

Distrib. : Cultivated in gardens. Bombay, Pune.

Tristellateia australasiae A Rich, Sert, Austral. t. 15. 1833; Srivastava in Hajra et al. Fl. India 4 : 37. 1997.

Climbers. Leaves ovate to elliptic. Flowers yellow, in terminal racemes. Samaras stellate.

Fls. & Frts. : February–March.

Distrib. : Cultivated in gardens. Bombay, Pune.

ZYGOPHYLLACEAE

(M. J. Kothari)

1. Stipules spiny ... FAGONIA
1. Stipules not spiny :
   2. Leaves simple, alternate, multifid; stamens 12–15 ... PEGANUM
   2. Leaves pinnately compound, opposite; stamens 10 or less :
      3. Fruits woody with 2 pairs of spines, 5–celled, each cell with several seeds ... TRIBULUS
      3. Fruits not spiny, 8–12–celled, each cell 1–seeded ... KALLSTROEMIA

FAGONIA L.

Fagonia schweinfurthii (Hadidi) Hadidi ex Ghafoor in Jafri & El–Gadi, Fl. Libya 38 : 31. 1977; P. Singh & V. Singh in Hajra et al. Fl. India 4 : 44. 1997. *F. indica* Burm. f. var. *schweinfurthii* Hadidi in Reich. f. Fl. Iran. 98 : 6. t. 6. 1972. *F. cretica* auct. non L. 1753; Cooke, Fl. Pres. Bombay 1: 173. 1958 (Repr.). *F. arabica* auct. non L. 1753; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 425. 1874 p.p. *'Dhamaso'*.

Spiny undershrubs, 30–50 cm high. Leaflets 3, upper ones unifoliolate, linear, mucronate entire. Flowers purple or rose coloured, pedunculate, axillary, solitary. Fruits 5–lobed, broadly ovoid, glandular–pubescent. Seeds pale brown, flat, oblong.

Fls. & Frts. : October–December.

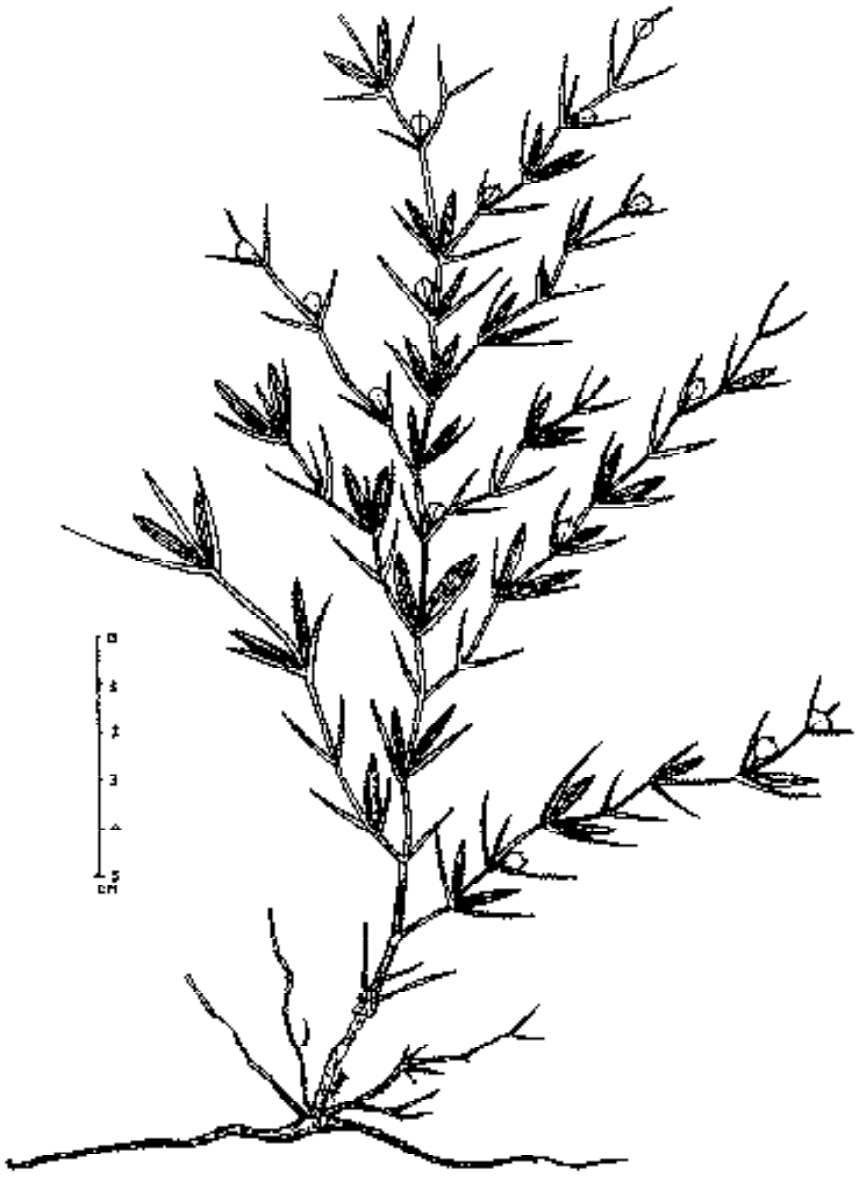
Illus. : Mahesh. Illus. Fl. Delhi f. 39. 1966.

Distrib. : In dry places, rare. Ahmednagar, Aurangabad, Nasik, Pune, Satara.

KALLSTROEMIA Scop.

Kallstroemia pubescens (G. Don) Dandy in Kew Bull. 1955 : 138. 1955; Bhide in J. Bombay Nat. Hist. Soc. 75: 529, ff. 1–7. 1979; Ugemuge, Fl. Nagpur Dt. 85, f. 33. 1986; P. Singh & V. Singh in Nayar et al. Fasc. Fl. India 20: 182. 1980 & in Hajra et al. Fl. India 4 : 45, f. 15. 1997. *Tribulus pubescens* G. Don, Gen. Syst. 1: 769. 1831.

Diffuse herbs. Leaves abruptly pinnate, usually opposite, occasionally alternate towards the base of branches; leaflets elliptic, apiculate, entire, hairy. Flowers yellow, solitary or leaf opposed. Fruits separating into 8–12–tubercled cocci.



Fagonia schweinfurthii (Hadidi) Hadidi ex Ghafoor

Fls. & Frts. : July–September.

Illus. : Bhide, op. cit.; Ugemuge, op. cit; P. Singh & V. Singh in Hajra et al. op. cit.

Distrib. : As a weed along road sides and in moist places, occasional. Nagpur (Bhide, op. cit.).

PEGANUM L.

Peganum harmala L. Sp. Pl. 444. 1753; Hook. f. Fl. Brit. India 1: 486. 1875; Cooke, Fl. Pres. Bombay1: 172. 1958 (Repr.); Almeida, Fl. Mah. 1: 170. 1996; P. Singh & V. Singh in Hajra et al. Fl. India 4 : 48. 1997. *P. harmala* var. *stenophyllum* Boiss. Fl. Or. 1 : 917. 1867. *'Harmal'*.

Bushy herbs, 25–60 cm high. Leaves 5.0–7.5 cm long, segments narrow, linear–lanceolate, acute. Flowers white, solitary, leaf–opposed, subterminal. Capsules glabrous, trigonous, veined, depressed or retuse at apex with persistent style. Seeds blackish–brown, 3–angular.

Fls. & Frts. : October–December.

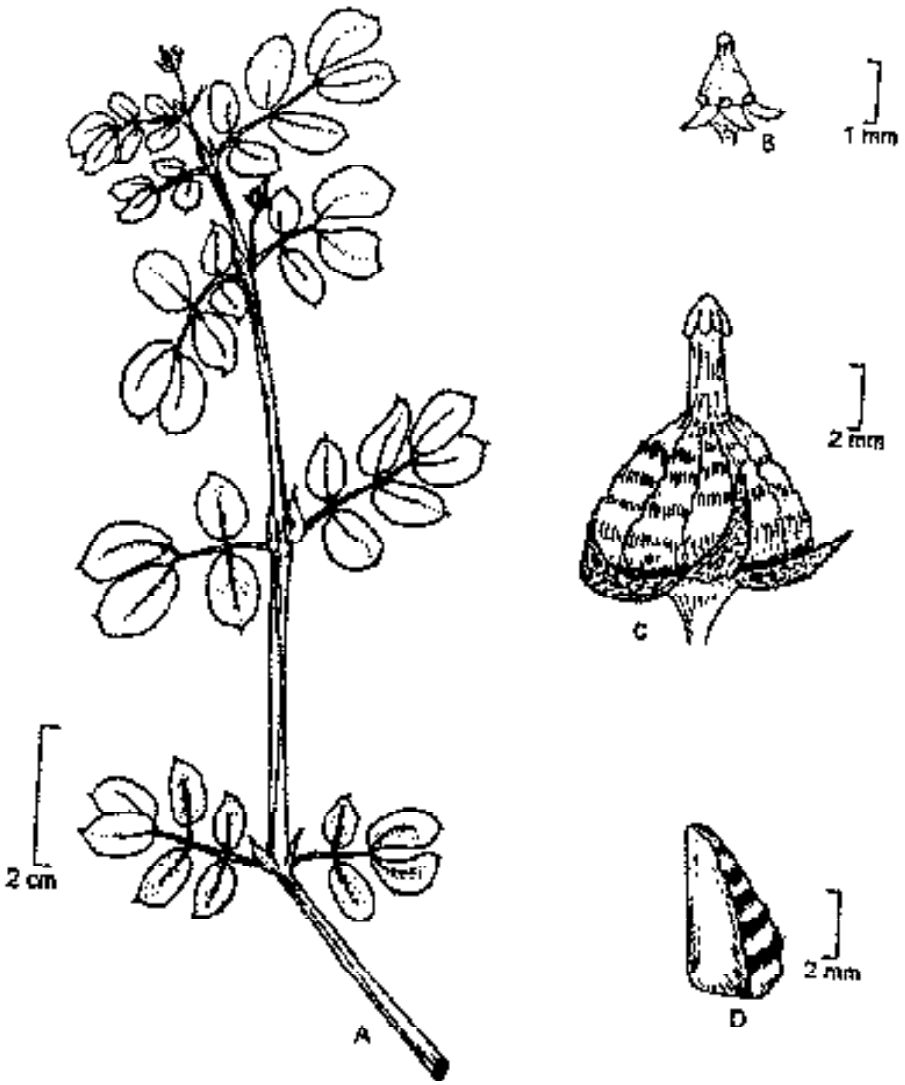
Illus. : Hadidi in Rech. f. Fl. Iran. 98: 18, t. 14 & 15. 1972.

Distrib. : Rare in dry places. Bombay (Almeida, op. cit.), 'Konkan' & 'Pune' (Cooke, op. cit.).

TRIBULUS L.

1. Infrastaminal glands ciliate; style pubescent ... *T. subramanyamii*
1. Infrastaminal glands not ciliate; style glabrous :
   2. Each mericarp with 2 median and 20-30 dorsal spines, basal pair of spines absent ... *T. rajasthanensis*
   2. Each mericarp with 4 spines, basal pair of spines sometimes reduced to tubercles :
      3. Pedicels equal or longer than subtending leaves; styles 1.5–2.5 mm long ... *T. lanuginosus*
      3. Pedicels shorter than subtending leaves; styles upto 0.5 mm long ... *T. terrestris*

Tribulus lanuginosus L. Sp. Pl. 387. 1753; Nayar & Giri in Bull. Bot. Surv. India 24 : 161. 1983; P. Singh & V. Singh in Hajra et al. Fl. India 4 : 51. 1997; Naik, Fl. Marathwada 1 : 181. 1998. *T. terrestris* sensu Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1 : 423. 1874 p.p. non L. 1753. *'Sarata'*.



Kallstroemia pubescens (G. Don) Dandy : A-Habit; B-Gynoecium; C-Schizocarp; D-Mericarp.

Herbs; branches prostrate or suberect, silky-pubescent, 15–60 cm high. Leaves pinnate; leaflets 6–12, 8–12 mm long, mucronate at apex, oblique at base, sericeo-villous on both surfaces. Flowers pale yellow, solitary, axillary or leaf opposed. Fruits disk–shaped, mericarps acuminate at apex, 2–4 spined.

Fls. & Frts. : Almost throughout year.

Illus. : Wight, Ic. t. 98. 1838.

Distrib. : Common in all districts of Marathwada.

T. rajasthanensis Bhandari & Sharma in Bot. Notis. 129: 367, f. 1. 1977; P. Singh & V. Singh in Hajra et al. Fl. India 4 : 53, f. 17. 1997; Naik, Fl. Marathwada 1 : 182. 1998.

Herbs; branches prostrate or procumbent, hirsute. Leaflets 8–14, 6–10 x 4–5 mm, elliptic–oblong to ovate–oblong, pubescent above, villous beneath. Flowers yellow, solitary axillary. Fruits globose 12–14 m in dam.; mericarps with two median, 5–6 mm long divergent spines and many muriculations, densely hispid.

Fls. & Frts. : August–December.

Illus. : P. Singh & V. Singh in Hajra et al. op. cit.

Distrib. : On rocky soil, occasional in all districts of Marathwada (Naik, op. cit.).

T. subramanyemii P. Singh, Giri & V. Singh in Bull. Bot. Surv. India 25: 197. 1985; P. Singh & V. Singh in Nayar et al. Fasc. Fl. India 20: 191. 1990 & in Hajra et al. Fl. Inda 4 : 55, f. 18. 1997.

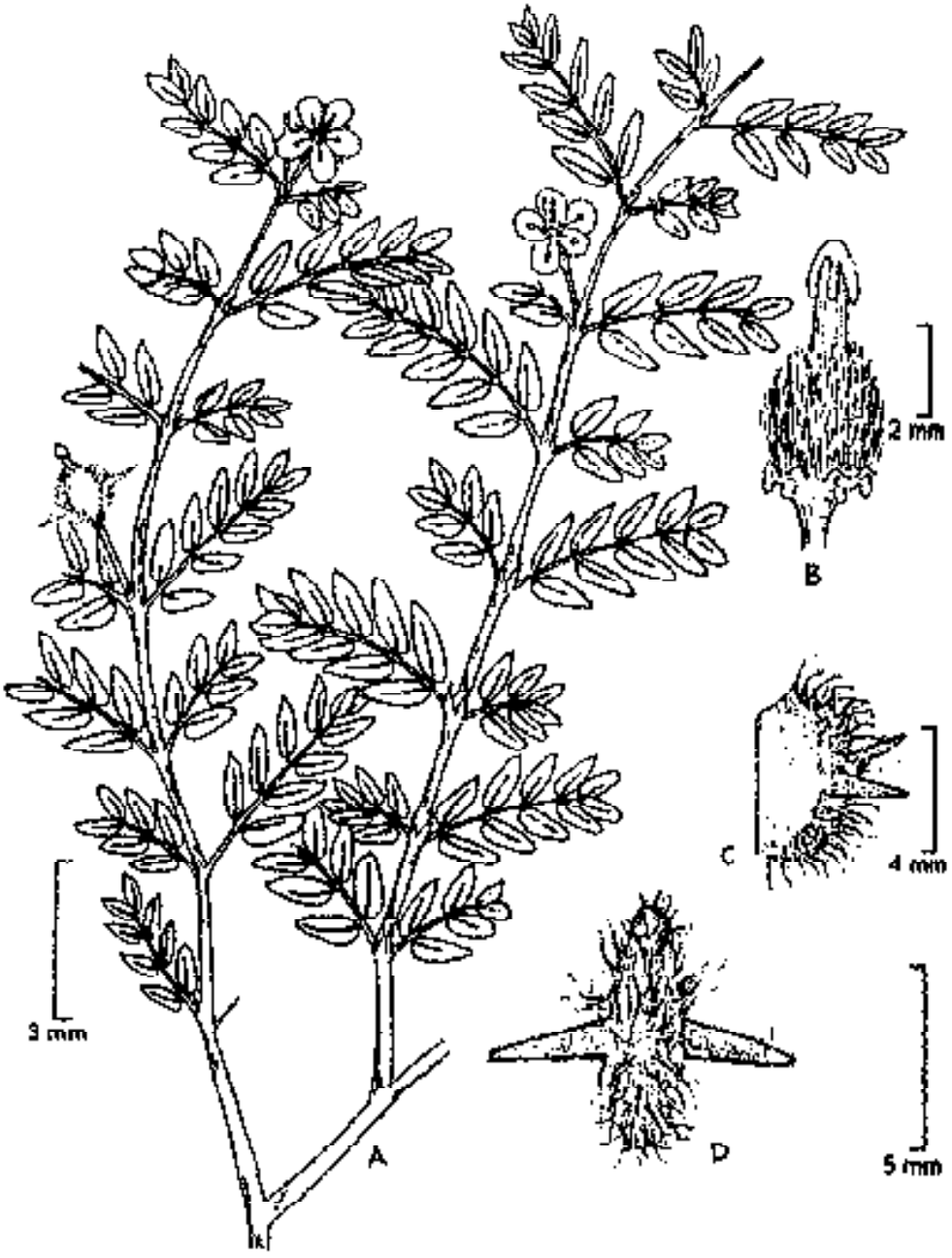
Annual, silky hairy herbs. Leaves 4–6 cm long; leaflets 6–10, 8–15 x 6–9 mm, elliptic to obovate, apiculate at apex, oblique at base, thinly to densely pubescent above, silky villous beneath. Flowers 1.0–1.5 cm across. Schizocarprs c. 1.5 cm across, mericarps c 10 x 6 mm, dorsally ridged, appressed silky hairy, greenish–yellow, spines 4 or sometimes lower pair reduced.

Fls. &Frts. : July–August.

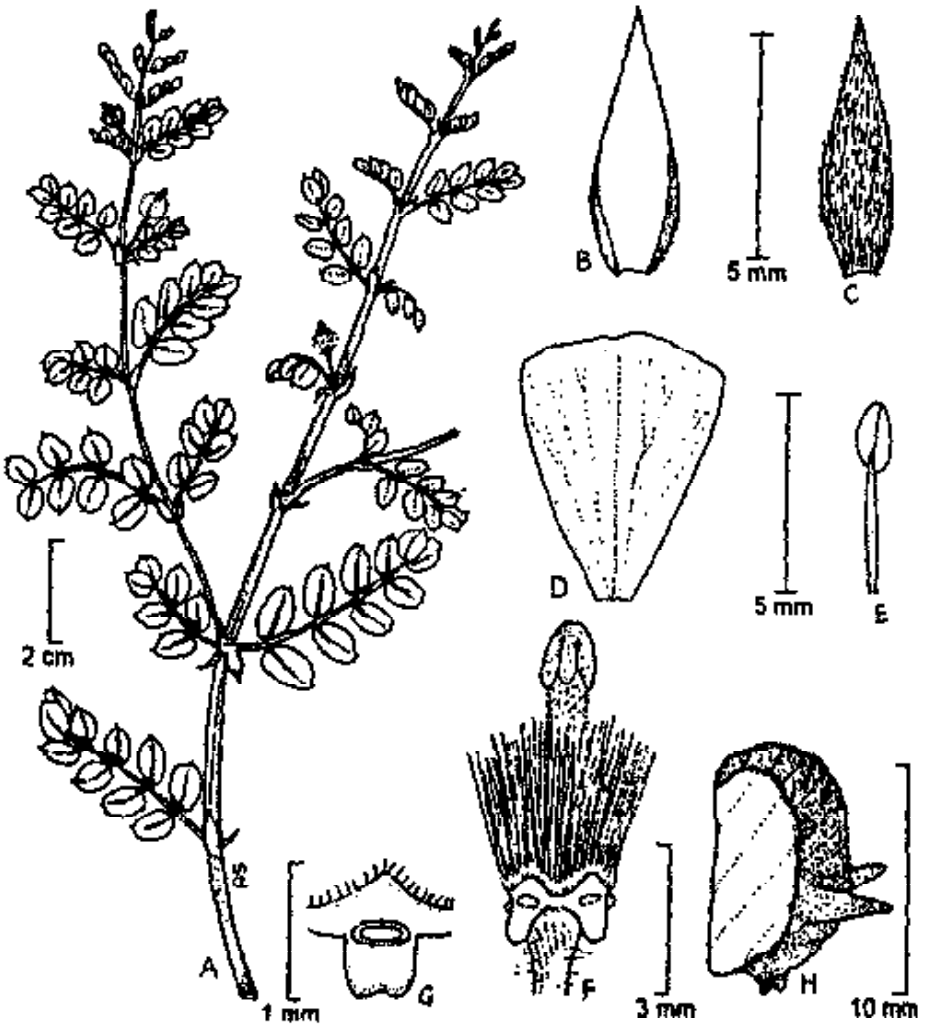
Illus. : P. Singh & V. Singh in Hajra et al. op. cit.

Distrib. : Rare. Pune (P. Singh, Giri & V. Singh, op. cit.).

T. terrestris L. Sp. Pl. 387. 1753; Edgew. & Hook. f. in Hook. f. Fl. Brit. 1: 423. 1874 p.p.; Cooke, Fl. Pres. Bombay 1: 170. 1958 (Repr.) p.p.; P. Singh & V. Singh in Nayar et al. Fasc. Fl. India 20: 191. 1990 & in Hajra et al. Fl. India 4 : 55. 1997. *'Gokhru', 'Sarata'.*



Tribulus rajasthanensis Bhandari & Sharma
A- Habit; B- Gynoecium; C- Mericarp - lateral view;
D- Mericarp - dosal view.



Tribulus subramanyemii P. Singh, Giri & Singh : A-Habit; B-Sepal - ventral surface; C-Sepal - dorsal surface; D-Petal; E-Stamen; F-Gynoecium; G-Intra and extra - staminal glands; H-Mericarp-side view.

Prostrate or suberect, silky–pubescent herbs. Leaves paripinnate; leaflets 4–8 pairs, 0.5–1.8 x 0.3–0.5 cm, elliptic–oblong, appressed hairy. Flowers yellow, solitary, axillary or leaf–opposed. Fruits glabrous. Seeds minute, oblong.

Fls. & Frts. : Almost throughout the year.

Illus. : Mahesh. Illus. Fl. Delhi f. 38. 1966; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 33. 1982.

Distrib. : As a weed in dry places and waste lands. Common throughout.

CULTIVATED SPECIES :

Quaiacum officinale L. Sp. Pl. 381. 1753; Blatt. & Mill. Beaut. Ind. Trees ed. 2. 90. 1954; P. Singh & V. Singh in Hajra et al. Fl. India 4: 59. 1997.

Evergreen trees. Branchlets terminated by pseudowhorls of blue flowers in umbellate cymes. Fruits fleshy.

Fls. & Frts. : March–September.

Illus. : Engl. in Engl. & Prantl, Natur. Pflanzenfam. 167, f. 77. 1931.

Distrib. : A native of S. America and West Indies. Planted in gardens as an ornamental. Bombay, Nagpur (Ugemuge, 1986), Pune.

GERANIACEAE

(M. J. Kothari)

1. Stamens 15; capsules obconical, long beaked, upto 6 cm ... MONSONIA
1. Stamens 5–10; capsules not as above ... GERANIUM

GERANIUM (Tourn.) L.

Geranium ocellatum Camb. in Jacq. Voy.Bot. 4 Inde. 33, t.38. 1844; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 433. 1874; Malhotra in Hajra et al. Fl. India 4 : 75, f. 25. 1997.

1. Leaf segments obovate ... var. *ocellatum*
1. Leaf segments orbicular–reniform ... var. *himalaicum*

var. **ocellatum.**

Herbs; stems prostrate to ascending, furrowed, mostly covered with spreading hairs or glands. Leaves 5–lobed, lobes 0.3–1.0 cm across, pubescent. Flowers purple–pink with dark–purple centre. Cocci with shallow, reticulate ridges.

Fls. & Frts. : September.

Illus. : Nasir in Nasir & Ali, Fasc. Fl. Pak. 149 : 6, f. 1 J–L. 1983; Malhotra in Hajra et al. op. cit.

Distrib. : In humid places, rare. Pune.

var. **himalaicum** Kunth in Engl. Pflanzenr. 35 (iv–129): 62. 1912; Sant. Fl. Purandhar 29. 1958.

Prostrate herbs; stem glandular pubescent. Basal leaves crowded, long petioled, upper ones in remote pairs, short petioled, palmately 5–7–fid or partite. Flowers red or reddish, with deep–purple centre. Mericarps transversely rugose, glandular–pubescent. Seeds smooth.

Fls. & Frts. : October–December.

Distrib. : In crevices of stone walls and humid places, occasional. Pune.

MONSONIA L.

Monsonia senegalensis Guill. & Perr. Fl. Seneg. Tent. 131. 1830; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 427. 1874; Cooke, Fl. Pres. Bombay 1: 175. 1958 (Repr.); Malhotra in Hajra et al. Fl. India 4 : 90, f. 32. 1997.

Erect or diffuse herbs, 7–30 cm high; branches viscidly glandular–pubescent. Leaves 1.4–3.0 x 1–2 cm, ovate, villous beneath, margins ciliate. Flowers pink on deflexed peduncles. Fruits hairy. Seeds 5, oblong, greenish–brown with 2 curved faces.

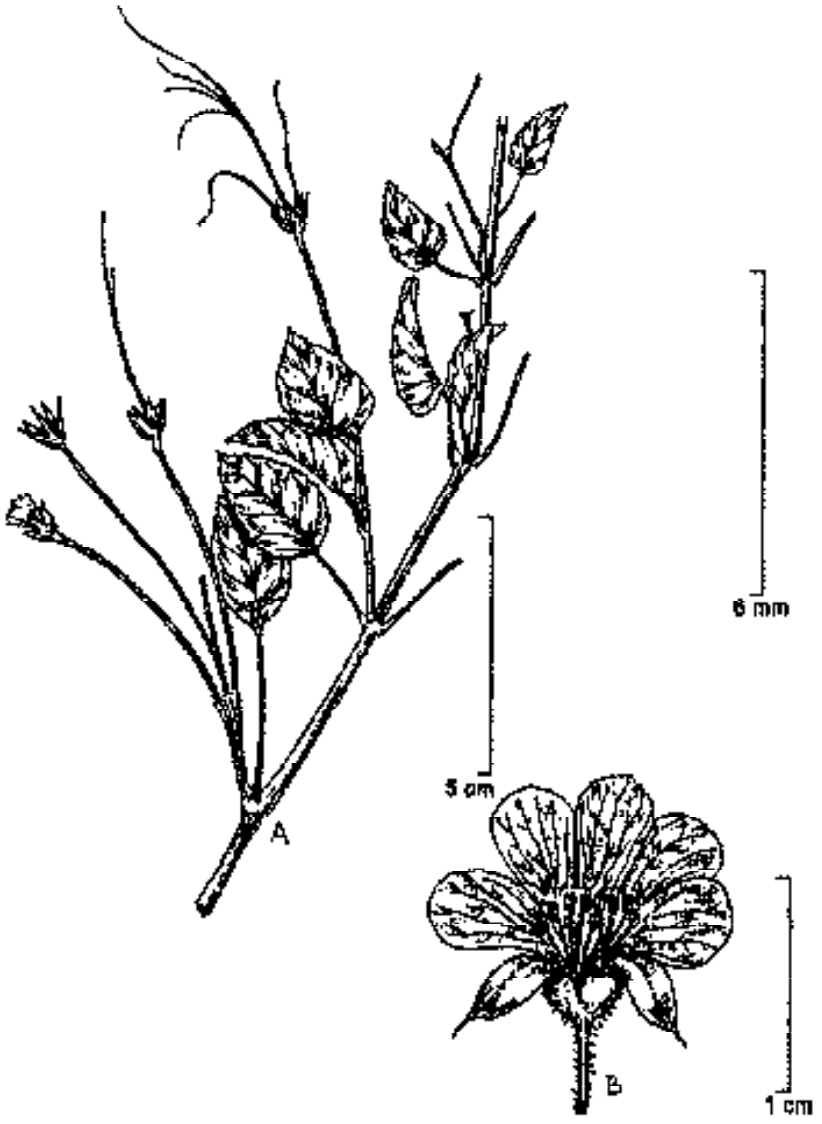
Fls. & Frts. : August–September.

Illus : Y. Nasir in E. Nasir & Ali, Fl. W. Pak. 149: 30, f. 7, F–I. 1983; Malhotra in Hajra et al. op. cit.

Distrib. : Rare, in dry places. Ahmednagar, Nasik, Pune.

CULTIVATED SPECIES :

Pelargonium inquinans (L.) Sol. in Ait. Hort. Kew. 2. 424. 1789; Almeida, Fl. Mah. 1: 178. 1996; Malhotra in Hajra et al. Fl. India 4 : 94. 1997. *Geranium inquinans* L. Sp. Pl. 676. 1753.



Monsonia senegalensis Guill. & Perr. : A-Habit; B-Flower.

Plants very velvetty and sometimes viscid. Leaves long–petioled, orbicular–reniform, crenate along margins. Calyx tube densely glanduler and viscid; petals scarlet, but also varying to lighter colours.

Fls. : December–February.

Distrib. : It is a Native of South Africa, cultivated in gardens for flowers (Almeida, op. cit.).

P. lateripes L. Herit. Geran. t. 24. 1792; Almeida, Fl. Mah. 1: 178. 1996; Malhotra in Hajra et al. Fl. India 4 : 94. 1997.

Leaves cordate.

Fls. : December–February.

Distrib. : It is a Native of South Africa, cultivated in gardens. (Almeida, op. cit.).

P. peltatum (L.) Sol. in Ait. Hort. Kew. 2. 427. 1789; Almeida, Fl. Mah. 1: 179. 1996; Malhotra in Hajra et al. Fl. India 4 : 94. 1997. *Geranium peltatum* L. Sp. Pl. 678. 1753.

A weak and straggling plant. Leaves thick and shiny, slightly peltate and prominently angled–lobed. Flowers 2–lipped, pink or reddish.

Fls. : December–February.

Distrib. : It is a Native of South Africa, cultivated in gardens (Almeida, 1996).

P. quercifolium (L.f.) Ait. Hort. Kew. 2. 422. 1789; Almeida, Fl. Mah. 1: 179. 1996; Malhotra in Hajra et al. Fl. India 4: 94. 1997. *Geranium quercifolium* L.f. Suppl. Pl. 306. 1782.

Shrubs; branches glandular hairy. Leaves cordate–ovate with 2–3 pairs of oblong side lobes. Flowers in umbels, red–purplish.

Fls. : December–February.

Distrib. : It is a native of South Africa. Cultivated in gardens (Almeida op. cit.).

P. radula (Cav.) L' Herit. Geran. t. 16, 1792; Almeida, Fl. Mah. 1: 179. 1996; Malhotra in Hajra et al. Fl. India 4 : 94. 1997. *Geranium radula* Cav. Diss. 4: 262. 1787.

Leaves deeply palmately lobed, hispid on outer surface, soft pubescent beneath. Flowers pale purple with dark streaks.

Fls. : December–February.

Distrib. : It is a native of South Africa. Cultivated in gardens (Almeida, op. cit.).

P. vitifolium (L.) Aiton, Hort. Kew. 2 : 425. 1789; Malhotra in Hajra et al. Fl. India 4 : 94. 1997; Naik, Fl. Marathwada 1 : 183. 1998. *Geranium vitifolum* L. Sp. Pl. 678. 1753.

Herbs, 30–90 cm high; stem woody, young parts grey–pubescent. Leaves cordate–ovate to nearly reniform, crenate–dentate along margins. Flowers red-pink, many, in umbels. Capsules oblong, 5–valaved.

Fls. & Frts. : September–December.

Distrib. : A native of tropical Africa, grown as pot herb (Naik, op. cit.).

P. zonale L. Herit ex Soland. in Ait. Hort. Kew. ed. 1, 2: 424. 1789; Bailey, Man. Cult. Pl. 597. 1949; Malhotra in Hajra et al. Fl. India 4 : 94. 1997.

Showy herbs, sparsely branched. Leaves alternate, roundish–cordate, lobed. flowers pink to deep red in umbellate cyme. Fruits beaked.

Fls. & Frts. : April–May.

Distrib. : Native of South Africa. Planted in gardens. Pune.

AVERRHOACEAE

(B. G. Kulkarni)

CULTIVATED SPECIES :

Averrhoa bilimbii L. Sp. Pl. 428. 1753; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 439. 1874; Cooke, Fl. Pres. Bombay 1: 178. 1958 (Repr.). *'Bilimbi'.*

Small trees, 5–8 m tall. Leaves odd pinnate; leaflets 5–21 pairs, oblong or elliptic–oblong, 3–5 x 2 cm, base rounded, apex acuminate. Flowers on old trunk and branches in panicles. Fruits oblong, obtusely 5–angled, edible.

Fls. & Frts. : February–May.

Illus. : Bedd. Fl. Sylv. S. India t. 117. 1871.

Distrib. : Native of Tropical America. Planted in gardens as an ornamental tree. Bombay, Sindhudurg.

A. carambola L. Sp. Pl. 428. 1753; Edgew. & Hook. f. Hook. f. Fl. Brit. India 1: 439. 1874; Cooke, Fl. Pres. Bombay 1: 178. 1958 (Repr.). *'Kamaranga'*.

Small trees, 6–8 m tall; branches pendulous. Leaves odd pinnate; leaflets ovate–lanceolate, 3–8 x 1.5–2.4 cm, glabrous or puberulous above, glaucous beneath, obliquely acute at base, acuminate at apex. Flowers usually in axillary racemes. Fruits oblong, yellowish, acutely angled, edible.

Fls. & Frts. : March–August.

Distrib. : Planted in gardens for edible fruits. Bombay, Kolhapur, Nagpur, Pune, Sindhudurg, Thane.

OXALIDACEAE

(B. G. Kulkarni)

1.	Leaves palmately compound, 3–foliolate	...	OXALIS
1.	Leaves pinnately compound, more than 3–foliolate	...	BIOPHYTUM

BIOPHYTUM DC.

1.	Sepals exceeding capsules :		
2.	Seeds tubercled	...	*B. candolleanum*
2.	Seeds ridged	...	*B. sensitivum*
1.	Sepals not exceeding capsules :		
3.	Stems woody at base; seeds striate	...	*B. helenae*
3.	Stems herbaceous; seeds tubercled	...	*B. reinwardtii*

Biophytum candolleanum Wight, Illus. Ind. Bot. 1: 161, t. 62. 1840; Matthew, Fl. Tamilnadu Carnatic 1: 188. 1983. *B. sensitivum* var. *candolleanum* (Wight) Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 437. 1874.

Erect, annual herbs, 5–20 cm tall. Leaves variable in length, upto 8 cm long; leaflets 1.2 x 0.8 cm, oblong–obovate, membranous, hairy or glabrous, glaucous beneath, apex apendiculate, base obtuse or rounded. Umbels 3 –10; pedundes 3–12 cm long, filiform. Flowers 0.4–0.6 cm across; sepals lanceolate; petals oblanceolate. Capsules ovoid, hairy on angles. Seeds ovoid, brown.

Fls. & Frts. : August–October.

Illus. : Wight, *op. cit;* Ramam. in Sald. & Nicols. Fl. Hassan Dt. 398, f. 77A. 1976.

Distrib. : Frequent in moist, open situations and in cultivated fields in the state.

B. helenae Busc. & Muschl. in Bot. Jahrb. 49: 475. 1913; Veldk. in Blumea 16: 138. 1968; Naik in Proc. Acad. Sci. (sect. B.) 71: 226. 1970. *B. sensitivum* auct. non (L.) DC. 1824; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 436. 1874 p.p.

Annuals, erect, 3–20 cm tall. Leaves abruptly pinnate, 2–8 cm long; leaflets 6–15 pairs, 0.3–1.0 x 0.2–0.5 cm, elliptic to obovate, subsessile. Flowers in terminal umbels; peduncles slender; sepals 0.3–0.4 cm long ; petals yellow to orange–yellow, much exceeding sepals. Capsules 0.3–0.4 cm long, ellipsoid, apiculate. Seeds fusiform, brown.

Fls. & Frts. : August–February.

Distrib. : Weed in cultivated fields and wet places. Osmanabad (Naik, op. cit.).

B. reinwardtii (Zucc.) Klotz. in Peters, Reise Mossamb. Bot. 1: 85. 1862; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 437. 1874; Blatt. in J. Bombay nat. Hist. Soc. 34: 899. 1931; Naik, Fl. Marathwada 1 : 184. 1998. *Oxalis reinwardtii* Zucc. in Munch. in Abhand 1: 274. 1848.

Annual herbs, 6–12 cm tall; stems c 8 cm high, simple, appressed–scattered hairy. Leaves 5–7 cm long ; leaflets 14–20 pairs; largest leaflet 0.8–0.9 x 0.2– 0.3 cm, elongate–triangular. Peduncles densely puberulous, 2–7 cm long, 3–7–flowered. Flowers yellow; sepals pubescent or glabrescent; petals cuneate, thrice as long as sepals. Capsules glabrous. Seeds cristate.

Fls. & Frts. : August–December.

Distrib. : Frequent weed of wet fields and in open grass lands. Bombay (Blatter, op. cit.), Chandrapur, Ratnagiri and in all dstricts of Marathwada (Naik, op. cit.).

B. sensitivum (L.) DC. Prodr. 1: 690. 1824; Edgew. & Hook. f. in Hook. f. Fl. Brit. India 1: 436. 1874 p.p; Cooke, Fl. Pres. Bombay. 1: 177. 1958 (Repr.) *Oxalis sensitiva* L. Sp. Pl. 434. 1753.

Herbs, annual; stems unbranched, up to 20 cm tall. Leaves 4–6 cm long; leaflets 5–14 pairs, 0.3–1.2 x 0.1–0.4 cm, oblong, oblique, punctate on upper surface. Flowers in terminal umbels, peduncles upto 10 cm long ; sepals sometimes glandular–pubescent; petals oblong–obovate, yellow. Capsules 0.2–0.3 cm long, ellipsoid, covered with persistent calyx. Seeds ovoid, brown.

Fls. & Frts. : August–April.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 96. 1982.

Distrib : Common throughout as a weed in cultivated fields in wet places.

OXALIS L.

1. Stems elongated, rhizomatous or creeping; leaves radical :
   2. Stems rhizomatous, scaly; flowers white or pink, 10–14 mm long; seeds longitudinally ribbed ... *O. acetocella*
   2. Stems creeping, not scaly; flowers yellow, 6–7 mm long; seeds transversely ribbed ... *O. corniculata*
1. Stems reduced, not as above; leaves basal :
   3. Leaflets 4 ... *O. deppei*
   3. Leaflets 3 :
      4. Pedicels, sepals and styles glabrous ... *O. dehradunensis*
      4. Pedicels, sepals and styles hairy ... *O. debilis* var. *corymbosa*

Oxalis acetocella L. Sp. Pl. 433. 1753; Edgew. & Hook. f. in Hook. f. Fl. Brit. India, 1: 436. 1874; Almeida, Fl. Mah. 1: 172. 1996. *O. repens* Thunb. ex Wight, Ic. t. 18. 1838; Edgew. & Hook. f. in Hook. f. op. cit.

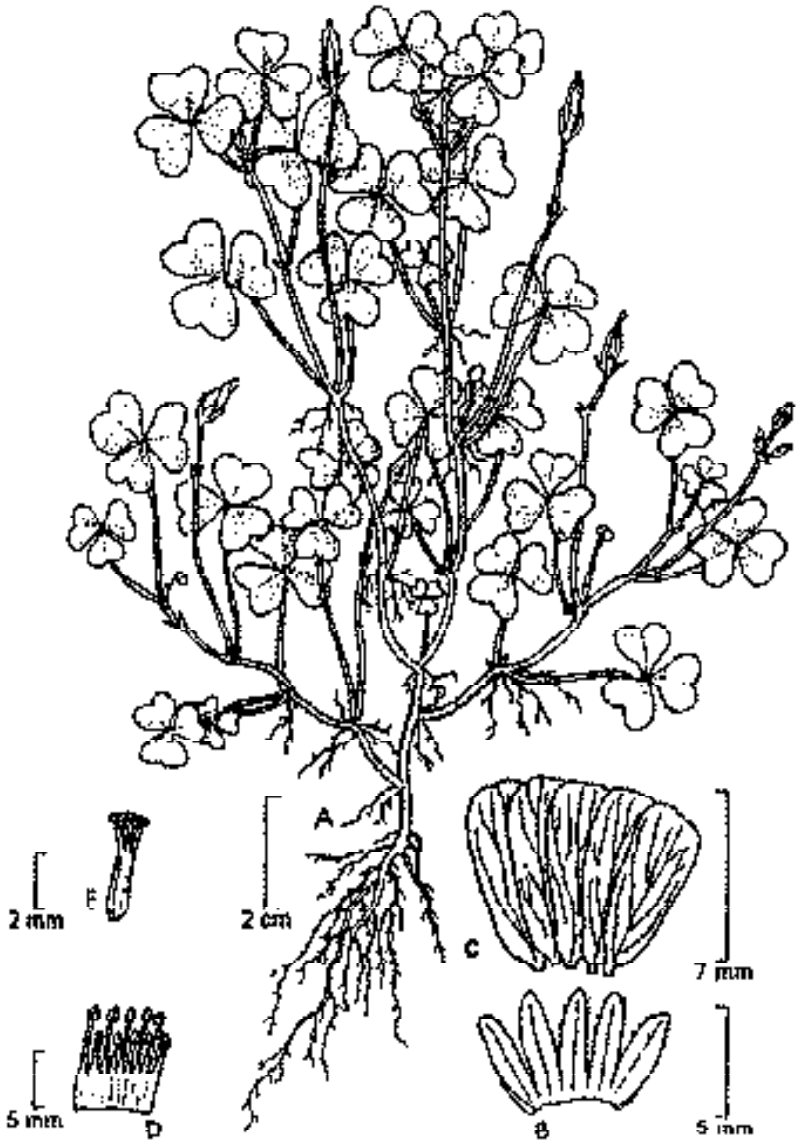
Perennial herbs. Leaflets 3, obocordate. Flowers white, with purple or rose–purple veins.

Fls. : April–May.

Distrib. : Satara (Almeida, op. cit.).

O. corniculata L. Sp. Pl. 435. 1753; Edgew. & Hook. f. in Hook f. Fl. Brit. India 1: 436. 1874; Cooke, Fl. Pres. Bombay 1: 177. 1958 (Repr.).

1. Sepals appressed–pubescent outside; capsules tomentose ... var. *corniculata*
1. Sepals appressed–hirsute; capsules hispid ... var. *hispida*



Oxalis corniculata L. : A-Habit; B-Calyx; C-Corolla; D-Androecium; E-Gynoecium

var. **corniculata.** *'Ambusi', Ambuti', 'Tipani'.*

Perennial, hairy herbs. Leaflets 1–2 x 1.2–2.5 cm, obcordate, membranous, sessile or subsessile. Umbels 2–4–flowered on axillary peduncles. Flowers yellow; sepals appressed–pubescent outside; petals as long as sepals, oblong. Capsules oblong, 1.0–1.8 cm long, narrowed at apex, 5–angled and beaked. Seeds ovoid, transversely striate.

Fls. & Frts. : Almost throughout the year.

Illus. : Wight, Ic. t. 18. 1838; Mahesh. Illus. Fl. Delhi 41. 1966; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 97. 1982.

Distrib. : Occurring as weed in gardens and on wet soil of waste places. Common throughout.

var. **hispida** Blatt. in J. Bombay nat. Hist. Soc. 34: 898. 1931; Almeida, Fl. Mah. 1: 173. 1986.

Fls. & Frts. : August–October.

Distrib. : Occurs 'along ghats'. Satara & Sindhudurg (Almeida, op. cit.).

O. debilis H.B. & K. var. **corymbosa** (DC.) Lourt. in Ann. Miss. Bot. Gard. 67: 840. 1980. *O. corymbosa* DC. Prodr. 1: 696. 1824. *O. martiana* Zucc. in Denkschr. Akad. Muench. 9: 144, n. 6. 1824 & in Abn. Akad. Muench. 1: 203, 1830; Almeida, Fl. Mah. 1: 174. 1996.

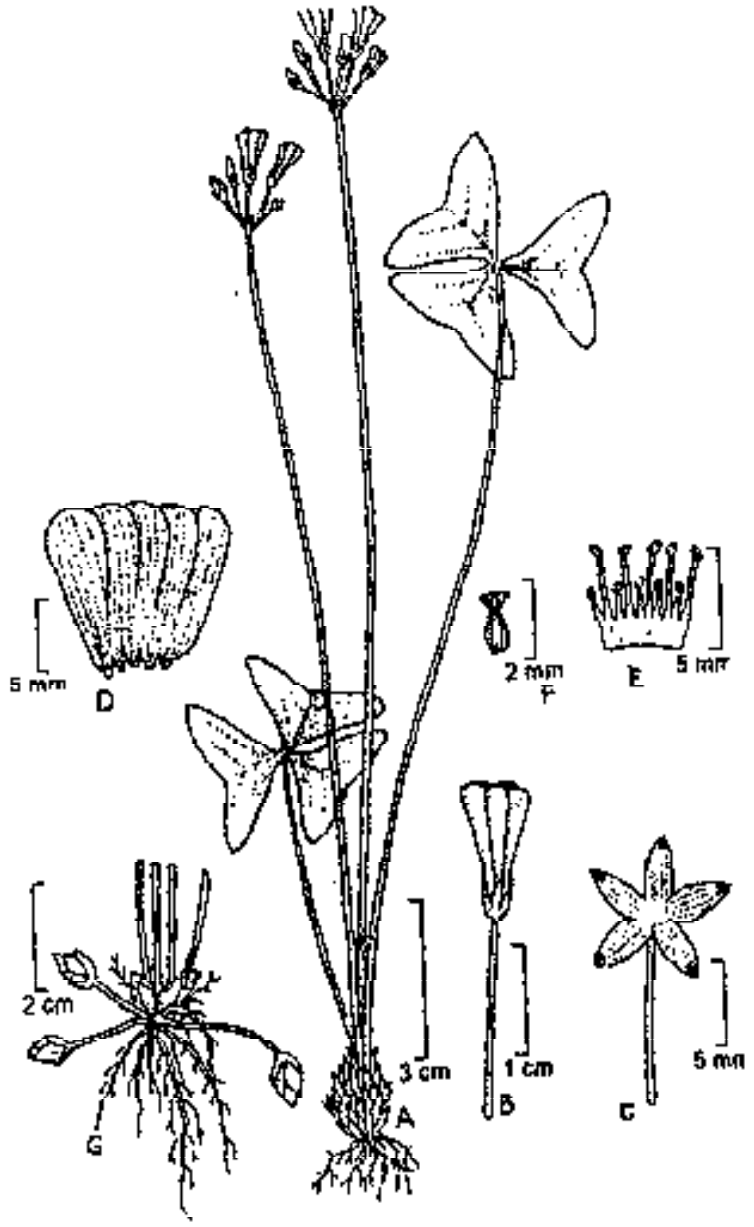
Bulbous, annual herbs, upto 20 cm tall; bulbs glabrous, 0.3–0.8 cm across, covered with scales. Leaflets broadly obcordate, 1.5–2.0 x 1.7–2.5 cm, apex deeply notched, base cuneate. Umbels 2–many flowered, 6–7 umbels on 10–30 cm long scapes. Flowers violet with dark purplish streaks; sepals elliptic, margins hyaline and with 2 orange glands at base; petals oblique. Capsules ovoid, 0.6 cm long.

Fls. & Frts. : December–May.

Distrib. : A native of Tropical America, growing as weed in gardens. Aurangabad, Nagpur, Nanded, Satara.

O. dehradunensis Raiz. Suppl. Duthie's Fl. Upp. Gang. Plain 37. 1976. *O. latifolia* auct. pl. non H.B. & K. 1821; Blatt. in J. Bombay nat. Hist. Soc. 34: 898. 1931. *O. richardiana* Babu, Herb. Fl. Dehra Dun 104. 1977. *O. latifolia* H. B. & K. Nov. Gen. et Sp. 184, t. 467. 1821; Blatt. in J. Bombay nat. Hist. Soc. 34: 898. 1931.

Annual herbs, upto 20 cm tall, root stock bulbous; bulbs conical with few scales. Leaflets 1.5 x 2.5 cm, broadly deltoid, subsessile.



Oxalis debradunensis Raiz. : A-Habit; B-Flower; C-Calyx; D-Corolla; E-Androecium; F-Gynoecium; G-Bulbils

Umbels 9–12–flowered, on 10–25 cm long scapes. Flowers pink to violet; sepals lanceolate, margins hyaline and glandular; petals oblanceolate. Capsules ovoid–cylindrical.

Fls. & Frts. : May–November.

Distrib. : Weed in gardens. Aurangabad, Pune, Satara.

O. deppei Lodd. Bot. Cab. 15: t. 1500. 1828; Matthew in Rec. Bot. Surv. India 20: 56. 1969. *O. tetraphyla* Cav. Ic. 3: 19, t. 237. 1794; Blatt. in J. Bombay nat. Hist. Soc. 34: 898. 1931.

Herbs, c 30 cm high; bulbs spherical, 1.5–3.0 cm in diam., covered with scales. Leaves 3–6; leaflets 3.5 cm as long as broad, obtriangular, membranous, apex retuse, base cuneate. Umbels 5–12–flowered on 20–35 cm long peduncles. Flowers 2.0–2.5 cm across; sepals with 2 red dots at apex; petals 4–5 times longer than sepals. Capsules oblong, beaked.

Fls. & Frts. : May–August.

Distrib. : This is a native of Mexico, naturalized in wet places. Satara (Blatt., op. cit.).

CULTIVATED SPECIES:

Oxalis rosea Jacq. Oxalid. 25. 1794; Almeida, Fl. Mah. 1: 174. 1996.

Tall, perennial herbs, erect; root stock thick. Leaflets 3, obcordate. Flowers pink or rose coloured with darker veins, arranged in compound umbels above foliage.

Fls. : December–January.

Distrib. : Cultivated in gardens (Almeida, op. cit.).

O. variabilis var. **rubra** Jacq. Oxal. 90, t. 53. 1794; Matthew in Rec. Bot. Surv. India 10(1): 55. 1969. *O. rubra* St. Hil. Bras. Mer. 1: 124. 1825; Sharma et al. Fl. Karnataka–Anal. 36. 1984.

Annual herbs, bulbous, upto 8 cm tall; bulbs 1.4 x 1 cm, tapering, covered by few scales. Leaves 8–12, radical, 3–foliolate; petioles reddish, upto 9 cm long, base sheathing; leaflets obcordate, 2 x 2 cm, laterals smaller than the middle one. Flowers solitary, red, 3 cm across, terminal on scapes upto 10 cm long; sepals yellowish–green; petals obovate. Fruits ovoid–cylindrical capsules.

Fls. & Frts. : August–February.

BALSAMINACEAE

(S. K. Mudaliar & V.P. Prasad)

IMPATIENS L.

1. Perennials; leaves radical:
   2. Spur longer than flower :
      3. Wings 2-lobed ... *I. scaulis*
      3. Wings 3-lobed ... *I. scapiflora*
   2. Spur shorter than flower or absent :
      4. Spur clavate, obtuse ... *I. clavicornu*
      4. Spur absent ... *I. crenata*
1. Annuals; leaves cauline :
   5. Herbs rooting at nodes :
      6. Spur filiform, ascending, inflated if thicker ... *I. diversifolia*
      6. Spur not filiform, incurved, never inflated ... *I. chinensis*
   5. Herbs not rooting at nodes :
      7. Flowers yellow ... *I. dalzellii*
      7. Flowers pink, purple or white :
         8. Herbs pubescent, tomentose or rufous hairy :
            9. Flowers fascicled ... *I. scabriuscula*
            9. Flowers solitary ... *I. tomentosa*
         8. Herbs glabrous :
            10. Leaves opposite :
               11. Wings clawed or stipitate, almost entire :
                  12. Wings pink with a streak of purple on inner side; line of pubescence on pedicel present ... *I. kleiniformis*
                  12. Wings pink; line of pubescence on pedicel absent ... *I. minor*
               11. Wings not as above :
                  13. Lip conical ... *I. oppositifolia*
                  13. Lip not conical :
                     14. Lip cymbiform; nodes swollen ... *I. lawii*
                     14. Lip sulcate; nodes not swollen :
                        15. Lip scapiform or cymbiform ... *I. pusilla*
                        15. Lip saccate ... *I. inconspicua*

10. Leaves alternate or whorled at ends of branches :

16. Leaves alternate :

17. Flowers large, 3–4 cm across ... *I. pulcherrima*

17. Flowers less than 2.5 cm across ... *I. balsamina*

16. Leaves whorled at end of branches :

18. Herbs robust, branched ... *I. latifolia*

18. Herbs flaccid, not branched ... *I. lucida*

Impatiens acaulis Arn. in Hook. Comp. Bot. Mag. 1:325. 1835; Hook. f. Fl. Brit. India. 1: 443. 1874. Cooke, Fl. Pres. Bombay 1: 180. 1958 (Repr.); Blatt. in J. Bombay nat. Hist. Soc. 36: 309. 1933.

Scapigerous herbs with tuberous root stocks, 15–30 cm high. Leaves radical, variable, 8–13 x 3–7 cm, ovate, obovate, oblong or rotundiform, base rounded, truncate or subacute; petioles c 8 cm long. Scapes 8–26 cm long. Flowers purplish–pink, c 3 cm across; spur 6.5 cm long. Capsules 1.2 x 0.4 cm long, ovoid.

Fls. & Frts. : July–September.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 99 & 964 c. 1982.

Distrib. : Common on damp rocks near waterfalls along ghats. Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Sindhudurg.

I. balsamina L. Sp. Pl. 938. 1753; Hook. f. Fl. Brit. India 1: 453. 1874; Cooke, Fl. Pres. Bombay 1: 184. 1958 (Repr.).

1. Leaves 2.3–5.0 cm long :

2. Leaves ovate or ovate–lanceolate; flowers large ... var. *macrantha*

2. Leaves ovate, obtuse, thick; flowers small ... var. *agrestis*

1. Leaves 7.5–20.0 cm long :

3. Flowers in axillary, corymbose racemes ... var. *corymbosa*

3. Flowers not as above :

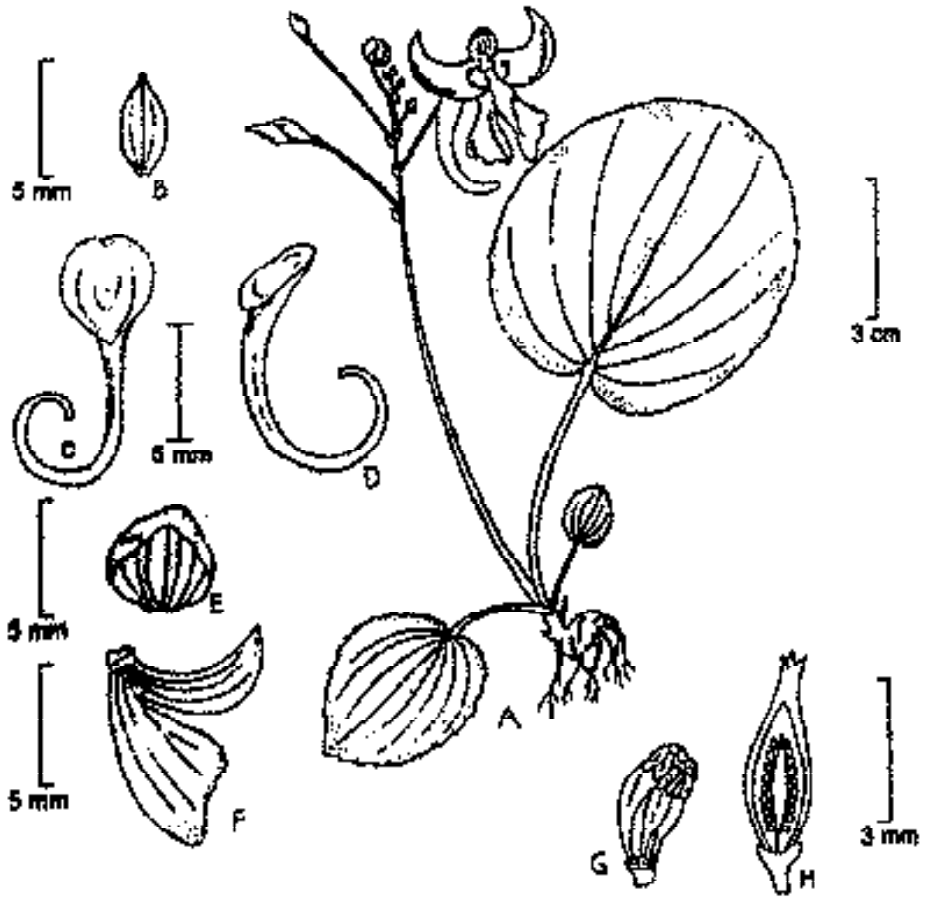
4. Leaves elliptic–lanceolate; spur short,stout, incurved ... var. *rosea*

4. Leaves elliptic–lanceolate; spur long and slender :

5. Flowers pink ... var. *balsamina*

5. Flowers bright scarlet or reddish–purple ... var. *coccinea*

var. **agrestis** Hook. f. in Rec. Bot. Surv. India 4: 50. 1906; Blatt. in J. Bombay nat. Hist. Soc. 36: 314. 1933.



Impatiens acaulis Arn. : A-Habit; B-Lateral sepal; C & D - Lip - front & side veiw; E-Standard; F-Wing petal; G-Stamens; H-L.s. of ovary

Stem stout, much branched, leafy. Leaves subsessile, ovate, obtuse, thick. Sepals minute, obtuse; standard petal orbicular; spurs stout, incurved; pedicels short.

Fls. & Frts. : July–October.

Distrib. : Occurs in ploughed fields. Satara.

var. **balsamina.** *'Terda'*.

Branched succulent herbs, 30–60 cm high; nodes, internodes, petioles and pedicels reddish. Leaves 10.0–13.0 x 1.5–2.5 cm, ellipitic–lanceolate, with serrate margins, scattered hairy above, glabrous beneath except on nerves, decurrent into a glandular petiole. Flowers pink, spur 3.0–4.0 cm long; pedicels slender, c 1.5 cm long; sepals ovate, minute; petals orbicular, retuse, horned. Capsules 1.5–1.7 cm long, ellipsoid, densely silky–hairy. Seeds black, shining.

Fls. & Frts. : July–September.

Distrib. : Common in open situations in plains.

var. **coccinea** Hook. f. Fl. Brit. India 1: 454. 1874; Cooke, Fl. Pres. Bombay. 1: 185. 1958 (Repr.).

Simple or sparingly branched, erect herbs, 30–60 cm high. Leaves 2.5–16.0 x 1–3 cm, margins serrate. Flowers 2.0–2.5 cm across, axillary, solitary or 2–6–fascicled, light to deep purple or bright reddish–purple. Capsules 0.5–1.2 cm long, ellipsoid or ovoid, apiculate, tomentose.

Fls. & Frts. : July–October.

Distrib. : In moist soils of plains and ghats. Ahmednagar, Nasik, Pune, Raigad, Thane.

var. **corymbosa** Sant. in Kew Bull. 1948 : 489. 1949 & in Rec. Bot. Surv. India 16 (1) : 31. 1967 (3rd Rev. ed.).

Herbs. Flowers small, axillary; rachis 1.3 cm long, bearing 3–5 flowers; bracts (of each pedicel) 0.11 cm long, acute, pubescent.

Fls. & Frts. : July–September.

Distrib : Occurs on Plateaus. Nasik, Pune (Sant. op. cit.).

var. **macrantha** Hook. f. Fl. Brit. India 1: 454. 1874; Almeida, Fl. Mah. 1: 190. 1996.



Impatiens balsamina L. var. **balsamina**

Small herbs, up to 10 cm high. Leaves ovate or ovate–lanceolate. Flowers large; spur short.

Fls. : November.

Distrib. : Bombay & Thane (Almeida, op. cit.).

var. **rosea** (Lindl.) Hook. f. Fl. Brit. India 1: 454. 1874; Blatt. in J. Bombay nat. Hist. Soc. 36: 314. 1933. *I. rosea* Lindl. Bot. Reg. t. 27. 1841. *I. balsamina* var. *brevicalcarata* T. Cooke, Fl. Pres. Bombay 1: 174. 1901 [1: 185. 1958 (Repr.)]. *'Ran–tirda'*.

Herbs, up to 35 cm high. Leaves 7.5 –15.0 cm long, narrowly lanceolate. Flowers c 1.5 cm across; standard petal winged at back, horned at apex; pedicels 2–3–nate. Capsules c 1.0 x 0.5 cm, ellipsoid. Seeds few, glabrous, granular.

Fls. & Frts. : August–October.

Illus. : Deshpande et al. Fl. of Mahabaleshwar 1: 115, f. 5. 1993.

Distrib. : Common in moist soil on plains and Ghats.

I. chinensis L. Sp. Pl. 937, 1753; Hook. f. Fl. Brit. India 1: 444. 1874; Cooke, Fl. Pres. Bombay 1: 181. 1958 (Repr.).

1. Stem stiff, usually simple; leaves coriaceous, serrate ... var. *chinensis*

1. Stem slender, simple or sparingly branched; leaves sub – membranaceous, entire or subserrate ... var. *rupicola*

var. **chinensis.**

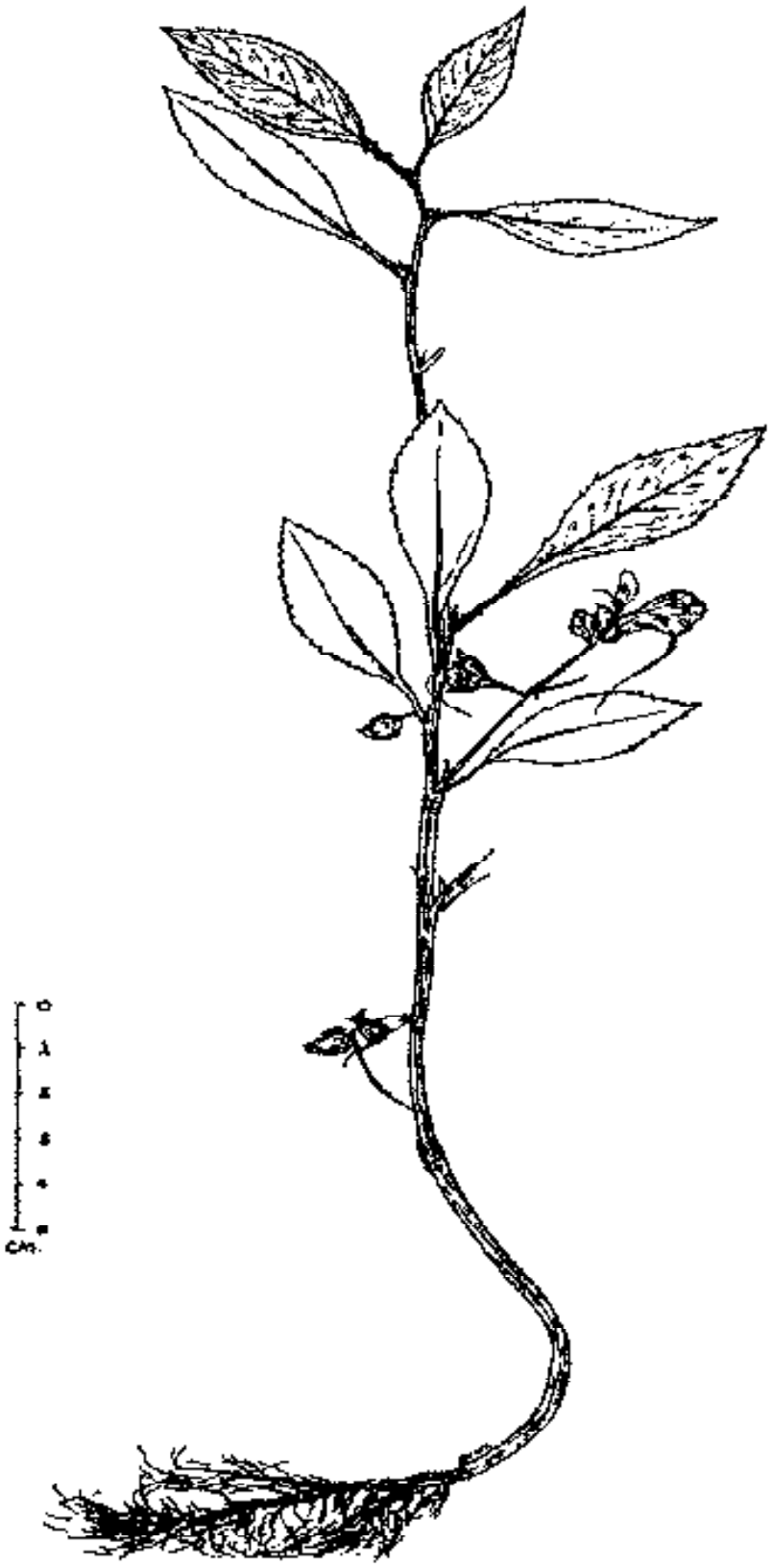
Procumbent, reddish, annual, 10–50 cm high, angled and rooting at nodes. Leaves 2.5–5.5 x 0.5 –1.0 cm, decussate, lanceolate, upper surface hairy, serratures bristle–like, nerves reddish. Flowers pinkish–purple, pink or white, axillary, in clusters of 2 or 3, rarely solitary, 3.5 cm across; spur equalling pedical which equal leaves, 4.5 cm long. Capsules ellipsoid, turgid in middle, attenuate at both ends, 1.5 x 0.8 cm.

Fls. & Frts. : August–November.

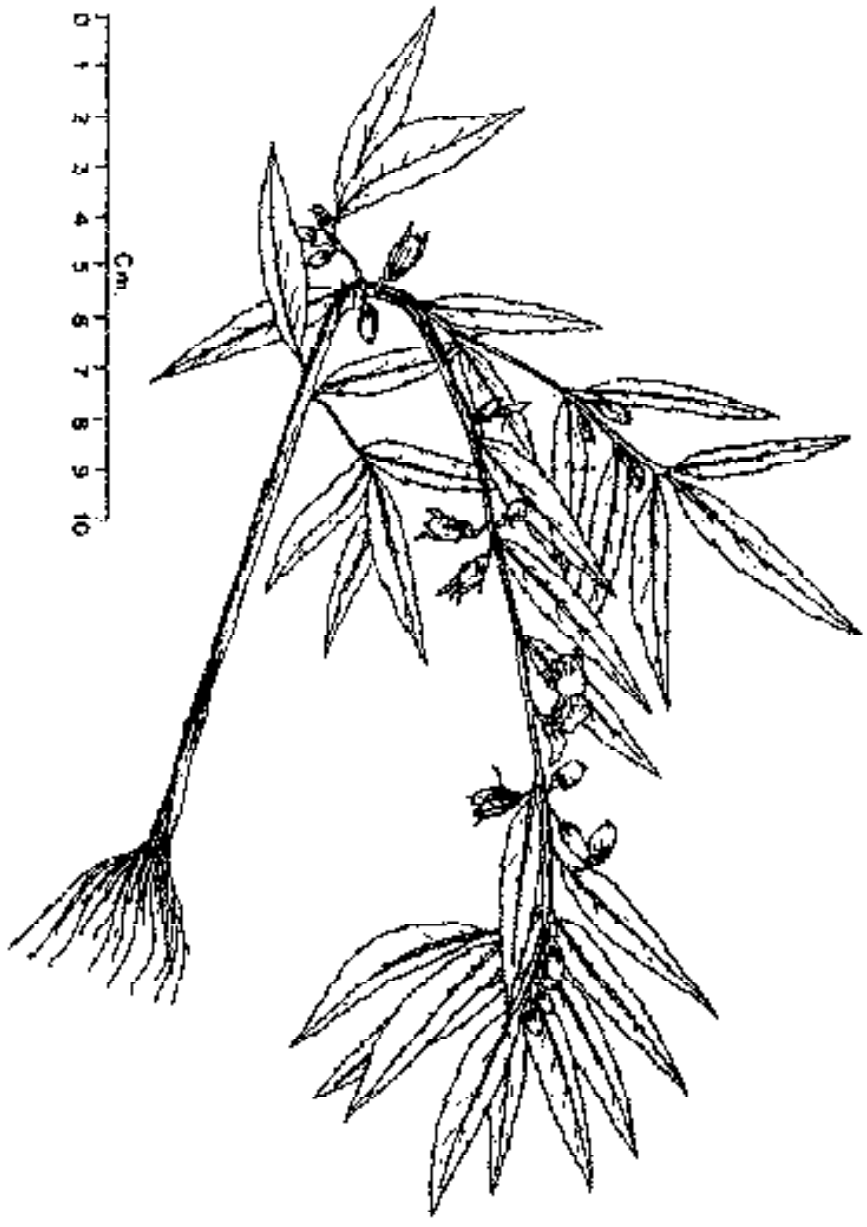
Illus. : Wight, Ic. t. 748. 1844. (*I. fasciculata* Lam. Encycl. 1: 363. 1785).

Distrib. : Along the ghats in wet places. 'Konkan' (Cooke, op. cit.). Rare. Recent collection is from Sawantwadi in Sindhudurg.

var. **rupicola** (Hook. f.) Bhaskar in Indian J. Forestry 1: 72. 1978; Almeida, Fl. Mah. 1: 190. 1996. *I. rupicola* Hook. f. in Kew Bull. 1910: 292. 1910.



Impatiens balsamina var. **coccinea** Hook. f.



Impatiens balsamina var. **rosea** (Lindl.) Hook. f.

Herbs 30–40 cm high, erect. Leaves sessile or shortly petiolate, oblong, obovate–oblong or linear, acute at apex, rounded, cordate or acute at base. Flowers rose or rose–purple, 1.5–2.0 cm across. Capsules ellipsoid, 1.2–1.5 cm long, many–seeded. Seeds orbicular, c 2 mm across, smooth, black or chestnut brown, shining.

Fls. & Frts. : September–November.

Distrib. : Pune & Sindhudurg (Almeida, op. cit.).

I. clavicornu Turcz. in Bull. Soc. Imp. Natur. Moscou 32(1): 271. 1859; Vajravelu in N. C. Nair et al. Fl. Tamilnadu Anal. 1: 52. 1983. *I. beddomei* Hook. f. Fl. Brit. India 1: 442. 1874; Cooke, Fl. Pres. Bombay 1: 180 1958 (Repr.). *I. scapiflora* Wight & Arn. Prodr. 137. 1834 p.p.

Scapigerous herbs with tuberous root stock, c 30 cm high. Leaves radical, deeply sinuate–cordate, fleshy, 3.8–7.6 cm across, orbicular, margins toothed; teeth far apart; nerves flabellate lower suirface pale. Flowers white with yellow patches on the wings, 1.2 cm across; spurs curved. Capsules ellipsoid, 0.9 cm long, covered with spiral hairs. Seeds minute, granular.

Fls. & Frts. : July–November.

Illus. : Wight, Ic. t. 967. 1845 (*I. scapiflora*).

Distrib. : Found along the ghats. 'Konkan' (Cooke, op. cit.).

I. crenata Bedd. in Madras J. Sci. Ser. 2, 4: 69, t. 7, f. 10. 1859; Ramachand. & Nair, Fl. Cannanore 78. 1988. *I. stocksii* Hook. f. & Thoms. in J. Linn. Soc. 4: 119. 1860; Hook. f. Fl. Brit. India 1: 442. 1874; Cooke, Fl. Pres. Bombay 1: 180. 1958 (Repr.).

Perennial herbs with tuberous rootstock, 2.5–12.5 cm high. Leaves orbicular–oblong or broadly ovate, nerves flabellate, crenate, usually with a small tooth between the crenatures, 1.2–5.0 cm across; petiole equal to or shorter than blade, 1.2–3.7 cm long. Flowers blue inside, c 2 cm across, 3–6–together on a raceme, 2.5 3.7 cm long; pedicels stout, up to 11.2 cm long. Capsules 0.6–11.2 cm long, ellipsoid, turgid, acute. Seeds minute, linear–oblong.

Fls. & Frts. : August.

Illus. : Bedd. op. cit.

Distrib. : Rare. 'Konkan' (Cooke, op. cit.).

I. dalzellii Hook. f. & Thoms. in J. Linn. Soc. 4: 123. 1860; Hook. f. Fl. Brit. India 1: 449. 1874; Cooke, Fl. Pres. Bombay 1: 183. 1958 (Repr.).

Succulent, annual, reddish, herbs, 20–60 cm high. Leaves 3–8 x 1.0–2.0 cm, opposite, sessile or subsessile, ovate, lanceolate, hairy on nerves above, glabrous and pale beneath, cordate or subcordate or acute at base. Flowers 0.9 cm across, in fascicles (upto 6 in each fascicle); spurs minute 0.4 cm long, tinged with red. Capsules 1.0 x 0.7 cm, 5–ribbed, ribs wavy. Seeds black polished, oblong.

Fls. & Frts. : August–October.

Distrib. : Occurs in rocky crevices along slopes of ghats. Ahmednagar, Nasik, Raigad, Pune, Satara.

Note : Juice of leaves used as eye drops for cooling effect.

I. diversifolia Wall. ex Wight & Arn. Prodr. 139. 1834; Hook. f. Fl. Brit. India 1: 446. 1874 & in Rec. Bot. Surv. India 4: 46. 1906; Blatt. in J. Bombay nat. Hist. Soc. 36: 310. 1936.

Diffuse, succulent, annual herbs, c 30 cm long, with ascending branches, rooting at nodes. Leaves 1.2–7.5 cm long, opposite; upper leaves sessile, linear–oblong, cordate at base; lower leaves short–petioled, elliptic or oblong, obtuse, glandular, flaccid on drying. Flowers 1.8–1.9 cm across, pink; pedicels with a single row of pubescence, longer than flowers. Capsules c 0.8 cm long, ellipsoid, turgid. Seeds glabrous, dark brown, smooth, shining.

Fls. & Frts. : June–November.

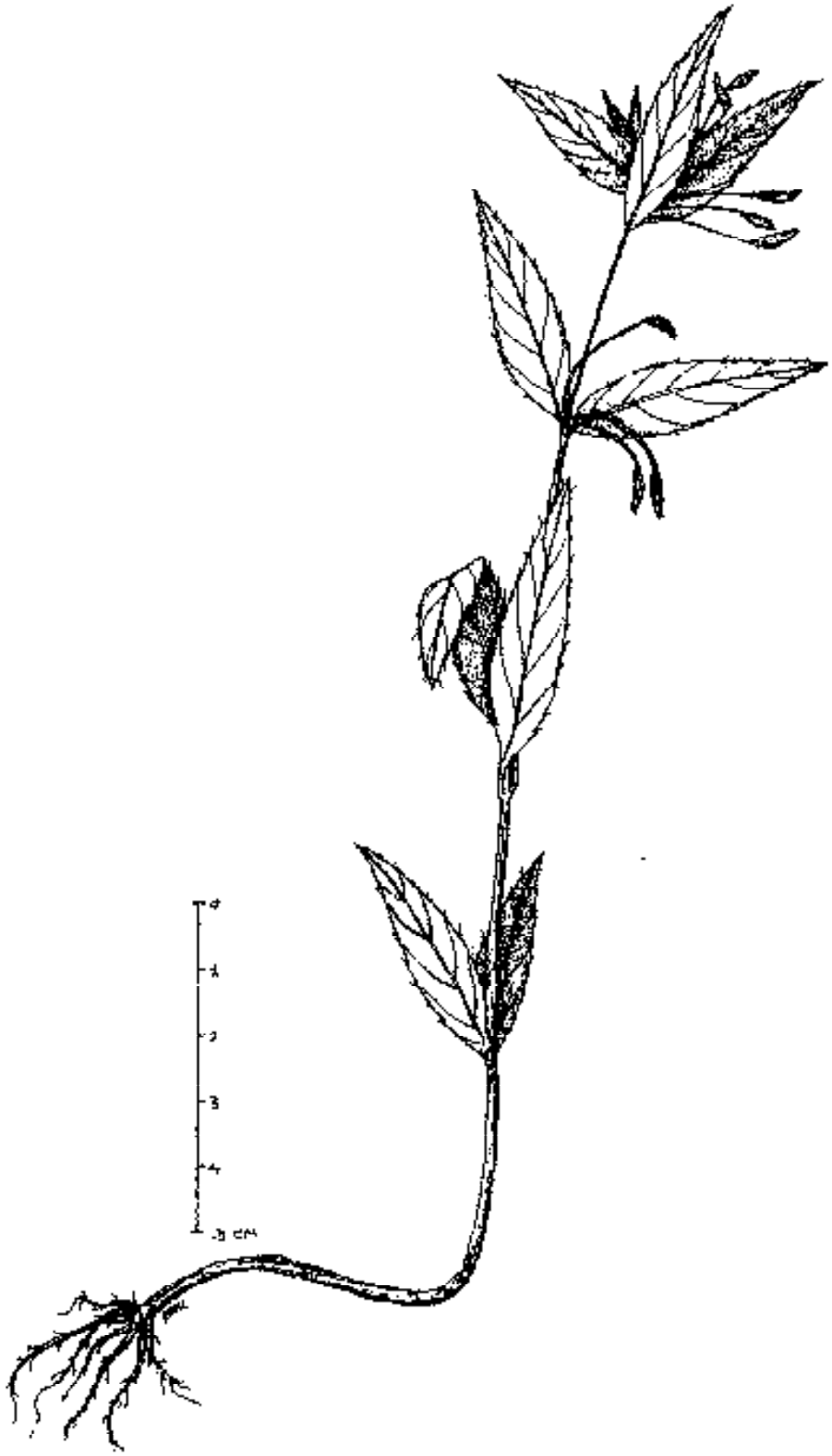
Distrib. : Found along the ghats. 'Konkan' (Blatt. op. cit.).

I. inconspicua Bth. ex Wight & Arn. Prodr. 139. 1834; Almeida, Fl. Mah. 1: 192. 1996.

1. Slender herbs ... var. *filiformis*
1. Robust herbs :
   2. Leaves petioled, ovate or ovate–lanceolate ... var. *inconspicua*
   2. Leaves sessile, oblong ... var. *ramosissima*

var. **inconspicua.**

Herbs, 10–30 cm high. Leaves 1–10 cm long, rounded or acute at base, serrate along margins. Flowers pink, axillary, solitary or twin,



Impatiens dalzellii Hook. f. & Thoms.

shorter than leaves. Capsules c 9 mm long, ellipsoid, shortly pointed, turgid in middle. Seeds few, subglobose, black, shining.

Fls. & Frts. : August–October.

Distrib. : Kolhapur, Pune, Satara, Sindhudurg.

var. **filiformis** (Wight & Arn.) Hook. f. Fl. Brit. India 1: 448. 1874; Cooke, Fl. Pres. Bombay 1: 182. 1958 (Repr.); Almeida, Fl. Mah. 1: 192. 1996. *I. filiformis* Wight & Arn. Prodr. 140. 1834.

Herbs, much branched. Leaves subsessile, long, slender, remotely serrate, the lower sometimes petioled and lanceolate. Flowers few.

Fls. : August–October.

Distrib. : Pune.

var. **ramosissima** (Dalz.) Hook. f. Fl. Brit. India 1: 448. 1874; Cooke, Fl. Pres. Bombay 1: 182. 1958 (Repr.); Almeida, Fl. Mah. 1: 192. 1996. *I. ramosissima* Dalz. in Hook. Kew J. 3: 230. 1852.

Herbs, much branched. Leaves short–obtuse or subacute at apex, subcordate or rounded at base. Flowers reddish–purple; spur minute.

Fls. : September–October.

Distrib. : Common on hills in Deccan & Konkan (Cooke, op. cit.), Satara (Almeida, op. cit.).

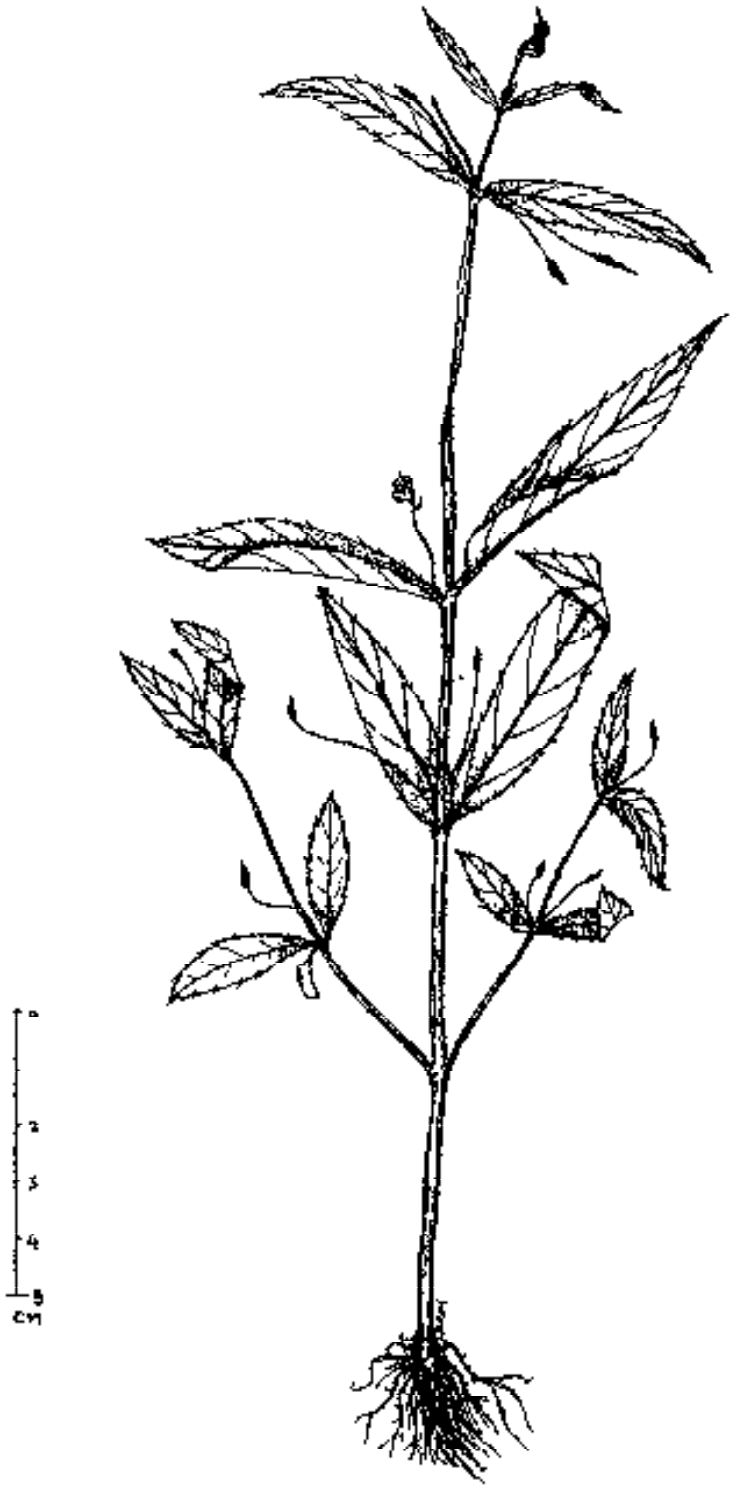
I. kleiniformis Sedgw. in Rec. Bot. Surv. India 6(8): 351. 1919; Blatt. in J. Bombay nat. Hist. Soc. 36: 311. 1936.

Erect, flaccid herbs, 15–25 cm high. Leaves sessile or subsessile, up to 9 cm long, c 2.5 cm broad, upper linear–lanceolate and lower elliptic or obovate, eglandular, lower surface pale; margins faintly serrate. Flowers pale pink, 0.6 cm across; wings with a purple longitudinal line; axillary spurs filiform, up to 0.9 cm long, pedicels 1.5–2.0 cm long, hairy. Capsules ellipsoid. Seeds black, glabrous, polished.

Fls. & Frts. : September.

Distrib. : Rare. Kolhapur, Ratnagiri, Sindhudurg.

I. latifolia L. Sp. Pl. 937. 1753; Hook. f. Fl. Brit. India 1: 450. 1874; Cooke, Fl. Pres. Bombay 1: 184. 1958 (Repr.).



Impatiens kleiniformis Sedgw.

Annuals, 60–90 cm high; branches alternate. Leaves 5–12 x 0.6–5.0 cm, subopposite at lower portions, subverticillate at end of branches, membranous, lanceolate, ovate–lanceolate to ovate, apex caudate–acuminate, 7–9–nerved, base acute, margins crenate–serrate, serratures setose. Flowers 2.5–3.8 cm across, in axillary fascicles; spurs green, long, slender, straight or curved; pedicels slender. Capsules ellipsoid, turgid.

Fls. & Frts. : August–December.

Illus. : Wight, Ic. t. 741. 1844 (*I. cuspidata* Wight & Arn.).

Distrib. : 'Konkan' (Cooke, op. cit.), Kolhapur, Satara.

I. lawii Hook. f. & Thoms. in J. Linn. Soc. 4: 122. 1860; Hook. f. Fl. Brit. India 1: 448. 1874; Cooke, Fl. Pres. Bombay 1: 183. 1958 (Repr.).

Reddish, branched, succulent herbs, 15–25 cm high. Leaves sessile or subsessile, 1.5–5.0 x 0.7–1.4 cm, obovate, elliptic–lanceolate, base of upper leaves cordate, lower leaves cuneate, margins faintly serrate, serratures c 0.5 cm apart. Flowers c 1.5 cm across, pink, axillary, solitary or in fascicles of 2; spurs c 0.5 cm long, curved upwards; peduncle 3–4 cm long. Capsules ellipsoid, 1.5 x 0.5 cm. Seeds ovoid, black.

Fls. & Frts. : August–October.

Distrib. : Frequent in open areas and roadsides in ghats as well as hilly areas in plains. Ratnagiri, Satara, Sindhudurg.

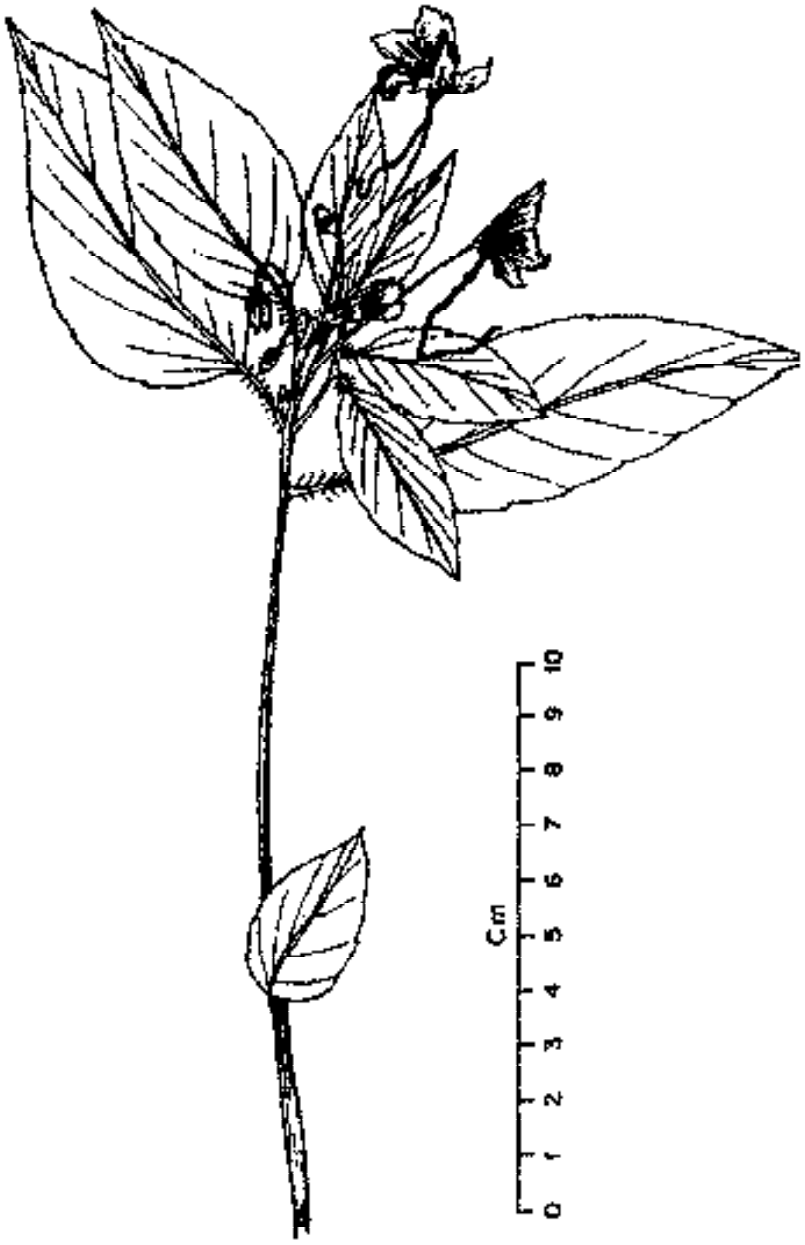
I. lucida Heyne ex Hook. f. Fl. Brit. India 1: 451. 1874 (excl. syn. *I. latifolia* Wight. & Arn.); Cooke, Fl. Pres. Bombay 1: 184. 1958 (Repr.).

Slender, annual herbs, 10–20 cm high. Leaves 1.3–2.0 cm long, sub–opposite or whorled, petioled, ovate or ovate–lanceolate, glabrous with a few scattered hairs above, paler beneath, acuminate, crenate–serrate; petiole slender. Flowers 0.9 cm across, solitary or fascicled; spurs slender. Capsules c 1.2 cm long, ellipsoid, turgid in the middle, attenuated at both ends.

Fls. & Frts. : August–September.

Distrib. : 'Konkan' (Cooke. op. cit.).

I. minor (DC.) Bennet in Indian J. For. 2: 283. 1979. *Balsamina minor* DC. Prodr. 11: 686. 1824. *Impatiens kleinii* Wight & Arn. Prodr.



Impatiens pulcherrima Dalz.

Illus. : Hook, Bot. Mag. t. 4615: 1851; Blatt. in *J.* Bombay nat. Hist. Soc. 36: t. II. 1936.

Distrib. : Frequent along ghats, slopes and scarce in hilly areas on the plains. Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg.

I. pusilla Bth. ex Wight & Arn. Prodr. 139. 1834; Blatt. in J. Bombay nat. Hist. Soc. 36: 312. 1934; Almeida, Fl. Mah. 1: 194. 1996. *I. inconspicua* var. *pusilla* (Heyne) Hook. f. Fl. Brit. India 448. 1874; Cooke, Fl. Pres. Bombay 1: 182. 1958 (Repr.). *I. inconspicua* auct. non Bth. ex Wight & Arn. 1834; Hook. f. Fl. Brit. India op. cit.; Cooke, op. cit. *'Bhadri'*.

Robust, succulent annual herbs, branched at base; branches asccending, reddish; internodes 10–15 cm long. Leaves 3.5–8.0 x 0.5–1.8 cm, variable, lower short–petioled, obovate, oblong or linear; upper subsessile, linear or strap–shaped, pale beneath, serrate, cordate at base. Flowers solitary or 2–nate, purple, short–spurred or spur absent; pedicels with 2 rows of hairs, up to·3 cm long. Capsules fusiform, 1.5 x 0.9 cm. Seeds black, polished.

Fls. & Frts. : August–October.

Illus. : Wight, Ic. t. 970. 1845 (*I. inconspicua*).

Distrib. : Frequently found along ghats and in cultivated fields. Ahmednagar, Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

I. scapiflora Heyne ex Roxb. Fl. Ind. (ed. Carey) 2: 464. 1824; Hook. f. Fl. Brit. India 1: 443. 1874; Blatt. in *J.* Bombay nat. Hist. Soc. 36: 310. 1936. *I. rivalis* Wight in Madras J. 5: 13, t. 8. 1837; Hook. f. op. cit. 444. 1874; Cooke, Fl. Pres. Bombay 1: 181. 1958 (Repr.).

Scapigerous, succulent, annual herbs, 15–45 cm high, with tuberous root stock. Leaves radical, 4.8–15.0 x 5–10 cm, variable in form and pubescence, ovate, ovate–oblong, elliptic and occasionally broader than long, base acute, rounded or cordate, margins obscurely to distinctly crenate–serrate; petioles 4.5–16.0 cm long. Flowers in racemes on scape, 14–26 cm long, pink, dark–pink or mauve; spurs curved, c 2.5 cm long. Capsules fusiform.

Fls. & Frts. : July–September.

Illus. : Wight, Ic. t. 751. 1844 (*I. rivalis*).

Distrib. : Sindhudurg (S. M. Almeida, 1990).

I. scabriuscula Heyne ex Roxb. Fl. Ind. (ed. Carey) 2: 464. 1824; Hook. f. Fl. Brit. India. 1: 454. 1874; Cooke, Fl. Pres. Bombay 1: 185. 1958 (Repr.).

Much branched herbs, 10–25 cm high, pubescent and tomentose. Leaves 2.5–5.0 cm long, elliptic-lanceolate or obovate, glabrous or with a few hairs above, more or less hairy on nerves beneath, decurrent into a petiole, sometimes slightly glandular, serrate. Flowers pink, c 1.3 cm across, axillary; pedicels scabrid. Capsules ellipsoid, c 0.8 cm long, mucronate, villous. Seeds dark brown, minute, granulate.

Fls. & Frts. :–October.

Illus. : Bedd. Ic. t. 144. 1874.

Distrib. : Rare. 'Konkan' (Cooke, op. cit.).

I. tomentosa Heyne ex Wight & Arn. Prodr. 139. 1834; Hook. f. Fl. Brit. India 1: 449. 1874; Cooke, Fl. Pres. Bombay 1: 184. 1958 (Repr.).

Herbs, 15–25 (–60) cm high; young parts, leaf–petiole, nerves and pedicels rufous-hairy. Leaves: upper linear, sessile, obtuse, subcordate; lower linear-lanceolate, elliptic or ovate-oblong; margins distantly serrate, upper surface hispid or tomentose, lower pale, tomentose. Flowers pink, axillary, 0.8–1.2 cm across; spurs stout, short. Capsules fusiform, 1–2 cm long.

Fls. & Frts. : September.

Illus. : Wight, Ic. t. 749. 1844 & t. 969. 1845.

Distrib.: 'Satara' (Bole & Almeida in J. Bombay nat. Hist. Soc. 78: 569. 1981), Sindhudurg (Cooke, op. cit.).

CULTIVATED SPECIES :

Impatiens sultanae Hook. f. Bot. Mag. t. 6643. 1882; Almeida, Fl. Mah. 1: 196, f. 1996.

Herbs, c 30 cm long, erect or decumbent; stem somewhat zigzag. Leaves alternate, ovate-lanceolate or obovate, 3–6 x 2–3 cm, acute or acuminate at apex, acute or sometimes rounded at base, serrate along margins; lateral nerves 5–10 pairs. Flowers c 3 cm across, white, arising singly or in pairs from axils of leaves.

Fls. : September–December.

Illus. : M.R. Almeida, op. cit.

Distrib. : Cultivated in gardens (M.R. Almeida, op. cit.).

RUTACEAE

(C. R. Jadhav)

1. Petioles distinctly winged:
   2. Flowers hermaphrodite; ovule one in each locule ... NARINGI
   2. Flowers polygamous; ovules many in each locule ... LIMONIA
1. Petioles not as above:
   3. Leaves unifoliolate:
      4. Flowers hermaphrodite; petals imbricate; fruit of berries:
         5. Anthers linear–oblong; disc elongate ... PARAMIGNYA
         5. Anthers ovate–oblong or with cordate base; disc cupular ... ATALANTIA
      4. Flowers polygamous; petals valvate; fruits drupaceous ... ACRONYCHIA
   3. Leaves tri or many foliolate :
      6. Plants armed:
         7. Leaflets three, digitate:
            8. Flowers unisexual ... TODDALIA
            8. Flowers bisexual:
               9. Stamens 8–10; ovules 2 per locule ... LUVUNGA
               9. Stamens more than 20; ovules many per locule ... AEGLE
         7. Leaflets more than three, pinnate ... ZANTHOXYLUM
      6. Plants unarmed :
         10. Leaflets digitate; flowers unisexual ... MELICOPE
         10. Leaflets pinnate; flowers bisexual:
            11. Leaflets 3–5, base equal; anthers glandular ... GLYCOSMIS
            11. Leaflets 5 or more, base unequal; anthers eglandular :
               12. Filaments dialated at base; ovary grooved, 4–celled ... CLAUSENA
               12. Filaments not as above(linear); ovary entire, 2–celled ... MURRAYA

ACRONYCHIA J. R. & G. Forst. (nom. cons.)

Acronychia pedunculata (L.) Miq. Fl. Ind. Bat. Suppl. 532. 1861; Rao in Bull. Bot. Surv. India 10 (Suppl. No. 2): 18. 1968; Hartley in J. Arnold Arbor. 55: 549. 1974; Nair & Nayar in Hajra et al. Fl. India 4 : 392. 1997. *Jambolifera pedunculata* L. Sp. Pl. 349. 1753. *Acronychia laurifolia* Hook. f. Fl. Brit. India 1: 498. 1875 non Bl. 1823; Cooke, Fl. Pres. Bombay 1: 191. 1958 (Repr.).

Trees, 8–10 m tall, canopy dense. Leaves subopposite, 7–14 x 3.5–6.0 cm, elliptic–oblong or oblanceolate, chartaceous, pale green. Flowers 2.0–2.5 cm across, white, in axils of leaves at end of branches; petals hairy inside towards base. Drupes 1.2–1.5 cm long, obovoid, angled.

Fls. & Frts. : September–November.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 190, f. 116. 1909.

Distrib. : Nagpur, Sindhudurg.

AEGLE Corr. (nom. cons.)

Aegle marmelos (L.) Corr. in Trans. Linn. Soc. London 5: 223. 1800; Hook. f. Fl. Brit. India 1: 516. 1875; Cooke, Fl. Pres. Bombay 1: 204. 1958 (Repr.); Almeida Fl. Mah. 1: 198. 1996; Nair & Nayar in Hajra et al. Fl. India 4 : 264. 1997. *Crateva marmelos* L. Sp. Pl. 444. 1753. *Aegle marmelos* var. *mahurensis* Zate in Indian J. For. 5: 36. 1982. *'Bel'*.

Trees, c 10 m tall. Leaves 3–foliolate; leaflets 5–10 x 1.5–5.0 cm, lanceolate or elliptic–lanceolate, chartaceous, acuminate at apex. Inflorescence of axillary panicles. Flowers greenish–white or yellow, fragrant. Fruits c 5 cm across, globose, smooth, with gray or yellowish rind, pulp orange coloured.

Fls. & Frts. : April–November.

Illus. : Wight, Ic. t. 16. 1838; Bedd. Fl. Sylv. S. India t. 161. 1871; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 101. 1982.

Distrib. : Common throughout in dry deciduous forests and also planted.

Notes. : Roy & Singh (1979) have investigated the chemistry, medicinal properties, morphology, propagation, harvesting, packing and storage of the pulp, which has the possibilities of being commercially exploited.

ATALANTIA Corr. (nom. cons.)

1. Filaments free, or 2–3 of them more or less united ... *A. wightii*
1. Filaments united into a tube:
   2. Calyx regularly or subregularly 4–5–lobed ..... *A. racemosa*
   2. Calyx irregularly lobed, split to the base on one side ..... *A. monophylla*

Atalantia monophylla (L.) Corr. Serr. in Ann. Mus. Natl. Hist. Nat. 6: 383. 1805; Hook. f. Fl. Brit. India 1: 511. 1875; Cooke, Fl. Pres. Bombay 1: 198. 1958 (Repr.); Nair & Nayar in Hajra et al. Fl. India 4 : 266. 1997. *Limonia monophylla* L. Mant. Pl. 237. 1771. *Atalantia floribunda* Wight, Ic. t. 1611. 1850; Puri & Mahajan in Bull. Bot. Surv. India 2: 171. 1960.

Shrubs or trees. Leaves 2–8 x 1.0–3.5 cm, ovate–oblong or elliptic, apex obtuse, emarginate, base rounded. Flowers white, crowded in axillary fascicles or umbels. Berries globular, usually 4–celled, each cell with 1 seed.

Fls. & Frts. : October–May.

Illus. : Wight, op. cit. *(A. floribunda);* Bedd. Fl. Sylv. S. India 56, t. 7, f. 5. 1870; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 76. 1982.

Distrib. : Kolhapur, 'Konkan' (Cooke, op. cit.), Satara (Puri & Muhajan, op. cit.).

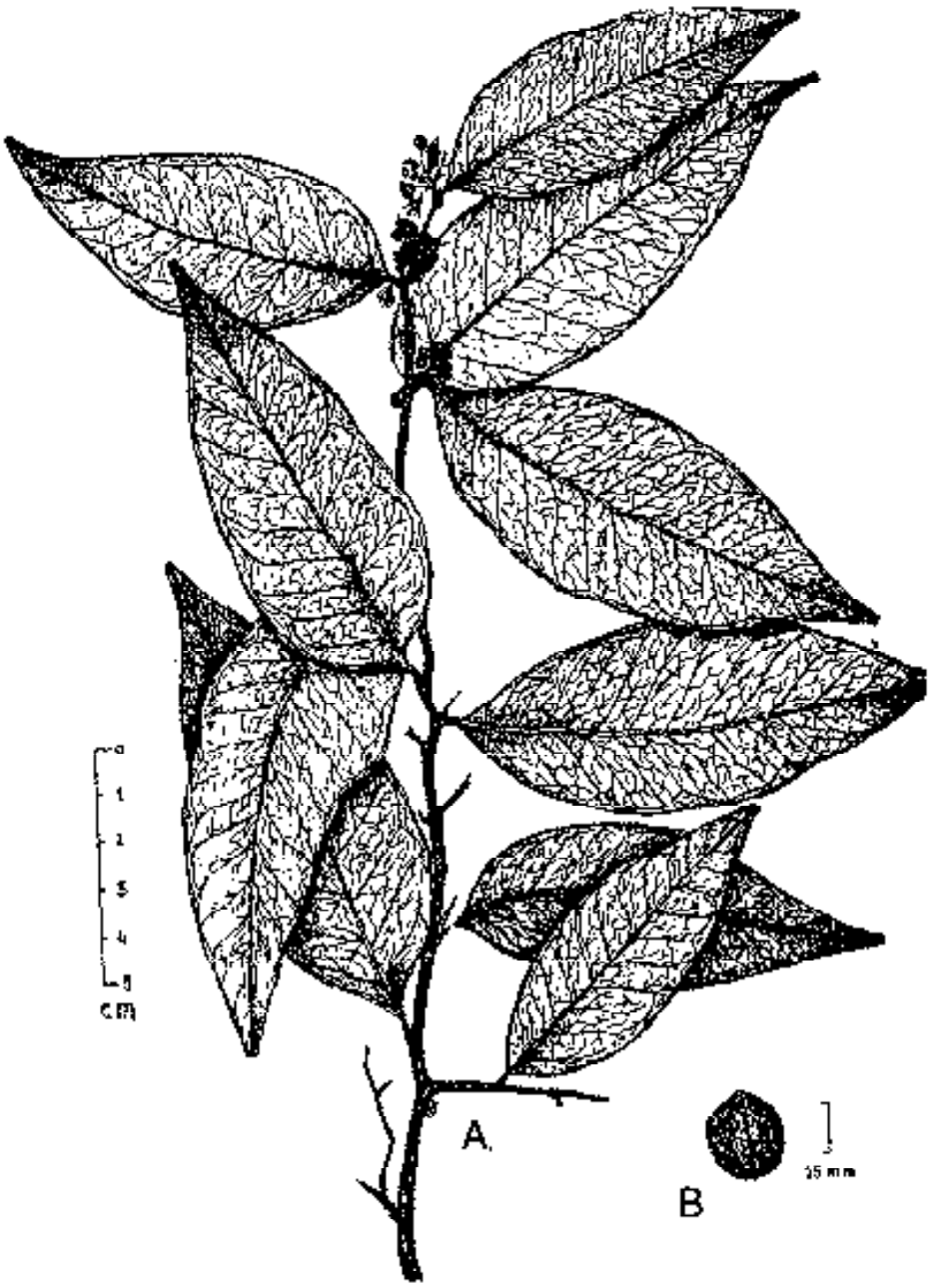
A. racemosa Wight in Hooker's J. Bot. Kew Gard. Misc. 1 : 64, t. 122 (Jan.). 1834; Hook. f. Fl. Brit. India 1: 512. 1875; Cooke, Fl. Pres. Bombay 1: 199. 1958 (Repr.); Nair & Nayar in Hajra et al. Fl. India 4: 269. 1997. *'Makad limbu', 'Ran limbu'.*

Trees, 8–10 m high. Leaves 4.5–11.0 x 2.5–6.0 cm, ovate or elliptic–oblong, leathery, apex obtuse or retuse. Flowers 1 cm across, white, in racemes; petals elliptic or obovate. Berries 2.0–2.5 x 1.0–1.5 cm, globose, creamy when ripe.

Fls. & Frts. : September–June.

Illus. : Wight, Ic. t. 71. 1838 *(Sclerostylis parvifolia)*; Talb. For. Fl. Bombay Pres. & Sind 1: 202, f. 123. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 102. 1982.

Distrib. : Ahmednagar, Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.



Atalantia wightii Tanaka
A- Habit; B- Fruit

Notes. : The berries yield oil (Ainolic) which is said to be valuable in chronic 'Rheumatism & Paralysis.' The leaf juice is used in hemiplegia in Konkan area (Kothari & Moorthy, 1993).

A. wightii Tanaka in Bull. Soc. Bot. France 75: 714. 1928; Nair & Nayar in Hajra et al. Fl. India 4 : 274, f. 71. 1997. *A. ceylanica* (Arn.) Oliver in J. Linn. Soc. 5 (Suppl. 2): 25. 1861 p.p.; Hook. f. Fl. Brit. India 1: 512. 1875 p.p.; Cooke, Fl. Pres. Bombay 1: 199. 1958 (Repr.) p.p.; Almeida, Fl. Mah. 1: 198. 1996.

Shrubs, much branched; stems armed with sharp spines, bark smooth. Leaves 2.5–10.0 cm long, variable, ovate–oblong or elliptic–oblong, coriaceous. Flowers in racemose or corymbose cymes; sepals 4; petals 0.6–0.8 cm long, elliptic–oblong. Berries 1.2 x 0.6 cm, globose or ovoid, 2–4–seeded.

Fls. & Frts. : November–January.

Distrib. : Marathwada (Almeida, op. cit.), 'Ratnagiri' (Cooke, op. cit.).

CLAUSENA Burm. f.

1.	Flowers in axillary racemes, 4–merous	...	*C. anisata*
1.	Flowers in terminal panicles, 5–merous	...	*C. indica*

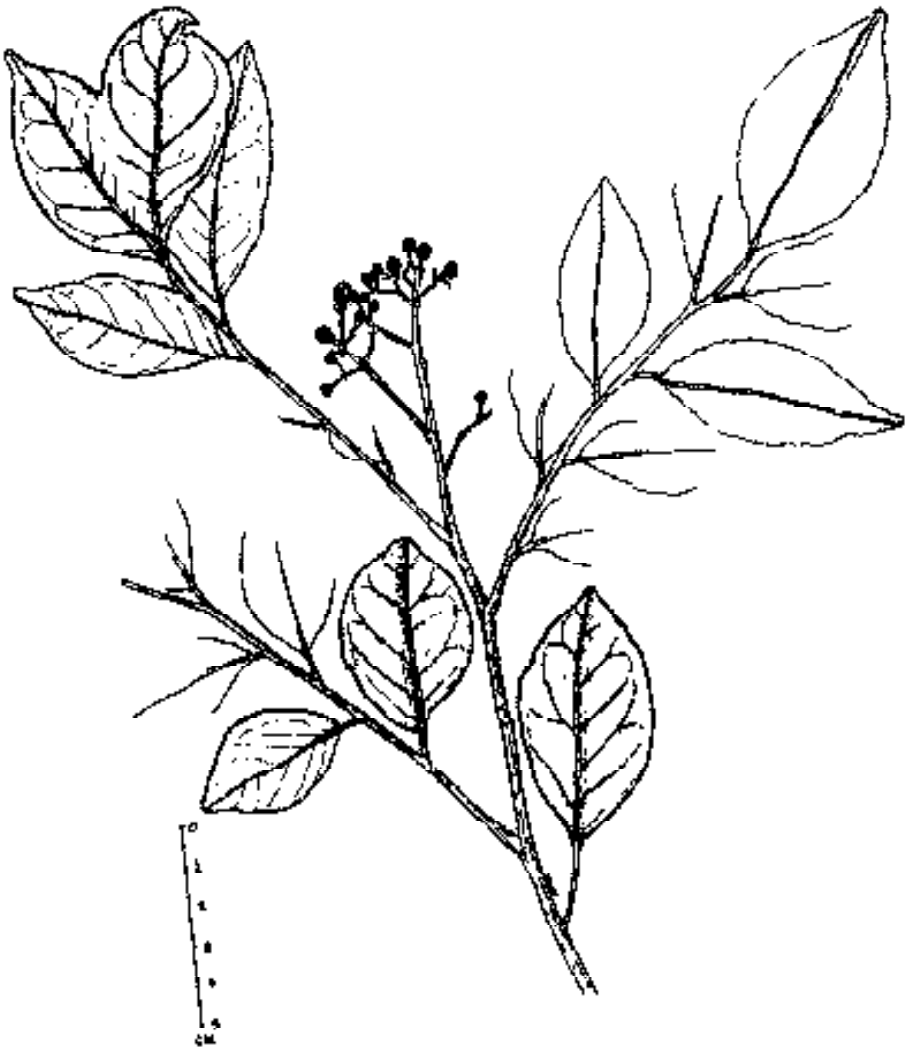
Clausena anisata (Willd.) Hook. f. ex Bth. in Hook. Niger Fl. 256. 1849; Molino in Bull. Mus. Hist. Nat. (Paris) 16 : 128. 1994; Nair & Nayar in Hajra et al. Fl. India 4 : 321. 1997. *Amyris anista* Willd. Sp. Pl. ed. 4 (2) : 337. 1799. *A. dentata* Willd. op. cit. *Clausena dentata* (Willd.) Roem. Syn. Hesper. 44. 1846. *C. willdenowii* Wight & Arn. Prodr. 96. 1834 nom. superfl.; Hook. f. Fl. Brit. India 1 : 506. 1875; Cooke, Fl. Pres. Bombay 1 : 194. 1958 (Repr.).

Trees, 8–10 m tall; young parts grey tomentose. Leaves imparipinnate; leaflets 4–8 x 2.5–5.0 cm, ovate or elliptic, pale green, base oblique, margins entire or dentate. Flowers c 0.8 cm across, white. Berries c 1.2 cm across, ovoid to orbicular, 1–2–seeded, greenish–white.

Fls. & Frts. : February–May.

Illus. : Wight, Ic. t. 14. 1838 (*Clausena willdenovii);* Matthew, Illus. Fl. Tamilnadu Carnaic 2: t. 105. 1982 (*C. willdenovii*).

Distrib. : Bombay, Ratnagiri, Satara, Sindhudurg.



Clausena indica (Dalz.) Oliver

C. indica (Dalz.) Oliver in J. Linn. Soc. Bot. 5 (Suppl. 2): 36. 1861; Hook. f. Fl. Brit. India 1: 505. 1875; Cooke, Fl. Pres. Bombay 1: 94. 1958 (Repr.); Nair & Nayar in Hajra et al. Fl. India 4 : 328. 1997. *Piptostylis indica* Dalz. in Hook. J. Bot. Kew Gard. Misc. 3: 33, t. 2. 1851.

Shrubs or trees, 5–8 m tall. Leaves 10–25 cm long; leaflets 7–13, 2–8 x 2–4 cm, alternate, ovate–oblong or lanceolate, apex obtuse, acute or acuminate, base oblique. Flowers white. Berries c 1.3 cm across, subglobose, cream coloured, pulpy.

Fls. & Frts. : January–April.

Distrib. : Kolhapur, Sindhudurg.

GLYCOSMIS Corr.

1. Leaflets with subdentate margin; ovary ovoid, sessile; fruits glandular–mammillate ... *G. pentaphylla*

1. Leaflets with entire margin; ovary fusiform, stalked; fruits glandular–pitted ... *G. mauritiana*

Glycosmis mauritiana (Lam.) Tanaka in Bot. Not. 1928 : 159 (4 Apr.) 1928; Brizicky in J. Arnold Arbor. 43: 90. 1962 (excl. syn. *G. pentaphylla* DC.); Mitra & Subr. Ibid. 50: 157. 1969. Nair & Nayar in Hajra et al. Fl. India 4 : 340. 1997. *Limonia mauritiana* Lam. Encycl. 3: 517. 1792. *Glycosmis pentaphylla* auct. non. (Retz.) DC. 1824; Hook. f. Fl. Brit. India 1: 499. 1875 p.p.; Cooke, Fl. Pres. Bombay 1: 192. 1958 (Repr.); Puri & Mahajan in Bull. Bot. Surv. India 2: 120. 1960. *'Ambute', 'Kirmira'.*

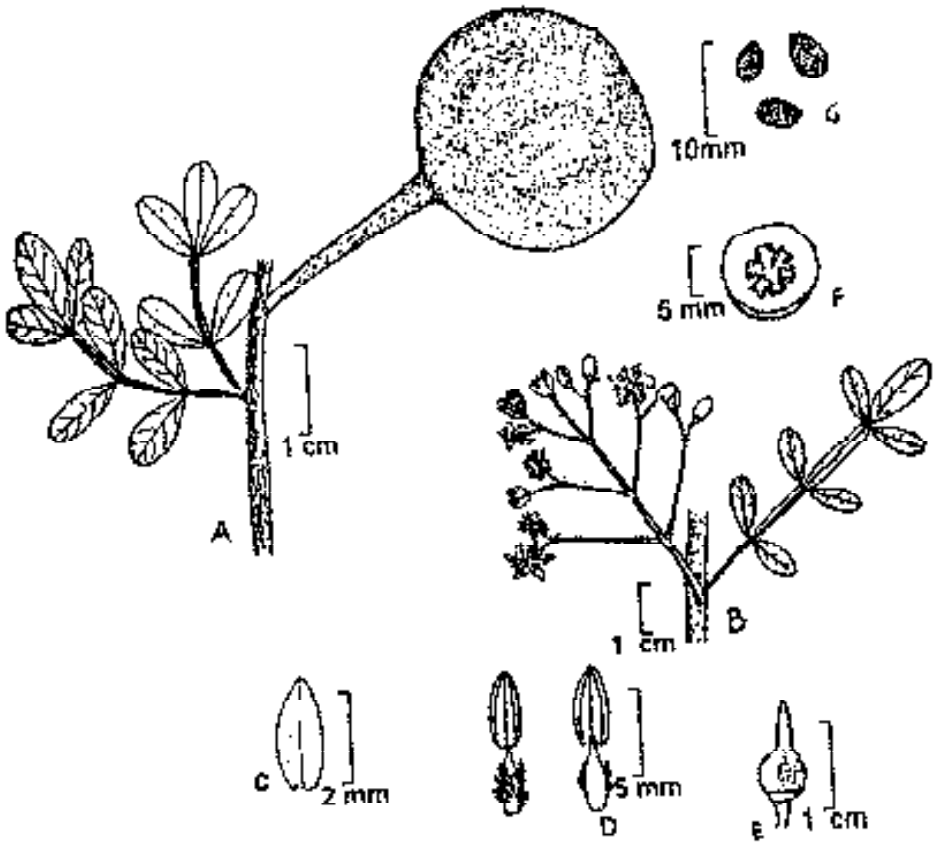
Shrubs or small trees, 3–5 m high. Leaves 5–foliolate; leaflets 6–10 x 1–4 cm. subsessile, entire. Flowers in axillary panicles, white; calyx glandular without, sepals ovate–orbicular; petals broadly obovate. Berries c 0.8 cm across, globose, apiculate.

Fls. & Frts. : November–May.

Illus. : Wight, Ic. t. 167. 1839 (*Glycosmis triphylla*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 107. 1982.

Distrib. : Few in semi–evergreen forerts. Kolhapur, Pune, Raigad, Satara, Sindhudurg.

G. pentaphylla (Retz.) DC. Prodr. 1 : 538. 1824, quoad basionym; Mitra & Subr. in J. Arnold. Arbor. 50. 155. 1969; Nair & Nayar in Hajra et al. Fl. India 4 : 343. 1997. *Limonia pentaphylla* Retz. Obs. Bot.



Limonia acidissima L. : A-Branchlet with fruit; B-Flowering twig; C-Petal; D-Stamens (dorsal and ventral views); E-C.s. of ovary; G-Seeds.

5: 24. 1788. *L. arborea* Roxb. Pl. Cor. 1: 60, t. 85. 1788. *Glycosmis arbobea* (Roxb.) DC. Prodr. 1: 538. 1824. *G. pentaphylla* auct. non DC. 1824 : Hook. f. Fl. Brit. India. 1: 499. 1875.

Shrubs or small trees, 4–6 m high. Leaflets 5–18 x 2–6 cm, oblong–lanceolate or oblanceolate, minutely serrate. Flowers white, in axillary panicles; sepals deltoid, ciliate; petals broadly oblong or obovate. Berries globose.

Fls. & Frts. : February–March.

Illus. : Narayanasw. in Rec. Bot. Surv. India 14(2): 20, f. 6. 1940 (*G. arborea*).

Distrib. : Bombay, Kolhapur, Pune, Ratnagiri, Satara, Sindhudurg.

LIMONIA L.

Limonia acidissima L. Sp. Pl. ed. 2, 1 : 554. 1762; Nair & Nayar in Hajra et al. Fl. India 4 : 294, f. 75. 1997. *Schinus limonia* L. Sp. Pl. 389. 1753 p. p. *Feronia elephantum* Corr. in Trans. Linn. Soc. London 5: 225. 1800; Hook. f. Fl. Brit. India 1: 516. 1875; Cooke, Fl. Pres. Bombay 1: 203. 1958 (Repr.). *'Kavath'*.

Trees, moderate sized; spines straight, sharp. Leaves imparipinnate; leaflets 3–9, 1.5–5.0 x 1–2 cm, cuneate or obovate, tip crenulate. Inflorescence of lateral or terminal, pubescent panicles. Flowers red. Berries c 5 cm across, globose. Seeds embedded in pulp.

Fls. & Frts. : March–August.

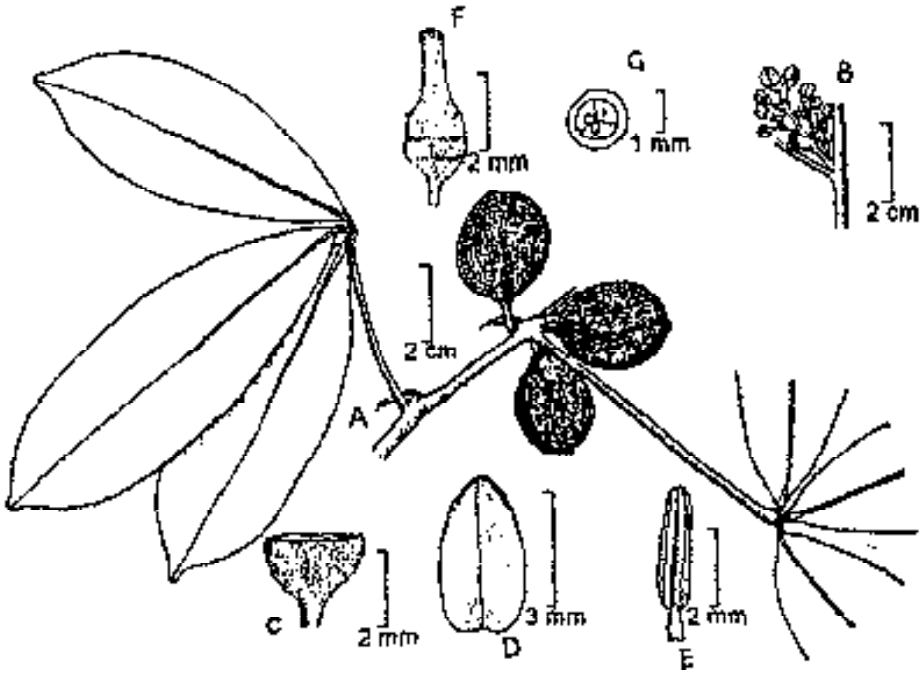
Illus. : Wight, Ic. t. 15. 1838 (*Feronia elephantum*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 108. 1982.

Distrib. : Common.

Notes : Also planted for its edible fruits in some parts of the state.

LUVUNGA Buch.–Ham. ex Wight & Arn.

Luvunga eleutherandra Dalz. in Hook. J. Bot. & Kew Gard. Misc. 2: 258. 1850; Hook. f. Fl. Brit. India 1: 509. 1875; Cooke, Fl. Pres. Bombay 1: 196. 1958 (Repr.); Mohanan et al. in J. Econ. Tax. Bot. 5 : 457. 1984; Nair & Nayar in Hajra et al. Fl. India 4 : 296, f. 76. 1997. *L. sarmentosa* auct. non (Bl.) Kurz, 1870; Gandhi in Sald. & Nicols. Fl. Hassan Dist. 386. 1976. *'Aklan, Akran'*.



Luvunga eleutherandra Dalz. : A-Fruiting twig; B-Inflorescence; C-Calyx; D-Petal; E-Stamen; F-Pistil; G-C.S. of ovary

Shrubs, scandent; thorns 2.5 cm long, stout. Leaflets 6–10 x 3–5 cm, elliptic–oblong or obovate, dark green above, coriaceous, margins incurved. Flowers 1.0–1.5 cm across, white, in axillary short cymes. Berries 1.0–2.5 cm long, ellipsoid, 3–angled, pitted with glands, rough.

Fls. & Frts. : January–June.

Illus. : Talb. For Fl. Bombay Pres. & Sind 1: 196, f. 120. 1909.

Distrib. : Kolhapur, Ratnagiri, Sindhudurg.

MELICOPE J. R. & G. Forst.

Melicope lunuankenda (Gaertn.) T. Hartley in Sandakania 4: 61. 1994; Nair & Nayar in Hajra et al. Fl. India 4: 369. 1997. *Fagara lunuankenda* Gaertn. Fruct. Sem. Pl. 334, t. 68, f. 9. 1778. *Euodia lunuankenda* (Gaertn.) Merr. Philipp. J. Sci. 7: 378. 1912. *E. roxburghiana* Bth. Fl. Hongk. 59. 1861; Hook. f. Fl. Brit. India 1: 487. 1875; Cooke, Fl. Pres. Bombay 1: 188. 1958 (Repr.). *'Bok'.*

Trees, 10–15 m tall, branching above the 2/3 portion of stem. Leaflets 8–17 x 3–9 cm, elliptic–ovate, oblong, nerves prominent above. Flowers 0.15–0.20 cm across, greenish–yellow, 4–merous, in terminal panicles. Cocci 0.4–0.5 cm across, globose, 1–seeded. Seeds bi–convex, black.

Fls. & Frts. : January–May.

Illus. : Wight, Ic. t. 204. 1839 (*Zanthoxylum triphyllum* Juss.); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 106. 1982.

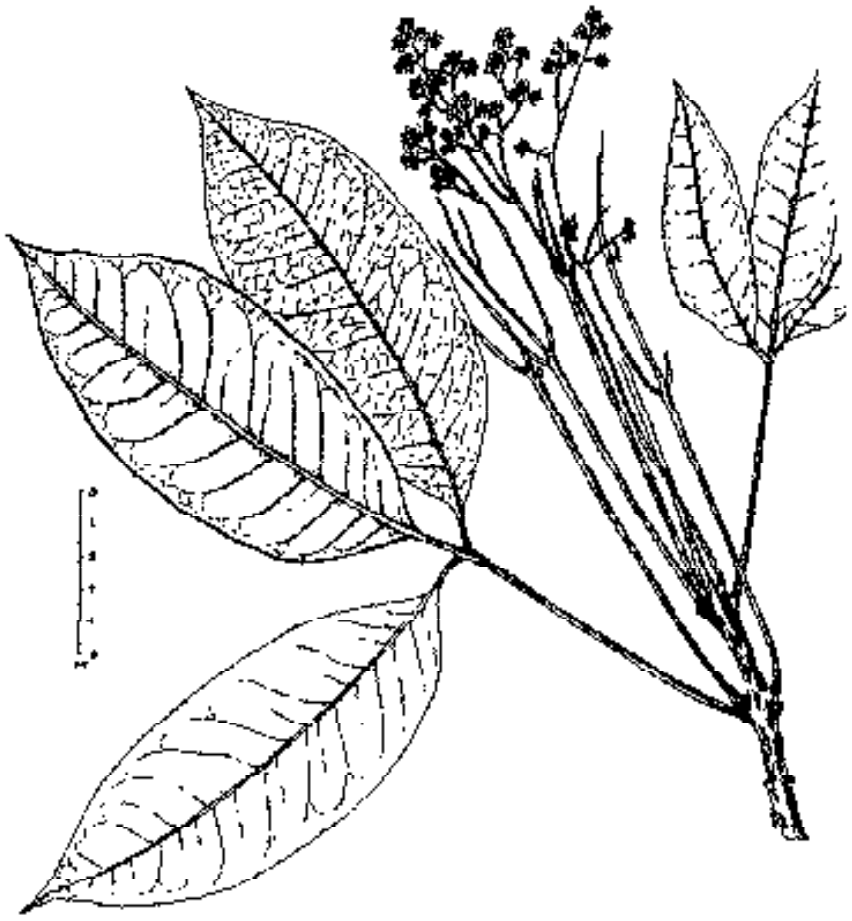
Distrib. : Kolhapur, Pune, Raigad, Satara, Sindhudurg.

MURRAYA L. (nom. cons.)

1. Leaflets 11–25, aromatic, pubescent; berries ovoid, deep violet when ripe ... *M. koenigii*

1. Leaflets 3–7, glabrous; berries oblong, red when ripe ... *M. paniculata*

Murraya koenigii (L.) Spr. Syst. 2: 315. 1825; Hook f. Fl. Brit. India 1: 503. 1875; Cooke, Fl. Pres. Bombay 1: 193. 1958 (Repr.); Nair & Nayar in Hajra et al. Fl. India 4 : 351. 1997. *Bergera koenigii* L. Mant. 1: 563. 1771. *'Kadhi limb', 'Karipatta'.*



Melicope lunuankenda (Gaertn.) T. Hartley

Shrubs or small trees, 3–5 m tall; branches brownish, lenticelled. Leaflets 3–9 x 1–4 cm, elliptic or ovate, base oblique. Flowers 1 cm across, greenish–white, in terminal corymbose cymes; pedicels and sepals pubescent. Berries 1.4 x 1.0 cm, rough with pitted glands.

Fls. & Frts. : February–June.

Illus. : Wight, Ic. t. 13. 1838 *(Bergera koenigii).*

Distrib. : Commonly grown in kitchen gardens and farms for aromatic leaves.

Notes : The roots are used to cure piles, itching, leucoderma & for blood purification (Kothari & Moorthy, 1993). The green leaves are eaten raw in dysentery and are commonly used for flavouring curries.

M. paniculata (L.) Jack, in Mal. Misc. 1 (5) : 31. 1820; Nair & Nayar in Hajra et al. Fl. India 4 : 352, f. 92. 1997. *Chalcas paniculata* L. Mant. 68. 1767. *Murraya exotica* L. Mant. 2: 563. 1771 (*'Murraea'*); Hook. f. Fl. Brit. India 1: 502. 1875; Cooke, Fl. Pres. Bombay 1: 193. 1958 (Repr.). *'Chula juti', 'Kunti', 'Kamini', 'Pandhari'.*

Small trees, 4–10 m tall, evergreen; bark yellowish–white, branches slender. Leaflets 4–10 x 1.5–5.0 cm, elliptic –ovate, pale green, coriaceous, acuminate at apex with notched tip. Flowers 3.5 cm across, fragrant, white, solitary or in terminal and axillary corymbose cymes; petals oblong. Berries 1.5–2.0 x 0.6 cm, gland dotted.

Fls. & Frts. : June–January.

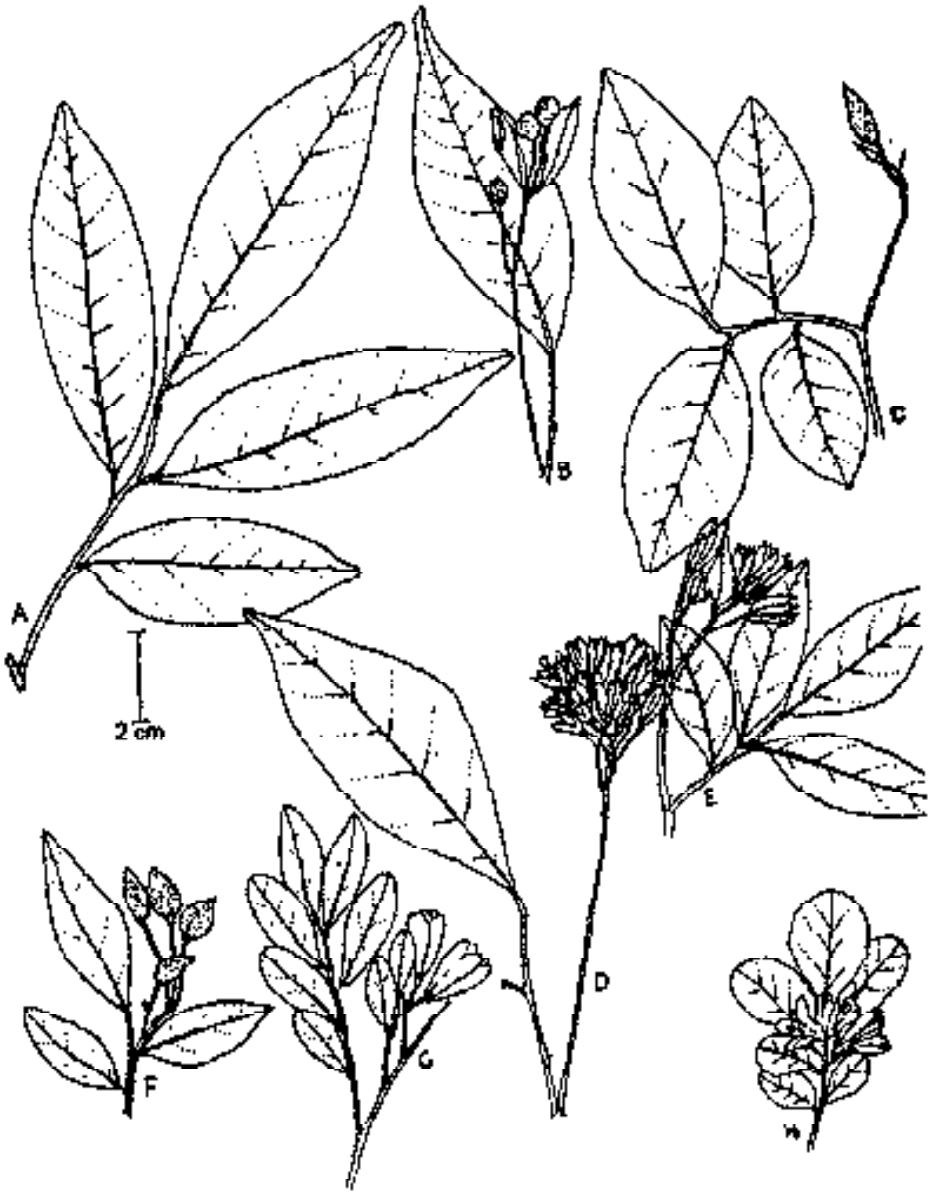
Illus. : Wight, Ic. t. 96. 1938. (*Murraya exotica*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 109. 1982.

Distrib. : Commonly grown in gardens for fragrant flowers

NARINGI Adans.

Naringi crenulata (Roxb.) Nicols. in Sald. & Nicols. Fl. Hassan Dt. 387. 1976; Nair & Nayar in Hajra et al. Fl. India 4 : 302, f. 79. 1997. *Limonia crenulata* Roxb. Pl. Cor. 1: 60, t. 86. 1798. *L. acidissima* auct. non L. 1762; Hook. f. Fl. Brit. India 1: 507. 1875; Cooke, Fl. Pres. Bombay 1: 196. 1958 (Repr.).

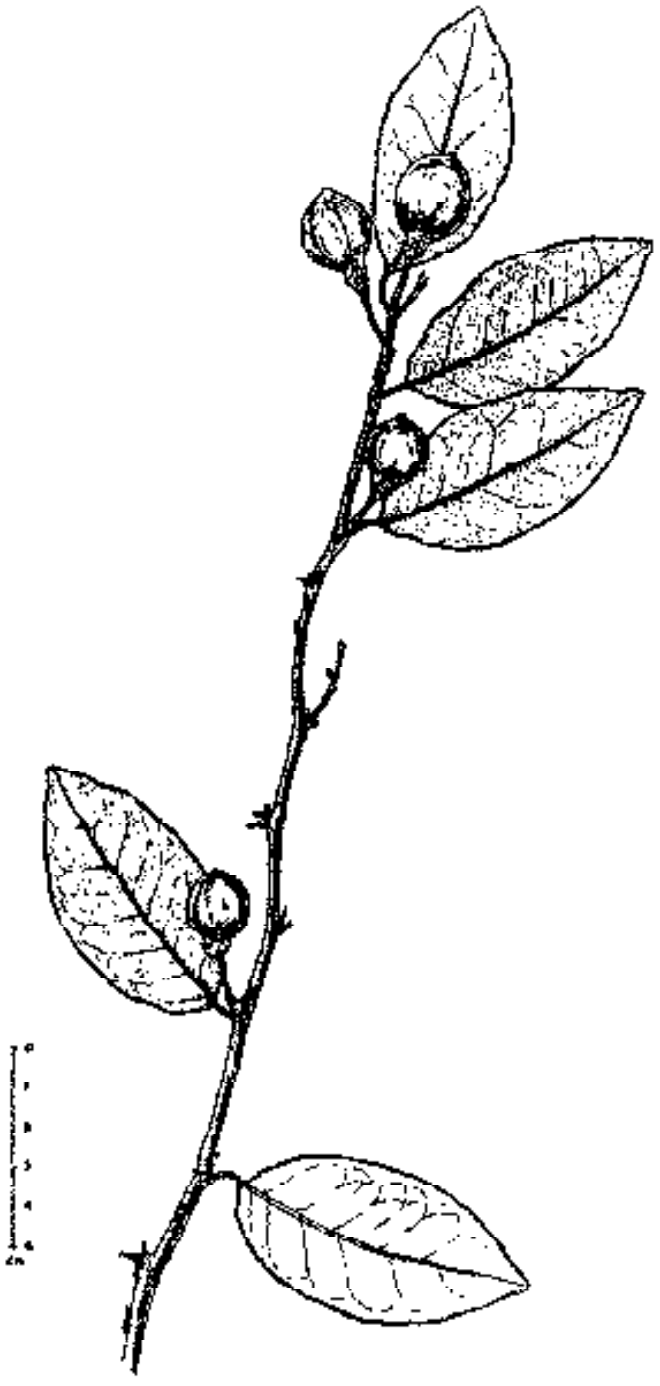
Trees, c 6 m tall, spiny; bark sandy–coloured, rough. Leafles 3–7, ovate to ovate–rhombic, apex obtuse to minutely emarginate, base



Murraya paniculata (L.) Jack.



Naringi crenulata (Roxb.) Nicols.



Paramignya monophylla Wight

acute. Inflorescence axillary, clustered, racemose, few flowered, pubescent. Flowers white. Berries 0.6–0.7 cm across, globose, glandular. Seeds c 0.5 cm across, subglobose, pale orange–brown.

Fls. & Frts. : April–May.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 98, f. 121. 1909 *(L. acidissima)*; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 110. 1982.

Distrib. : Bombay, Pune.

PARAMIGNYA Wight

Paramignya monophylla Wight, Illus. Ind. Bot. 1: 108, t. 42. 1840; Hook. f. Fl. Brit. India 1: 510. 1875; Cooke, Fl. Pres. Bombay 1: 197. 1958 (Repr.); Nair & Nayar in Hajra et al. Fl. India 4: 312. 1997. *'Kari vageti', 'Kurvi vageti', 'Narayan makadi'.*

Evergreen, woody climbers; young parts pubescent, older branches armed with recurved, axillary spines. Leaves 5–12 x 3–7 cm, elliptic–ovate, pale green. Flowers 2.5–3.0 cm across, white, in 2–3–flowered cymes; sepals silky tomentose. Berries 4 x 3 cm, obovoid, brownish–grey, pubescent.

Fls. & Frts. : December–April.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 199, f. 122. 1909.

Distrib. : Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg.

Notes : The roots are said to be used to cure urinary and abdominal desorders in catles.

TODDALIA Juss.

Toddalia asiatica (L.) Lam. Tab. Encycl. Meth. 2: 116. 1797; Nair & Nayar in Hajra et al. Fl. India 4 : 403. 1997. *Paullinia asiatica* L. Sp. Pl. 365. 1753. *Toddalia aculeata* (Smith) Pers. Syn. Pl. 1: 249. 1805 nom. superfl.; Hook. f. Fl. Brit. India 1: 497. 1875; Cooke, Fl. Pres. Bombay 1: 190. 1958 (Repr.).

1. Leaflets more than 2 cm broad; fruits hardly lobed ... var. *asiatica*
1. Leaflets less than 2 cm broad; fruits distinctly lobed ... var. *gracilis*



Toddalia asiatica var. **gracilis** Gamble

var. **asiatica.** *'Jangali kali mirchi'.*

Large shrubs, scandant; prickles curved (or very rarely unarmed). Leaflets 4.5–9.0 x 2.0–4.5 cm, elliptic or obovate, sessile, coriaceous, apex acuminate or notched, margins serrate. Flowers 0.6–0.8 cm across, yellowish–green; sepals triangular. Berries 0.6–1.0 cm across, glabrous depressed, pitted, yellow when ripe.

Fls. & Frts. : December–April.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 189, f. 115. 1909.

Distrib.: Kolhapur, Pune, Satara, Sindhudurg.

var. **gracilis** Gamble Fl. Pres. Madras 1: 151. 1915 [1: 107. 1957 (Repr.)].

Shrubs, scandent. Leaflets 4.0–7.5 x 1.5–2.0 cm, lanceolate, apex broadly obtuse, nerves obscure. Flowers greenish–white, in axillary panicles. Berries c 0.5 cm across, globose.

Fls. & Frts. : April.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 82. 1988.

Distrib. : Pune, Satara.

Note : Narayanan Nair & Nayar, 1997 considered this variety as a ecoform of *Toddalia asiatica*.

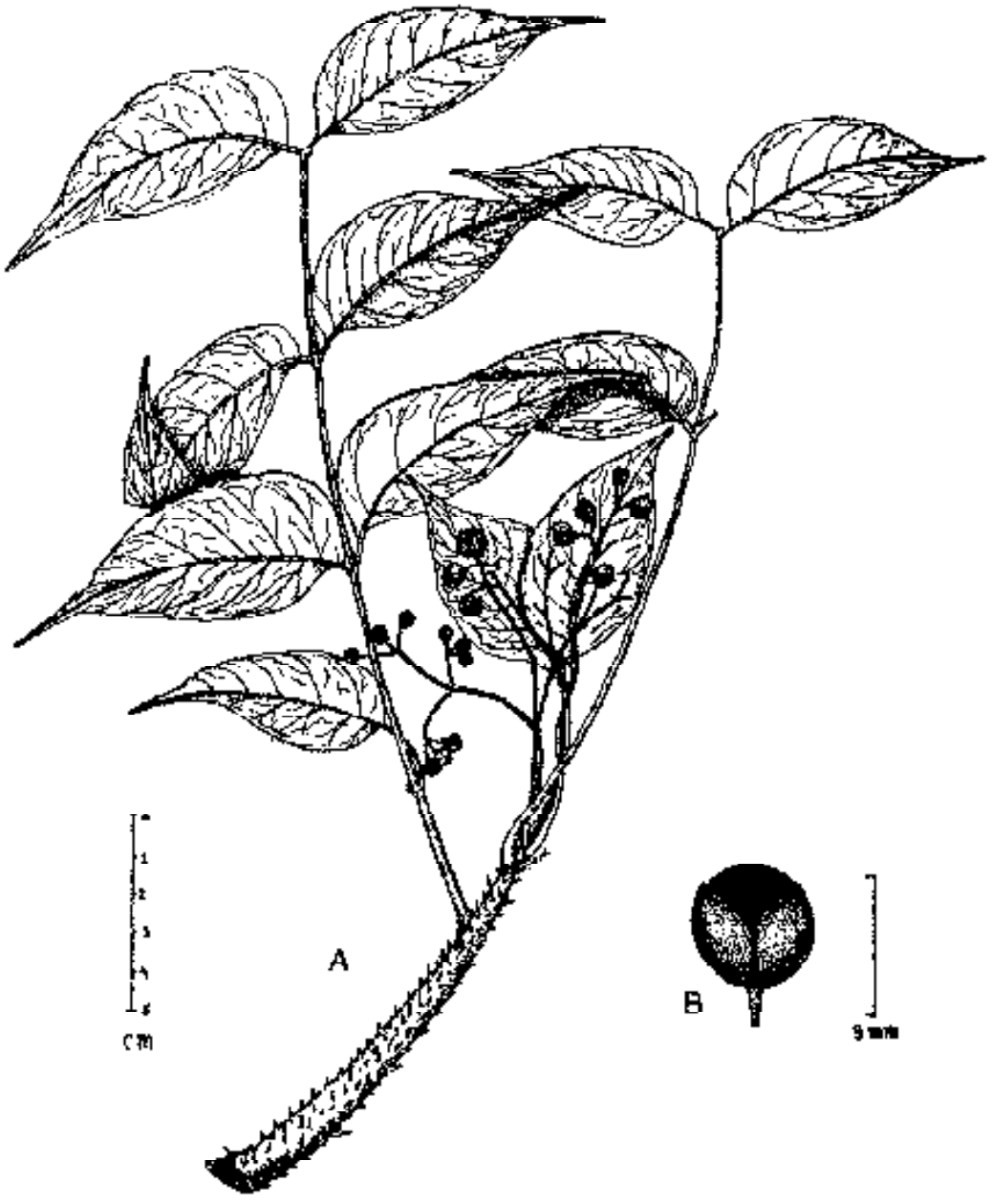
ZANTHOXYLUM L.

Zanthoxylum rhetsa (Roxb.) DC. Prodr. 1: 728. 1824; Hook. f. Fl. Brit. India 1: 495. 1875; Cooke, Fl. Pres. Bombay 1: 189. 1958 (Repr.); Babu in Bull. Bot. Surv. India 15: 56. (1974) 1977; Nair & Nayar in Hajra et al. Fl. India 4: 387. 1997; *Fagara rhetsa* Roxb. Fl. Ind. 1: 438. 1820. *Zanthoxylum budrunga* (Roxb.) DC. Prodr. 1: 728. 1824. *'Kokli', 'Tirphal', 'Tisal'.*

Trees, 8–10 m tall; stems and branches prickly. Leaflets 3.5–12.0 x 3.0–5.0 cm, elliptic–oblong or ovate, apex acuminate. Flowers 0.6–0.8 cm, greenish–yellow, in terminal cymes. Cocci 0.8 x 0.6 cm, globose, 1–seeded.

Fls. & Frts. : June–March.

Distrib. : 'Khandesh' (Cooke, op. cit.), Kolhapur, Pune, Raigad, Ratnagiri, Sindhudurg.



Zanthoxylum rhetsa (Roxb.) DC.
A- Habit; B- Fruit

CULTIVATED SPECIES :

Atalantia rotundifolia (Thw.) Tanaka in Bull. Soc. Bot. France 75: 714. 1928; Almeida, Fl. Mah. 1: 200. 1996. *Sclerostylis rotundifolia* Thw. Enum. 46. 1858. *Atalantia ceylanica* var. *rotundifolia* (Thw.) Oliver in J. Linn. Soc. Bot. 5, Suppl. 2: 25. 1861; Hook. f. Fl. Brit. India 1: 513. 1875.

Large shrubs or small trees; internodes short. Leaves densely crowded on spineless twigs, obcordate, 2.5–4.5 x 1.2 cm, emarginate at apex.

Fls. : October–January.

Distrib. : Bombay gardens (Almeida, op. cit.).

Choisya ternata Kunth in H.B. & K. Nov. Gen. & Sp. Pl. 6: 6, t. 513. 1823; Almeida, Fl. Mah. 1: 200. 1996; Nair & Nayar in Hajra et al. Fl. India 4 : 406. 1997.

Shrubs, evergreen, 1.5–2.0 m tall. Leaves opposite, digitately compound; leaflets usually three, narrowly oblong, 2.5–8.0 cm long, obtuse at apex, entire, gland–dotted, resolute along margins, young leaves pubescent. Flowers c 2.5 cm across, white. Fruit 5–valved capsule.

Fls. & Frts. : October–December.

Distrib. : Cultivated in Bombay gardens (Almeida, op. cit.).

Citrus aurantifolia (Christm. & Panz.) Swingle in J. Wash. Acad. Sci. 3: 465. 1913; Ugemuge, Fl. Nagpur Dt. 90. 1986; Nair & Nayar in Hajra et al. Fl. India 4 : 278. 1997. *Limonia aurantifolia* Christm. & Panz. in Linn. Pflanzen. Syst. 1: 618, 1777. *C. medica* var. *acida* (Roxb.) Hook. f. Fl. Brit. India 1 : 515. 1875. *'Kaghi Limbu', 'Limbu', 'Nimbu'.*

An armed small tree. Leaves elliptic–oval, crènate; petioles narrowly but distinctly winged. Flowers solitary or few in axils, white. Fruits globose, 3–5 cm in diam., yellow when ripe; pulp very sour.

Fls. & Frts. : More or less throughout the year.

Distrib. : Probably a native of Malesia. Cultivated in most of the districts for its fruits. Fruits are used for pickles & in medicines.

C. aurantium L. Sp. Pl. 782. 1753; Hook. f. Fl. Brit. India 1: 515. 1875, excl. var. 3, *bergamia;* Cooke, Fl. Pres. Bombay 1: 201. 1958 (Repr.); Ugemuge, Fl. Nagpur Dt. 90. 1986; Nair & Nayar in Hajra et al. Fl. India 4 : 279. 1997. *'Naringi', 'Santra'.*

An armed small tree. Leaves elliptic–ovate or oblong, obtuse or acute at apex; petioles broadly winged. Flowers solitary or in axillary clusters, white, fragrant. Fruits globose, 6–8 cm in diam., orange; pulp sweet, orange yellow.

Fls. & Frts. : February–August.

Distrib. : Cultivated for fruits especially in Nagpur, Osmanabad, Pune.

C. limon (L.) Burm. f. Fl. Ind. 173. 1768; Bailey, Man. Cult. Pl. (ed. 2) 609. 1949; Nair & Nayar in Hajra et al. Fl. India 4 : 282. 1997. *C. medica* var. *limon* L. Sp. Pl. 782. 1753. *C. medica* var. *limonum* (Wight & Arn.) Hook. f. Fl. Brit. India 1: 515. 1875; Cooke. Fl. Pres. Bombay 1: 201. 1958 (Repr.). *C. karna* Raf. Syl. Tell. 142. 1838; Naik Fl. Osmanabad 64. 1979. *'Gadha–limbu'*,*'Idlimbu'*.

Shrubs or small trees; thorns short, stout & stiff. Leaves elliptic–ovate or ovate lanceolate, obtuse, crenate–serrate; petioles merely margined. Flowers 1–2 cm long, solitary or in axillary condensed racemes; petals white above, reddish–purple below. Fruits yellow when ripe, oval or oblong, pulp very acidic.

Fls. & Frts. : April–September.

Distrib. : Grown in gardens. Nagpur, Osmanabad, Sindhudurg.

Notes : Roots, bark & fruits are used in medicine (Naik, 1979). Rind of the fruits removes Vata & Lung troubles (Kothari & Moorthy, 1993).

C. maxima (Burm.) Merr. Interpre. Herb. Amb. 46. 1917; Deb, Fl. Tripura State 1: 435. 1981; Nair & Nayar in Hajra et al. Fl. India 4 : 283. 1997. *Aurantium maximum* Burm. Auctuarium Herb. Amb. 16. 1755. *Citrus aurantium* var. *grandis* L. Sp. Pl. 783. 1753. *C. grandis* (L.) Osb. Dagbok Ostind. Resa 98. 1757. *C. decumana* L. Syst. Nat. ed. 12: 508. 1767 nom illeg.; Hook. f. Fl. Brit. India 1: 516. 1875; Cooke Fl. Pres. Bombay 1: 202. 1958 (Repr.).

var. **maxima.**

Small trees, armed or unarmed. Leaves ovate–oblong, 15–20 cm long, emarginate; petioles broadly winged. Flowers solitary or in axillary clusters, white. Fruits globular or oblate, pale yellow.

Fls. & Frts. : May–October.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 77. 1982.

Distrib. : Planted near houses. Osmanabad, Sindhudurg.

Notes : Fruits are edible. Leaves & fruits are medicinal.

var. **uvacarpa** Merr. & Lee in Amer. J. Bot. 11 : 383. 1924; Nair & Nayar in Hajra et al. Fl. India 4 : 284. 1997. *C. paradisi* Macf. in Hook. Bot. Misc. 1: 304. 1830 & in Fl. Jamaica 1: 131. 1837; Almeida, Fl. Mah. 1: 204. 1996.

Large trees; twigs angular when young. Leaves ovate, obtuse at apex, broadly rounded at base; petioles winged. Flowers large. Seeds white.

Fls. & Frts. : May–June.

Distrib. : Cultivated in orchards at Nagpur (Almeida, op. cit.).

C. medica L. Sp. Pl. 782. 1753; Hook. f. Fl. Brit. India 1: 514. 1875; Fischer in Rec. Bot. Surv. India 12(2): 85. 1938; Cooke, Fl. Pres. Bombay 1: 201. 1958 (Repr.). Nair, Fl. Bash. Himal. 53. 1977; Nair & Nayar in Hajra et al. Fl. India 4 : 284. 1997.

var. **medica.** *'Bijora'*, *'Mahalungi'*.

Shrubs or small trees, armed. Leaves ovate–lanceolate or oblong, crenate–serrate; petioles winged or not. Flowers in panicles or in axillary clusters, whitish–purple. Fruits oblong or obovoid; rind thick, very aromatic; pulp scanty.

Fls. & Frts. : May–October.

Distrib. : Commonly cultivated probably for its rind.

Notes : Flowers, fruits, seeds and roots are used in medicine (Naik, 1979.).

var. **limetta** Hook. f. Fl. Brit. India, 1: 515. 1872; Almeida, Fl. Mah. 1: 203, f. 1996. *'Mitha limbu'*.

Shrubs or small trees. Leaves ovate–elliptic, rounded–acute at base, obtuse at apex, petioles wingless. Flowers white, Fruits globose, 8–12 cm across, rind thin, smooth; adhering to pulp, Juice abundant, sweet.

Fls. & Frts. : October–March.

Distrib. : Widely cultivated for its fruits. (Almeida, op. cit.).

C. reticulata Blanco, Fl. Filip. 610. 1837; Almeida, Fl. Mah. 1: 204. 1996; Nair & Nayar in Hajra et al. Fl. India 4 : 287. 1997; Naik, Fl.

Marathwada 1 : 194. 1998. *C. chrysocarpa* Lush. in Indian Forester 36 : 343. 1910; Naik, Fl. Osmanabad 65. 1979. *C. poonensis* Hort. ex Tanaka in Int. Rev. Sci. Pract. Agric. n. s. 1 : 34. 1923. *'Santra', 'Zambari'*.

Small trees. Leaves lanceolate, elliptic or obovate Flowers white, in clusters, axillary. Fruits 5–6 cm across, orange cloured, depressed globose or sub globose when fully ripe. Seeds small, pointed at one end with green embryo.

Fls. & Frts. : June–August.

Distrib. : It is a Native of Philippines. Cultivated for fruits.

C. sinensis (L.) Osb. Dagbok Ostind. Resa 41. 1775; Tanaka in J. Indian Bot. 16: 236. 1937; Nair & Nayar in Hajra et al. Fl. India 4 : 287. 1997. *C. aurantium* L. var. *sinensis* L. Sp. Pl. 782. 1753. *'Mosambi'*.

Medium sized trees; spines few or absent. Leaves ovate–oblong, acuminate, sinuate or crenate, rounded at base, pointed at apex; petioles narrowly winged or not. Flowers white. Fruits globose; rind green or yellow when ripe; pulp sweet, orange yellow.

Fls. & Frts. : More or less throughout the year.

Distrib. : Probably native of China. Cultivated for its sweet fruits. Nagpur, Osmanabad.

Clausena excavata Burm. f. Fl. Ind. 87, t. 29, f. 2. 1768; Hook. f. Fl. Brit. India. 1: 504. 1875; Almeida, Fl. Mah. 1: 206. 1996; Nair & Nayar in Hajra et al. Fl. India 4 : 325. 1997.

Small trees; young parts softly tomentose. Leaves 20–30-foliolate, 15–30 cm long; leaflets membranous, ovate or lanceolate, acuminate at apex, oblique at base, crenate along margins. Panicles 10–30 cm long. Flowers 4-merous. Fruit c 1.8 cm across, broadly oblong.

Fls. & Frts. : May–July.

Distrib. : Only found cultivated in gardens (Almeida, op. cit.).

C. lansium (Lour.) Skeels in U.S. Dept. Agric. Bur. Pl. Industry, Bull. 168:31. 1909; Nair & Nayar in Hajra et al. Fl. India 4 : 330. 1997. *Quinaria lansium* Lour. Fl. Cochinch. 272. 1790. *Clausena wampii* Blanco Flor. Filip. 358. 1837; Hook. f. Fl. Brit. India 1: 505. 1875.

Small trees, unarmed. Leaves spirally arranged, pinnate; leaflets 5–9, ovate–elliptic, 7.5–12.5 cm in long; petioles shiny above. Flowers

4–5–merous, in large terminal panicles, white. Fruits ovate–globose c 1.5 cm long, 5–lobed; skin glandular pubescent.

Distrib. : A native of China, Formosa & Indo–China. Grown in gardens, probably for its fruits. Bombay, Satara.

Micromelum falcatum (Lour.) Tanaka in Bull. Mus. Hist. Nat. Paris 2, 2: 157. 1930; Almeida, Fl. Mah. 1: 209. 1996. *Aulacia falcata* Lour. Fl. Cochinch. 1: 273. 1790.

Shrubs or small trees; twigs wooly pubescent when young, turning glabrescent at maturity. Leaves 5–30 cm long, imparipinnately compound; leaflets 7–9, lanceolate, falcate, long acuminate at apex, crenulate along margins; lateral nerves 6–8 pairs. Inflorescence shorter than leaves. Flowers c 5 mm long, greenish–white. Fruits ellipsoid, fleshly, with numerous glands and 2–3 segments.

Fls. & Frts. : December–January.

Distrib. : It is a native of China. Cultivated in gardens (Almeida, op. cit.).

Pamburus missionis (Wallich ex Wight) Swingle in J. Wash. Acad. Sci. 6: 338. 1916 & in Webber & Batchelor, Citrus Industr. 1 : 263. 1967; Almeida, Fl. Mah. 1: 211. 1996; Nair & Nayar in Hajra et al. Fl. India 4 : 304, f. 80. 1997. *Limonia missionis* Wallich (Num. List No. 6358. 1832, nom. nud.) ex Wight in Hook. J. Bot. Misc. 3: 291, t. 33. 1833.

Small trees; branches terete, the old ones with long, sharp thorns. Leaves 5–10 cm long, oblong–obovate or elliptic, rounded, thick and coriaceous, rounded or emarginate at apex, undulate or crenulate along margins. Racemes 2–4 cm long, 6–8–flowered. Flowers white, 1–2 cm across. Berries globose c 2.5 cm across, 4–5–celled, cells 1–seeded. Seeds oblong.

Fls. & Frts. : December–February.

Distrib. : Rarely cultivated in gardens (Almeida, op. cit.).

Ravenia spectabilis (Lindl.) Engl. in Mart. Fl. Brazil. 12(2): 126. 1840; Almeida, Fl. Mah. 1: 211. 1996; Nair & Nayar in Hajra et al. Fl. India 4 : 408. 1997. *Limonia spectabilis* Lindl. Bot. Reg. t. 59. 1840.

Sender shrubs. Leaves opposite, 3–foliolate; leaflets entire. Flowers red, solitary or in few–flowered clusters on axillary peduncles.

Distrib. : It is a native of Cuba & Brazil. Pune (Almeida, op. cit.).

Ruta chalepensis L. Mant. 1: 69. 1767; Chandrab. & Nair, Fl. Coimbatore 55. 1988; Nair & Nayar in Hajra et al. Fl. India 4 : 363. 1997. *R. graveolens* var. *angustifolia* (Pres.) Hook. f. Fl. Brit. India 1: 485. 1875 non *R. angustifolia* Pers. 1805; Cooke, Fl. Pres. Bombay 1: 187. 1958 (Repr.). *'Satap'*.

Herbs 30–60 cm high, tall, aromatic. Leaves 2–3 pinnate, 5–8 cm long; segments spathulate, oblong or linear–oblong, cuneate at base. Flowers in corymbs, yellow. Capsules 6–8 mm across, globose, 4–5–lobed.

Fls. & Frts. : February–October.

Distrib. : Native of the Mediterranean region. Planted in gardens. Ahmednagar, Bombay, Nagpur, Osmanabad, Pune, Sindhudurg, Thane.

Notes : Plants are used as antiseptic, stimulant, etc. mainly for uterine & nervous system (Chandrabose & Nair, op. cit.). Leaves are used in rheumatism & in treating hysteria, worms (Ugemuge, 1986). Essential oil is used in hysteria, ammenorrhoea & epilepsy (Nair & Nayar in Hajra et al. op. cit.).

Triphasia trifolia (Burm. f.) P. Wils in Torreya 9 : 33. 1909; Nair & Nayar in Hajra et al. Fl. India 4 : 319. 1997. *Limonia trifolia* Burm. f. Fl. Ind. 103. 1768. *Triphasia aurantiola* Lour. Fl. Cochinch. 5(1): 152. 1790; Cooke, Fl. Pres. Bombay 1: 195. 1958 (Repr.). *T. trifoliolata* (L.) DC. Prodr. 1 : 536. 1824; Hook. f. Fl. Brit. India 1 : 507. 1875 *'Chini Limbu'*.

Shrubs, straggling, with axillary, straight, paired spines. Leaves 3–foliolate; leaflets ovate–elliptic, terminal leaflet larger. Flowers axillary, solitary or in 2–3–flowered peduncled cymes, fragrant, white. Berries ovoid.

Fls. & Frts. : February–May.

Distrib. : Probably native of China. Grown in gardens. Bombay, Nagpur, Pune, Thane.

Zanthoxylum armatum DC. Prodr. 1: 727. 1824 non (Thunb.) Druce 1917; Nair & Nayar in Hajra et al. Fl. India 4 : 379. 1997. *Z. alatum* Roxb. Fl. Ind. 3: 768. 1832; Hook. f. Fl. Brit. India 1: 493. 1875; Almeida, Fl. Mah. 1: 213. 1996.

Large shrubs or small trees; stems covered with vertically flattered prickles. Leaves 3–7–foliolate; leaflets 2–10 cm long, lanceolate or elliptic–lanceolate, rarely ovate, obtusely acuminate at apex; petioles and rachis winged with 2 stipular prickles near base.

Flowers 3–4 mm across, in panicles. Carpels solitary, 4–5 mm across, ovoid pale red, tubercled.

Fls. & Frts. : October–December.

Distrib. : Bageshwar (Almeida, op. cit.).

SIMAROUBACEAE

(S. Moorthy)

1.	Leaves simple	...	QUASSIA
1.	Leaves compound	...	AILANTHUS

AILANTHUS Desf. (nom. cons.)

1.	Leaflets entire; filaments longer than anthers	...	*A. triphysa*
1.	Leaflets coarsely toothed; filaments shorter than anthers	...	*A. excelsa*

Ailanthus excelsa Roxb. Pl. Cor. 1: 24, t. 23. 1795; Bennett in Hook. f. Fl. Brit. India 1: 518. 1875; Cooke, Fl. Pres. Bombay 1: 205. 1958 (Repr.); Basak in Fasc. Fl. India 4: 4. 1980. *'Ghod–limb', 'Maharukh'.*

Trees, 8–20 m; leaf scars large. Leaves 20–50 cm long or more; leaflets 8–14 pairs, 8–16 x 4–7 cm, alternate or subopposite, tomentose when young, variable in shape, apex acute or acuminate, base unequal. Flowers greenish in much branched, lax panicles. Samaras 4–6 x 1.0–1.5 cm, reddish–brown, linear–oblong to lanceolate. Seeds solitary.

Fls. & Frts. : January–July.

Illus. : Wight, Illus. 1: 70, t. 67. 1840; Talb. For. Fl. Bombay Pres. & Sind 1: 208, ff. 126, 127. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 115. 1982.

Distrib. : In scrubs or dry deciduous forests and sometimes planted as an avenue tree. Common throughout the State.

A. triphysa (Dennst.) Alston, Handb. Fl. Ceylon 4 (Suppl.): 41. 1931; Basak in Fasc. Fl. India 4: 5. 1980. *Adenanthera triphysa* Dennst. Schluess. Hort. Malab. 32. 1818. *Ailanthus malabarica* DC. Prodr. 2: 69. 1825 nom. illeg.; Bennett in Hook. f. Fl. Brit. India 1: 518. 1875; Cooke, Fl. Pres. Bombay 1: 206. 1958 (Repr.).

Trees, 30–40 m. tall. Leaves 20–70 cm long, mostly paripinnate; leaflets 6–10 pairs, 9–12 x 2.5–5.5 cm, opposite, obliquely

ovate–lanceolate to oblong–lanceolate, apex acute to acuminate, base unequal, wavy along the margins. Flowers white, in 20–50 cm long dense panicles. Samaras 5–6 x 1.5–2.5 cm, reddish–brown, linear–oblong, rounded at both ends. Seeds solitary.

Fls. & Frts. : January–June.

Illus. : van Rheede, Hort. Malab. 6 : 27, t. 15. 1686 (based on Pongelion)

Distrib. : In semi–evergreen forests. Rare. Pune, Raigad, Ratnagiri – Kolhapur Road (Cooke, op. cit.), Satara.

QUASSIA L.

Quassia indica (Gaertn.) Nooteb. in Blumea 11: 517. 1962; Nicols. et al. Interp. Van Rheede, Hort. Malab. 245. 1988. *Samadera indica* Gaertn. Fruct. 2: 352, t. 156, f. 3. 1791; Bennett in Hook. f. Fl. Brit. India 1: 519. 1875; Cooke, Fl. Pres. Bombay 1: 206. 1958 (Repr.); Basak in Fasc. Fl. India 4: 15. 1980.

Trees, 6–10 m. high. Leaves 16–28 x 4–11 cm, elliptic–oblong, apex usually shortly acuminate, base rounded, rarely subacute. Flowers tetramerous, white or pale yellow, many on 7–20 cm long umbels. Drupes 1–4, 4–6 x 3–4 cm, flattened, reticulate, keeled.

Fls. & Frts. : January–July.

Illus. : Wight, Illus. 1: 171, t. 68. 1840.

Distrib. : In semi–evergreen forests. Sindhudurg, 'S. Konkan' (Cooke, op. cit.).

Notes : It is the source of the '*niepa*' bark of commerce. Wood is used in Match–stick industry.

CULTIVATED SPECIES :

Quassia amara L. Sp. Pl. ed. 2, 553. 1762. app. 1679. 1763; Basak in Fasc. Fl. India 4: 18 1980; Almeida, Fl. Mah. 1: 214. 1996. *'Suranam'*.

Shrubs, 2–3 m tall. Leaves compound, pentaphyllous; leaflets elliptic–oblong; petioles winged. Inflorescence of racemes. Flowers crimson c 4 cm long.

Fls. : June–October.

Distrib. : Planted. Bombay & Thane (Almeida, op. cit.).

Notes : It is a native of Tropical America.

BALANITACEAE

(S. Moorthy)

BALANITES Del.

Balanites aegyptiaca (L.) Del. in Descr. Egypt. Hist. Nat. 2: 221, t. 28, f. 1. 1813; Basak in Fasc. Fl. India 4: 20. 1980. *Ximenia aegyptiaca* L. Sp. Pl. 1194. 1753. *Balanites roxburghii* Planch. in Ann. Sci. Nat. 4, 2: 258. 1854; Bennett in Hook. f. Fl. Brit. India 1: 522. 1875; Cooke, Fl. Pres. Bombay 1: 207. 1958 (Repr.). '*Hingan–bet*', '*Hingu*'.

Shrubs or trees, upto 5 m tall; younger parts pubescent, spines 2.5–4.5 cm long, often with leaves and flowers. Leaves bifoliolate; leaflets 1.5–5.0 x 1.0–2.5 cm, elliptic–obovate, oblanceolate, puberulous, apex obtuse or acute or rarely mucronulate, base rounded or cuneate. Flowers 4–12, greenish–white, in axillary, short peduncled cymes or fascicles. Drupes 3–6 x 2–4 cm, woody angular, 5–grooved, yellow when ripe. Seeds solitary, strong.

Fls. & Frts. : March–June.

Illus. : Wight, Ic. t. 274. 1840; Talb. For. Fl. Bombay Pres. & Sind 1: 211, f. 128. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 116. 1982 (*Balanites roxburghii*).

Distrib. : Common in scrub and dry deciduous forests.

Notes : Amalraj (1985) opines that the species occurring in India should be named as *Balanites roxburghii* instead of merging it with African *B. aegyptiaca*. However the characters on which he bases his argument are quantitative rather than qualitative, such as length of petiole, hairiness of petals and lengthening of the ovary and weight and pulp content of the fruits. Hence his view is not acceptable.

The flowers are fragrant. The fruit pulp is foetid smelling, said to be edible and also used for cleansing silk and cotton. Bark used as anthelmintic for cattle and its juice used as fish–poison. Wood is used for walking sticks and as fuel.

The roots and fruits of this plant yield diosgenin which is the starting material for the production of cortico steroid sex harmones, oral contraceptives and anabolic agents (Amalraj & Jayaraman, 1979).

OCHNACEAE

(S. Moorthy)

1. Stamens 10, anthers opening by terminal pores ... CAMPYLOSPERMUM
1. Stamens indefinite, anthers dehiscing longitudinally ... OCHNA

CAMPYLOSPERMUM Tieghem

Campylospermum serratum (Gaertn.) Bittrich & M.C.E. Amaral in Taxon 43: 92. 1994. *Meesia serrata* Gaertn. Fruct. 1: 344, t. 70, f 6. 1788. *Gomphia angustifolia* Vahl, Symb. 2: 49. 1791; Bennett in Hook. f. Fl. Brit. India 1: 525. 1875; Cooke, Fl. Pres. Bombay 1: 209. 1958 (Repr.). *G. serrata* (Gaertn.) Kanis in Taxon 16: 422. 1967.

Trees, much-branched. Leaves 7.5–15.0 x 2.5–5.0 cm, oblong-lanceolate, base and apex acute, margins finely serrate. Flowers yellow, in pyramidal, terminal and axillary panicles. Drupes 5 or fewer, 0.6–1.0 cm across, usually obovoid, smooth, reticulately veined, surrounded by persistent sepals.

Fls. & Frts. : December–March.

Distrib. : Rare in moist deciduous forests. Sindhudurg.

OCHNA L.

Ochna obtusata DC. in Ann. Mus. Natl. Hist. Nat. 17: 411, t. 11. 1811. *O. squarrosa* auct. non L. 1762; Bennett in Hook. f. Fl. Brit. India 1: 523. 1875 (excl. syn. *O. lucida* Griff. & *O. rufescens Thw.*); Cooke, Fl. Pres. Bombay 1: 208. 1958 (Repr.).

1. Undershrubs; leaf margins spinous-serrate ... var. *pumila*
1. Shrubs or trees; leaf margins not spinous-serrate:
   2. Leaves glaucous, margins wavy, entire or serrate, densely clustered on short branchlets; flowers in racemes; stigma lobed ... var. *gamblei*
   2. Leaves green, margins not wavy, finely serrate, alternate; flowers in umbellate panicles; stigma simple ... var. *obtusata*

var. **obtusata.** *'Kanak Champa'.*

Shrubs, 2–3 m tall. Leaves 6–10 x 2–4 cm, elliptic or oblanceolate, young leaves pale reddish. Flowers 1.5–2.0 cm across, yellow, on old wood or sometimes on short leafless branchlets. Drupes 1.5 x 0.6 cm, ovoid, 2–4-together, black when ripe, surrounded by persistent calyx.

Fls. & Frts. : February–April.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 212, f. 129. 1909.

Distrib. : In deciduous forests. Sometimes found planted in gardens.

Notes : Flowers fragrant, petals shorter than sepals.

var. **gamblei** (King ex Brandis) Kanis in Blumea 16: 34. 1968. *O. gamblei* King ex Brandis, Indian Trees 128. 1906.

Shrubs or trees, small. Leaves broadly elliptic or obovate, coriaceous, waxy. Flowers yellow in axillary or terminal corymbs. Fruits black on ripening.

Fls. & Frts. : April–June.

Illus. : Matthew, Fur. Illus. Tamilnadu Carnatic t. 83, ff. 1–11. 1988.

Distrib. : In deciduous forests. Rare. Bombay (Kanis, op. cit.), Chandrapur.

var. **pumila** (Buch.–Ham. ex DC.) Kanis in Blumea 16: 34. 1968. *O. pumila* Buch.–Ham. ex DC. Prodr. 1: 736. 1824; Bennett in Hook. f. Fl. Brit. India 1: 524 1875; Cooke, Fl. Pres. Bombay 1: 209. 1958 (Repr.).

Undershrubs, c 60 cm high. Leaves 10.0–16.2 x 3.7–5.0 cm, oblanceolate, base acute; stipules lanceolate. Flowers 3–6, yellow in axillary umbels. Drupes 0.7–1.2 cm long, ellipsoid, reticulately rugose.

Fls. & Frts. : October–January.

Distrib. : In deciduous forests. Infrequent Sindhudurg, 'Konkan' (Cooke, op. cit.).

CULTIVATED SPECIES

Ochna kirkii Oliver, Fl. Trop. Afr.1 : 317. 1868; Almeida, Fl. Mah. 1 : 216. 1919.

Shrubs c 4 m, tall; stem dark coloured. Leaves 5–7 cm long, elliptic–ovate, leathery, acute at both ends, spiny–serrate along margins. Flowers yellow, 1–3 cm across, 1–3 together at ends of branches. Berries scarlet red when ripe.

Fls. & Frts. : November–April.

Distrib. : Cultivated in gardens. Bombay (Almeida, op. cit.).

Notes : It is a native of Africa.

BURSERACEAE

(S. Moorthy)

1. Drupes dehiscent; pyrenes separating ... BOSWELLIA
1. Drupes indehiscent; pyrenes not separating :
   2. Flowers trimerous; stamens connate into a tube ... CANARIUM
   2. Flowers tetra or pentamerous; stamens free:
      3. Leaflets less than 3 pairs; calyx toothed; disc cupular ... COMMIPHORA
      3. Leaflets 6–15 pairs; calyx 5–fid; disc lining the calyx tube ... GARUGA

BOSWELLIA Roxb. ex Colebr.

Boswellia serrata Roxb. ex Colebr. in Asiat. Res. 9: 379, t. 5. 1807; Bennett in Hook. f. Fl. Brit. India 1: 528. 1875; Cooke, Fl. Pres. Bombay 1: 210. 1958 (Repr.). *'Salai', 'Salphali', 'Sarpal'.*

Trees, 4.5–6.0 m tall; young shoots pubescent. Leaves 15–21 cm long, imparipinnate, apically clustered; leaflets, 1.3–5.0 x 1.3–2.3 cm, subopposite, ovate–lanceolate or oblong, apex acute, base cuneate or subacute. Flowers 1 cm across, axillary, in racemes shorter than leaves. Drupes trigonous, c 1.5 x 1.0 cm, pyrenes 3, each single seeded.

Fls. & Frts. : February–June.

Illus. ; Bedd. Fl. Sylv. t. 174. 1871; Talb. For. Fl. Bombay Pres. & Sind 1: 216, t. 130. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 118. 1982.

Distrib. : In deciduous forests. Common throughout the state.

CANARIUM L.

Canarium strictum Roxb. Fl. Ind. 3: 138. 1832; Bennett in Hook. f. Fl. Brit. India 1: 534. 1875; Cooke, Fl. Pres. Bombay 1: 214. 1958 (Repr.); Leenh. in Blumea 9: 414. 1959. *'Raldhup'.*

Trees, 20 m tall; young branches and leaves densely rufous–tomentose beneath. Leaves up to 60 cm long, imparipinnate, coriaceous; leaflets 3–7 pairs, 10–20 x 4.5–8.7 cm, ovate–oblong or ovate

to ovate- lanceolate, apex acuminate, base obtuse or semicordate, finely serrate along margins. Flowers 0.8 cm across, pale yellow, in short-branched, axillary panicles shorter than leaves. Drupes 3.7–5.0 x 1.5 cm, ellipsoid or ovoid, tapering at both ends; stone hard, bony.

Fls. & Frts. : February –May.

Illus. : Bedd. Fl. Sylv. t. 128. 1871; Matthew, Illus. Fl. Tamilnadu Carnatic 2: tt. 120 & 965 a. 1982.

Distrib. : In evergreen forests. Kolhapur, Pune, Raigad.

COMMIPHORA Jacq.

Commiphora wightii (Arn.) Bhandari in Bull. Bot. Surv. India 6: 327. & 1965 & Fl. Indian Des. 96, f. 34. 1978. *Balsamodendron wightii* Arn. in Ann. Nat. Hist. Soc. 3: 86. 1839. *B. roxburghii* Stocks in J. Asiat. Soc. Beng. 2: 391. 1848 non Arn. 1839; Bennett in Hook. f. Fl. Brit. India 1: 529. 1875. *B. mukul* Hook. ex Stocks in Hook. J. Bot. & Kew Gard. Misc. 1: 259, t. 8. 1849; Bennett in Hook. f. op. cit. *Commiphora mukul* (Hook. ex Stocks) Engl. in DC. Mon. Phan. 4: 12. 1883; Cooke, Fl. Pres. Bombay 1: 212. 1958 (Repr.). *'Gugal'*, *'Gugul'*.

Shrubs, 1–2 m high; young parts glandular–pubescent. Leaves 1–3 foliolate; leaflets subsessile, rhomboid–ovate. Flowers brownish–red in fascicles of 2–3. Drupes 0.6 –0.7 cm across, ovoid, ripens red, epicarp 4–valved; pyrenes ovoid, acute, readily splitting into two.

Fls. & Frts. : March–May.

Illus. : Bhandari, op. cit.

Distrib. : In dry regions. Rare. Jalgaon, Pune.

GARUGA Roxb.

Garuga pinnata Roxb. Pl. Cor. 3: 5, t. 208. 1819; Bennett in Hook. f. Fl. Brit. India 1: 528. 1875; Cooke, Fl. Pres. Bombay 1: 211. 1958 (Repr.); Kalkman in Blumea 7: 468. 1953. *'Kakkad'*.

Trees, c 10 m high. Leaves 15–32 cm long; leaflets 6–12 x 2.5–5.0 cm, ovate or ovate-lanceolate, pubescent on lower side, apex acuminate, base oblique. Flowers 0.4 cm across, yellow, in much branched, axillary, tomentose panicles. Drupes 1–2 cm across, greenish–yellow, black when dry, irregularly globular. Seeds 1–5.

Fls. & Frts. : February–August.

Illus. : Wight, Ic. tt. 1594 & 1595. 1850; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 122. 1982.

Distrib. : In deciduous forests. Common throughout the state.

CULTIVATED SPECIES :

Canarium vulgare Leenh. in Bernice Bishop Mus. 216: 31, f. 13. 1955 & in Blumea 8: 188. 1955; Almeida, Fl. Mah. 1: 220. 1996. *C. commune* auct. non L. 1767; Bennett in Hook. f. Fl. Brit. India 1: 531. 1875.

Trees, small. Leaves imparipinnate, stipules auricled, early deciduous; leaflets 7–9, ovate to oblong or elliptic acuminate at apex; lateral nerves 10–15 pairs. Inflorescence of terminal panicles with short lateral branches. Drupes ellipsoid, sub trigonous with a bony 1–3–celled stone.

Fls. & Frts. : December–February.

Distrib. : Cultivated in gardens. Bombay (Almeida, op. cit.).

Commiphora gileadense (Roxb.) Almeida, Fl. Mah. 1: 219. 1996. *Amyris gileadense* Roxb. Fl. Ind. 2: 246. 1832. *Commiphora berryi* (Arn.) Engl. in DC. Monogr. Phan. 4: 12. 1883; Cooke, Fl. Pres. Bombay 1: 213. 1958 (Repr.). *Balsamodendron berryi* Arn. in Arn. Nat. Hist. 1, 3: 86. 1839; Bennett in Hook. f. Fl. Brit. India 1: 529. 1875.

Bush, much branched or a small tree; branches spiny. Leaves 3–foliolate, petioles slender; leaflets the terminal one 1.0–2.0 cm long, twice as large as lateral ones, obovate, sessile, base cuneate, all entire or the upper portion obsoletely crenate. Flowers c 0.8 cm long, subsessile, solitary or fascicled. Drupes c 1 x 0.7 cm, oblong, apiculate. Seeds 2.

Fls. & Frts. : February–June.

Illus. : Bedd. Fl. Sylv. t. 126. 1871.

Distrib. : Planted. Bombay, Pune.

Notes. : Said to be introduced into Bombay in 1837 by Mr. Watson from Mecca.

C. stocksiana Engl. in DC. Monogr. 4 : 17. 1883; Cooke, Fl. Pres. Bombay 1 : 213. 1958 (Repr.); Naik, Fl. Marathwada 1: 204. 1998. *Balsamodendron pubescens* Stocks in J. As. Soc. Beng. 2: 395, t. 26. 1848 non (Wight & Arn.) Engl. 1883.

Shrubs or small trees, unarmed, 4.5 m tall; bark smooth, strongly aromatic, young parts rusty pubescent. Leaves imparipinnate, upto 15 cm long, base cuneate, entire, pubescent. Flowers yellow or white, 1–3, subsessile, 8–10 mm across, fascicled.

Fls. : March–April.

Illus. : Stocks, op. cit.

Distrib. : Occasionally grown in gardens.

Notes : A native of Sindh and Baluchistan.

MELIACEAE

(S. Moorthy)

1. Leaves simple ... TURRAEA
1. Leaves compound :
   2. Leaves tri, penta or more foliolately compound :
      3. Leaves trifoliolately compound :
         4. Common petiole winged ... NARGAMIA
         4. Common petiole not winged ... WALSURA
      3. Leaves penta or more foliolately compound :
         5. Staminal-tube apically entire ... AGLAIA
         5. Staminal tube apically lobed ... TRICHILIA
   2. Leaves pinnately compound :
      6. Leaves 2–3 pinnately compound ... MELIA
      6. Leaves 1–pinnately compound :
         7. Leaves paripinnate :
            8. Stamens free ... TOONA
            8. Stamens connate into a staminal tube :
               9. Stamens in 2 whorls ... REINWARDTIODENDRON
               9. Stamens not in two whorls (single only) :

10. Leaves less than 15 cm long ... XYLOCARPUS

10. Leaves more than 15 cm long :

11. Leaflets opposite; petals clawed; lobes of staminal tube bidentate ... SOYMIDA

11. Leaflets subopposite; petals not clawed; lobes of staminal tube not bidentate ... CHUKRASIA

7. Leaves imparipinnate :

12. Margins of leaflets entire or undulate, not serrate ... APHANAMIXIS

12. Margins of leaflets serrate :

13. Leaflets opposite; ovary 5–celled ... CIPADESSA

13. Leaflets subopposite; ovary 3–4–celled :

14 Petals 5; ovary 3–celled; disc absent ... AZADIRACHTA

14. Petals 4; ovary 4–celled; disc large, sheathing ovary ... DYSOXYLUM

AGLAIA Lour. (nom. cons.)

1. Fruits bright yellow ... *A. talbotii*

1. Fruits grey or buff coloured :

2. Flowers white; petals 4; stamens 8 ... *A. lawii*

2. Flowers yellow; petals 5; stamens 5 ... *A. elaeagnoidea*

Aglaia elaeagnoidea (A. Juss.) Bth. Fl. Austr. 1: 383. 1863. *Nemedra elaeagnoidea* A. Juss. in Mem. Mus. Hist. Nat. Paris 19: 259, t. 14. 1830. *Aglaia roxburghiana* (Wight & Arn.) Miq. in Ann. Mus. Lugd. Bat. 4: 41. 1868; Hiern in Hook. f. Fl. Brit. India 1: 555. 1875. *A. odoratissima* Bl. Bijdr. 171. 1825; Cooke, Fl. Pres. Bombay 1: 222. 1958 (Repr.).

Trees, 10–15 m tall; young branches, petiolules, inflorescence covered with minute, brown, deciduous scales. Leaves 7–18 cm long; leaflets 5.5–8.0 x 2.5–4.0 cm, elliptic or oblong–lanceolate, apex usually shortly acuminate, base acute. Flowers 0.15–0.20 cm across, globular in axillary, 7–20 cm long panicles. Berries c 1.5 cm across, ovoid–pyriform or subglobose, velvety–tomentose. Seeds solitary, ellipsoid.

Fls. & Frts. : November–June.

Illus. : Wight, Ic. t. 166. 1839 (*Milnea roxburghiana* Wight & Arn.).

Distrib. : In semi–evergreen forests. Infrequent. Ratnagiri, Sindhudurg.

A. lawii (Wight) Sald. in Sald. & Nicols. Fl. Hassan Dt. 392. 1976. *Nimmonia lawii* Wight in Calcutta J. Nat. Hist. 7: 13. 1847. *Amoora lawii* (Wight) Bedd. Fl. Sylv. t. 133. 1871; Hiern in Hook. f. Fl. Brit. India 1: 561. 1875; Cooke, Fl. Pres. Bombay 1: 225. 1958 (Repr.). *'Burumb', 'Kat', 'Ragatrohida'.*

Trees; young branches, inflorescence with yellowish brown scales, at length glabrous. Leaves 15–20 cm long; leaflets 5, 5–10 x 2–3 cm, elliptic or oblong–lanceolate, apex acuminate, base rounded or acute. Flowers in axillary, branched panicles. Fruits c 2.5 cm long, pyriform densely lepidote.

Fls. & Frts. : November–June.

Illus. : Bedd. op. cit.; Talb. For. Fl. Bombay Pres. & Sind 1: 240, f. 142. 1909 (*Amoora lawii).*

Distrib. : In semi–evergreen forests. Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

A. talbotii Raghavan in Bull. Bot. Surv. India 11: 184. 1971. *A. littoralis* Talb. Trees, Shrubs & Woody Climbers Bombay Pres. 76. 1902 non Miq. ex Zipp. 1868 & For. Fl. Bombay Pres. & Sind 1: 235, f. 139. 1909.

Shrubs, evergreen. Leaves c 15 cm long, 5–foliolate; leaflets oblanceolate–obovate, apex acute or shortly acuminate, base cuneate. Flowers pale brown to yellowish in rusty–brown panicles. Berries c 1.7 x 0.8 cm,ovoid, oblong or ellipsoid. Seeds plano–convex.

Fls. & Frts. : September–November.

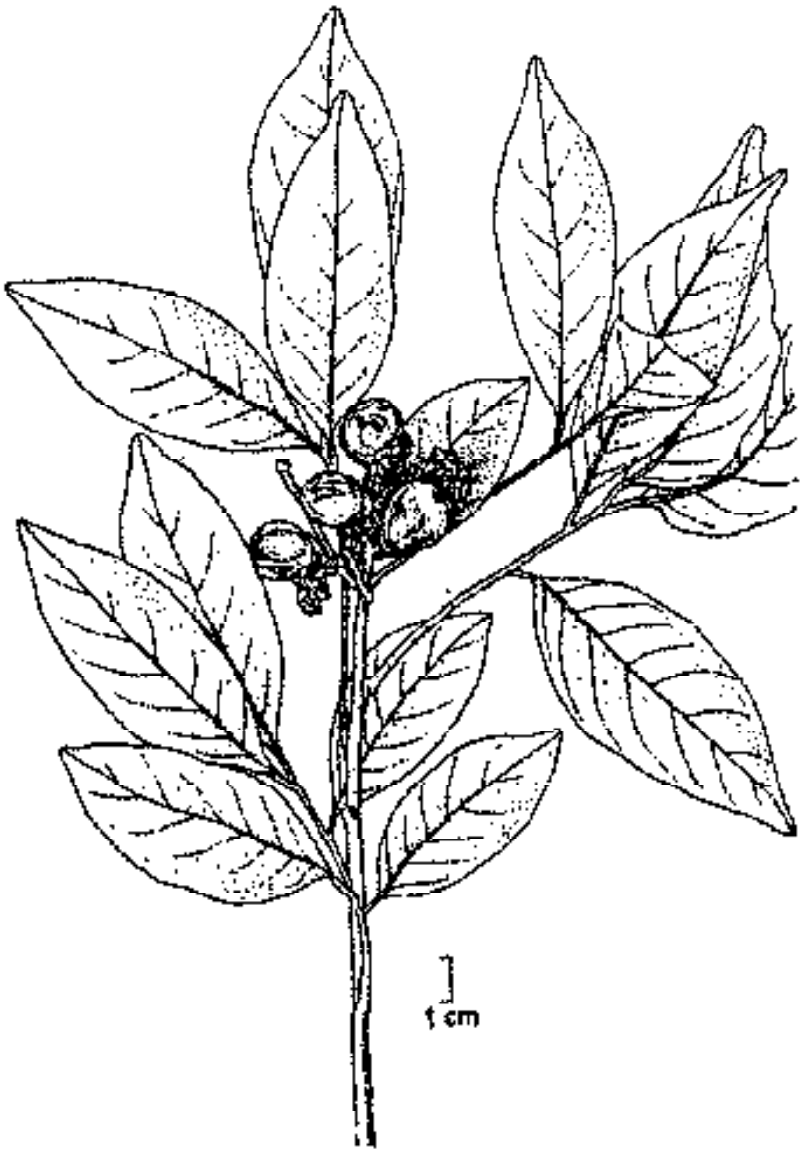
Illus. : Talb. op. cit.

Distrib. : In open forests along the rocky slopes at low altitudes of 100–200 m. 'Konkan' (Talb. op. cit.), Thane.

APHANAMIXIS Bl.

1. Seeds with scarlet aril ... *A. polystachya*

1. Seeds with orange coloured aril ... *A. cucullata*



Aglaia lawii (Wight) Sald.

Aphanamixis cucullata (Roxb.) Almeida, Fl. Mah. 1: 223. 1996. *Amoora cucullata* Roxb. Pl. Cor. 3: 54, t. 258. 1819; Dalz. & Gibs. Bombay Fl. 41: 1861; Hiern in Hook. f. Fl. Brit. India 1: 560.1875; Dalgado, Fl. Goa & Sawantwadi 34. 1898; Cooke, Fl. Pres. Bombay 1: 224. 1958 (Repr.).

Trees, 10–15 m tall. Leaves imparipinnate, 30–40 cm long; leaflets 2–4 pairs and an odd one, opposite or subopposite, 7–17 x 2.0–6.5 cm, oblong–elliptic, subsulcate, base rounded, very inequilateral except the terminal, apex subacute. Male flowers in axillary, lax, branched panicles and female or bisexual flowers larger than male in few flowered supra–axillary racemes. Fruits depressed globular, 5–13 cm across. Seeds 3, rounded, trigonous.

Fls. & Frts. : January–June.

Distrib. : Semi–evergreen forests. Infrequent. Sindhudurg. (Dalgado, op. cit.).

A. polystachya (Wall.) Parker in Indian Forester 57: 486. 1931; Mabb. in Blumea 31: 136.1985. *Aglaia polystachya* Wall. in Roxb. Fl. Ind. 2: 429. 1824. *Amoora rohituka* (Roxb.) Wight & Arn. Prodr. 119. 1834; Hiern in Hook. f. Fl. Brit. India 1: 559. 1875; Cooke, Fl. Pres. Bombay 1: 224. 1958 (Repr.). *A. beddomei* Kosterm. in Acta Bot. Neerl. 31: 133. 1982; Kamble & Sharma in J. Econ. Tax. Bot. 5: 493. 1984; Dawre et al. Ibid 6: 716. 1985. *Aglaia beddomei* (Kosterm.) Jain & Gaur, Ibid. 7: 465. 1985. *A. elaeagnoidea* (Juss.) Bth. var. *beddomei* (Gamb.) K.K.N. Nair in J. Bombay nat. Hist. Soc. 78: 426. 1981. *A. roxburghiana* sensu Bedd. Fl. Sylv. t. 130A. 1871 non (Wight & Arn.) Miq. 1868. *'Rohitak', 'Sohaga'.*

Trees, 9–18 m tall; young parts finely silky. Leaves 30–45 cm long; leaflets 4–8 pairs and an odd one, 7.5–22.5 x 3–10 cm, elliptic–oblong or oblong–lanceolate, apex acuminate, base inequilateral, obtuse or acute. Male flowers in axillary panicles; female in axillary or supra–axillary, solitary spikes. Fruits 2.5–3.7 cm long, globular, ripens yellow. Seeds oblong.

Fls. & Frts. : July–September.

Illus. : Bedd. op. cit. (*Aglaia roxburghiana*).

Distrib. : In evergreen forests. Bombay, Pune, Sindhudurg.

Notes. : Mabb. op. cit. considers *Aphanamixis beddomei* Kosterm. op. cit. is conspecific with *A. polystachya* (Wall.) Parker. However, he cites *Aglaia? polystachya* Wall. (Cat. No. 1277. 1829) as basionym. In fact Wallich's *Aglaia polystachya* in Roxb. Fl. Ind. 1824, which is 5

years earlier, is the actual basionym. Kamble & Sharma, op. cit., Dawre et al. and Jain & Gaur are the result of erecting a new species, *Amoora beddomei* by Kosterm. which is a superfluous name for *A. polystachya* (Wall.) Parker.

Mabb. op. cit. further states that the differentiating character between *Aglaia* Lour. & *Aphanamixis* Bl. is the union of lengthwise cotyledons in *Aphanamixis* and while it is free in *Aglaia* and if not, it is *Aglaia* only. If so *Aglaia polystachya* Wall. in Roxb. Fl. Ind. 2: 429. 1924. stands as valid and correct name.

AZADIRACHTA A. Juss.

Azadirachta indica A. Juss. in Mem. Mus. Hist. Nat. Paris 19: 220, t. 2, f. 5. 1830; Cooke, Fl. Pres. Bombay 1: 220. 1958 (Repr.). *Melia azadirachta* L. Sp. Pl. 385. 1753; Hiern in Hook. f. Fl. Brit. India 1: 544. 1875. *'Neem,' 'Nim', 'Nimb'.*

Trees, c 6 m high. Leaves crowded near branch endings; leaflets 3.5–6.5 x 1–2 cm, ovate–lanceolate, Flowers white, in axillary panicles. Drupes c 1.5 cm long, ovoid. Seeds solitary, ellipsoid.

Fls. & Frts. : March–June.

Illus. : Wight. Ic. t. 17. 1838; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 125. 1982.

Distrib. : Planted. Common throughout the state along the roadsides and in gardens. Some times naturalised through self propagation.

Notes : Flowers mildly fragrant.

CHUKRASIA A. Juss.

Chukrasia tabularis A. Juss. in Mem. Mus. Paris 19: 251, t. 22, f. 27. 1830; Hiern in Hook. f. Fl. Brit. India 1: 567. 1875; Cooke, Fl. Pres. Bombay 1: 229. 1958 (Repr.).

1. Leaflets glabrous above, more or less velvety beneath ... *var. tabularis*

1. Leaflets tomentose or pubescent on both surfaces ... var. *velutina*

var. **tabularis.** *'Dalmara', 'Lal–devdar'.*

Trees; young branches lenticellate. Leaves abruptly pinnate, 30–45 cm long; leaflets 5–8 pairs, 6.0–12.5 x 2.5–6.2 cm, ovate or ovate–oblong, apex acute or acuminate, base inequilateral. Flowers dirty white, in terminal panicles, shorter than leaves. Capsules 4.5–5.6 x c 2.3 cm, ovoid or obovoid. Seeds winged.

Fls. & Frts. : February–May.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 248, f. 147. 1909.

Distrib. : In evergreen forests. Sometimes found planted also. 'Konkan' (Cooke, op. cit.), Pune, Raigad, Sindhudurg.

var. **velutina** (Wall. ex Wight & Arn.) King in J. Asiat. Soc. Bengal 64: 88. 1895; Hiern in Hook. f. Fl. Brit. India 1: 568. 1874; Cooke, Fl. Pres. Bombay 1: 230. 1958 (Repr. ed.). *C. velutina* Wall. ex Wight & Arn. Prodr. 123. 1834. '*Dung mol*'.

Trees, 8–10 m tall; young parts, inflorescence pubescent. Leaflets 3–5 pairs, 5–10 x 3.5–6.0 cm, ovate or ovate–oblong, apex acuminate. Flowers c 1.2 x 2.2 cm, dirty white; sepals linear–oblong. Capsules c 4.2 x 5.0 cm, ovoid, woody, black.

Fls. & Frts. : February–July.

Illus. : Wight, Illus. t. 56. 1840 (*C. nimmonii* Grah.); Talb. For. Fl. Bombay Pres. & Sind 1: 247, f. 147. 1909.

Distrib. : In moist deciduous forests. Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

CIPADESSA Bl.

Cipadessa baccifera (Roth) Miq. Ann. Mus. Lugd.-Bat. 4: 6. 1868–69. *Melia baccifera* Roth, Nov. Pl. Sp. 215. 1821. *Cipadessa fruticosa* Bl. Bijdr.162. 1825; Hiern in Hook. f. Fl. Brit. India 1: 545. 1875; Cooke, Fl. Pres. Bombay 1: 219. 1958 (Repr.). *'Gudmei'*.

Shrubs, 2–5 m tall. Leaves 11–13–foliolate; leaflets 3.5–6.0 x 1.5–3.0 cm, ovate or elliptic, apex acuminate, base acute. Flowers greenish, in axillary, corymbose panicles. Fruits 0.6–0.8 cm across, indehiscent, 5–ribbed, depressed–globose.

Fls. & Frts. : September–February.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 228, f. 135. 1909 (*Cipadessa fruticosa*).

Distrib. : On hill slopes of the ghats. Aurangabad, Kolhapur, 'Konkan' (Cooke, op. cit.), Pune, Sindhudurg.

DYSOXYLUM Bl.

Dysoxylum binectariferum (Roxb.) Hook. f. ex Bedd. in Trans. Linn. Soc. 25: 212. 1866; Hiern in Hook. f. Fl. Brit. India. 1: 546. 1875;



Melia dubia Cav.

Cooke, Fl. Pres. Bombay 1: 221. 1958 (Repr.). *Guarea binectarifera* Roxb. Fl. Ind. 2: 240 1832. *Kauti, 'Yerindi'.*

Trees, 15–20 m tall. Leaves 15–20 cm long; leaflets 8–14 x 3–5 cm, elliptic–oblong or elliptic–lanceolate, pale green, apex acuminate, base acute, often inequilateral. Flowers c 0.8 x 0.5 cm, white; calyx cupular; petals 4; staminal column c 0.4 cm long. Capsules 4–6 cm long, obovoid, woody, reddish when ripe. Seeds 2–4.

Fls. & Frts. : October–April.

Illus. : Bedd. Fl. Sylv. t. 150. 1871; Talb. For. Fl. Bombay Pres. & Sind 1: 231, f. 137. 1909.

Distrib. : In moist deciduous forests. Kolhapur, Pune, Raigad, Ratnagiri, Sindhudurg.

MELIA L.

1. Flowers greenish or creamy white; anthers longer than the teeth of staminal tube ... *M. dubia*

1. Flowers lilac; anthers as long as teeth of staminal tube ... *M. azedarach*

Melia azedarach L. Sp. Pl. 384. 1753; Hiern in Hook. f. Fl. Brit. India 1: 544. 1875; Cooke, Fl. Pres. Bombay 1: 218. 1958 (Repr.). *'Bakain, 'Bakan nimb', 'Bakavan', 'Pejri'.*

Trees, c 6 m tall. Leaves opposite or alternate; leaflets 3–11, ovate or lanceolate, apex acuminate, base slightly inequilateral. Flowers in long peduncled, axillary panicles. Drupes ellipsoid–globose. Seeds 4, ellipsoid.

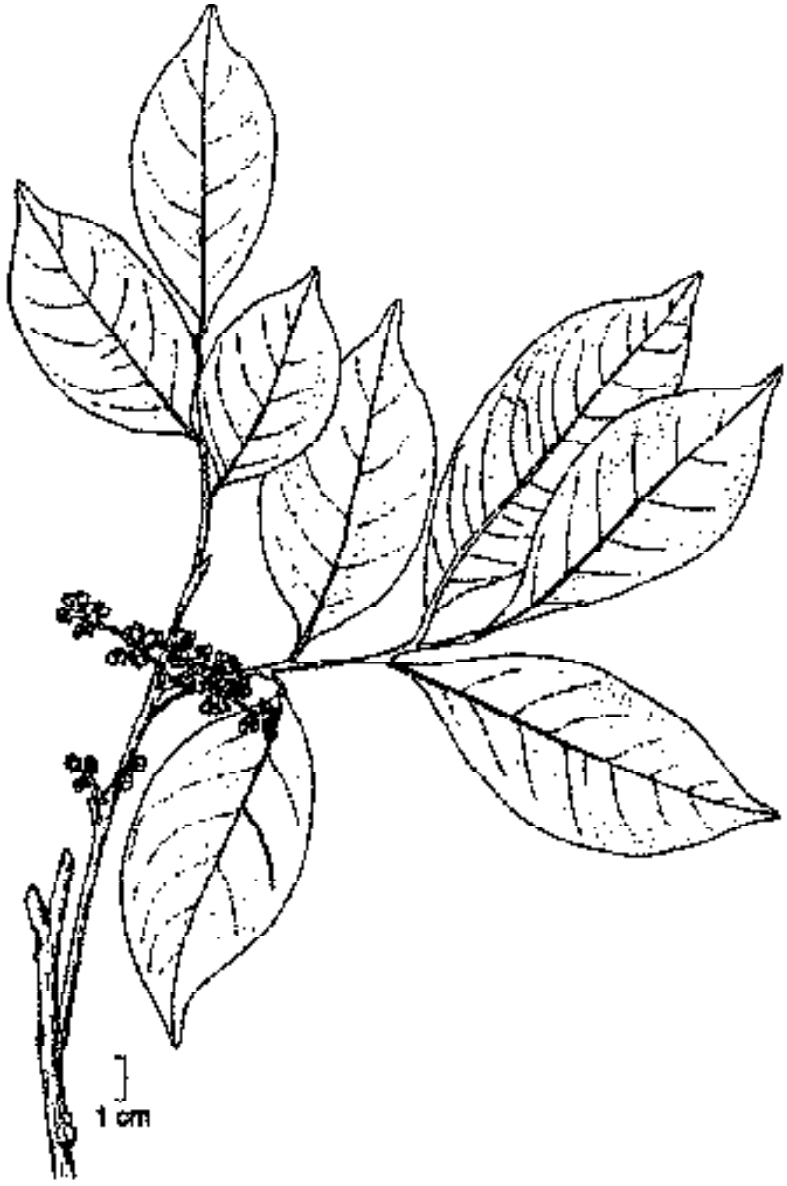
Fls. & Frts. : July–August.

Illus. : Wight, Ic. t. 160. 1893; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 128. 1982.

Distrib. : In the outskirts of moist deciduous forests, frequently planted along roadsides.

Notes. : The flowers are mildly fragrant.

M. dubia Cav. Diss. 7: 364. 1789; Ramam. in Sald. & Nicols. Fl. Hassan Dt. 94. 1978 (2nd Repr.). *M. composita* Willd. Sp. Pl. 2: 559. 1799; Hiern in Hook. f. Fl. Brit. India 1: 545. 1875; Cooke, Fl. Pres. Bombay 1: 218. 1958 (Repr.). *'Kadu Khajur', 'Kala Khajur', 'Maha–neem', 'Nimbara'.*



Reinwardtiodendron anamalayense (Bedd.) Mabb.

Trees, c 15 m tall; young shoots stellate–hairy. Leaves upto 24 cm long; leaflets 4.5–5.5 x 2.5–3.5 cm, ovate–lanceolate. Flowers in stellately pubescent panicles. Drupes c 2 x 1 cm, ovoid. Seeds solitary in each cell.

Fls. & Frts. : April–July.

Illus. : Bedd. Fl. Sylv. t. 12. 1869 (*M. composita*).

Distrib. : In moist deciduous forests. 'Konkan' (Cooke, op. cit.), Nasik, Pune, Raigad, Ratnagiri, Satara, Solapur.

NAREGAMIA Wight & Arn.

Naregamia alata Wight & Arn. Prodr. 117. 1834; Hiern in Hook. f. Fl. Brit. India 1: 542. 1875; Cooke, Fl. Pres. Bombay 1: 217. 1958 (Repr.). *'Kapur bhendi'.*

Herbs, 10–25 cm tall, erect or decumbent, woody. Leaves trifoliolate; leaflets 1–4 x 1.0–1.5 cm, cuneate obovate. Flowers 2.5–3.0 x 3 cm, white, axillary, solitary or 2 together. Capsules 0.6–0.8 cm across, ovoid, 3–lobed. Seeds tubercled, brown.

Fls. & Frts. : August–December.

Illus. : Wight, Ic. t. 90. 1838.

Distrib. : In open areas of deciduous forests. Raigad, Ratnagiri, Sindhudurg.

Notes : Flowers are showy and fragrant.

REINWARDTIODENDRON Koord.

Reinwardtiodendron anamalaiense (Bedd.) Mabb. in Malayan Forester 45 : 452. 1982; S. S. Jain & S. S. R. Bennet in Hajra et al. Fl. India 4: 498, f. 121. 1997. *Lansium anamalaiense* Bedd. in Madras J. Lit. Sci. 3,1 : 40. 1864. *L. anamallayanum* Bedd. Fl. Sylv.t. 131. 1871; Hiern in Hook. f. Fl. Brit. India 1: 556. 1875. *Aglaia anamallayana* (Bedd.) C. J. Sald. in Sald. & Nicols. Fl. Hassan Dt. 392. 1966.

Trees, 20 m tall. Leaves 10–30 cm long; leaflets 4–6, alternate, c 16 X 2–6 cm, elliptic–lanceolate, base acute or subequilateral, apex acute, entire along margins, leathery, glaucous. Flowers white, more or less sessile on an inflorescence shorter than leaves. Berries 3 x 1.5 cm, oblong, with dry greyish–tawny rind. Seeds 2.

Fls. & Frts. : March–November.

Illus. :Bedd. op. cit. (*L. anamallayanum*); S.S. Jain & S.S.R. Bennet in Hajra et al. op. cit.

Distrib. : Maharashtra (S. S. Jain & S. S. R. Bennet in Hajra et al. op. cit.).

SOYMIDA A. Juss.

Soymida febrifuga (Roxb.) A. Juss. in Mus. Hist. Nat. Paris 19: 251. t. 22. f. 26. 1830; Hiern in Hook. f. Fl. Brit. India 1: 567. 1875; Cooke, Fl. Pres. Bombay 1: 228. 1958 (Repr.). *Swietenia febrifuga* Roxb. Bot. Doser. Swietenia 1. 1793 & in Med. Facts Obs. 6: 129. 1795 & Pl. Cor. 1: 18, t. 17. 1795. *'Rohan, 'Rohin'*.

Trees. Leaves 22–45 cm long, dark-green, crowded at ends of branches; leaflets 3–6 pairs, 5–12 x 2.5–6.5 cm, elliptic or oblong; penninerved, apex abtuse. Flowers white, in axillary panicles. Fruits c 7.5 cm long, obovoid, woody. Seeds c 4 x 1.5 cm, compressed, winged.

Fls. & Frts. : February–July.

Illus. : Bedd. Fl. Sylv. t. 8. 1869; Talb. For. Fl. Bombay Pres. & Sind 1: 246, f. 146. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 129. 1982.

Distrib. : Common. In deciduous forests.

TOONA Roem.

1.	Flowers with 6 stamens	...	*T. hexandra*
1.	Flowers with 5 stamens	...	*T. microcarpa* var. *pilipetala*

Toona hexandra (Watl. ex Roxb.) Roem. Syn. Hesp. 139. 1849. *Cedrela hexandra* Watl. ex. Roxb. Fl. Ind. 2: 425. 1824. *Toona ciliata* Roem. Syst. Hesp. 136. 1846. *Cedrela toona* Roxb. ex Rottl. & Willd. in Ges. Naturf. Fr. Neue Schr. 2: 198. 1803; Bedd. Fl. Sylv. t. 10. 1869; Hiern in Hook. f. Fl. Brit. India 1: 568. 1875; Cooke, Fl. Pres. Bombay 1: 230. 1958 (Repr.).

1.	Leaflets 4–8 pairs, 4.5 – 9.0 x 2.5–4.0 cm; inflorescence drooping panicles	...	var. *hexandra*
1	Leaflets 8–20, 10–16 x 4–5 cm, inflorescence pyramidal panicles	...	var. *pallitbana*

var. **hexandra**. *'Kudak', 'Mahanim', 'Toona', 'Tuni'*.

Trees, 10–15 m tall. Leaves abruptly pinnate; leaflets 4–8 pairs, 4.5–9.0 x 2.5–4.0 cm, elliptic-oblong or ovate-oblong, the upperside usually larger. lower small, apex acuminate, base inequilateral, rounded or acute. Flowers 0.3–0.35 cm across, white, in large, drooping

terminal, pubescent panicles. Capsules c 3.0 x 1.5 cm, ovoid, 5–angled, with thick, central column, 5–valved. Seeds 1.5–2.0 cm long (including membranous wings).

Fls. & Frts. : December–May.

Illus. : Wight, Ic. t. 161. 1839; Talb. For. Fl. Bombay Pres. & Sind 1: 249, f. 148. 1909; Bedd. op. cit.

Distrib. : In moist deciduous forests. Dhule, Nanded, Pune, Raigad, Ratnagiri, Satara, Sindhudurg.

var. **griffithiana** (Pierre) Almeida, Fl. Mah. 1: 230. 1996. *Cedrela febrifuga* Bl. var. *griffithiana* Pierre Fl. Fr. Cochinch. 4, t. 358. 1897. *Toona ciliata* Roem. var. *australis* (F. Muell.) Bahadur, Monogr. Toona 78. 1988. *Cedrela australis* Muell. Fragm. Austr. 1: 4. 1858.

Trees, tall. Leaves deciduous; leaflets 8–20, 10–16 x 4–5 cm, ovate or ovate–lanceolate, sometimes oblong–ovate or oblong–lanceolate, rarely subfalcate, membranous, oblique or suboblique at base. Flowers in large, pyramidal, many–flowered panicles; androgynophore pubescent; filaments pilose; style hirsute. Capsules c 2.0 x 0.9 cm, oblong, ripens black.

Fls. & Frts. : February–May.

Distrib. : Bombay (Almeida, op. cit.).

T. microcarpa (C.DC.) Harms var. **pilipetala** (C.DC.) Bahadur, Monogr. Toona 113. 1988; Almeida, Fl. Mah. 1: 230. 1996. *Cedrela toona* var. *pilipetala* C.DC. in Rec. Bot. Surv. India 3: 367. 1908.

Trees, moderate–sized, deciduous; branchlets puberulous, lenticelled. Leaflets upto 10 x 4 cm, ovate–oblong, apex acutely acuminate, base tapering below. Flowers in puberulous dark–reddish panicles; sepals sparingly puberulous, outside, ciliate at edges; petals pilose on inner surface; filaments pilose; androgynophore, ovary and style hirsute.

Fls. : April–July.

Distrib. : Bombay (Almeida, op. cit.).

TRICHILIA P. Br.

Trichilia connaroides (Wight & Arn.) Bentv. in Acta Bot. Neerl. 11: 13. 1962. *Zanthoxylum connaroides* Wight & Arn. Prodr. 148. 1834.



Trichilia connaroides (Wight & Arn.) Bentv.

Heynea trijuga Roxb. ex Sims. in Bot. Mag. 41: t. 1738. 1875; Hiern in Hook. f. Fl. Brit. India. 1: 565. 1875; Cooke, Fl. Pres. Bombay 1: 227. 1958 (Repr.). *'Limbara'*.

Trees, 8–10 m tall; branches spreading. Leaves 15–35 cm long; leaflets 7–9, 5–10 x 2.5–4.0 cm, elliptic–oblong or ovate, pale beneath, apex acuminate, base rounded or acute. Flowers 0.4–0.5 cm across, white, in corymbosely branched panicles. Capsules c 1.2 x 1.4 cm, obovoid, reddish–pink when ripe. Seeds 2–5.

Fls. & Frts. : March–September.

Illus. : Bedd. Fl. Sylv. t. 634. 1871; Talb. For. Fl. Bombay Pres. & Sind 1: 242, f. 144. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 132. 1982.

Distrib. : Infrequent in moist deciduous forests. Aurangabad, Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg.

TURRAEA L.

Turraea villosa Benn. Pl. Jav. Rar. 182. 1840; Hiern in Hook. f. Fl. Brit. India 1: 542. 1875; Cooke, Fl. Pres. Bombay 1: 216. 1958 (Repr.).

Shrubs, 3–5 m tall. Leaves 5–10 x 3.5–6.5 cm, ovate or elliptic, membranous, apex acuminate, base acute or rounded. Flowers c 3.5 cm long, yellow, in axillary, solitary or in fascicles in short peduncled umbels. Capsules c 1 cm across, subglobose. Seeds oblong.

Fls. & Frts. : April–August.

Illus. : Wight, Ic. t. 1593. 1850; Talb. For. Fl. Bombay Pres. & Sind 1: 225, f. 134. 1909.

Distrib. : In moist deciduous forests. Bombay, Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

WALSURA Roxb.

Walsura trifoliata (A. Juss.) Harms in Engl. & Prantl, Pflanzenf. ed. 2, 19: 119. 1940. *('trifolia')*. *Heynea trifolia* A. Juss. In Mem. Mus. Hist. Nat. Paris 19: 235. 1830. *Walsura piscida* Roxb. Fl. Ind. 2: 387. 1832; Hiern in Hook. f. Fl. Brit. India 1: 564. 1875; Cooke, Fl. Pres. Bombay 1: 227. 1958 (Repr.). *W. ternata* Roxb. op. cit. 389.; Hiern in Hook. f. op. cit. 563. *'Valursi'*, *'Walsura'*.

Trees, 8–10 m tall. Leaflets 6–10 x 2.5–4.0 cm, elliptic–oblong to ovate– lanceolate, coriaceous, glaucous beneath. Flowers c 0.5 cm across, greenish–creamy, in corymbosely branched, axillary or terminal panicles. Berries c 1.4 x 0.9 cm, ovoid, brownish hairy. Seeds often solitary, completely enclosed in a white fleshy aril.

Fls. & Frts. : November–December.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 241, f. 143. 1909 (*Walsura piscida*).

Distrib. : In moist deciduous forests. Rare. Ratnagiri, Sindhudurg.

XYLOCARPUS Koen.

1. Calyx lobes rounded; petals broadly elliptic–oblong ... *X. granatum*

1. Calyx lobes abruptly truncate; petals obovate–oblong, shortly obliquely acuminate. ... *X. moluccensis*

Xylocarpus granatum Koen. Naturf. 20: 2. 1784. *Carapa moluccensis* Bedd. Fl. Syls. t. 136. 1871 non Lam. 1784; Hiern in Hook. f. Fl. Brit. India 1: 567. 1875 p. p. *C. obovata* Bl. Bijdr. 179. 1825; Cooke, Fl. Pres. Bombay 1: 226. 1958 (Repr.).

Trees. Leaves abruptly–pinnate, 7.5–15.0 cm long; leaflets 1–2 pairs, 7.5–10.0 x 3.7–4.5 cm, oblong–obovate or elliptic, apex obtuse or shortly acuminate, base narrowed, subequilateral. Flowers in axillary, few flowered, cymose panicles. Fruits 6–10 cm across. Seeds angular.

Fls. & Frts. : September–October.

Illus. : Bedd. op. cit.; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 134. 1982.

Distrib. : Along the sea–coast. *'Konkan'* (Cooke, op. cit.).

X. moluccensis (Lam.) Roem. Synop. 1: 124. 1846; Almeida, Fl. Mah. 1: 232. 1996. *Carapa moluccensis* Lam. Encycl. 1: 621. 1785; Hiern in Hook. f. Fl. Brit. India 1: 567. 1875 p.p.

Trees; bark smooth. Leaflets 1–7, 4–12 x 2–6 cm, usually ovate or oblong, thinly coriaceous, apex obtusely acuminate or rarely obtuse, base broadly rounded, acutely acuminate. Flowers yellowish in 6–18 cm long panicles. Fruits broadly ellipsoid, 8–15 cm across, brown.

Fls. & Frts. : February–April.

Distrib. : Sea coast of Konkan (Almeida, op. cit.).

CULTIVATED SPECIES :

Khaya grandifolia C. DC. in Bull. Soc. Bot. Fr. 54, mem. 8: 10. 1907.

Trees; bark blackish, scaly. Leaflets 10–25 x 6–10 cm, elliptic or ovate–elliptic, base shortly cuneate or rounded, apex shortly acuminate.

Fls. & Frts. : January–June.

Illus. : Hutch. & Dalziel, Fl. W. Trop. Afr. 1(1): 699, f. 194. 1954.

Distrib. : Planted. Pune, Thane.

K. senegalensis (Desr.) A. Juss in Mem. Mus. Par. 19: 249. 1830; *Swietenia senegalensis* Desr. in Lam. Encycl. 3: 679. 1791.

Trees, 15–18 m high. Leaves 6–12 x 2.5 cm, shining; leaflets oblong or oblong–elliptic, base rounded or obtuse, Flowers usually tetramerous. Fruits 4–valved, 4–6 cm across.

Fls. & Frts. : January–June.

Distrib. : Planted. Pune, Thane.

Swietenia mahagoni (L.) Jacq. Enum. Pl. Carib. 20. 1760. *Cedrela mahagoni* L. Syst. Nat. ed. 10, 940. 1759. *'Mahogani'.*

Trees, 18–22 m tall; bark rugose, grey–black. Leaves paripinnate; leaflets, 2–4 pairs, 3–5 cm long, opposite, base very oblique, often subfalcate, lanceolate or ovate. Flowers greenish–yellow, in axillary, pendulous panicles shorter than leaves. Capsules 7–15 x c 7.5 cm, ovoid or ellipsoid. Seeds many, flat, winged.

Fls. & Frts. : April–December.

Distrib. : Planted in gardens. Aurangabad, Bombay, Nagpur, Pune, Sindhudurg.

Notes. : Native of tropical Central America and West Indies.

S. macrophylla King in Hook. Ic. Pl. t. 1550. 1896; Almeida, Fl. Mah. 1: 228. 1996; Naik, Fl. Marathwada: 1 : 207. 1998.

Trees c 25 m tall. Leaves paripinnately compound; leaflets 3–4 pairs, subopposite 6–12 x 4–5 cm, ovate–lanceolate, falcate, apex sub acute or acuminate, base inequilateral, entire along margins. Inflorescence of axillary panicles upto 1 cm long. Flowers c 8 mm across. Capsules c 8.5 cm long, globose. Seeds c 6 cm long, winged.

Fls. & Frts. : March--May.

Distrib. : Cultivated in gardens. Bombay (Almeida, op. cit.), Marathwada (Naik op. cit.).

Notes : Native of Tropical America.

FLINDERSIACEAE

(S. Moorthy)

CHLOROXYLON DC. (nom. cons.)

Chloroxylon swietenia DC. Prodr. 1: 625. 1824; Hiern in Hook f. Fl. Brit. India 1: 569. 1874; Cooke, Fl. Pres. Bombay 1: 231. 1958 (Repr.). *'Behru', 'Bhirra', 'Billu', 'Girya', 'Halda'*.

Trees; bark furrowed, corky. Leaves alternate, main rhachis densely pubescent; leaflets oblong–lanceolate, glaucous beneath. Flowers white or yellowish–white, in branched, terminal and axillary panicles. Capsules oblong. Seeds winged.

Fls. & Frts. : January–April.

Illus. : Wight, Ill. Ind. Bot. t. 56. 1840; Bedd Fl. Sylv. t. 11. 1869; Talb. For. Fl. Bombay Pres. & Sind.1: 251, t. 150. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 103. 1982.

Distrib. : Occassional in dry deciduous forests. Ahmednagar, Chandrapur, Nagpur, Nanded, Pune, Raigad, Yavatmal.

DICHAPETALACEAE

(S. Moorthy)

DICHAPETALUM Thouars

Dichapetalum gelonioides (Roxb.) Engl. in Engl. & Prantl. Pflanzenf. 3(4): 348. 1891; Leenh. in Steenis, Fl. Males. 1, 5: 310. 1957. *Moacurra gelonioides* Roxb. Fl. Ind. 2: 69. 1832. *Chailletia gelonioides* Bedd. Fl. Sylv. 3: 59, t. 9. f. 1. 1871; Hook. f. Fl. Brit. India 1: 570. 1875. *C. sumatrana* Miq. Fl. Ind. Bat. Suppl. 327. 1860; Cooke, Fl. Pres. Bombay 1: 232. 1958 (Repr.).

Shrubs, 1.5-2.0 m tall; young parts grey tomentose. Leaves 6-10 x 2.5-4.0 cm, elliptic or oblong–elliptic, pale green, apex acuminate. Flowers c 0.3 cm across, white, in axillary fascicles. Drupes c 1.2 x 1.4 cm, obovoid, 1–2- lobed, pubescent.

Fls & Frts. : February–May.

Illus. : Bedd. op. cit. ; Talb. For. Fl. Bombay Pres. & Sind 1: 253, f. 151. 1909.

Distrib. : Rare in semi–evergreen forests. Sindhudurg.

OLACACEAE

(S. Moorthy)

1. Plants spiny; stamens 10 ... XIMENIA
1. Plants usually unarmed, rarely with prickles (*Olax* psittacorum); stamens 3 or 5 :
   2. Stamens 3; staminodes 5–6 ... OLAX
   2. Stamens 5; staminodes absent ... STROMBOSIA

OLAX L.

1. Straggling shrubs upto 10 m high; racemes solitary, lax ... *O. psittacorum*
1. Lianas upto 20 m long; racemes clustered, dense ... *O. imbricata*

Olax imbricata Roxb. Fl. Ind. 1: 169. 1820; Sleum. in Blumea 26: 156. 1980. *O. wightiana* Wall. ex Wight & Arn. Prodr. 89. 1834; Mast. in Hook. f. Fl. Brit. India 1: 575. 1875; Cooke, Fl. Pres. Bombay 1: 235. 1958 (Repr.). *'Kukurbit'.*

Climbers, woody. Leaves 6–10 x 3–5 cm, oblong–ovate or elliptic–oblong, coriaceous. Flowers c 1.0 x 0.6 cm, white, in axillary, short, pubescent racemes; calyx cupular. Drupes c 1.4 x 1.2 cm, ovoid, enclosed in calyx except the top, red when mature.

Fls. & Frts. : December–May.

Illus. : Wight, Ic. t. 1861. 1852; Bedd. Fl. Sylv. 60, t, 9, f. 2. 1869; Talb. For. Fl. Bombay Pres. & Sind 1: 257, f. 152. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 135, ff. 1–10. 1982.

Distrib. : In moist deciduous forests. Bombay, Kolhapur, Pune, Raigad, Ratnagiri, Sindhudurg, Thane.

O. psittacorum (Willd.) Vahl, Enum. 34, 1804; Almeida & Almeida in J. Bombay Nat. Hist. Soc. 81(3): 742–43. 1984. *Fissibia psittacorum* Willd. Sp. Pl. 1: 194. 1797. *O. scandens* Roxb. Pl. Cor. 2: 2, t. 102. 1798; Mast. in Hook. f. Fl. Brit. India 1: 575. 1875; Cooke, Fl. Pres. Bombay 1: 234. 1958 (Repr.); Sleum. in Blumea 26: 157. 1980.

Shrubs, straggling, much branched, armed with slightly curved prickles on old wood. Leaves elliptic, ovate–oblong, apex obtuse or subacute, base roundish. Flowers white, in short, axillary racemes which are shorter than leaves. Fruits globose, yellow, apiculate, three–fourths enclosed in enlarged calyx.

Fls. & Frts. : August–April.

Distrib. : In deciduous forests. Ahmednagar, Aurangabad, Bombay, Chandrapur, Nagpur, Nanded, Pune, Yavatmal.

STROMBOSIA Bl.

Strombosia ceylanica Gardn. in Calc. J. nat. Hist. Soc. 6: 350. 1846; Mast. in Hook. f. Fl. Brit. India 1: 579. 1875; Cooke, Fl. Pres. Bombay 1: 236. 1958 (Repr.). *'Ragrorar', 'Raktrorar'.*

Trees; bark grey. Leaves 6–12 x 3–5 cm, oblong–lanceolate, coriaceous, pellucid dotted, apex shortly acuminate, base inequilateral, usually acute. Flowers c 0.3 cm across, white, subsessile, in axillary cymes. Drupes 2.0–2.5 x 1.5–1.8 cm, globose or ovoid–pyriform, rugose, ripens purple.

Fls. & Frts. : January–March.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 260, f. 154. 1909.

Distrib. : Rare in semievergreen forests. Pune, Ratnagiri, Sindhudurg.

XIMENIA L.

Ximenia americana L. Sp. Pl. 1193; 1753; Mast. in Hook. f. Fl. Brit. India 1: 574. 1875; Cooke, Fl. Pres. Bombay 1: 234. 1958 (Repr.); Sleum. in Blumea 26: 166. 1980; Almeida, Fl. Mah. 1: 238. 1996.

Shrubs, 1–2 m tall; young shoots angular, stems spinous; branches often ending in spines. Leaves c 3.0 x 2.5 cm, ovate–oblong or roundish, coriaceous, apex emarginate, base rounded. Flowers axillary, c 1 cm long, white, calyx minute, persistent. Drupes ovoid, 1–celled.

Fls. & Frts. : January–March.

Distrib.: On Banks of Tapi river. Jalgaon (Almeida, op. cit.).

OPILIACEAE

(S. Moorthy)

CANSJERA A. Juss. (nom. cons.)

Cansjera rheedii Gmel. in Linn. Syst. Nat. ed. 13, 2: 280. 1791; Mast. in Hook. f. Fl. Brit. India 1: 582. 1875; Cooke, Fl. Pres. Bombay 1: 237. 1958 (Repr.).

Shrubs, climbing; young branches pubescent. Leaves 4–9 x 2.5–3.2 cm, elliptic–oblong, unequal sided, pale green, chartaceous, apex acuminate. Flowers 3.5–4.0 cm long, greenish–white, sessile, in axillary, 1.5–2.5 cm long racemes. Drupes 1.2–1.5 x 0.6–0.8 cm, ellipsoid, ripens red.

Fls. & Frts. : December–March.

Illus. : Wight, Ic. t. 1861. 1852; Talb. For. Fl. Bombay Pres. & Sind 1: 262, f. 155. 1909.

Distrib. : Frequent in diciduous forests. Bombay, Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

ICACINACEAE

(S. Moorthy)

1. Climbing shrubs ... SARCOSTIGMA
1. Erect. trees or shrubs :
   2. Petals glabrous within ... STEMONURUS
   2. Petals villous within ... NOTHAPODYTES

NOTHAPODYTES Bl.

Nothapodytes nimmoniana (J. Grah.) Mabberley in Manilal, Bot. & Hist. Hort. Malab. 88. 1980. *Premna nimmoniana* J. Grah. Cat. Pl. Bombay 155. 1839. *Mappia foetida* (Wight) Miers, Contrib. 1: 64. 1851; Mast. in Hook. f. Fl. Brit. India 1: 589. 1875; Cooke, Fl. Pres. Bombay 1: 239. 1958 (Repr.). *'Amrut', 'Ghanera', 'Kalgur'.*

Trees, c 3 m high. Leaves 5–13 x 2.5–6.5 cm, ovate–oblong, or elliptic–oblong, dark–green above, pale and hairy, at length glabrous, base unequal. Flowers in terminal corymbose panicles, densely pubescent. Drupes ellipsoid–obovoid, purple when ripe.

Fls. & Frts. : September–November.

Illus. : Wight, Ic. t. 955. 1845. (*Stemonurus foetidus*); Bedd. Fl. Sylv. t. 141. 1871. (*Mappia foetida*).

Distrib. : In moist–deciduous forests. Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg.

SARCOSTIGMA Wight & Arn.

Sarcostigma kleinii Wight & Arn. in Edinburgh New Philos. J. 14: 299.1893; Mast. in Hook. f. Fl. Brit. India 1: 594. 1875; Cooke, Fl. Pres. Bombay 1: 240. 1958 (Repr.).

Shrubs, climbing. Leaves 10–30 x 5–10 cm, ovate–oblong or oblong–lanceolate, coriaceous, apex acute or acuminate, base acute or rarely rounded. Flowers greenish, in fascicles, subsessile. Fruits 2.0–3.3 cm long, bright orange–red, rugose.

Fls. & Frts. : October–February.

Illus. : Wight, Ic. t. 1854. 1852.

Distrib. : In evergreen forests along the ghats. Kolhapur.

STEMONURUS Bl.

Stemonurus tetrandrus (Wall. ex Roxb.) Alst. in Trim. Handb. Fl. Ceylon 6 : Suppl. 48. 1931; Almeida, Fl. Mah. 1: 287. 1996. *Lasianthera tetrandra* Wall. ex Roxb. Fl. Ind. 2: 328. 1824. *Gomphandra tetrandra* (Wall. ex Roxb.) Sleum. Notizbl. Bot. Gart. Berl. Dahl. 15 : 238. 1940. *G. axillaris* Wall. ex Bedd. Fl. Sylv. 3: 61, Deser. 1871; Mast. in Hook. f. Fl. Brit. India 1: 568. 1875; Cooke, Fl. Pres. Bombay 1: 237. 1958 (Repr.) *G. polymorpha* Wight, Illus. 103. 1840 et Ic. t. 953. 1845; Mast. in Hook. f. op. cit; Cooke, op. cit. 238.

Shrubs or small trees. Leaves reaching c 15 cm in length, broadly elliptic–oblong to narrow lanceolate, apex acuminate, base acute, entire. Flowers polygamo–dioecious, cymose. Fruits elongate, drupe–like, surmounted by the remains of stigma. Seeds solitary.

Fls. & Frts. : December–May

Illus. : Wight, op. cit.; Talb. For. Fl. Bombay Pres. & Sind. 1 : 263, f. 156. 1909 *(Gomphandra axillaris).*

Distrib. : In semi–evergreen forests. Infrequent. Sindhudurg (Almeida, op. cit.).

AQUIFOLIACEAE

(S. Moorthy)

ILEX L.

Ilex malabarica Bedd. Fl. Sylv. t. 143. 1871; Hook. f. Fl. Brit. India 1: 600. 1875; Cooke, Fl. Pres. Bombay 1: 241. 1958 (Repr.).

Trees. Leaves 5.0 –10.2 x 2.3–3.5 cm, elliptic–lanceolate, apex acute. Flowers white, in axillary umbellate cymes; sepals 6, puberulous; petals 6, oblong, united at base; stamens alternate with petals. Drupes c 0.3 cm across, globose, 6–celled, calyx persistent.

Fls. & Frts. : February–April.

Illus. : Bedd. op. cit.; Talb. For. Fl. Bombay Pres. & Sind 1: 268, f. 159. 1909.

Distrib. : In evergreen forests. Savantwadi, Sindhudurg (Cooke, op. cit.).

CELASTRACEAE

(A. N. Londhe)

1. Seeds winged:
   2. Stamens 5–6 ... LOPHOPETALUM
   2. Stamens 3 :
      3. Inflorescence of panicles; calyx lobes orbicular; carpels 5–10 cm long ... ARNICRATEA
      3. Inflorescence of corymbosely branched cymes or paniculate dichotomous cymes; calyx lobes triangular–ovate; carpels under 5 cm in length
         4. Style overtopping the stamens ... LOESENERIELLA
         4. Style shorter than the stamens ... REISSANTIA
1. Seeds not winged:
   5. Stamens 3 ... SALACIA
   5. Stamens 4–5 :
      6. Fruits indehiscent :
         7. Leaves alternate & opposite; stipules minute, caducous; seeds exarillate ... CASSINE
         7. Leaves opposite; stipules absent; seeds arillate ... PLEUROSTYLIA
      6. Fruits dehiscent:
         8. Leaves alternate:

9. Plants unarmed with terminal inflorescence; flowers polygamous ... CELASTRUS

9. Plants often armed, with axillary or extra axillary inflorescence; flowers hermaphrodite ... MAYTENUS

8. Leaves opposite:

10. Disc absent or annular; petals connate at base ... MICROTROPIS

10. Disc 4–5–lobed; petals free ... EUONYMUS

ARNICRATEA N. Halle

Arnicratea grahamii (Wight) N. Halle in Bull. Mus. Natn. Hist. Paris 4e, 6, Section B Adansonia 1: 14. 1984. *Hippocratea grahamii* Wight, Illus. Ind. Bot. 134. 1839 & Ic. t. 380. 1840; Laws. in Hook. f. Fl. Brit. India 1: 624. 1875; Cooke, Fl. Pres. Bombay 1: 249. 1958 (Repr.). *Pristimera grahamii* (Wight) A.C. Sm. in J. Arnold Arbor. 26: 178. 1945. *Reissantia grahamii* (Wight) Ding Hou in Blumea 12: 33. 1963 & in Steenis Fl. Males. 1, 6: 402, f. 29. 1964; Raju in J. Biol. Sci 8: 57. 1965. *'Daushir', 'Lokhandi', 'Yesti'.*

Shrubs; stems climbing, c 10 m long. Leaves 5–15 x 3–8 cm, ovate–elliptic, coriaceous. Flowers white, in axillary, densely branched panicles. Carpels 3, linear–oblong. Seeds ovoid–oblong, winged below.

Fls. & Frts. : November–May.

Illus. : Wight, op. cit.; Ding Hou in Steenis, op. cit.; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 148. 1982 (*Reissantia grahamii).*

Distrib. : Few, along ghats. Kolhapur, Nasik, Pune, Raigad, Sindhudurg, Satara.

CASSINE L.

1. Leaves broadly and deeply crenate along margins; cymes 5.0–6.5 cm long, slender; petals 0.2–0.25 cm long, orbicular ... *C. glauca*

1. Leaves entire or shallowly crenate along margins; cymes 10 cm long, stout; petals 0.45–0.5 cm long, spathulate ... *C. paniculata*

Cassine glauca (Rottb.) O. Ktze. Rev. Gen. Pl. 1: 114. 1891; Ding Hou in Steenis, Fl. Males. 1, 6: 286. 1962. *Mangifera glauca* Rottb. Nye Samml. Kongel. Norske Vid. Selsk. Skr. 2: 534, t. 4, f. 1. 1783. *Elaeodendron glaucum* (Rottb.) Pers. Syn. Pl. 1: 241. 1805; Laws. in Hook. f. Fl. Brit. India 1: 623. 1875 p.p.; Cooke, Fl. Pres. Bombay 1: 246. 1958 (Repr.). *'Alan, 'Bhutkas' 'Buscut', 'Butya Kalas', 'Jamrasikirmira' 'Kanguni', 'Pigavi', Tamruj'.*

Trees, 4.5–6.0 m tall. Leaves 6–10 x 2.5–5.0 cm, elliptic or ovate–elliptic. Inflorescence of divaricate, axillary or extra axillary, paniculate, dichotomously branched cymes. Flowers greenish; calyx lobes 4–5, orbicular, margins membranous; petals 4 –5, oblong; stamens 4–5; stigma 2–5–lobed; disc 4–5–angled or lobed. Drupes 1.5–2.0 x 0.5 cm, obovoid, stalked, apiculate. Seeds 2.

Fls. & Frts. : August–April.

Illus. : Bedd. Fl. Sylv. t. 148. 1871 (*Elaeodendron roxburghii* Wight & Arn. Prodr. 157. 1834); Talb. For. Fl. Bombay Pres. & Sind 1: 275, f. 182. 1909 (*Elaeodendron glaucum);* Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 141. 1982.

Distrib. : Common throughout the State in deciduous forests.

C. paniculata (Wight & Arn.) Lobreau–Collen in Adansonia 2, 15: 220. 1976. *Elaeodendron paniculatum* Wight & Arn. Prodr. 157. 1834. *E. glaucum* sensu Laws. in Hook. f. Fl. Brit. India 1:623. 1875 p.p. non (Rottb.) Pers. 1805.

Trees. Leaves 5–7 x 2.0–3.5 cm, simple, ovate–lanceolate, margins crenate. Flowers axillary, c 0.5 cm across in c 10 cm long cymes. Drupes fleshy, elliptic. Seeds 2.

Fls. & Frts. : April–July.

Distrib. : Rare in semi–evergreen forests. Sindhudurg.

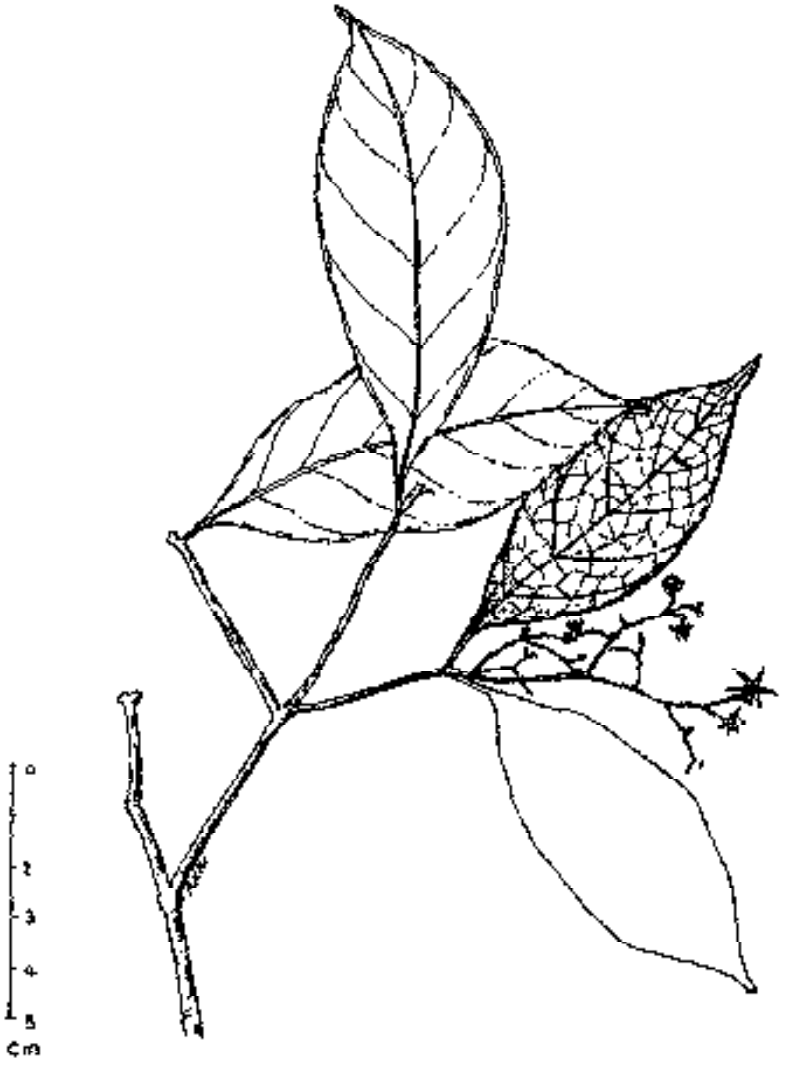
CELASTRUS L.

Celastrus paniculatus Willd. Sp. Pl. 1: 1125. 1798; Laws. in Hook. f. Fl. Brit. India 1: 617. 1875; Cooke, Fl. Pres. Bombay 1: 245. 1958 (Repr.); Ding Hou in Steenis, Fl. Males. 1, 6: 25. 1962. *'Dhimar–bel', 'Jyotishmati', 'Kangli', Kangun; 'Karkanganvel', 'Kazad–Kungoni', 'Kiri', 'Malkangoni', 'Piwalvel'.*

Climbing shrubs; young branches lenticelled. Leaves 3.0–11.5 x 2.5–8.5 cm, broadly elliptic, ovate or obovate, apex acuminate, margins crenate–serrate. Inflorescence of panicles, c 15 cm long, axillary and terminal. Flowers greenish–white or yellow. Capsules c 0.5 cm in diam., subglobose, 3–4–valved, bright yellow. Seeds 1–6, brown, ovoid.

Fls. & Frts. : June–December.

Illus. : Wight, Ic. t. 158. 1839; Talb. For. Fl. Bombay Pres. & Sind 1: 277, f. 163. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 142. 1982.



Loeseneriella ovata (Lam.) Almeida

Distrib. : Common throughout in deciduous forests.

EUONYMUS Tournf. ex L.

Euonymus indicus Heyne ex Wall. in Roxb. Fl. Ind. 2: 409. 1824; Laws. in Hook. f. Fl. Brit. India 1: 608. 1875; Cooke, Fl. Pres. Bombay 1: 242. 1958 (Repr.). *'Sarpin'*.

Shrubs or trees, 5–8 m tall. Leaves 4–8 x 2–4 cm, elliptic, coriaceous, shining, apex acuminate, margins undulate. Flowers 1.0–1.2 cm across, rosy–pink, axillary, solitary or 2–3–together; calyx deeply divided. Capsules 1.6–2.0 cm across, obovate or cordate, 5–winged, ripens reddish.

Fls. & Frts. : January–October.

Illus. : Wight, Ic. t. 215. 1839, (*E. goughii* Wight, Ill. 1: 178. 1850).

Distrib. : Few scattered in semi–evergreen forest. Kolhapur, Sindhudurg.

LOESENERIELLA A. C. Sm.

Loeseneriella ovata (Lam.) Almeida, Fl. Mah. 1: 245. 1996. *Hippocratea ovata* Lam. Illustr. 1: 100, t. 28. f. 2.1791. *H. obtusifolia* Roxb. Fl. Ind. (Carey ed.) 1: 166. 1832; Laws. in Hook. f. Fl. Brit. India 1: 623. 1875; Cooke, Fl. Pres. Bombay 1: 249. 1958 (Repr.). *Loeseneriella obtusifolia* (Roxb.) A.C. Sm. Amer. J. Bot. 28: 440. 1941 & in J. Arnold Arbor. 26: 169. 1945; Raju in J. Biol. Sci. 8: 56. 1965. *'Daushir'*.

Climbing shrubs. Leaves 5–13 x 3–8 cm elliptic or lanceolate, coriaceous, apex acute. Flowers axillary; calyx deeply divided, puberulous; petals triangular Carpels 3, oblong–obovoid, emarginate.

Fls. & Frts. : October–January.

Illus. : Wight, Ic. t. 963. 1845 (*H. obtusifolia*).

Distrib. : Ahmednagar, Pune, Satara, Sindhudurg, Thane.

LOPHOPETALUM Wight & Arn.

Lophopetalum wightianum Arn. in Ann. Nat. Hist. 1, 3: 151. 1839; Laws. in Hook. f. Fl. Brit. India 1: 615. 1875; Cooke, Fl. Pres. Bombay 1: 244. 1958 (Repr.); Ding Hou in Steenis, Fl. Males. 1, 6: 267. 1962. *'Balpale'*.

Trees, 10–15 m tall. Leaves 8–12 x 4–7 cm, broadly elliptic or elliptic–oblong, coriaceous. Flowers 2.5 cm across, white, in terminal or axillary panicles; sepals triangular; petals broadly ovate with undulate margin. Capsules 10–12 cm long, 3–angled, woody. Seeds 0.7 x 2.5 cm, thin, flat, brownish.

Fls. & Frts. : December–May.

Illus. : Wight, Ic. t. 4. 162. 1839; Bedd. Fl. Sylv. t. 142. 1871.

Distrib. : Rare. Sindhudurg.

MAYTENUS Molina

1. Branches and twigs unarmed ... *M. puberula*

1. Branches and twigs armed :

2. Cymes axillary ... *M. senegalensis*

2. Cymes of subsessile clusters from old wood :

3 Ripe capsules bright red ... *M. rothiana*

3. Ripe capsules greenish–black ... *M. ovata*

M. ovata (Wall. ex Wight & Arn.) Loes. in Pflanzenfam. 20 b: 140. 1942; Blacklock in Kew Bull. 1956: 239. 1956; Almeida, Fl. Mah. 1: 242. 1996. *Celastrus ovatus* Wall. ex Wight. & Arn. Prodr. 159. 1834. *Gymnosporia ovata* (Wight. & Arn.) Laws. in Hook. f. Fl. Brit. India 1: 619. 1875.

Shrubs, 3–5 m tall. Leaves 4–8 x 3–6 cm, rounded–ovate, coriaceous, serrate along margins. Flowers in sessile, fasciculate, dichotomous cymes, 6–20 mm long. Fruits c 1 cm long broadly obovoid, 3–celled, drying black, cells 1–2–seeded.

Fls. & Frts. : January–June.

Distrib. : Sindhudurg (Almeida, op. cit.).

M. puberula (Laws.) Loes in Engl. & Prantl, Nat. Pflanzenfam. 20b: 136. 1942. *Gymnosporia puberula* Laws. in Hook. f. Fl. Brit. India 1: 619. 1875; Cooke, Fl. Pres. Bombay 1: 246. 1958 (Repr.). *'Pitari'*.

Shrubs. Leaves 6.0–8.0 x 2.0 x 2.4 cm, obovate–elliptic, cuneate or rhomboid, pubescent. Flowers white, c 0.7 cm across, in slender, few–flowered, lax cymes; calyx deeply divided. Fruits obovoid, 3–angled, on long slender pedicels. Seeds ellipsoid.

Fls. & Frts. : July–September.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 280, f. 165. 1909 (*G. konkanensis*).

Distrib. : Few. Bombay, Pune, Thane.

M. rothiana (Walp.) Lobreau–Collen in Adansonia 2, 15: 223. 1975. *Catha rothiana* Walp. Rep. 1: 532. 1842. *Gymnosporia rothiana* (Walp.) Laws. in Hook. f. Fl. Brit. India 1: 619. 1875; Cooke, Fl. Pres. Bombay 1: 246. 1958 (Repr.). *Maytenus wightiana* Babu in Bull. Bot. Surv. India 10 : 349. 1969. *'Lokhandi', 'Yenki'.*

Scandent shrubs. c 1.5 m high. Leaves 1.0–2.0 x 3.0–5.5 cm, broadly obovate–cuneate, apex rounded or shortly acuminate. Flowers greenish–white; calyx 5–lobed. Capsules c 1 cm across, 3–lobed. Seeds 6, ellipsoid with a small basal aril, brownish–orange, smooth, shining.

Fls. & Frts. : April–October.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 279, f. 164. 1909.

Distrib. : Ahmednagar, Jalgaon, Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

M. senegalensis (Lam.) Excell. in Bot. Soc. Brot. 2, 26: 223. 1952; Almeida, Fl. Mah. 1: 243, f. 1996. *Celastrus senegalensis* Lam. Encycl. 1: 400. 1763. *Maytenus emarginata* (Willd.) Ding Hou in Steenis, Fl. Males. 1, 6 : 241. 1962. *Celastrus montana* Roth in R. & S. Syst. Veg. 5: 427. 1819. *Gymnosporia montana* Bth. Fl. Austr. 1: 400. 1863; Laws. in Hook. f. Fl. Brit. India, 1: 621. 1875; Cooke, Fl. Pres. Bombay 1: 247. 1958 (Repr.). *G. emarginata* (Willd.) Thw. Enum. 409. 1864; Laws. in Hook. f. op. cit. *'Hekel', 'Malkanguni', 'Yenkal'.*

Shrubs, 2.0–2.5 m tall. Leaves 1.5–6.5 x 1.5–4.0 cm, obovate. Flowers white or yellowish, upto 0.5 cm long; calyx ciliate. Capsules concave at tip, purple when ripe. Seeds upto 6, rugose, black.

Fls. & Frts. : September–February.

Illus. : Wight, Ic. t. 382. 1840 (*Celastrus montanus*); Talb. For. Fl. Bombay Pres. & Sind 1: 281, f. 166. 1909 (*G. emarginata*); Almeida, op. cit.

Distrib. : Common throughout the State in scrub and deciduous forests.

MICROTROPIS Wall.

1. Flowers in sessile clusters ... *M. latifolia*

1'. Flowers in peduncled cymes ... *M. microcarpa*

Microtropis latifolia Wight ex Laws. in Hook. f. Fl. Brit. India 1: 613. 1875; Cooke, Fl. Pres. Bombay 1: 243. 1958 (Repr.).

Trees, 5–8 m tall. Leaves 8.5–12.5 x 3.0–7.5 cm, elliptic, coriaceous, apex acute or shortly acuminate, base acute, margins repand. Flowers axillary or extra axillary. Fruits 1.2–2.0 cm long, oblong–ellipsoid, narrowed at both ends. Seeds rugose.

Distrib. : 'Konkan' (Cooke, op. cit.).

M. microcarpa Wight, Ic. t. 975. 1845; Laws. in Hook. f. Fl. Brit. India 1: 614. 1875; Cooke, Fl. Pres. Bombay1: 243. 1958 (Repr.).

Erect shrubs. Leaves 3.7–5.0 x 2.0–2.5cm, elliptic or oblong–lanceolate, coriaceous,apex subobtuse, base acute, margins repand. Calyx persistent; petals clawed. Fruits c 1.2 long, narrow –oblong, subcylindric or ellipsoid, pointed, apiculate, longitudinally rugose. Seeds solitary.

Illus. : Wight, op. cit.

Distrib. : 'Konkan' (Cooke, op. cit.).

PLEUROSTYLIA Wight & Arn.

Pleurostylia opposita (Wall.) Alston in Trimen, Handb. Fl. Ceyl. 6(Suppl): 48. 1931; Ding Hou in Steenis Fl. Males 1, 6: 288. 1962; Almeida, Fl. Mah. 1: 244, f. 1996. *Celastrus opposita* Wall. in Roxb. Fl. Ind. 2: 398. 1824. *Pleurostylia wightii* Wight & Arn. Prodr. 157. 1834; Laws. in Hook. f. Fl. Brit. India 1: 617 1875; Cooke, Fl. Pres. Bombay. 1: 245. 1958 (Repr.).

Shrubs or small trees; bark rough. Leaves 4–6 x 2–3 cm, elliptic–oblong, oblong–lanceolate or somewhat obovate, usually rounded at apex, sometimes emarginate, base acutely tapering. Flowers 3–4mm across, in small, axillary paniculate cymes; peduncles pubescent. Drupes c 9 mm long, ovoid, white, calyx persistent.

Illus : Wight Ic. t. 155. 1839; Bedd. Fl. Sylv. 66, t. 10, f. 1870 (*P. wightii*); Almeida, op. cit.

Distrib. : Ghats (Cooke, op. cit.).

REISSANTIA Halle

Reissantia indica (Willd.) Halle in Mem. Inst. Fr. Afr. Noire 64: 85. 1962; Ding Hou in Blumea 12: 33. 1963 & in Steenis, Fl. Males. 1, 6: 401. 1964; Raju in J. Biol. Sci. 8: 57. 1965. *Hippocratea indica* Willd. Sp. Pl. 1: 193. 1797; Laws. in Hook. f. Fl. Brit. India 1: 624. 1875;

Cooke, Fl. Pres. Bombay 1: 250. 1958 (Repr.). *Pristimera indica* (Willd.) A. C. Sm. in Amer. J. Bot. 28: 440. 1941 & in J. Arnold Arbor. 26: 175. 1945. *'Kazurati', 'Turruli'.*

Climbing shrubs. Leaves 4–8 x 1.5–4.0 cm, elliptic, thin, apex acute or acuminate, margins entire or serrulate. Flowers pale yellow; sepals ovate–triangular; petals lanceolate. Capsules 4.0 x 1.5 cm, oblong, flat.

Fls. & Frts. : February–September.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 285, f. 169. 1909 (*Hippocratea indica*).

Distrib. : Few in forests. Chandrapur, Kolhapur, Nasik, Pune, Satara, Sindhudurg.

SALACIA L.

1. Flowers in short peduncled cymes ... *S. oblonga*
1. Flowers from axillary or extra–axillary tubercles:
   2. Flowers few (1 to 6):
      3. Flowers 1 –2 ... *S. brunoniana*
      3. Flowers 3–6 :
         4. Calyx lobes triangular; fruits 3 or more seeded ... *S. macrophylla*
         4. Calyx lobes rounded; fruits one seeded ... *S. chinensis*
   2. Flowers many (more than 6) ... *S. macrosperma*

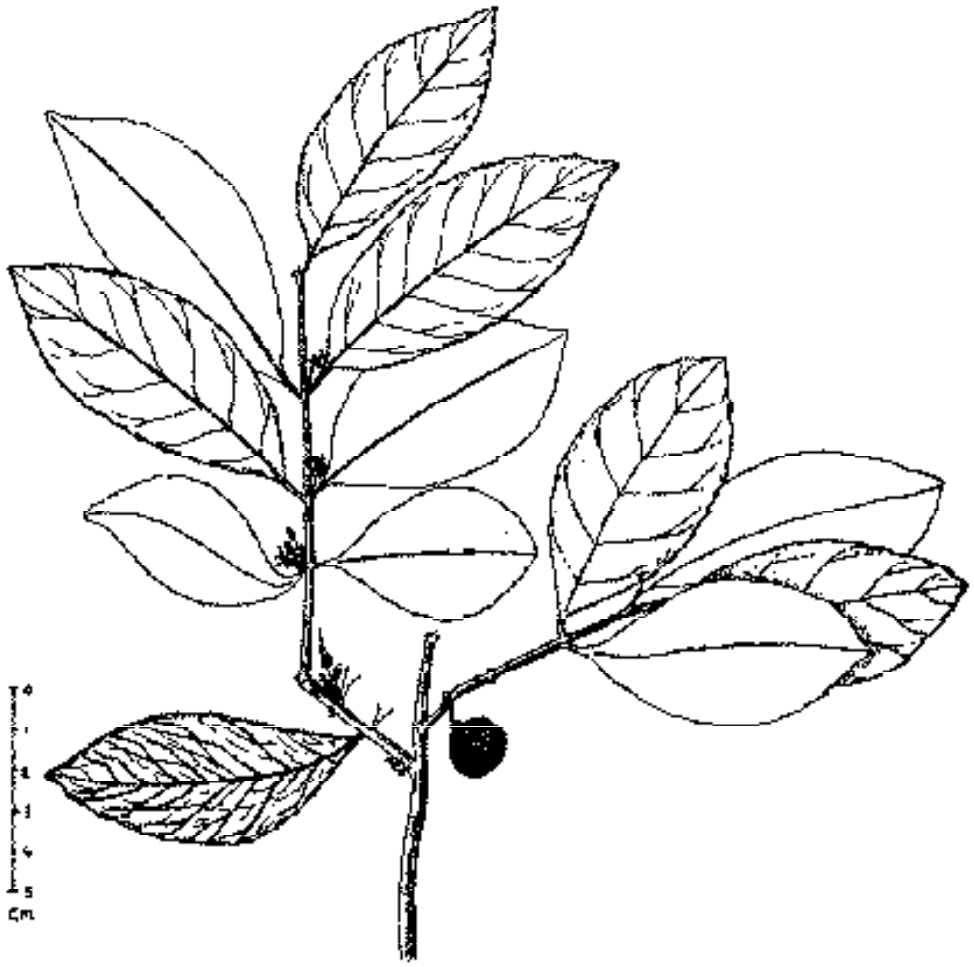
Salacia brunoniana Wight & Arn. Prodr. 105. 1834; Laws. in Hook. f. Fl. Brit. India 1: 626. 1875; Cooke, Fl. Pres. Bombay 1: 251. 1958 (Repr.); Raju in J. Biol. Sci. 8: 57. 1965.

Scandent shrubs; branches terete. Leaves oblong or elliptic, coriaceous, apex acuminate or sub–obtuse, base acute, margins minutely serrate. Flowers axillary; petals with incurved margins when dry.

Fls. & Frts. : January–February.

Distrib. : Sindhudurg.

S. chinensis L. Mant. Pl. 2: 293. 1771; Ding Hou in Steenis, Fl. Males. 1, 6: 419. 1964; Raju in J. Biol. Sci. 8: 57. 1965. *S. prionoides* DC. Prodr. 1: 571. 1824; Laws. in Hook. f. Fl. Brit. India. 1: 626. 1875; Cooke, Fl. Pres. Bombay 1: 250. 1958 (Repr.) *'Nisul bondi', 'Saptarangi'.*



Salacia chinensis L.

Straggling or climbing shrubs; branches divaricate. Leaves 4.5–8.5 x 2.5–3.5 cm, elliptic–oblong, apex shortly acuminate. Flowers yellow, axillary. Berries c 1.2 cm across, subglobose, minutely apiculate. Seeds globose.

Fls. & Frts. : December–June.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 149. 1982.

Distrib. : Common in plains and on ghats. Nasik, Ratnagiri, Thane.

S. macrophylla Bl. Bijdr. 22. 1825; Ding Hou in Steenis, Fl. Males. 1, 6: 412. 1964; Raju in J. Biol. Sci. 8: 58. 1965. *S. flavescens* Kurz in J. Asiat. Soc. Bengal 41: 300. 1872; Laws. in Hook. f. Fl. Brit, India 1: 627. 1875. *S. ovalis* Laws. in Hook f. op. cit.

Lianas. Leaves 7.5–34.0 x 4.5–13.5 cm, elliptic, elliptic–lanceolate or obovate–oblong, apex acuminate, base cuneate; stipules triangular or reniform. Flowers greenish–yellow, axillary. Fruits subglobose or broadly ellipsoid, orange or red.

Distrib. : 'Konkan' (Ding Hou in Steenis, op. cit. & Raju, op. cit.).

S. macrosperma Wight, Ic. t. 962. 1840; Laws. in Hook. f. Fl. Brit. India 1: 628. 1875; Cooke, Fl. Pres. Bombay 1: 251. 1958 (Repr.); Raju in J. Biol. Sci. 8: 58. 1965. *'Dharsi'*.

Lianas; stem blackish–brown. Leaves 10–12 x 3–5 cm, elliptic–oblong or lanceolate, subcoriaceous, apex acute or acuminate, entire. Flowers 3.5 cm across, greenish, in axillary or extra axillary panicles, 8–12–together; sepals oblong, fringed along margins; petals oblong Fruits 2–3 x 2.2.–2.5 cm, globose to obovoid, reddish, wrinkled when mature.

Fls. & Frts. : January–September.

Illus. : Wight, op. cit.

Distrib. : Kolhapur, Sindhudurg.

S. oblonga Wall. ex Wight & Arn. Prodr. 106. 1834; Laws. in Hook. f. Fl. Brit. India 1: 628. 1875; Cooke, Fl. Pres. Bombay 1: 252. 1958 (Repr.); Raju in J. Biol. Sci. 8: 58. 1965.

Scandent shrubs; branches lenticellate. Leaves 7.5–15.0 x 3.5 cm, elliptic–oblong, apex rounded or sometimes obtusely acuminate, crenate–serrate. Flowers greenish–yellow, axillary, usually 3–together.

Fruits 5.0–5.5 cm across, globose or somewhat pyriform, ripens orange. Seeds 1–8, angular, embedded in pulp.

Fls. & Frts. : December–February.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 288, f. 171. 1909.

Distrib. : Sindhudurg.

CULTIVATED SPECIES :

Catha edulis Forssk. Fl. Aegypt.–Arab. 63. 1775. *'Cafta'*, *'Khat'*.

Trees, 3–4 m tall. Leaves c 10 cm long, opposite or alternate, thick, narrowly elliptic or ovate–oblanceolate, serrate, apex acute and narrowed to the base. Flowers small, in short axillary clusters; calyx 5–lobed; petals 5; stamens 5. Capsules c 1 cm long, oblong or clavate, red, 3- valved, 1–3 -seeded.

Distrib. : An Ethiopiana plant cultivated in gardens. Bombay.

RHAMNACEAE

(S. G. Pradhan)

1. Fruits winged:
   - 2. Plants tendrillar; wings of the fruits c 0.6 cm long, orbicular ... GOUANIA
   - 2. Plans not tendrillar; wings of the fruits 3–5 cm long, oblong :
     - 3. Fruits indehiscent, samaroid; wing of the fruit separated from the seed–chamber by a distinct constriction; seeds globose to subglobose ... VENTILAGO
     - 3. Fruits dehiscent, capsular; not separated from the seed chamber by constrictions; seeds elongated, compressed ... SMYTHEA

1. Fruits not winged:
   - 4. Plants tendrilar ... HELINUS
   - 4. Plants not tendrilar :
     - 5. Ripe fruits capsular ... COLUBRINA
     - 5. Ripe fruits not capsular
       - 6. Ovary semi- inferior; fruits drupaceous ... ZIZIPHUS
       - 6 Ovary superior; fruits baccate.
         - 7. Plants armed ... SCUTIA
         - 7. Plants unarmed:

8.	Flowers bisexual, fascicled on paniculate branches	...	SAGERETIA
8.	Flowers bisexual or polygamous, in axillary fascicles or racemes	...	RHAMNUS

COLUBRINA Rich. ex Brongn. (nom. cons.)

Colubrina asiatica (L.) Brongn. in Ann. Sci. Nat. 1, 10: 369. 1827; Laws. in Hook. f. Fl. Brit. India 1: 642. 1875; Cooke, Fl. Pres. Bombay 1: 261. 1958 (Repr.); Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 32. 1990. *Ceanothus asiaticus* L. Sp. Pl. 196. 1753. *'Guti'*.

Shrubs. Leaves 3.0–7.5 x 2.5–6.0 cm, broadly ovate, acute to acuminate at apex, rounded or subcordate at base, margins crenate–serrate or subentire. Flowers yellowish, in axillary, pubescent cymes. Capsules c 0.9 cm across, globose. Seeds dark brown, angled, with rounded bracts, base slightly emarginate, smooth.

Fls. & Frts. : February–May.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 304, f. 180. 1909.

Distrib. : Found in moist and semi–evergreen forests. Pune, Raigad, Ratnagiri, Sindhudurg.

GOUANIA Jacq.

1.	Leaves distantly and minutely serrulate, pedicels c 1.0 mm or less; disc villous	...	*G. microcarpa*
1.	Leaves create, pedicels 2mm long; disc glabrous	...	*G. leptostachya*

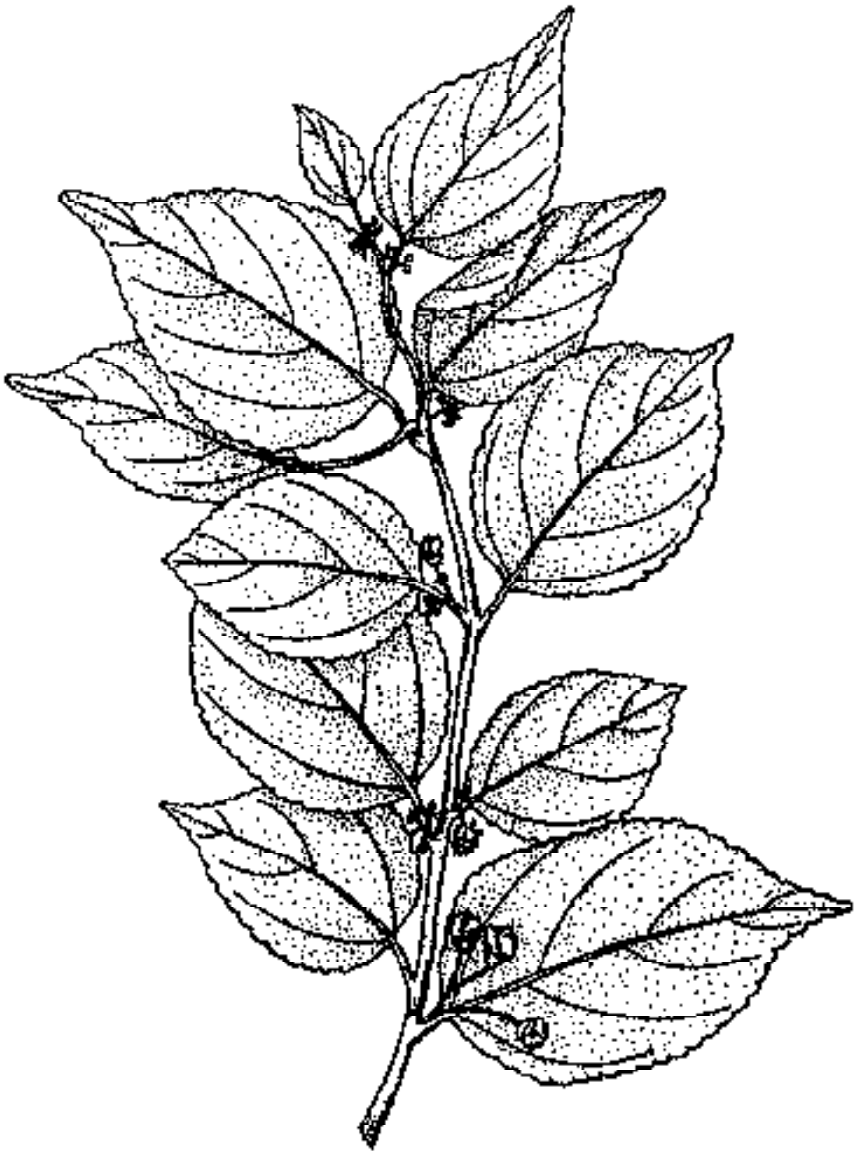
G. leptostachya DC. Prodr. 2: 40. 1825; Laws. in Hook. f. Fl. Brit. India 1: 643. 1875; Bhandari & Bhansali in Nayar et al. Fasc.Fl. India 20: 38. 1990.

Climbing shrubs or lianas upto 8m long; tendrils axillary or extra–axillary. Leaves 3.5–8.6 x 2.0–8.5 cm, ovate, acute to acuminate at apex, glabrous above, grey or brown hairy beneath on veins. Racemes 3–7 cm long. Flowers white, 5–6 cm across; calyx lobes deltoid, thickened at apex; petals spathulate; stamens alternate with disc appendages; styles 3–cleft. Capsules with persistent calyx.

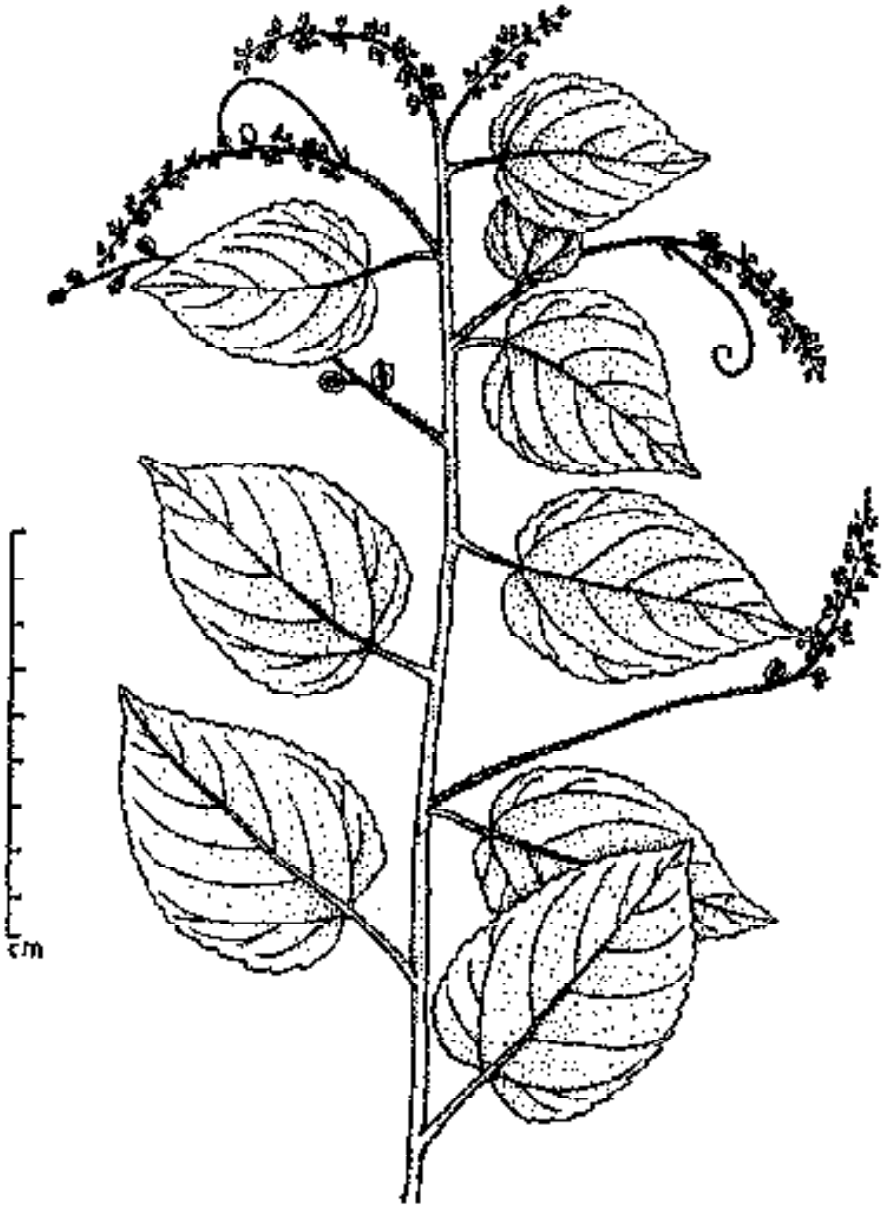
Fls. & Frts. : August–December.

Illus. : Bhandari & Bhansali in Nayar et al. op. cit. 39.

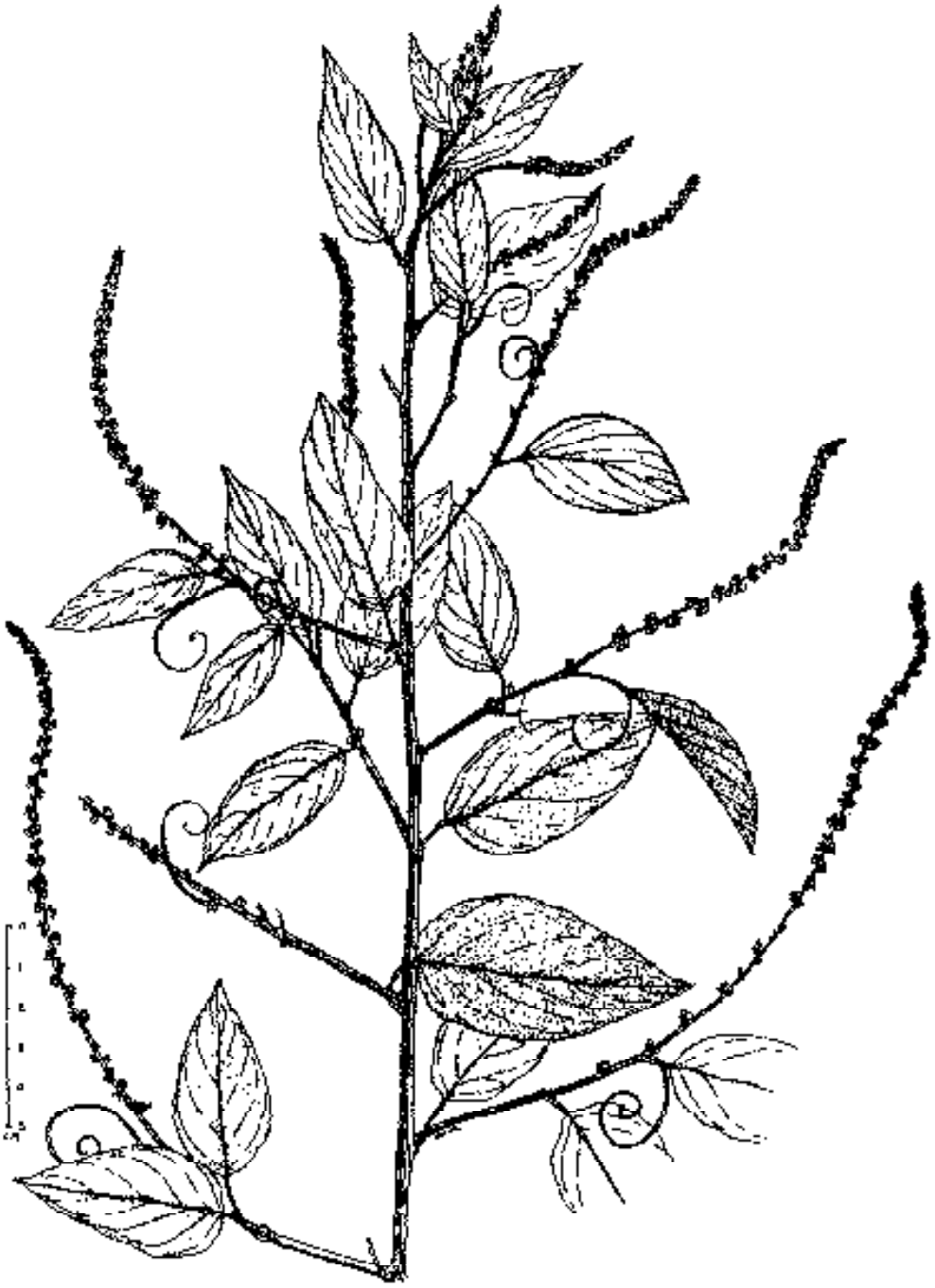
Distrib. : Maharashtra, based on Bhandari & Bhansali in Nayar et al. op. cit.



Colubrina asiatica (L.) Brongn.



Gouania leptostachya DC.



Gouania microcarpa DC.

G. microcarpa DC. Prodr. 2: 40. 1825; Laws. in Hook. f. Fl. Brit. India 1. 643. 1825; Cooke, Fl. Pres. Bombay 1: 262. 1958 (Repr.); Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 40. 1990.

Climbing shrubs. Leaves 5–10 x 2.5–3.0 cm, ovate or elliptic, acute to acuminate at apex, rounded or subcordate at base, margins entire. Flowers in pubescent clusters, on panicled, axillary or teminal branches. Fruits c 0.6 x 1.2 cm, 3–winged.

Fls. & Frts. : November–December.

Illus. : Talb. For Fl. Bombay Pres. & Sind 1: 304, f. 181. 1909.

Distrib. : Uncommon, in moist deciduous forests. Ratnagiri.

HELINUS Mayer ex Endl.

Helinus lanceolatus Brandis, For. Fl. 574 1874. & Ind. Trees175. 1906 (Repr. ed.); Laws. in Hook. f. Fl. Brit. India 1: 644. 1875; Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 43. 1990.

Tendrilar shrubs. Leaves ovate–lanceolate, glabrous, rounded or slightly cordate at base, acute at apex. Flowers whitish in 2–12–flowered umbels. Fruits 0.5–1.0 cm long, pendulous, globose to ovoid, 3–seeded, glabrous. Seeds plano–convex.

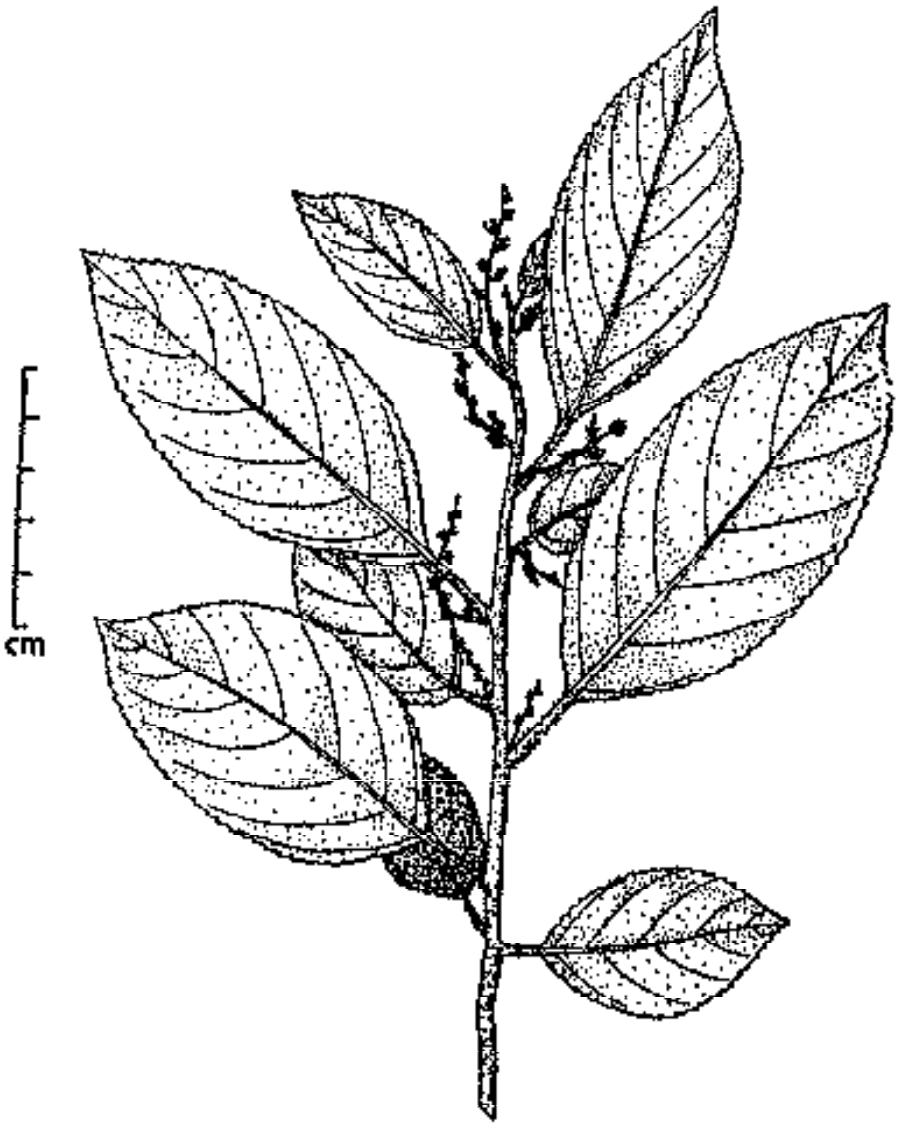
Fls. & Frts. : January–May.

Distrib. : Maharashtra, Bhandari & Bhansali (op. cit.).

RHAMNUS L.

1.	Leaves glabrous; inflorescence of many–flowered, axillary panicles	...	*R. wightii*
1.	Leaves pubescent or tomentose beneath; inflorescence 1–3–flowered, on short peduncles	...	*R. hirsuta*

Rhamnus hirsuta Wight & Arn. Prodr. 164. 1834; Almeida, Fl. Mah. 1: 249. 1996. *R. purandharensis* Bhandari & Bhansali in J. Econ. Tax. Bot. 5: 911. 1984 & in Nayar et al. Fasc. Fl. India 20: 56. 1990. *R. triqueter* sensu Woodr. in J. Bombay nat. Hist. Soc. 11: 271. 1897 non Laws. 1875; Cooke, Fl. Pres. Bombay 1: 260. 1958 (Repr.). *R. dahuricus* Pallas var. *hirsutus* (Wight & Arn.) Laws. in Hook. f. Fl. Brit. India 1: 639. 1875.



Rhamnus hirsuta Wight & Arn.

Shrubs or trees, 1.5–6.0 m tall; young parts pubescent. Leaves 0.5–8.0 x 0.3–4.0 cm, elliptic, base rounded, margins serrate. Flowers 0.5–7 mm across. Fruits c 5 mm across, ovoid and 3–lobed, pyrenes usually 3, obovoid, grooved.

Fls . & Frts. : February–May.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 301, f. 178. 1909 (*R. triqueter*).

Distrib. : Rare. Nasik, Pune, Satara, Thane.

R. wightii Wight & Arn. Prodr. 164. 1834; Laws. in Hook. f. Fl. Brit. India 1: 639. 1875; Cooke, Fl. Pres. Bombay, 1: 259. 1958 (Repr.); Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 59. 1990.*'Ragt–roda'*.

Shrubs. Flowers in axillary fascicles; calyx urceolate, lobes keeled on the inner face, pubescent outside; petals small, lanceolate; styles 3–4, connate below. Berries globose, reddish–purple with persistent calyx.

Fls. & Frts. : January.

Illus. : Wight Ic. t. 159. 1839.

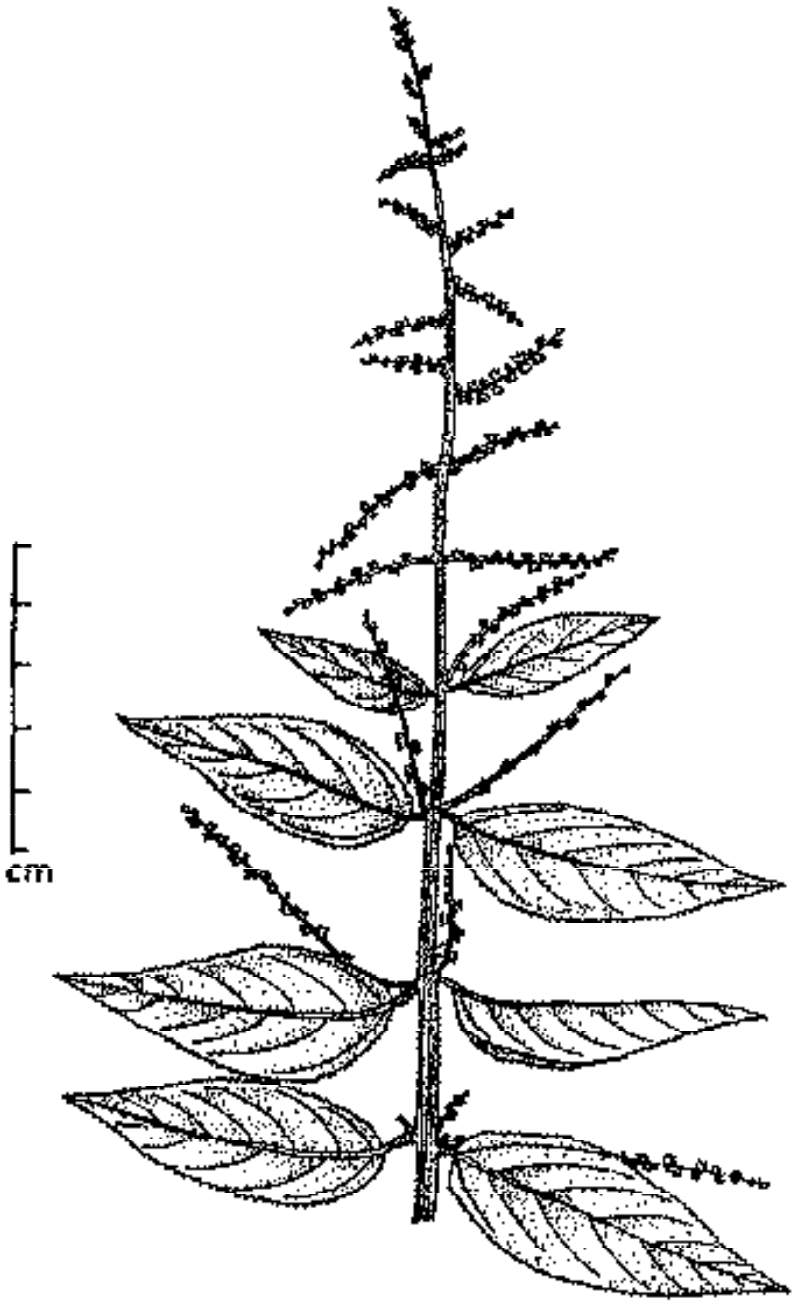
Distrib. : Rare. 'Pune' (Cooke, op. cit.), Satara.

SAGERETIA Brongn.

Sageretia parviflora (R. & S.) G. Don, Gen. Syst. 2: 29. 1832; Balakr. in Indian Forester 67: 58. 1970; Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 66, f. 15. 1990. *Rhamnus parviflora* Roem. & Schult. Syst. Veg. 5: 295. 1819. *Sageretia oppositifolia* Brongn. Mem. Fam. Rham. 53: 1826 & in Ann. Sci. Nat. Ser. 1, 10: 360. 1827; Laws. in Hook. f. Fl. Brit. India 1: 641. 1875; Cooke, Fl. Pres. Bombay 1: 261. 1958 (Repr.). *Sageretia filiformis* (R. & S.) G. Don, Gen. Syst. 2: 29. 1832; Almeida, Fl. Mah. 1: 250, f. 1996.

Shrubs or small trees, 2.5–4.5 m tall, armed. Leaves 3.0–10 x 1.5–3.2 cm, ovate–oblong, woody, tomentose beneath, acute or acuminate at apex, margins serrate. Flowers in sessile clusters. Fruits c 0.6 cm across, ovoid, black when ripe.

Fls. & Frts. : December–February.



Sageretia parviflora (R. & S.) G. Don

Illus. : Bhandari & Bhansali, op. cit.; Almeida, op. cit. (*Sageretia filiformis*).

Distrib. : Rare. 'Konkan'(Cooke, op. cit.).

SCUTIA Commers. ex Brongn. (nom. cons.)

Scutia myrtina (Burm. f.) Kurz in J. Asiat. Soc. Bengal 44: 178. 1875; Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 71. 1990. *Rhammus myrtinus* Burm. f. Fl. Ind. 60. 1768. *Scutia indica* Brongn. in Ann. Soc. Nat. 1, 10: 363. 1827; Laws. in Hook. f. Fl. Brit. India 1: 640. 1875; Cooke, Fl. Pres. Bombay 1: 260. 1958 (Repr.).

1. Leaves orbicular, elliptic or ovate at apex ... var. *myrtina*
1. Leaves obcordate, emarginate at apex ... var. *emarginata*

var. **myrtina.**

Shrubs, straggling or occasionally scandent. Leaves subopposite, 1.6–3.5 cm broad, orbicular, elliptic to obovate, margins entire. Flowers in umbels; petals c 0.6 cm across, smooth. Pyrenes compressed.

Fls. & Frts. : February–April.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 302, f. 179. 1909.

Distrib. : Common in semi–evergreen forests. Kolhapur, Pune, Raigad, Satara, Sindhudurg.

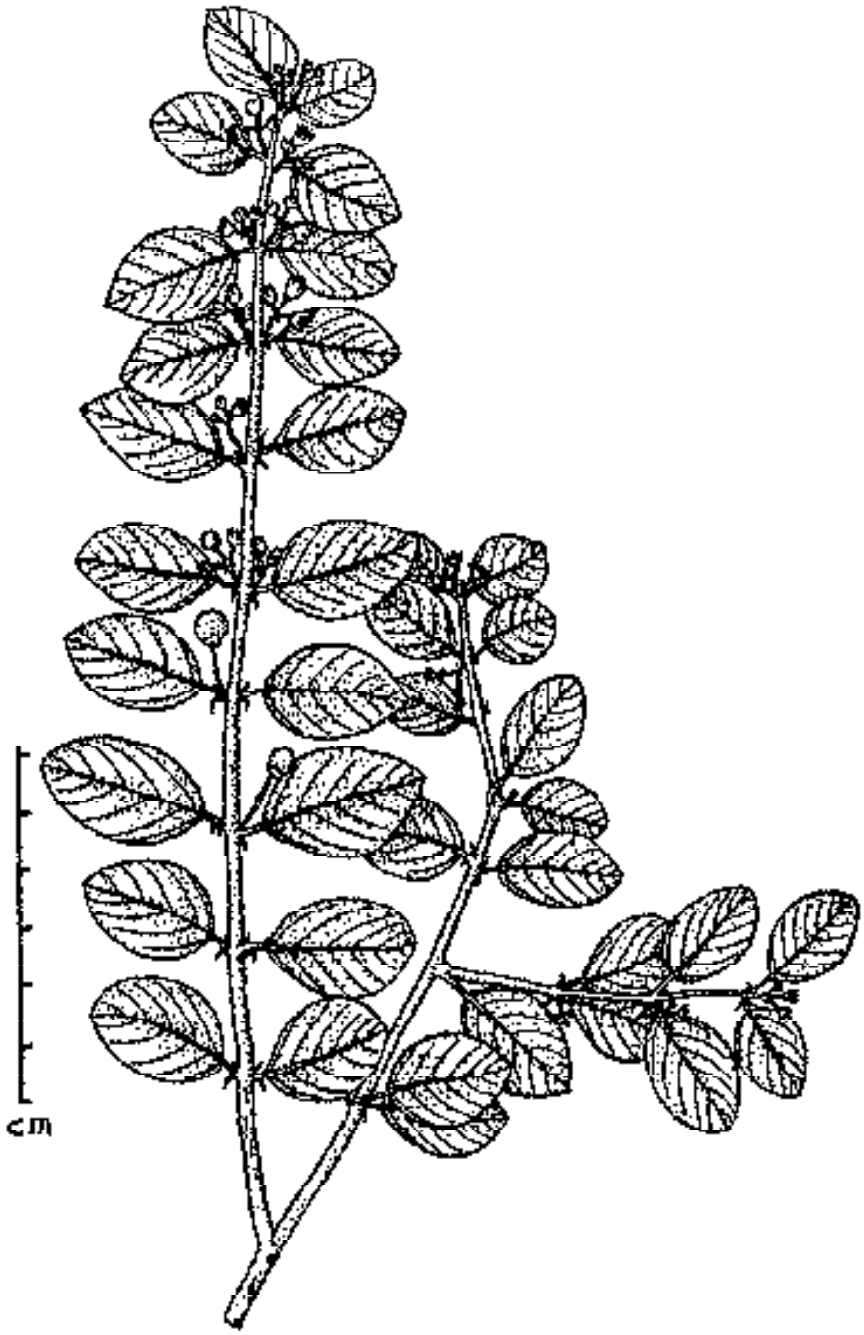
var. **emarginata** Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 71. 1990.

Leaves 1–2 x 0.8–2.2 cm, obcordate, emarginate at apex, mucronate, cuneate at base, margins entire with 3–6, distinct crenulate teeth at distal end. Fruits globose, 4–6 cm across.

Distrib. : Maharashtra (Bhandari & Bhansali in Nayar et al. op. cit.).

SMYTHEA A. Gray

Smythea bombaiensis (Dalz.) Ban. & Mukh. in Indian Forester 96: 214. 1970; Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 75. 1990. *Ventilago bombaiensis* Dalz. in Hook. Kew J. Bot. 3: 36. 1851;



Scutia myrtina (Burm. f.) Kurz

Laws. in Hook. f. Fl. Brit. India 1: 631. 1875; Cooke, Fl. Pres. Bombay 1: 254. 1958 (Repr.); Sant. in J. Bombay nat. Hist. Soc. 44: 496. 1944; Oza, Ibid. 70: 591. 1973.

Shrubs, scandent, fulvous–pubescent. Leaves 7–9 x 2.0–3.5 cm, lanceolate, acute at apex, oblique at base. Flowers 15–20, yellow, in axillary fascicles; calyx fulvous–pubescent without, cleft c half way down; petals truncate. Fruits laterally compressed, wings brownish.

Fls. & Frts. : December–June.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 290, 291, f. 172 & 173 (excl. the fruit drawn separately on right hand top in f. 173.) 1909; Sant. op. cit. f. between 496 & 497 (*Ventilago bombaiensis*).

Distrib. : Uncommon, Nasik, Pune, Raigad, Satara, Sindhudurg, Thane.

VENTILAGO Gaertn.

1.	Calyx tube adnate to the lower part of the nut	... *V. denticulata*
1.	Calyx tube adnate only to the base of the nut:	
2.	Inflorescence minutely grey–puberulous	... *V. maderaspatana*
2.	Inflorescence yellow–villous	... *V. gamblei*

Ventilago denticulata Willd. in Ges. Naturf. Fr. Schr.3: 417. 1801; Ban. & Mukh. in Indian Forester 96: 209. 1970; Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 82. 1990. *V. calyculata* Tul. in Ann. Sci. Nat. 4,8: 124. 1857; Laws. in Hook. f. Fl. Brit. India. 1: 631. 1875; Cooke, Fl. Pres. Bombay 1: 254. 1958 (Repr.). *'Lokhandi'.*

Stragglers; stems extensive.Leaves 4.5–10.0 x 2.5–8.5 cm, elliptic–oblong, subacute at apex, oblique, rounded or acute at base, margins create–serrate. Flowers greenish, many, in densely pubescent, paniculate spikes. Fruits 3.5 cm long, wings rounded at apex, terminated by bifid style remains.

Fls. & Frts. : February–April.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 292, f. 174. 1909 (*V. calyculata).*

Distrib. : Common in deciduous forests.

V. gamblei Suesseng. in Engl. & Prantl, Pflanzenfam. Naturl. ed. 2, 20 d: 152. 1953. Ban. & Mukh. in Indian Forester 96: 209. 1970; Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 84. 1990.

Shrubs; stems scandent. Leaves 5–10 x 2.5–5.0 cm, ovate or ovate–oblong, rounded or cordate and acuminate at apex, slightly oblique at base, margins distantly denticulate. Flowers c 10, in axillary fascicles. Fruits ovate, acute or acuminate. Seed 1, compressed.

Fls. Frts. : February–July.

Distrib. : Rare. Pune (Ban. & Mukh. op. cit.).

V. maderaspatana Gaertn. Fruct. 1: 223. t. 49, f. 2, 1788. Laws. in Hook. f. Fl. Brit. India 1: 631. 1875; Cooke, Fl. Pres. Bombay 1: 253. 1958 (Repr.); Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 57. 1990.

1.	Apex of the wing of the fruit more or less deeply bifid	...	var. *fructifida*
1.	Apex of the wing of the fruit not bifid	...	var. *maderaspatana*

var. **maderaspatana.**

Lianas. Leaves 5–10 x 2.5–3.5 cm, oblong–lanceolate or elliptic–ovate, subacute at apex, rounded or acute at base, margins entire or slightly create. Flowers greenish, in drooping, terminal panicles. Fruits winged; nuts c 0.5 cm across with persistent calyx, wing 2–5–5.0 x 0.8 cm, linear–oblong.

Fls. & Frts. : December–January.

Illus. : Wight, Ic. t. 163. 1839.

Distrib. : Common in moist deciduous forests.

var. **fructifida** Sant. in Kew Bull. 1949: 340. 1949; Ban. & Mukh. in Indian Forester; 96: 208. 1970; Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 87. 1990.

Lianas. Leaves, oblong–lanceolate to elliptic–ovate. Flowers greenish, in drooping terminal panicles. Fruits winged.

Fls. & Frts. : December–January.

Distrib. : Rare. Pune (Ban. & Mukh. op. cit.).

ZIZIPHUS Mill.

Petals absent		...	*Z. rugosa*
Petals present:			
2.	Leaves glabrous to glabrescent beneath:		
	3. Plants armed:		
	4. Styles 2–cleft, connate upto the middle	...	*Z. williamani*
	4. Styles 3–cleft, distinct or nearly so :		
	5. Leaves ovate–elliptic to suborbicular	...	*Z. horrida*
	5. Leaves broadly ovate	...	*Z. caracutta*
	3. Plants unarmed :		
	6. Flowers in sessile cymes :	...	*Z. glabrata*
	6. Flowers in peduncled cymes	...	*Z. caracutta*
2.	Leaves tomentose beneath :		
	7. Leaf apex acute to subacuminate	...	*Z. oenoplia*
	7. Leaf apex obtuse to subacate or rounded :		
	8. Fruits less than 1 cm across	...	*Z. nummularia*
	8. Fruits 1.5–2.3 cm across :		
	9. Styles distinct	...	*Z. xylopyra*
	9. Styles connate	...	*Z. mauritiana*

Ziziphus caracutta Roxb. Fl. Ind. 2: 361. 1824. et Fl. Ind. 1: 612. 1882; Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 93. 1990. *Z. xylopyra* var. *glaberrima* Sedgw. in Ind. For. 45: 71. 1919; Sant. in Kew Bull. 1948: 489–490–1949. *Z. glaberrima* (Sedgw.) Sant. in J. Bombay nat. Hist. Soc. 51: 803. 1953.

Trees, upto 3.5 m tall. Leaves 2–5–5.0 x 1.5–3.5 cm, ovate–elliptic; stipulaer prickles when present, in pairs, one straight, other curved. Flowers white, in peduncled cymes. Fruits globose, 3–seeded.

Fls. & Frts. May–December.

Distrib. : Common throughout.

Z. glabrata Heyne ex Roth, Nov. Pl. Sp. 159. 1821; Laws. in Hook. f. Fl. Brit. India 1: 633. 1875. *Z. trinervia* Roxb. Fl. Ind. 1: 606. 1820 non Poir. 1813; Cooke, Fl. Pres. Bombay 1: 256. 1958 (Repr.); Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 96. 1990.

Trees, 3–4 tall. Leaves 2.5–7.5 x 1.5–3.5 cm, elliptic, subobtuse at apex, oblique, rounded or subacute at base, margins serrate. Flowers greenish–yellow, in axillary, peduncled cymes. Fruits globose, rugose, yellow when ripe.

Fls. & Frts. : November–December.

Illus. : Wight, Ic. t. 282. 1840.

Distrib. : Uncommon. Aurangabad, Bombay, Satara, Thane.

Z. horrida Roth, Nov. Pl. Sp. 159. 1821; Laws. in Hook. f. Fl. Brit. India 1: 636. 1875; Cooke, Fl. Pres. Bombay 1: 258. 1958 (Repr.); Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 96. 1990.

Shrubs. Leaves 1.6–3.0 x 1.2–2.5 cm, margins crenate. Flowers in dense, branched, pubescent cymes. Fruits globose, woody, 3–seeded.

Distrib. : Rare. 'Konkan' (Cooke, op. cit.).

Z. mauritiana Lam. Encycl. 3: 319. 1789; Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 99. 1990. *Z. jujuba* (L.) Gaertn. Fruct. 1: 203. 1788 non Mill. 1768; Laws. in Hook. f. Fl. Brit. India 1: 632. 1875 non Lam. 1789; Cooke, Fl. Pres. Bombay 1: 256. 1958 (Repr.). *'Bor', 'Bor'.*

Small trees or large shrubs, 3–5 m tall, armed. Leaves 2.0–5.5 x 1.6–3.0 cm, ovate–elliptic with rounded ends, slightly oblique at base, glabrous above and white–tomentose beneath. Flowers greenish–yellow, in axillary clusters or shortly peduncled axillary cymes. Drupes 1.2–1.5 cm across, globose, fleshy, yellow or orange when ripe.

Fls. & Frts. : September–October.

Illus. : Wight, Ic. t. 99. 1838; Talb. For. Fl. Bombay Pres. & Sind 1: 294, f. 175. 1909 *(Z. jujuba.).*

Distrib. : Common throughout.

Z. nummularia (Burm. f.) Wight & Arn. Prodr. 162. 1834; Laws. in Hook. f. Fl. Brit. India 1: 633. 1875; Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 103. 1990. *Rhamnus nummularia* Burm. f. Fl. Ind. 61. 1768. *Ziziphus rotundifolia* Lam. Encycl. 3: 319. 1789; Cooke, Fl. Press. Bombay 1: 257. 1958 (Repr.). *'Gangr', 'Gangra'.*

Shrubs, branched from near the base with dichotomous branches. Leaves 1.2–1.8 cm broad, orbicular or ovate, tomentose, margins spinous–dentate. Flowers in axillary, sessile cymes. Drupes c 0.8 across, globose, red when ripe.

Fls. & Frts. : October–December.

Illus. : Mahesh. Illus. Fl. Delhi f. 45. 1966

Distrib. : Common along dried tracts.

Z. oenoplia (L.) Mill. Gard. Dict. ed. 8, 3. 1768; Laws. in Hook. f. Fl. Brit. India 1: 634. 1875; Cooke, Fl. Pres. Bombay 1: 257. 1958 (Repr.); Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 106. 1990. *Rhamnus oenoplia* L. Sp. Pl. 194. 1753. *'Burgi', Yeruni'.*

Straggling shrubs. Leaves distichous, 2.5–5.5 x 1.8–22.5 cm, ovate or ovate–lanceolate, oblique at base, margins minutely denticulate. Flowers in paniculate, subsessile cymes. Drupes c 0.6 cm across, globose or obovoid, black when ripe, edible.

Fls. & Frts. : August–September.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 297, f. 176. 1909.

Distrib. : Common throughout.

Z. rugosa Lam. Encycl. 3: 319. 1789; Laws. in Hook. f. Fl. Brit. India 1: 636. 1875; Cooke, Fl. Pres. Bombay 1: 258. 1958 (Repr.); Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 110. 1990.

1. Leaves tomentose beneath ... var. *rugosa*
1. Leaves glabrous except a few hairs on nerves beneath :
   2. Ovary villous ... var. *glabrescens*
   2. Ovary glabrous ... var. *glabra*

var. **rugosa.** *'Churan', 'Poran'.*

Straggling shrubs, c 4 m tall; stems and branches armed. Leaves 5–10 cm long, broadly elliptic, tomentose beneath, oblique, acuminate at apex, cordate at base, margins denticulate. Flowers in long peduncled, tomentose, paniculate cymes on leafless spinous branches. Drupes 0.6–0.8 cm across, whitish when ripe.

Fls. & Frts. : December–February.

Illus. : Wight, Ic. t. 339. 1840.

Distrib. : Common in deciduous forests. Ahmednagar, Bombay, Chandrapur, Jalgaon, Nasik, Pune, Raigad, Ratnagiri, Satara, Thane.

var. **glabra** Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 109. 1990.

Leaves glabrous on both the surfaces except a few hairs on nerves beneath, serrate, acute at apex. Disc. and ovary glabrous.

Distrib. : Raigad (Bhandari & Bhansali in Nayar et al. op. cit.).

var. **glabrescens** Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20. 110. 1990.

Leaves 7.5–13.5 x 5.5–7.4 cm, ovate–elliptic, acute at apex, glabrous on both the surfaces, with few hairs on nerves beneath. Fruits glabrous.

Distrib. : Maharashtra. based on Bhandari & Bhansali in Nayar et al. op. cit.

Z. williamani Bhandari & Bhansali in Nayar et al. Fasc. Fl. India 20: 111. 1990.

Trees upto 4 m tall, branches glabrous, yellowish; spines paired straight, one often absent, the other recurved. Leaves 3.0–5.0 x 1.5–3.7 cm, ovate or elliptic, rounded or tapering at base, acute at apex, mucronate, margins glandular–crenate. Flowers 0.4 cm across, in fascicles of 25–30–flowered, axillary cymes; petals distinctly clawed. Fruits obovate, 0–8 cm across. glabrous, 2–seeded.

Fls. & Frts. : November–March.

Distrib. : Maharashtra (Coastal plant), Bhandari & Bhansali in Nayar et al. (op. cit.).

Z. xylopyra (Retz.) Willd. Sp. Pl. 1: 1104. 1798; Laws. in Hook. f. Fl. Brit. India 1: 634. 1875; Cooke, Fl. Pres. Bombay 1: 258. 1958 (Repr.); Bhandari & Bhansal in Nayar et al. Fasc. Fl. India 20: 112. 1990. *Rhamnus xylopyra* Retz. Obs. Bot. 2: 11. 1781. *'Hadkibor', 'Ghatbor', 'Gora', 'Guti'.*

Straggling shrubs or occasionally trees 3–6 m tall, armed or not. Leaves 3.5–7.5 cm long, occasionally elliptic–oblong or suborbicular,

obliquely cordate at base. Flowers in pubesecent, paniculate cymes. Fruits 2.5 cm across, globose, hard and woody. 2–3 seeded.

Fls. & Frts. : April–July.

Illus. : Deshpande et. al. Fl. of Mahabaleshwar 1: 138. 1993.

Distrib. : Common throughout the State.

CULTIVATED SPECIES :

Ziziphus jujuba Mill. Gard. Dict. ed. 8. 1768; Bhandari & Bhansal in Nayar et al. Fasc. Fl. India 20: 99. 1990. *Z. sativa* Gaertn. Fruct. 1: 202. 1788. *Z. vulgaris* Lam. Encycl. 3: 317. 1789; Laws. in Hook. f. Fl. Brit. India 1: 633. 1875; Almeida, Fl. Mah. 1: 257, 1996.

Shrubs or small trees; prickles on stems geminate c 2.5 cm long, stout. Leaves 2–6 cm long subobliquely ovate, obtuse or subacute at apex, crenate–serrate along margins. Flowers few, fascided in axils of the leaves. Fruits globose or ovoid c 1 cm across, succulent, red, turning black, shining.

Fls. & Frts. : September–December.

Illus. : Almeida, op. cit.

Distrib. : Bombay; Dhule & Jalgaon (Almeida, op. cit); Pune.

Z. mauritiana var. **hysundrica** (Edgew.) Almeida, Fl. Mah. 1: 255. 1996. *Z. jujuba* var. *hysundrica* Edgew. in J. Linn. Soc. 6: 201. 1863. *Z. hysundrica* Hole in Indian Forester 44: 505. 1918.

Leaves dentate, membranaceous.

Distrib. : Cultivated in Bombay gardens (Almeida, op. cit.).

Z. spina–cristi (L.) Willd. Sp. Pl. 1: 1105. 1798; Laws. in Hook. f. Fl. Brit. India 1: 637. 1875; Almeida, Fl. Mah. 1: 257. 1996. *Rhamnus–spina–cristi* L. Sp. Pl. 195. 1753.

Trees, 5–10 m tall, armed. Leaves ovate, crenate along margins; spines paired, in axils of leaves. Flowers white, c 3 mm across in axillary clusters.

Fls. : September–December.

Distrib. : Cultivated in gardens (Almeida, op. cit.).

VITACEAE

(B. G. Kulkarni)

1. Tendrils present in inflorescence ... AMPELOCISSUS
1. Tendrils absent in inflorescence :
   2. Leaves simple (some times 3–lobed or 3–foliolate); flowers 4–merous :
      3. Leaflets sessile or subsessile ... CYPHOSTEMMA
      3. Leaflets stalked ... CISSUS
   2. Leaves usually compound; flowers 5–merous :
      4. Flowers hermaphrodite; seeds pitted ... CAYRATIA
      4. Flowers polygamo–dioecious; seeds 2–furrowed on one side ... TETRASTIGMA

AMPELOCISSUS Planch. (nom. cons.)

1. Tendrils simple :
   2. Berries ovoid–oblong ... *A. erioclada*
   2. Berries globose ... *A. indica*
1. Tendrils forked :
   3. Leaves trifoliolate ... *A. araneosa*
   3. Leaves simple :
      4. Stems stout, tomentose; tendrils woody; disc thin; seeds rugose ... *A. ternata*
      4. Stems weak, glabrous; tendrils not woody; disc thick, furrowed; seeds grooved on back, not rugose ... *A. latifolia*

Ampelocissus araneosa (Dalz. & Gibs.) Planch. in DC. Monogr. Phan 5: 176. 1887; Almeida, Fl. Mah. 1: 262. 1996. *Cissus araneosus* Dalz. & Gibs. Bombay Fl. 41. 1861. *Vitis araneosus* (Dalz. & Gibs.) Laws. in Hook. f. Fl. Brit. India 1: 657. 1875; Cooke, Fl. Pres. Bombay 1: 272. 1958 (Repr.).

Scandent shrubs, covered with floccose down. Terminal leaflets 8–10 x 4–5 cm, elliptic or lanceolate, attenuated or rounded and nearly equilateral at base, acute at apex, crenate–serrate at margins, lateral leaflets scarcely smaller, inequilateral at base. Flowers pentamerous, in leaf–opposed, small umbellate cymes. Berries globose, 1–4–seeded. Seeds c 6 x 4 mm, ellipsoid, rugose, pointed at one end, longitudinally grooved on back and with deep circular depression on the face.

Fls. & Frts. : September–October.

Distrib. : Highest ghats, West of Junnar, Pune (Cooke, op. cit.).

A. erioclada (Wight & Arn.) Planch. in DC. Monogr. Phan. 5: 380. 1887; Almeida, Fl. Mah. 1: 263. 1996. *Vitis erioclada* Wight & Arn. Prodr. 130. 1834; Laws. in Hook. f. Fl. Brit. India 1: 651. 1875. *V. indica* Thw. Enum. 63. 1858 non L. 1753; Laws. in Hook. f. op. cit. 1: 653. 1875; Cooke, Fl. Pres. Bombay 1: 269. 1958 (Repr.).

Stout climbers; stems hollow, woolly. Leaves 10–20 x 7.5–18.0 cm, broadly ovate, angled or lobed, glabrous above, tomentose beneath, apex of angles acute or acuminate, base cordate with narrow sinus, margins serrate. Flowers greenish–purple, in woolly compound cymes. Berries ovoid, purple when mature.

Fls. & Frts. : December–January.

Distrib. : In evergreen forest. Sindhudurg (Almeida, op. cit.).

A. indica (L.) Planch. Amer. Vitic. Var. 8: 375. 1884; Shetty & P. Singh in Taxon 37: 169. 1988; Almeida, Fl. Mah. 1: 263. 1996. *Vitis indica* Linn. Sp. Pl. 202. 1753.

Climbing shrubs. Leaves and stem woolly in younger stages, becoming glabrous at maturity. Leaves 10–25 cm long, cordate–ovate, serrate, coriaceous. Flowers greenish–purple, in short cylindric spikes. Fruits globose, 2–4–seeded.

Fls. & Frts. : May–July.

Distrib. : Without any precise locality (Almeida, op. cit.).

A. latifolia (Roxb.) Planch. in J. Vigne, Amer. 374. 1884 & in DC. Monogr. Phan. 5(2): 370 1887. *Vitis latifolia* (Lam.) Roxb. Fl. Ind. 1: 661. 1820; Laws. in Hook. f. Fl. Brit. India 1: 652. 1875; Cooke, Fl. Pres. 1: 269. 1958 (Repr.). *Cissus latifolia* Vahl, Symb. Bot. 3: 18. 1794 non Lam. 1783. *'Dokela','Nadena'.*

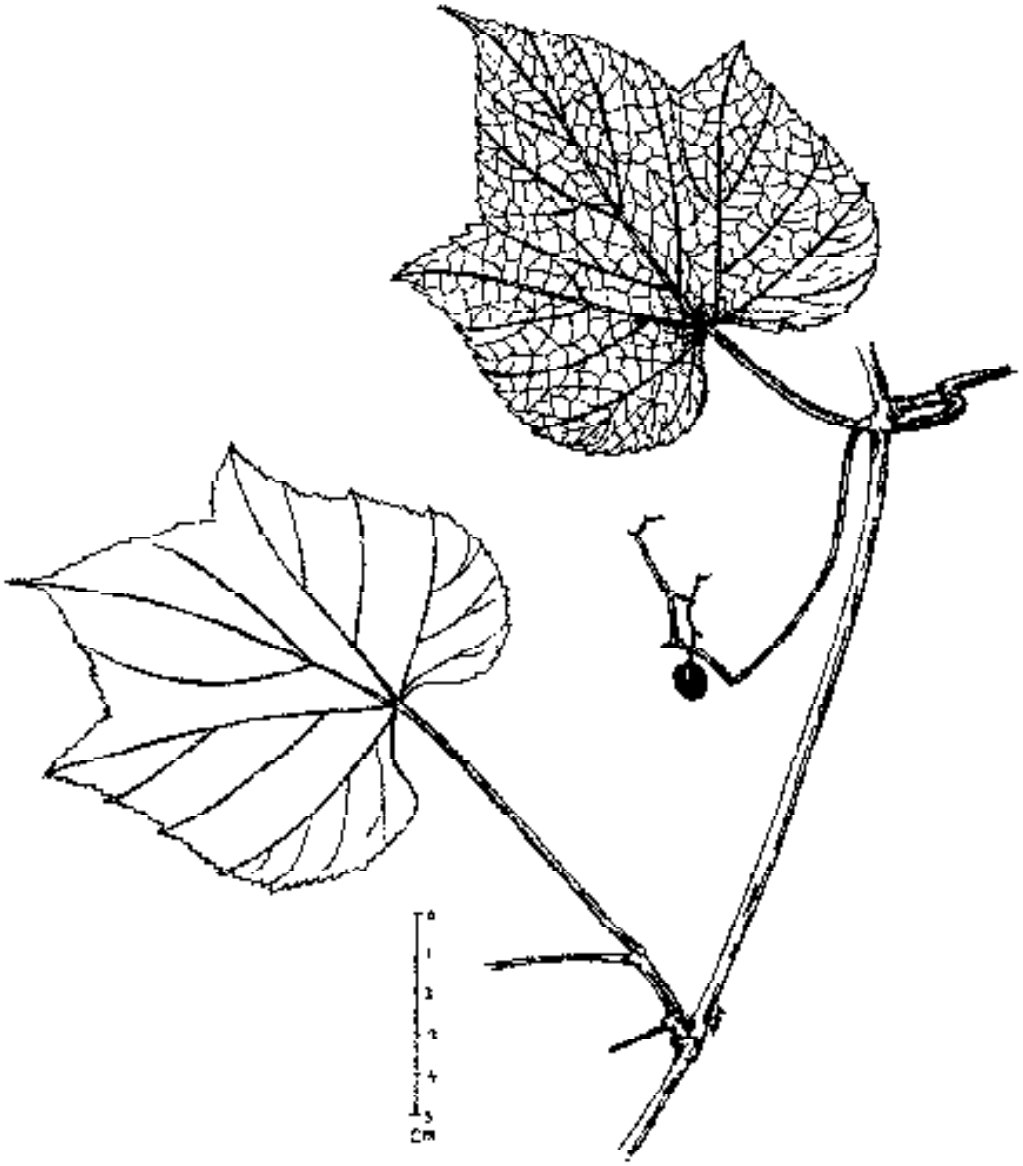
Climbing shrubs; young parts reddish–tomentose, stem and branches striate. Leaves 8–12 cm as long as broad, orbicular, 5–9–angled or shallowly palmately lobed, cottony–tomentose beneath when young, glabrous at length, margins toothed. Flowers 0.1–0.15 cm across, reddish, in pyramidal paniculate–cymes; calyx cup–shaped. Berries 0.6–1.0 cm across, globose, red when ripe. Seeds ellipsoid

Fls. & Frts. : June–October.

Illus.: Ic. Roxb. Fasc. 3, t. 5. 1969 [Repr. ed. (*Vitis* latifolia)].

Distrib. : In moist and dry deciduous forests. Common throughout.

A. ternata (Roth ex R. & S.) DC. Prodr.1: 633. 1824; Almeida, Fl. Mah. 1: 264. 1996. *Vitis ternata* Roth ex R. & S. 48. Syst. 5: 319. 1819. *V. tomentosa* Heyne ex Roth, Nov. Pl. Sp. 157. 1821; Laws. in Hook. f.



Ampelocissus latifolia (Roxb.) Planch.

Fl. Brit. India 1: 650. 1875; Cooke, Fl. Pres. Bombay 1: 268. 1958 (Repr.). *Ampelocissus tomentosa* (Heyne ex Roth) Planch. J. Vigne Amer. 374. 1883.

Scandent woody shrubs; stems reddish, clothed with white tomentum; tendrils 3–forked, stout. Leaves 8–12 cm as long as broad, orbicular, 3–5 angled or lobed, scabrid, sparsely white tomentose above, woolly beneath. Flowers reddish, in leaf–opposed, densely woolly cymes. Berries 0.4–0.6 cm across, subglobose. Seeds ovoid.

Fls. & Frts. : March–June.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 315, f. 186. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 155. 1982.

Distrib. : Infrequent in deciduous forests. Chandrapur, Nanded, Parbhani, Sindhudurg, Yavatmal.

CAYRATIA A. L. Juss. (nom. cons.)

1. Leaves always 3–foliolate ... *C. trifolia*
1. Leaves usually more than 3–foliolate:
   2. Leaflets 5–7 (rarely 3); disc in flower lobed ... *C. tenuifolia*
   2. Leaflets more than 7; disc in flower entire ... *C. pedata*

Cayratia pedata (Lam.) Juss. ex Gagnep. in Lecomte, Not. Syst. 1: 346. 1911; Shetty & P. Singh in Kew Bull. 42: 935, f. 2. 1987. *Cissus pedata* Lam. Encycl. 1: 31. 1783. *Vitis pedata* (Lam.) Wall. ex Wight, Cat. 26. 1833; Laws. in Hook. f. Fl. Brit. India 1: 661. 1875; Cooke, Fl. Pres. Bombay 1: 274. 1958 (Repr.).

Climbing shrubs; branches tomentose or slightly hairy. Leaves 5–9–foliolate; leaflets 5–12 x 2.5–6.0 cm, oblong–lanceolate, apex acuminate, base oblique, margins distantly serrate. Flowers white, in axillary, corymbose cymes; sepals and petals triangular. Berries 0.6–0.9 cm across, subglobose, often 4–lobed, creamy when ripe.

Fls. & Frts. : June–October.

Distrib. : In moist deciduous forest. Cooke (op. cit.) reports it from 'Konkan'.

C. tenuifolia (Wight & Arn.) Gagnep. in Lecomte, Not. Syst. 1: 348. 1911. *Vitis tenuifolia* Wight & Arn. Prodr. 129. 1834; Laws. in Hook. f. Fl. Brit. India 1: 660. 1875; Cooke, Fl. Pres. Bombay 1: 273. 1958 (Repr.).

Climbing shrubs; stems and branches slender, angled. **Leaflets** 2–7 x 1.9–5.0 cm, lanceolate, sometimes oblong, lateral ones **pedate**, apex acuminate, base cuneate, margins serrate, serratures **tipped with** awn like mucro. Flowers greenish–white, in dichotomously **branched**, lax, divaricate cymes; petals ovate. Berries 0.6–0.8 cm across, **globose**, pinkish when ripe. Seeds irregularly many angled.

Fls. & Frts. : March–August.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 323, f. 192. 1909.

Distrib. : Occasional in moist deciduous forest. Pune [Sant. in Rec. Bot. Surv. India 16: 46. 1967 (3rd ed.)].

C. trifolia (L.) Domin in Biblioth. Bot. 89: 371. 1927.; Suesseng. in Engl. & Prant, Pflanzenfam. ed. 2. 20d: 280. 1953. *Vitis trifolia* L. Sp. Pl. 203. 1753; Cooke, Fl. Pres. Bombay 1: 271. 1958 (Repr.). *V. carnosa* Wight & Arn. Prodr. 127. 1834; Laws. in Hook. f. Fl. Brit. India 1: 654. 1875. *'Ambat– vel', 'Dhavri'.*

Herbaceous climbers or trailers; young shoots pubescent. **Leaflets** 3–12 x 2.5–5.0 cm, broadly ovate or obovate, hairy on nerves, **apex** acute or acuminate, base obtuse, truncate or obliquely **rounded**, margins crenate–dentate. Flowers 0.4 cm across, greenish–white, **in** axillary, dichotomous cymes; calyx saucer–shaped, calyx and petals pubescent. Berries 0.4–0.5 cm across, depressed–globose, lobed, **red** turning black.

Fls. & Frts. : May–October.

Illus. : Wight, Ic. t. 171. 1839; Talb. For. Fl. Bombay Pres. & Sind 1: 217, f. 187. 1909 (*V. carnosa*); Mahesh. Illus. Fl. Delhi, f. 46. 1966.

Distrib. : In open, wet situations and waste places in deciduous forests. Common throughout.

CISSUS L.

1. Tendrils absent; erect shrubs ... *C. woodrowii*
1. Tendrils present; climbers or scandent shrubs :
   2. Stems fleshy, 4–winged, contracted at nodes ... *C. quadrangularis*
   2. Stems not as above :
      3. Leaves compound :
         4. Leaves 3–foliolate ... *C. reticulata*
         4. Leaves 5–foliolate ... *C. elongata*
      3. Leaves simple :

5. Leaves pubescent or tomentose :

6. Flowers greenish ... *C. gigantea*

6. Flowers not as above :

7. Seeds smooth ... *C. repanda*

7. Seeds pitted or rugulose :

8. Tomentum grey; berries glaucous ... *C. vitiginea*

8. Tomentum ferruginous; berries purplish–red ... *C. adnata*

5. Leaves glabrous :

9. Leaves blotched with white above, purple beneath ... *C. javanica*

9. Leaves not as above :

10. Branchlets glaucous; seeds tessellate; leaves with long petioles ... *C. latifolia*

10. Branchlets not glaucous; seeds pitted or smooth; leaves with short petioles :

11. Tendrils simple; serratures of leaf margins glandular ... *C. pallida*

11. Tendrils forked; margings eglandular ... *C. repens*

Cissus adnata Roxb. Fl. Ind. 1: 423. 1820; Shetty & P. Singh in Kew Bull. 44: 475. 1989. *Vitis adnata* (Roxb.) Wall. Num. List. 205. no. 5998. 1831–33; Laws. in Hook. f. Fl. Brit. India 1: 649. 1875; Cooke, Fl. Pres. Bombay 1: 267. 1958 (Repr.).

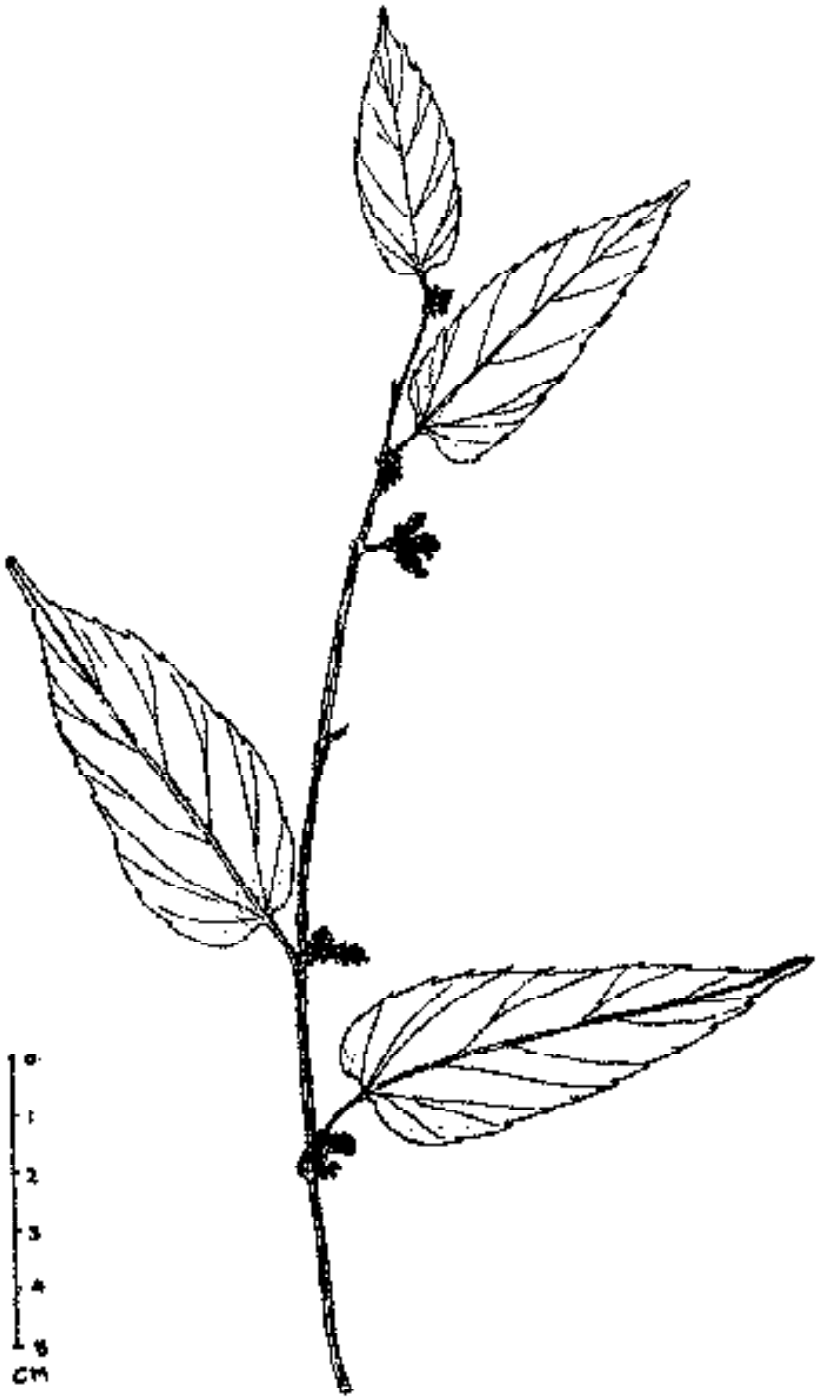
Extensive climbers; old stems wrinkled. Leaves 3–15 x 3–14 cm, broadly ovate, sometimes 3–5–lobed, margins serrate–dentate, apex acuminate, base cordate. Flowers c 0.15 cm across, red, in terminal dichotomous cymes; calyx saucer–shaped; petals oblong, hairy outside. Berries 0.8 x 0.6–0.7 cm, ovoid, beaked.

Fls. & Frts. : December–March.

Illus. : Wight, Ic. t. 144. 1839.

Distrib. : Infrequent in moist deciduous forests. Pune, Raigad, Sindhudurg.

C. elongata Roxb. Fl. Ind. 1: 429. 1820; P. Singh & Shetty in Taxon 35: 596. 1986. *Vitis elongata* (Roxb.) Wall. Num. List. no. 6016. 1831–32; Laws. in Hook. f. Fl. Brit. India 1: 658. 1875; Cooke, Fl. Pres. Bombay 1: 273. 1958 (Repr.). *Cayratia elongata* (Roxb.) Suesseng. in Engl. & Prantl, Pflazenfam. ed. 2, 20 d: 281. 1953.



Cissus javanica DC.

Climbers, succulent. Leaflets 3–5 (usually 5), 6–12 x 2–4 cm, elliptic–lanceolate or oblong–lanceolate, apex acuminate, base narrowed into petiolules, margins dentate–serrate. Flowers greenish–purple, c 2 mm across, in dichotomous cymes. Berries 9 x 8 mm, elliptic to globose, ripens black.

Fls. & Frts. : May–November.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 320, f. 190. 1909. (*Vitis elongata*).

Distrib. : Frequent in moist and dry deciduous forests. Ahmednagar, Dhule, Jalgaon, Kolhapur, Nasik, Pune, Raigad, Satara, Sindhudurg, Thane.

C. gigantea (Bedd.) Planch. in A. & DC. Monogr. Phan. 5(2): 622. 1887; Matthew & Britto in Matthew, Fl. Tamilnadu Carnatic 3: 281. 1983. *Vitis gigantea* Bedd. in Trans. Linn. Soc. 25: 212. 1865; Laws. in Hook. f. Fl. Brit. India 1: 648. 1875; Cooke, Fl. Pres. Bombay 1: 267. 1958 (Repr.).

Extensive climbers; bark corky, branches terete. Leaves 10–20 x 8–15 cm, ovate glabrous above, hairy beneath, apex acuminate–mucronate, base cordate, margins crenate–serrate. Flowers in umbellate–cymes. Berrics 1.0–1.4 cm long, obovoid, black when ripe. Seeds c 0.15 cm across, polygonal.

Fls. : August–September.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 311, f. 183. 1909.

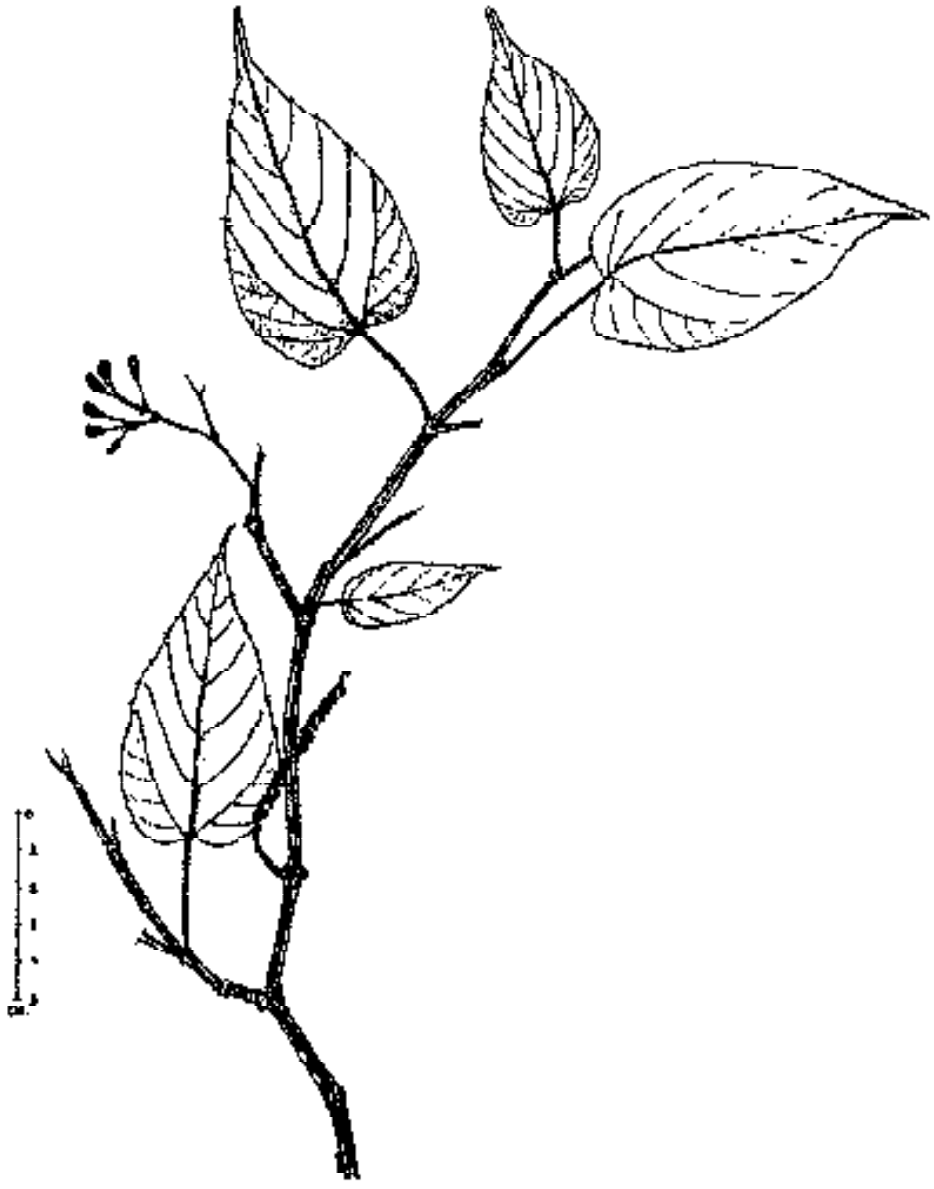
Distrib. : In moist deciduous forests. Pune, Thane.

C. javanica DC. Prodr. 1: 628. 1824; Moniyama in Har. Fl. E. Himalaya 199. 1966; S. M. Almeida, Fl. Savantwadi 1: 103. 1990. *C. discolor* Bl. Bijdr. 181. 1825. *Vitis discolor* (Bl.) Dalz. in Hook. Kew J. Bot. 2: 39. 1850; Laws. in Hook. f. Fl. Brit. India 1: 647. 1875; Cooke, Fl. Pres. Bombay 1: 266. 1958 (Repr.). *'Telit sayel'.*

Herbaceous climbers; basal part woody, branches angled, deep red. Leaves 6–9 x 2.5–5.0 cm, ovate–oblong, apex acuminate, base cordate, margins crenate–dentate. Flowers c 0.1 cm across, reddish, 4–merous, in umbellate–cymes; calyx saucer–shaped; petals oblong. Berries c 0.6 cm long, subglobose, dark red when ripe.

Fls. & Frts. : August–October.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 309, f. 190. 1909 (*C. discolor*).



Cissus latifolia Lam.

Distrib. : Frequent in moist deciduous and semi–evergreen forests. Pune, Raigad, Satara, Sindhudurg.

C. latifolia Lam. Encycl. 1: 30. 1783; Shetty & P. Singh in Taxon 37: 172. 1988; Almeida, Fl. Mah. 1: 269. 1996. *C. glauca* auct. non Roxb. 1832; S.M. Almeida, Fl. Savantwadi 1: 102. 1990.

Tendrilar climbers. Leaves with long petioles, cordate. Inflorescence cymose. Flowers small. Fruits sub–globose, 1–2–seeded.

Fls. & Frts. : May–September.

Distrib. : Rare. Buldhana (Almeida, op. cit.), Sindhudurg (S.M. Almeida op. cit.).

C. pallida (Wight & Arn.) Planch. in DC. Monogr. Phan. 5: 477. 1887. *Vitis pallida* auct. non. Wight & Arn. in Wight. Cat. Ind. Pl. 1833; Laws. in Hook. f. Fl. Brit. India 1: 647. 1875; Cooke, Fl. Pres. Bombay 1: 265. 1958 (Repr.).

Scandent shrubs; stems and branchlets glabrescent. Leaves 6–18 cm, as long as broad, ovate to orbicular, hairy on nerves, apex acuminate, base cordate, margins serrate. Flowers 0.6–0.8 cm across, pinkish, in umbellate–cymes; calyx 4–lobed; petals ovate. Berries 0.8–11.4 cm long, subglobose. Seeds smooth.

Fls. & Frts. : April– June.

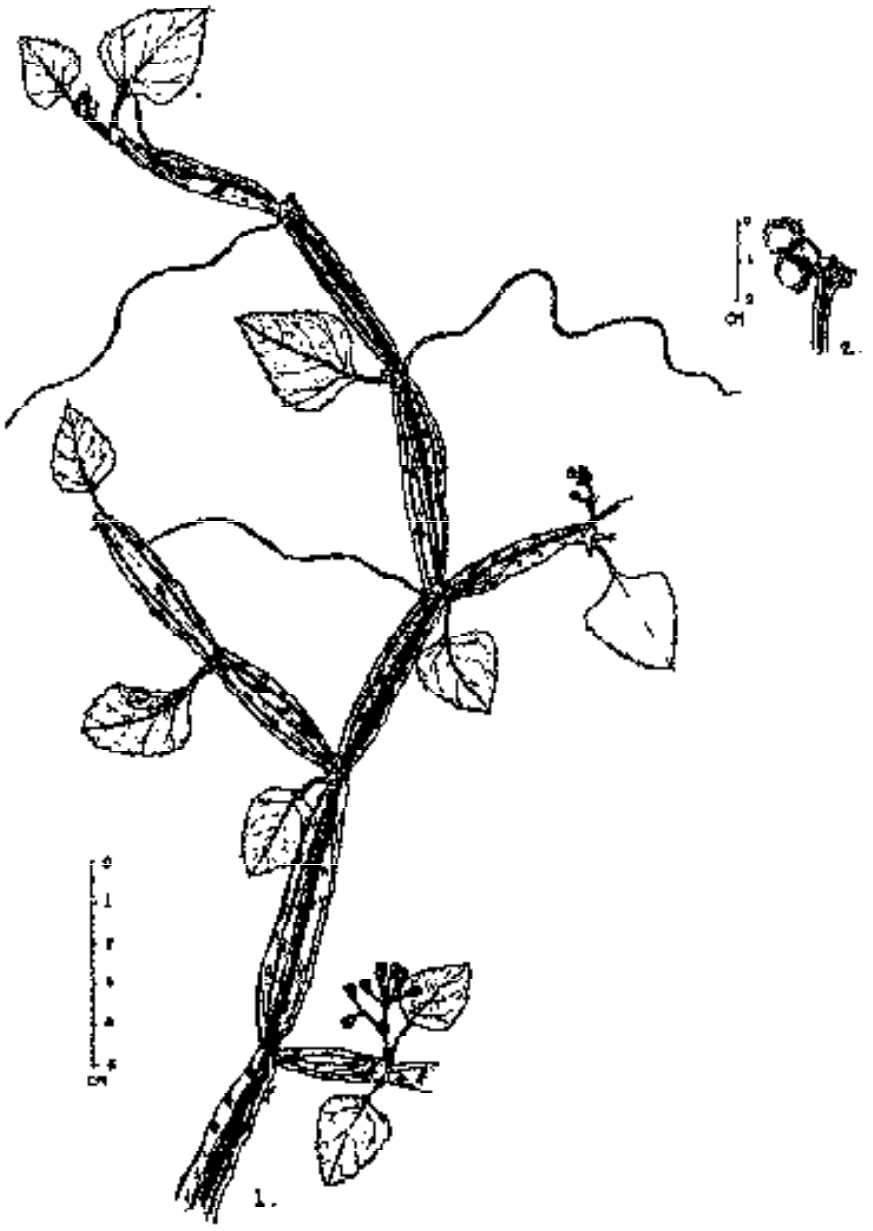
Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 310, f. 182. 1909 (*Vitis pallida*); Ramam. in Sald. & Nicols. Fl. Hassan Dt. 357, f. 70, A–Ac. 1976.

Distrib. : Infrequent in deciduous forests. Jalgaon, Nasik, Osmanabad, Parbhani, Pune, Satara, Thane.

C. quadrangularis L. Mant. 1: 39. 1767. *Vitis quadrangularis* Wall. ex Wight & Arn. Prodr. 125. 1834; Laws. in Hook. f. Fl. Brit. India 1: 645. 1875; Cooke, Fl. Pres. Bombay 1: 266. 1958 (Repr.).*'Chaudari', 'Harsankar', 'Kandvel'.*

Climbing shrubs; rootstock stout, leafless when old, tendrils simple. Leaves 2–5 x 3–6 cm, broadly ovate, apex rounded, base cordate, margins entire or lobed. Flowers greenish–white, in shortly peduncled umbels; calyx cup–shaped; petals oblong. Berries 0.5–0.7 cm across, globose, red when ripe. Seeds obovoid.

Fls. & Frts. : January–June.



Cissus quadrangularis L.
A-Habit; B-Fruit

Distrib. : Common throughout in deciduous forests, on outskirts, sometimes planted.

C. repanda Vahl, Symb. Bot. 3: 18. 1794. *Vitis repanda* (Vahl) Wight & Arn. Prodr. 125. 1834; Laws. in Hook. f. Fl. Brit. India 1: 648. 1875; Cooke, Fl. Pres. Bombay 1: 267. 1958 (Repr.).*'Gendal'*.

Scandent shrubs; young parts and leaves rufous tomentose, nodes swollen. Leaves 5–8 x 4–7 cm, ovate, apex acuminate, base shallowly cordate, margins crenate–dentate. Flowers c 0.15 cm across, reddish–pink, in dichotomous cymes; calyx cupular; petals oblong. Berries 1.0 x 0.5 cm, ovoid or pyriform, beaked, dark purple when ripe.

Fls. & Frts. : March–June.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 312, figs. 184. & 185. 1909 (*Vitis repanda*).

Distrib. : Common in deciduous forests.

C. repens Lam. Encycl. 1: 31 1789. *Vitis repens* (Lam.) Wight & Arn. Prodr. 125. 1834; Laws. in Hook. f. Fl. Brit. India 1: 646. 1875; Cooke, Fl. Pres. Bombay 1: 265. 1958 (Repr.).

Climbers; young parts glaucous. Leaves 6–10 x 4–6 cm, ovate–oblong, membranous, puberulous, apex acuminate, base cordate, margins crenate–serrate. Flowers 0.3–0.4 cm across, brick–red in compound umbels; calyx cupular; petals ovate. Berries 0.8 x 0.3 cm, globose, black when ripe. Seeds smooth.

Fls. & Frts. : February–June.

Distrib. : Infrequent in deciduous forests. Beed, Pune, Ratnagiri, Satara, Sindhudurg.

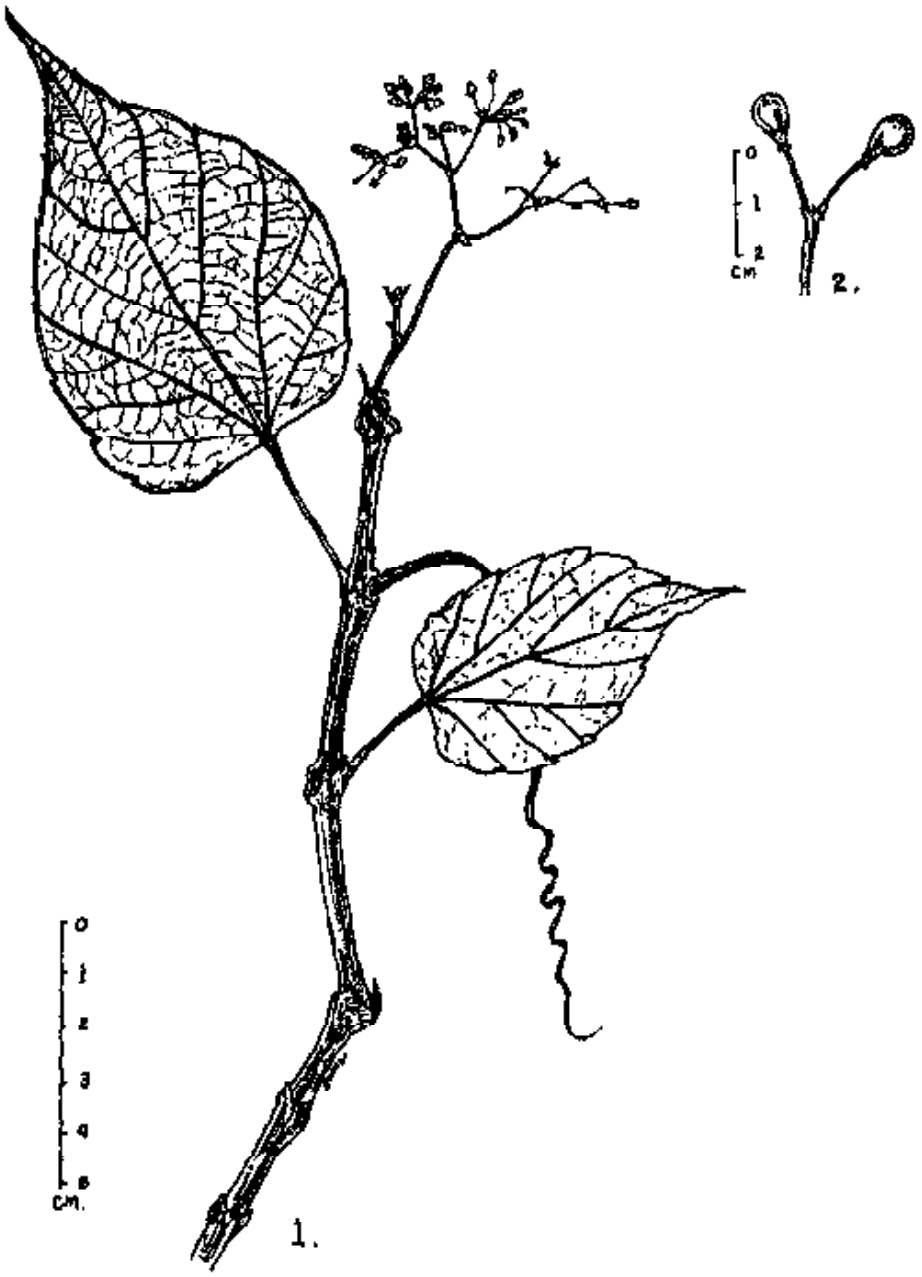
C. reticulata Thw. Enum. Pl. Zeyl. 63; 1858 S.M. Almeida, Fl. Savantwadi 1: 104. 1990. *Vitis reticulata* Thw. op. cit.; Laws. in Hook. f. Fl. Brit. India 1: 6 55. 1875; Talb. For. Fl. Bombay Pres. & Sind 1: 324–25, f. 193. 1909.

Climbers; tendrils simple; stems reticulate. Leaves trifoliolate; leaflets broadly elliptic–ovate, cuspidate, upper half denticulate, membranous when dry. Berries orange–yellow when ripe.

Fls. & Frts. : April–June.

Illus. : Talb. op. cit.

Distrib. : Rare climber along forest margins. Sindhudurg.



Cissus repens Lam.
A- Habit; B-Fruit

C. vitiginea L. Sp. Pl. 117. 1753. *Vitis linnaei* Wall. ex Wight & Arn. Prodr. 126. 1834; Laws. in Hook. f. Fl. Brit. India 1: 649. 1875; Cooke, Fl. Pres. Bombay 1: 268. 1958 (Repr.). *'Duka vela', 'Jugbel'.*

Climbing shrubs; branches grey tomentose. Leaves 5–12 x 3.0–10.5 cm, ovate, palmately 3–5, angled or lobed, coriaceous, hairy on both sides, apex acuminate, base truncate or broadly cordate, margins dentate. Flowers 0.3–0.4 cm across, pale yellow, in umbellate–cymes; calyx obscurely lobed, hairy without; petals ovate. Berries 1 x 0.6 cm, ovoid, apiculate. Seeds tessellate.

Fls. & Frts. : June–February.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 158. 1982.

Distrib. : Frequent in deciduous forests.

C. woodrowii (Stapf ex T. Cooke) Sant. in Kew Bull. 1948: 276. 1948. *Vitis woodrowii* Stapf ex T. Cooke, Fl. Pres. Bombay 1: 248. 1902 [1: 264. 1958 (Repr.)].

Shrubs, 1.5–3.0 m high; bark rough, grey. Leaves 8–20 cm as long as broad, ovate, sometimes obscurely 3–lobed, apex acute, acuminate, base cordate, margins crenate–repand. Flowers green, apex tinged red, 0.3–0.5 cm across, in compound umbels; calyx saucer–shaped; petals deciduous. Berries 0.7–1.0 cm across, subglobose, reddish when ripe.

Fls. & Frts. : June–October.

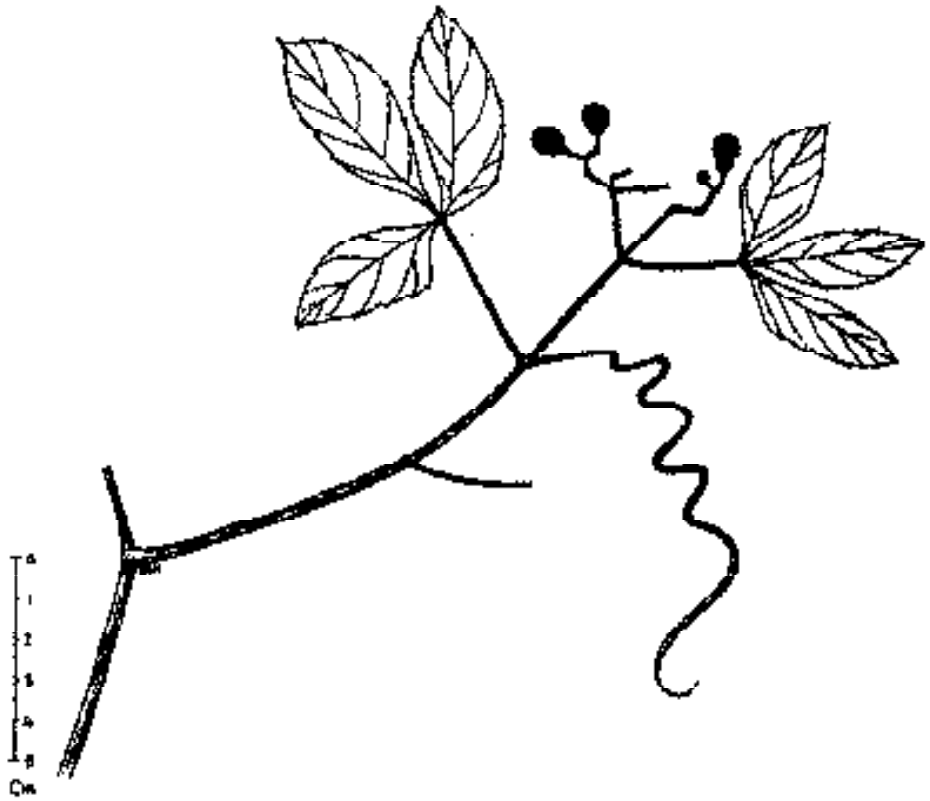
Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 309, f. 182. 1909.

Distrib. : Common in dry deciduous forests.

CYPHOSTEMMA (Planch) Alston

1. Stipules prominent ... *C. auriculatum*
1. Stipules not as above :
   2. Leaflets sessile; berry scarlet, hispid ... *C. setosus*
   2. Leaflets subsessile; berry black, smooth ... *C. triloba*

Cyphostemma auriculatum (Roxb.) P. Singh & Shetty in Taxon 35: 596. 1986. *Cissus auriculata* Roxb. Fl. Ind. 1: 430. 1820. *Vitis auriculata* Wall. Num. List. no. 6031. 1831–32; Laws. in Hook. f. Fl. Brit. India 1: 658. 1875; Cooke, Fl. Pres. Bombay 1: 273. 1958 (Repr.). *Cayratia auriculata* (Roxb.) Gumble, Fl. Pres. Madras 237. 1918 [1 : 70. 1957 (Repr.)]. *'Jangli–Kajorni', 'Kali–vel'.*



Cyphostemma trilobа (Lam.) Almeida

Extensive climbers; stems succulent, reddish, cylindrical or angular, young parts softly pubescent. Leaves 5–foliolate; leaflets digitate, 4–8 x 2.5–4.5 cm, obovate to rhomboid, pubescent beneath, margins serrate. Flowers c 0.4 cm across, 4–merous, yellowish in divaricate cymes; calyx truncate, pubescent outside; petals oblong, pubescent outside. Berries 1.0–1.5 cm across, globose, red when ripe.

Fls. & Frts. : May–September.

Illus. : Wight, Ic. t. 145. 1839 (*Cissus auriculata*).

Distrib. : Infrequent in deciduous forests. Akola, Aurangabad, Bombay, Buldhana, Chandrapur, Nagpur, Nasik, Pune, Satara, Sindhudurg, Thane.

C. setosus (Roxb.) Alston in Trimen, Handb. Fl. Ceylon 6: Suppl. 53. 1931; Ramam. in N.C. Nair et al. Fl. Tn. St. Anal. 1: 81. 1983. *Cissus setosa* Wall. in Roxb. Fl. Ind. 1: 410. 1820. *Vitis setosa* (Roxb.) Wall. ex Wight & Arn. in Wight, Cat. Ind. Pl. 26. 1833 & Prodr. 127. 1834; Laws. in Hook. f. Fl. Brit. India 1: 654. 1875; Cooke, Fl. Pres. Bombay 1: 270. 1958 (Repr.). *'Khajagolicha–vel', 'Triphan–Kand'.*

Herbaceous climbers; stems and branches fleshy. Leaflets 4–8 x 3–5 cm, oblong–obovate, glandular–puberulous, apex and base rounded, margins dentate–serrate. Flowers greenish, 0.6 cm across, in dichasial, divaricate, glandular–pubescent cymes; calyx obscurely 4–lobed; petals ovate–oblong. Berries 0.6–0.8 x 0.7 cm, ovoid, red when ripe. Seeds pitted and crenate along margins.

Fls. & Frts. : September–January.

Illus. : Wight Ic. t. 170. 1839; Ic. Roxb. Fasc. 3, t. 12. 1969 (Repr. ed.); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 157. 1982 (*Cissus setosa*).

Distrib. : Infrequent in deciduous forests. Aurangabad, Beed, Buldhana, Jalna, Nagpur, Parbhani, Pune.

C. triloba (Lam.) Almeida, Fl. Mah. 1: 273. 1996. *Cissus trilobata* Lam. Encycl. 1: 31. 1783; Shetty & Singh in Taxon 37: 173. 1988. *Vitis rheedei* Wight & Arn. Prodr. 127. 1834; Laws. in Hook. f. Fl. Brit. India 1: 653. 1875; Cooke, Fl. Pres. Bombay 1: 270. 1958 (Repr.).

Herbaceous climbers; stems stout. Leaves 3–foliolate, sometimes 3–lobed or 3–partite (especially upper ones); leaflets unequal, oblong–lanceolate, lateral ones oblique, margins sharply and distantly toothed; petioles 4–7 cm long, petiolules short or absent. Flowers

4–merous in umbellate–cymes, shorter than petioles; petals distinct. Berries 0.4–0.6 cm across, globose, 1–seeded, white when mature.

Fls. & Frts. : October–December.

Distrib. : Occassional in moist deciduous forest. 'Konkan' (Cooke, op. cit.).

TETRASTIGMA Planch.

1. Stems smooth or slightly muricate; seeds smooth ... *T. gamblei*
1. Stems muricate; seeds crenate on margins ... *T. leucostaphylum*

Tetrastigma gamblei Shetty & P. Singh in Kew Bull. 42: 933. 1987. *T. canarense (Dalz.)* sensu Gamble, Fl. Pres. Madras 1: 228. 1918 [1: 164. 1957 (Repr.)] p.p. non *Vitis canarensis* Dalz. in Hook. Kew. J. Bot. 3: 123. 1851. *V. canarensis* sensu Talb. For. Fl. Bombay Pres. & Sind 1: 319, f. 189. 1909.

Scandent dioecious shrubs; branches terete, slender; tendrils simple or bifid. Terminal leaflet 7–11 x 4.0–7.5 cm, ellipic to obovate, cuneate, obscurely serrate–dentate to subentire; petiolules 1.0–2.5 cm long, lateral leaflets 5–10 x 3.5–6.5 cm, elliptic, slightly oblique at base, margins as in terminal leaflets. Inflorescence c 3 cm long, umbellate–cymose, pubescent. Flowers 4–merous; calyx subtruncate or minutely 4–lobed, pubescent; petals oblong–ovate, slightly hooded, pubescent. Berries 0.4–0.6 cm across, globose. Seeds subglobose, furrowed and striated.

Fls. & Frts. : January–May.

Illus. : Talb. op. cit.

Distrib. : Infrequent in moist deciduous and semi–evergreen forests. Bombay, Pune, Ratnagiri, Sindhudurg, Thane.

T. leucostaphylum (Dennst.) Alston ex Mabb, in Taxon 26: 539. 1977; Shetty & P. Singh in Taxon 37: 173. 1988. *Cissus leucostaphyla* Dennst. Schluess. Hort. Malab. 17, 19, 33. 1818 & in Forst. Allg. Teutsch. Gart.–Mag. 3: 35, 37, 81. 1818. *Tetrastigma muricatum* (Wight & Arn.) Gamble, Fl. Pres. Madras 1: 229. 1918 [1: 164. 1957 (Repr.)]. *Vitis lanceolaria* Wall. Num. List. 206, no. 6013. 1831–32 nom. illeg.–based on *Cissus lanceolaria* Roxb.; Laws. in Hook. f. Fl. Brit. India 1: 660. 1875, Cooke, Fl. Pres. Bombay 1: 274. 1958 (Repr.). *Tetrastigma lanceolarium* (Roxb.). Planch in DC. Monogr. Phan. 5: 423. 1887. *'Khajorlicha vel'*.

Climbing shrubs; stems woody. Leaves 3–5–foliolate; leaflets 4–12 x 2–5 cm, oblanceolate to oblong–lanceolate, coriaceous, apex abruptly acute, base cuneate, margins entire or distantly serrate. Inflorescence: males in paniculate cymes and females in corymbose cymes. Flowers 0.4 cm across, greenish–white; calyx–tube 4–lobed; petals ovate. Berries 1 x 0.8 cm, globose. Seeds oblong or ellipsoid.

Fls. & Frts. : January–May.

Illus. : Wight, Ic. t. 777. 1840 (*Vitis lanceolaria*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 159. 1982.

Distrib. : Occasional in moist deciduous forests. Raigad (Cooke, op. cit.), Ratnagiri.

CULTIVATED SPECIES :

Vitis vinifera L. Sp. Pl. 202. 1753; Laws. in Hook. f. Fl. Brit. India 1: 652. 1875; Cooke, Fl. Pres. Bombay 1: 275. 1958 (Repr.). *'Draksha', 'Kagoor'.*

Stout climbers. Leaves roundish or ovate or suborbicular, 3–5–lobed, base cordate, margins dentate, glabrescent above, hairy beneath; tendrils simple or forked. Flowers greenish, in umbels arranged in panicles, axillary. Berries oblong, succulent, variable as regarding shape, size, colour and taste.

Fls. & Frts. : November–May.

Distrib. : Probably a native of S.E. Europe to W. India. Often cultvated for edible fruits.

LEEACEAE

(S. Moorthy)

LEEA van Royen ex L.

1. Leaves simple, unifoliolate or unipinnate ... *L. macrophylla*
1. Leaves 2(–3)–pinnate:
   2. Lower surface of leaves with circular discs ... *L. aequata*
   2. Lower surface of leaves not as above :
      3. Stems, rachis and peduncles crispate or winged ... *L. asiatica*
      3. Stems, rachis and peduncles not crispate or winged :
         4. Leaflets glabrous ... *L. indica*
         4. Leaflets hairy :

5. Young stems and branches glabrous ... *L. guineensis*

5. Young stems and branches rusty pubescent :

6. Rachis and petioles angled ... *L. compactiflora*

6. Rachis and petioles not angled :

7. Leaflets with small, straight, sharp spine like hairs below especially along veins ... *L. robusta*

7. Leaflets not with such type of hairs; hairs bulbous based and setuligerous ... *L. setuligera*

Leea aequata L. Syst. Nat. ed. 12, 2: 627. 1767; Cooke, Fl. Pres. Bombay 1: 278. 1958. (Repr.); Ridsd. in Blumea 22: 90. 1974; Almeida, Fl. Mah. 1: 258. 1996. *L. hirta* Roxb. ex. Hornem. Hort. Hafn. 1: 231. 1813; Laws. in Hook. f. Fl. Brit. India 1: 668. 1875.

Shrubs, c 3 m high; young stems pubescent. Leaves 2–pinnate; leaflets 7–18 x 2.5–4.0 cm, oblong or ovate–oblong, hairy on both surfaces. Flowers white, in short, compact, pubescent cymes. Berries c 6 mm across, depressed globular, 2–6–lobed, black when ripe.

Fls. : August–September.

Distrib. : Pune [Khandala (Almeida, op. cit.)].

L. asiatica (L.) Ridsd. in Manilal, Bot, & Hist. Hort. Malab. 189. 1980. *Phytolacca asiatica* L. Sp. Pl. 474. 1753. *Leea crispa* van Royen ex L. Syst Nat. ed. 12, 2: 627. 1767 & Mant. 1: 124. 1767; Laws. in Hook. f. Fl. Brit. India 1: 665. 1875; Cooke, Fl. Pres. Bombay 1: 276. 1958 (Repr.); Ridsd. in Blumea 22:88. 1974. *L. aspera* Edgew. in Trans. Linn. Soc. 20: 36. 1846 non Wall. ex G. Don 1831; Laws. in Hook. f. op. cit.; Cooke, op. cit. 277 nom. illeg. *L. edgeworthii* Sant. in Rec. Bot. Surv. India 16: 54. 1953, 16: 46, ed.3, 1967. *L. pumila* Kurz in J. Asiat. Soc. Beng. 41 (2): 302. 1872; Laws. in Hook. f. op. cit. 666. *'Dinda'*, *'Gharbanda'*.

Shrubs, 2 m high. Leaflets 5.7–18.0 x 3.0–11.5 cm, elliptic or ovate, glabrous above, pubescent beneath, base rounded or cordate. Flowers in much branched, trichotomous, pubescent cymes. Berries 0.5–1.5 cm across, depressed–globular, purplish–black when ripe, 5–6–lobed, smooth.

Fls. & Frts. : May–November.

Illus. : Sald. in Sald. & Nicols. Fl. Hassan Dt. 355, f. 69 A. 1976.

Distrib. : Common throughout.

Notes. : Ridsdale op. cit. cites van Rheed's plate *'Nalagu'* (Hort. Malab. 1: 26. 1678) as 'type' for *L. asiatica* while making combination for *L. crispa* (in Manilal op. cit.) quoting the basionym *Phytolacca asiatica*. But infact the type plate cited resembles more *L. indica* than *L. crispa*. Hence, the name *L. asiatica* should be adopted for *L. indica* instead of *L. crispa*.

L. compactiflora Kurz. in J. Asiat. Soc. Beng. 42 (2) : 43, 65. 1873; Ridsd. in Blumea 22 : 88. 1974; Almeida, Fl. Mah. 1 : 260. 1996. *L. trifoliata* Laws. in Hook. f. Fl. Brit. India 1 : 666. 1875.

Shrubs, c 2 m high. Leaves simply pinnate to tripinnate; leaflets 8–10 X 2.5–9 cm, base acute, apex acuminate, sparsely strigose above. Flowers greenish–white in much branched compound cymes. Berries depressed globular. Pyrenes 4–6.

Fls. : August.

Illus. : Almeida, op. cit. facing p. 260.

Distrib. : Bombay (Almeida, op. cit.), Pune, Sindhudurg, Thane.

L. guineensis G. Don, Gen. Syst. 1: 712, 1831; Ridsd. in Blumea 22; 92. 1974; Almeida, Fl. Mah. 1: 260. 1996.

Shrubs, c 2 m tall. Leaves petiolate, ovate, base cordate, apex acuminate, sharply serrate along margins, upper surface reddish, pale white beneath. Inflorescence axillary panicles.

Fls. : July–August.

Distrib. : Bombay (Almeida, op. cit.).

L. indica (Burm. f.) Merr. in Philip. J. Sci. 14: 245. 1919; Ridsd. in Blumea 22: 95. 1974. *Staphylea indica* Burm. f. Fl. Ind. 75, t. 24, f. 2. 1768. *Leea sambucina* (L.) Willd. Sp. Pl. 1: 1177. 1797 nom. illeg.; Laws. in Hook. f. Fl. Brit. India 1: 666. 1875 p. p.; Cooke, Fl. Pres. Bombay1: 277. 1958 (Repr.). *'Dinda, 'Karkani'.*

Shrubs, 1–2 m tall, sometimes with aerial or stilt roots during monsoon. Leaflets 7–20 x 3–7 cm, ovate or ovate–oblong, apex acute or acuminate, margins crenate or dentate. Flowers c 0.6 cm across, greenish–white in terminal or dichotomous cymes. Fruits c 0.6 cm across, dorsally compressed, 1–4–lobed.

Fls. & Frts. : August–March.

Illus. : Wight, Ic. t. 78. 1838 (*Leea sambucina*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 160. 1982.

Distrib. : Common throughout.

L. macrophylla Roxb. ex Horn. Hort. Hafn. 1: 231. 1813; Laws. in Hook. f. Fl. Brit. India 1: 664. 1875; Cooke, Fl. Pres. Bombay 1: 276. 1958 (Repr.); Ridsd. in Blumea 22: 85. 1974. *L. integrifolia* Roxb. Fl. Ind. 2: 468. 1824; Laws. in Hook. f. op. cit. 667. *L. cinerea* Laws. in Hook. f. op. cit. 665. *L. coriacea* Laws. in Hook. f. op. cit. *L. diffusa* Laws. in Hook. f. op. cit. 667. *L. angustifolia* Laws. in Hook. f. op. cit. 665. *L. parallela* Wall. ex Laws. in Hook. f. op. cit. 666. *L. latifolia* Wall. ex Kurz in J. Asiat. Soc. Beng. 2, 44: 178. 1875; Cooke, op. cit. 277. *L. talbotii* King ex Talb. For. Fl. Bombay Pres. & Sind 1: 329, t. 195. 1909. *'Anderphod', 'Bendar', 'Dinda', 'Dindo', 'Supad'., 'Vhodlo.*

Herbs or shrubs upto 1.5 m tall. Leaflets 15–60 x 10–50 cm, broadly ovate, upper surface glabrous to sparsely hairy, lower surface sparsely to densely hairy, margins serrate; Flowers 5–merous, greenish–white, in much branched compound cymes. Fruits 0.5–1.0 cm across. Seeds usually 6.

Fls. & Frts. : July–October.

Illus. : Ic. Roxb. Fasc. 4, t. 2. 1970 (Repr. ed.).

Distrib. : Common throughout the state in deciduous forests.

L. robusta Roxb. Fl. Ind. 1: 655. 1820; Laws. in Hook. f. Fl. Brit. India. 1: 667. 1875 p.p.; Cooke, Fl. Pres. Bombay 1: 278. 1958 (Repr.).

Shrubs, 2–3 m high; stems and branches rufous–pubescent, at length glabrous. Leaves petiolate; leaflets 3–7, broadly ovate–oblong, apex caudately acuminate, base cuneate, irregularly serrate–dentate, at times double dentate. Flowers greenish–white or yellowish in 2–20 cm long cymes. Fruits c 0.8 cm across. Seeds 1–6, distinctly tuberculately rugose.

Fls. & Frts. : August–October.

Illus. : Ic. Roxb. Fasc. 4, t. 3. 1970 (Repr. ed.).

Distrib. : In deciduous forests. Ahmednagar, Kolhapur, Nasik, Pune, Raigad, Sindhudurg.

Notes. : Ridsdale (1974) treated this species as synonymous to *L. macrophylla* Roxb. ex. Horn. However on scrutiny of herbarium material at *MH* coupled with my project study on the genus, I am of the opinon that *L. robusta* of Roxb. is quite distinct from that of *L. macrophylla* Roxb. ex Horn. and hence the above treatment.

L. setuligera C. B. Cl. in Trim. J. Bot. 19: 105. 1881; Ridsd. in Blumea 22(1): 91. 1974; Cooke, Fl. Pres. Bombay 1: 279. 1958 (Repr.); Sant. Rec. Bot. Surv. India 16(1): 56. 1953.

Shrubs. Leaflets elliptic or elliptic–lanceolate, clothed with stiff bristles between the nerves above, bristly on the nerves beneath, apex acuminate, base rounded or subacute, sharply and closely serrate. Flowers in compact, umbellate cymes.

Fls. & Frts. : June–October.

Illus. : Ridsd., op. cit. f. 3. 6, 5: 11 & 12

Distrib. : Pune, Sindhudurg, Thane.

CULTIVATED SPECIES :

L. coccinea Planch. in Hort. Donatch. 6. 1860 & in Hook. Bot. Mag. t. 5299. 1862; Almeida, Fl. Mah. 1: 259. 1996.

Shrubs, 1.0–1.5 m tall; stems and leaves pinkish–red.

Fls. : July–August.

Distrib. : Cultivated in gardens. Bombay (Almeida, op. cit.).

SAPINDACEAE

(B. G. Kulkarni)

1. Climbing, tendrilar herbs; leaves biternate ... CARDIOSPERMUM
1. Shrubs or trees; leaves not as above :
   2. Leaves simple, viscid ... DODONEA
   2. Leaves compound, not viscid :
      3. Leaflets 3 ... ALLOPHYLUS
      3. Leaflets more than 3, 2–3 pairs:
         4. Flowers irregular ... LEPISANTHES
         4. Flowers regular :
            5. Fruits bladdery, 2–lobed ... HARPULLIA
            5. Fruits not as above :
               6. Fruits entire, often echinate ... SCHLEICHERA
               6. Fruits lobed or angled, not echinate:
                  7. Fruits smooth, saponaceous, hairy ... SAPINDUS
                  7. Fruits tubercled, not hairy ... DIMOCARPUS

ALLOPHYLUS L.

1. Thyrses shorter than the leaves, not branched; bark of branchlets whitish ... *A. serratus*

1. Thyrses longer than the leaves, branched; bark of branches not whitish :

2. Stamens 5; ovary 2–lobed ... *A. cominia*

2. Stamens 8; ovary not lobed ... *A. cobbe*

Allophylus cobbe (L.) Racusch. Nom. Bot. ed. 3, 108. 1797; Hiern in Hook. f. Fl. Brit. India 1: 673. 1875; Cooke, Fl. Pres. Bombay 1: 282. 1958 (Repr.); Leenh. in Blumea 15: 322. 1967. *Rhus cobbe* L. Sp. Pl. 267. 1753. *'Tipan'*.

Scandent shrubs, ferruginous–tomentose. Leaflets 4–16 x 2.5–8.0 cm, ovate or elliptic, terminal one obovate, brownish–tomentose beneath, sparsely so above, apex and base acute, margins serrate. Flowers 0.2–0.25 cm across,white, in axillary racemes with several interrupted fascicles; sepals and petals obovate. Berries 0.6 x 0.5 cm, globose, 1–seeded, purplish–red when ripe.

Fls. & Frts. : May–October.

Illus. : Wight, Ic. t. 964. 1845; Talb. For. Fl. Bombay Pres. & Sind 1: 334, f. 197.1909.

Distrib. : Frequent in moist deciduous, semi–evergreen forests along Western ghats and in coastal plains. Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

A. cominia (L.) Sw. Prodr. Veg. Ind. Occ. 62. 1791; S.M. Almeida, F. Savantwadi 1: 107. 1990. *Rhus cominia* L. Syst. (ed. 10) 964. 1759. *Allophylus concanicus* Radlk. in Sitz. & Maths. Phy. Cl. Bayer. Akad. Wiss. 20: 230. 1890; Leenh. in Blumea 15: 323. 1967; Mukerjee in Indian Forester 98: 496. 1972.

Scandent shrubs; bark red, lenticellate, young branches minutely puberulous. Leaflets variable, 5–18 x 2.5–7.5 cm, subcoriaceous, green above, reddish beneath, terminal one elliptic or ovate–elliptic, laterals ovate–lanceolate, much shorter than terminal one, margins subentire or crenulate. Flowers yellowish–white, in axillary, branched panicles, upto 10 cm long; sepals pubescent below; petals villous. Berries 0.4–0.6 cm across, globose, black when ripe.

Fls. & Frts. : April–September.

Distrib. : Infrequent in moist deciduous/semi–evergreen forests. 'Bombay' (Mukerjee, op. cit.), Sindhudurg (S.M. Almeida op. cit.).

A. serratus (Roxb.) Kurz in J. Asiat. Soc. Bengal 44: 185. 1876; Leenh. in Blumea 15: 351. 1967; S. K. Mukherjee in Indian Forester 98: 495. 1972. *Ornitrophe serrata* Roxb. Pl. Cor. 44, t. 61. 1795. *A. cobbe* Hiern in Hook. f. Fl. Brit. India 1: 674. 1875, p.p.; Cooke, Fl. Pres. Bombay 1: 282. 1958 (Repr.).

Climbing shrubs. Leaflets 5–10 x 2.5–4.5 cm, ovate or elliptic–ovate, margins serrate–dentate. Flowers white, in 5–10 cm long, pendulous racemes. Fruits subglobose, c 5 mm across.

Fls. & Frts. : August–September.

Distrib. : Frequent in scrub forests. Kolhapur, Satara.

CARDIOSPERMUM L.

1. Leaves glabrous; capsules winged on angles ... *C. halicacabum*
1. Leaves pubescent; capsules not winged on angles ... *C. microcarpa*

Cardiospermum halicacabum L. Sp. Pl. 366. 1753; Hiern in Hook. f. Fl. Brit. India 1: 670. 1875; Cooke, Fl. Pres. Bombay 1: 280. 1958 (Repr.). *'Ghanphodi', 'Kapalphodi', 'Tejovati'.*

Slender, perennial herbs; roots woody. Leaflets 3–5 x 2–3 cm, ovate–lanceolate, margins toothed. Flowers 0.4–0.45 cm across, white, 4–merous, in corymbose, tendriliferous cymes; petals unequal with scales on inner side at base. Capsules 2–3 x 2.0–2.4 cm, trigonous, depressed, pyriform. Seeds globose, arillate.

Fls. & Frts. : August–December.

Illus. : Wight, Ic. t. 508. 1841; Mahesh. Illus. Fl. Delhi. f. 47. 1966.

Distrib. : Growing as a weed in open situations. Common throughout.

C. microcarpa Kunth, Nov. Gen. Sp. 5: 104. 1821; Almeida, Fl. Mah. 1: 276. 1996; Naik, Fl. Marathwada 1: 229. 1998. *C. canescens* Wall. Pl. As. Rar. 1: 14. 1830; Hiern in Hook. f. Fl. Brit. India 1: 670. 1875; Cooke, Fl. Pres. Bombay 1: 281. 1958 (Repr.).

Climbing herbs or undershrubs; stems furrowed, pubescent. Leaflets 3.5–5.0 x 1–3 cm, ovate to obovate, apex in laterals obtuse, base cuneate to cordate, in terminal one apex mucronate, margins coarsely serrate. Flowers 0.6–1.5 cm long, white, in umbellate cymes; peduncles 4–12 cm long. Capsules 2.5–4.0 cm long, globose, 3–angled. Seeds 0.3–0.5 cm across, globose, black, arillate.

Fls. & Frts. : July–February.

Illus. : Wight, Ic. t. 74. 1838.

Distrib. : Occasional on hill slopes in deciduous forests. 'Konkan' (Cooke, op. cit.) & Marathwada (Naik, op. cit.).

DIMOCARPUS Lour.

Dimocarpus longan Lour. Fl. Cochinch. 233. 1079; Leenh. in Blumea 19: 122. 1971. *Nephelium longana* (Lam.) Camb. in Mem. Mus. Hist. Nat. 18: 30. 1829; Hiern in Hook. f. Fl. Brit. India 1: 688. 1875; Cooke, Fl. Pres. Bombay 1: 285. 1958 (Repr.). *'Umb', 'Vumb'.*

Trees, 8–15 m high; young shoots rusty–brown tomentose. Leaves 10–40 cm long; leaflets 3 pairs, 8–16 x 2.5–4.0 cm, alternate, oblong–elliptic, coriaceous, glaucous beneath, apex acute or obtuse, base cuneate or obtuse. Flowers c 0.4 cm across, white to creamy, in terminal or upper axillary, rusty–tomentose panicles; sepals pubescent without; petals pilose at base. Fruits 1.5 x 1.2 cm, globose, red when ripe, 1–seeded.

Fls. & Frts. : February–May.

Illus. : Bedd. Fl. Sylv. t. 156. 1871; Talb. For. Fl. Bombay Pres. & Sind 1: 338, f. 200. 1909.

Distrib. : Frequent in semi–evergreen and moist deciduous forests along the ghats. Kolhapur, Pune, Satara, Sindhudurg.

DODONEA P. Mill. (nom. cons.)

Dodonea viscosa (L.) Jacq. Enum. Syst. Pl. 19. 1760; Hiern in Hook. f. Fl. Brit. India 1: 697. 1875; Cooke, Fl. Pres. Bombay 1: 287. 1958 (Repr.); Leenh. in Blumea 28: 285. 1983. *Ptelea viscosa* L. Sp. Fl. 118. 1753. *'Baad', 'Jakhmi'.*

Shrubs, 1–2 m high, much branched; young shoots and leaves covered with bright yellow resin. Leaves subsessile, 3–7 x1–3 cm, oblanceolate, shiny above, apex acute or obtuse, base tapering. Flowers greenish–yellow, in few–flowered, axillary or terminal racemes or panicles; sepals ovate. Capsules 0.5–1.5 cm long, membranous, septicidally 2–6–valved, winged, viscid. Seeds subglobose.

Fls. & Frts. : July–March.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 342, f. 202. 1909; Croat in Ann. Missouri Bot. Gard. 63: 447, f. 5. 1976.

Distrib. : Common in dry deciduous and scrub forests, also planted as a hedge plant.

HARPULLIA Roxb.

Harpullia arborea (Blanco) Radlk. in Sitzungsb. Math.–Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muenchen 16: 404. 1890; Gandhi in Sald. & Nicols. Fl. Hassan Dt. 367. 1976. *Ptelea arborea* Blanco, Fl. Filip. 63. 1837. *Harpullia imbricata* Thw. Enum. 56. 1858 (excl. syn. *H. cupanoides* Roxb.); Cooke, Fl. Pres. Bombay 1: 286. 1958 (Repr.). *H. cupanoides* Hiern in Hook. f. Fl. Brit. India 1: 692. 1975.

Trees, 8–15 m high with straight trunk. Leaves 12–25 cm long, imparipinnate; leaflets 4–5 pairs, alternate, 3–12 x 2.5–4.5 cm, oblong–lanceolate, shining above, apex acuminate, base obliquely acute. Flowers yellowish, c 1.5 cm long, in axillary, subterminal, lax, drooping panicles; calyx deciduous; petals obovate, clawed. Capsules 5.0 x 2.5 cm, 2–valved, bright orange–red when ripe. Seeds black, arillate.

Fls. & Frts. : December–April.

Illus. : Bedd. Fl. Sylv. t. 158. 1871.

Distrib. : Occasional in semi–evergreen forests. 'Konkan' (Cooke, op. cit.).

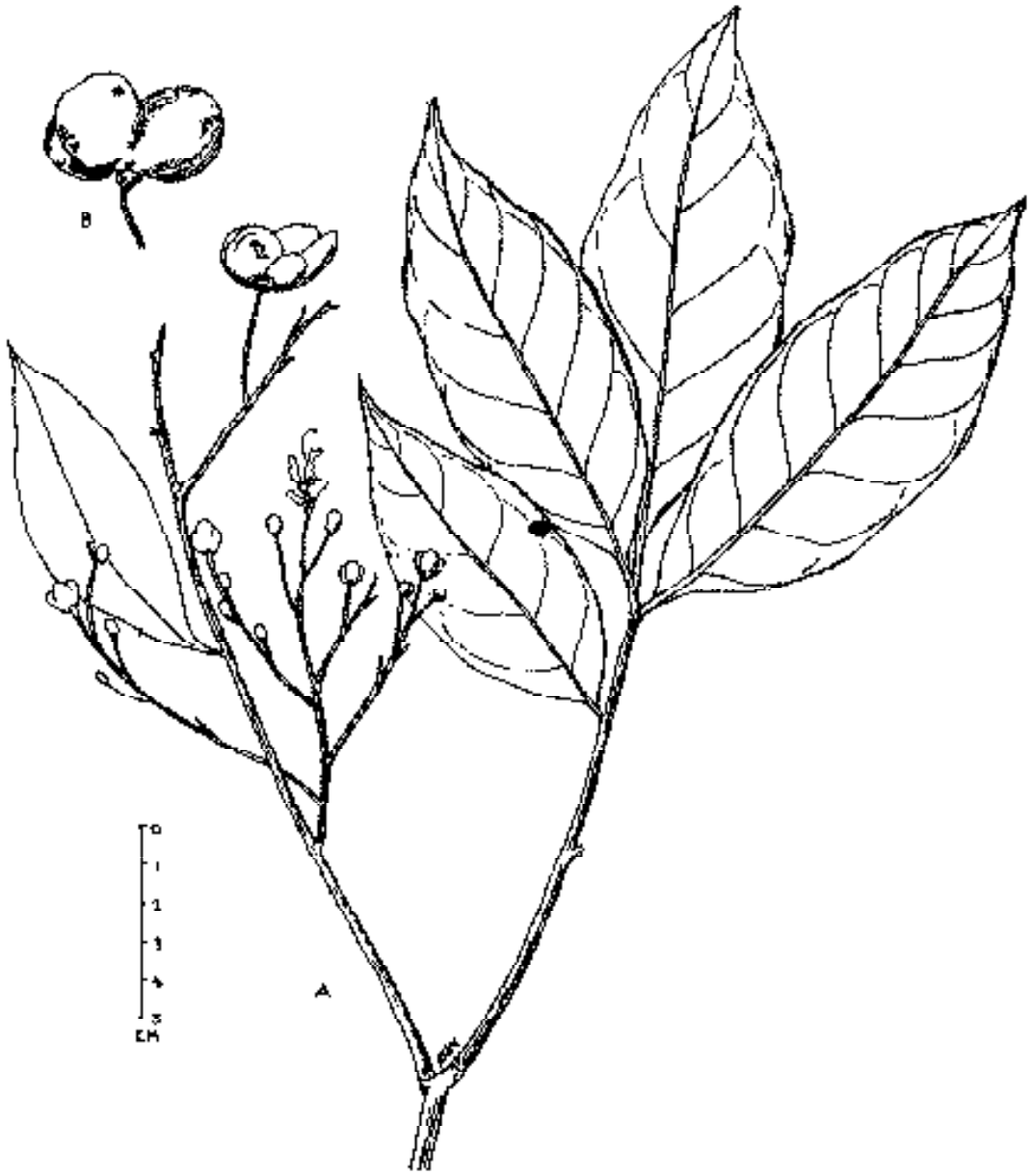
LEPISANTHES Bl.

Lepisanthes tetraphylla (Vahl) Radlk. Sap. Holl. Ind. 35 (105). 1877; Leenh. in Blumea 17 : 63. 1969. *Sapindus tetraphyllus* Vahl, Symb. Bot. 3: 54. 1794. *Hemigyrosa canescens* Bl. in Rumphia 3: 166. in Obs. 1847; Hiern in Hook. f. Fl. Brit. India 1: 671. 1875; Cooke, Fl. Pres. Bombay 1: 281. 1958 (Repr.). *'Karpa', 'Lokhandi'.*

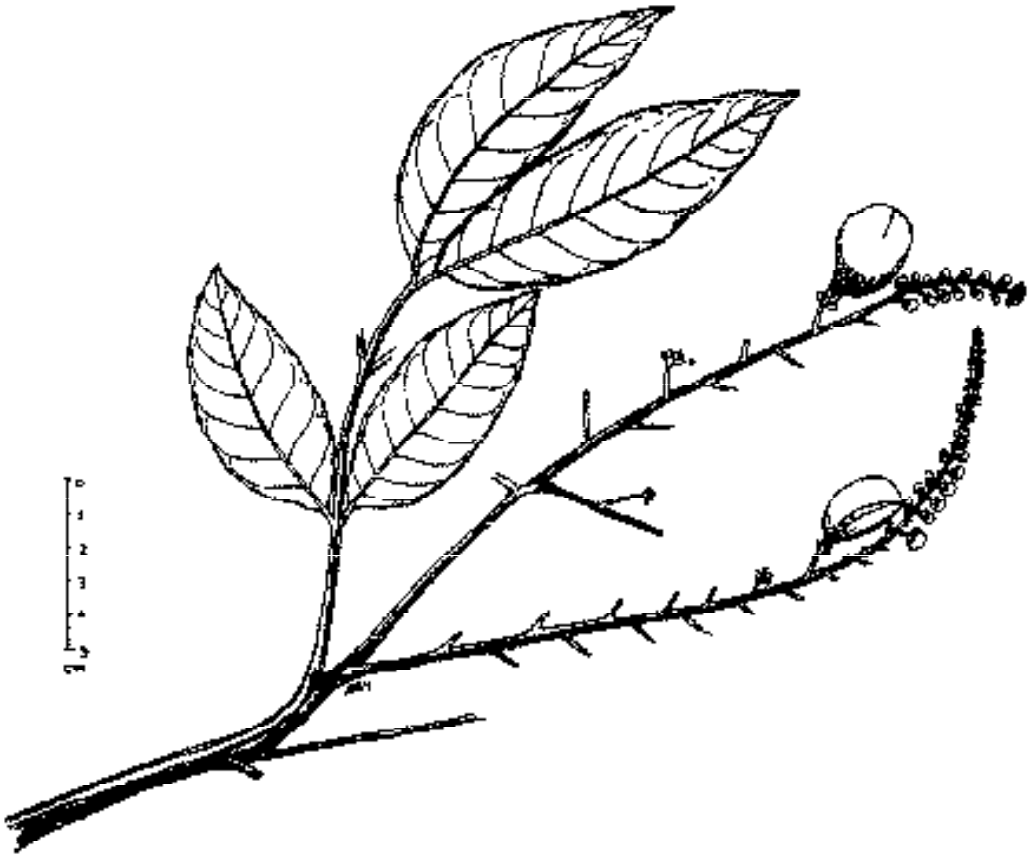
Shrubs or small trees, 5–8 m high. Leaves 10–25 cm long; leaflets 2–3 pairs, 5–12 x 3–5 cm, lanceolate or elliptic–oblong, glabrous on both sides or sometimes pubescent beneath, apex acuminate, base acute or obtuse. Flowers 0.4–0.5 cm across, white or greenish–white, in terminal, rusty pubescent panicles; calyx pubescent; petals oblong–spathulate, hairy. Capsules 1.8–2.0 x 1.0–1.2 cm, ovoid, 3–angled, brownish when ripe, 1–seeded.

Fls. & Frts. : November–March.

Illus. : Wight, Ic. t. 141. 1839; Bedd. Fl. Sylv. t. 151. 1871; Talb. For. Fl. Bombay Pres. & Sind 1: 337, f. 196. 1909.



Harpullia arborea (Blanco) Radlk.
A–Habit; B–Fruit



Lepisanthes tetraphylla (Vahl) Radlk.

Distrib. : Frequent in semi–evergreen and moist deciduous forests along the Western ghats and Konkan plains. Bombay, Pune, Raigad, Ratnagiri, Sindhudurg, Thane.

SAPINDUS L.

1. Apex of leaflets emarginate; petals glabrous on inner surface except tufts of white hairs above claw ... *S. emarginatus*

1. Apex of leaflets acuminate; petals softly woolly on inner surface except claw ... *S. laurifolius*

Sapindus emarginatus Vahl, Symb. Bot. 3: 54. 1794. S. *trifoliatus* Hiern. in Hook. f. Fl. Brit. India 1: 682. 1875, p.p. non L. 1753. *S. laurifolius* Vahl var. *emarginauts* (Vahl) T. Cooke, Fl. Pres. Bombay 1: 267. 1902 [1: 284. 1958 (Repr.)]. *'Ritha'*.

Trees, 5–10 m high; bark rough with grey scales, branches tomentose. Leaves paripinnate; leaflets 3–5 (7) pairs, 4–12 x 2–5 cm, oblanceolate or ovate–oblong, thickly coriaceous, glabrous above, pubescent beneath, base cuneate or obtuse. Flowers 0.5 cm across, dull white, in terminal panicles; sepals 2–seriate; petals 5. Drupes ovoid, lobed, fleshy, fulvous hairy when young.

Fls. & Frts. : February–May.

Illus. : Bedd. Fl. Sylv. t. 154. 1871; Matthew, Illus. Fl. Tamilnadu Carnatic 2 : t. 167. 1982.

Distrib. : Frequent in deciduous forests, usually planted.

S. laurifolius Vahl, Symb. Bot. 3: 54. 1794; Cooke, Fl. Pres. Bombay 1: 284. 1958 (Repr.). *S. trifoliatus* auct. non L. 1753; Hiern in Hook. f. Fl. Brit. India 1: 682. 1875 p. p. *'Aritha'*, *'Ringi'*, *'Ritha'*.

Trees, 8–15 m high. Leaves abruptly pinnate; leaflets 2–3 pairs, 5–12 x 3–5 cm, lanceolate or elliptic–oblong, glabrous on both sides or sometimes pubescent beneath, base acute or rounded. Flowers 0.4–0.5 cm across, white or greenish–white, in terminal, rusty pubescent panicles; calyx pubescent; petals longer than calyx. Drupes 1.8–2.0 x 1.0–1.2 cm, 3–lobed, brownish when ripe.

Fls. & Frts. : November–March.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 337, f. 199. 1909. (*S. trifoliatus).*

Distrib. : Frequent in deciduous forests, also planted.

SCHLEICHERA Willd. (nom. cons.)

Schleichera oleosa (Lour.) Oken in Allg. Naturgesch. 3(2): 1341. 1841; Merr. in J. Arnold Arbor. 31: 284. 1950. *Pistacia oleosa* Lour. Fl. Cochinch. 2: 615. 1790. *Schleichera trijuga* Willd. Sp. Pl. 4(2): 1096. 1805; Hiern in Hook. f. Fl. Brit. India 1: 681. 1875; Cooke, Fl. Pres. Bombay 1: 283. 1958 (Repr.). *'Kosab', 'Koshimb', 'Kusum'.*

Trees, 10–15 m high. Leaves paripinnate, young leaves reddish; leaflets 2–4 pairs, 5–15 x 2.5–5.5 cm, oblong or elliptic–oblong, coriaceous, nerves strongly plaited below, apex obtuse–round or acute, base cuneate–subcordate. Flowers 0.25–0.3 cm across, greenish–white, polygamo–dioecious, fascicled in interrupted, branched racemes; calyx acute, 5–lobed; petals absent. Drupes 2.0–2.5 x 1.5–2.0 cm, ovoid, 1–2 seeded.

Fls. & Frts. : March–May.

Illus. : Bedd. Fl. Sylv. t. 119. 1871; Talb. For. Fl. Bombay Pres. & Sind 1: 335, f. 198. 1909 (*Schleichera trijuga*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 168. 1982.

Distrib. : Frequent in moist and dry deciduous forests.

CULTIVATED SPECIES:

Acer negundo L. Sp. Pl. 1056. 1753; Almeida Fl. Mah. 1: 279. 1996.

Leaves trifoliolate.

Distrib. : Cultivated at Victoria garden. Bombay (Almeida op. cit.).

Blighia sapida Koenig in Koenig & Sims, Ann. Bot. 2: 571. 1806; Bailey, Man. Cult. Pl. 641. 1949. *'Akee'.*

Trees, 10–14 m tall; branches stiff. Leaves paripinnate with 3–5 pairs of leaflets; leaflets obovate–oblong; short petioled. Flowers greenish–white in axillary racemes; calyx 5; petals longer than calyx. Capsules 3–angular, ovoid, straw–coloured to magenta–red, 1–seeded.

Fls. & Frts. : February–April.

Distrib. : Trees are cultivated for edible fruits. Bombay & Pune (Cooke, op. cit.).

Dodonea thunbergiana Eckl. & Zeyl. Enum. 54. 1834; Almeida, Fl. Mah. 1: 278. 1996.

Shrubs upto 3 m tall. Leaves up to 6 cm long, lanceolate or linear–lanceolate. Flowers in dense racemes.

Fls. : November–December.

Distrib. : It is a Native of Africa cultivated in Victoria garden in Bombay (Almeida, op. cit.).

Filicum decipiens (Wight. & Arn.) Thw. Enum. 408. 1864; Hook. f. Fl. Brit. India 1: 539. 1875; Cooke, Fl. Pres. Bombay 1: 280. 1958 (Repr.); Naik, Fl. Marathwada 1 : 231. 1998. *Rhus decipiens* Wight, Illus. t. 75. 1840.

Evergreen, elegant, handsome trees, 10–20 m tall; branches covered with scales. Leaves 20–30 cm long, fern–like, imparipinnate; leaflets 12 pairs, lanceolate 5 x 2 cm, rhachis winged. Flowers unisexual, greenish–white, in axillary panicles; calyx ovate; petals orbicular. Fruits subglobose, red tinged turning to dark blue on ripening, 1–seeded.

Fls. & Frts. : January–February.

Illus. : Wight, op. cit.; Brandis, Indian Trees 188, t. 85. 1929.

Distrib. : Probably a native of Ceylon, planted along roads, gardens for decorative leaves. Bombay, Marathwada (Naik, op. cit.), Pune, Thane.

Lepisanthes rubiginosa (Roxb.) Leenh.in Blumea 17: 82. 1969. *Sapindus rubiginosum* Roxb. Pl. Cor. 1: 44, t. 62. 1795. *Erioglossum rubiginosum* (Roxb.) Bl. in Rumphia 3: 118. 1847; Radlk. in Engl. Pfreich. 98: 693. 1932. *E. edule* Bl. Bijdr. 5: 229. 1825; Hiern in Hook. f. Fl. Brit. India 1: 672. 1875; Prain in Rec. Bot. Surv. India 3: 190. 1905; Cooke, Fl. Pres. Bombay 1: 279. 1958 (Repr.).

Trees, upto 9 m tall; branches pubescent. Leaves 30–45 cm long; leaflets elliptic or ovate–oblong, 4–6 pairs, obliquely obtuse at base, acuminate at apex. Flowers white, fragrant, in small clusters on elongated spike–like racemes, arranged in axillary or terminal tomentose panicles. Fruits deeply 2–3–lobed.

Fls. & Frts. : March–May.

Distrib. : Usually cultivated in gardens Bombay (Cooke, op. cit.).

Nephelium chinensis (Lour.) Almeida, Fl. Mah. 1: 280. 1996. *Litchi chinensis* Sonn. Voy. Ind. 2: 230. pl. 129. 1782; Radlk. in Engl. Pfreich. 98: 917. 1932. *Nephelium litchi* Camb. in Mem. Mus. Hist. Nat. Paris 18: 30. 1829; Hiern in Hook. f. Fl. Brit. India 1: 687. 1875; Cooke, Fl. Pres. Bombay 1: 286. 1958 (Repr.).

Trees, 7–15 m tall. Leaflets elliptic–oblong or lanceolate, obtuse or acute at base, acuminate at apex, glabrous. Flowers in terminal panicles; calyx 4, spreading; petals absent. Fruits globose, red or pink when ripe, aril white.

Fls. & Frts. : February–June.

Distrib. : Native of China. Cultivated in gardens for edible fruits. Bombay (Cooke, op. cit.), Pune, Satara, Sindhudurg, Thane.

Sapindus mukorossi Gaertn. Fruct. 1: 342, t. 70, f. 3. 1789; Hook. f. Fl. Brit. India. 1: 683. 1875; Almeida, Fl. Mah. 1: 281. 1996.

Trees, 6–8 m tall; bark peeling. Leaves paripinnately compound; leaflets 5–8 pairs, elliptic–lanceolate, acuminate, often falcate, pubescent. Flowers white, in terminal panicles. Fruits fleshy, composed of 1–2 berries, 1–8 cm across, ripens yellow.

Distrib. : Bombay gardens (Almeida, op. cit.).

STAPHYLEACEAE

(P. V. Prasanna)

TURPINIA Vent.

1. Anther filaments glabrous ... *T. pomifera*
1. Anther filaments sparsely villous ... *T. malabarica*

Turpinia malabarica Gamble in Bull. Misc. Inform. Kew. 135. 1916. & Fl. Pres. Madras 241. 1918 [1: 173. 1957 (Repr.)]; Naithani, Fl. Plants of Ind. Nepal & Bhutan 102. 1990.

Trees c 10 m tall. Leaves imparipinnate; leaflets c 13 x 7.5 cm, elliptic, apex obtuse or acuminate, base cuneate. Flowers 0.3 cm long, white, in terminal and axillary panicles. Berries c 2.5 cm across, sub globose.

Fls. & Frts. : June–December.

Distrib. : This species is included on the authority of Naithani (op. cit.). Precise locality from Maharashtra state is not stated.

T. pomifera (Roxb.) Wall. ex DC. Prodr. 2: 3. 1825; sensu Hiern in Hook. f. Fl. Brit. India 1: 698. 1875 p.p. non (Roxb.) DC. 1825; Cooke, Fl. Pres. Bombay 1: 288. 1958 (Repr.). *Dalrympelia pomifera* Roxb. Pl. Cor. 3: 76, t. 279. 1819.

Trees, c 5 m high. Leaves c 12 x 6 cm, opposite, imparipinnate; leaflets oblong–lanceolate, apex acuminate, margins serrate, shining. Flowers white, in axillary and terminal panicles, c 1.5 cm long. Drupes globose, c 10 x 0.4 cm, purplish–black. Seeds angular, dark brown.

Fls. & Frts. : January.

Illus. : Wight, Ic. t. 972. 1845.

Distrib. : 'Konkan' (Cooke op. cit.), 'Satara' (Birdwood, Cat. Fl. Matheran & Mahableshwar 11. 1897).

SABIACEAE

(P. V. Prasanna)

Meliosma Bl.

Meliosma simplicifolia (Roxb.) Walp. ssp. **pungens** (Wall. ex Wight & Arn.) Beus. in Blumea 19: 466. 1971; Nayar & S.C. Majumdar in Nayar et al. Fasc. Fl. India 20: 123. 1990; Almeida, Fl. Mah. 1: 285. 1996. *Millingtonia pungens* Wall. ex Wight & Arn. in Edinb. New Phil. J. 15: 178. 1833. *Meliosma wightii* Planch. ex Brandis, For. Fl. 116. 1874; Hook. F. Fl. Brit. India 2: 4. 1876; Cooke, Fl. Pres. Bombay 1: 289. 1958 (Repr.).

Trees, c 20 m tall. Leaves 5–20 x 2–8 cm, oblong–elliptic, apex acuminate, base rounded. Panicles 10–55 cm long, densely fulvous–tomentose. Flowers crowded, sessile. Drupes 0.4–0.6 cm across, globular, subtended by persistent calyx.

Fls. & Frts. : April–September.

Illus. : Wight, Ic. t. 964/3. 1845; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 169. 1982.

Distrib. : Rare in semi–evergreen forests. 'Konkan' (Cooke, op. cit.).

Note : Cooke op. cit. states that he has seen only one specimen collected from Bombay by Dalzell. Nayar & Majumdar in Nayar et al. op. cit. have not included Maharashtra under distribution of this

subspecies. M.R. Almeida op. cit. includes this sub species based on Dalzell's collection from Konkan.

EXCLUDED SPECIES : Almeida, Fl. Maharashtra 1: 285. 1996 has included *Meliosma pinnata* (Roxb.) Maxim. ssp. *barbulata* (Cufod.) Beus. based on a single specimen at BLAT. without precise locality.

ANACARDIACEAE

(P.V. Prasanna)

1. Leaves simple:
   2. Carpels 3–4 :
      3. Flowers tetramerous; style 1 ... NOTHOPEGIA
      3. Flowers pentamerous; styles 3:
         4. Petioles with spur–like appendages; petals valvate ... HOLIGARNA
         4. Petioles without appendages; petals imbricate ... SEMECARPUS
   2. Carpel 1:
      5. Flowers hermaphrodite ... BUCHANANIA
      5. Flowers polygamous :
         6. Fruit a nut, peduncle enlarged in fruit ... ANACARDIUM
         6. Fruit a drupe, peduncle not enlarged as above ... MANGIFERA
1. Leaves compound:
   7. Leaves with an intramarginal nerve ... SPONDIAS
   7. Leaves not as above:
      8. Branches spiny; leaves trifoliolate ... RHUS
      8. Branches not spiny; leaves 7–9–foliolate ... LANNEA

ANACARDIUM L.

Anacardium occidentale L. Sp. Pl. 383. 1753; Hook. f. Fl. Brit. India 2: 20. 1876; Cooke, Fl. Pres. Bombay 1: 292. 1958 (Repr.). *'Kaaju'*.

Trees, c 4 m tall; branches terete. Leaves 4–11 x 2.5–7.0 cm, obovate or elliptic, apex rounded, base cuneate. Panicles 15–25 cm long, terminal. Flowers yellow, with pink stripes. Nuts c 2.5 cm long, reniform on juicy receptacle.

Fls. & Frts. : December–May.

Illus. : Bedd. Fl. Sylv. t. 163. 1871; Talb. For. Fl. Bombay Pres. & Sind 1: 351, f. 205. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 170. 1982.

Distrib. : Usually planted, occassionaly found as an escape in deciduous forests. Ahmednagar, Bombay, Chandrapur, Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

BUCHANANIA Spreng.

1. Petioles stout; inflorescence pubescent ... *B. cochinchinensis*

1. Petioles slender; inflorescence glabrous ... *B. axillaris*

Buchanania axillaris (Desr.) Ramam. in Sald. & Nicols. Fl. Hassan Dt. 374. 1976. *Mangifera axillaris* Desr. in Lam. Encycl. 3: 697. 1792. *Buchanania angustifolia* Roxb. Pl. Cor. 3: t. 262. 1820; Hook. f. Fl. Brit. India 2: 23. 1876; Cooke, Fl. Pres. Bombay 1: 294. 1958 (Repr.).

Trees, 15–20 m tall; bark rough, deeply fissured. Leaves 10–15 x 3–5 cm, elliptic–lanceolate, base rounded and slightly decurrent into petiole. Panicles axillary and terminal. Flowers 0.3–0.4 cm across, sessile, pale white. Drupes c 1.5 cm across, slightly compressed.

Fls. & Frts. : May–September.

Illus. : Wight, Ic. t. 101. 1839 (*Buchanania angustifolia*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 170. 1982.

Distrib. : Aurangabad, Chandrapur.

B. cochinchinensis (Lour.) Almeida, Fl. Mah. 1: 287. 1996. *Toluifera cochinchinensis* Lour. Fl. Cochinch. 262. 1790. *B. lanzan* Spreng. in J. Bot. (Schrad.) 2: 234. 1800; Cooke, Fl. Pres. Bombay 1: 293. 1958 (Repr.). *B. latifolia* Roxb. Fl. Ind. 2: 385. 1832; Hook. f. Fl. Brit. India 2: 23. 1876. *'Char', 'Charoli', 'Piyal'*.

Trees, c 20 m tall; young branches silky tomentose. Leaves 10–20 x 6–9 cm, broadly oblong, apex emarginate, base rounded. Inflorescence terminal, panicles c 20 cm long. Flowers 0.3–0.4 cm across, white. Drupes 0.4–1.0 cm across, subglobose, reddish–purple when ripe; stone hard.

Fls. & Frts. : January–May.

Illus. : Bedd. Fl. Sylv. t. 165. 1871; Ic. Roxb. Fasc. 4, t. 24, 1970 [(Repr. ed.) *B. latifolia*]; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 111. 1988.

Distrib. : Fairly common in deciduous forests.

Notes. : The fruit is eaten and oil is extracted from kernels (Cooke, op. cit.).

HOLIGARNA Buch.–Ham. ex Roxb. (nom. cons.)

1.	Leaves pubescent beneath; drupes exserted	...	*H. grahamii*
1.	Leaves glabrous; drupes not exserted	...	*H. arnottiana*

Holigarna arnottiana Hook. f. Fl. Brit. India 2: 36. 1876; Cooke, Fl. Pres. Bombay 1: 298. 1958 (Repr.). *'Bibba', 'Hulgeri'.*

Trees, 10–25 m tall. Leaves 10–28 x 4–12 cm, oblanceolate, coriaceous, apex acute, base cuneate. Inflorescence panicled, axillary and terminal, rusty tomentose, c 15 cm long. Flowers c 0.3 cm across, greenish–yellow. Drupes c 2.5 x 1.5 cm, obliquely ovoid, brownish–black, resinous.

Fls. & Frts. : January–June.

Illus. : Bedd. Fl. Sylv. t. 167. 1871.

Distrib. : Sindhudurg, Wardha.

H. grahamii (Wight) Kurz in J. Asiat. Soc. Bengal 41(2): 305. 1872; Hook. f. Fl. Brit. India 2: 37. 1876; Cooke Fl. Pres. Bombay 1: 298. 1958 (Repr.). *Semecarpus grahamii* Wight, Ic. t. 235. 1839. *Holigarna wightii* Balakr. in J. Bombay nat. Hist. Soc. 63: 327. 1967. *'Hulgeri'.*

Trees, 10–25 m tall. Leaves 20–40 x 10–15 cm, oblanceolate, triangular above the middle, decurrent into the petiole, apex acute, base cuneate. Inflorescence of tomentose, terminal, panicles. Flowers 0.3–0.7 cm across, white or yellowish–green. Drupes 1.0–2.8 x 0.5–1.5 cm, obliquely ovoid, basal portion embedded in calyx.

Fls. & Frts. : December–June.

Illus. : Wight, op. cit.; Talb. For. Fl. Bombay Pres. & Sind 1: 359, f. 210. 1909.

Distrib. : Frequent along ghats in semi–evergreen forests. Kolhapur, Pune, Raigad, Satara, Sindhudurg.

Notes. : Kurz (op. cit.) while describing his collection from Burma misidentified them with those of Wight's and based on the latter's epithet, proposed a new combination. Hook. f. (1876) described Kurz's

plant as a new species, *Holigarna* using Wight's name as the basionym. This becomes superfluous as Kurz too made the new combination based on the same type. Subsequently, Balakrishnan (op. cit.) also supplied a superfluous new name thinking that Hook. f.'s name has become a later homonym.

LANNEA A. Rich. (nom. cons.)

Lannea coromandelica (Houtt.) Merr. in J. Arnold Arbor. 19: 353. 1939. *Dialium coromandelicum* Houtt. Nat. Hist. 2, 2: 39, t. 5, f. 2. 1774. *Odina wodier* Roxb. Fl. Ind. 2: 293. 1832; Hook. f. Fl. Brit. India 2: 29. 1876; Cooke Fl. Pres. Bombay 1: 296. 1958 (Repr.). *'Moya', 'Shimti'.*

Trees, c 20 m tall; bark ash coloured, young branchlets puberulous. Leaves crowded at ends of branches; leaflets 5–12 x 3.0–5.5 cm, ovate–oblong, apex acuminate, base rounded. Inflorescence of terminal panicles; flowers c 0.1 cm across, creamy yellow with reddish tinge. Drupes 1.0 x 0.5 cm, reniform, ripens red.

Fls. & Frts. : January–June

Illus. : Wight, Ic. t. 60. 1838; Bedd. Fl. Sylv. t. 123. 1871; Ic. Roxb. Fasc. 45, t. 25. 1970 [(Repr. ed.) *Odina wodier*]; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 172. 1982.

Distrib. : Common throughout in deciduous forests.

MANGIFERA L.

1.	Panicles pubescent or tomentose	...	*M. indica*
1.	Panicles glabrous	...	*M. sylvatica*

Mangifera indica L. Sp. Pl. 200. 1753; Hook. f. Fl. Brit. India 2: 13. 1876; Cooke, Fl. Pres. Bombay 1: 291. 1958 (Repr.). *'Amba'.*

Trees, c 15 m tall. Leaves 12–25 x 4–8 cm, crowded at apex of branches, oblong–lanceolate, coriaceous. Inflorescence of pubescent, terminal panicles. Flowers c 0.5 cm across, polygamous. Drupes 4–10 cm long, obliquely pyriform or obovoid; stone compressed, fibrous, hard.

Fls. & Frts. : January–June.

Illus. : Bedd. Fl. Sylv. t. 162. 1871; Matthew, Illus. Fl. Tamilnadu Carnatic 2: tt. 173 & 967. 1982.

Distrib. : Commonly cultivated, sometimes found wild.

M. sylvatica Roxb. Fl. Ind. 1: 644. 1820; Hook. f. Fl. Brit. India 2: 15. 1876; Grah. Cat. Bombay Pl. 41. 1839; Almeida, Fl. Mah. 1: 290. 1996.

Trees upto 45m tall. Fruits ovoid–ellipsoid, 8–10 cm long, flesh thin, slimy.

Fls. & Frts. : February–May.

Distrib. : Common along river banks in Southern Konkan (Almeida, op. cit.).

NOTHOPEGIA Bl. (nom. cons.)

Nothopegia castaneifolia (Roth) Ding Hou in Blumea 24: 33. 1978; Almeida, Fl. Mah. 1: 290. 1996. *Ficus castaneifolia* Roth, Nov. Pl. Sp. 389. 1821. *Nothopegia racemosa* (Dalz.) Ramam. in Sald. & Nicols. Fl. Hassan Dt. 377. 1976. *Glycycorpus racemosus* Dalz. in J. Asiat. Soc. Bombay 3: 69. 1849. *Nothopegia colebrookiana* sensu Hook. f. Fl. Brit. India 2: 40. 1876 p.p. non Bl. 1849; Cooke, Fl. Pres. Bombay 1: 299. 1958 (Repr.). *'Amberi'*.

Trees, 4–8 m tall. Leaves 8–14 x 2.5–5.0 cm, ellipic–oblong, coriaceous, apex acute or acuminate, base rounded, decurrent into the petiole. Inflorescence of axillary panicles. Flowers 0.2–0.3 cm across, yellowish; calyx persistent. Drupes 1.0–1.2 x 0.5–1.2 cm, seated on enlarged torus, longitudinally striate, depressed–globose, dark purple, pulpy.

Fls. & Frts. : January–May.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 361, f. 211. 1909.

Distrib. : Satara, Sindhudurg, Thane.

Note : Fruits are edible.

RHUS L.

R. mysorensis G. Don, Gen. Syst. 2: 74. 1832; Hook. f. Fl. Brit. India 2: 9. 1876; Cooke. Fl. Pres. Bombay. 1: 290. 1958 (Repr. ed.). *R. sinuata* Thunb. Prodr. Fl. Cap. 52. 1807; Almeida, Fl. Mah. 1: 291. 1996. *'Amani'*, *'Amboni'*.

Shrubs, c 2.5 m tall. Leaflets 1.0– 3.5 x 0.8–1.5 cm, obovate, cuneate, margins sinuate–toothed. Inflorescence of pubescent panicles, axillary and terminal. Flowers 0.15–0.2 cm across, greenish–yellow. Drupes 0.3–0.4 cm across, ripens brown. Seeds reniform, yellowish.

Fls. & Frts. : August–December.

Illus. : Talb. For. Fl. Bombay. Pres. & Sind 1: 347, f. 203. 1909; Mahesh. Illus. Fl. Delhi f. 48. 1966.

Distrib. : Common in scrub jungles.

SEMECARPUS L. f.

Semecarpus anacardium L. f. Suppl. 182. 1781; Hook. f. Fl. Brit. India 2: 30. 1876; Cooke. Fl. Pres. Bombay 1: 296. 1958 (Repr.).

1. Leaves rounded at base ... var. *anacardium*
1. Leaves cuneate at base ... var. *cuneifolia*

var. **anacardium.** *'Bhilava', 'Bibba'.*

Trees, 6–10 m tall. Leaves 7–30 x 5–15 cm, obovate–oblong, grey–tomentose beneath, apex obtuse. Inflorescence of pubescent panicles. Flowers 0.5–0.6 cm across, greenish–yellow. Drupes 2.0–3.0 cm across, yellowish to orange–black when ripens, seated on a fleshy receptacle.

Fls. & Frts. : January–September.

Illus. : Wight, Ic. 2: t. 558. 1842; Talb. For. Fl. Bombay Pres. & Sind 1: 355, f. 208. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 1175. 1982.

Distrib. : Common throughout in deciduous forests.

Notes. : The tree is known as marking nut tree. The juice of the pericarp is used for marking cotton clothes. An acrid viscid juice is extracted from it, which is used in making a kind of varnish, while the fleshy receptacles on which the drupes rest are roasted and eaten (Cooke, op. cit.).

var. **cuneifolia** (Roxb.) DC. Prodr. 2: 62. 1825; Hook. f. Fl. Brit. India 2: 31. 1876; Cooke, Fl. Pres. Bombay 1: 297. 1958 (Repr.). *S. cuneifolia* Roxb. Fl. Ind. 2: 86. 1824. *'Bibba'.*

Trees, c 8 m tall. Leaves often tomentose beneath.

Fls. & Frts. December.

Distrib. : In dry deciduous forests. Pune (Cooke, op. cit.).

SPONDIAS L.

1.	Flowers bisexual; ovary 1–celled or rarely 2–celled	...	*S. indica*
1.	Flowers polygamous; ovary 4–5–celled	...	*S. pinnata*

Spondias indica (Wight & Arn.) Airy Shaw & Forman in Kew Bull. 21: 16. 1967: Almeida, Fl. Mah. 1 : 293. 1996. *Solenocarpus indica* Wight & Arn. Prodr. 171. 1834; Hook. f. Fl. Brit. India 2: 27. 1876; Cooke, Fl. Pres. Bombay 1: 295. 1958 (Repr.).

Trees, 6–10 m tall. Leaves imparipinnate; leaflets 5–8 x 1.2–3.0 cm, oblong, apex acuminate, base oblique. Inflorescence of branched panicles. Flowers 0.4–0.5 cm across, white; calyx 5–lobed; petals recurved. Drupes c 0.6 cm long, obliquely oblong.

Fls. & Frts. : January–March.

Illus. : Bedd. Fl. Sylv. t. 233. 1872; Talb. For. Fl. Bombay Pres. & Sind 1: 352, f. 206. 1909 (*Solenocarpus indica*).

Distrib. : Rare. Sindhudurg (Almeida, op. cit.).

S. pinnata (L.f.) Kurz in Prelim. Rep. For. & Veg. Pegu Append. A. 44. & B. 42. 1875. *Mangifera pinnata* L. f. Suppl. 156. 1781. *Spondias mangifera* Willd. Sp. Pl. 2: 751. 1799 nom. illeg.; Hook. f. Fl. Brit. India 2: 42. 1876; Cooke, Fl. Pres. Bombay 1: 299. 1958 (Repr.). *S. acuminata* Roxb. Fl. Ind. 2: 453. 1832; Hook. f. op. cit.; Cooke, op. cit. 300. *'Ambada'*.

Trees, 9–15 m tall. Leaves imparipinnate; leaflets 5–15 x 3–6 cm, oblong or elliptic, apex acuminate, margins entire or serrate. Inflorescence of terminal panicles. Flowers c 0.5 cm across, greenish–white, clustered, yellow when ripe; stones hard.

Fls. & Frts.: December–July.

Illus. : Bedd. Fl. Sylv. t. 169. 1872; Talb. For. Fl. Bombay Pres. & Sind 1: 347, f. 203. 1909; Mahesh. Illus Fl. Delhi f. 48. 1966; Airy Shaw & Forman in Kew Bull. 21:7, f. 2 (1 & 2). 1967; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 177 & t. 967. 1982.

Distrib.: Occasional in hill forests and around fields. Ahmednagar, Aurangabad, Bombay, Latur, Nagpur, Nasik, Pune, Raigad, Ratnagiri, Thane.

Notes. : Fruits are edible.

CULTIVATED SPECIES :

Pistacia terebinthus Bieb. Fl. Taur. Cauc. Chark. 2: 418. 1819; Almeida, Fl. Mah. 1: 290. 1996.

Trees, small, deciduous. Leaves compound, petioles winged; leaflets 9–13. Flowers small, dioecious, apetalous. Fruits dry, drupaceous, dark purple, wrinkled.

Fls. & Frts. : January–March.

Distrib. : Rarely cultivated in gardens (Almeida, op. cit.).

Rhus simarubifolia Gray, Bot. U.S. Exptl. Exped. 1: 367. t. 44. 1798; Almeida, Fl. Mah. 1: 291. 1996.

Shrubs or small trees. Leaves imparipinnately compound; leaflets 5–7, 5–6 x 1.5 x 2.0 cm, ovate–lanceolate, coriaceous, acute or obtuse at apex, entire along margins. Inflorescence of axillary panicles. Flowers small, white.

Fls. : June–July.

Distrib. : It is a native of Fiji islands, cultivated in gardens (Almeida, op. cit.).

Schinus molle L. Sp. Pl. 388. 1753; Almeida, Fl. Mah. 1: 291. 1996.

Evergreen trees, 8–15 m tall; branches tapering. Leaves imparipinnately compound, 10–25 cm long; leaflets many, 2.0–3.8 x 0.5–0.8 cm, linear–lanceolate, falcate, resinous. Inflorescences of branched, terminal or axillary, panicles. Flowers yellowish–white. Fruits rose coloured or purplish–green, c 5 mm across, resinous with a strong peppery odour.

Fls. & Frts. : April–June.

Distrib. : It is a native of Tropical South Africa, cultivated in gardens (Almeida, op. cit.).

S. terebinthifolius Raddi in Mam. Mod. 18. Fis. 399. 1820; Almeida, Fl. Mah. 1: 291. 1996.

Evergreen shrubs or small trees, 6–12 m tall. Leaves imparipinnate, up to 13 cm long; leaflets 5–13, usually 7, 2.5–5.0 cm long, oblong, elliptic oblong–elliptic or ovate–lanceolate. Inflorescence of

dense, terminal panicles. Flowers small, white or bright red. Drupes globose, c 4 mm across, bright green, ripens pale brown or scarlet.

Fls. & Frts. : March–September.

Distrib. : It is a native of Brazil, occasionally planted in gardens. Bombay & Nagpur (Almeida, op. cit.).

Spondias cytherea Sonner. Voy. Ind. Or. & Chine 242, t. 123. 1782; Almeida, Fl. Mah. 1: 293. 1996. *'Vilayati Ambada'.*

Trees, deciduous, 10–15 m tall; bark grey. Leaves imparipinnately compound, 15–25 cm long; leaflets 13–15, elliptic, oblique at base. Flowers white, in clusters on branches, polygamous. Fruits ovoid, golden yellow, marked with rusty spots.

Distrib. : Cultivated in compound of Royal Institute of Science around Fort area, Bombay (Almeida, op. cit.).

MORINGACEAE

(P.V. Prasanna)

MORINGA Adans.

1. Leaves 2–pinnate; leaflets emarginate at apex, veins distinct ... *M. concanensis*
1. Leaves 3–pinnate; leaflets rounded at apex ... *M. oleifera*

Moringa concanensis Nimmo in Grah. Cat. Bomb. Pl. 43: 1839; Hook. f. Fl. Brit. India 2: 45. 1876; Cooke, Fl. Pres. Bombay 1: 301. 1958 (Repr.); Verdc. in Kew Bull. 40: 12. 1985.*'Mhua', 'Ran Shegat', 'Ran Shevga'.*

Trees, 5–8 m tall. Leaflets 2–3 x 1–2 cm, broadly elliptic–ovate or orbicular. Inflorescence of lax, pubescent, c 45 cm long panicles. Flowers 0.8–1.2 cm across; sepals white; petals yellow with pink streaks. Capsules 30–45 x 1.5 cm, triquetrous, slightly constricted between seeds. Seeds 1.5–1.8 cm long, yellow, 3–angled.

Fls. & Frts. : December–April.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: tt. 178 & 967 c & d. 1982.

Distrib. : Akola, Chandrapur, Nasik, Raigad, Thane, Yavatmal.

M. oleifera Lam. Encycl. 1: 398. 1785; Verdc. in Kew Bull. 40: 7. 1985. *M. pterygosperma* Gaertn. Fruct. 2: 314. 1791; Hook. f. Fl. Brit. India 2: 45. 1876; Cooke, Fl. Pres. Bombay 1: 301. 1958 (Repr.). *'Musik', 'Shegat', 'Shengul', Shevga'.*

Trees, 5–10 m tall. Leaflets 1–2 x 0.5–1.0 cm, lateral leaflets elliptic, terminal obovate. Inflorescence of puberulous panicles. Flowers c 1 cm across, white. Capsules 25–50 cm long, 9–ribbed. Seeds 3–angled, angles winged.

Fls. & Frts. : January–April.

Illus. : Bedd. Fl. Sylv. t. 80. 1871; Talb. For. Fl. Bombay Pres. & Sind 1: 365, f. 212. 1909 *(M. pterygosperma)*; Matthew Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 111. 1988.

Distrib. : Common throughout; usually cultivated for its edible fruits and young leaves.

CONNARACEAE

(P. V. Prasanna)

1. Inflorescences tomentose; calyx not accrescent; follicles, stipitate ... CONNARUS

1. Inflorescences glabrous; calyx accrescent; follicles sessile ... TALI

CONNARUS L.

Connarus monocarpus L. Sp. Pl. 675. 1753; Hook. f. Fl. Brit. India 2: 50. 1876; Cooke, Fl. Pres. Bombay 1: 303. 1958 (Repr.); Almeida, Fl. Mah. 1: 282. 1996. *C. wightii* Hook. f. op. cit. 51.; Cooke, op. cit. 304. *C. ritchiei* Hook. f. op. cit.; Cooke, op. cit. *'Kokani', 'Kutkutar', 'Nagotri'.*

Scandent shrubs, 3–6 m tall, much branched. Leaflets one or two pairs and with a terminal one, 5–10 x 3.0–4.5 cm, elliptic or elliptic–lanceolate or elliptic–ovate, obtusely acuminate at apex, rounded or acute at base; lateral nerves 3–5 pairs. Inflorescence of terminal panicles. Flowers white, c 5 mm across. Follicles 2–6 x 1.2–1.8 cm, fusiform, slightly falcate tapering into a narrow stalk, ripens brown or bright–red. Seeds c 2.5 cm long, ovoid or obovoid–oblong, arillate at base.

Fls. & Frts. : December–July.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 371, f. 214. 1909 (*C. ritchiei*); Ramam. in Sald. & Nicols. Fl. Hassan Dt. 362, f. 71a. 1976 (*C. wightii*).

Distrib. : Infrequent along forest edges. Kolhapur, Raigad, Satara, Sindhudurg.

TALI Adans.

1. Leaflets shining, elliptic or lanceolate; follicles falcately curved, dehiscing longitudinally on ventral suture ... *T. minor*

1. Leaflets dull–coloured, oblong–ovate; follicles not as above, dehiscing irregularly ... *T. prainiana*

Tali minor (Gaertn.) Almeida, Fl. Mah. 1: 283. 1996. *Aegiceras minor* Gaertn. Fruct. 1: 216, t. 46. 1788. *Rourea santaloides* (Vahl) Wight & Arn. Prodr. 144. 1844; Hook. f. Fl. Brit. India 2: 47. 1876; Cooke, Fl. Pres. Bombay, 1: 303. 1958 (Repr.). *R. minor* (Gaertn.) Alst. in Trim. Handb. Fl. Ceylon 6: 67 1931; Leenh. in Steenis, Fl. Males. 1, 5: 514. 1958. *'Verdhara', 'Wakeri'*.

Shrubs, climbing or sarmentose, 2–3 m high. Leaflets 2–4 pairs and a terminal one, 4–9 x 1.9–3.8 cm, caudate–acuminate at apex, rounded at base. Inflorescence of axillary panicles, 5–10 cm long. Flowers 5–8 mm across. Follicles 1.8–2.5 cm long, finely striate, chestnut brown. Seeds c 9 mm long, ovoid–oblong, arillate.

Fls. & Frts. : October–April.

Illus. : Ramam. in Sald. & Nicols. Fl. Hassan dt. 362, f. 71. B. 1976 *(R. minor).*

Distrib. : Kolhapur, Pune, Raigad, Satara, Sindhudurg.

T. prainiana (Talb.) Almeida, Fl. Mah. 1: 284. 1996. *Rourea prainiana* Talb. For. Fl. Bombay Pres. & Sind 1: 368, f. 213. 1909; Leenh. in Steenis, Fl. Males. 1, 5: 520. 1958.

Scandent shrubs; branches circinately climbing. Leaflets 2.5–8.0 x 0.9–3.0 cm, acuminate at apex, rounded at base. Inflorescence a fascicled panicle or raceme. Flowers pink when young, white at maturity, 8–10 mm across. Follicles c 2 x 1.2 cm, purplish–yellow at maturity. Seeds with creamy white, fleshy aril.

Fls. & Frts. : September–June.

Illus. : Talb. op. cit.

Distrib. : Pune, Raigad, Satara, Sindhudurg.

FABACEAE (PAPILIONACEAE)

(M. J. Kothari)

1. Plants erect, suberect or prostrate but not climbing (except *Clitoria ternatea*, a few species of *Butea* and *Dalbergia* which may be climbing or scandent shrubs):
   2. Trees :
      3. Leaves 3–foliolate:
         4. Plants armed; pods turgid, torulose ... ERYTHRINA
         4. Plants unarmed; pods flat, not torulose:
            5. Flowers orange–red or scarlet coloured ... BUTEA
            5. Flowers white ... OUGEINIA
      3. Leaves more than 3–foliolate:
         6. Leaflets opposite; pods woody ... PONGAMIA
         6. Leaflets alternate; pods not woody :
            7. Flowers yellow; pods orbiculate, winged ... PTEROCARPUS
            7. Flowers creamy–white; pods oblong or strap–shaped, not winged ... DALBERGIA
   2. Shrubs, undershrubs or herbs, erect, diffuse or prostrate:
      8. Flowers pure yellow, creamy–yellow, white or purple spotted:
         9. Corolla white or pale–purple ... LUPINUS
         9. Corolla pure or creamy–yellow or spotted purple:
            10. Joints of pods turgid:
               11. Leaves gland dotted beneath ... FLEMINGIA
               11. Leaves not gland dotted beneath:
                  12. Pods moniliform ... SOPHORA
                  12. Pods not as above:
                     13. Keel beaked, much curved ... CROTALARIA
                     13. Keel obtuse, slightly curved ... PYCNOSPORA
            10. Joints of pods flat:
               14. Pod joints 2–6, echinate ... ZORNIA
               14. Pod joints 1–2, not echinate :
                  15. Pods boat–shaped ... ELEIOTIS
                  15. Pods not as above :
                     16. Leaves 3–foliolate :
                        17. Herbs:

18. Pods falcate or with 2–4 spirals .. MEDICAGO

18. Pods not as above :

19. Stamens monadelphous ... ROTHIA

19. Stamens diadelphous :

20. Flowers solitary or 2–3–fascicled; calyx accrescent, silvery hairy outside ... CULLEN

20. Flowers in racemes; calyx not as above :

21. Pods short, globose, subglobose or ovoid ... MELILOTUS

21. Pods elongate, straight or falcately recurved ... TRIGONELLA

17. Undershrubs or shrubs ... STYLOSANTHES

16. Leaves more than 3–foliolate:

22. Leaflets pairs 2 ... GEISSASPSIS

22. Leaflets more than 2–pairs:

23. Pods long (upto 30 cm), narrowly linear, septate between seeds, but not jointed ... SESBANIA

23. Pods relatively much shorter, often jointed, if not jointed, pods turgid:

24. Joints of pods folded inside calyx ... SMITHIA

24. Joints of pods not as above; pods exserted ... AESCHYNOMENE

8. Flowers red, reddish–purple, bluish–purple, mauve or blue :

25. Plants armed ... ALHAGI

25. Plants unarmed:

26. Pods jointed:

27. Joints of pods echinate ... TAVERNIERA

27. Joints of pods not echinate:

28. Joints of pods folded one above the other ... URARIA

28. Joints of pods not folded one above the other:

29. Calyx glumaceous, twice the pedicel length or more, imbricate; pods turgid, straight ... ALYSICARPUS

29. Calyx not glumaceous, less than half of the pedicel length, valvate; pods flattened, curved ... DESMODIUM

26. Pods not jointed:

30. Pods flat:

31. Plants viscidly pubescent ... PSEUDARTHRIA

31. Plants not viscidly pubescent ... CLITORIA

30. Pods not flat, if flat, leaves simple :

32. Leaves simple:

33. Pods 1–seeded ... CULLEN

33. Pods more than 1–seeded :

34. Inflorescence mostly axillary; pods torulose, cylindric or 4–gonous ... INDIGOFERA

34. Inflorescence mostly leaf opposed, axillary or extra–axillary; pods flat ... TEPHROSIA

32. Leaves 3 or more foliolate :

35. Anthers apiculate; hairs medi fixed :

36. Flowers red; pods not subtetragonous ... INDIGOFERA

36. Flowers bright rosy–purple or lilac, occasionally white; pods subtetragonous ... CYAMOPSIS

35. Anthers muticous; hairs basifixed :

37. Large shrubs upto 4.5 m high; pods 6–8–seeded ... MUNDULEA

37. Herbs or undershrubs upto 90 cm high; pods many seeded ... TEPHROSIA

1. Plants climbing or twining (except *Butea monosperma*, few species of *Cajanus, Vigna khandalensis):*

38. Leaflets modified into tendril :

39. Leaflets 5, all or upper 3 modified into tendrils; style bearded down on inner face ... LATHYRUS

39. Leaves with or without tendrils; style bearded in tuft or a ring at apex ... VICIA

38. Leaflets not modified into tendrils :

40. Sepals persistent, foliaceous, creamy white or pale yellow ... PARACALYX

40. Sepals not as above :

41. Leaves gland dotted beneath ... DUNBARIA

41. Leaves not as above :

42. Stamens monadelphous :

43. Stamens 9 (the tenth stamen absent) ... ABRUS

43. Stamens 10 :

44. Alternate anthers sterile; pods straight or curved, shortly beaked; seeds 2–9 ... TERAMNUS

44. Alternate anthers not sterile; pods straight, not beaked; seeds 4–5 :

45. Leaflets 3, ovate; pods densely hairy; calyx teeth subulate, longer than tube, plumose ... NEONOTONIA

45. Leaflets 5–7, oblong–lanceolate; pods appressedly silky pubescent; calyx teeth deltoid, shorter than tube, not plumose ... OPHRESTIA

42. Stamens diadelphous :

46. Pods 1–seeded :

47. Flowers small, c 5 mm across, purple, in panicles ... SPATHOLOBUS

47. Flowers large, c 5cm across, bright–red, in racemes ... BUTEA

46. Pods many–seeded :

48. Pods linear or oblong:

49. Pods constricted between seeds; seeds 2–5 ... MILLETTIA

49. Pods not constricted; seeds 10–12 ... SPHENOSTYLIS

48. Pods strap shaped:

50. Scandent shrubs ... DERRIS

50. Herbs or erect shrubs :

51. Flowers creamy–yellow; yellow or tinged red :

52. Leaves gland dotted beneath :

53. Corolla less than 1 cm long; seeds 1–2 ... RHYNCHOSIA

53. Corolla more than 1 cm long; seeds 3 or more ... CAJANUS

52. Leaves not gland dotted beneath:

54. Styles not bearded below stigma; stigma terminal ... DUMASIA

54. Style bearded below stigma; stigma oblique:

55. Stipules prolonged below the point of insertion; keel erect, incurved, rarely with 1 complete spiral turn; style ending beyond stigma in a more or less distinct beak ... VIGNA

55. Stipules not prolonged below the point of insertion; keel in a spiral of 1–5 complete turns; stigma elongated; style without any apical appendage ... MACROPTILIUM

51. Flowers white, bright rosy–purple, reddish mauve, bluish–purple, violet or blue :

56. Pods turgid or flat, constricted between seeds :

57. Flowers bright rosy–purple, pods flat ... CANAVALIA

57. Flowers bluish–purple; pods turgid ... PUERARIA

56. Pods not turgid, if flat not constricted between seeds :

58. Racemes congested mostly at apex :

59. Styles conspicously flatened ... LABLAB

59. Styles not flattened :

60. Styles bearded :

61. Style filiform, beared along inner face below oblique stigma; pods thin valved ... VIGNA

61. Style clavate or cylindric with a tuft of hairs below capitate stigma; pods thick valved ... DOLICHOVIGNA

60. Styles not bearded :

62. Calyx densely hairy; pods hairy, slightly recurved; seeds 5–7 ... SHUTERIA

62. Calyx and pods glabrous, much recurved; seeds 10–12:

63. Flowers lilac or purple, in axillary fascicles; leaf apex acuminate ... DOLICHOS

63. Flowers creamy with purple dots; leaves apex acute ... MACROTYLOMA

58. Racemes lax :

64. Racemes drooping; flowers mauve or dark–purple; pods 'S' shaped ... MUCUNA

64. Racemes erect; flowers blue or bluish–purple; pods not as above :

65. Pods flat; two upper calyx teeth fused into one ... GALACTIA

65. Pods turgid; two upper calyx teeth not fused into one ... NOGRA

ABRUS Adans.

Abrus precatorius L. Syst. Nat. ed. 2, 2: 472. 1767; Baker in Hook. f. Fl. Brit. India 2:175. 1876; Cooke, Fl. Pres. Bombay 1: 382. 1958 (Repr.); Breteler in Blumea 10:617. 1960; Verdc. in Kew Bull. 24: 240. 1970; Sanj. Legumes of India 74. 1991. *'Gunj'.*

Twiners, perennial. Leaves 8–12 cm long; leaflets 0.5–1.8 x 0.3–0.8 cm, oblong or elliptic–oblong, glabrous above, appressed–hairy beneath. Flowers pinkish–purple, fading white in racemes. Pods 2–4 cm long, linear–oblong, beaked. Seeds 3–5, ellipsoid, bright scarlet with a black spot.

Fls. & Frts. : August–March.

Illus. : Wight, Ic. t. 33. 1838; Talb. For. Fl. Bombay Pres. & Sind 1: 397, f. 223. 1909; Mahesh. Illus. Fl. Delhi f. 71. 1966; Matthew, Illus. Fl. Tamilnadu Carnatic t. 2:179. 1982.

Distrib. : Common throughout the state on hedges and dry deciduous forests.

AESCHYNOMENE L.

1.	Leaflets 2–several costate, somewhat falcate	...	*A. americana*
1.	Leaflets 1– costate, not falcate:		
2.	Calyx glabrous; joints of pods smooth	...	*A. indica*
2.	Calyx hispid; joints of pods echinulate	...	*A. aspera*

Aeschynomene americana L. Sp. Pl. 713. 1753; Rudd in Reinwardtia 5: 25 1959; Sanj. Legumes of India 75. 1991; Bachulkar & Yadav in J. Econ. Tax. Bot. 17: 329. 1993.

Erect herbs, 1.0–1.5 m high; stem glandular–hispid. Leaves 2–7 cm long; petiole and rachis hispidulous; leaflets 20–40, 8–10 x 1.5–2.0 mm, subfalcate, ciliate, apiculate, base oblique. Flowers 5–10 mm long in few–flowered racemes; petals yellow with purplish lines. Pods 2.0–2.2 cm long, 3–9–jointed, glandular, hispidulous, muricate, reticulately veined. Seeds brown.

Fls. & Frts. : October–December.

Distrib. : Growing along road sides in marshy places, frequent. Kolhapur (Bachulkar & Yadav, op. cit.).

A. aspera L. Sp. Pl. 713. 1753; Baker in Hook. f. Fl. Brit. India 2:152. 1876; Cooke, Fl. Pres. Bombay 1:363. 1958 (Repr.); Rudd in Reinwardtia 5: 29. 1959; Sanj. Legumes of India 75.1991.

Shrubs, perennial. Leaves sessile or subsessile, imparipinnate; leaflets many, alternate, 0.3–1.2 x 0.1–0.3 cm, linear–oblong, obtuse. Flowers yellow, few in corymbose racemes. Pods woody, 4–9–jointed. Seeds reniform, black.

Fls. & Frts. : August–September.

Illus. : Wight, Ic. t. 299. 1840.

Distrib. : Rare in swampy habitat. Chandrapur, Kolhapur, Nanded, Nasik.

A. indica L. Sp. Pl. 713. 1753; Baker in Hook. f. Fl. Brit. India 2:151. 1876; Cooke, Fl. Pres. Bombay 1:363. 1958 (Repr.); Rudd in Reinwardtia 5:30. 1959; Sanj. Legumes of India 75. 1991.

Herbs or undershrubs. Leaves imparipinnate; leaflets many, alternate, 0.2–0.7 x 0.1–0.4 cm, linear–oblong, apex obtuse or subacute, minutely mucronate, base rounded and inequilateral. Flowers pale to creamy–yellow, few, in axillary, lax racemes. Pods 6–10–jointed. Seeds dark–brown.

Fls. & Frts. : July–December.

Illus. : Wight, Ic. t. 405. 1840; Mahesh. Illus. Fl. Delhi f. 65. 1966; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 180. 1982.

Distrib. : Common throughout the State.

ALHAGI Gagneb.

Alhagi maurorum Medik. in Vorles, Chrupf. Phys. Oek. Ges. 2: 397. 1787; Baker in Hook. f. Fl. Brit. India 2: 145. 1876; Sanj. Legumes of India 76. 1991. A. *camelorum* Fisch ex DC. Prodr. 2: 352. 1825; Cooke, Fl. Pres. Bombay 1: 355. 1958 (Repr.). *A. pseudalhagi* sensu Naik, Fl. Marathwada 1: 242. 1998 non (M. Bieb.) Desv. 1813. *'Javasa'*.

Undershrubs, 30–60 cm high; stem armed. Leaves 0.6–1.7 x 0.2–0.5 cm, ovate–oblong or obovate, appressed pubescent. Flowers red, few in short racemes on thorns. Pods 2–4 cm long, falcate, torulose.

Fls. & Frts. : March–May.

Distrib. : Occasional along sandy barks of rivers. Aurangabad, Beed, Jalna & Nanded (Naik, op. cit.).

ALYSICARPUS Neck ex Desv. (nom. cons.)

1. Calyx shorter or slightly longer than first joint of pods:
   2. Pods moniliform, veinless or faintly reticulately veined ... *A. monilifer*
   2. Pods not moniliform, prominently veined:
      3. Calyx equaling or slightly longer than first joint of pod; mature pods blackish:
         4. Flowers violet in compact racemes ... *A. vaginalis*
         4. Flowers pink to buff coloured in lax racemes ... *A. ovalifolius*
      3. Calyx shorter than first joint of pods; mature pods not as above ... *A. hamosus*
1. Calyx much longer than first joint of pods:
   5. Teeth of calyx imbricate in fruiting stage:
      6. Pods slightly or more moniliform:
         7. Stipules ovate–lanceolate, upto 6 mm long; pods reticulately veined ... *A. longifolius*
         7. Stipules linear upto 3 mm long; pods veinless:
            8 Leaves linear–oblong; flowers 2 in short, spicate racemes ... *A. bupleurifolius*
            8. Leaves linear; flowers many in lax, 7–15 cm long racemes ... *A. roxburghianus*
      6. Pods not moniliform, transversly ribbed:
         9. Pods 4–gonous, exserted:
            10. Standard petal yellow; joints of pods longer than broad, faintly rugose ... *A. luteo–vexillatus*
            10. Standard petal bright reddish–purple; joints of pods not longer than broad, deeply transversely rugose ... *A. tetragonolobus*
         9. Pods not 4–gonous, not exserted:
            11. Stem finely pubescent or glabrous:
               12. Calyx hairy on the back:
                  13. Flowers in dense racemes; pods 3–4 segmented, all segments tranversely rugose ... *A. scariosus*
                  13. Flowers in lax racemes; pods 2–3 segmented, basal segment without ribs ... *A. salimali*
               12. Calyx glabrous ... *A. glumaceus*
            11. Stem densely pubescent or villous:
               14. Pods rugose, transversely ribbed ... *A. heyneanus*
               14. Pods not rugose, reticulately veined ... *A. narimanii*

5. Teeth of calyx not imbricate in fruiting stage:

15. Flowers sessile ... *A. pubescens*

15. Flowers pedicelled :

16. Erect herbs, 30–70 cm high, pods included, 3–4–jointed, straight, scarcely moniliform ... *A. belgaumensis*

16. Ascending herbs, 10–30 cm high; pods equalling calyx teeth or exserted, 4–7–jointed, curved, moniliform ... *A. racemosus*

Alysicarus belgaumensis Wight Ic. Pl. Ind. Or. t. 92. 1838; Baker in Hook. f. Fl. Brit. India 2: 158. 1876; Cooke, Fl. Pres. Bombay 1: 372. 1958 (Repr.); Sanj. Legumes of India 77. 1991. *Desmodiastrum belgaumense* (Wight) Pramanik & Thoth. in J. Ind. Bot. Soc. 65: 375. 1987.

Herbs up to 1 m high, erect. Leaves 1–foliolate below, rarely 3–foliolate above; leaflets 1.4–8.0 x 1–4 cm, apex acute, base subcordate. Flowers rosy, many, in terminal racemes. Pods jointed, joints rectangular, turgid, pubescent, Seeds ovate or semi–orbiculate.

Fls. & Frts. : September–December.

Illus. : Wight, op. cit.

Distrib. : Along the ghats, frequent. Ahmednagar, Chandrapur, Kolhapur, Pune, Raigad, Ratnagiri, Satara, Thane.

A. bupleurifolius (L.) DC. Prodr. 2: 352. 1825; Baker in Hook. f. Fl. Brit. India 2: 158. 1876; Cooke, Fl. Pres. Bombay 1:370. 1958 (Repr.); van Meeuwen et al. in Reinwardtia 6:88. 1961; Sanj. Legumes of India 77. 1991. *Hedysarum bupleurifolium* L. Sp. Pl. 745. 1753.

1. Upper and lower leaves similar shaped; pods smooth ... var. *bupleurfolius*

1. Upper and lower leaves different shaped; pods rugose ... var. *hybridus*

var. **bupleurifolius.**

Herbs, prostrate or suberect. Leaves unifoliolate; leaflets 1–7 x 0.3–0.6 cm, linear–lanceolate or elliptic–oblong. Flowers purplish, 2, in axillary and terminal spicate racemes. Pods exserted, cylindric, apiculate, smooth, 3–7–jointed.

Fls. & Frts. : June–January.

Illus. : Mahesh. Illus. Fl. Delhi f. 70. 1966.

Distrib. : Among grasses in plains, common throughout.

var. **hybridus** DC. Prodr. 2: 352. 1825; Sanj. Legumes of India 77. 1991. *A. bupleurifolius* (L.) DC. var. *intermedius* Haines, Bot. Bih. Or. 2: 258. 1922 [2: 270 1961 (Repr.)].

Erect herbs. Lower leaves 1.0–2.0 x 0.5–0.8 cm, ovate–elliptic; upper leaves 2–3 x 0.4–0.5 cm, linear–lanceolate. Flowers in c 6 cm long, spicate racemes. Pods rugose, 2–3–jointed.

Fls. & Frts. : September–October.

Distrib. : Maharashtra (Sanj. op. cit.).

A. glumaceus (Vahl) DC. Prodr. 2:353. 1825; Sanj. Legumes of India 78. 1991. *Hedysarum glumaceum* Vahl, Symb. Bot. 2:106. 1791. *Alysicarpus rugosus* (Willd.) DC. Prodr. 2: 353. 1825; Baker in Hook. f. Fl. Brit. India 2:159. 1876; Cooke, Fl. Pres. Bombay 1:371. 1958 (Repr.). *A. rugosus* var. *minor* Prain in J. Asiat. Soc. Bengal 66:383. 1897; Cooke, op. cit.

Herbs, suberect, ascending. Leaves unifoliolate; leaflets 1.4–3.0 x 0.7–1.8 cm, ovate–orbicular to linear–lanceolate, appressed pubescent beneath. Flowers reddish–purple, in dense spicate racemes. Pods moniliform, 3–6–jointed, joints transversely ribbed.

Fls. & Frts. : September–January.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 181. 1982.

Distrib. : Among grasses in plains and ghats, frequent.

A. hamosus Edgew. in J. Asiat Soc. Bengal 21:171. 1853; Baker in Hook f. Fl. Brit. India 2:157. 1876; Cooke, Fl. Pres. Bombay 1: 368. 1958 (Repr.); Sanj. Legumes of India 78. 1991. *Hedysarum procumbens* Roxb. Fl. Ind. 3:345. 1832 non Mill. 1768. *Alysicarpus procumbens* (Roxb.) Schindl. in Feddes Repert. 21:11. 1925.

Herbs, prostrate or procumbent, hairy; branches radially spreading or diffuse. Leaves 0.7–4.0 x 0.3–2.5 cm, ovate–oblong or suborbicular, hairy on nerves beneath. Flowers purple or pink, few, in terminal and axillary racemes. Pods 2–6–jointed, hairy.

Fls. & Frts. : August–October.

Distrib. : Common among grasses in waste places and in cultivated fields.

A. heyneanus Wight & Arn. Prodr. 234. 1834; Sanj. Legumes of India 78. 1991. *A. rugosus* var. *heyneanus* (Wight & Arn.) Baker in Hook. f. Fl. Brit. India 2: 159. 1876; Cooke, Fl. Pres. Bombay 1: 371. 1958 (Repr.).

1. Calyx shorter, ciliated on edge only ... *var. heyneanus*

1. Calyx c 0.75 cm long, hairy, not much ciliated ... *var. ludens*

var. **heyneanus.**

Herbs, suberect or diffuse. Leaves 1.5–4.7 x 0.4–2.5 cm, elliptic–oblong or obovate–oblong, hairy beneath. Flowers reddish–purple, in terminal and axillary racemes. Pods upto 1.2 cm long, 3–5–jointed, apiculate, joints suborbicular, rugose. Seeds ellipsoid, brown.

Fls. & Frts. : August–December.

Distrib. : Frequent in cultivated fields and waste places.

var. **ludens** (Baker) Pramanik & Thoth. in Bull. Bot. Surv. India 24:112. 1983; Sanj. Legumes of India 79. 1991. *A. rugosus* var. *ludens* Baker in Hook. f. Fl. Brit. India 2: 159. 1876. *A. glumaceus* var. *ludens* (Baker) Sant. in Rec. Bot., Surv. India 16:60. 1967 (3rd. Rev.ed.).

Herbs, ascending. Leaves 5–7 cm long, linear. Pods included, 3–5–jointed, transversely ribbed.

Fls. & Frts. : October.

Distrib. : Rare among grasses. Pune.

A. longifolius (Rottl. ex Spreng.) Wight & Arn. Prodr. 233. 1834; Baker in Hook. f. Fl. Brit. India 2: 159. 1876; Cooke, Fl. Pres. Bombay 1: 370. 1958 (Repr.); Sanj. Legumes of India 79. 1991. *Hedysarum longifolium* Rottl. ex Spreng. Syst. Veg. 3: 319. 1826. *'Shevra'.*

Herbs, erect, slender. Leaves 2.0–7.5 x 0.5–2.0 cm, oblong or lanceolate, appressedly pubescent on nerves beneath. Flowers reddish–purple, geminate in spicate racemes. Pods 4–6–jointed.

Fls. & Frts. : September–October.

Illus. : Wight, Ic. t. 251. 1840.

Distrib. : Common in cultivated fields and waste places.

A. luteo–vexillatus Naik & Pokle in J. Econ. Tax. Bot. 7:670, f. 1. (1985) 1986; Sanj. Legumes of India 79. 1991.

Herbs, 15–40 cm high, erect or decumbent, much branched. Leaves 1.5–3.5 x 0.8–1.2 cm, elliptic–oblong, hispid and reticulately veined beneath, apex obtuse or rounded. Flowers in leaf opposed, lax racemes; standard petals with red margin, wings and keel pink. Pods 1.0–1.5 cm long, 2–4–jointed, joints quadrate, 4–winged.

Fls. & Frts. : September–November.

Illus. : Naik & Pokle, op. cit.

Distrib. : On gravelly slopes of hills in drier parts, infrequent. Aurangabad, Beed, Osmanabad, Parbhani.

A. monilifer (L.) DC. Prodr. 2: 353. 1825; Baker in Hook. f. Fl. Brit. India 2: 157. 1876; Cooke, Fl. Pres. Bombay 1: 368. 1958 (Repr.); Sanj. Legumes of India 79. 1991. *Hedysarum moniliferum* L. Mant. Pl. 1: 102. 1767.

Herbs, prostrate, hairy. Leaves 0.3–1.8 x 0.2–1.0 cm, elliptic–oblong or obovate, hairy on nerves beneath. Flowers pinkish–purple, few in axillary and terminal racemes. Pods 0.5–2.0 cm long, 2–7–jointed, hairy. Seeds subglobose or oblong, brownish.

Fls. & Frts. : August–October.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 113. 1988.

Distrib. : In plains, frequent.

A. narimanii. S.M. & M. R. Almeida in J. Bombay nat. Hist. Soc. 85: 394. 1988.

Herbs, 50–90 cm high; stem slender, striate, hairy. Leaves simple, alternate, 2.0–3.0 x 0.5–0.8 cm, linear–oblong, apex mucronate, base rounded, hairy on both sides of mid vein underneath. Flowers dark–straw coloured, shining, binate in axillary and terminal racemes. Pods 3.0–3.5 cm long, 4–6–segmented, segments, flat, quadrangular, reticulately veined. Seeds rounded, brown, compressed, solitary in each segment.

Fls. & Frts. : September–October.

Illus. : S.M. & M.R. Almeida, op. cit. 397, f. 2 A–H.

Distrib. : Bombay, Poona.

Notes. : This species is similar to *A. heyneanus* Wight & Arn.externally but differs in leaf, floral and fruiting characters especially in having acuminate, hairy sepals covering entire pods and non constricted, reticulately veined pods.

A. ovalifolius (Schum.) J. Leon. in Bull. Jard. Bot. Stat. Brux. 24: 88 1954; Sanj. & Bhatt. in J. Bombay Nat. Hist. Soc. 75. 250. 1978; Sanj. Legumes of India 79. 1991; Naik, Fl. Marathwada 1: 246. 1998. *Hedysarum ovalifolium* Schum. Beskr. Guin Pl. 359. 1827.

Herbs, 20–50 cm high. Leaves 1–foliolate; leaflets 1.0–6.0 x 0.9–1.0 cm, elliptic–oblong, apex acute or mucronate, base subcordate, puberulous on nerves beneath. Flowers pink to orange buff, many in terminal or leaf opposed, lax racemes. Pods 1.0–3.0 cm long, exserted, joints 5–7, flattened, puberulous. Seeds brown, ellipsoid, slightly compressed with reddish–black patches.

Fls. & Frts. : August–October.

Illus. : Sanj. & Bhatt. op. cit.

Distrib. : Occasional but locally abundant. Nanded (Naik, op. cit).

Notes : This species is wide spread in tropcal Africa, Madagascar and in Asia. It differs from *A. vaginalis* in having laxer inflorescences with longer distance between the pairs of flowers (Sanj. & Bhatt. op. cit.).

A. pubescens Law in Wight, Ic. t. 250. 1840; Baker in Hook. f. Fl. Brit. India 2: 160. 1876; Cooke, Fl. Pres. Bombay 1: 372. 1958 (Repr.); Sanj. Legumes of India 80. 1991.

1. Flowers sessile, in dense spikes; pods 3–4–jointed ... var. *pubescens*

1. Flowers pedicelled, in lax spikes; pods 1–jointed ... var. *vasavadae*

var. **pubescens.**

Herbs, 60–120 cm tall, erect, hairy. Leaves linear–oblong or oblong–lanceolate,apex acute or mucronate, base rounded or slightly cordate. Flowers yellow–purple, in dense, villous spikes. Pods moniliform, included, joints reticulated.

Fls. & Frts. : September–December.

Illus. : Wight, op. cit.

Distrib. : In plains, frequent. Ahmednagar, Amravati, Aurangabad, Kolhapur, 'Konkan' (Cooke, op. cit.), Nanded, Osmanabad, Parbhani, Pune, Satara.

var. **vasavadae** (Hemadri) Sanj. in Taxon 32:668. 1983 & Legumes of India. 80. 1991. *A. vasavadae* Hemadri in Indian Forester 97:65, f. 1–2. 1971.

Herbs, 25–90 cm high. Leaves unifoliolate; stipules minute, ovate–lanceolate, acuminate; lamina 1.5–5.0 x 0.2–0.9 cm, linear–oblong, sparsely villous. Flowers orange–yellow in terminal, spicate racemes. Pods 0.5–0.7 cm long, obovoid.

Fls. & Frts. ; October– November.

Illus. : Hemadri, op. cit.

Distrib. : Frequent on hill slopes, endemic. Ahmednager, Aurangabad, Beed, Jalna, Latur, Nanded, Osmanabad, Parbhani, Pune, Satara, Solapur.

Notes. : It differs from the type variety in having less plumose rachis, distant flowers, smaller calyx and obovate pods.

A. racemosus Bth. in Linnaea 24:642. 1851; Sanj. Legumes of India 80. 1991. *A. belgaumensis* var. *racemosus* Baker in Hook. f. Fl. Brit. India 2:160. 1876; Cooke, Fl. Pres. Bombay 1: 373. 1958 (Repr.). *Desmodiastrum racemosum* (Bth.) Pramanik & Thoth. in J. Ind. Bot. Soc. 65:376. 1987.

Herbs up to 20 cm high. Leaves mostly 1–foliolate, at times 3–foliolate above; leaflets 0.8–2.6 x 0.5–1.9 cm, obovate–orbicular, appressed pubescent beneath, apex obtuse, base subcordate. Flowers pink, many in terminal or axillary racemes. Pods 3–4–jointed, joints turgid to subcompressed. Seeds orbicular, dark–grey.

Fls. & Frts. : September–November.

Illus. : Bedd. Ic. 69 t. 292. 1874.

Distrib. : Common on the hill slopes. Ahmednagar, Pune, Satara.

A. roxburghianus Thoth. & Pramanik in Bull. Bot. Surv. India 21: 189. (1979) 1981; Sanj. Legumes of India 80. 1991; Naik, Fl. Marathwada 1 : 247. 1998. *A. bupleurifolius* sensu Baker in Hook f. Fl. Brit. India 2 : 158. 1876 p.p. non (L.) DC. 1825.

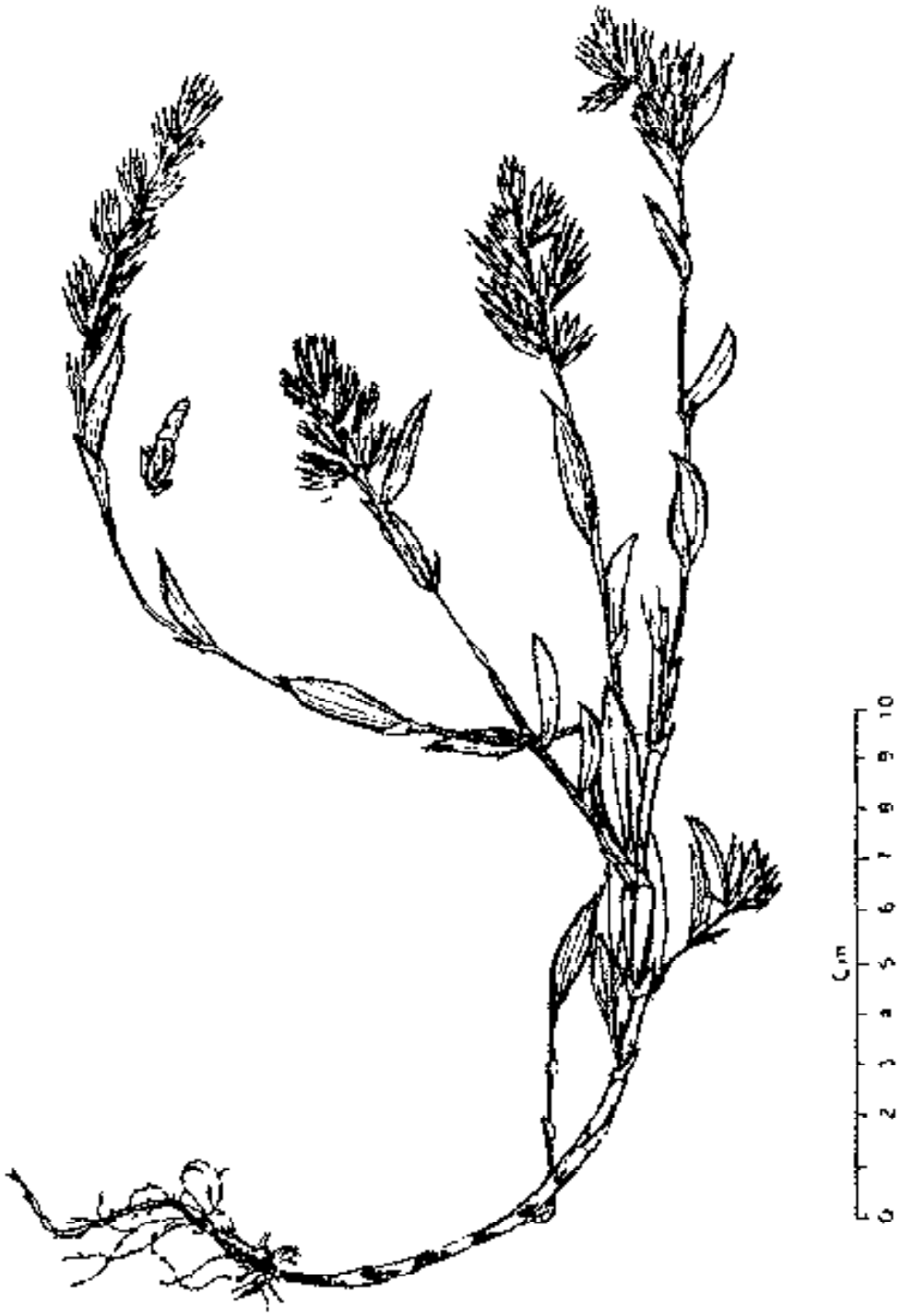
Herbs or undershrubs, 30–100 cm high; branches many, internodes ribbed. Leaves alternate, 1–foliolate; leaflets 2.8–10.0 x 0.3–0.6 cm, linear, apex acute, base cuneate or rounded, glabrous above, appressed hairy on midvein beneath. Flowers pale–rose or pinkish–brown, many in terminal, lax, 7–15 cm long racemes. Pods sub cylindric, 3–6–jointed, joints 1.5–8.0 mm long, subglobose, glabrous.

Fls. & Frts .: September–December.

Illus. : Thoth. & Pramanik, op. cit. 190, t 1.

Distrib. : On gravelly, moist soil in road side, often near dried ditches. All districts of Marathwada (Naik, op. cit.), Pune.

Notes. : This species is endemic to India (Sanj. op cit.).



Alysicarpus scariosus (Rottl. ex Spr.) Grah. ex Thw.

A. salimali S.M. & M.R. Almedia in J. Bombay nat. Hist. Soc. 85: 400. 1988.

Herbs up to 50 cm high; stem branched with nodes and internodes, strigose hairy. Leaves simple, 1.6 x 4.2 cm, alternate, oblong, apex obtuse, base rounded, hairy on both surfaces. Flowers binate in leaf opposed and terminal, lax racemes. Pods 2–3–segmented, 0.8–1.0 cm long, stalked, almost covered by calyx, middle segment ovoid, rugose with horizontal ribs, basal segment without ribs, oblong, apical one with prominent style.

Fls. & Frts. : September.

Illus. : S. M. & M. R. Almeida, op. cit. 401, f. 4. A–G.

Distrib. : In hilly region, Nasik.

Notes. : This species is allied to *A. scariosus* but differs in having lax racemes in remote deposition of flowers, leaves, etc.

A. scariosus (Rottl. ex. Spr.) Grah. ex Thw. Enum. Pl. Zeyl. 88. 1859; Ali in Biologia 12: 32. 1966; Sanj. Legumes of India 80. 1991. *Hedysarum scariosum* Rottl. ex Spreng. Syst. Veg. 3:319. 1826. *Alysicarpus rugosus* var. *styracifolius* (DC.) Baker in Hook. f. Fl. Brit. India 2:159. 1876; Cooke, Fl. Pres. Bombay 1:371. 1958 (Repr.).

Herbs, 20–40 cm high, erect or diffuse, pubescent. Leaves 0.6–3.0 x 0.4–1.7 cm, elliptic–oblong, glabrous above, hairy beneath, apex mucronate. Flowers reddish–purple, in axillary, dense racemes. Pods 5–8 mm long, apiculate, 3–4–jointed, joints transversely rugose.

Fls. & Frts. : September–February.

Illus. : Deshpande et al. Fl. of Mahableshwar 1:161, f. 9. 1993.

Distrib. : In cultivated fields and waste places, common.

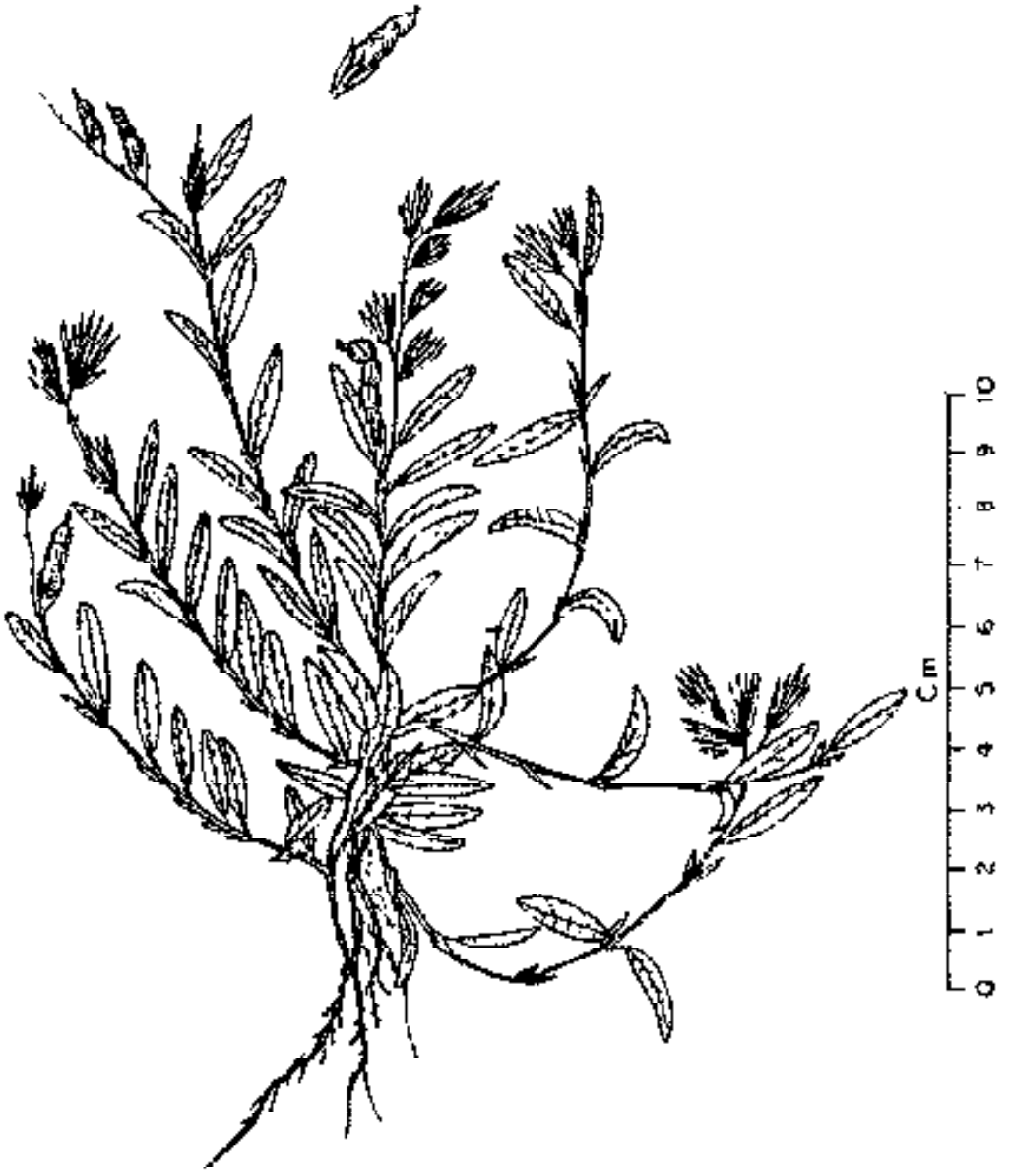
A. tetragonolobus Edgew. in J. Asiat. Soc. Bengal 21: 69. 1853; Baker in Hook. f. Fl. Brit. India 2: 159. 1876; Cooke, Fl. Pres. Bombay 1:372. 1958 (Repr.); Sanj. Legumes of India 81. 1991.

1. Pods distinctly 4–angled; standard with coloured patches; sepals unequal; staminal tube not striate ..var. *tetragonolobus*

1. Pods and standard not as above; sepals uniform sized; staminal tube striate ... var. *pashanensis*

var. **tetragonolobus.**

Herbs, caespitose, procumbent. Leaves unifoliolate; leaflets 0.5–3.8 x 0.2–1.3 cm, linear–oblong, lanceolate or elliptic–oblong,



Alysicarpus tetragonolobus Edgew.

glabrous above, appressed–pubescent beneath. Flowers in lax racemes. Pods c 1 cm long, 2–6–jointed.

Fls. & Frts. : August–December.

Illus. : Deshpande et al. Fl. of Mahableshwar 1: 162, f. 10. 1993.

Distrib. : Common throughout among grasses in plains.

var. **pashanensis** S.M. & M.R. Almeida in J. Bombay Nat Hist. Soc. 85: 402, f. 6. A–B. 1988.

Herbs, 20–30 cm high; stem erect, branched, striate, hairy. Leaves simple, 2.5–3.5 x 0.5 cm, linear–oblong, alternate, apex acute, base rounded, hairy on both surfaces, punctate. Flowers yellow, few in terminal racemes. Pods exserted, 3–5–segmented, oblong, rough with irregularly folded, hard, thick ribs.

Fls. & Frts. : November.

Illus. : Almeida, op. cit. 404. f. 6. A–B.

Distrib. : Near lake, Pune.

A. vaginalis (L.) DC. Prodr. 2:353. 1825; Baker in Hook. f. Fl. Brit. India 2:158. 1876; Cooke, Fl. Pres. Bombay 1:369. 1958 (Repr.); Sanj. Legumes of India 81. 1991. *Hedysarum vaginale* L. Sp. Pl. 746. 1753.

1. Leaflets oblong–orbicular; flowers in crowded, short (± 2.5 cm) racemes ... var. *nummularifolius*

1. Leaflets obovate–oblong; flowers in elongated (± 7 cm) racemes ... var. *stocksii*

var. **nummularifolius** Miq. Fl. Ind. Bat. 1: 232. 1855; Baker in Hook. f. op. cit.; Cooke op. cit.; Sanj. op. cit.

Herbs, diffuse or suberect, sparsely hairy. Leaves 1.2–4.5 x 0.8–3.4 cm, ovate–oblong or nearly orbicular, glabrous above, pubescent beneath. Flowers violet, 6–12, in terminal and axillary racemes. Pods 6–8–jointed, reticulately veined. Seeds ellipsoid, brown.

Fls. & Frts. : July–October.

Illus. : Mahesh. Illus. Fl. Delhi f. 69. 1966; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 114. 1988.

Distrib. : Open situations in plains and waste places, common throughout the state.

var. **stocksii** Baker in Hook. f. Fl. Brit. India 2: 158. 1876; Cooke, Fl. Pres. Bombay 1: 369. (Repr.); Sanj. Legumes of India 82. 1991.

Herbs; stem hairy Leaflets obovate–oblong, hairy beneath. Flowers in elongated racemes.

Fls. : October.

Distrib. : Plains of Konkan. Endemic (Sanj. op. cit.).

BUTEA Roxb. ex Willd. (nom. cons.)

1.	Trees	...	*B. monosperma*
1.	Climbing shrubs or extensive lianas	...	*B. superba*

Butea monosperma (Lam.) Taub. in Engl. & Prantl. Pflanzenfam. 3(3): 365. 1894; Sanj. Legumes of India 99. 1991. *Erythrina monosperma* Lam. Encycl. 2: 391. 1785. *Butea frondosa* Roxb. ex Willd. Sp. Pl. 3: 917. 1802 nom superfl.; Baker in Hook. f. Fl. Brit. India 2: 194. 1876; Cooke, Fl. Pres. Bombay 1: 395. 1958 (Repr.). *'Palas'*.

1.	Plants upto 15 m high; flowers bright crimson red	...	var. *monosperma*
1.	Plants upto 5 m high; flowers yellowish or canary–yellow	...	var. *lutea*

var. **monosperma.**

Trees; bark rough, ash coloured. Leaves 3–foliolate; leaflets 4.5–24.0 x 3–20 cm, obovate, ovate–rhomboid, glabrous above, silky–pubescent beneath. Flowers in compact racemes on leafless branches. Pods 9–14 x 1.5–4.5 cm, oblong, sandy–brown, hairy, stalked. Seeds solitary.

Fls. & Frts. : January–June.

Illus. : Ic. Roxb. Fasc. 5, t. 25. 1971 (Repr. ed.); Talb. For. Fl. Bombay Press. & Sind 1:409, f. 231.1909; Mahesh. Illus. Fl. Delhi f. 74. 1966; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 184. 1982.

Distrib. : Common throughout in deciduous forests of the state.

var. **lutea** (Witt) Mahesh. in Bull. Bot. Surv. India 3:92. (1961) 1962; Sant. in Rec. Bot. Surv. India 16:66. 1967 (3rd Rev. ed.). *B. frondosa* var. *lutea* Witt, Descr. List. N. & Berar Circ. C. P. 75. 1916.

Trees. Leaves 3–foliolate; leaflets 4.0–20.5 x 2.5–18.0 cm, obovate, ovate–rhomboid, glabrous above, silky pubescent beneath. Flowers yellowish or canary–yellow. Pods oblong, brownish, 1–seeded.

Fls. & Frts. : January–May.

Distrib. : In dry deciduous forests. Amravati, Bombay, Nanded, Pune, Yavatmal.

B. superba Roxb. ex. Willd. Sp. Pl. 3: 917. 1802; Baker in Hook. f. Fl. Brit. India 2: 195. 1876; Cooke, Fl. Pres. Bombay 1:396. 1958 (Repr.); Sanj. Legumes of India 99. 1991. *'Palas–vel'*.

Lianas. Leaves 3–foliolate; leaflets 5–28 x 3–18 cm, ovate–rhomboid or elliptic–oblong, coriaceous, glabrescent, apex acute, base obliquely rounded. Flowers in racemes or panicles. Pods 12.0–14.5 x 4.0–4.5 cm, oblong, brown, hairy, reticulately veined, thickened at sutures.

Fls. & Frts. : February–June.

Illus. : Ic. Roxb. Fasc. 5, t. 24. 1971 (Repr. ed.).

Distrib. ; In moist and dry deciduous forests, frequent. Akola, Amravati, Chandrapur, Dhule, Kolhapur, Nagpur, Nanded, Nasik, Pune, Raigad, Thane, Yavatmal.

CAJANUS DC. (nom. cons.)

1. Climbing or creeping plants:
   - 2. Pods with faint lines between seeds; seeds with a small strophiole ... *C. heynei*
   - 2. Pods with deep lines between seeds; seeds with a large strophiole:
     - 3. Pods flat, broad and papery ... *C. platycarpus*
     - 3. Pods narrower, more roundish and thicker:
       - 4. Leaflets small, upto 5.5 cm long, elliptic or obovate, obtuse ... *C. scarabaeoides*
       - 4. Leaflets larger, upto 11 cm long, obovate, acuminate:
         - 5. Indumentum spreading, green; bracts hairy; corolla fugaceous ... *C. goensis*
         - 5. Indumentum short, dense, gray or golden–brown below; bracts short, puberulous; corolla persistent ... *C. crassus*

1. Erect shrubs:
   - 6. Ripe seeds without strophiole or with small vestigial strophiole ... *C. cajan*

6. Ripe seeds with conspicuous strophiole:

7. Leaflets obovate–oblong; stipules 0.2–0.3 cm long ... *C. lineatus*

7. Leaflets oblanceolate; stipules 0.5–0.7 cm long ... *C. sericeus*

Cajanus cajan (L.) Millsp. in Field Columb. Mus. Bot. 2, (1): 53. 1900; van der Maesen in Agric. Univ. Wageningen Papers 85 (4): 65, f. 4, t. 2–3, 5–7. (1985) 1986; Sanj. Legumes of India 100. 1991. *Cytisus cajan* L. Sp. Pl. 739. 1753. *Cajanus indicus* Spreng. Syst. Veg. 3:248. 1826; Baker in Hook. f. Fl. Brit. India 2:217. 1876; Cooke, Fl. Pres. Bombay 1: 435. 1958 (Repr.). *'Tur'.*

Shrubs, 0.5–3.0 m high. Leaflets 3, 1.2–13.7 x 0.3–5.5 cm, ovate–elliptic or lanceolate, rarely obcordate, glandular–punctate, apex acuminate, acute or mucronate, base cuneate. Flowers many, yellow in racemes. Pods oblong or sickle shaped, hairy. Seeds globose or ellipsoid.

Fls. & Frts. : September–March.

Illus. : van der Maesen, op. cit.; Matthew, Fur. Illus. Fl. Tamilnadu, Carnatic 4: t. 116. 1988.

Distrib. : Cultivated as a pulse crop, almost throughout the state; also found as an escape.

C. crassus (Prain & King) van der Maesen in Agric. Univ. Wageningen Papers 85 (4): 105, f. 9. (1985) 1986; Sanj. Legumes of India 100. 1991. *Atylosia crassus* Prain & King in J. Asiat Soc. Bengal 66: 45. 1897; Cooke, Fl. Pres. Bombay 1: 408. 1958 (Repr.). *A. mollis* Bth. in Miq. Pl. Jungh 2:243. 1852. p.p. excl. syn. *Collaca mollis* Grah. 1831; Baker in Hook. f. Fl. Brit. India 2: 213. 1876.

Climbers. Leaves 3–foliolate; leaflets 3.5–10.0 x 2.5–9.5 cm, dark–green and puberulous above, fulvous–pubescent beneath, acute, lateral ones oblique. Flowers yellow, in lax racemes. Pods oblong, sturdy. Seeds 3–5, rectangular–rounded.

Fls. & Frts. : January–April.

Illus. : van der Maesen, op. cit.

Distrib. : 'Konkan' (Cooke, op. cit.).

C. goensis Dalz. in Hook. Kew J. Bot. 2: 264. 1850; van der Maesen in Agric. Univ. Wageningen Papers 85 (4):117, f. 11. (1985) 1986; Sanj. Legumes of India 101. 1991. *Atylosia goensis* (Dalz.) Dalz. in J. Linn. Soc. 13:186. 1873; Cooke, Fl. Pres. Bombay 1: 409. 1958 (Repr.). *A. barbata* (Bth.) Baker in Hook. f. Fl. Brit. India 2: 216. 1876.

Climbers,perennial; branches covered with long, sticky brown hairs. Leaves 3–foliolate; leaflets 1.8–11.0 x 1.5–6.0 cm, lateral ones oblique. Flowers many, yellow in lax racemes. Pods 3.5–5.5 x 0.9–1.1 cm, linear–acuminate, densely covered with brown hairs. Seeds 5–8, broader than long.

Fls. & Frts. : July–September.

Illus. : van der Maesen, op. cit.

Distrib. : Bombay (van der Maesen, op. cit.); Konkan (Cooke, op. cit.).

C. heynei (Wight & Arn.) van der Maesen in Agric. Univ. Wageningen Papers 85 (4):129, f. 13. (1985) 1986; Sanj. Legumes of India 101. 1991. *Dunbaria heynei* Wight & Arn. Prodr. 258. 1834; Baker in Hook. f. Fl. Brit. India 2: 217. 1876; Cooke, Fl. Pres. Bombay 1:411. 1958 (Repr.).

Climbers; branches hairy. Leaves 3–foliolate; Leaflets 2.5–7.0 x 2.3–5.0 cm, rhomboid, apex acuminate, base rounded or cordate. Flowers yellow, in lax racemes. Pods c 4x1 cm, oblong, tipped with style, hairy.

Fls. & Frts. : January.

Illus. : van der Maesen, op. cit.

Distrib. : 'Bombay' (van der Maesen op. cit.), Konkan & Satara (Cooke, op. cit.).

C. lineatus (Wight & Arn.) van der Maesen in Agric. Univ. Wageningen Papers 85 (4):143, f. 18, t. 10. (1985) 1986; Sanj. Legumes of India 101. 1991. *Atylosia lineata* Wight & Arn. Prodr. 258. 1834; Baker in Hook. f. Fl. Brit. India 2:213. 1876; Cooke, Fl. Pres. Bombay 1: 408. 1958 (Repr.). *'Jangli tur', 'Ran–tur'.*

Shrubs, 0.5–2.5 m high. Leaves 3–foliolate; leaflets 1.2–4.2 x 0.5–2.3 cm, glandular punctate, lateral ones oblique. Flowers yellow, in sessile racemes. Pods c 1.2 x 0.8 cm, oblong, acute at both ends. Seeds flat, orbicular.

Fls. & Frts. : October–April.

Illus. : Wight, Ic. t. 93. 1838 *(Atylosia lawii);* van der Maesen, op. cit.

Distrib. : Ahmednagar, 'Bombay' (Cooke, op. cit.), Kolhapur, 'Konkan' (Cooke, op. cit.), Satara.

C. platycarpus (Bth.) van der Maesen in Agric. Univ. Wageningen Papers 85(4):160, f. 23. (1985) 1986; Sanj. Legumes of India 102. 1991. *Atylosia platycarpa* Bth. in Miq. Pl. Jungh. 243. 1852; Baker in Hook. f. Fl. Brit. India 2: 216. 1876; Cooke, Fl. Pres. Bombay 1: 410. 1958 (Repr.). *'Safal-supli'*.

Herbs, trailing; branches fulvous or grey-pubescent. Leaves 3-foliolate; leaflets 2.5–7.0 x 2–5 cm, ovate-rotundate, membranous, grey-pubescent, apex acuminate, base slighly cordate. Flowers pale bright yellow, solitary or geminate. Pods 2.0–4.5 cm long, elliptic-oblong, appressedly hairy. Seeds 4–7, rectangular-oblong, dark brown.

Fls. & Frts. : August–November.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 412, f. 233. 1909; van der Maesen, op. cit.

Distrib. : Along the hedges, frequent. Amravati, Chandrapur, Dhule, Nanded, Nasik, Parbhani, Thane, Yavatmal.

C. scarabaeoides (L.) du-Petit-Thours in Dict. Sci. Nat. 6:617. 1817 (*'Cajan scarabaeoide'*); van der Maesen in Agric. Univ. Wageningen Papers 85 (4): 183, 189, f. 27. (1985) 1986; Sanj. Legumes of India 103. 1991. *Dolichos scarabaeoides* L. Sp. Pl. 726. 1753. *Atylosia scarabaeoides* (L.) Bth. in Miq. Pl. Jungh. 242. 1852; Baker in Hook. f. Fl. Brit. India 2: 215. 1876; Cooke, Fl. Pres. Bombay 1: 409. 1958 (Repr.). *'Rantur'*.

Herbs, twining. Leaflets 2.0–5.5 x 1.0–2.7 cm, sessile. Flowers pale brown-yellow, solitary or few in axillary racemes. Pods 1.5–2.0 cm long, oblong, brown, hairy. Seeds 3–5, rectangular, black.

Fls. & Frts. : June–February.

Illus. : Gillet et al. in Milne-Redhead & Polhill, Fl. Trop. E. Afr. 4(2):708, f. 107. 1971; van der Maesen, op. cit.; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 117. 1988.

Distrib. : Common throughout in deciduous forests of the state.

C. sericeus (Bth. ex Baker) van der Maesen in Agric. Univ. Wageningen Papers 85(4): 195, f. 28, t. 11. (1985) 1986; Sanj. Legumes of India 103. 1991. *Atylosia sericeus* Bth. ex Baker in Hook. f. Fl. Brit. India 2: 213. 1876; Cooke, Fl. Pres. Bombay 1: 408. 1958 (Repr.).

Shrubs, 1.0–1.5 m high. Leaflets 1.0–3.5 x 0.2–0.7 cm, sessile or nearly so, densely silkly-pubescent. Flowers 1–3, yellow, axillary in

racemes. Pods 1.1–1.3 cm long, linear–oblong, densely hairy. Seeds orbicular, black with a pale–brown strophiole.

Fls. & Frts. : September–February.

Illus. : vander Maesen, op. cit.

Distrib. : Frequent in deciduous forests. Ahmednagar, Dhule, Nasik, Pune, Raigad, Ratnagiri, Satara, Thane.

CANAVALIA Adans. emend. DC. (nom. cons.)

1. Upper calyx lip nearly equalling the tube or if shorter lowest calyx tooth not strongly subulate, not exceeding laterals; pods compressed:
   2. Leaflets obtuse to acute; hilum less than 1/2 as long as seed, seeds ivory or white, 22 mm long ... *C. ensiformis*
   2. Leaflets strongly acuminate; hilum more than half as long as seed, seeds not ivory or white:
      3. Seeds red or reddish, upto 2.5 cm long ... *C. gladiata*
      3. Seeds brown, upto 2 cm long ... *C. africana*
1. Upper calyx lip much shorter than tube, lowest tooth subulate, exceeding laterals; pods inflated:
   4. Leaflets acute or obtuse; upper calyx lip apiculate ... *C. lineata*
   4. Leaflets acute, acuminate or emarginate; upper calyx lip not apiculate :
      5. Leaflets thin, acute or acuminate ... *C. cathartica*
      5. Leaflets coriacious, emarginate ... *C. maritima*

Canavalia africana Dunn in Pipers & Dunn, Bull. Misc. Inf. Kew 1922:135. 1922; Verdc. in Kew Bull. 42:658. 1987; Sanj. Legumes of India 107. 1991. *C. virosa* (Roxb.) Wight & Arn. Prodr. 253. 1834 p.p.; Sauer in Brittonia 16:152. 1964. *C. ensiformis* (L.) DC. var. *virosa* (Roxb.) Baker in Hook. f. Fl. Brit. India 2:196. 1876; Cooke, Fl. Pres. Bombay 1:396. 1958 (Repr.). *'Gowara'*.

Extensive climbers; stems pubescent. Leaflets 4.5–16.0 x 3.0–13.5 cm, broadly ovate or ovate–orbicular or obovate–oblong, pubescent. Flowers bluish–white, in lax, axillary racemes; rhachis c 11 cm long, densely pubescent. Pods upto 19 x 2 cm, linear–oblong, flat, beaked, sparsely hairy. Seeds 1.5–2.0 x 0.8 cm, oblong–ellipsoid.

Fls. & Frts. : September–March.

Illus. : Chatterjee in J. Ind. Bot. Soc. 28:93 t. A. 1949; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 187. 1982 & Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 120. 1988.

Distrib. : In deciduous forests and along river banks, common.

C. cathartica Thou. in Desv. J. Bot. 1: 81. 1813 ('*C. catharticus*'); Sauer in Brittonia 16: 158. 1964; Sanj. Legumes of India 107. 1991 *C. stocksii* Dalz & Gibs. Bombay Fl. 69. 1861; Cooke, Fl. Pres. Bombay 1: 397 1958 (Repr.). *C. ensiformis* var. *turgida* (Grah. ex. A. Gray) Baker in Hook. f. Fl. Brit. India 2: 196. 1876.

Twiners. Leaflets ovate, up to 20 cm long, sparsely hairy. Flowers purple in axillary racemes. Pods 7–12 cm long, inflated, dark–brown. Seeds oblong, flat.

Fls. & Frts. : Throughout year.

Distrib. : Rare. Pune.

C. ensiformis (L.) DC. Prodr. 2: 404. 1825; Baker in Hook. f. Fl. Brit. India 2: 195. 1876; Cooke, Fl. Pres. Bombay 1: 397. 1958 (Repr.); Sauer in Brittonia 16: 142. 1964; Sanj. Legumes of India 107. 1991. *Dolichos ensiformis* L. Sp. Pl. 725. 1753. *'Abai'*.

Twiners, biennials or perennials. Leaflets 3.5–13.0 x 2.4–11.5 cm, ovate, glabrescent. Flowers pink, in racemes. Pods up to 13 x 2.6 cm, straight, flat, glabrescent. Seeds 14 x 8 mm, oblong, compressed with an inconspicuous brown mark near hilum.

Fls. & Frts. : September–November.

Illus. : Talb. For Fl. Bombay Pres. & Sind 1: 404, f. 228. 1909.

Distrib. : Cultivated or found as an escape. Chandrapur, Dhule, Nagpur, Osmanabad, Pune.

C. gladiata (Jacq.) DC. Prodr. 2:404. 1825; Sauer in Brittonia 16:149. 1964; Sanj. Legumes of India 107. 1991. *Dolichos gladiatus* Jacq. Coll. Bot. 2: 276. 1788 non DC. 1825; Cooke, Fl. Pres. Bombay 1:397. 1958 (Repr.). *'Abeyvel'*.

Twiners, stout, lignose. Leaflets 3.5–9.6 x 2.4–5.0 cm, ovate, pubescent, petiolate. Flowers pale lilac, pedicellate, brownish. Seeds oblong–ellipsoid.

Fls. & Frts. : October–March.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 404, f. 228. 1909 *(Canavalia ensiformis);* Anon. Wealth of India 2:55, ff. 27–29. 1950. (right–hand half).

Distrib. : Common on hedges.

C. lineata (Thunb.) DC. Prodr. 2:404. 1825; Cooke, Fl. Pres. Bombay 1:398. 1958 (Repr.); Sauer in Brittonia 16:162. 1964. *Dolichos lineatus* Thunb. Fl. Jap. 280. 1784 (excl. syn).

Perennials, prostrate or twining. Leaves 3–foliolate; leaflets 5.0–7.5 x 5.0–7.5 cm, broadly ovate, obovate or orbicular, subcoriaceous, apex acute or obtuse sometimes emarginate, base cuneate. Flowers violet, 4–8, in racemes. Pods 7.5–12.0 x 1.2–2.0 cm, linear–oblong, beaked. Seeds 4–6, dark brown.

Fls. & Frts. : March–May.

Distrib. : Rare along the sea–shore. 'Konkan' (Cooke, op. cit.).

C. maritima (Aubl.) Thou. in Desv. J. Bot. 2, 1:80. 1813; Sauer in Brittonia 16:163. 1964; Sanj. Legumes of India 108. 1991. *Dolichos maritimus* Aubl. Hist. Pl. Guian. Fr. 765. 1775. *C. obtusifolia* (Lam.) DC. Prodr. 2:404. 1825; Baker in Hook. f. Fl. Brit. India 2:196. 1876.

Twiners. Leaflets 5–10 cm long, obovate. Flowers rose–pink or purple, in axillary racemes. Pods c 2.5 cm long, oblong, Seeds 4–6, brown.

Fls. & Frts. : March–May.

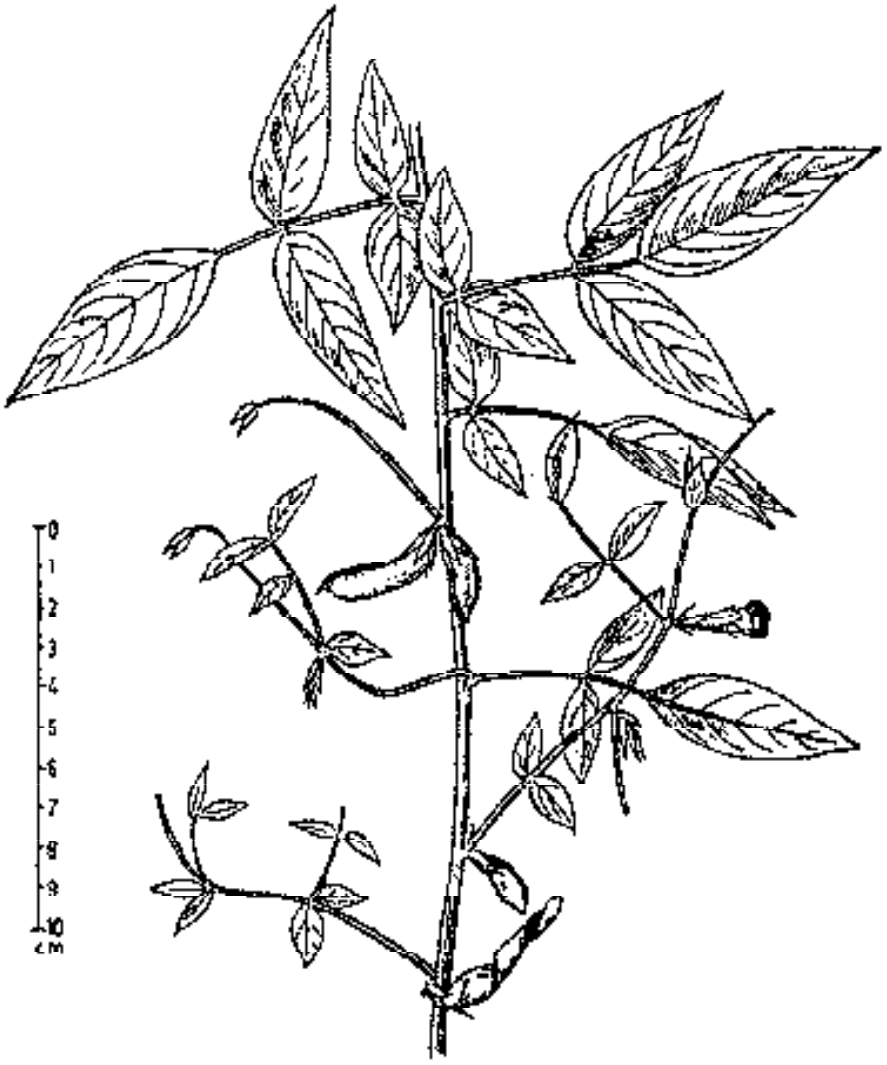
Distrib. : Usually planted in coastal areas, at times found as an escape. Ratnagiri.

CLITORIA L.

1. Flowers usually geminate; pods upto 5 cm long, 4–6–seeded ... *C. biflora*
1. Flowers usually solitary; pods upto 10 cm long, 6–10–seeded ... *C. ternatea*

Clitoria biflora Dalz. in Kew J. Bot. 2: 35. 1850; Baker in Hook f. Fl. Brit. India. 2: 208. 1876; Cooke, Fl. Pres. Bombay 1:406. 1958 (Repr.); Varghese et al. in J. Econ. Tax. Bot. 14:642. 1990; Sanj. Legumes of India 114. 1991.

Herbs, 30–60 cm high. Leaves imparipinnate; leaflets 5, 1.5–7.5 x 0.5–3.0 cm, elliptic–oblong or ovate–lanceolate, strigosely hairy, apex acute. Flowers blue, 2, in axillary racemes. Pods 1.5–4.0 x 0.5 cm, flat beaked. Seeds 4, brown.



Clitoria biflora Dalz

Fls. & Frts. : August–October.

Illus. : Lakshminarasimhan & Sharma, Fl. Nasik Dt. 151, f. 8. 1991.

Distrib. : Along the road sides or a an undergrowth in deciduous forests, frequent. Amravati, Aurangabad, Dhule, Nasik, Pune, Raigad, Thane.

C. ternatea L. Sp. Pl. 753. 1753; Baker in Hook. f. Fl. Brit. India 2: 208. 1876; Cooke, Fl. Pres. Bombay 1: 405. 1958 (Repr.); Sanj. Legumes of India 114. 1991.

1. Leaflets more than 2.5 cm long; flowers blue ... var. *ternatea*
1. Leaflets under 2.5 cm long; flowers white ... var. *pilosula*

var. **ternatea.** *'Gokarn'.*

Perennials, twining. Leaflets 5–7, 1.3–3.5 x 1–2 cm, elliptic–oblong, sparsely hairy, apex obtuse, base acute or obtuse. Flowers bright blue, axillary, solitary. Pods 5.5–6.5 x 0.3–0.5 cm, sharply beaked with 5 persistent sepals. Seeds 6–10, yellowish–brown.

Fls. & Frts. : May–December.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 188. 1982.

Distrib. : Along hedges and also cultivated, common throughout the state.

var. **pilosula** Wall. ex Baker in Hook. f. Fl. Brit. India 1:208. 1876; Sanj. Legumes of India 115. 1991.

Fls. & Frts. : July–October.

Distrib. : Nagpur (Ugemuge, 1986), Pune.

CROTALARIA L.

1. Leaves simple:
    2. Racemes all lateral, leaf opposed, few, often only 1–flowered:
        3. Pods glabrous:
            4. Plants erect; leaves equal sided at base; bracts leafy, lanceolate ... *C. vestita*
            4. Plants prostrate; leaves inequilateral at base; bracts minute:

5. Corolla exserted; pods 6–10–seeded, distinctly stalked ... *C. filipes*

5. Corolla slightly or not exserted; pods 10–20–seeded, nearly sessile:

6. Leaves upto 3 cm long, not pellucido–punctate beneath; corolla slightly exsered :

7. Pods linear–oblong, glabrous ... *C. stocksii*

7. Pods subglobose, golden hairy ... *C. angulata*

6. Leaves upto 3.5 cm long; pellucido–punctate beneath ; corolla not exserted ... *C. prostrata*

3. Pods hairy:

8. Flowers, axillary, solitary ... *C. hebecarpa*

8. Flowers in terminal and leaf opposed recemes :

9. Racemes 1–2–flowered; pods sparsely hairy ... *C. bifaria*

9. Racemes 2–3–flowered; pods strigosely hirsute:

10. Leaves upto 5 cm long, ovate; pods ellipsoid, 8–10–seeded ... *C. hirsuta*

10. Leaves upto 3.5 cm long; pods oblong, 10–25–seeded ... *C. hirta*

2. Racemes terminal, many flowered, rarely opposite the leaves:

11. Pods glabrous:

12. Pods exserted, longer than calyx:

13. Plants erect; stipules present:

14. Whole plant densely clothed with patent hairs; racemes 6–9–flowered ... *C. mysorensis*

14. Plants not as above; racemes many flowered:

15. Stipules and bracts minute, c 5 mm long, subulate or linear:

16. Pods 1.0–1.5 cm long, 10–seeded ... *C. decasperma*

16. Pods 3.0–3.8 cm long, 15–20–seeded ... *C. retusa*

15. Stipules and bracts foliaceous, ovate, acuminate ... *C. spectabilis*

13. Plants erect or diffuse; stipules absent :

17. Plants diffuse; leaves pellucido–punctate beneath; pods 6–12–seeded ... *C. albida*

17. Plants erect; leaves not as above:

18. Seeds 6–12 ... *C. epunctata*

18. Seeds numberous ... *C. lutescens*

12. Pods included or scarcely exserted:

19. Racemes capitate:

20. Stipules present :

21. Seeds 6–8 ... *C. dubia*

21. Seeds 15–25 :

22. Leaves oblong, apex rounded, base cordate; pods 6–9 mm long, 15–20–seeded ... *C. acicularis*

22. Leaves obovate–oblong, ovate, apex obtuse, base rounded; pods upto 2 cm long, 20–50–seeded ... *C. ferruginea*

20. Stipules absent:

23. Upper calyx teeth connate; seeds 6-10 ... *C. nana*

23. Upper calyx teeth not connate, long, lanceolate; seeds 10-20:

24. Leaves pellucido-punctate and silky beneath, apex rounded ... *C. chinensis*

24. Leaves not pellucido-punctate, but shaggy beneath, apex mucronate ... *C. priestleyoides*

19. Racemes lax:

25. Herbs; stipules present; calyx fulvous pubescent, upper teeth of calyx oblanceolate ... *C. calycina*

25. Herbs or undershrubs; stipules absent; calyx silky, upper teeth of calyx connate or lanceolate :

26. Leaf apex rounded or emarginate; pods oblique–oblong:

27. Leaves upto 2.5 cm, apex emarginate ... *C. tecta*

27. Leaves upto 7.5 cm, apex rounded ... *C. naikiana*

26. Leaf apex acute or blunt; pods oblique–rounded or ovoid ... *C. linifolia*

11. Pods hairy:

28. Corolla bluish–purple ... *C. verrucosa*

28. Corolla yellow :

29. Shrubs or undershrubs :

30. Bushy, low undershrubs upto 1.2 m high; branches narrow, numerous, hoary pubescent; leaves deciduous ... *C. burhia*

30. Shrubby plants upto 2 m high; branches and leaves not as above:

31. Pods 1–seeded:

32. Stipules present; bracts abundant, amplexicaul ... *C. lunulata*

32. Stipules absent; bracts not abundant, falcate ... *C. ramosissima*

31. Pods 2–12–seeded :

33. Leaves ovate–oblong; pods much exserted, 10–12–seeded ... *C. madurensis*

33. Leaves oblanceolate; pods included, 2–seeded ... *C. berteroana*

29. Herbs, erect or diffuse:

34. Erect herbs:

35. Stem terete; leaves obtuse or subacute; pods 10 or more seeded ... *C. juncea*

35. Stem quadrangular; leaves acute or acuminate; pods 4–6–seeded ... *C. leptostachya*

34. Diffuse herbs:

36. Branches triquetrous; stipules present ... *C. triquetra*

36. Branches not as above; stipules absent ... *C. pusilla*

1. Leaves compound:

37. Leaves 3–foliolate:

38. Pods 2–seeded, hairy or velvety:

39. Calyx teeth exceeding tube; pods subglobose ... *C. medicaginea*

39. Calyx teeth equalling tube; pods sub–quadrangular ... *C. notonii*

38. Pods many seeded, glabrous:

40. Stipules present; pod stalk upto 6 mm long:

41. Bracts large, foliaceous, ovate; pods 8–10–seeded ... *C. orixensis*

41. Bracts minute, setaceous; pods 20–40–seeded ... *C. pallida*

40. Stipules absent; pod stalk upto 2.5 cm long ... *C. laburnifolia*

37. Leaves usually 5–foliolate, often varying from 3–7–foliolate ... *C. quinquefolia*

Crotalaria aciculáris Buch.–Ham. ex Bth. in Hook. London J. Bot. 2:476. 1843; Baker in Hook. f. Fl. Brit. India 2:68. 1876; Malhotra & Moorthy in J. Bombay Nat. Hist. Soc. 78: 638. (1980) 1981; Sanj. Legumes of India 115. 1991.

Herbs, prostrate, silky hairy. Leaves sessile, 1.2–3.6 cm long, slightly oblique, glaucous–green. Flowers yellow, 12–20 in racemes. Pods linear–oblong, sessile.

Fls. & Frts. : August–October.

Illus. : Malhotra & Moorthy, op. cit. 639, ff. 1–7.

Distrib. : Rare in deciduous forests. Chandrapur.

C. albida Heyne ex Roth, Nov. Pl. Sp. 333. 1821; Baker in Hook. f. Fl. Brit. India 2:71. 1876; Cooke, Fl. Pres. Bombay 1:315. 1958 (Repr.); Munk in Reinwardtia 6:200. 1962; Sanj. Legumes of India 116. 1991.

Herbs or undershrubs, 15–50 cm high; branches many. Leaves 1.0–4.5 x 0.4–1.3 cm, linear–oblong or obovate, appressedly pubescent. Flowers yellow, few in lax racemes. Pods sessile, 1.0–1.2 cm long, oblong–cylindric. Seeds brownish–black, subreniform, shining.

Fls. & Frts. : September–March.

Illus. : Fyson, Fl. Nilgiri Hill tops 2: t. 78. 1915 (Repr. ed. 1974); Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 122. 1988.

Distrib. : In open situations, frequent.

C. angulata Mill. Dict. ed. 8 : 9. 1768; Naik, Fl. Marathwada 1 : 257. 1998. *Astragalus biflorus* L. Mant. 273. 1771. *Crotalara biflora* (L.) L. Mant. 570. 1771; Baker in Hook. f. Fl. Brit. India 2 : 66. 1876.

Herbs, prostrate or trailing; branches 20–30 cm long, silky hairy. Leaves 0.7–1.7 x 0.5–1.2 cm, ovate or orbicular, obtuse or mucronate at apex, oblique at base, densely silky beneath. Flowers yellow, solitary or two in leaf opposed racemes. Pods subglobose, up to 1.3 cm long, covered with stiff golden hairs. Seeds 10–20, reniform, brown, polished.

Fls. & Frts. : September–November.

Distrib. : Rare in pastures around tanks. Nanded.

Notes : This species is allied to *Crotalaris filipes* Bth. but varies in longer pods with more number of seeds.



Crotalaria berteroana DC.

C. berteroana DC. Prodr. 2:127. 1825; Sanj. Legumes of India 117. 1991. *C. fulva* Roxb.Fl. Ind 3:266. 1832; Baker in Hook. f. Fl. Brit. India 2:80. 1876; Cooke, Fl. Pres. Bombay 1:321. 1958 (Repr.).

Undershrubs, 1.0–1.5 m high, silky. Leaves 3.5–8.0 x 1.5–3.0 cm, yellowish–brown hairy on both surfaces, apex obtuse, base cuneate. Flowers many, in panicled racemes. Pods turgid, thinly silky, oblong. Seeds light brown, polished.

Fls. & Frts. : November–February.

Distrib. : Rare along hills and in plains. Sindhudurg (Cooke, op. cit.).

C. bifaria L. f. Suppl. 322. 1781; Baker in Hook. f. Fl. Brit. India 2:69. 1876; Cooke, Fl. Pres. Bombay 1: 313. 1958 (Repr.); Sanj. Legumes of India 117. 1991.

Herbs c 30 cm high, erect or trailing. Leaves 1.5–6.4 x 0.8–3.2 cm , ovate–oblong, pubescent, apex rounded or mucronate, base rounded. Flowers few, yellow with purple wings, in racemes. Pods 1.5–3.0 cm long, oblong. Seeds brown, subreniform.

Fls. & Frts. : September–December.

Illus. : Wight, Ic. t. 30. 1838; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 189. 1982.

Distrib. : In open scrub forests, rare. Aurangabad, Pune, Ratnagiri (Cooke, op. cit.).

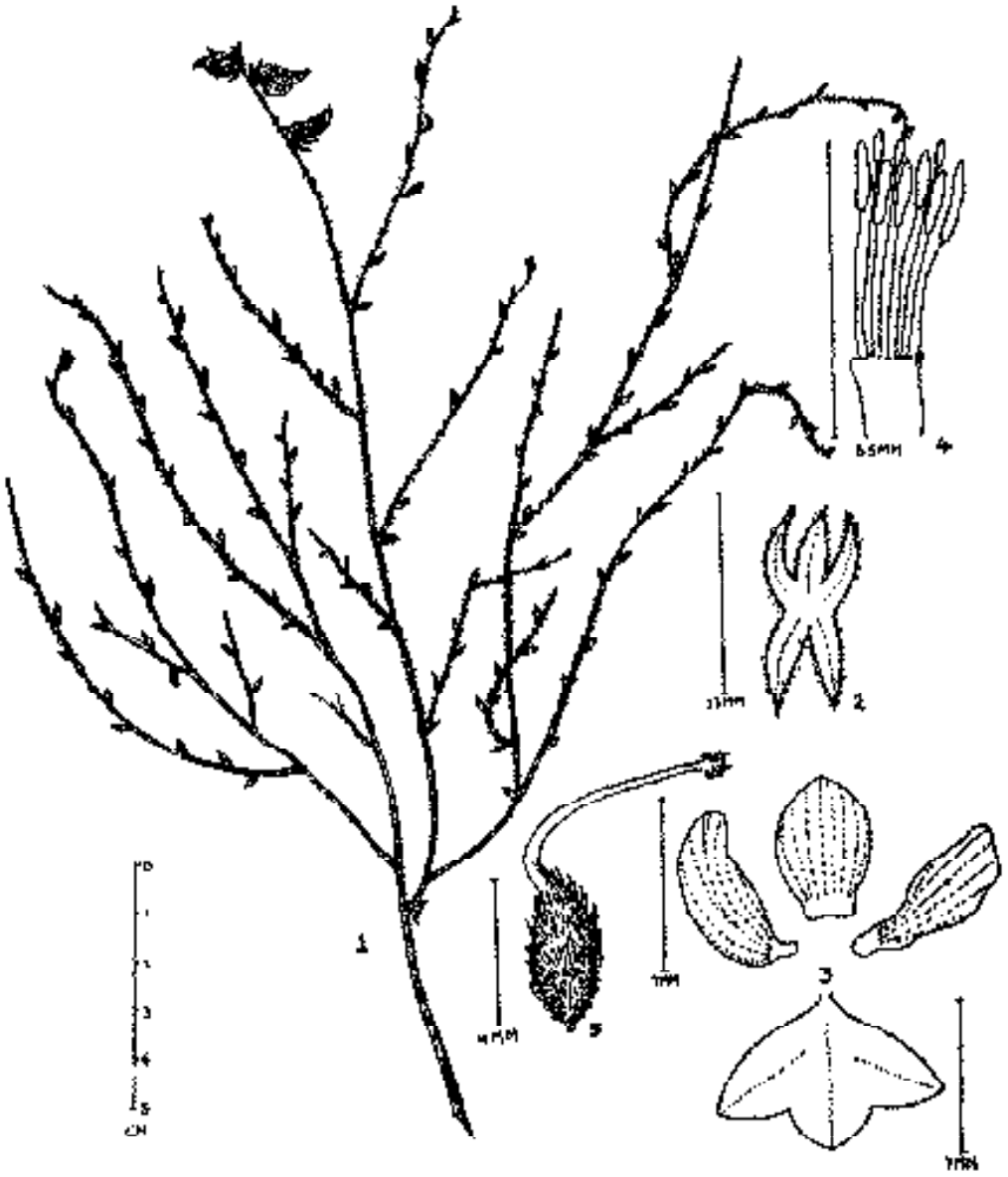
C. burhia Buch.–Ham. ex. Bth. in Hook. London J. Bot. 2:474. 1843; Baker in Hook. f. Fl. Brit. India. 2: 66. 1876; Cooke, Fl. Pres. Bombay 1:311. 1958 (Repr.); Sanj. Legumes of India 117. 1991.

Undershrubs. Leaves 0.5–2.5 x 0.3–0.9 cm, elliptic–oblong or lanceolate, appressed silky–pubescent, apex mucronate, base rounded. Flowers in terminal racemes. Pods scarcely longer than calyx. Seeds dark–brown, subreniform.

Fls. & Frts. : November–June.

Distrib. : Rare. Kolhapur.

C. calycina Schrank, Pl. Rar. Hort. Monac. t. 12. 1819; Baker in Hook. f. Fl. Brit. India 2:72. 1876; Cooke, Fl. Pres. Bombay 1:317. 1958 (Repr.); Munk in Reinwardtia 6:202. 1962; Sanj. Legumes of India 118. 1991.



Crotalaria burhia Buch.–Ham. ex. Bth.
1- Habit; 2- Calyx; 3- Corolla; 4- Stamens; 5- Pistil

Herbs, 30–60 cm high, erect, silky–pubescent. Leaves 2.0–8.8 x 0.3–1.4 cm, linear–lanceolate or oblong–lanceolate, appressed hairy beneath, acute. Flowers yellow with purple veins in terminal racemes. Pods c 2 cm long, oblong. Seeds 30–35, shining.

Fls. & Frts. : September–October.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 124. 1988.

Distrib. : Occasional in open forests, frequent. Ahmednagar, Amravati, Nanded, Parbhani, Pune, Satara, Thane, Yavatmal.

C. chinensis L. Syst. Nat. ed. 10:1158. 1759; Baker in Hook f. Fl. Brit. India 2:73 1876; Cooke, Fl. Pres. Bombay 1: 316. 1958 (Repr.); Sanj. Legumes of India 118. 1991.

Herbs, 30–60 cm high; stems and branches clothed with long, spreading hairs. Leaves 2.3–6.5 x 0.6–2.0 cm, oblong–oblanceolate, base rounded. Flowers pale yellow, in terminal racemes. Pods sessile. Seeds 15–20.

Fls. & Frts. : October–December.

Distrib. : Rare along the ghats. Ratnagiri (Cooke, op. cit.).

C. decasperma Naik in Indian Forester 92:760, f. A–D. 1966; Sanj. Legumes of India 119. 1991.

Herbs up to 90 cm high. Leaves 1.2–2.6 x 0.2–0.3 cm, oblong–linear or lanceolate, white hairy, apex obtuse or acute, mucronate, base rounded, narrowed. Flowers yellow, in short terminal racemes. Pods ellipsoid–oblong. Seeds ear–shaped.

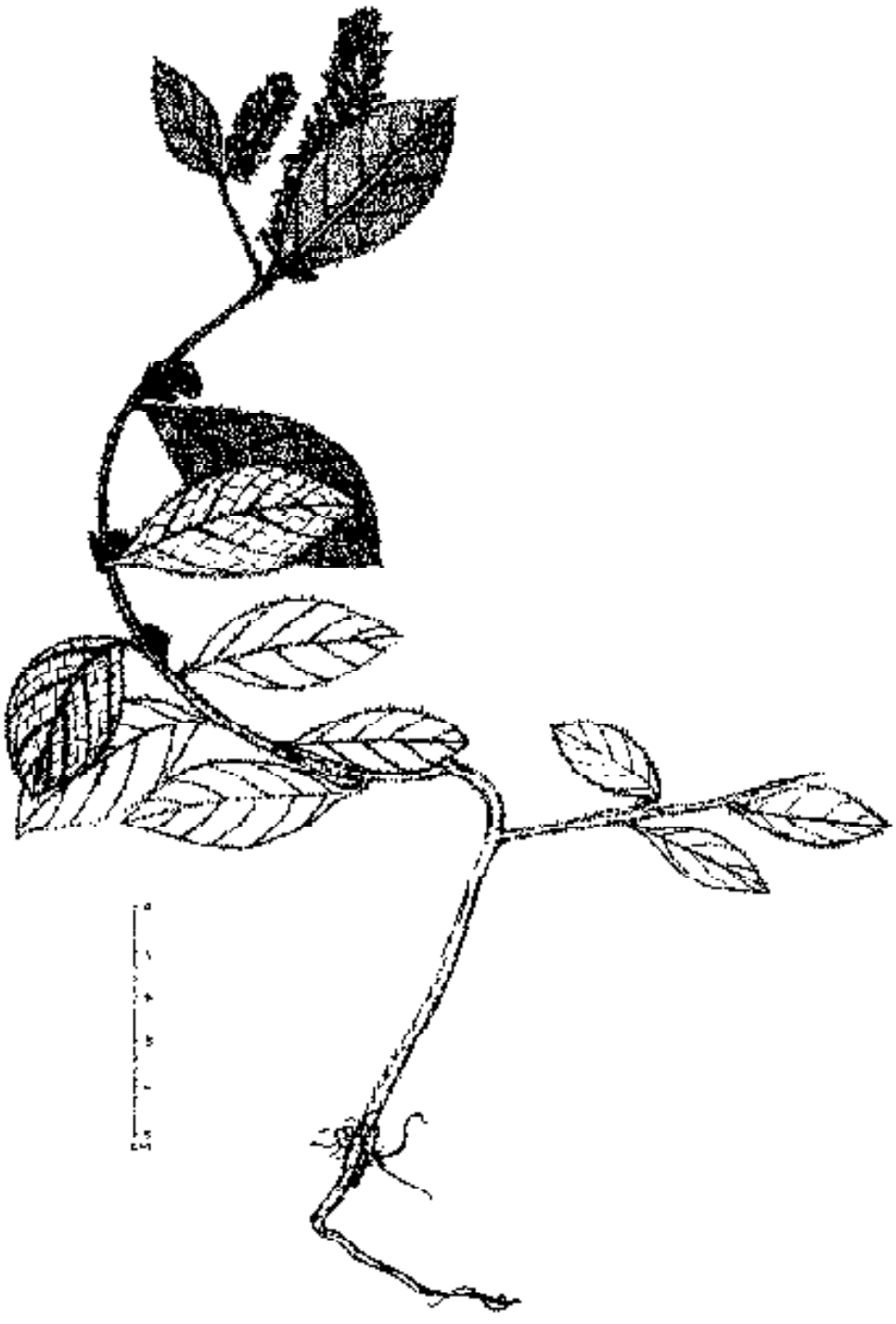
Fls. & Frts. : September–November.

Illus. : Naik, op. cit.

Distrib. : Occasional along gulley on hill slopes. Beed, Osmanabad, Parbhani, Pune.

C. dubia Grah. ex Bth. in Hook. London J. Bot. 2:568. 1843; Baker in Hook. f. Fl. Brit. India 2:73. 1876; Cooke, Fl. Pres. Bombay 1:316. 1958 (Repr.); Sanj. Legumes of India 119. 1991.

Herbs, 30–60 cm high. Leaves 5.0–7.5 x 2.5–3.0 cm. Flowers 12–30, in dense, silky–villous, terminal heads. Pods sessile, oblong. Seeds brownish.



Crotalaria dubia Grah. ex Bth.

Fls. & Frts. : November–January.

Distrib. : 'Konkan' (Cooke, op. cit.).

C. epunctata Dalz. in Hook. J. Bot. Kew Gard. Misc. 3: 210. 1850; Vajrav., Nair & Henry in Fl. Tamil Nadu 1: 196. 1983; Sanj. Legumes of India 119. 1991. *C. albida* Heyne ex Roth var. *epunctata* (Dalz.) Baker in Hook. f. Fl. Brit. India 2: 71. 1876.

Shrubs, Leaves membrahous, pubescent, not dotted. Flowers 3–6, in lax racemes; calyx teeth linear–acuminate.

Fls. : December–Februrary.

Distrib. : Southern Konkan (Dalzell, op. cit.). Endemic.

C. ferruginea Grah. ex Bth. in Hook. London J. Bot. 476. 1843; Baker in Hook. f. Fl. Brit. India 2 : 68. 1876; Naik, Fl. Marathwada 1 : 258. 1998.

Herbs, erect, robust; branches shaggy or silky pubescent. Leaves 1.2–4.0 x 0.3–1.2 cm, ovate or obovate–oblong, obtuse at apex, rounded at base, pale beneath. Flowers yellow, 1–3, in axillary, short racemes. Pods oblong, c 2 cm long, glabrous. Seeds 20–25, reniform, pale yellow, polished.

Fls. & Frts. : November–February.

Distrib. : Occasional on gravelly slopes of hills. Aurangabad, Beed, Nanded.

C. filipes Bth. in Hook. London J. Bot. 2:475. 1843; Baker in Hook. f. Fl. Brit. India 2:66. 1876; Cooke, Fl. Pres. Bombay 1:312. 1958 (Repr.); Sanj. Legumes of India 120. 1991.

1. Stem filiform, hairy; leaves 0.9–1.6 cm long ... var. *filipes*

1. Stem not as above; leaves 1.2–2.5 cm long ... var. *trichophora*

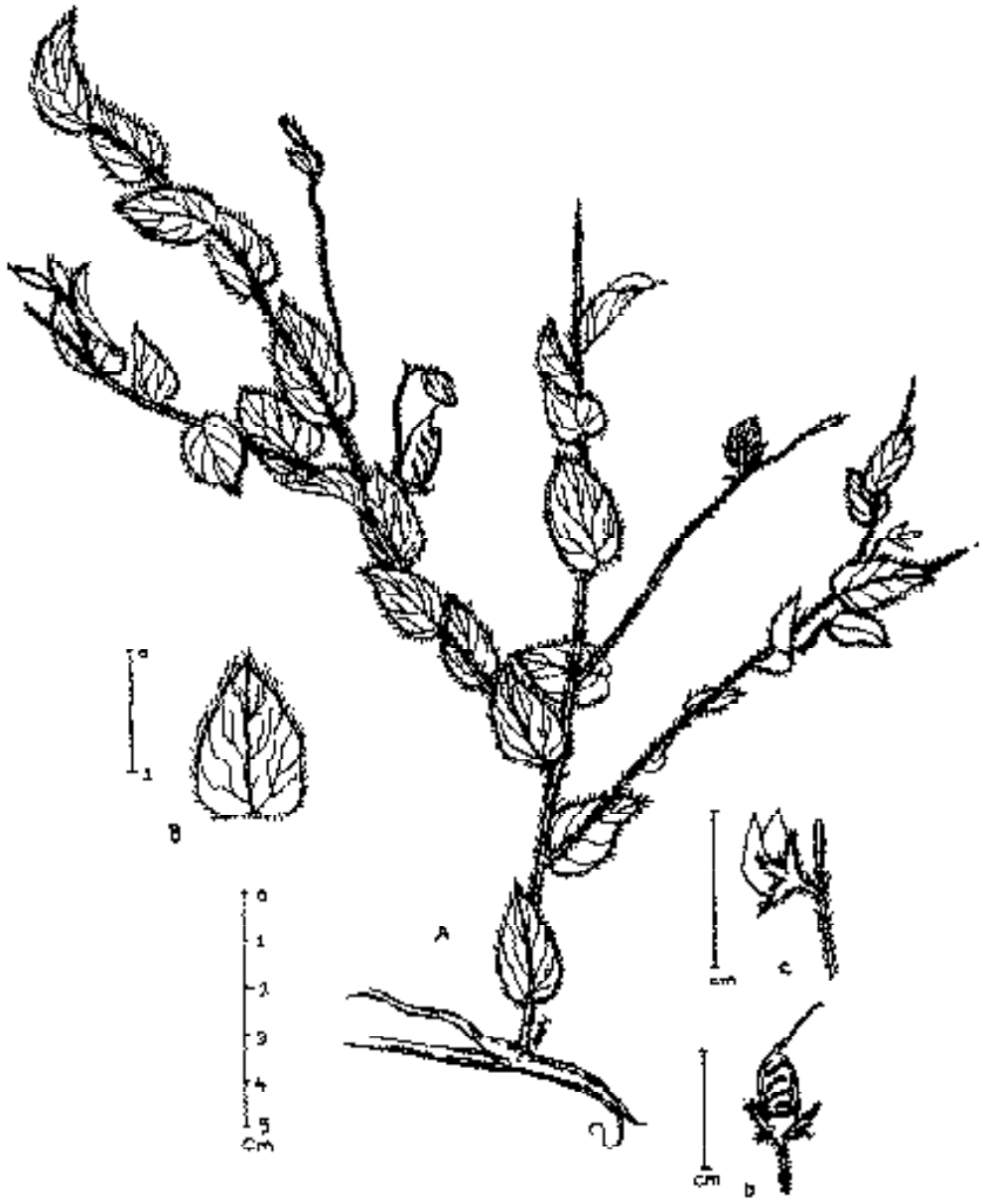
var. **filipes.** *'Phatphati'.*

Herbs, prostrate, 20–30 cm long. Leaves 0.3–1.6 x 0.2–1.0 cm, ovate–oblong or ovate–elliptic, silky hairy. Flowers yellow, distant. Pods oblong, stalked.

Fls. & Frts. : August–February.

Illus. : Deshpande et al. Fl. of Mahableshwar 1:167, f. 11. 1993.

Distrib. : Common in open situations.



Crotalaria filipes var. **trichophora** (Bth. ex Baker) T. Cooke
A. Habit; B. Leaf; C. Flower; D. Fruit.

var. **trichophora** (Bth. ex Baker) T. Cooke, Fl. Pres. Bombay 1:293. 1903 [1:312. 1958 (Repr.)]; Sanj. Legumes of India 120. 1991. *C. trichophora* Bth. ex Baker in Hook. f. Fl. Brit. India 2:67. 1876.

Herbs, stout, densely hairy. Leaves 1.2–2.5 x 0.6–0.8 cm, ovate–oblong, pubescent. Flowers yellow. Pods oblong.

Fls. & Frts. : September–December.

Distrib. : Rare, among grasses. Nagpur, Pune, Raigad.

C. hebecarpa (DC.) Rudd in Phytologia 54: 28.1983; Sanj. Legumes of India 121. 1991. *Goniogyna hebecarpa* DC. Ann. Sci. Nat. Paris 4: 92. Jan. 1825. *Heylandia latebrosa* DC. Mem. Legum. 6: 201. Nov. 1826; Baker in Hook. f. Fl. Brit. India 2: 65. 1876; Cooke, Fl. Pres. Bombay 1: 310 1958 (Repr.). *'Godhadi'*.

Herbs, prostrate, hairy. Leaves 0.6–1.7 x 0.4–0.8 cm, ovate, hairy, apex subacute, base obliquely subcordate. Flowers yellow, solitary, axillary. Pods oblong, flat, brownish, hairy. Seeds 1–2, reniform.

Fls. & Frts. : February–June.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 190. 1982.

Distrib. : Common throughout the state in plains in open situations.

C. hirsuta Willd. Sp. Pl. 3:978. 1803; Baker in Hook. f. Fl. Brit. India 2:68. 1876; Sanj. Legumes of India 121. 1991.

Herbs, silky–hairy. Leaves 1.2–5.0 x 0.4–3.5 cm, hairy. Flowers yellow. Pods oblong. Seeds subreniform, blackish–brown, shining.

Fls. & Frts. : July–October.

Distrib. : In open situations, frequent. Akola, Amravati, Aurangabad, Chandrapur, Dhule, Jalgaon, Nagpur, Nanded, Parbhani, Wardha.

C. hirta Willd. in Ges. Naturf. Fr. Berlin Neue Schr. 4:217. 1803; Baker in Hook. f. Fl. Brit. India 2:70. 1876; Pataskar & Moorthy in M.V.M. Patrika 5: 25, f. 1–3. 1970; Sanj. Legumes of India 121. 1991.

Herbs, erect or diffuse, silky hairy up to 1.5 m high. Leaves 1.0–3.5 x 0.2–0.8 cm, oblong or oblanceolate, glabrescent above, hairy beneath, apex obtuse or mucronate. Flowers yellow in terminal, subcapitate heads. Pods c 1.4 cm long, oblong. Seeds yellowish–brown, kidney shaped, shining.



Crotalaria hirsuta Willd.

Fls. & Frts. : August–April.

Illus. : Pataskar & Moorthy, op. cit.; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 126. 1988.

Distrib. : Occasional weed of black cotton soil and also amidst grasses in plains. Ahmednagar, Amravati, Aurangabad, Chandrapur, Dhule, Kolhapur, Nanded, Pune, Satara, Yavatmal.

C. juncea L. Sp. Pl. 714. 1753; Baker in Hook. f. Fl. Brit. India 2:79. 1876; Cooke, Fl. Pres. Bombay 4:320. 1958 (Repr.); Sanj. Legumes of India 122. 1991. *'Tagada'.*

Herbs, branched, silky–pubescent. Leaves subsessile, 3–15 x 0.5–4.0 cm, linear–lanceolate or elliptic–lanceolate, appressed–pubescent. Flowers yellow, in terminal and lateral racemes. Pods oboviod–oblong. Seeds subreniform, yellowish–brown.

Fls. & Frts. : November–January.

Illus. : Anon. Wealth of India 2: 373, f. 136. 1950; Kaur in Bull. Lucknow Nat. Bot. Gard. 87: t. 2 & 3. 1964; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 127. 1988.

Distrib. : Usually cultivated for its fibre, often found as an escape.

C. laburnifolia L. Sp. Pl. 715. 1753; Baker in Hook. f. Fl. Brit. India 2:84. 1876; Cooke, Fl. Pres. Bombay 1:324. 1958 (Repr.); Sanj. Legumes of India 123. 1991.

Bushy shrubs, 60–120 cm high. Leaves elliptic–oblong, acute or subacute at both ends. Flowers yellow, in terminal and lateral racemes. Pods cylindric. Seeds 20–30.

Fls. & Frts. : August–October.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 128. 1988.

Distrib. : Rare in plains & ghats. Chandrapur, 'S. Konkan' (Cooke, op. cit.).

C. leptostachya Bth. in Hook. London J. Bot. 2:562. 1843; Baker in Hook. f. Fl. Brit. India 2:78. 1876; Cooke, Fl. Pres. Bombay 1:320. 1958 (Repr.); Sanj. Legumes of India 123. 1991. *'Khul–Khuli', 'Tag'.*

Herbs, 0.5–1.5 m high, erect, rigid, fulvous–pubescent. Leaves 5.4–14.0 x 1.2–4.3 cm, linear–oblong or oblong–lanceolate, appressed silky–pubescent. Flowers yellow, in terminal and axillary racemes. Pods obovate–oblong, hairy. Seeds subreniform, yellowish–brown.



Crotalaria leptostachya Bth.
1- Habit; 2- Flower

Fls. & Frts. : October–November.

Distrib. : In moist deciduous forest, frequent. Ahmednagar, Pune, Raigad, Thane.

C. linifolia L. f. Suppl. 322. 1781; Baker in Hook. f. Fl. Brit. India 2:72. 1876; Cooke, Fl. Pres. Bombay 1: 317. 1958 (Repr.); Munk in Reinwardtia 6:207. 1962; Sanj. Legumes of India 123. 1991.

Undershrubs, 30–90 cm high, suffruticose. Leaves alternate 1.2–4.5 x 0.4–1.0 cm, obovate–oblong or lanceolate, appressed silvery hairy beneath. Flowers yellow, in simple or branched, terminal, lax racemes. Pods deflexed. Seeds 4–10, pale–brown, reniform.

Fls. & Frts. : August–November.

Distrib. : Common throughout the state in ghats and in plains.

C. lunulata Heyne ex Wight & Arn., Prod. 183 1834; Baker in Hook. f. Fl. Brit India 2: 80. 1876; Sanj. Legumes of India 123. 1991.

Undershrubs; stem branched, densely silky pubescent. Leaves oblanceolate, apex acute, base cuneate, silky hairy. Calyx and corolla hairy. Pods sessile, silky hairy.

Fls. & Frts. : Not known.

Distrib. : This specie is endemic to Maharashtra and Karnataka (Sanj. op. cit.).

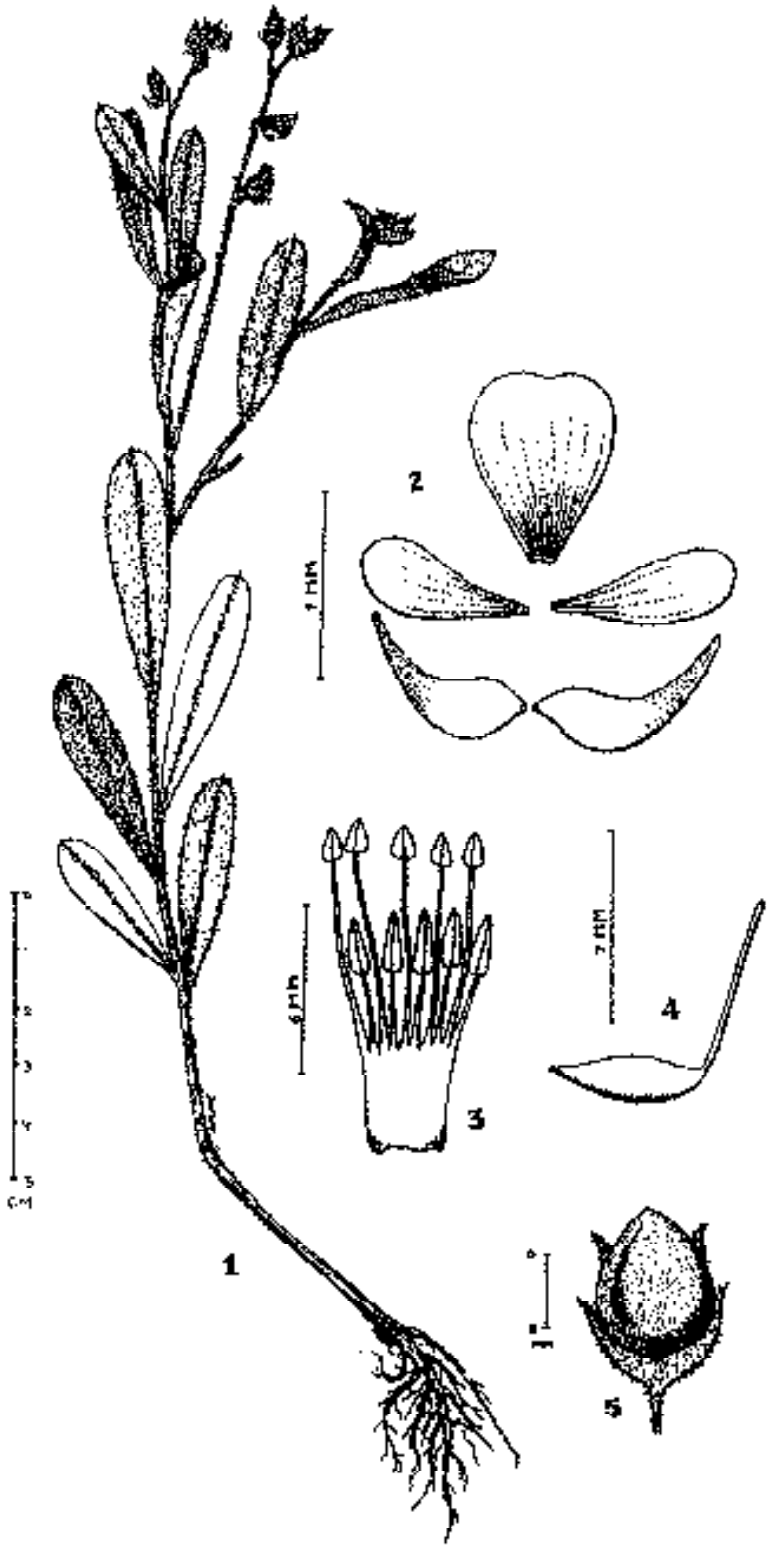
C. lutescens Dalz. in Hook Kew J. Bot. 2:34. 1843; Baker in Hook. f. Fl. Brit. India. 2:74. 1876; Cooke, Fl. Pres. Bombay 1:318. 1958 (Repr.); Sanj. Legumes of India 123. 1991.

Undershrubs, 50–100 cm high. Leaves subsessile, 3.5–6.5 x 0.8–1.8 cm, elliptic–lanceolate, membranous, apiculate. Flowers yellow, in lax racemes. Pods oblong.

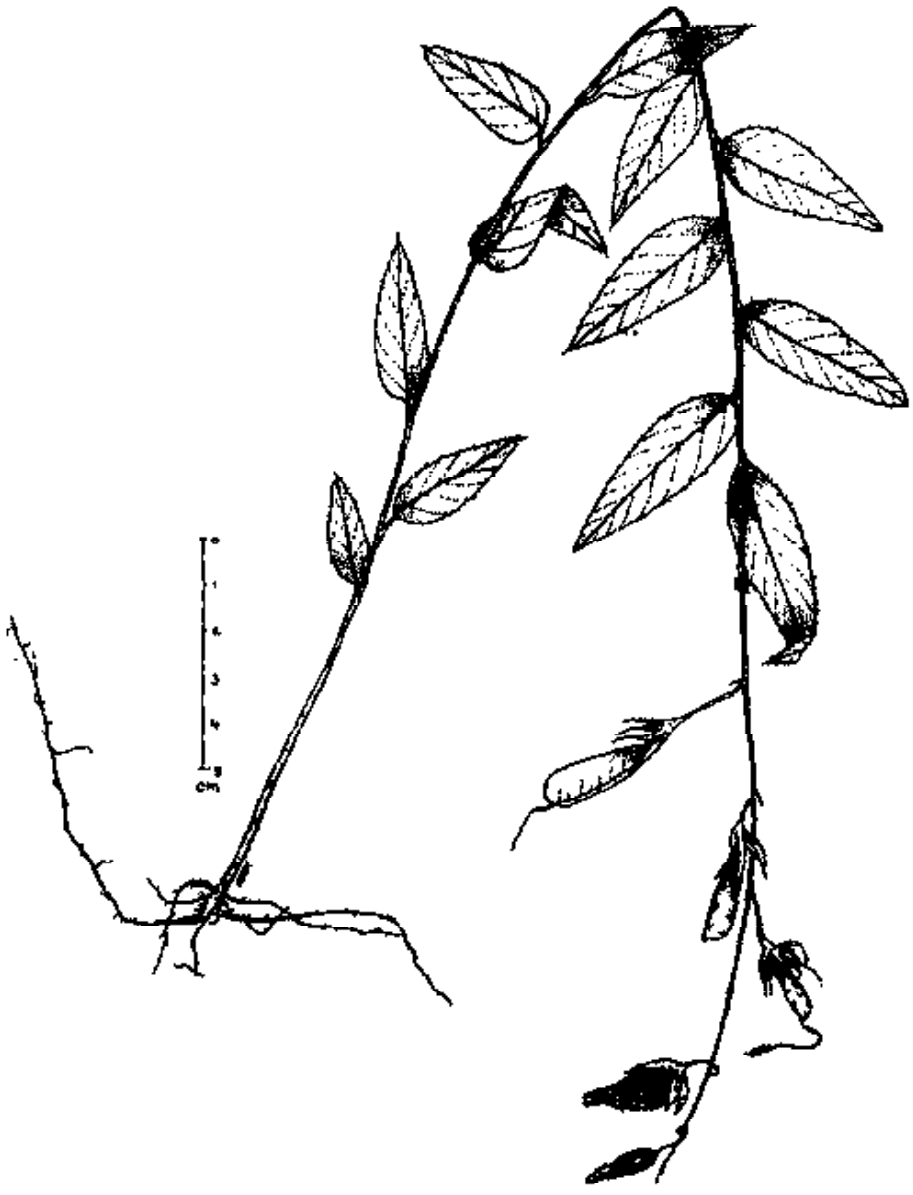
Fls. & Frts. : August–December.

Distrib. : In plains, frequent. Ahmednagar, Kolhapur, Nagpur, Ratnagiri.

C. madurensis Wight & Arn. Prodr. 184. 1834; Baker in Hook. f. Fl. Brit. India 2:79. 1876 p.p.; Cooke, Fl. Pres. Bombay 1:321. 1958 (Repr.); Sanj. Legumes of India 123. 1991.



Crotalaria linifolia L. f.
1- Habit; 2- Petals; 3- Stamens; 4- Carpel; 5- Pod.



Crotalaria lutescens Dalz.



Crotalaria madurensis Wight & Arn.

Undershrubs. Leaves 3.7–8.5 x 2.5–5.0 cm, clothed with yellowish–brown silky hairs. Flowers yellow, in panicled racemes. Pods turgid, stalked, hairy.

Fls. & Frts. : December–February.

Distrib. : Rare along the ghats. Pune.

C. medicaginea Lam. Encycl. 2:201. 1786; Baker in Hook. f. Fl. Brit. India 2:81. 1876; Cooke, Fl. Pres. Bombay 1:322. 1958 (Repr.); Munk in Reinwardtia 6:208. 1962; Sanj. Legumes of India 124. 1991.

1. Flowers 2–6 ... *var. medicaginea*
1. Flowers more than 6:
   2. Leaflets retuse ... *var luxuriens*
   2. Leaflets apiculate ... *var. neglecta*

var. **medicaginea.** *'Rangas'.*

Herbs, 20–80 cm high, erect. Leaflets 3, 0.6–3.5 x 0.3–1.5 cm, obovate–oblong or oblanceolate, appressed silky–pubescent beneath, apex apiculate. Flowers yellow, 2–6, in terminal and leaf–opposed racemes. Pods obliquely beaked. Seeds dark–brown, subreniform.

Fls. & Frts. : September–December.

Illus. : Mahesh. Illus. Fl. Delhi f. 49. 1966; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 131. 1988.

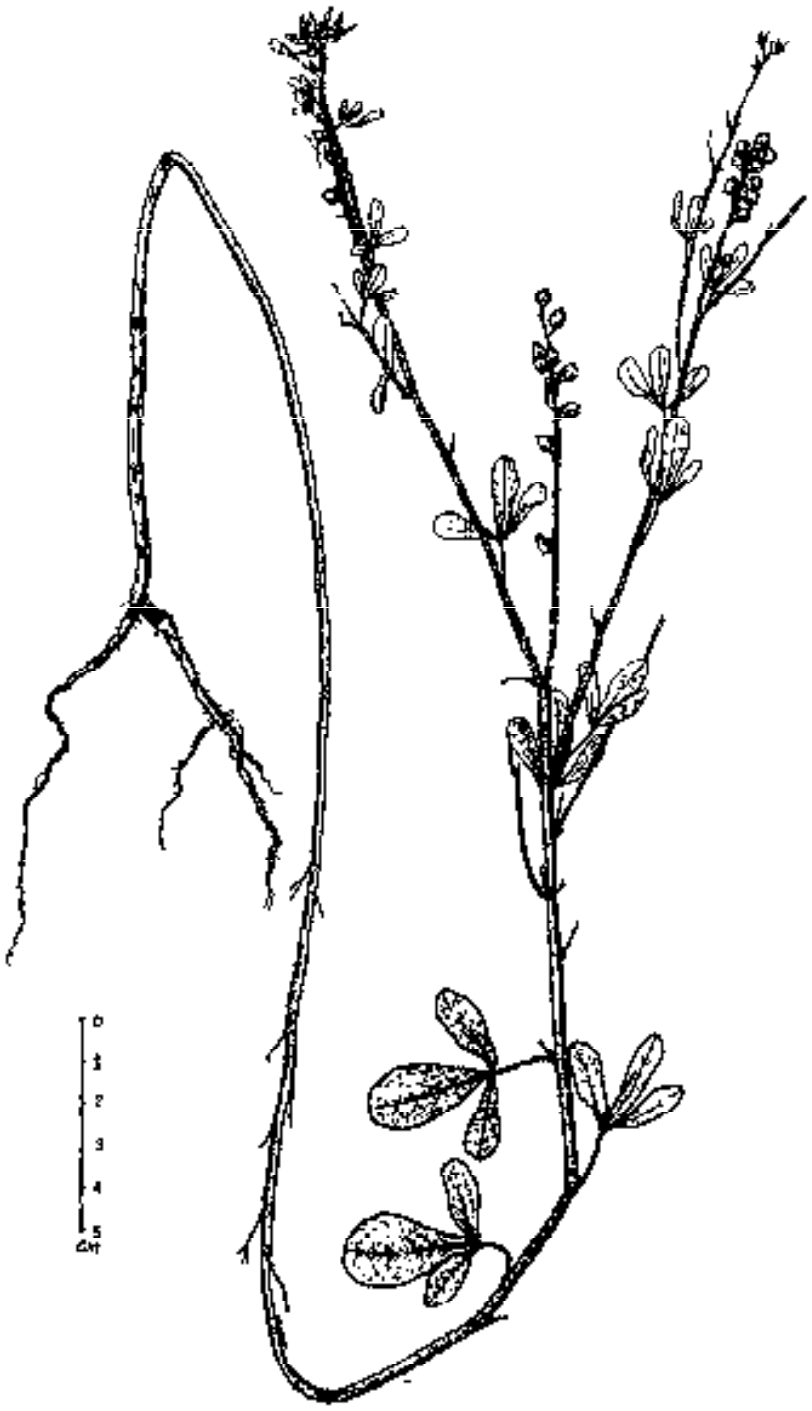
Distrib. : Common throughout the state in open situations and forests. Endemic.

var. **luxuriens** (Bth.) Baker in Hook. f. Fl. Brit. India 2:81. 1876; Cooke, Fl. Pres. Bombay 4:322. 1958 (Repr.). *C. luxuriens* Bth. in Hook. London J. Bot. 2:578. 1843; Sanj. Legumes of India 124. 1991.

Herbs, 60–90 cm high; young branches pubescent. Leaflets larger, obovate–oblanceolate, silky beneath, retuse; terminal leaflet 1.2–2.5 cm long. Flowers 6–12, yellow, in terminal few flowered racemes. Pods c 4 mm long, subglobose, oblique.

Fls. & Frts. : September–November.

Illus. : Mahesh. Illus. Fl. Delhi. f. 49. 1966.



Crotalaria medicaginea Lam. var. **medicaginea**

Distrib. : Rare along ghat slopes. Pune, Satara.

Notes. : This variety differs from the species proper in having stouter plants, leaflets larger, retuse and racemes 6–12–flowered.

var. **neglecta** (Wight & Arn.) Baker in Hook. f. Fl. Brit. India 2:81. 1876; Cooke, Fl. Pres. Bombay 1: 322. 1958 (Repr.); Shah & Badrinath in J. Econ. Tax. Bot. 6:124. 1985; Sanj. Legumes of India 124. 1991. *C. neglecta* Wight & Arn. Prodr 192. 1834. *'Ranmethi'*.

Herbs; branches more ascending than in type. Leaflets larger, apiculate. Flowers yellow, 6–9, in racemes.

Fls. & Frts. : September–November.

Distrib. : Occasional. Raigad (Cooke, op. cit.), Thane (Shah & Badrinath, op. cit.).

C. mysorensis Roth, Nov. Pl. Sp. 338. 1821; Baker in Hook. f. Fl. Brit. India 2:70. 1876; Cooke, Fl. Pres. Bombay 1:314. 1958 (Repr.); Sanj. Legumes of India 124. 1991.

Herbs, 30–90 cm high. Leaves sessile, 1.5–12.0 x 0.4–1.7 cm, linear–oblong, pilose. Flowers yellow, in terminal, lax racemes. Pods oblong, shortly beaked. Seeds many, yellowish–brown, subreniform.

Fls. & Frts. : September–November.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 134. 1988.

Distrib. : Common as forest under growth and in open situations.

Crotalaria naikiana Zate in Ind. J. Forestry 5: 35. 1982; Sanj. Legumes of India 286. 1991; Naik, Fl. Marathwada 1 : 263. 1998.

Erect, appressed pubescent herbs, 50–60 cm high. Leaves 2.5–7.5 x 1–2 cm, oblanceolate, obtuse or rounded at apex, narrowed at base, glabrous above, appressed pubescent beneath. Flowers yellow, in axillary and terminal, lax racemes reaching 30 cm long. Pods sessile, oblong, included within calyx. Seeds 2–4, reniform, yellow, polished.

Fls. & Frts. : September–November.

Illus. : Zate, op. cit. 35, f. 1 A–E.

Distrib. : Rare on hill slopes. Nanded (Naik, op. cit.).

C. nana Burm. f. Fl. Ind. 156, t. 48, f. 2. 1768; Baker in Hook. f. Fl. Brit. India 2:71. 1876 p.p.; Cooke, Fl. Pres. Bombay 1:315. 1958 (Repr.); Sanj. Legumes of India 125. 1991.

Herbs, 30–45 cm high; branches silky–brown hairy. Leaves 1.2–4.0 x 0.5–0.9 cm , oblong–oblanceolate, pellucid–punctate, silky hairy, subacute or apiculate. Flowers yellow, in capitate, terminal sracemes. Pods obliquely ovoid–subglobose, black when ripe. Seeds dark–brown, reniform.

Fls. & Frts. : September–December.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 135. 1988.

Distrib. : Along the hill slopes and river beds, frequent. Ahmednagar, Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara.

C. notonii Wight & Arn. Prodr. 192. 1834; Baker in Hook. f. Fl. Brit. India 2:82. 1876; Cooke, Fl. Pres. Bombay 1:323. 1958 (Repr.); Sanj. Legumes of India 125. 1991; Naik, Fl. Marathwada 1 : 263. 1998.

Undershrubs; branches divaricate, silky–hairy. Leaflets 3, 0.4–1.5 x 0.2–0.5, obovate–oblong, appressed hairy, cuneate at base. Flowers yellow, 12–20, in dense, terminal or leaf opposed racemes. Pods thinly silky. Seeds blackish–brown, subreniform.

Fls. & Frts. : July–October.

Illus. : Matthew, Illus. Fl. Palni Hills t. 164. 1996.

Distrib. : Along the ghats, around fields and on wastelands, occasional. Dhule, Marathwada (Naik, op. cit.), Nagpur, Pune.

C. orixensis Willd. in Ges. Naturf. Fr. Berlin Neue Schr. 4: 217. 1803; Baker in Hook. f. Fl. Brit.India 2:83. 1876; Cooke, Fl. Pres. Bombay 1: 323. 1958 (Repr.); Munk in Reinwardtia 6:211. 1962; Sanj. Legumes of India 126. 1991. *'Andabel', 'Jensru'.*

Herbs, 30–45 cm long, prostrate or suberect. Leaflets 3, 1.0–3.5 x 0.3–2.0 cm, elliptic or obovate–oblong, appressed hairy beneath, obtuse at apex. Flowers yellow, in terminal and axillary racemes. Pods c 1.5 x 0.6 cm, cylindric. Seeds 8–10, yellow, sometimes mottled black.

Fls. & Frts. : August–December.

Illus. : Kaur in Bull. Lucknow Natl. Bot. Gard. 87: t. 6 & 7. 1964.

Distrib. : In open situations, common.

C. pallida Ait. Hort. Kew. 2: 20. 1789; Sanj. Legumes of India 126. 1991. *C. striata* DC. Prodr. 2:131. 1825; Baker in Hook. f. Fl. Brit. India 2: 84. 1876; Cooke, Fl. Pres. Bombay 1:323. 1958 (Repr.). *'Jangli tag'.*

Suffruticose herbs or undershrubs, 30–120 cm high. Leaflets 13, teminal one larger, elliptic, acute–mucronate. Flowers yellow, many, in terminal racemes. Pods deflexed. Seeds brownish.

Fls. & Frts. : July–December.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 136. 1988.

Distrib. : Frequent in open situations and also introduced in gardens. Chandrapur, Nagpur, Nasik, Pune (Cooke, op. cit.), Ratnagiri, Thane.

C. priestleyoides Bth. ex. Baker in Hook. f. Fl. Brit. India 2:74. 1876; Cooke, Fl. Pres. Bombay 1:316. 1958 (Repr.); Sanj. Legumes of India 127. 1991.

Undershrubs; branches ascending, silky–hairy. Leaves obovate or oblanceolate, hairy. Flowers 4–8 in dense, terminal heads. Pods sessile, dark–brown. Seeds 10–16, chestnut brown, polished.

Fls. & Frts. : October–December.

Illus. : Matthew, Fur. Illus. Fl. Tamillnadu Carnatic 4: t. 138. 1988.

Distrib. : Rare. 'Konkan' (Cooke, op. cit.).

C. prostrata Rottl. in Willd. Enum. Hort. Berol. 2:747. 1809; Baker in Hook. f. Fl. Brit. India 2:67. 1876; Cooke, Fl. Pres. Bombay 1:312. 1958 (Repr.); Sanj. Legumes of India 127. 1991.

Herbs, prostrate or diffuse, slender. Leaves 1.2–3.5 x 0.4–1.7 cm, oblong or oblong–obovate, silky–pubescent. Flowers yellow, 2–4, in lateral racemes. Pods oblong. Seeds brown, subreniform.

Fls. & Frts. : September–April.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 139. 1988.

Distrib. : In open situations, amidst grasses, common.

C. pusilla Heyne ex DC. Prodr. 2: 128. 1825; Baker in Hook. f. Fl. Brit. India 2:70. 1876; Cooke, Fl. Pres. Bombay 1: 315. 1958 (Repr.); Sanj. Legumes of India 127. 1991.



Crotalaria ramosissima Roxb.
1- Habit; 2- A mature pod with sepals, style and stigma

Herbs, 8–10 cm high; branches many, silky–hairy. Leaves subsessile, 0.6–2.5 x 0.2–0.3 cm, linear–oblong, densely silky–pubescent. Flowers yellow, 3–10, in lateral racemes. Pods oblong. Seeds 4–8, brown, subreniform.

Fls. & Frts. : August–October.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 141. 1988.

Distrib. : In deciduous forests, occassional. Akola, Amravati, Aurangabad, Bombay (Cooke, op. cit.), Chandrapur Nasik, Osmanabad, Parbhani, Yavatmal.

C. quinquefolia L. Sp. Pl. 716. 1753; Baker in Hook. f. Fl. Brit. India 2:84. 1876; Cooke, Fl. Pres. Bombay 1:324. 1958 (Repr.); de Munk in Reinwardtia 6:212. 1962; Sanj. Legumes of India 127. 1991.

Herbs, 40–80 cm high, erect. Leaflets sessile, 3.0–8.5 x 0.8–1.2 cm, oblong–lanceolate or elliptic–oblong, apex subacute, base acute. Flowers 10–20, in terminal, lax racemes. Pods oblong, base slightly tapering. Seeds 30–40.

Fls. & Frts. : November–February.

Illus. : Wight, Ic. t. 15. 1838.

Distrib. : In cultivated fields, rare. 'Bombay' (Cooke, op. cit.), Chandrapur, Ratnagiri.

C. ramosissima Roxb. Fl. Ind. 3:268:1832; Baker in Hook. f. Fl. Brit. India 2: 81. 1876; Cooke, Fl. Pres. Bombay 1:322. 1958 (Repr.); Sanj. Legumes of India 128. 1991.

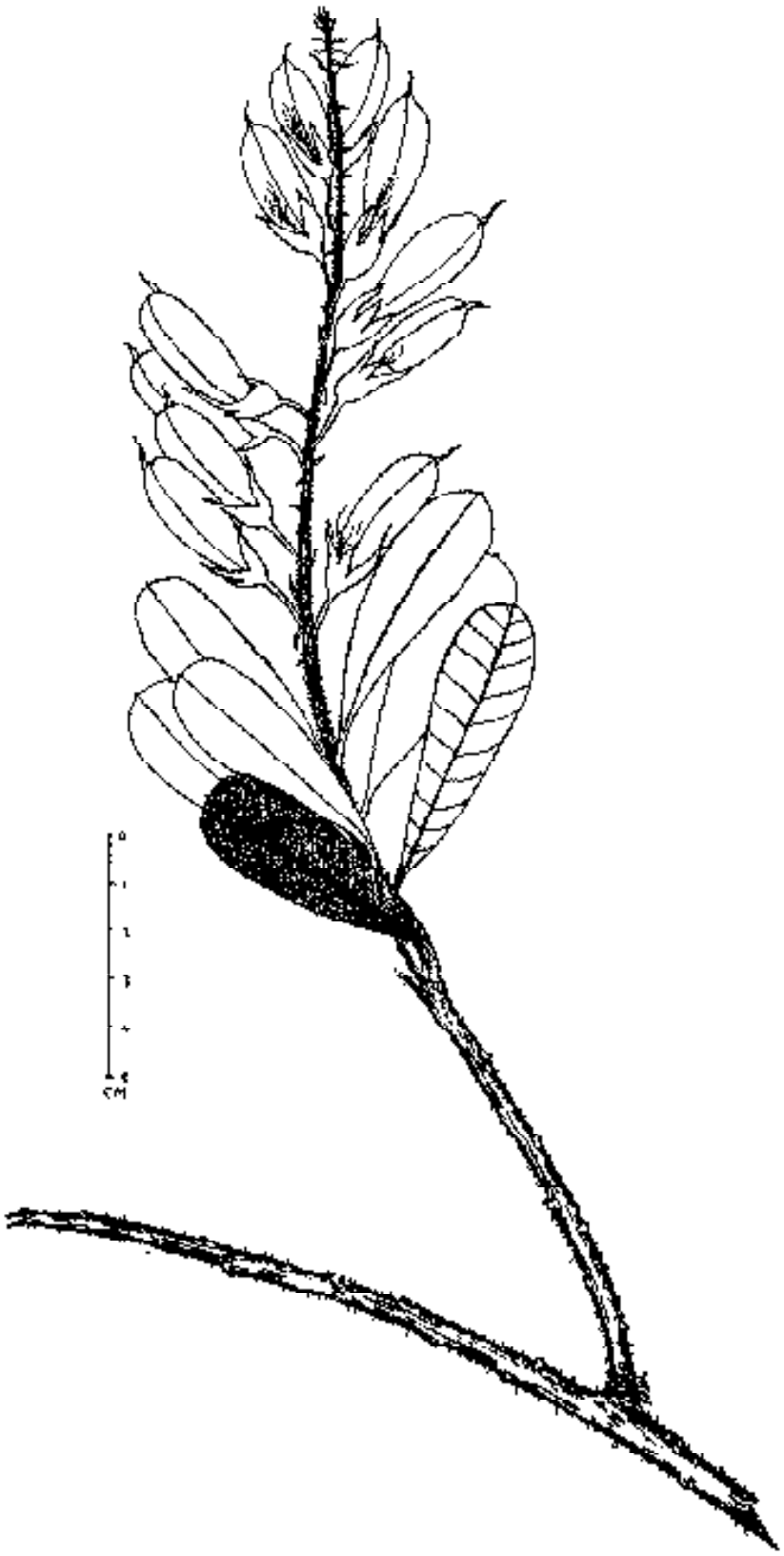
Herbs up to 30 cm high; branches many, densely silky hairy. Leaves crowded, linear or oblanceolate, densely hairy, apex usually obtuse. Flowers in panicled racemes. Pods oblong, densely silky. Seeds brownish–black.

Fls. & Frts. : October–December.

Distrib. : In open situations, or near nallahs, rare. Chandrapur, Nagpur, Nanded, Parbhani.

C. retusa L. Sp. Pl. 715. 1753; Baker in Hook. f. Fl. Brit. India 2:75. 1876; Cooke, Fl. Pres. Bombay 1:318. 1958 (Repr.); Munk in Reinwardtia 6:212. 1962; Sanj. Legumes of India 128. 1991. *'Dingala'*.

Undershrubs, upto 1.2 m high, robust. Leaves 2.5–8.0 x 1–3 cm, obovate–oblong or oblanceolate–oblong, pubescent beneath, apex obtuse



Crotalaria spectabilis Roth

or retuse, base cuneate. Flowers bright yellow, many, in compact, terminal racemes. Pods linear–oblong, stalked.

Fls. & Frts. : September–March.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1:377, f. 215. 1909; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 142. 1988.

Distrib. : Common throughout in open situations and as forest undergrowth.

C. spectabilis Roth, Nov. Pl. Sp. 341. 1821; Ali. in Biologia 12 (2):26. 1966; Sanj. Legumes of India 130. 1991. *C. sericea* Retz. Obs. Bot. 5:26. 1789 non Burm. f. 1768; Baker in Hook. f. Fl. Brit. India 2:75. 1876; Cooke, Fl. Pres. Bombay 1:319. 1958 (Repr.). *C leschenaultii* DC. Prodr 2: 125. 1825; Baker in Hook. f. op. cit. 76. *'Jangli san'.*

Undershrubs, 1.0–1.5 m high. Leaves 4–15 x 1–7 cm, oblong–lanceolate, appressed hairy beneath, apex acute, subacute or mucronate. Flowers yellow, in terminal and axillary racemes. Pods linear–oblong. Seeds 20–30, dark brown or black, reniform.

Fls. & Frts. : October–February.

Illus. : Matthew, Illus. Fl. Palni Hills. t. 169. 1996.

Distrib. : In open situations, frequent. Akola, Aurangabad, Bombay, Chandrapur, Kolhapur, Nanded, Raigad, Satara, Thane, Yavatmal.

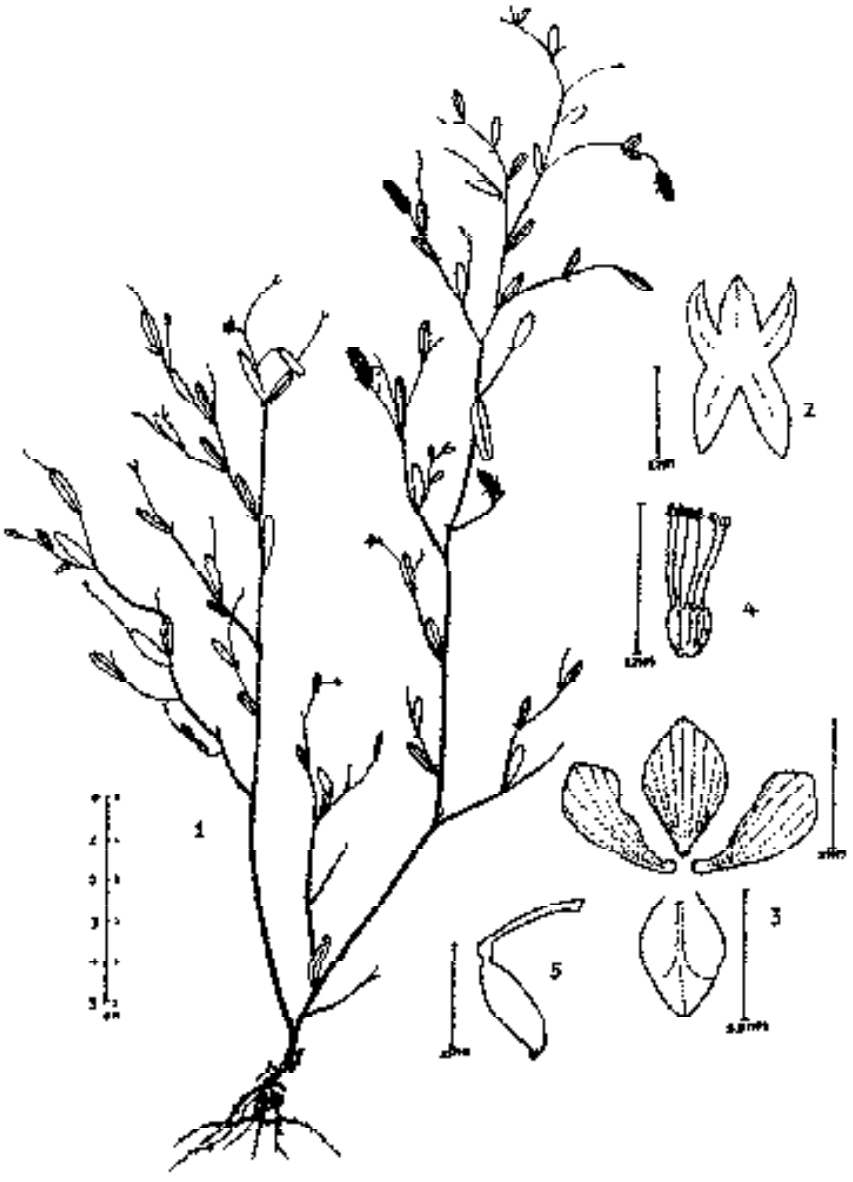
C. stocksii Bth. ex Baker in Hook. f. Fl. Brit. India 2:67. 1876; Cooke, Fl. Pres. Bombay 1:313. 1958 (Repr.); Sanj. Legumes of India 130. 1991.

Herbs; branches many. Leaves 2–3 x c 0.5 cm, linear–oblong, apex rounded. Flowers yellow, solitary, leaf opposed. Pods sessile, linear–oblong, black. Seeds reniform, compressed.

Fls. & Frts. : September–October.

Distrib. : Along the ghats, rare. Nasik, Raigad.

C. tecta Roth, Nov. Pl. Sp. 334. 1821; Baker in Hook. f. Fl. Brit. India 2: 76. 1876; K.K.N. Nair in J. Bombay Nat. Hist. Soc. 78: 190. 1981; Sanj. Legumes of India 130. 1991.



Crotalaria stocksii Bth. ex Baker
1- Habit; 2- Calyx; 3- Corolla; 4- Androecium; 5- Gynoecium

Herbs, 30–50 cm high, erect. Leaves 0.6–2.5 x 0.5 x 1.2 cm, ovate or oblong, appressed pubescent beneath, base cuneate. Flowers yellow in terminal racemes. Pods stalked, oblong. Seeds reniform.

Fls. & Frts. : August–October.

Illus. : Matthew, Illus. Fl. Palni Hills t. 170. 1996.

Distrib. : Rare. Thane.

C. triquetra Dalz. in Hook. Kew. J. Bot. 2:34. 1850; Baker in Hook. f. Fl. Brit. India 2:71. 1876; Cooke, Fl. Pres. Bombay 1:314. 1958 (Repr.); Sanj. Legumes of India 131. 1991. *'Ghati'*.

Herbs, 30–40 cm high, diffuse. Leaves 1.2–5.0 x1.0–2.2 cm, elliptic–oblong. Flowers pale–yellow, 2–3 in lax racemes. Pods oblong, 15–20–seeded.

Fls. & Frts. : September–April.

Distrib. : In open situations, near stream bed and as forest undergrowth, common. Ahmednagar, Kolhapur, Nagpur, Nasik, Pune, Raigad, Ratnagiri, Satara, Thane.

C. verrucosa L. Sp. Pl. 715. 1753; Baker in Hook. f. Fl. Birt. India 2:77. 1876; Cooke, Fl. Pres. Bombay 1:319. 1958 (Repr.); Sanj. Legumes of India 131. 1991.

Herbs, 25–100 cm high, erect. Leaves 3.0–10.5 x 2.0–7.5 cm, ovate to ovate–deltoid, hairy beneath, apex obtuse–acute, base tapering. Flowers 15–20 in racemes. Pods oblong–cylindric, 10–12–seeded.

Fls. & Frts. : February–August.

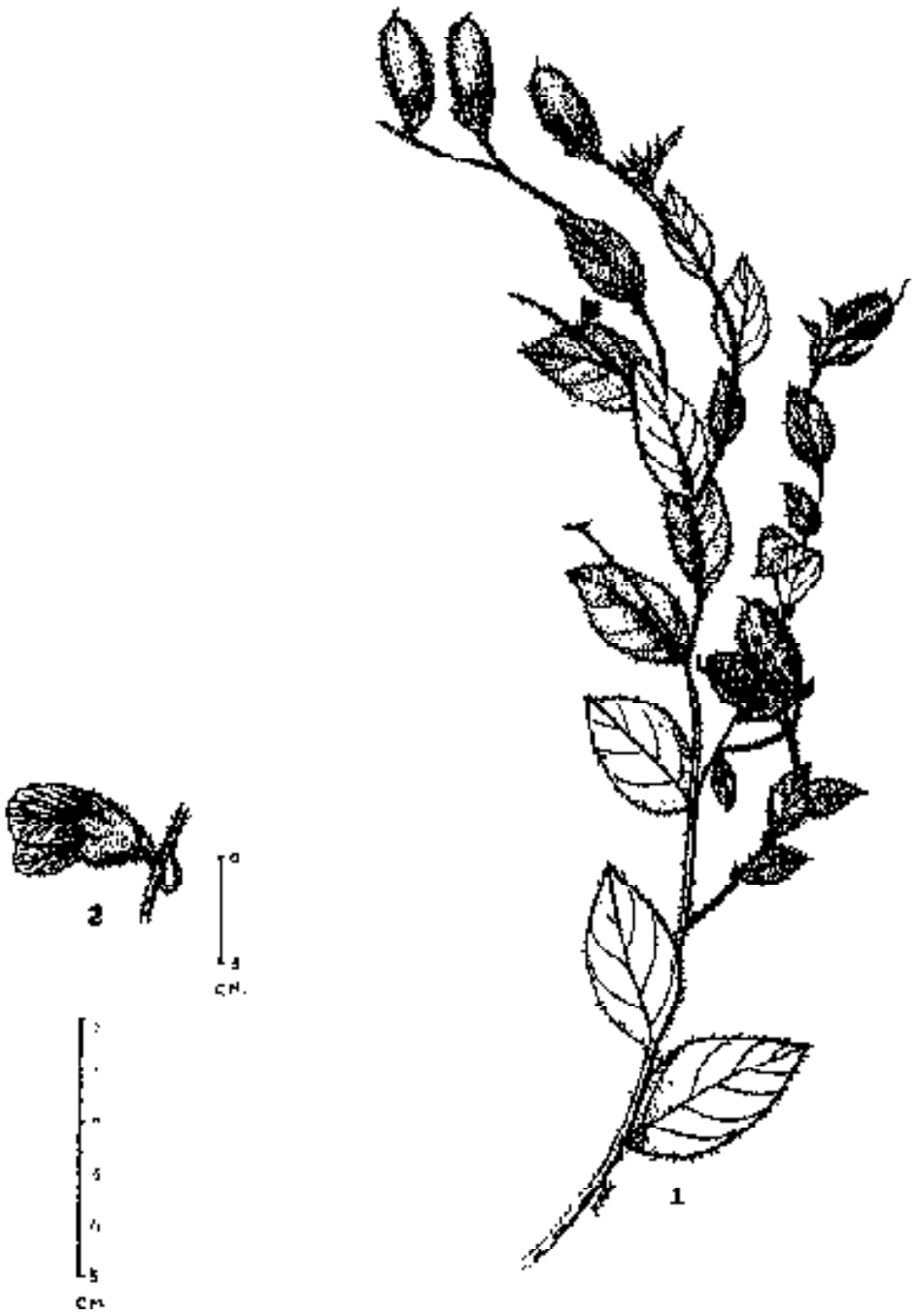
Illus.: Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 146. 1988.

Distrib.: On sandy soil near river or sea–coast and as forest undergowth, common.

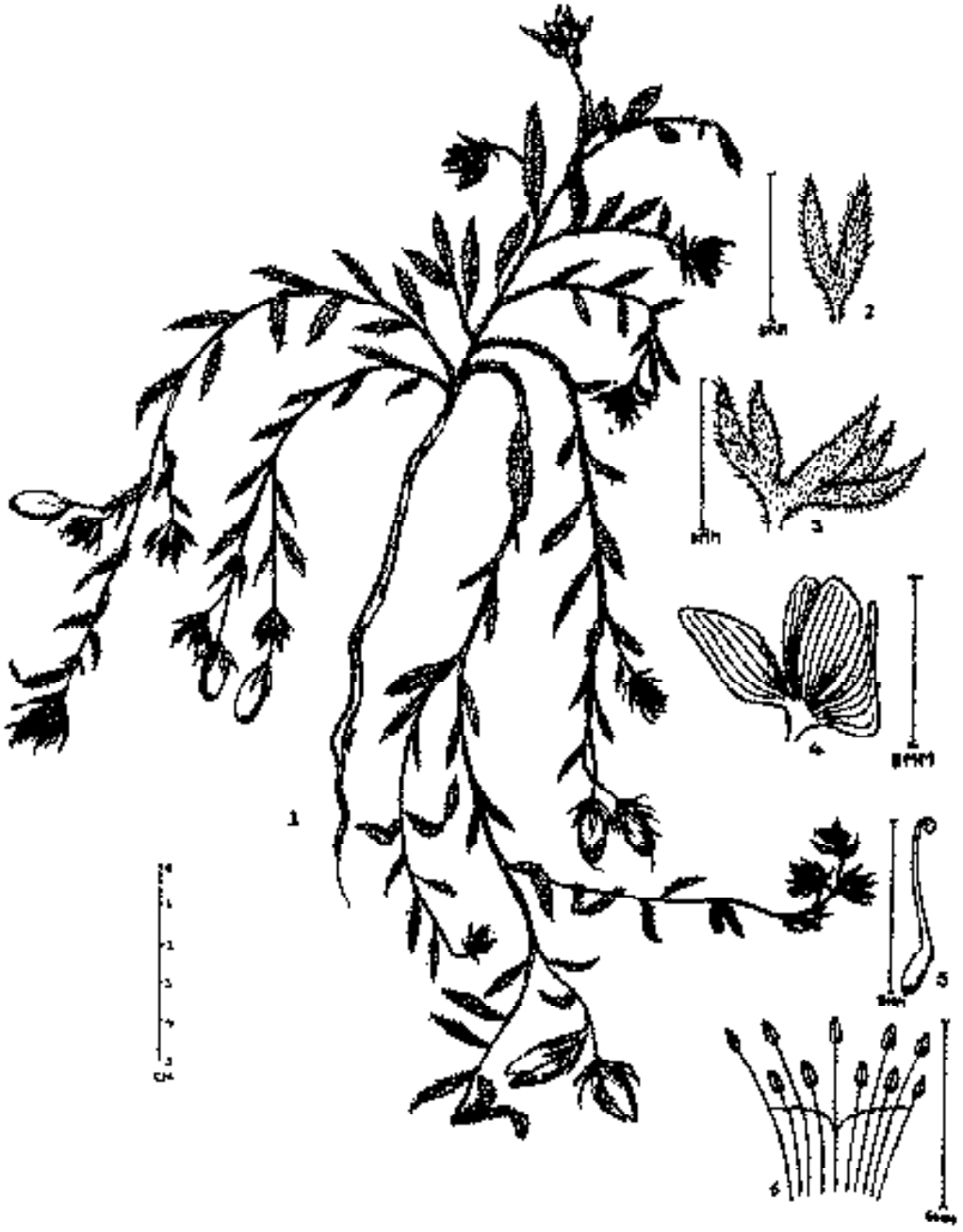
C. vestita Baker in Hook. f. Fl. Brit. India 2:67. 1876; Cooke, Fl. Pres. Bombay 1:313. 1958 (Repr.); Sanj. Legumes of India 131. 1991. *'Ghaturi'*.

Herbs, 15–25 cm high. Leaves subsessile, 1.5–4.0 x 0.5–1.2 cm, oblong or obovate–oblong, hairy, obtuse or subacute. Flowers yellow, 4–5, in racemes. Pods oblong, 10–16–seeded.

Fls. & Frts. : September–February.



Crotalaria triquetra Dalz.
1- Habit ; 2- Flowering twig



Crotalaria vestita Baker
1- Habit; 2- Bract; 3- Calyx; 4- Corolla; 5- Androecium;
6- Gynoecium

Distrib. : In open situations, hill slopes and as forest undergrowth, common.

CULLEN Medik.

Cullen corylifolia (L.) Medik., Vorles. Churpf. Phys.–Oek. Ges. 2: 380. 1787; Sanj. Legumes of India 132. 1991. *Psoralea corylifolia* L. Sp. Pl. 764. 1753; Baker in Hook. f. Fl. Brit. India 2: 103. 1876; Cooke, Fl. Pres Bombay 1: 341. 1958 (Repr.). *'Bavchi'*

Herbs, 60–120 cm high, erect; stem and branches covered with white hairs and red glands. Leaves 2.3–7.0 x 2.0–5.5 cm, broadly elliptic, nigro–punctate beneath, apex mucronate, base rounded, margins inciso–dentate. Flowers bluish–purple, 10–30 in dense, axillary racemes. Pods ovoid–oblong, closely pitted, black, apiculate, 1–seeded.

Fls. & Frts. : August–December.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 215. 1982.

Distrib. : In waste places, frequent.

CYAMOPSIS DC.

Cyamopsis tetragonolobus (L.) Taub. in Engl. & Prantl. Nat. Pflanzenf. 3(3): 259. 1894; Sanj. Legumes of India 133. 1991 & in Hajra et al. Fasc. Fl. India 21:2. 1995. *Psoralea tetragonoloba* L. Mant. Pl. 104. 1767. *Cyamopsis psoralioides* (Lam.) DC. Prodr. 2: 216. 1825; Baker in Hook. f. Fl. Brit. India 2:92. 1876; Cooke, Fl. Pres. Bombay 1:328. 1958 (Repr.). *'Gawar'*.

Herbs, erect. Leaves 3–foliolate. Flowers pink. Pods linear, flat, subquadrangular.

Fls. & Frts. : April–May.

Illus. : Wight, Ic. t. 248. 1840 (*Cyamopsis psoralioides*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 191. 1982.

Distrib. : Usually cultivated throughout for pods used as vegetable, at times escape.

DALBERGIA L. f. (nom. cons.)

1. Trees:

   2. Stamens monadelphous, usually 9; staminal tube split on upper side only:

3.	Leaflets acuminate	...	*D. sissoo*
3.	Leaflets subacute, obtuse or emarginate:		
4.	Leaflets 5–7	...	*D. latifolia*
4.	Leaflets 9–15	...	*D. melanoxylon*
2.	Stamens diadelphous, 5+5; staminal tube split on upper and lower side	...	*D. lanceolaria*
1.	Shrubs:		
5.	Erect shrubs with spine tipped branchlets	...	*D. spinosa*
5.	Climbing shrubs; branchlets not as above:		
6.	Stem and branches hooked	...	*D. volubilis*
6.	Stem and branches not as above:		
7.	Leaflets 25–41:		
8.	Leaflets densely ferruginous–pubescent below	...	*D. malabarica*
8.	Leaflets not as above	...	*D. pinnata*
7.	Leaflets less than 25:		
9.	Leaflets 5–7:		
10.	Pods straight	...	*D. rubiginosa*
10.	Pods crescent shaped	...	*D. candenatensis*
9.	Leaflets 9–15	...	*D. horrida*

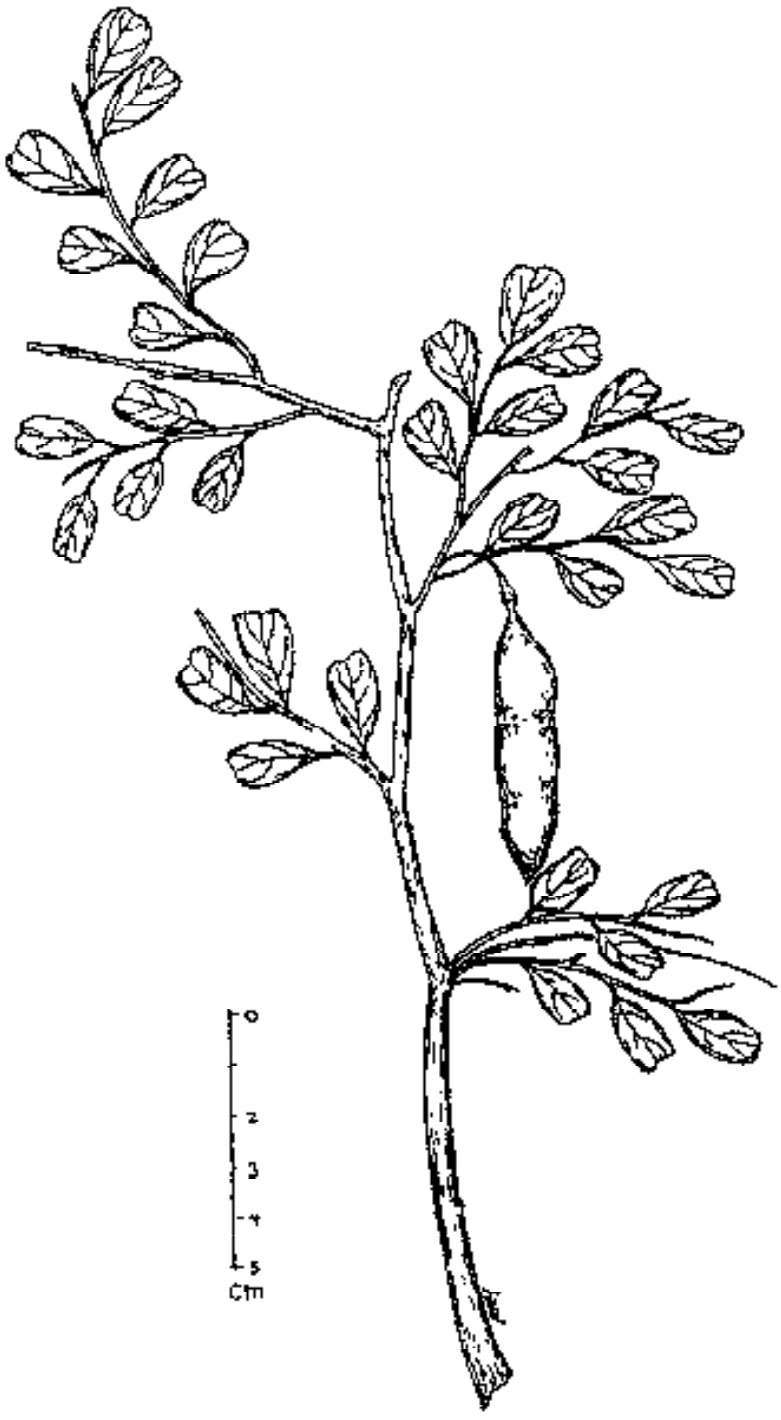
Dalbergia candenatensis (Dennst.) Prain in J. Asiat. Soc. Bengal 70:49. 1901; Thoth. & Nair in Taxon 30: 45. 1981; Sanj. Legumes of India 134. 1991. *Cassia candenatensis* Dennst. Schl. Hort. Ind. Malab. 12. 1818. *Dalbergia monosperma* Dalz. in Hook. Kew J. Bot. 2: 36. 1850; Baker in Hook. f. Fl. Brit. India 2:237. 1876. *D. torta* Grah. ex Gray, Bot. Wilkes Exped. 1:458. 1854; Cooke, Fl. Pres. Bombay 1:423. 1958 (Repr.). *'Garudvel'*.

Scandent shrubs; bark purplish–black. Leaflets 1.5–2.4 x 1.0–1.5 cm, elliptic–oblong, apex obtuse or emarginate, glabrous above, puberulous beneath. Flowers white, in axillary, solitary racemes or panicles. Pods brown, shortly stalked, 1–seeded.

Fls. & Frts. : June–August.

Distrib. : In moist deciduous forests, infrequent. Raigad, Ratnagiri.

D. horrida (Dennst.) Mabb. in Taxon 26:538. 1977; Sanj. Legumes of India 136. 1991. *Amerimnon horridum* Dennst. Schl. Hort. Ind. Malab. 34. 3. 1818. *Dalbergia sympathetica* Nimmo in Grah. Cat.



Dalbergia horrida (Dennst.) Mabb. var. **horrida**

Pl. Bombay 55. 1839; Baker in Hook. f. Fl. Brit. India 2:234. 1876; Cooke, Fl. Pres. Bombay 1: 424. 1958 (Repr.).

1. Pods narrow and oblong ... var. *horrida*

1. Pods ovate and wider ... var. *concanensis*

var. **horrida.** *'Pendgul', 'Yekvel'.*

Shrubs; branches twisted, spiny. Leaflets 1.0–3.2 x 0.4–2.0 cm, oblong or obovate, pubescent, apex emarginate or obtuse. Flowers white, in axillary panicles. Pods flat, pubescent. Seeds 1–3.

Fls. & Frts. : November–June.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1:427, f. 240. 1909 (*Dalbergia sympathetica*).

Distrib. : In moist deciduous forests, frequent. Kolhapur, Pune, Raigad, Ratnagiri, Satara.

var. **concanensis** Thoth. Tax. Rev. Dalb. Ind. Subcont. 110. 1987; Sanj. Legumes of India 136. 1991.

Scandent shrubs. Leaves imparipinnae, 5–11 cm long; leaflets 11–13, elliptic–oblong, entire, apex obtuse–retuse, base rounded, 1.4–2.0 x 0.8–1.2 cm. Pods ovate, compressed, acute, puberulous, shortly stalked. Seeds one, black, reniform, compressed.

Frts. : January–February.

Illus. : Thoth. op. cit. 111, f. 10.

Distrib. : This variety is so far known from 'Konkan' in Maharashtra and Mysore in Karnataka. Endemic.

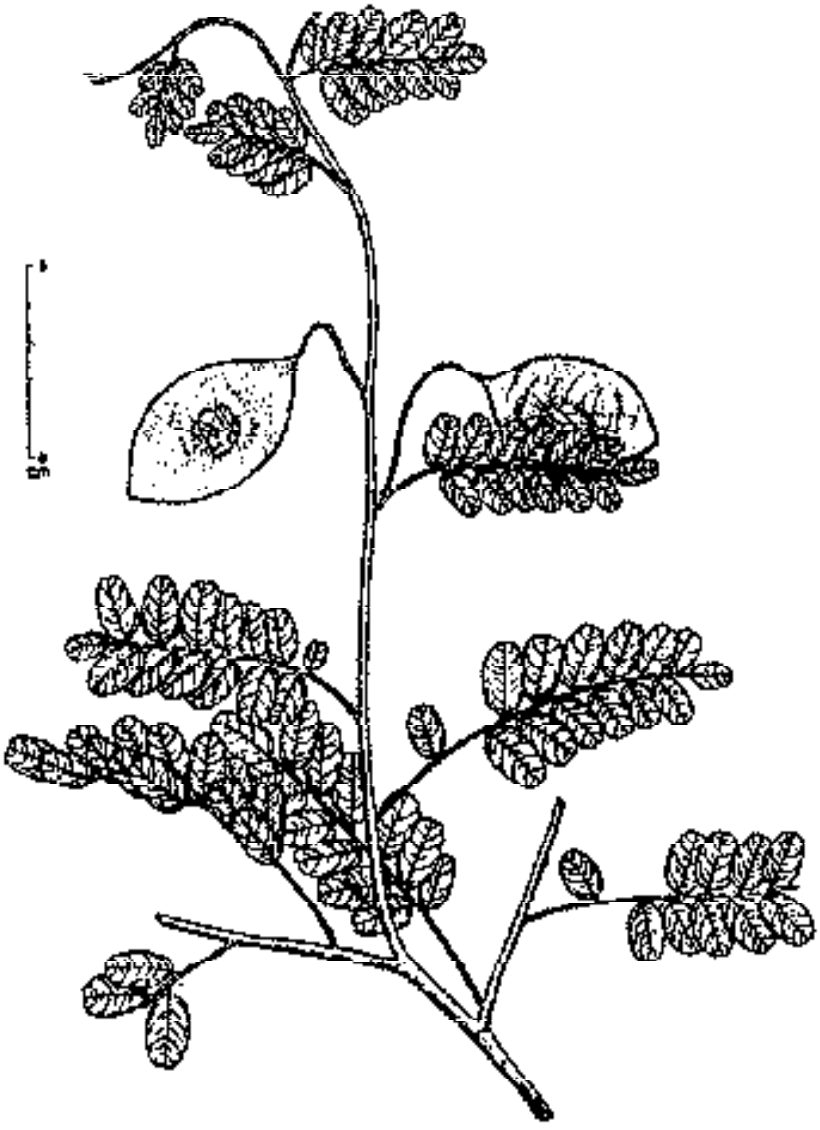
D. lanceolaria L. f. Suppl. 316. 1781; Baker in Hook. f. Fl. Brit. India 2: 235. 1876; Cooke, Fl. Pres. Bombay 1:425. 1958 (Repr.); Sanj. Legumes of India 136. 1991.

1. Leaflets wih parallel nerves; standard with callus at base of limb ... ssp. *lanceolaria*

1. Leaflets with reticulate venation; standard without callus at base of limb ... ssp. *paniculata*

ssp. **lanceolaria.** *'Dandus'.*

Trees, 3–10 m high; bark greyish–white. Leaflets 11–17, 1.2–7.5 x 0.5–4.2 cm, elliptic–oblong or ovate–obovate, puberulous beneath.



Dalbergia horrida var. **concanensis** Thoth.

Flowers white or pinkish, in axillary or terminal, leafless panicles. Pods strap shaped, stipitate, 1–3–seeded.

Fls. & Frts. : March–June.

Illus. : Wight, Ic. t. 266. 1840 (*D. frondosa* Roxb. ex DC.); Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 148. 1988.

Distrib. : In deciduous forests, common. Akola, Aurangabad, Beed, Bombay, Chandrapur, Kolhapur, Nanded, Nasik, Pune, Raigad, Satara, Thane.

ssp. **paniculata** (Roxb.) Thoth. in Bull. Bot. Surv. India 25:171. 1985; Sanj. Legumes of India 137. 1991. *D. paniculata* Roxb. Pl. Cor. 2:8, t. 114. 1799; Baker in Hook. f. Fl. Brit. India 2:236. 1876; Cooke, Fl. Pres. Bombay 1:426. 1958 (Repr.). *'Phansi'*.

Trees, 10–15 m high; bark grey. Leaflets 9–15, 1.2–4.0 x 0.8–2.8 cm, oblong–obovate or elliptic, obtuse or emarginate at apex. Flowers creamy–white or bluish–white, in terminal panicles. Pods oblong–lanceolate.

Fls. & Frts. : February–May.

Illus. : Prain in Ann. Roy. Bot. Gard. Calcutta 10:87, t. 68. 1905; Talb. For. Fl. Bombay Pres. & Sind. 1:429, f. 102. 1909; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 150. 1988.

Distrib. : In deciduous forests, frequent.

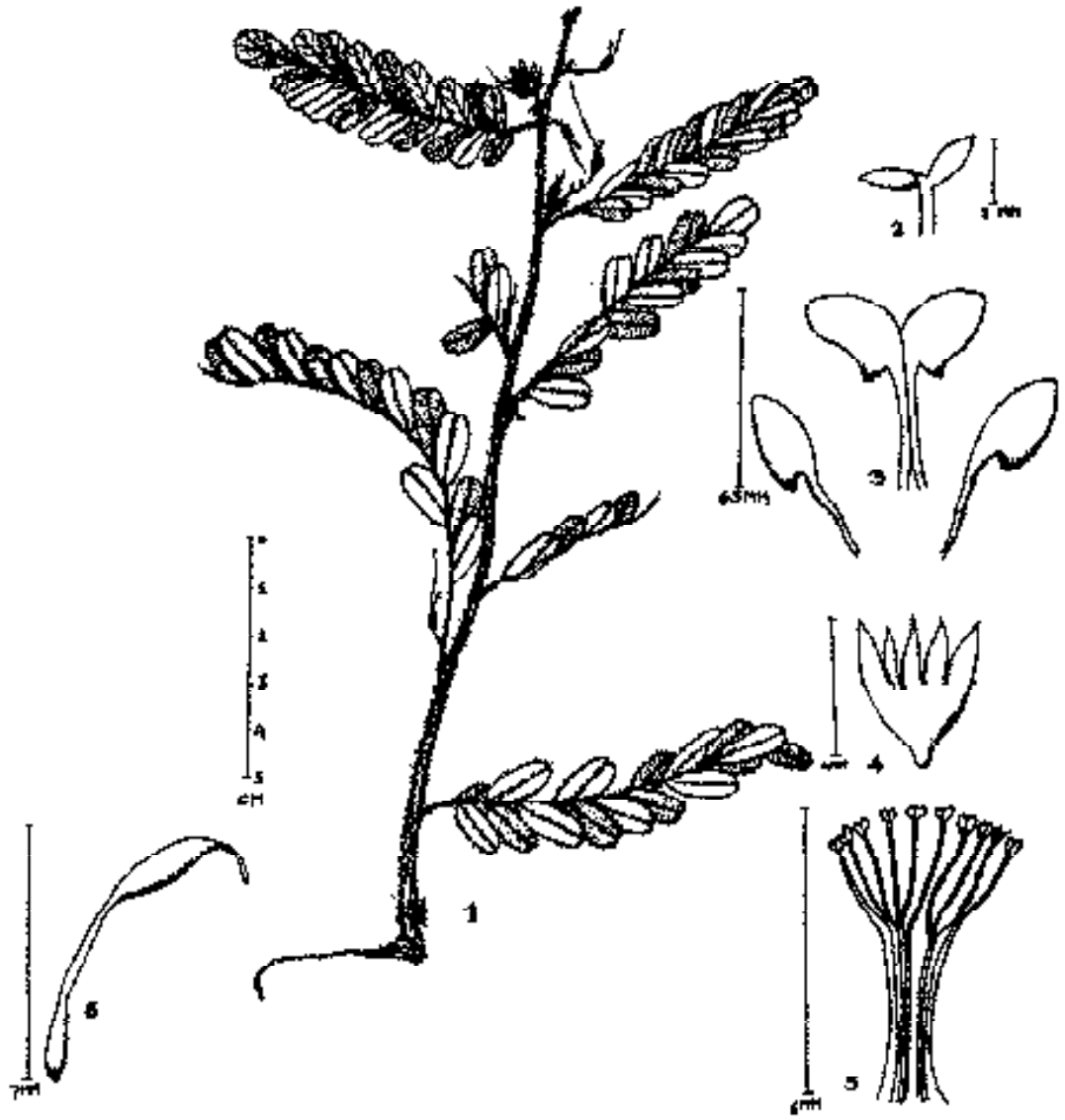
D. latifolia Roxb. Pl. Cor. 2:7, t. 113. 1799; Baker in Hook. f. Fl. Brit. India 2: 235. 1876; Cooke, Fl. Pres. Bombay 1:422. 1958 (Repr.); Sanj. Legumes of India 137. 1991. *'Bija'*, *'Shisham'*, *'Shisav'*, *'Sissu'*.

Trees, 10–15 m high; bark grey–ash coloured. Leaflets 2.5–8.0 x 2.0–7.2 cm, elliptic–obovate or ovate–suborbicular, apex emarginate or rounded. Flowers creamy–white in axillay, lax panicles. Pods oblong–lanceolate, reticulately veined, 1–4–seeded.

Fls. & Frts. : August–December.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 424, f. 239. 1909; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 149. 1988.

Distrib. : In moist deciduous forests, common.



Dalbergia malabarica Prain
1- Habit; 2- Bract; 3- Corolla; 4- Calyx; 5- Androecium;
6- Gynoecium

D. malabarica Prain in J. Asiat. Soc. Bengal, 70: 48. 1901 & in Ann. Roy. Bot. Gard. Calcutta 10: 67, t. 46. 1905; Sanj. Legumes of India 137. 1991. *D. tamarindifolia* var. *pubescens* Baker in Hook. f. Fl. Brit. India 2:235. 1876; Cooke, Fl. Pres. Bombay 1:425. 1958 (Repr.).

Scandent shrubs; branches and underside of leaves clothed with persistent, thick, ferruginous pubescence. Flowers creamy–white in corymbose, axillary panicles. Pods flat, strap–shaped.

Fls. & Frts. : February–March.

Distrib. : 'Konkan' (Cooke, op. cit.).

D. melanoxylon Guill. & Perr. Fl. Seneg. Tent. 1: 227, t. 53. 1832; Baker in Hook. f. Fl. Brit. India 2: 234. 1876; Cooke, Fl. Pres. Bombay 1: 422. 1958 (Repr.); Sanj. Legumes of India 138. 1991. *D. stocksii* Bth. in J. Linn. Soc. 4: Suppl. 42. 1860; Baker in Hook. f. op. cit.

Trees, 4–6 m high; bark white. Leaflets 1.0–2.5 x 0.6–1.5 cm, obovate, apex obtuse–emarginate, base cuneate. Flowers yellow, numerous, in axillary panicles. Pods ellipsoid–lanceolate, acute, reticulately veined. Seeds 1–2.

Fls. & Frts. : April–June.

Distrib. : Pune.

D. pinnata (Lour.) Prain in Ann. Roy. Bot. Gard. Calcutta 10:48. 1904; Sanj. Legumes of India 138. 1991. *Derris pinnata* Lour. Fl. Cochinch. 432. 1790. *Dalbergia tamarindifolia* Roxb. Fl. Ind. 3:233. 1832; Baker in Hook. f. Fl. Brit. India 2:234. 1876 (excl. vars.); Cooke, Fl. Pres. Bombay 1:424. 1958 (Repr.).

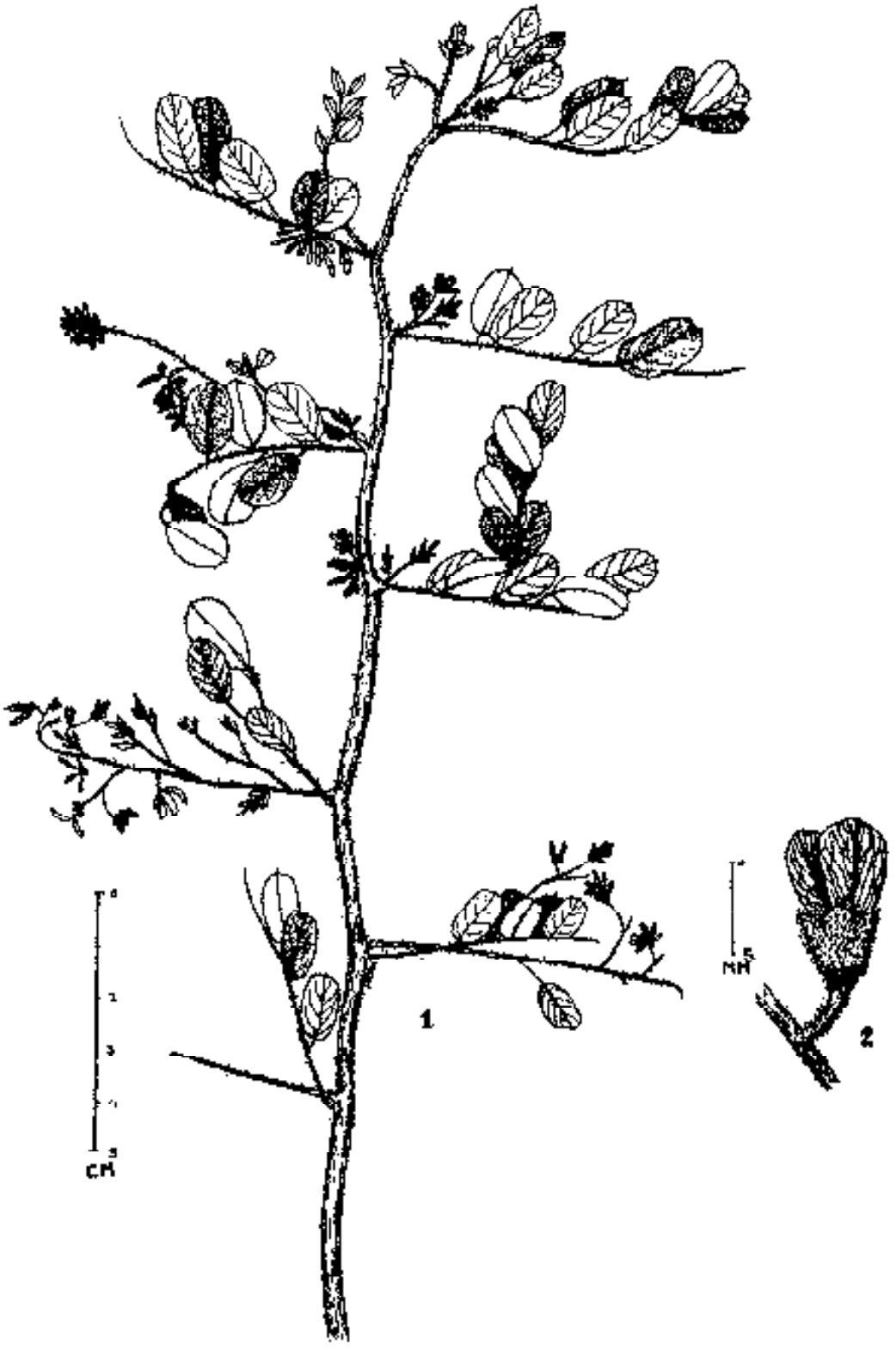
1. Leaflets thicker, oblique, glaucous beneath ... var. *acaciaefolia*
1. Leaflets thinner, not oblique, brown–pubescent beneath ... var. *pinnata*

var. **pinnata.**

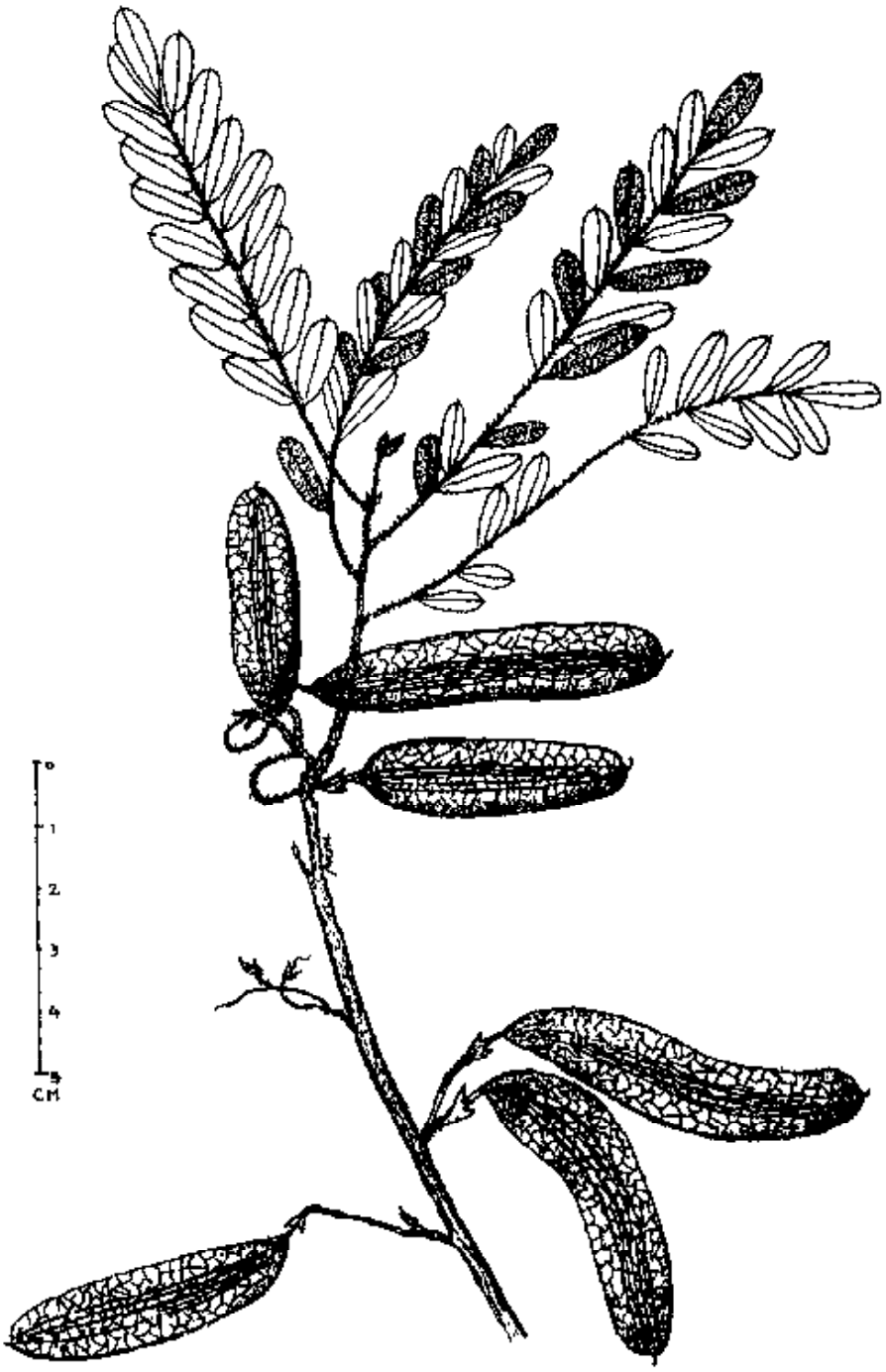
Scandent, shrubs. Leaflets 1–2 x 0.5–1.0 cm, trapezoid–oblong, pubescent. Flowers white, in corymbose, axillary panicles. Pods greenish with reddish brown tinge, strap–shaped.

Fls. & Frts. : March–May.

Distrib. : 'Konkan' (Cooke, op. cit.).



Dalbergia melanoxylon Guill. & Perr.
1- Habit; 2- Flowering twig



Dalbergia pinnata (Lour.) Prain

var. **acaciaefolia** (Dalz.) Thoth. in Bull. Bot. Surv. India 25:170. 1985; Sanj. Legumes of India 139. 1991. *D. acaciaefolia* Dalz. in Hook. Kew J. Bot. 2:37. 1850. *D. tamarindifolia* var. *acaciaefolia* (Dalz.) Baker in Hook. f. Fl. Brit. India 2:235. 1876; Cooke, Fl. Pres. Bombay 1:425. 1958 (Repr.).

Scandent shrubs. Leaflets rigidly coriaceous, dark–green and shining above, more or less hairy beneath. Flowers white, in axillary panicles.

Fls. & Frts. : April.

Distrib. : 'Konkan' (Cooke, op. cit.).

D. rubiginosa Roxb. Pl. Cor. 2:9, t. 115. 1779; Baker in Hook. f. Fl. Brit. India 2:232. 1876; Cooke, Fl. Pres. Bombay 1:423. 1958 (Repr.); Sanj. Legumes of India 140. 1991.

Scandent shrubs. Leaves imparipinnate; leaflets 2.5–6.2 x 1.2 cm, elliptic–oblong, obtuse or emarginate at apex, rounded or subacute at base. Flowers in short, crowded, axillary panicles. Pods veined. Seeds 1–2.

Fls. & Frts. : July–August.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 192. 1982 & Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 151. 1988.

Distrib. : Rare. 'Konkan' (Cooke, op. cit.).

D. sissoo Roxb. Fl. Ind. 3: 223. 1832; Baker in Hook. f. Fl. Brit. India 2:231. 1876; Cooke, Fl. Pres. Bombay 1:421. 1958 (Repr.); Sanj. Legumes of India 140. 1991. *'Shisham', 'Sisvi'*.

Trees, 8–12 m high; bark greyish–brown, rough, fissured. Leaflets 2.5–8.0 x 1.5–3.0 cm, terminal ones largest, broadly ovate or suborbicular. Flowers white, in axillary panicles. Pods strap–shaped, stalked. Seeds 1–4.

Fls. & Frts. : February–October.

Illus. : Talb. For. Fl. Bombay Pres. & Sind. 1:423, f. 238. 1909; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 152. 1988.

Distrib. : In deciduous forests, common throughout the state, also planted.

D. spinosa Roxb. Fl. Ind. 3;233. 1832; Baker in Hook. f. Fl. Brit. India 2:238. 1876; Cooke, Fl. Pres. Bombay 1: 426. 1958 (Repr.); Sanj. Legumes of India 141. 1991.

Shrubs, stiff. Leaves crowded in fascicles from nodes of branchlets; leaflets 7–11, 0.6–1.2 x 0.2–0.6 cm, oblong, obtuse. Flowers in congested, corymbose, axillary panicles.

Fls. & Frts. : March–October.

Distrib. : 'Konkan' (Cooke, op. cit.).

D. volubilis Roxb. Pl. Cor. 2:48, t. 191. 1798; Baker in Hook. f. Fl. Brit. India 2:235. 1876; Cooke, Fl. Pres. Bombay 1:426. 1958 (Repr.); Sanj. Legumes of India 142. 1991. *'Alai', 'Alsi', 'Yeloshi'.*

Climbers, extensive, woody, spirally twisted. Leaflets 1.0–3.5 x 0.8–1.0 cm, oblong–obovate, apiculate. Flowers blue or pinkish, in dense, terminal and axillary corymbose cymes. Pods linear–oblong, veined, stipitate.

Fls. & Frts. : January–June.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1:430, f. 241. 1909.

Distrib. :In moist deciduous and semievergreen forests, common. Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Thane.

DERRIS Lour. (nom. cons.)

1. Pods winged on only the dorsal suture:
   2. Pods thin, strap shaped ... *D. scandens*
   2. Pods oblong to suborbicular ... *D. trifoliata*
1. Pods winged on both the dorsal and ventral sutures:
   3. Base of vexillum usually with 2 callosities; pods narrowly or obscurely winged on ventral suture ... *D. canarensis*
   3. Base of vexillum without callosities; pods distinctly winged on both sutures:
      4. Pods brown, silky–pubescent ... *D. brevipes*
      4. Pods glabrous:
         5. Panicles dense; pedicels 3–4 mm long; keels silky in the back ... *D. thothathrii*
         5. Panicles lax; pedicels 8–9 mm long; keels glabrous ... *D. heyneana*



Derris brevipes (Bth.) Baker

Derris brevipes (Bth.) Baker in Hook. f. Fl. Brit. India 2:244. 1878; Cooke, Fl. Pres. Bombay 1: 432. 1958 (Repr.); Thoth. in Bull. Bot. Surv. India 3:184, t. 4.(1961) 1962 & in Fasc. Fl. India 8:11. 1982; Sanj. Legumes of India 144. 1991. *D. heyneana* Bth. var *brevipes* Bth. in J. Linn. Soc. 4(Suppl.): 110. 1860.

Climbing shrubs, large. Leaves 15–20 cm long; leaflets 5–7, 5–10 x 2.3–4.5 cm, elliptic–oblong or oblong–lanceolate, apex subacute. Flowers in axillary and terminal panicles. Pods oblong. Seeds solitary.

Fls. & Frts. : May–September.

Illus. : Thoth. op. cit.

Distrib. : Along the higher ghats. 'Konkan' (Cooke, op. cit.).

D. canarensis (Dalz.) Baker in Hook. f. Fl. Brit. India 2:246. 1878; Cooke, Fl. Pres. Bombay 1:433. 1958 (Repr.); Thoth. in Bull. Bot. Surv. India 3:190. (1961) 1962 & in Fasc. Fl. India 8:12. 1982; Sanj. Legumes of India 144. 1991. *Pongamia canarensis* Dalz. in Hook. Kew J. Bot. 2:37. 1850.

Scandent shrubs. Leaves 10–30 cm long; leaflets 4.5–6.0 x 1.5 cm, oblong, glabrous above, hairy beneath, apex obtuse, base rounded. Flowers pinkish–white, in terminal, rusty–tomentose racemes. Pods oblong, flat, mucronate, reticulately veined. Seeds 1–2, bluish–black.

Fls. & Frts. : February–September.

Illus. : Talb. For. Fl. Bombay. Pres. & Sind 1: 437, f. 246. 1909.

Distrib. : Rare in semi–evergreen forests. Ratnagiri, Satara.

D. heyneana (Wight & Arn.) Bth. in Miq. Pl. Jungh. 1:252. 1852 in J. Linn. Soc. 4(Suppl.): 110. 1860; Thoth. in Fasc. Fl. India 8: 19, ff. 19–24. 1982; Sanj. Legumes of India 146. 1991. *Pongamia heyneana* Wight & Arn. Prodr. 1:263. 1834. *Derris heyneana* var. *paniculata* Baker in Hook. f. Fl. Brit. India 2: 244. 1878. *D. bakeri* Thoth. in Bull. Bot. Surv. India 3(2): 186. (1961) 1962.

Climbers. Leaves 13.2–21.0 cm long; leaflets 5–9, 7.5–12.5 x 3–6 cm, ovate–elliptic or obovate, apex obtuse, base rounded. Flowers 4–5, on short pedunclate, much branched, axillary panicles. Pods ovate, flat, reticulately veined. Seeds solitary.

Fls. & Frts. : February–June.

Illus. : Thoth. op. cit.

Distrib. : In semievergreen forests, rare. Ratnagiri.



Derris heyneana (Wight & Arn.) Bth.
A- Flowering branch; B- Calyx cup; C- & D- Flower closed and open; E-Staminal sheath; F- Pistils, one with ovary longitudinally split showing ovules

D. scandens (Roxb.) Bth. in J. Linn. Soc. 4(Suppl.):103. 1860; Baker in Hook. f. Fl. Brit. India 2:240. 1878; Cooke, Fl. Pres. Bombay 1:430. 1958 (Repr.); Thoth. in Bull. Bot. Surv. India 3:177. (1961) 1962 & in Fasc. Fl. India 8:27, t. 1. 1982; Sanj. Legumes of India 148. 1991. *Dalbergia scandens* Roxb. Pl. Cor. 2: 29, t. 192. 1805.

Climbers, extensive, woody. Leaves 5.0–8.5 cm long; leaflets 3.5–8.0 x 1.2–4.0 cm, elliptic–oblong or obovate–oblong, puberulous beneath, apex retuse, base rounded–cuneate. Flowers white to pink, in axillary and terminal racemes. Pods narrowly oblong, reticulately veined, winged, silky hairy. Seeds 1–5, reddish–brown.

Fls. & Frts. : May–September.

Illus. : Thoth. op. cit. 1982; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t.193. 1982.

Distrib. : On river banks and in moist deciduous & semievergreen forests, occasional. Chandrapur, Kolhapur, Nanded, Pune, Ratnagiri, Satara, Thane.

D. thothathrii Bennet in Indian J. Forestry 1:23. 1978; Thoth. in Fasc. Fl. India 8:29. 1982; Sanj. Legumes of India 148. 1991. *D. heyneana* Baker in Hook. f. Fl. Brit. India 2:244. 1878 non Bth. 1852; Cooke, Fl. Pres. Bombay 1:432. 1958 (Repr.); Thoth. in Bull. Bot. Surv. India 3:186. (1961) 1962.

Climbers. Leaves 15.5–26.2 cm long; leaflets 5–7, 8.0–15.5 x 3.5–6.9 cm, ovate–oblong, apex acuminate, base narrowed. Flowers rosy–pink, in axillary, copiously branched panicles. Pods falcately oblong, reticulately veined, 1–seeded.

Fls. & Frts. : December–March.

Distrib. : 'Konkan' (Cooke, op. cit.).

D. trifoliata Lour. Fl. Cochinch. 2:433.1790; Thoth. in Bull. Bot. Surv. India 3:181. (1961) 1962 & in Fasc. Fl. India 8:30. 1982; Sanj. Legumes of India 148. 1991. *D. uliginosa* (Willd.) Bth. in Miq. Pl. Jungh. 1:252. 1852; Baker in Hook. f. Fl. Brit. India 2: 241. 1878; Cooke, Fl. Pres. Bombay 1:431. 1958 (Repr.). *'Kajar–vel'*.

Scandent shrubs. Leaves 10–25 cm long; leaflets 3–5, 4.5–13.0 x 2.5–6.4 cm, ovate–oblong, apex shortly acuminate, base rounded. Flowers rosy–pink, in axillary racemes. Pods oblong, reticulately veined. Seeds ovate–orbicular.

Fls. & Frts. : April–October.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2:194. 1982.

Distrib. : Along the sea-coast, common. Bombay, Ratnagiri, Thane.

DESMODIUM Desv. (nom. cons.)

1. Leaves one or 3-foliolate :
   2. Leaves unifoliolate;
      3. Herbs :
         4. Flowers included or slightly exserted ... *D. ritchiei*
         4. Flowers distinctly exserted :
            5. Leaflets reniform; pedicels not reflexed ... *D. renifolium*
            5. Leaflets oblong; pedicels reflexed ... *D. benthami*
      3. Shrubs or undershrubs :
         6. Petioles winged ... *D. triquetrum*
         6. Petioles not winged :
            7. Branches angled; leaflets fulvous hairy; joints of pods as long as broad ... *D. velutinum*
            7. Branches terete; leaflets not fulvous hairy; joints of pods longer than broad ... *D. gangeticum*
   2. Leaves trifoliolate :
      8. Flowers in axillary umbels :
         9. Branches triquetrous ... *D. triangulare*
         9. Branches terete ... *D. umbellatum*
      8. Flowers usually in elongated racemes or 1–3 in axillary fascicles :
         10. Herbs :
            11. Stipules foliaceous, auriculate ... *D. dichotomum*
            11. Stipules not as above :
               12. Stipules ovate–lanceolate, acuminate ; leaflets obovate or oblong :
                  13. Leaflet apex truncate or emarginate; petioles upto 1 cm long ... *D. triflorum*
                  13. Leaflet apex acute; petioles 2–3 cm long ... *D. heterophyllum*
               12. Stipules subulate; leaflets ovate or lanceolate ... *D. procumbens*
         10. Shrubs or undershrubs :
            14. Pods deeply constricted between seeds; joints dehiscent ... *D. heterocarpon*
            14. Pods scarcely constricted between seeds; joints indehiscent :

15. Bracts large, leafy, concealing flowers ... *D. pulchellum*

15. Bracts not as above :

16. Leaflets usually acute; pads linear, not indented towards inner side:

17. Undershrubs; flowers white or bluish–violet ... *D. laxiflorum*

17. Straggling herbs; flowers lemon–yellow ... *D. scorpiurus*

16. Leaflets usually obtuse; pods oblong, indented towards inner side ... *D. motorium*

1. Leaves one and 3–foliolate, intermixed ... *D. alysicarpoides*

Desmodium alysicarpoides van Meeuwen in Reinwardtia 6 : 246.1962; Sanj. Legumes of India 149.1991. *Alysicarpus parviflorus* Dalz. in Hook. Kew J. Bot. 3:211. 1851. *Desmodium parviflorum* (Dalz.) Baker in Hook. f. Fl. Brit. India 2:172. 1876 non Mart. & Galeotti, 1843; Cooke, Fl. Pres. Bombay 1:381. 1958 (Repr.). *Desmodiastrum racemosum* (Bth.) Pramanik & Thoth. var. *parviflorum* (Dalz.) Pramanik & Thoth. in J. Ind. Bot. Soc. 65:377. 1986.

Herbs, 30–60 cm long. Leaflets appressed pubescent beneath. Flowers in lax, terminal racemes. Pods falcate, both sutures indented; joints 4–6.

Fls. & Frts. : October–December.

Illus. : Matthew, Fur. Fl. Tamilnadu Carnatic 4: t. 153. 1988.

Distrib. : In hilly region of deciduous forests, occasional. Ahmednagar, Aurangabad, Kolhapur, Pune, Ratnagiri, Satara, Thane.

D. benthami Balakr. in J. Bombay Nat. Hist. Soc. 63:328. 1966; Sanj Legumes of India 150. 1991. *D. brachystachyum* Grah. ex Bth. in Miq. Pl. Jungh. 223. 1852 non Schlecht 1838 nec Walp. 1842 nec Mich. 1903; Baker in Hook. f. Brit. India 2: 171. 1876; Malhotra & Moorthy in J. Bombay Nat. Hist. Soc. 75:247. 1978.

Herbs, trailing. Leaves 1–foliolate; leaflets broadly oblong, apex emarginate, base cordate. Flowers light–blue, in c 2.5 cm long racemes. Pods included, 2–jointed.

Fls. & Frts. : September–November.

Distrib. : Rare in moist places. Chandrapur.

D. dichotomum (Willd.) DC. Prodr. 2:336. 1825; van Meeuwen in Reinwardtia 6:248. 1962; Sanj. Legumes of India 152.1991. *Hedysarum dichotomum* Willd. Sp. Pl. 3:1180. 1802. *Desmodium diffusum* (Willd.) DC. Prodr. 2:336. 1825; Baker in Hook. f. Fl. Brit. India 2:169.1876; Cooke, Fl. Pres. Bombay 1 : 377. 1958 (Repr.). *'Chikta'*.

Herbs, 30–120 cm high, straggling, viscidly pubescent. Leaflets 1.8–17.5 x 0.7–4.6 cm, ovate–obovate, elliptic or obovate, hairy on both sufaces. Flowers pink. Pods 1.0–1.5 x 0.3 cm, faintly reticulate, hairy.

Fls. & Frts. : September–December.

Illus. : Wight, Ic. t. 208. 1839 (*Desmodium diffusum*).

Disturb. : Common throughout in open situations as well as in forest undergrowth.

D. gangeticum (L.) DC. Prodr. 2: 327. 1825; Baker in Hook. f. Fl. Brit. India 2: 168. 1876 (incl. var. *maculatum* (L.) Baker); Cooke, Fl. Pres. Bombay 1: 379. 1958 (Repr.); van Meeuwen in Reinwardtia 6 : 249. 1962; Sanj. Legumes of India 153. 1991. *Hedysarum gangeticum* L. Sp. Pl. 746. 1753. *'Salparni', 'Salvan'*.

Undershrubs, 60–120 cm high. Leaves 2.0–14.5 x 1.1–7.6 cm, ovate–oblong, glabrous above, appressed–pubecent beneath, apex acute. Flowers bluish–violet, in terminal and axillary racemes. Pods reddish–brown, subfalcate, hairy, 4–6–jointed.

Fls. &Frts. : March–November.

Illus. : Mahesh. Illus. Fl. Delhi f. 68. 1966; Mathew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 155. 1988.

Distrib : Common throughout in deciduous forests and also in open situations.

D. heterocarpon (L.) DC. Prodr. 2 :337. 1825; van Meeuwen in Reinwardtia 6:251. 1962; Sanj. Legumes of India 154. 1991. *Hedysarum heterocarpon* L. Sp. Pl. 747. 1753. *Desmodium polycarpon* (Poir.) DC. Prodr. 2:334. 1825; Baker in Hook. f. Brit. India 2: 171. 1876; Cooke, Fl. Pres. Bombay 1:377. 1958 (Repr.).

Erect or suberect undershrubs, 60–150 cm high. Leaflets 3.2–6.5 x 1–3 cm, obovate–oblong, hairy beneath, apex rounded, base cuneate. Flowers bluish–purple. Pods linear–oblong, flat, pubescent, 5–8–joined.

Fls. & Frts. : August–December.

Illus. : Wight, Ic. t. 406 1840 (*Desmodiun polycarpum*); Matthew, Illus. Palni Hills t. 178. 1996.

Distirb. : Common in deciduous forests. Chandrapur, Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Solapur, Thane.

D. heterophyllum (Willd.) DC. Prodr. 2:334. 1825; Baker in Hook. f. Fl. Brit. India. 2 : 173. 1876; van Meeuwen in Reinwardtia 6:251. 1962; Sanj. Legumes of India 155. 1991. *Hedysarum heterophyllum* Willd. Sp. Pl. 3, 2:1201. 1803.

Herbs, prostrate, rooting at nodes. Leaves 3–foliolate; leaflets 1.0–2.3 x 0.5–0.8 cm. elliptic–lanceolate or oblong–obovate, hairy beneath, mid nerve whitish, shortly petiolate, apex acute, base rounded. Flowers pink, solitary or in axillary racemes. Pods oblong, 2–6–jointed, indented on one suture, sparsely pubescent.

Fls. & Frts. : September–December.

Distrib. : Rare in shady places as undergrowth. Sindhudurg.

D. laxiflorum DC. in Ann. Sci. Nat Paris 1, 4:100. 1825; Baker in Hook. f. Fl. Brit India 2:164. 1878; Cooke, Fl. Pres. Bombay 1:376. 1958 (Repr.); van Meeuwen in Reinwardtia 6:252. 1962; Sanj. Legumes of India 156. 1991. *'Asud, 'Jangli–ganja.'*

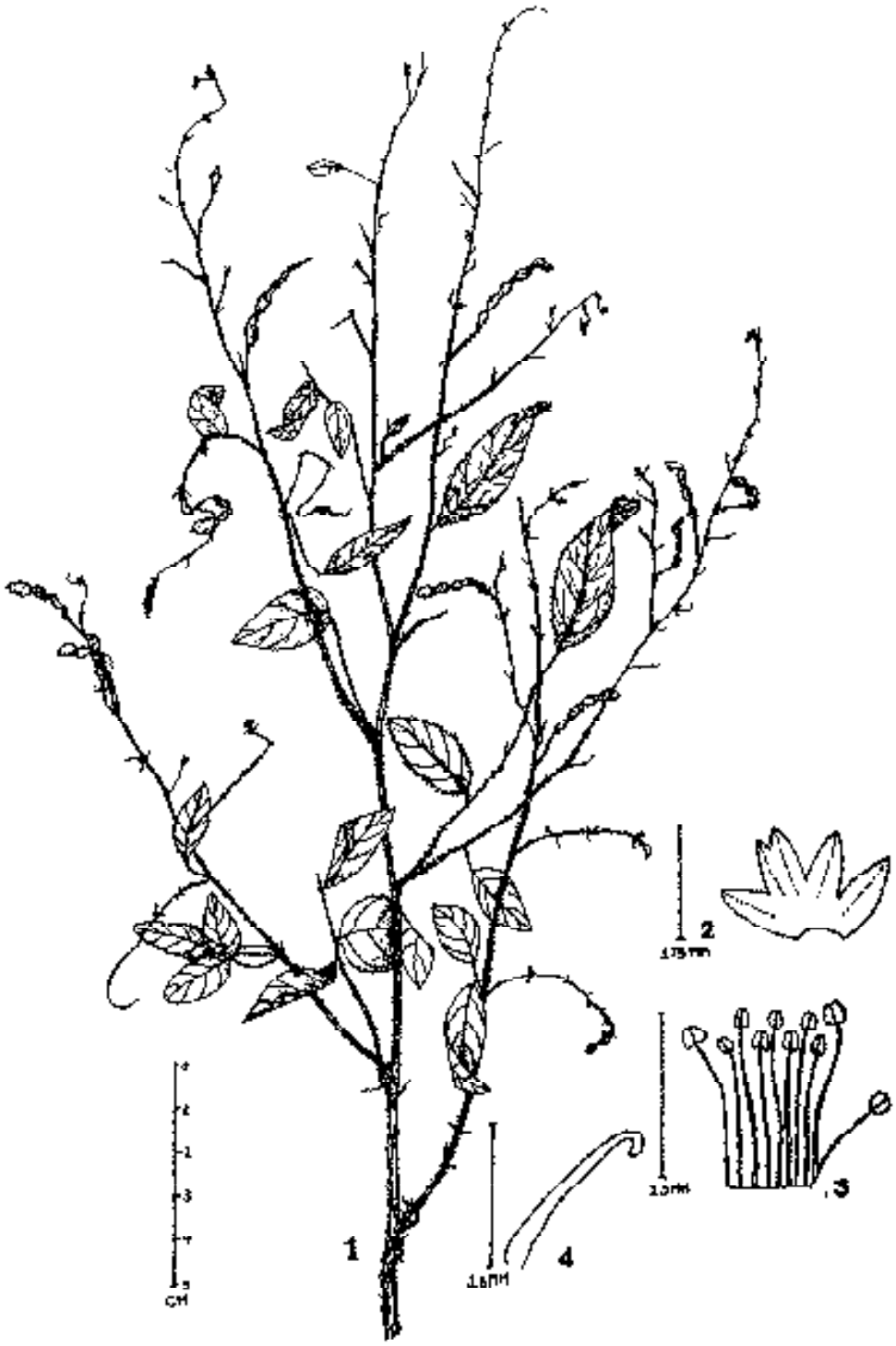
Undershrubs. Leaflets 3.5–15.0 x 1.5–8.0 cm, ovate–elliptic or lanceolate, appressed–pubescent beneath. Flowers white or bluish–violet, in lax racemes. Pods flat, rarely constricted between seeds, hariy, 6–10–jointed.

Fls. & Frts. : August–December.

Illus. : Wight, Ic. t. 374. 1840 (*D. recurvatum* (Roxb.) Grah. ex Wight & Arn. Prodr. 226. 1843); Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 156. 1988.

Distrib. : Common as forest undergrowth.

D. motorium (Houtt.) Merr. in J. Arn. Arb. 19:345. 1938; Sanj. Legumes of India 158. 1991. *Hedysarum motorium* Houtt. Nat. Hist. 10: 246. 1779. *Desmodium gyrans* (L. f.) DC. Prodr. 2:326. 1825: Baker in Hook f. Fl. Brit. India 2 : 174. 1876; Cooke, Fl. Pres. Bombay 1:382. 1958 (Repr.).



Desmodium procumbens (Mill.) Hutch.
1-Habit ; 2-Calyx; 3-Androecium; 4-Gynoecium

Herbs or undershrubs. Leaves 1–3–foliolate; leaflets 2.0–7.0 x 0.4–1.4 cm, oblong–lanceolate. Flowers pink, in terminal and axillary, lax racemes. Pods flat, 5–10–jointed.

Fls. & Frts. : August–December.

Illus : Wight, Ic. t. 294, 1840 (*Desmodium gyrans*).

Distrib. : Rare in semi–evergreen and moist deciduous forests. Chandrapur, Konkan (Cooke, op. cit.), Pune, Nagpur.

D. procumbens (Mill.) Hutch. in Rep. Moss. Bot. Gard. 4:76. 1893; van Meeuwen in Reinwardtia 6:255. 1962; Sanj Legumes of India 160. 1991. *Hedysarum procumbens* Mill. Gard. Dict. ed. 8:10. 1768. *Desmodium spirale* (Sw.) DC. Prodr. 2.:332. 1825; Baker in Hook. f. Fl. Brit. India 2:164.1876.

Herbs c 1 m high, erect. Leaves 1.7–4.3 x 0.5–1.8 cm, ovate or lanceolate. Flowers in panicles; bracts setaceous; pedicels filiform. Pods 1.5 cm long with deeply indented sutures, 4–6–jointed.

Fls. & Frts. : September–October.

Distrib. : Rare in deciduous forests. Dhule.

D. pulchellum (L.) Bth. in Fl. Hongk. 83. 1861; Baker in Hook. f. Fl. Brit India 2:162.1876; Cooke, Fl. Pres. Bombay 1:376. 1958 (Repr. ed.); van Meeuwen in Reinwardtia 6:256. 1962; Sanj. Legumes of India 160.1991. *Hedysarum pulchellum* L. Sp. Pl. 747.1753.

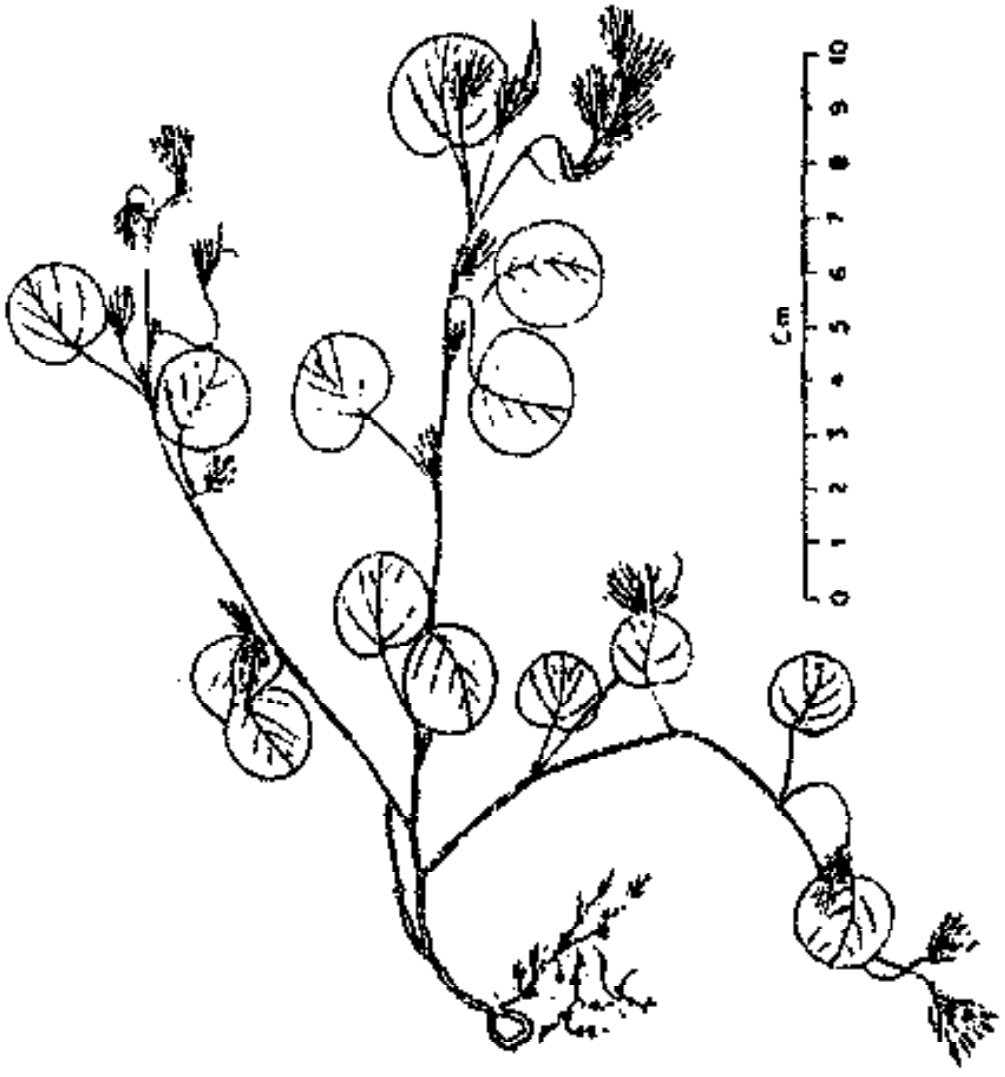
Undershrubs. Leaflets 4.5–10.0 x 2.4–5.0 cm, elliptic–ovate, downy tomentose beneath, apex obtuse or subacute, base rounded or subcordate. Flowers white or yellow, in axillary or terminal racemes; bracts 12–40, orbicular, leafy. Pods indented, 2–jointed, pubescent.

Fls. & Frts. : March–December.

Illus. : Wight Ic. t. 418. 1844–45 (*Hedysarum pulchellum*).

Distrib. : Common as an undergrowth in moist deciduous forests. Chandrapur, Pune, Ratnagiri.

D. renifolium (L.) Schindl. in Feddes Repert. 22:262. 1926; van Meeuwen in Reinwardtia 6:257. 1962; Sanj. Legumes of India 160. 1991. *Hedysarum renifolium* L. Syst. Nat. ed.10.2:1169. 1759. *Desmodium reniforme* (L.) DC. Prodr. 2:327. 1825; Baker in Hook. f. Fl. Brit India 2:173.1876.; Cooke, Fl. Pres. Bombay1:380 1958 (Repr.).



Desmodium ritchiei Sanj.

Herbs, 20–40 cm. high. Leaflets 1–2 x 2–3 cm, reniform. Flowers white or pale pink, solitary or two together, fascicled in the axils of leaves. Pods 1.5–2.0 cm long, 3–5–jointed.

Fls. & Frts. : Setember–October.

Distrib : Rare. Kolhapur, Pune.

D. ritchiei Sanj. in Bull. Bot. Surv. India 22: 229. (1980) 1982 & Legumes of India 161.1991. *D. rotundifolium* Baker in Hook. f. Fl. Brit. India 2:172. 1876 non DC. 1825; Cooke, Fl. Pres. Bombay 1:381.1958 (Repr.) p.p. *Desmodiastrum racemosum* (Bth.) Pramanik & Thoth. var. *rotundifolium* (Dalz. ex Prain) Pramanik & Thoth. in J. Ind. Bot. Soc. 65: 378. 1987.

Herbs, 15–45 cm high. Leaflets 1.2–2.5 x 1.2–2.5 cm, appressedly pubescent beneath. Flowers pink, in terminal and axillary racemes. Pods falcate, lower suture slightly indented; joints 3–6.

Flst. & Frts. : Septmeber–December.

Illus. : Deshpande et al. Fl. of Mahableshwar 1: 176, f. 12. 1993.

Distrib. : As an undergrowth in deciduous forests, common.

D. scorpiurus (Sw.) Desv. J. Bot. 1:122. 1813; Vartak & Kumbhojkar in J. Bombay Nat. Hist. Soc. 81 : 224. 1984. *Hedysarum scorpiurus* Sw. Prodr. 107. 1788.

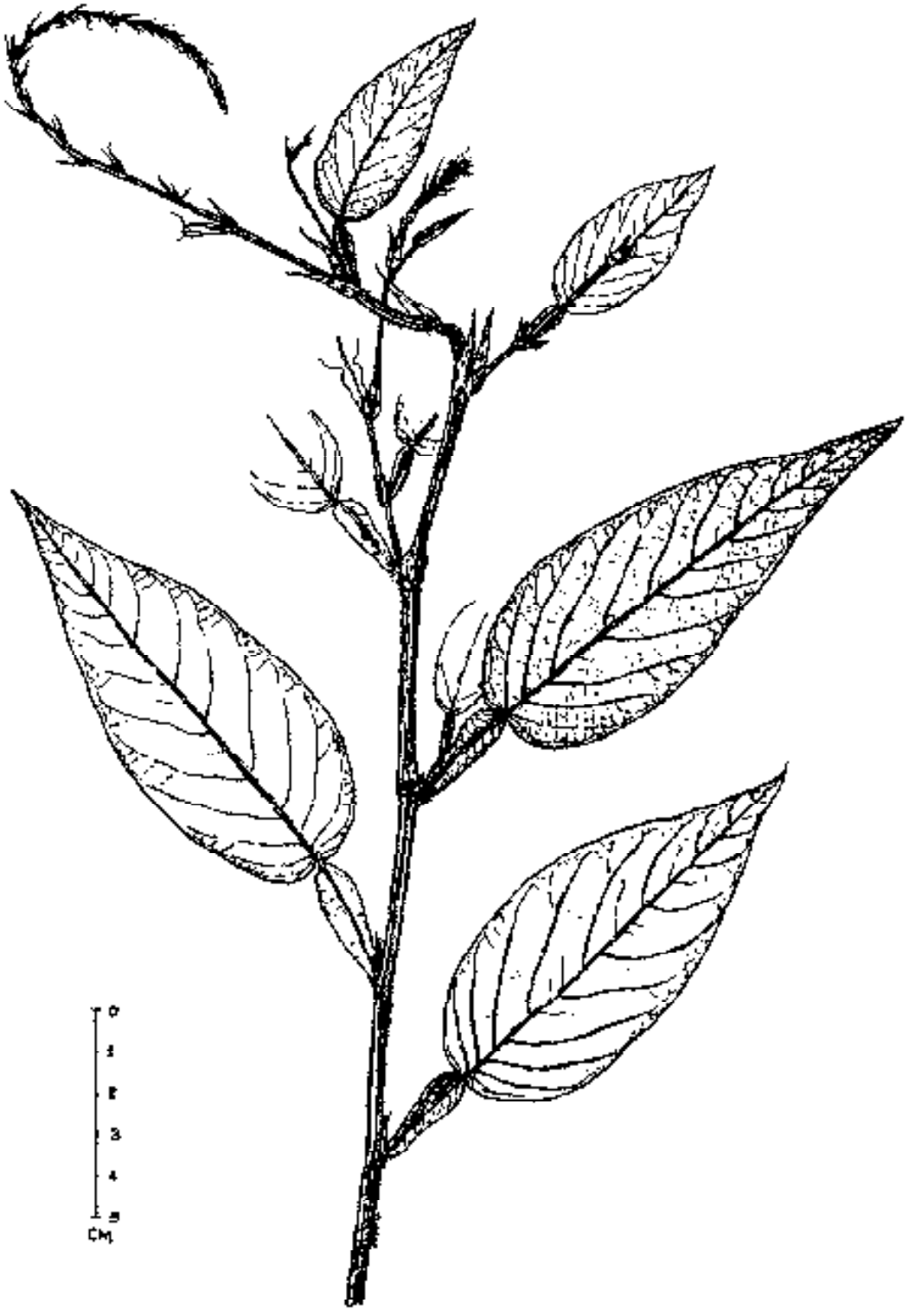
Herbs; stem straggling, wiry grooved, hairy. Leaves 3–foliolate, alternate; leaflets 3.0–7.0 x 1.5–4.0 cm, ovate–oblong or elliptic–oblong, apex obtuse, base rounded, hairy on both surfaces. Flowers white–purplish, in terminal and axillary racemes. Pods linear–moniliform, 4–6 cm long, 6–8–jointed, hairy. Seeds yellow to pale brown, rhomboidal.

Fls. & Frts. : October–March.

Illus. : Vartak & Kumbhojkar, op. cit. 225, ff. 1–5.

Distrib. : Common near riversides. Bombay, Poona.

Notes. : This species is allied to *D. laxiflorum* DC. and *D. dichotomum* (Willd.) DC. but differs in twinning, straggling habit, size and shape of leaves, nature of pubescence, colour of flowers fading to lemon yellow and rhomboidal seeds.



Desmodium triquetrum (L.) DC.

D. triangulare (Retz.) Merr. in J. Arnold Arbor. 23:170. 1942; van Meeuwen in Reinwardtia 6:261. 1962; Sanj. Legumes of India 162. 1991. *Hedysarum triangulare* Retz. Obs. Bot 3:40. 1783. *Desmodium congestum* Wall. ex Wight & Arn. Prodr. 224. 1834. *D. cephalotes* (Roxb.) Wall. ex, Wight & Arn. Prodr. 224.1834; Baker in Hook. f. Fl. Brit. India 2:161. 1876. *D. cephalotes* var. *congestum* (Wall. ex Wight & Arn.) Prain in J. As. Soc. Bengal 66:389. 1897; Cooke, Fl. Pres. Bombay 1 : 375. 1958 (Repr.). *D .triangulare* (Retz.) Merr. var. *congestum* (Prain) Sant. in Kew Bull. 1948 : 276. 1948. *'Lapoti' 'Ran–chitki.'*

Shrubs, 60–150 cm high. Leaflets 3.5–10.5 x 2.0–4.5 cm, elliptic–oblong, ovate–oblong or lanceolate, argento–silky pubescent beneath, apex acuminate, base subacute. Flowers white or red, in axillary umbels. Pods brown, slightly falcate, pubescent.

Fls. & Frts. : August–December.

Illus. : Wight, Ic t. 209. 1839 (*D. congestum*).

Distrib. : In deciduous forests, common. Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Thane.

D. triflorum (L.) DC. Prodr. 2:334. 1825; Baker in Hook f. Fl. Brit. India 2: 173.1876; Cooke, Fl. Pres. Bombay 1:378.1958 (Repr.); van Meeuwen in Reinwardtia 6:261.1962; Sanj. Legume of India 163. 1991. *Hedysarum triflorum* L. Sp. Pl. 749. 1753. *'Ran–methi'*

Prostrate herbs. Leaflets 0.3–1.5 x 0.2–0.8 cm, obovate, membranous, hairy beneath, cuneate at base. Flowers pinkish, 1–3 in axillary fascicles. Pods compressed, falcate, hairy.

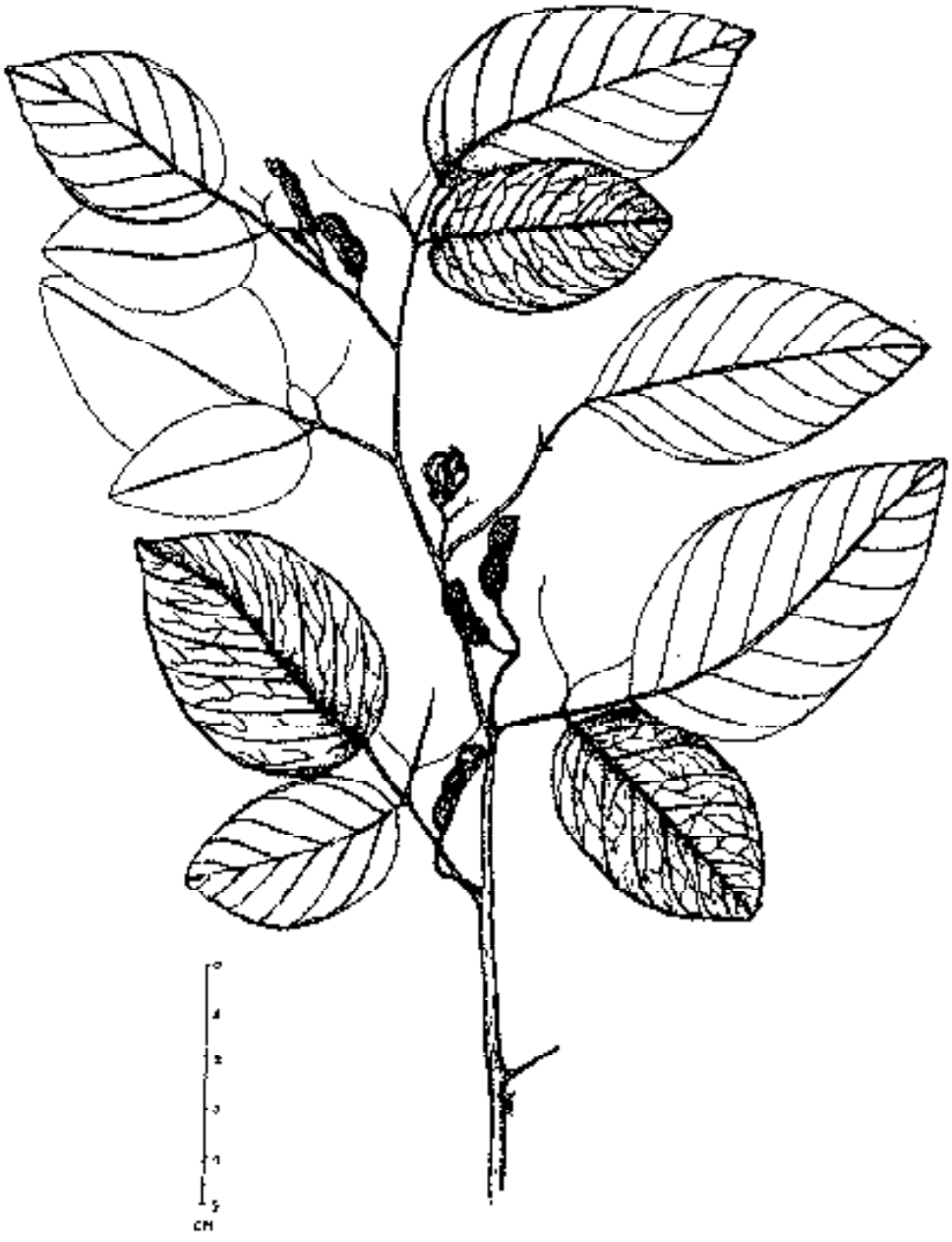
Fls. & Frts. : June–January

Illus. : Wight, Ic. t. 292.1840 (*D. triflorum* var. *minus* Wight & Arn. Prodr. 229. 1834); Mahesh. Fl. Delhi f. 67. 1966; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4 : t. 758. 1988.

Distrib. : Common throughout the state in moist situations.

D. triquetrum (L.) DC. Prodr. 2 : 326. 1821: Baker in Hook. f. Fl. Brit. India 2:163. 1876 p.p.; Cooke, Fl. Pres. Bombay 1: 378. 1958 (Repr.); van Meeuwen in Reinwardtia 6:262. 1962; Sanj Legumes of India 163. 1991. *Hedysarum triquetrum* L. Sp. Pl. 746. 1753. *'Kakganga'*.

Undershrubs; branches triquetrous, grooved. Leaflets 4–18 x 2–9 cm, ovate–oblong or lanceolate, sparsely hairy on nerves beneath, acute at apex. Flowers red, bluish or purplish, in axillary and terminal racemes. Pods linear–oblong, flat, beaked, grey–pubescent, 4–7–jointed.



Desmodium umbellatum (L.) DC.

Fls. & Frts. : August–December.

Illus. : Lakshminarasimhan & Sharma, Fl. Nasik Dt. 164, f. 10. 1991.

Distrib. : In plains, ghats,or as forest undergrowth, common. Ahamednagar, Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara. Thane.

D. umbellatum (L.) DC. Prodr. 2 : 325. 1825; Baker in Hook. f. Fl. Brit. India 2:161. 1876 p.p.; Cooke, Fl. Pres. Bombay 1:375. 1958 (Repr.); van Meeuwen in Reinwardtia 6:263.1962; Sanj. Legumes of India 165. 1991; *Hedysarum umbellatum* L. Sp. Pl. 747. 1753.

Shrubs or small trees. Leaflets 3, 3.7–7.5 x 2.5–5.0 cm, subcoriaceous, ovate–oblong, canescent beneath, obtuse or subacute at apex. Flowers white, 6–12, in axillary umbels. Pods thick, turgid, dented on both sutures, 4–5–jointed.

Fls & Frts. : September–October.

Distrib. : Rare in moist deciduous forests. Pune.

D. velutinum (Willd.) DC. Prodr. 2:328. 1825; van Meeuwen in Reinwardtia 6:264. 1962; Sanj. Legumes of India 165. 1991. *Hedysarum velutinum* Willd. Sp. Pl. 3:117. 1803. *Desmodium latifolium* (Roxb.) DC. Prodr. 2:327. 1825; Baker in Hook. f. Fl. Brit. India 2: 168.1876; Cooke, Fl. Pres. Bombay 1:380. 1958 (Repr.).*'Lipti'*.

Undershrubs, 60–150 cm high; branches fulvous–pubescent. Leaflets 7–13 x 4–10 cm, broadly ovate or suborbicular, scabridly sparsely hairy above, denely so beneath. Flowers pinkish or purplish, fascicled, in terminal and axillary racemes. Pods 1.5–2.0 cm long, densely hairy, 3–6 jointed.

Fls. & Frts. : July–December.

Illus. : Wight, Ic. t. 270. 1840 (*Desmodium latifolium*); Ic. Roxb. t. Fasc. 5 : t. 5. 1971 (Repr. ed.); Matthew, Fur. Illus. Fl. Tamilnadu Carnatic t. 159. 1988.

Distrib. : In hilly forests, common.

DOLICHOVIGNA Hay.

Dolichovigna pilosa (Willd.) Niyomdham in Nord. J. Bot. 12 : 341. 1992. *Dolichos pilosus* Willd. Sp. Pl. 3: 1043. 1800. *Vigna pilosa* (Willd.) Baker in Hook. f. Fl. Brit. India 2 : 207. 1876; Verdc. in Kew Bull. 24: 561. 1970; Sanj..Legumes of India 275. 1991.

Twiners. Leaves shallowly 3-lobed; leaflets 10–15 cm long, ovate, apex acute, base rounded, both surfaces subscabrous. Flowers reddish, many in 5.0–7.0 cm long racemes. Pods 10–12 cm long densely silky hairy, beaked, recurved. Seeds 8–12.

Fls. & Frts. : September–January.

Illus. : Ic. Roxb. Fasc. 6, t. 231. 1973 (Repr. ed.).

Distrib. : Occasional in shady, moist places in deciduous forests. Ratnagiri.

DOLICHOS L.

Dolichos trilobus L. Sp. Pl. 726. 1753 p.p.; Verdc. in Taxon 17: 170. 1968 & Kew Bull. 24 : 422.1970; Sanj. Legumes of India 167. 1991. *D. falcatus* Klein ex Willd. Sp. Pl. 3 : 1047. 1803; Baker in Hook. f. Fl. Brit. India 2: 211. 1876.

Herbs, diffuse, twining. Leaflets 1.5–8.0 x 0.9–6.5 cm, ovate, ovate–rhomboid or lanceolate, glabrescent, apex acuminate, base rounded or truncate. Flowers 1–3, lilac or purple, in axillary fascicles. Pods linear–oblong, subfalcate, apiculate. Seeds reddish–brown, ellipsoid–oblong.

Fls. & Frts. : September–November.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2 : t. 196. 1982.

Distrib. : In deciduous forests, common. Nasik, Pune, Satara, Thane.

DUMASIA DC.

Dumasia villosa DC. in Ann. Sci. Nat. (Paris) 1, 4 : 96. 1825; Baker in Hook. f. Fl. Brit. India 2:183. 1876; Cooke, Fl. Pres. Bombay 1:385. 1958 (Repr.); Sanj. Legumes of India 167. 1991.

Twining herbs. Leaflets 3–5 x 2.0–3.5 cm, ovate, glabrous above, hairy beneath, apex obtuse, base cuneate, margins ciliate. Flowers 6–20, yellow, in axillary racemes. Pods c 2.5 cm long, linear, torulose, velvety.

Fls. & Frts. : October–November.

Illus. : Wight Ic. 445. 1841 (*D. congesta* Grah. ex. Wight & Arn.); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 197. 1982 & Fur. Illus. Fl. Tamilnadu Carnatic 4 : t. 61. 1988.

Distrib. : Along the ghats, rare. Satara.

DUNBARIA Wight & Arn.

Dunbaria glandulosa (Dalz.) Prain in J. Asiat. Soc. Bengal 66 (2) : 433. 1897; Cooke, Fl. Pres. Bombay 1 : 411. 1958 (Repr.); Sanj. Legumes of India 169. 1991. *Cajanus glandulosus* Dalz. in Dalz. & Gibs. Bombay Fl. 73. 8161; van der Maesen in Agric. Univ. Wageningen Papers 85 (4) : 214 (1985) 1986. *Atylosia rostrata* Baker in Hook. f. Fl. Brit. India 2:216. 1876.

Twiners, woodly. Leaves 3–foliolate; leaflets 4.0–7.5 x 4.8–8.7 cm, terminal rhomboid–ovate, acute or acuminate, lateral obliquely ovate, acute. Flowers yellow, in lax racemes, usually in pairs along terete rachis. Pods straight, beaked. Seeds 8–10.

Fls. & Frts. : August–October.

Distrib. : Chandrapur, Kolhapur, Thane.

Notes. : van der Maesen (op. cit.) describes this species under excluded species.

ELEIOTIS DC.

1. Leaves 1–foliolate; calyx teeth very short ... *E. monophylla*

1. Leaves 3–foliolate; ealyx–teeth nearly equalling the tube ... *E. rottleri*

Eleiotis monophylla (Burm f.) DC. Mem. Legum. 7:350. 1825; Sanj Legumes of India 171. 1991. *Glycine monophylla* Burm. f. Fl. Ind. 161, t. 50, f. 2. 1768. *Eleiotis sororia* (L.) DC. op. cit.; Baker in Hook. f. Fl. Brit. India 2: 153. 1876; Cooke, Fl. Pres. Bombay 1: 364. 1958 (Repr.).

Herbs, prostrate or procumbent. Leaves 1–3–foliolate, petiolate; leaflets 1.2–4.5 x 0.8–5.0 cm, ovate–orbicular or subreniform, membranous, apex retuse or rounded, base cordate. Flowers pale to creamy yellow, in compact, axillary racemes. Pods subsessile, boat–shaped, pointed, reticulately veined. Seeds subreniform, dark–brown.

Fls. & Frts. : August–November.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2 : t. 199. 1982.

Distrib. : Among grasses in open forests, occasional. Akola, Amravati, Aurangabad, Chandrapur, Dhule, Nanded, Wardha.

E. rottleri Wight & Arn. Prodr. 231. 1834; Sanj. Legumes of India 171. 1991. *Desmodium rottleri* (Wight & Arn.) Baker in Hook. f. Fl. Brit. India 2 : 174. 1876. *Eleiotis trifoliata* T. Cooke, Fl. Pres. Bombay 1: 342. 1902 ([1 : 365.1958 (Repr.)].

Herbs, 30–40 cm long; stems prostrate, triquetrous, striate. Leaves 3–foliolate; leaflets 0.8–1.5 x 0.5–1.0 cm, obovate or orbicular, apex truncate or retuse, base subacute or rounded, appressed–pubescent beneath. Flowers few in lax recemes. Pods boat–shaped, pointed, stalked.

Fls. & Frts. : August–October.

Distrib. : Rare, Maharashtra (Sanj. op. cit.).

ERYTHRINA L.

1. Calyx not spathaceous, more or less, 2 –lipped, not splitting down to base ... *E. suberosa*

1. Calyx spathaceous, not 2–lipped, splitting down to base :

   2. Branches sparingly prickly, prickles nearly black; calyx 5–toothed, tips recurved; pods distinctly torulose, 6–8–seeded ... *E. variegata*

   2. Branches much prickly; prickles pale–green or yellowish; calyx entire, not recurved; pods compressed, slightly torulose, 2–3 or (or 5)–seeded ... *E. stricta*

Erythrina stricta Roxb. Fl. Ind. 3:251. 1832; Baker in Hook. f. Fl. Brit. India 2:189. 1876; Cooke. Fl. Pres. Bombay 1 : 391. 1958 (Repr.); Sanj. Legumes of India 173. 1991.

Trees. Leaflets 6–15 x 4–12 cm, terminal reniform, cordate, lateral ones ovate–cordate, shortly acuminate. Flowers scarlet, in terminal racemes. Pods brownish, narrowed at both ends.

Fls. & Frts. : January – May.

Illus. : Ic. Roxb. Fasc. 5, t. 14. 1971 (Repr. ed.); Talb. For. Fl. Bombay Pres. & Sind 1:402, f. 226. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 200. 1982.

Distrib. : In deciduous forests, common.

E. suberosa Roxb. Fl. Ind. 3:253. 1832; Baker in Hook. f. Fl. Brit. India 2: 189. 1876; Cooke, Fl. Pres. Bombay 1 : 392. 1958 (Repr.); Sanj. Legumes of India 173. 1991. *'Panghari'.*

Trees, large, 4–6 m high, prickly; bark corky. Leaflets 8.0–13.5 x 4.5–12.0 cm, terminal rhomboid–ovate, lateral ones obliquely ovate–cordate, densely pubescent beneath. Flowers scarlet, in 2.5–3.0 cm long racemes. Pods beaked, stalked. Seeds oblong.

Fls. & Frts. : April–October.

Illus. : Ic. Roxb. Fasc. 5, t. 16. 1971 (Repr. ed.); Talb. For. Fl. Bombay Pres. & Sind 1 : 403, f. 227. 1909.

Distrib. : In deciduous forests, frequent.

E. variegata L. in Stickm. Herb. Amboin. 10. 1754 & Amoen. Acad. 4:122. 1759;Krukoff in J. Arnold Arbor. 53:132. 1972; Sanj. Legumes of India 173. 1991. *E. indica* Lam. Encycl. 2:391. 1876; Baker in Hook. f. Fl. Brit. India 2:188. 1876; Cooke, Fl. Pres. Bombay 1:390. 1958 (Repr.). *E. indica* var *alba* Blatt. & Mill. in J. Bombay nat. Hist. Soc. 33:628. 1929. *'Pangara'*.

Trees, 8–10 m high, deciduous. Leaflets 3.0–15.0 x 2.5–12.4 cm, ovate or ovate–rhomboid, membranous, apex acute or acuminate, base truncate. Flowers coral–red, in dense racemes. Pods subcylindric, black when mature. Seeds reddish–brown, ellipsoid–oblong.

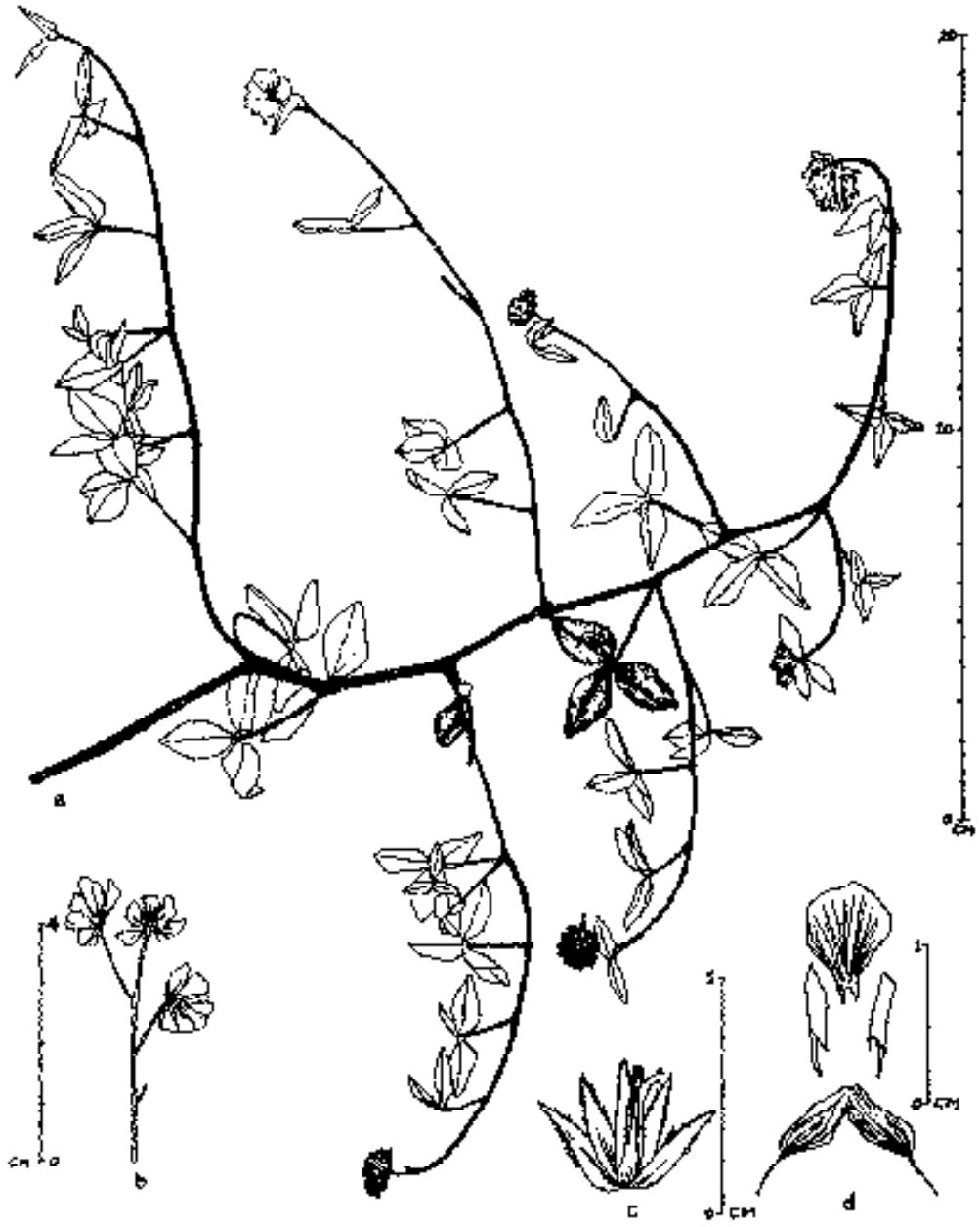
Fls. & Frts. : January–June.

Illus. : Wight, Ic. t. 58. 1838; Talb. For. Fl. Bombay Pres & Sind 1: 401, t. 225. 1909 *(E. indica)*; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4:t. 162. 1988 (*E. variegata.)*.

Distrib. : In deciduous forests and also planted, common.

FLEMINGIA Roxb. ex W. Ait. & W. T. Ait. (nom. cons.)

1. Leaves 1–foliolate ... *F. strobilifera*
1. Leaves 3–foliolate :
   2. Herbs :
      3. Erect herbs; stipules foliaceous ... *F. rollae*
      3. Prostrate or trailing herbs; stipules not as above :
         4. Roots tuberous :
            5. Inflorescence capitate, terminal ... *F. nilgheriensis*
            5. Inflorescence lax, axillary ... *F. tuberosa*
         4. Roots not tuberous ... *F. gracilis*
   2. Undershrubs or shrubs :



Flemingia gracilis (Mukerjee) Ali
A-Branch; B-Inflorescence; C-A flower excluding corolla;
D-Papilionaceous corolla separated

6.	Flowers in panicles	...	*F. lineata*
6.	Flowers in axillary racemes or dense globose heads :		
7.	Flowers in dense, globose heads, surrounded by large bracts	...	*F. involucrata*
7.	Flowers in axillary racemes; bracts small :		
8.	Calyx with a distinct tube; corolla exserted:		
9.	Petioles angular but not winged at margins	...	*F. macrophylla*
9.	Petioles distinctly winged at margins	...	*F. semialata*
8.	Calyx divided nearly to base; corolla included:		
10.	Leaflets black–gland dotted beneath; flowers solitary, fasciculate or in condensed, axillary racemes	...	*F. wallichii*
10.	Leaflets not as above; flowers in lax axillary racemes	...	*F. praecox* var. *robusta*

Flemingia gracilis (Mukerjee) Ali in Biologia 12:78. 1966; Kothari & Moorthy in J. Bombay Nat. Hist. Soc. 80. 259. 1983; Sanj. Legumes of India 175. 1991. *Moghania gracilis* Mukerjee in Bull. Bot. Soc. Bengal 6:22. 1952.

Herbs, prostrate, hairy. Leaflets 2.4–7.5 x 1.5 –4.4 cm, ovate–lanceolate, densely pubescent, glaucous and nigro–punctate beneath, apex acute, apiculate. Flowers deep violet, 3–6, in terminal, capitulate clusters.

Fls. & Frts. : September–October.

Illus. : Kothari in Nayar & Sastry, Red Data Book of Ind. Pl. 2:137, ff. a–d. 1988.

Distrib. : Among grasses on rocky plateaus, rare. Pune, Raigad, Satara.

F. involucrata Bth. in Miq. Pl. Jungh. 246. 1852; Baker in Hook. f. Fl. Brit. India 2:229. 1876; Cooke, Fl. Pres. Bombay 1:419. 1958 (Repr.); Sanj. Legumes of India 176. 1991. *Moghania involucrata* (Wall ex Bth.) O. Ktze. Rev. Gen. Pl. 1:199. 1891; Mukerjee in Bull. Bot. Soc. Bengal 6:21. 1953.

Shrubs, 0.6–1.8 m high. Leaflets 3.5–10.0 x 2.3– 4.0 cm, oblong or lanceolate, hairy, brownish gland dotted beneath, narrowed at both ends. Flowers c 2.5 cm across. Pods thin, oblong, turgid, apiculate, keeled on ventral suture, downy.

Fls. & Frts. : November–February.

Distrib. : In diciduous forests, frequent. Ahmednagar, Chandrapur, 'Konkan' (Cooke, op. cit.).

F. lineata (L.) Roxb. ex Ait. Hort. Kew ed. 2, 4:350. 1812; Baker in Hook. f. Fl. Brit India 2:228. 1876; Cooke, Fl. Pres. Bombay 1:417. 1958 (Repr.); Sanj. Legumes of India 176. 1991. *Hedysarum lineatum* L. Sp. Pl. 1054. 1753. *Moghania lineata* (L.) O. Ktze. Rev. Gen. Pl. 1. : 199. 1891; Mukerjee in Bull. Bot. Soc. Bengal 6:14. 1953.

Shrubs; young branches appressedly pubescent. Leaflets 2.5–4.0 x 1–2 cm, obovate or lanceolate, silky hairy beneath. Flowers pedicillate. Pods oblong, minutely apiculate. Seeds 2, orbicular–oblong, black.

Fls. & Frts. : December–January.

Illus..: Wight, Ic. t. 327. 1840; Ic Roxb. Fasc. 6, t. 2. 1973 [Repr. ed. (*Moghania lineata*)].

Distrib. : In deciduous forests, rare. Amravati, Chandrapur, 'Konkan' (Cooke, op. cit.), Nasik.

F. macrophylla (Willd.) O. Ktze. ex Merr. in Philipp. J. Sci. Bot. 5:130. 1910; Sanj. Legumes of India 176. 1991. *Crotalaria macrophylla* Willd. Sp. Pl. 3:982. 1802. *Flemingia congesta* Roxb. ex Ait. f. in Hort. Kew ed. 2, 4:349. 1812; Baker in Hook. f. Fl. Brit. India 2: 228. 1876; Cooke, Fl. Pres. Bombay 1:418. 1958 (Repr.). *F. nana* Roxb. Fl. Ind. 3: 339. 1832; Cooke, op. cit. 417. *F. congesta* var *latifolia* (Bth.) Baker in Hook. f. op. cit. 229. *F. congesta* var *nana* (Roxb.) Baker in Hook. f. op. cit. *Moghania nana* (Roxb.) Mukerjee in Bull. Bot Soc. Bengal 6: 20. 1953. *M. macrophylla* (Willd.) O. Ktze. Gen. Pl. 1:199. 1891; Mukerjee, op. cit. 16. *'Daudala'*.

Shrubs, 1.8 m high. Leaflets 10–16 x 4–6 cm, elliptic–ovate, subcoriaceous, silky on nerves beneath, apex acute, lateral ones oblique at base; petiole winged. Flowers purplish–yellow, in dense, axillary racemes; calyx gland dotted, pilose. Pods oblong, rusty–tomentose.

Fls. & Frts. : January–February.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 201. 1982.

Distrib. : In moist deciduous forests, frequent. Pune, Ratnagiri, Satara, Thane, Yavatmal.

F. nilgheriensis (Bakèr) Wight ex T. Cooke, Fl. Pres. Bombay 1: 393. 1902 [1: 419. 1958 (Repr.); Sanj. Legumes of India. 177.1991. *F. vestita* Bth. ex. Baker var. *nilgheriensis* Baker in Hook. f. Fl. Brit. India 2:230. 1876; Mukerjee in Bull. Bot. Soc. Bengal. 6:22. 1953.

Herbs, prostrate, hairy. Leaflets 1.2–2.5 x 0.8–1.2 cm, elliptic–ovate, hairy, apex acute or acuminate, base rounded. Flowers deep purple, 6–15 in each head; calyx fulvous hairy. Pods ovoid or subglobose. Seeds solitary, ellipsoid, dark–brown.

Fls. & Frts. : September–November.

Illus. : *F. procumbens* Wight, Ic. t. 987. 1845 non Roxb. 1832.

Distrib. : Rare in open moist places. Ratnagiri, Satara.

F. praecox C. B. Cl. ex Prain var **robusta** (Mukerjee) Sanj. Legumes of India 177. 1991. *Moghania praecox* (C. B. Cl. ex Prain) H. L. Li var. *robusta* Mukerjee in Bull. Bot. Soc. Bengal 6: 19. 1952.

Undershrubs. Leaves 3–foliolate; leaflets ovate–lanceolate or elliptic. Flowers creamy–yellow, tinged with red, in axillary racemes.

Fls. & Frts. : August–October.

Illus. : Sant. & Panthaki in J. Bombay Nat. Hist. Soc. 54:224, f. facing p. 225. 1956.

Distrib. : Rare in open situations. Chandrapur (Mukerjee, op. cit.), Thane (Mukerjee, op. cit.).

F. rollae (Billore & Hem.) A. Kumar in J. Econ. Tax. Bot. 4: 232. 1983; Sanj. Legumes of India 178. 1991. *Moghania rollae* Billore & Hem. in J. Econ. Tax. Bot. 3: 617, ff. 1–9. 1982.

Herbs, 30–60 cm high, erect, hairy. Leaflets 3, 2.0–4.5 x 2.0–2.5 cm, elliptic–lanceolate, ovate–lanceolate or obovate–lanceolate, sparsely to densely hairy on both surfaces; stipules foliaceous. Flowers 1.5 x 1 cm, bluish–purple, many in terminal heads. Pods 0.5 x 0.3 cm, ellipsoid, rugulose, reddish–brown. Seeds solitary, ovoid–ellipsoid.

Fls. & Frts. : September–October.

Illus. : Billore & Hem. op. cit.

Distrib. : Rare. Ahmednagar, Thane.

F. semialata Roxb. ex. Ait. f. Hort. Kew. ed. 2. 4:349. 1812; Ugemuge, Fl. Nagpur Dt. 143. 1986; Sanj. Legumes of India 178. 1991. *F. congesta* var. *semialata* (Roxb. ex Ait. f.) Baker in Hook. f. Fl. Brit. India 2:229. 1876; Cooke, Fl. Pres. Bombay 1:418. 1958 (Repr.). *Moghania semialata* (Roxb. ex Ait. f.) Mukerjee in Bull. Bot. Soc. Beagal 6: 16. 1952.

Shrubs, erect. Leaflets oblong, silky on ribs below, apex acuminate, base rounded. Flowers pink or purplish in branched racemes. Pods tomentose. Seeds 2.

Fls. & Frts. : August–February.

Illus. : Wight, Ic. t. 326. 1840.

Distrib. : In moist deciduous forests, infrequent. 'Konkan' (Cooke, op. cit.), 'Nagpur' (Ugemuge, op. cit.).

F. strobilifera (L.) Ait. & Ait. f. Hort. Kew. ed. 2, 4 : 350 1812; Baker in Hook. f. Fl. Brit. India 2:227. 1876; Cooke, Fl. Pres. Bombay 1:416. 1958 (Repr.); Sanj. Legumes of India 178. 1991. *Hedysarum strobiliferum* L. Sp. Pl. 746. 1753. *Flemingia bracteata* (Roxb.) Wight, Ic. t. 268. 1840; Cooke, op. cit. *F. strobilifera* var. *bracteata* (Roxb.) Baker in Hook. f. op. cit. *Moghania strobilifera* (L.) St. Hil. ex. O. Ktze. Rev. Gen. Pl. 1:199. 1891; Mukerjee in Bull. Bot. Soc. Bengal 6:10.1953.

Shrubs, 1–2 m high. Leaflets 6.0–15.5 x 2.3–7.5 cm, ovate–lanceolate or oblong, silky pubescent beneath, apex acute, base rounded. Flowers in axillary and terminal racemes. Pods oblong, mucronate, densely pubescent. Seeds 12, dark–brown or black.

Fls. & Frts. : August–April.

Illus. : Wight, Ic. t. 267. (*F. strobilifera*) & t. 268 (*Flemingia bracteata*). 1840; Talb. For. Fl. Bombay Pres. & Sind 1:418, f. 236. 1909; Matthew, Fur. Illus.Fl. Tamilnadu Carnatic 4: t. 163. 1988.

Distrib. : In deciduous forests, common.

F. tuberosa Dalz. in Hook. Kew. J. Bot. 2:34. 1850; Baker in Hook. f. Fl. Brit. India 2:230. 1876; Cooke, Fl. Pres. Bombay 1:420. 1958 (Repr.); Sanj. Legumes of India 179.1991. *Moghania tuberosa* (Dalz.) O. Ktze. Rev. Gen. Pl. 199. 1891; Mukerjee in Bull. Bot. Soc. Bengal 6:24. 1953.

Herbs, up to 1 m high, perennial, tuberous. Leaflets 2.2–5.0 x 1.5–2.6 cm, linear–oblong, oblong–elliptic or lanceolate, hairy, apex acute, base rounded. Flowers pinkish–purple. Pods oblong. Seeds 1–2.

Fls & Frts. : September–November.

Distrib. : In moist deciduous foests, rare. Raigad, Ratnagiri, Thane.

F. wallichii Wight & Arn. Prodr. 242. 1834; Baker in Hook. f. Fl. Brit. India 2:229. 1876; Cooke, Fl. Pres. Bombay 1:418. 1958 (Repr.); Sanj. Legumes of India 179. 1991. *Moghania wallichii* (Wight & Arn.) O. Ktze. Rev. Gen Pl. 1:199. 1891; Mukerjee in Bull. Bot. Soc. Bengal 6:18.1953.

Undershrubs, up to 90 cm high. Leaflets 3.7–11.2 x 1.5 – 5.0 cm, terminal obovate, lateral ones obliquely ovate–oblong, hairy, black gland dotted beneath. Flowers 1–3, seesile. Pods turgid, obtuse, pubescent, 2–seeded.

Fls. & Frts. : October–Febuary.

Distrib. : Rare in moist deciduous forests. 'Konkan' (Cooke op. cit. & Mukerjee, op. cit.).

Galactia R. Br.

1. Leaflets oblong to lanceolate, silky or villous beneath:
   2. Pods densely grey–downy ... *G. villosa*
   2. Pods pubescent at first, afterwards glabrescent ... *G. tenuiflora*
1. Leaflets linear to oblong, appressed pubescent beneath ... *G. longifolia*

Galactia longifolia Bth. in Ann. Wien. Mus. 2 : 127. 1838; Sanj. Legumes of India 180. 1991; Naik, Fl. Marathwada 1 : 274. 1998. *G. tenuiflora* var. *lucida* Baker in Hook. f. Fl. Brit. India 2 : 192. 1876.

Herbs; stems twining, appressed pubescent. Leaves 3–foliolate; leaflets 3.5–8.0 x 0.8–3.5 cm, linear–oblong, appressed pubescent

beneath. Flowers white, fading pale yellow, in axillary, 8–15 cm long racemes. Pods linear, flat, slightly curved, hairy. Seeds reniform, pale brown.

Fls. & Frts. : September–October.

Distrib. : Occasional, as an under growth. Nanded.

G. tenuiflora (Klein ex Willd.) Wight & Arn. Prodr. 206. 1834; Baker in Hook. f. Fl. Brit. India 2:192. 1876; Cooke, Fl. Pres. Bombay 1:393. 1958 (Repr.); Pataskar & Ahuja in J. Bombay Nat. Hist. Soc. 67:126. 1970; Sanj. Legumes of India 180. 1991. *Glycine tenuiflora* Klein ex Willd. Sp. Pl. 1059. 1802.

1. Leaves oblong or oblong–lanceolate :
   2. Flowers bluish–purple ... var. *tenuiflora*
   2. Flowers purplish ... var. *minor*
1. Leaves orbicular ... var. *latifolia*

var. **tenuiflora.**

Twiners, herbaceous. Leaflets 3, 2.2–5.5 x 1.3–2.7 cm, elliptic–oblong or oblong–lanceolate, silky pubescent beneath, apex obtuse, retuse or minutely apiculate. Flowers bluish–purple, in 7–15 cm long racemes. Pods slightly incurved. Seeds 6–9, ellipsoid, dark–brown.

Fls. & Frts. : September–October.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 202. 1982.

Distrib. : Along the hills, rare. Amravati, Chandrapur, Dhule.

var. **latifolia** Baker in Hook. f. Fl. Brit India 2:192. 1876; Cooke, Fl. Pres. Bombay 1:394. 1958 (Repr.); Sanj. Legumes of India 180. 1991.

Twiners; stem and leaves densely pubescent beneath. Leaflets roundish, subcoriaceous. Racemes elongate. Calyx hairy, more deeply cleft. Flowers bluish–purple in racemes.

Fls. & Frts. : September–December.

Distrib : 'Konkan' (Cooke, op. cit.).

Notes. : This variety differs from the type in having stem, leaves and calyx densely pubscent.

var. **minor** Baker in Hook. f. Fl. Brit. India 2:192. 1876; Cooke. Fl. Pres. Bombay 1:393. 1958 (Repr.); Sanj. legumes of India 180. 1991.

Twiners; stem filiform. Leaflets 1.2–2.4 x 0.6–1.2 cm, oblong, membranous, grey silky beneath, apex obtuse or apiculate. Flowers purple, in axillary, short peduncled racemes, solitary or in pairs. Pods obliquely constricted between seeds.

Fls. & Frts. : October–December.

Distrib. : On rocky ground, rare. Ratnagiri (Cooke, op. cit.).

Notes : This variety differs from the typical one in having smaller leaflets and small pods with number of seeds.

G. villosa Wight & Arn. Prodr. 207. 1834; Naik, Fl. Marathwada 1 : 275. 1998. *G. tenuiflora* var. *villosa* (Wight & Arn.) Baker in Hook. f. Fl. Brit. India 2 : 192. 1876; Cooke, Fl. Pres. Bombay 1 : 394. 1958 (Repr.); Sanj. Legumes of India 180. 1991.

Herbs; stems twining, silky villous. Leaves 3–foliolate; leaflets upto 8 x 5 cm long, elliptic or oblong–lanceolate, acute at apex, acute or rounded at base, thinly pubescent above, silky or villous beneath. Flowers 5–8, white or tinged with pink–purple, fading pale–yellow in axillary, short racemes. Pods linear, flat, apiculate. Seeds 3–8, grey pubescent.

Fls. & Frts. : September–October.

Distrib. : Frequent, on bushes and under shade of trees. Aurangabad, Nanded.

GEISSASPIS Wight & Arn.

1. Flowers in dense, capitate racemes or heads upto 2.5 cm or even more long, much shorter than bracts; brackts orbicular ... *G. cristata*

1. Flowers in lax, capitate racemes upto 1 cm long, conspicuous, as long as or longer than bracts; bracts ovate–oblong ... *G. tenella*

Geissaspis cristata Wight & Arn. Prodr. 218. 1834; Baker in Hook. f. Fl. Brit India 2: 141. 1876; Cooke, Fl. Pres. Bombay 1:353. 1958 (Repr.); Sanj. Legumes of India 181. 1991. *'Barki'*.

Herbs, procumbent; stem densely hairy. Leaflets 4, 0.5–1.3 x 0.3–0.5 cm, obovate, slightly oblique, apex obtuse, base narrowed. Flowers yellow with reddish–purple streaks. Pods flat, moniliform, reticulately veined, beaked, 1–2–jointed. Seeds solitary in each joint.

Fls. & Frts. : September–February.

Illus. : Beed. Ic. Pl. Ind. Or. t. 293. 1876.

Distrib. : In moist places on hill slopes or among grassess, common. Ahmednagar. Bombay, Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Thane.

G tenella Bth. in Flora 32: 559. 1849; Baker in Hook. f. Fl. Brit. India 2:141. 1876; Cooke, Fl. Pres. Bombay 1:954. 1958 (Repr.); Sanj. Legumes of India 181. 1991. *'Lahan barki'.*

Herbs, prostrate or trailing. Leaves pinnate; leaflets 4, 0.4–0.8 x 0.2–0.4 cm, obovate, apex rounded or truncate, base cuneate. Flowers yellow. Pods 1–2–jointed, joints orbicular, turgid.

Fls. & Frts. : August –December.

Distrib. : In wet places, rare. Kolhapur, Pune, Raigad, Ratnagiri, Thane.

INDIGOFERA L.

1. Leaves simple :
   2. Pods 1–seeded :
      3. Pods falcate or sickle shaped, spiny ... *I. nummularifolia*
      3. Pods globose, not spiny ... *I. linifolia*
   2. Pods 2 (or more) seeded :
      4. Leaves ovate, cordate; pods 2–seeded ... *I. cordifolia*
      4. Leaves oblong, not cordate; pods 4–6–seeded ... *I. dalzellii*
1. Leaves compound, imparipinnate :
   5. Flowers in axillary, sessile or shortly peduncled heads :
      6. Leaves 3–foliolate, nigro–punctate beneath:
         7. Pods 1.0–1.8 cm long, 8–seeded ... *I. prostrata*
         7. Pods 0.4–0.7 cm long, 1–2–seeded ... *I. glandulosa*
      6. Leaves 5–11–foliolate, not nigro–punctate beneath ... *I. linnaei*
   5. Flowers in axillary racemes :
      8. Pods quite flat and papery ... *I. hochstetteri*
      8. Pods neither flat nor papery :
         9. Leaflets alternate :
            10. Leaves argento–canescent; pods torulose :
               11. Plants shrubby; pods 6–8–seeded ... *I. oblongifolia*
               11. Plants herbaceous; pods 1–3–seeded ... *I. angulosa*
            10. Leaves not argenteo–canescent; pods not torulose ... *I. hendecaphylla*
         9. Leaflets opposite :

12. Racemes 12–20–flowered ... *I. coerulea*

12. Racemes 6–12–flowered :

13. Leaflets 3–5 :

14. Leaflets 3:

15. Leaflets mucronate; pods 17 mm long, 4–seeded :

16. Herbs; pods subcylindric ... *I. santapaui*

16. Shrubs; pods subtetragonous ... *I. deccanensis*

15. Leaflets obtuse; pods 20–25 mm long, 6–10– seeded (except in *I. trifoliata* var *duthiei*):

17. Terminal leaflet sessile ... *I. trifoliata*

17. Terminal leaflet stalked... *I. trita*

14. Leaflets 5 ... *I. glabra*

13. Leaflets 7–21 :

18. Leaflets 7–11 :

19. Racemes 3–6–flowered; pods distinctly torulose ... *I. karnatakana*

19. Racemes 6–12 or more flowered :

20. Racemes 6–12–flowered :

21. Hairs of stem gland– tipped; seeds 10–12 ... *I. colutea*

21. Hairs of stem not gland tipped; seeds 15–20 ... *I. parviflora*

20. Racemes more than 12–flowered :

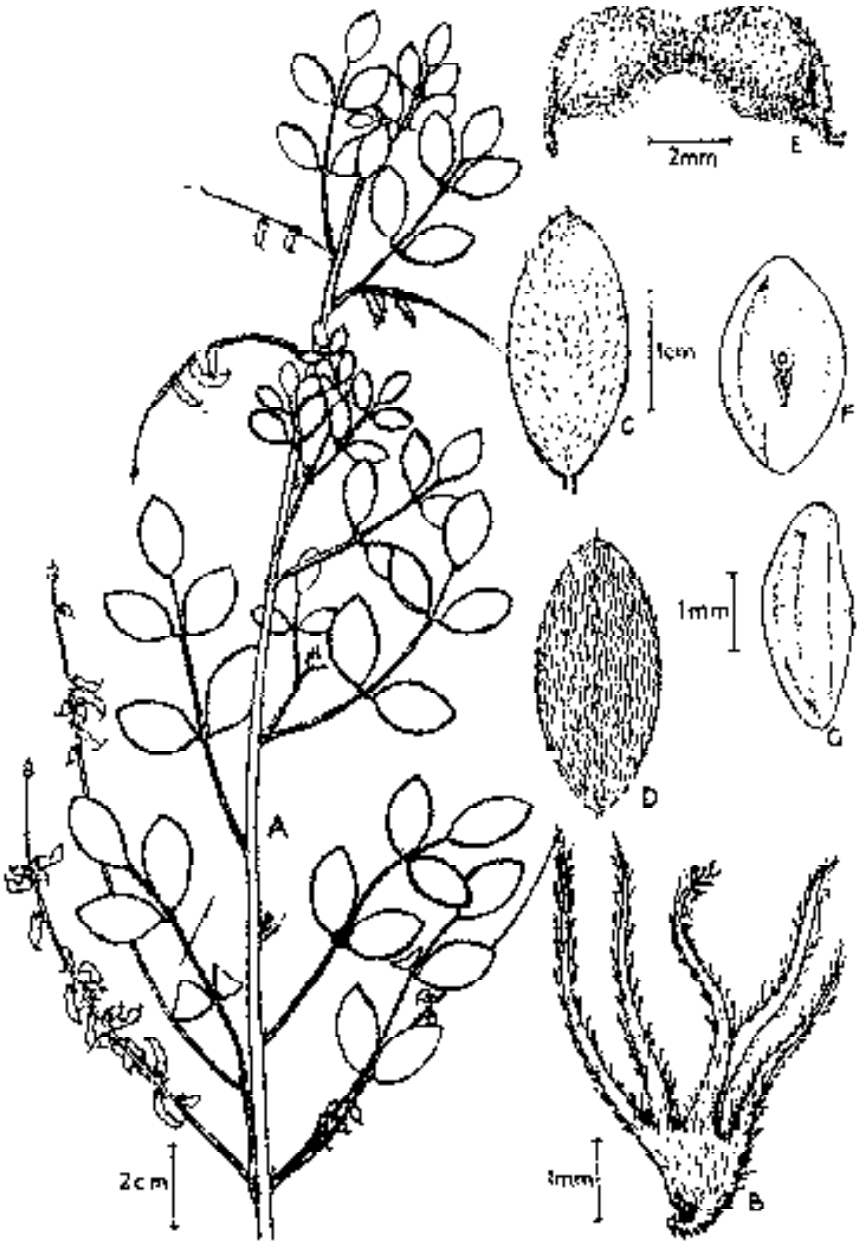
22. Pods cylindric ... *I. tinctoria*

22. Pods densely tetragonous :

23. Pods densely pubescent, not torulose, deflexed ... *I. astragalina*

23. Pods thinly hairy, torulose, not deflexed ... *I. constricta*

18. Leaflets 13–21 :



Indigofera angulosa Edgew. : A-Habit; B-Calyx; C-Leaflet-abaxial surface; D-Leaflet-adaxial surface; E-Pod; F-Seed-hilar view; G-Seed-side view

24. Standard and keel petals hairy outside	...	*I. wightii*
24. Standard and keel petals glabrous	...	*I. cassioides*

Indigofera angulosa Edgew. in J. Asiat. Soc. Bengal 21:168. 1852; Baker in Hook. f. Fl. Brit. India 2:97. 1876; Sanj. in J. Econ. Tax. Bot. 5 :1028. 1984 & Legumes of India 184. 1991 & in Hajra et al. Fasc. Fl. India 21: 11, f. 2. 1995.

Herbs, suffruticose, c 1m high. Leaflets 3–5, 2.0–4.3 x 0.5–1.5 cm, elliptic–oblong, lanceolate or obovate, silvery to grey pubescent. Flowers red, many in lax racemes. Pods 10–15 mm long, curved, argenteo–canescent, shortly mucronate, torulose, rectangular. Seeds ellipsoid, blackish–brown.

Fls. & Frts. : September–October.

Illus. : Sanj. in Hajra et al. op. cit.

Distrib. : On gravelly soils along the slopes of deciduous forests, rare and endemic. Amravati, Dhule.

I. astragalina DC. Prodr. 2:228. 1825; Sanj. Legumes of India 185. 1991 & in Hajra et al. Fasc. Fl. India 21: 20. 1995. *I hirsuta* auct. non L. 1753; Baker in Hook. f. Fl. Brit. India 2: 98. 1876 p.p.; Cooke, Fl. Pres. Bombay 1:339. 1958 (Repr.); de Kort & Thijsse in Blumea 30: 121. 1984. *'Ran–methi'*

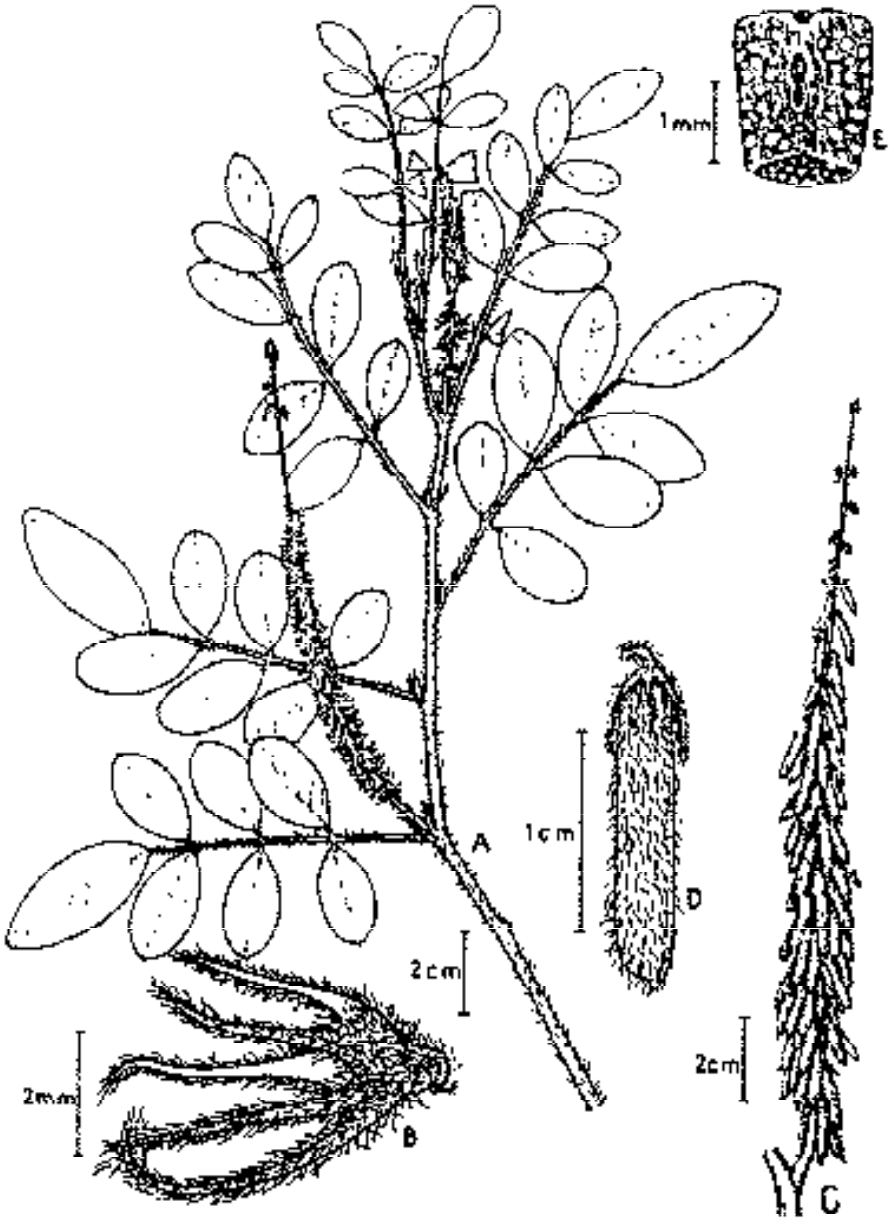
Herbs or undershrubs, 50–100 cm high, hairy. Leaflets 7, 1.2–6.5 x 0.5–2.8 cm, opposite, elliptic–oblong or ovate–oblong, appressed hairy on both surfaces. Flowers bright–scarlet to rosy–purple, in terminal and axillary, compact racemes. Seeds 6–8, black or brown.

Fls. & Frts. : August–December.

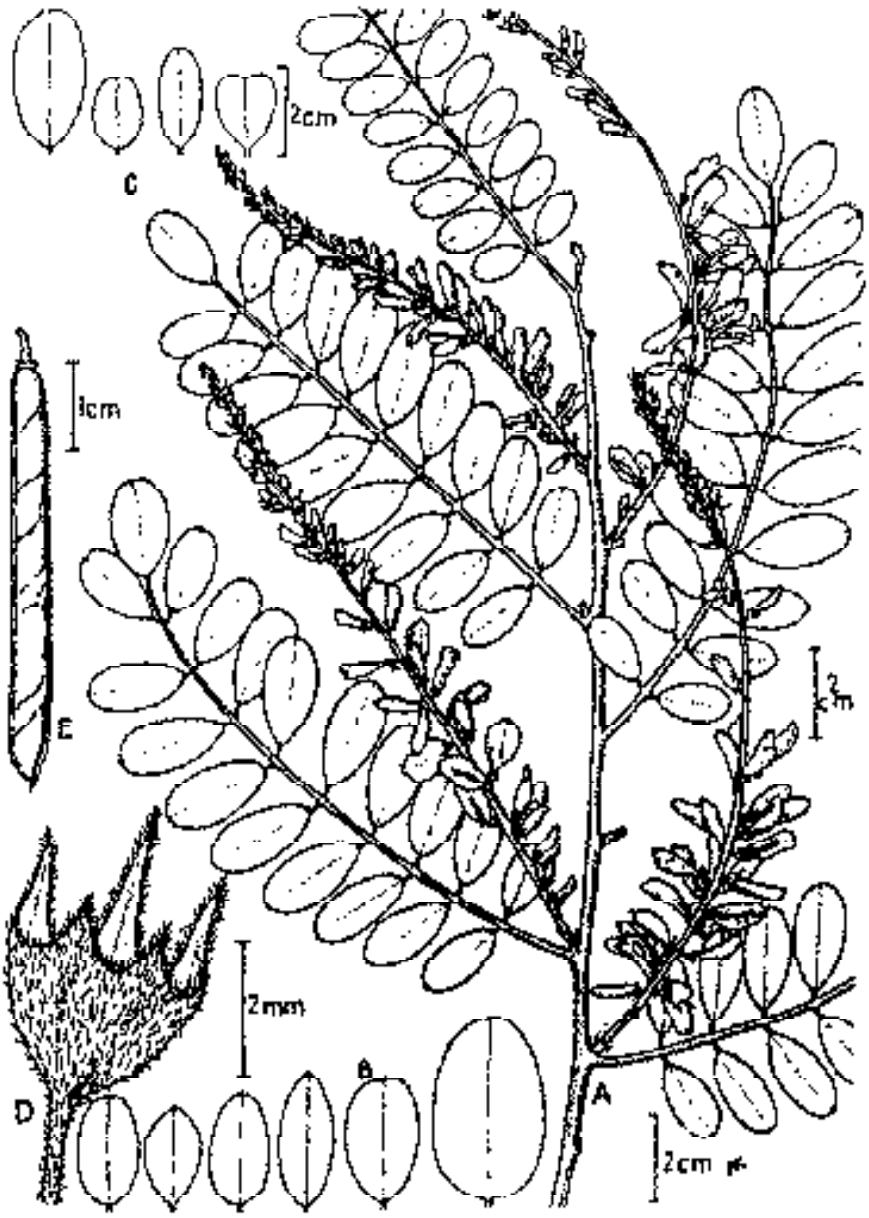
Illus. : Mahesh. Illus. Fl. Delhi f. 59. 1966 *(I hirsuta);* Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 167. 1988.

Distrib. : Common on gravelly slopes of hill, on waste land along 'out sides' etc.

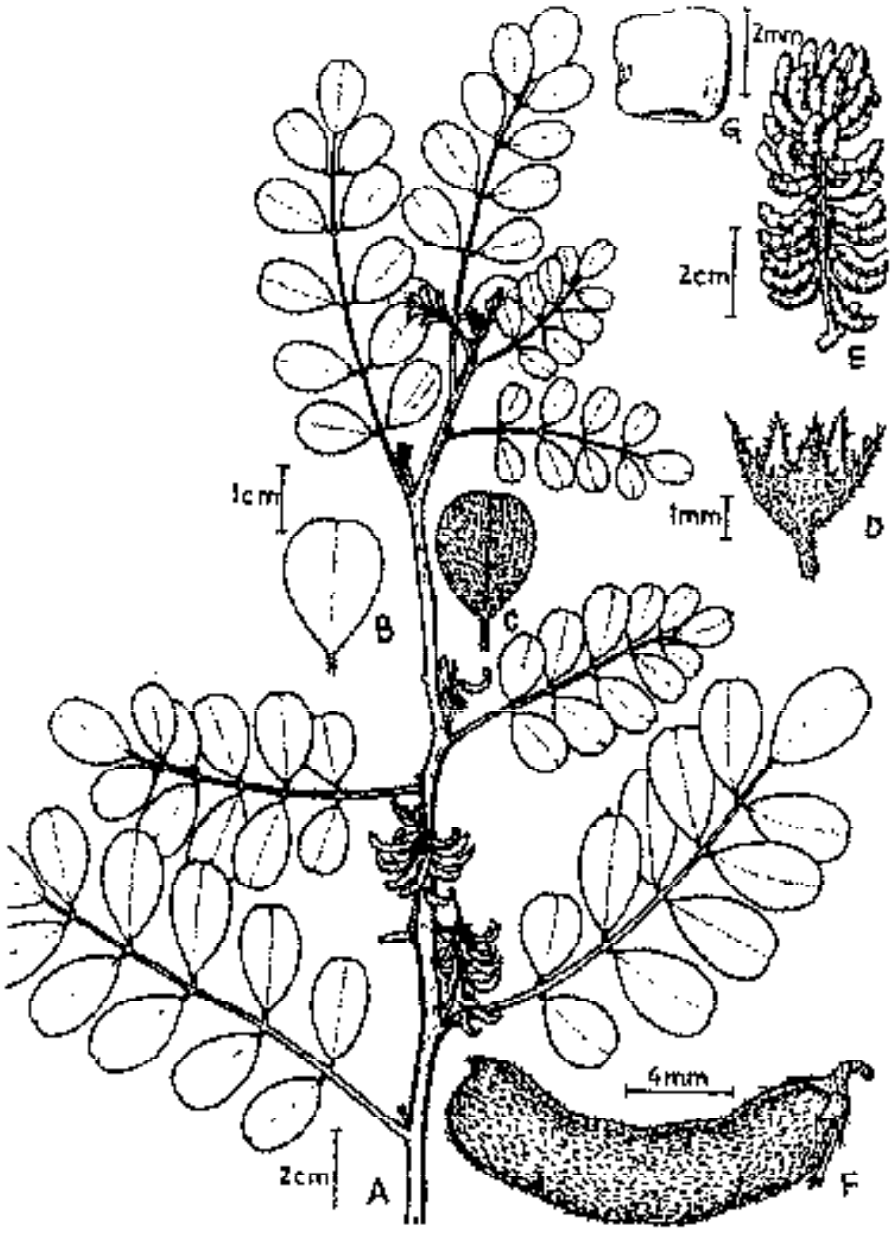
I. cassioides Rottl. ex DC. Prodr. 2:225. 1825; de Kort & Thijsse in Blumea 30:114. 1984; Sanj. Legumes of India 186. 1991 & in Hajra et al. Fasc. Fl. India 21 : 29. 1995. *I. leptostachya* DC. Prodr. 2: 225. 1825; Baker in Hook f. Fl. Brit. India 2: 100. 1876. *I. pulchella* Roxb. Fl. Ind. 3:382. 1832; Baker in Hook f. op. cit. 101; Cooke, Fl. Pres. Bombay 1:341. 1958 (Repr.). *'Baroli', 'Chimnati'.*



Indigofera astragalina DC. : A-Habit; B-Calyx; C-Infructescence; D-Pod; E-seed-hilar view



Indigofera cassioides Rottl. ex DC. (racemes with sterile bracts at base) : A-Habit; B & C- Leaflets; D-Calyx; E-Pod.



Indigofera coerulea Roxb. A-Habit; B-Leaflet-adaxial surface; C-Leaflet-abaxial surface; D-Calyx; E-Infructescence; F-Pod; G-Seed

Shrubs, 1.2–1.8 m high. Leaflets 1.0–2.5 x 0.8–1.4 cm, elliptic–oblong or obovate, hairy on both surfaces, base acute. Flowers bright rosy–purple, in short racemes. Pods turgid, cylindric. Seeds 8–12, reddish–brown, ellipsoid.

Fls. & Frts. : September–April.

Illus. : Wight, Ic. t. 367.1840 (*I. pulchella*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 204. 1982.

Distrib. : In hilly forests, Common.

Notes. : After the study of types of *I. cassioides* and *I. pulchella* Roxb., Ali (Bot. Notis. 3: 569. 1958 & Fl. W. Pak 100. (1977) 1978) maintained them as separate groups with sterile bracts at the base of racemes and without sterile bracts of the base of racemes respectively. Howerver, de Kort & G. Thijse (op. cit.) do not agree as this is a doubtful charcter.

I. coerulea Roxb. Fl. Ind. 3: 377. 1832; Sanj. Legumes of India 156. 1991 & in Hajra et al. Fasc. Fl. India 21: 34, f. 13. 1995; Naik, Fl. Marathwada 1: 278. 1998. *I articulata* sensu T. Cooke, Fl. Pres. Bombay 1:315. 1902 [1:336. 1958 (Repr.)] non Gouan 1773. *I. houer* auct. non Forssk. 1775; Cooke, Fl Pres. Bombay 1: 338. 1958 (Repr.).*'Karumili'*.

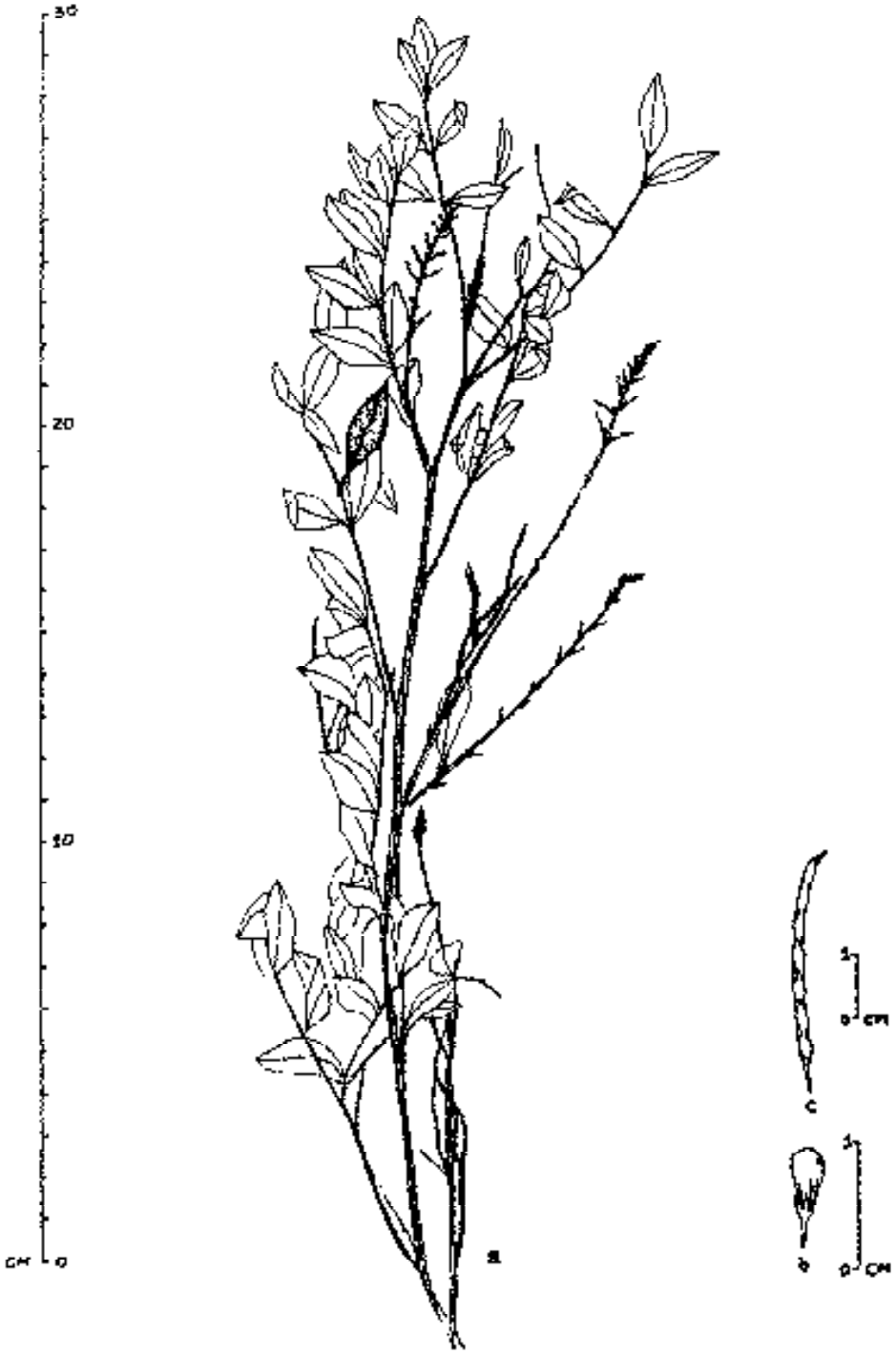
Shrubs, 60–100 cm high; stem and branches argenteo–canescent. Leaflets 0.5–3.2 x 1.2–2.4 cm, obovate, argenteo–canescent on both surfaces, apex rounded and apiculate, base cuneate. Flowers red, in axillary racemes. Pods turgid, torulose recurved, shortly mucronate, hairy when young, at length glabrescent.

Fls. & Fts. : November–January.

Illus. : Sanj. in Hajra et al. op. cit.

Distrib. : Occasional on rocky hills. Ahmednagar, Dhule, Marathwada (Naik, op. cit.), Pune.

I. colutea (Burm. f.) Merr. in Philip. J. Sci. 19: 355. 1921; Pataskar & Ahuja in J. Bombay Nat. Hist. Soc. 61:126. 1970; Sanj. Legumes of India 187. 1991 & in Hajra et al. Fasc. Fl. India 21: 39. 1995. *Galega colutea* Burm. f. Fl. Ind. 172. 1768. *Indigofera viscosa* Lam. Encycl. 3:249. 1789; Baker in Hook. f. Fl. Brit. India 2:95. 1876; Cooke, Fl. Pres. Bombay 1:337. 1958 (Repr.).



Indigofera constricta Trim. A-Twig; B-Flower; C-Pod

Herbs, 30–90 cm high, erect, suffruticose. Leaflets opposite, sessile, 0.4–1.0 x 0.2–0.4 cm, obovate–elliptic, appressed white pubescent beneath. Flowers pink, 6–12 in axillary, lax racemes. Pods subcylindric, straight, beaked, faintly torulose, clothed with gland tipped and appressed white hairs.

Fls. & Frts. : Septmber–October.

Illus. : Gillet et al. in Milne Redhead & Polhill, Fl. Trop. E. Afr. Legum. Subfam. Papilionaceae pt. 3(1) : 267, f. 41 (1–14). 1971: Matthew, Fur Illus. Fl. Tamilnadu Carnatic 4: t. 170. 1988

Distrib. : Rare. Dhule.

I. constricta (Thw.) Trim. Cat. Ceyl. Pl. 23. 1885; Cooke, Fl. Pres. Bombay 1:340. 1958 (Repr.); Diwakar & Moorthy in J. Econ. Tax. Bot. 7:498. (1985) 1986; Sanj. Legumes of India 187. 1991 & in Hajra et al. Fasc. Fl. India. 21: 41. 1995. *I. flaccida* Koen. var. *constricta* Thw. Enum. Pl. Zeyl. 411. 1864; Baker in Hook. f. Fl. Brit. India 2: 99. 1876.

Shrubs, 90–120 cm high. Leaflets opposite, 1.8–2.5 x 0.9 – 1.4 cm, elliptic–oblong, appressed pubescent, apiculate. Flowers red or green with pink tinge, many in axillary racemes. Pods linear, subtetragonous, curved, constricted between seeds, sparingly hairy. Seed 8–12, brownish.

Fls. & Frts. : July–Octomber.

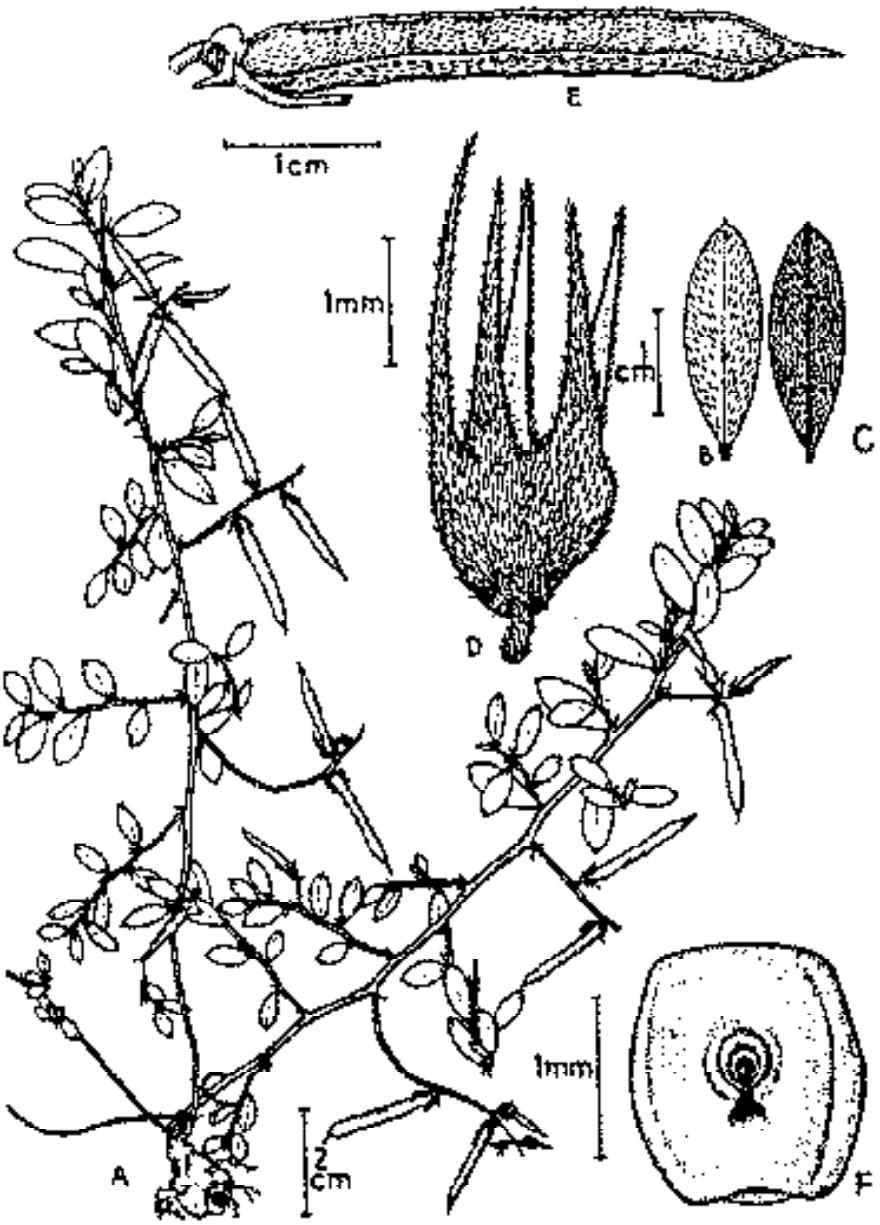
Illus. : Sanj. in Nayar & Sastry, Red Data Book of Ind. Pl. 2:127, f. 1988.

Distrib. : In moist deciduous forests, rare. Bombay, Buldhana, Jalgaon, Raigad.

I. cordifolia Heyne ex Roth, Nov. Pl. Sp. 357. 1821; Baker in Hook. f. Fl. Brit. India 2:93. 1876; Cooke, Fl. Pres Bombay 1: 331. 1958 (Repr.); de Kort & Thijsse in Blumea 30: 116. 1984; Sanj. Legumes of India 187. 1991 & in Hajra et al. Fase. Fl. India 21: 45. 1995. *'Bechka', 'Godadi'.*

Herbs, prostrate. Leaves 0.5–2.2 x 0.4–1.5 cm, densely hairy, apex subobtuse or mucronate, base cordate. Flowers red, 4–8 in axillary clusters. Pods deflexed, beaked, hairy. Seeds greenish–brown, truncate at one end.

Fls & Frts. : August–January.



Indigofera dalzellii T. Cooke : A-Habit; B-Leaflet adaxial surface; C-Leaflet-abaxial surface; D-Calyx; E-Pod; F-Seed-hilar view

Illus. : Wight, Ic. t. 333. 1840; Matthew, Fur Illus. Fl. Tamilnadu Carnatic 4: t. 171. 1988.

Distrib. : Common throughout in plains in open situations.

I. dalzellii T. Cooke, Fl. Pres. Bombay 1:311. 1902 [1: 331. 1958 (Repr.); Sanj. in J. Econ. Tax. Bot. 5:1031. 1984 & Legumes of India 188. 1991 & in Hajra et al. Fasc. Fl. India 21: 49, f. 18. 1995. *I. triquetra* Dalz. in Hook. Kew. J. 2:36 1850 non E. Meyer 1836; Baker in Hook f. Fl. Brit. India 2: 93.1876.

Herbs, perennial. Leaves 1.0–1.8 x 0.4–0.8 cm, appressed hairy beneath, apex subacute or mucronate, base acute. Flowers purple, in axillary racemes. Pods linear, tetragonous, scabrous, winged.

Fls. & Frts. : August–December.

Illus. : Sanj. in Hajra et al. op. cit.

Distrib. : On rocky slopes and among grasses on plateau, rare and endemic. Ratnagiri Satara.

I. deccanensis Sanj. in J. Econ. Tax. Bot. 4. 282. 1983; Sanj. Legumes of India 188. 1991 & in Hajra et al. Fasc. Fl. India 21: 51, f. 19. 1995. *I. torulosa* W. Khan in Indian Forester 108: 516. 1982 non E. Meyer, 1836.

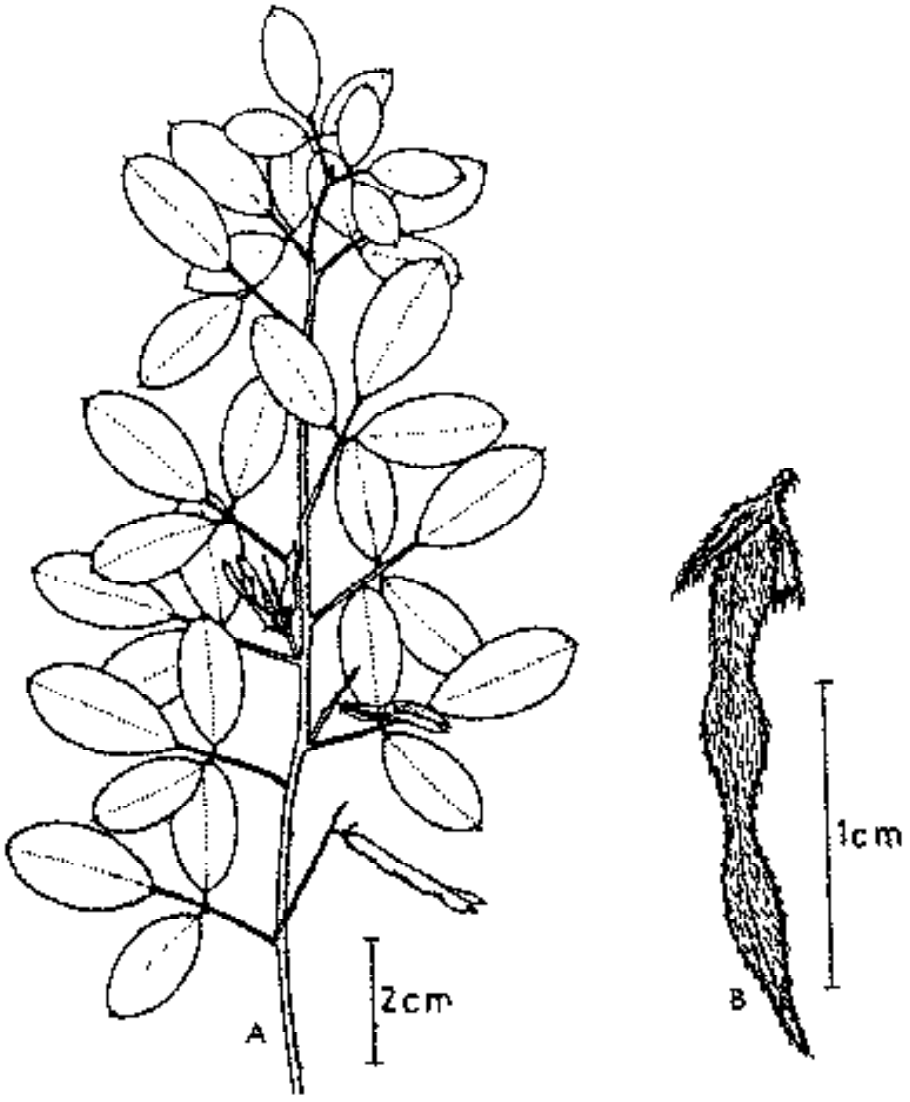
Shrubs, 50–90 cm high; branches angular, hairy. Leaves 3–foliolate, 3–4 cm long; leaflets 10–25 x 6–10 mm, obovate or elliptic, apex rounded, mucronate, base obtuse, strigose on both surfaces. Flower 8–10, pink or pale pink, in 1.5–4.5 cm long racemes. Pods subtetragonous, torulose, hairy, beaked. Seeds yellowish–brown, subtetragonous, ellipsoid, rounded at both ends.

Fls. & Frts. : August–December.

Illus. : Sanj. op. cit. 53, f. 19. 1995.

Distrib. : Rare in slopes of hills and banks of rivers between 500–800 m altitude. Beed. Endemic.

I. glabra L. Sp. Pl. 751. 1753; Cooke, Fl. Pres. Bombay 1:337. 1958 (Repr.); de Kort & Thijsse in Blumea 30:119.1984; Sanj. Legumes of India 189. 1991 & in Hajra et al. Fasc. Fl. India, 21: 64. 1995. *I. pentaphylla* Murr. Syst. Veg. ed. 13.564. 1774; Baker in Hook. f. Fl. Brit. India 2:95. 1876.



Indigofera deccanensis Sanj. : A-Habit; B-Pod.

Herbs, 30–90 cm high. Leaflets c 1.2 x 0.8 cm, obovate–elliptic, appressed–pubescent, young gland tipped, apex obtuse or apiculate. Flowers pale pink, in axillary racemes. Pods pale–brownish coppery, subcylindric or obscurely 4–angled, beaked. Seeds yellow, oblong–cubical, 4–angled.

Fls. & Frts. : September–March.

Illus. : Wight, Ic. t. 385. 1840 (*I. pentaphylla*).

Distrib. : Rare in deciduous forests. Chandrapur, Nagpur, Yavatmal.

I. glandulosa Wendl. Bot. Beob. 55. 1748; de Kort & Thijsse in Blumea 30:110. 1984; Sanj. Legumes of India 189. 1991 & in Hajra et al. Fasc. Fl. India 21: 66. 1995. *I. glandulosa* Roxb. ex Willd. Sp. Pl. 3: 1227. 1803; Baker in Hook. f. Fl. Brit. India 2: 94. 1876; Cooke, Fl. Pres. Bombay 1: 332. 1958 (Repr.).

1. Flowers in axillary clusters ... var. *glandulosa*
1. Flowers in short, peduncled (up to 1 cm long) clustered racemes ... *var. sykesii*

var. **glandulosa.** *'Borupdi'.*

Herbs, 20–90 cm high,erect. Leaflets 0.6–2.5 x 0.5–1.0 cm, elliptic–obovate or oblanceolate, nigro–punctate beneath. Flowers red. Pods linear–oblong, angled, densely hairy. Seeds brown, subreniform.

Fls & Frts. : August–December.

Illus. : Wight, Ic. t. 330. 1840; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 172. 1988.

Distrib. : Common throughout the State as a weed among grasses in plains and hilly forests.

var. **sykesii** Griff. ex Baker in Hook. f. Fl. Brit. India 2: 94. 1876; Sanj. in J. Econ. Tax. Bot. 5:1031. 1984 & Legumes of India 190. 1991 & in Hajra et al. Fasc. Fl. India 21: 70, f. 26 h–j. 1995. *I. monosperma* Blatt. in J. Asiat. Soc. Bengal 24: 341. 1934. *'Barbada'.*

Herbs. Leaflets elliptic–obovate, nigro–punctate beneath. Racemes elongated up to 1 cm long. Pods globose, 2.5 mm across with very short wings.

Fls. & Fruts. : August–December.

Illus. : Sanj. in Hajra et al. op. cit.

Distrib. : Frequent as a weed in pastures and wet fields. Aurangabad, Bombay, Buldhana, Osmanabad, Satara.

Notes : This variety differs from the species proper in having 1–seeded spherical pods with serrated wings.

I. hendecaphylla Jacq. Ic. Pl. Rar. t. 570. 1781–93 & Coll. Bot. 2: 358. 1788; Cooke, Fl. Pres. Bombay 1: 334. 1958 (Repr.); Du pay et al. in Kew Bull. 48: 727. 1993. *I. endecaphylla* Lam. Encycl. Suppl. 3: 147. 1813; Baker in Hook. f. Fl. Brit. India 2: 98. 1876.

Herbs, 30–90 cm long; stems trailing. Leaves 2.5–6.0 cm long; leaflets 5–11, alternate, 0.8–2.5 x 0.4–1.0 cm, oblanceolate, apex rounded or apiculae, base subacute, grey hairy on both surfaces. Flowers red or voilet, many in compact axillary racemes. Pods deflexed, 4–gonous, striaght, appressed hairy. Seed 6–10, oblong, truncate at both ends.

Fls. & Frts. : July–December.

Illus. : Matthew. Illus. Fl Palni Hills t. 188. 1996 (*I. spicata* Forssk.).

Distrib. : On sandy banks of rivers and hilly foreses along with grasses, common. Ahmednagar, Kolhapur, Latur, Nasik, Osmanabad, Parbhani, Pune, Satara, Thane.

Notes .: According to Du pay et al. (1993), *I. spicata* Forssk. is confined to Africa, Madagascar, Mascarenes & Yemen whereas *I. hedecaphylla* is most wide spread in Africa & extend upto S.E. Asia, Indo–China, Japan & Pacific.

I. hochstetteri Baker in Oliver, Fl. Trop. Africa 2:101. 1871; Sanj. Legumes of India 191. 1991 & in Hajra et al. Fasc. Fl. India 2: 83. 1995. *I. anabaptista* Steud. ex Baker in Hook. f. Fl. Brit. India. 2:102. 1876; Cooke, Fl. Pres. Bombay 1 : 334. 1958 (Repr.).

Herbs or unershrubs, 30–45 cm high. Leaves imparipinnate; leaflets 5, opposite, 1.0–2.5 x 0.4–0.8 cm, obovate–oblong or oblanceolate, appressed hairy. Flowers red, 12–20 in dense, axillary racemes. Pods linear, falcate, appressed–pubescent. Seeds 6–8, discoid, brownish.

Fls. & Frts. : September–October.

Illus. : Mahesh. Illus. Fl. Delhi f. 57. 1966.

Distrib. : Rare in plains. Aurangabad, Jalna, Nanded, Pune.

I. karnatakana Sanj. in Taxon 32: 120. 1983. & Legumes of India 191. 1991 & in Hajra et al. Fasc. Fl. India 21: 85, f. 33. 1995. *I. tenuifolia* Rottl. ex Wight & Arn. Prodr. 200: 1834 non Lam. 1789; Baker in Hook. f. Fl. Brit. India 2: 95. 1876; Cooke, Fl. Pres. Bombay 1: 337. 1958 (Repr.).

Herbs, 15–20 cm high, diffuse. Leaflets linear–obovate or oblanceolate, apex apiculate, base subacute. Flowers bright red, in short racemes. Pods subcylindric or compressed. Pods 10–12, oblong, truncate at both ends, punctate.

Fls. & Frts. : Sepember–November.

Illus. : Sanj. in Hajra et al. op. cit.

Distrib. : Rare. 'Konkan' (Cooke, op. cit.).

I. linifolia (L.) Retz. Obs. Bot. 4: 29. 1786; Baker in Hook. f. Fl. Brit. India 2: 92. 1876; Cooke, Fl. Pres. 1: 330. 1958 (Repr.); de Kort & Thijsse in Blumea 30:123. 1984; Sanj. Legumes of India 192. 1991 & in Hajra et al. Fasc. Fl. India. 21: 93. 1995. *Hedysarum linifolium* L. f. Suppl. 331. 1781. *Indigofera linifolia* var. *campbelli* Wight ex Baker in Hook. f. op. cit.; Cooke, op. cit. 331. *'Pandarphali.'*

Herbs, prostrate. Leaves 0.4–2.3 x 0.2–0.5 cm, appressed hairy, acute at apex, Flowers red, axillary, solitary or few in short racemes. Pods paniculate, silky–hairy. Seeds globose, brownish–black.

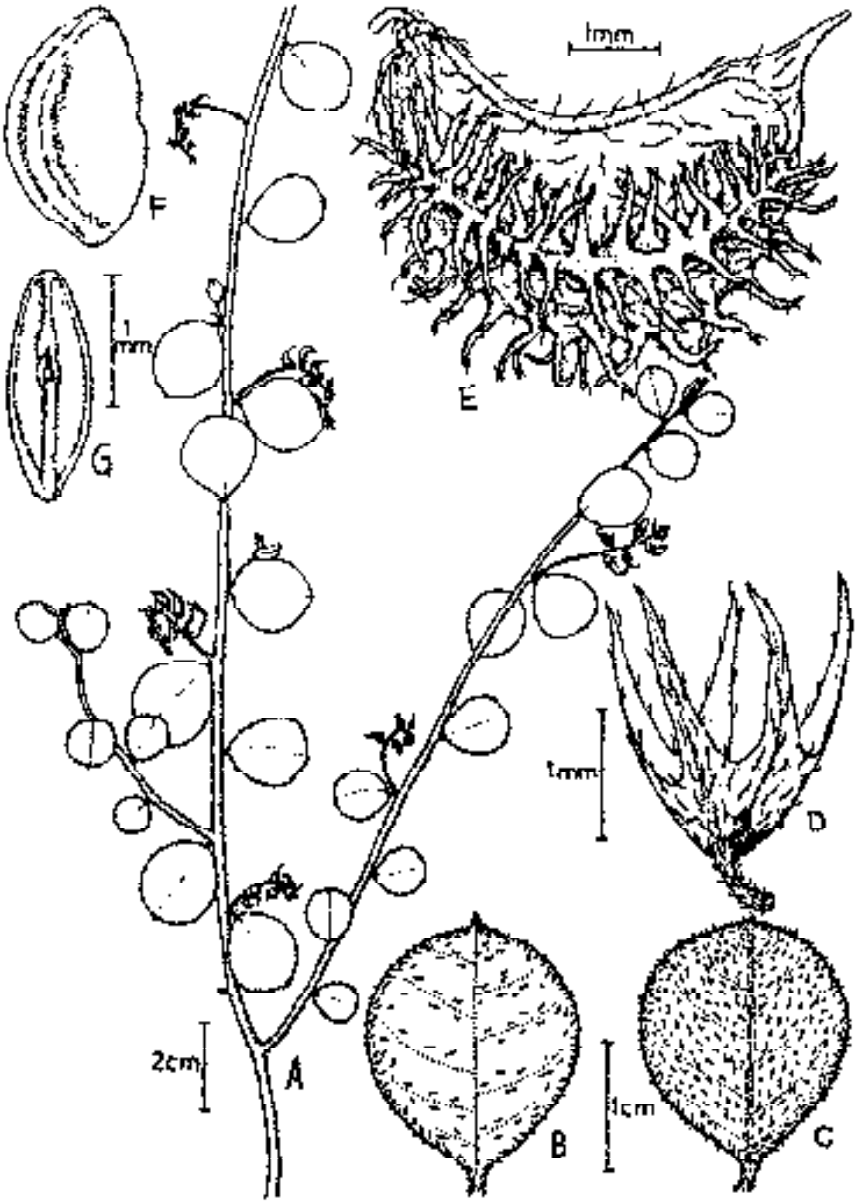
Fls. Frts. : August–January.

Illus. : Wight, Ic. t. 313. 1840; Mahesh. Illus. Fl. Delhi. f. 54. 1966; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 173. 1988.

Distrib. : Common throughout in open grasslands and rocky soils.

I. linnaei Ali in Bot. Notis. 111: 549. 1958; de kort & Thijsee in Blumea 30:125. 1984; Sanj. Legumes of India 192. 1991 & in Hajra et al. Fasc. Fl. India 21: 96. 1995. *I. enneaphylla* L. Mant. Pl. 2: 272. 1771 & Append. 571. 1771 nom. illeg.; Baker in Hook. f. Fl. Brit. India 2:94. 1876; Cooke, Fl. Pres. Bombay 1: 332. 1958 (Repr.). *'Bhuiguli.'*

Herbs, spreding, grey—pubescent. Leaflets 0.8–2.5 x 0.3–1.2 cm, obovate, appressed–hairy. Flowers red, 10–20 in axillary clusters. Pods subovoid, apiculate, hairy. Seeds brown, globose.



Indigofera nummularifolia (L.) Livera ex Alst. : A-Habit; B-Leaf-adaxial surface; C-Leaf-abaxial surface; D-Calyx; E-Pod; F-Seed side view; G-Seed-hilar view

Fls. & Frts. : July–December.

Illus. : Wight, Ic. t, 403. 1840. (*I. enneaphylla*); Mahesh. Illus. Fl. Delhi f. 56. 1966; Matthew, Fur. Illus. Fl. Tamilnadu Caranatic 4: t. 174. 1988.

Distrib. : Common throughout the State in open, moist places and in deciduous forests.

Notes : Linnaeus in Mantissa described *Hedysarum prostratum*. Again in Mantissa 2:272 & App. 571.1771 he has described *I. enneaphylla*. Both names have been given to the same species. Thus rendering the latter name superfluous and illegitimate. The epithet *prostrata* of *Hedysarum* could not be transferred to *Indigofera* as it has been preoccupied by *I. prostrata* Willd. 1805, *I. prostrata* Perr. ex DC. 1825, *I. prostrata* Roxb., 1832 and *I. prostrata* Klein ex Wight & Arn. 1834. So Ali has proposed the new name *I. linnaei*.

I. nummularifolia (L.) Livera ex Alst. in Trim. Hanb. Fl. Ceylon Suppl. 6: 172. 1931; Sanj. Legumes of India 193. 1991 & in Hajra Fasc. Fl. India 21: 104. 1995. *Hedysarum nummularifolium* L. Sp. Pl. 746. 1753. *I. echinata* Willd. Sp. Pl. 3:1222. 1802; Baker in Hook. f. Fl. Brit. India 2: 92. 1876; Cooke, Fl. Pres. Bombay 1: 330. 1958 (Repr.).

Herbs, diffuse. Leaves 1.5–2.5 x 0.8–1.9 cm, broadly ovate–elliptic, glabrous or sparsely hairy, apex obtuse or apiculate, base rounded. Flowers pink, 10–15 in racemes. Pods triquetrous.

Fls. & Frts. : September–October.

Illus. : Wight, Ic. t. 316. 1840 (*I. echinata*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 205. 1982.

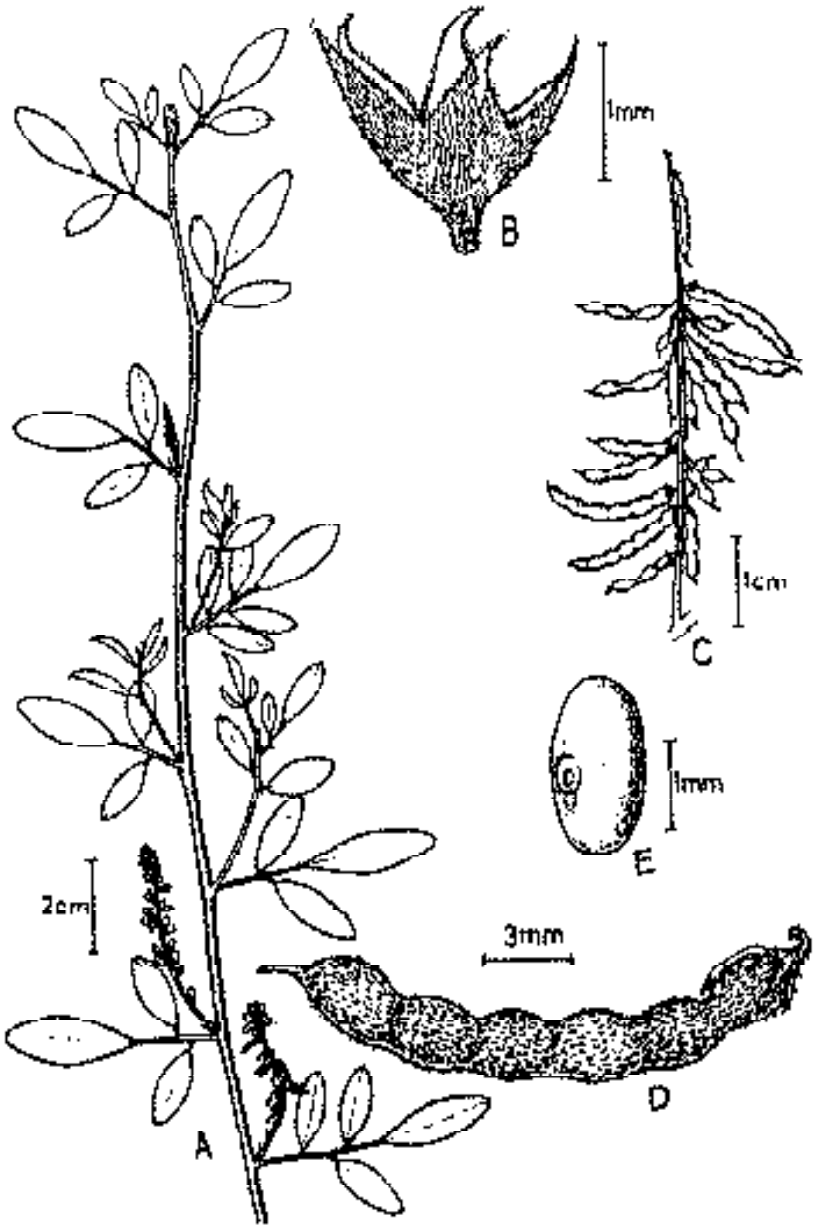
Distrib. : In sandy soil, rare. Chandrapur, Nanded, Ratnagiri.

I. oblongifolia Forssk. Fl. Aeg.–Arab. 137. 1775; Sanj. Legumes of India 193. 1991 & in Hajra et al. Fasc. Fl. India 21: 108. 1995. *I. paucifolia* Delile, Fl. 'd' Egypte 107, t. 37, f. 37. 1813; Baker in Hook. f. Fl. Brit. India 2: 97. 1876; Cooke, Fl. Pres Bombay 1:334. 1958 (Repr.).

Shrubs, 90–180 cm high, much branched, argenteo–canescent. Leaflets 3–5, 1.2–2.5 x 0.6–1.2 cm, elliptic–oblong or oblanceolate, white pubescent, apex obtuse, base acute. Flowers red, 20–50 in spicate racemes. Pods torulose, slightly curved. Seeds tetragonous, truncate at one end.

Fls. & Frts. : September.

Illus. : Mahesh. Illus. Fl. Delhi f. 55. 1966.



Indigofera oblongifolia Forssk. : A-Habit; B-Calyx; C-Infructescence; D-Pod; E-Seed-hilar view.

Distrib. : Rare in plains. Chandrapur, Dhule.

I. parviflora Heyne ex Wight & Arn. Prodr. 201. 1834; Baker in Hook. f. Fl. Brit. India 2: 97. 1876; Cooke, Fl. Pres. Bombay 1:338. 1958 (Repr.); Sanj. Legumes of India 193. 1991 & in Hajra et al. Fasc. Fl. India 21: 110. 1995.

Herbs, 20–75 cm high, slender, argenteo–canescent. Leaflets 7–9, 0.5–1.2 x 0.2–0.6 cm, linear–oblong, elliptic–oblong or oblanceolate, membranous. Flowers reddish–purple, in axillary racemes. Pods subcylindric, deflexed with curved tips, hairy.

Fls. Frts. : August–January.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 177. 1988.

Distrib. : In wastelands and as forest undergrowth, frequent 'Konkan' (Cooke, op. cit.), Osmanabad, Pune.

I. prostrata Willd. Sp. Pl. 3:1226. 1802; Sanj. Legumes of India 194. 1991. *I. trifoliata* auct. pl. non L. 1753; Baker in Hook. f. Fl. Brit. India 2:96. 1876 p.p.; Cooke, Fl. Pres. Bombay 1:335. 1958 (Repr.) p. p.

Herbs, 10–30 cm high, prostrate. Leaflets 1.0–2.5 x 0.5–0.9 cm, obovate or oblanceolate, appressed hairy, nigro–punctate beneath, apex obtuse, base acute. Flowers red, in axillary racemes. Pods deflexed, brown.

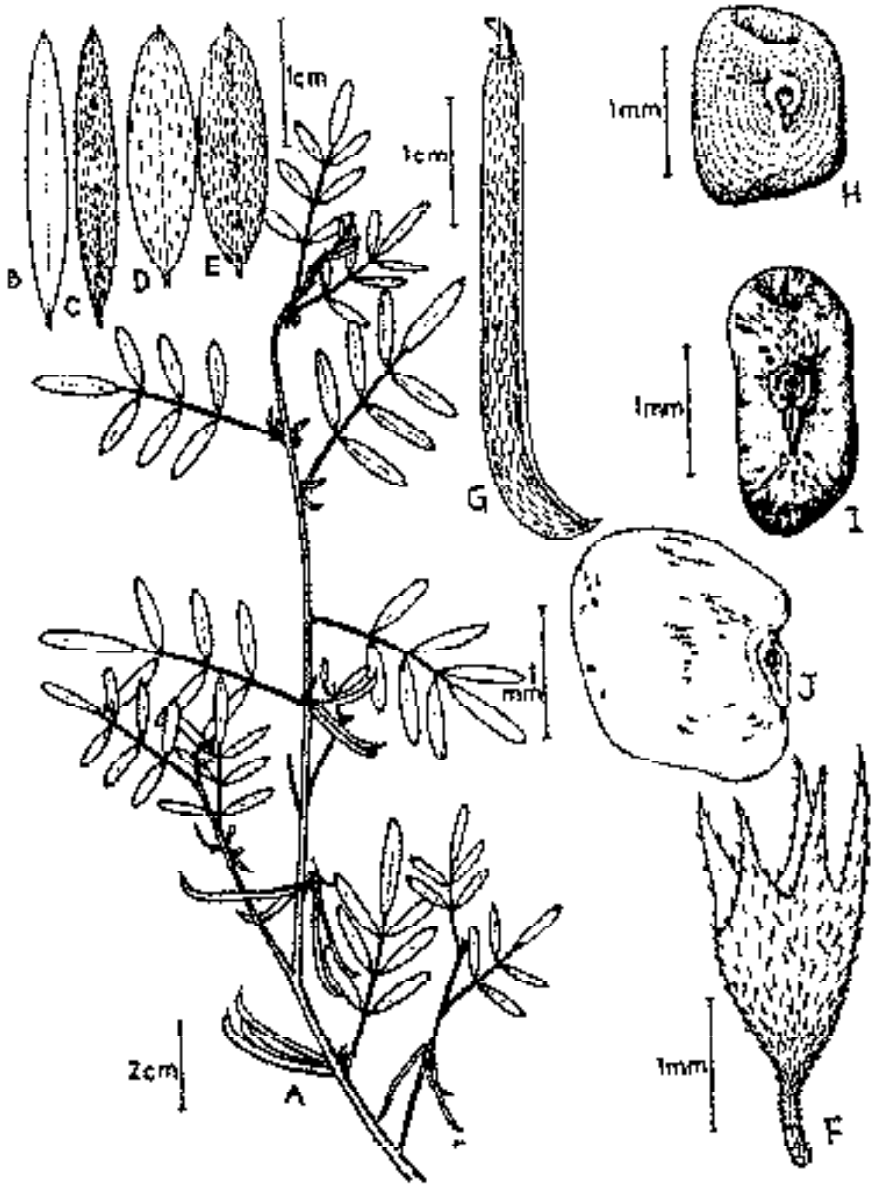
Fls. & Frts. : August–October.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4:t. 178. 1988.

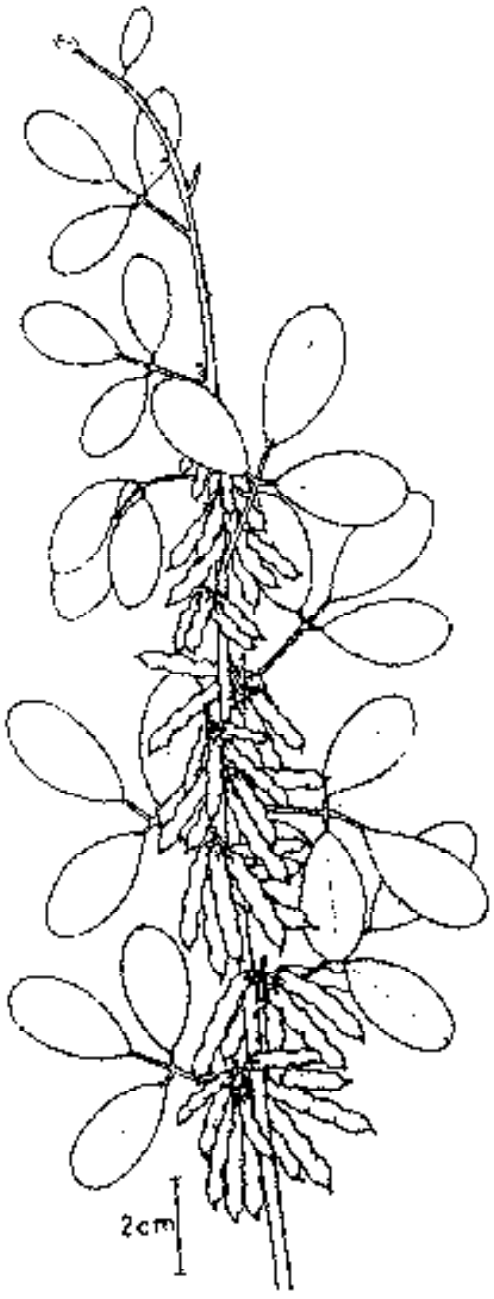
Distrib. : Among grasses along the hills, common. Aurangabad, Chandrapur, Nasik, Pune, Raigad, Ratnagiri, Solapur.

I. santapaui Sanj. in Bull. Bot. Surv. India 25: 202. 1985 & Legumes of India 194. 1991 & in Hajra et al. Fasc. Fl. India 21 : 117, f. 50. 1995.

Herbs, 15–35 cm high; branches reddish, hairy. Leaves 3–foliolate; leaflets 2.5–4.0 x 1.8 cm, obovate to obovate–oblong, apex rounded and mucronate, base cuneate, sparsely hairy on both surfaces. Flowers salmon red, 6–12 in 4–8 mm long, axillary, sessile racemes. Pods deflexed, subcylindric, constricted between seeds, hairy. Seeds 4, reddish–brown, rounded at ends, obscurely winged.



Indigofera parviflora Heyne ex Wight & Arn. : A-Habit; B & D - Leaflet-adaxial surface; C & E - Leaflet-abaxial surface; F-Calyx; G-Pod; H & I - Seed-hilar view; J-Seed-side view.



Indigofera santapaui Sanj.

Fls. & Frts. : August–November.

Illus. : Sanj. op. cit. 1995.

Distrib. : On exposed hill slopes at an altitude c 1500 m, Vazirghad–Purandhar in Pune dist., Maharashtra–Endemic.

I. tinctoria L. Sp. Pl. 751. 1753; Baker in Hook. f Fl. Brit. India 2: 99. 1876 p.p.; Cooke, Fl. Pres. Bombay 1: 339. 1958 (Repr.); de Kort & Thijsee in Blumea 30: 137. 1984; Sanj. Legumes of India 195. 1991 & in Hajra et al. Fasc. Fl. India 21: 133. 1995.

Shrubs, 40–150 cm high. Leaves alternate; leaflets 7–11, 0.4–2.8 x 0.2–0.8 cm, oblong, obovate or oblanceolate, hairy beneath, apex rounded, base acute. Flowers red, many in axillary, spicate racemes. Pods linear, thickened at deflexed sutures. Seeds brown, cylindric, truncate.

Fls. & Frts. : August–February.

Illus. : Wight, Ic. t. 365. 1840; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 179. 1988.

Distrib. : Common throughout in plains, in open situations and also cultivated.

I. trifoliata L. in Tourn. Cent. Pl. 2:29. 1756; Baker in Hook. f. Fl. Brit. India 2:96. 1876. p.p.; Cooke, Fl. Pres. Bombay 1:335. 1958 (Repr.), p.p.; de Kort & Thijsse in Blumea 30:137. 1984; Sanj. Legumes of India 196. 1991.

1. Pods 1–4–seeded, narrowly winged ... var. *duthiei*
1. Pods 6–10–seeded, wingless ... var. *trifoliata*

var. **trifoliata.**

Herbs, suffruticose, 20–60 cm high. Leaflets 3, 0.8–3.5 x 0.5–0.9 cm, oblanceolate, hairy, apex rounded or apiculate, base subacute. Flowers red, in dense racemes. Pods 4–gonous, hairy.

Fls. & Frts. : September–November.

Illus. : Wight, Ic. t. 314. 1840; Matthew, Fur Illus. Fl. Tamilnadu Carnatic 4: t. 180. 1988.

Distrib. : Common among grasses in plains.

var. **duthiei** (Drumm. ex Naik.) Sanj. Legumes of India 196. 1991 & in Hajra et al. Fasc. Fl. India 141. 1995. *I. duthiei* (Drumm.) ex Naik in Proc. Ind. Sci. 71 (6): 227. 1970 & Fl. Osmanabad 91. 1979; Sanj. in Econ. Tax. Bot. 5: 1031. 1984. *'Barbada'*.

Herbs, suffruticose or underhrubs, 30–60 cm high. Leaves 3–foliolate; leaflets 1.0–1.5 x 0.4–0.7 cm, oblanceolae, pellucido–punctate beneath. Flowers red, sessile, 4–8 in short racemes. Pods deflexed, 4–gonous, narrowly winged.

Fls. & Frts. : August–December.

Distrib. : As a weed on pasture and wastelands, occassional and endemic. Aurangabad, Beed, Chandrapur, Jalna, Latur, Nanded, Osmanabad, Parbhani.

I. trita L. f. Suppl. Pl. 335. 1781; Baker in Hook. f. Fl. Brit. India 2:96. 1876; Cooke, Fl. Pres. Bombay 1:335. 1958 (Repr.); de Kort & Thijsse in Blumea 30: 139. 1984; Sanj. Legumes of India 196. 1991 & in Hajra et al. Fasc. Fl. India 21: 143. 1995; Naik, Fl. Marathwada 1: 284. 1998.

1. Leaves 3–foliolate ;
   2. Racemes shorter (less than 4.5 cm) than subtending leaf ... var. *trita*
   2. Racemes longer (more han 4.5 cm) than subtending leaf:
      3. Pods narrow (c 1 mm), lax. spreading ... var. *maffei*
      3. Pods broad (more han 2mm), compact, deflexed ... var. *purandharenis*
1. Leaves 5–7–foliolate, often basal levaes 3–foliolate:
   4. Pods pointed, sutures margined, apprsed hairy ... var. *marginulata*
   4. Pods not as above, curved, hanging ... var. *scabra*

var. **trita.**

Undershrubs, 1.5–2.0 m high. Leaflets 3, 1.8–4.5 x 1.0–1.5 cm, elliptic–oblong, densely pubescent beneath, apex rounded, apiculate, base obtuse. Flowers red, in axillary racemes. Pods 4–gonous, deflexed, appressed–hairy.

Fls. & Frts. : October – January.

Distrib. : Rare in open forests. Amravati, Nasik, Marathwada (Naik, op. cit.), Pune, Thane.

var. **marginulata** (Grah. ex. Wight & Arn.) Sanj. in Bull. Bot. Surv. India 26: 118. 1985 & Legumes of India 197. 1991 & Hajra et al. Fasc. Fl. India 21: 147. 1995. *I. marginulata* Grah. ex Wight & Arn. Prodr. 204. 1834; Baker in Hook. f. Fl Brit. India 2: 97. 1876 p.p.; Cooke. Fl. Pres. Bombay 1: 336. 1958 (Repr.).

Undershrubs, 60–120 cm high. Leaves imparipinnate; leaflets 1.0–1.5 x 0.5–0.7 cm. elliptic or oblanceolate, appressed pubescent, apiculate at apex. Flowers in lax racemes. Pods pointed, sutures margined, appresed hairy.

Fls. & Frts. : October–January.

Distrib. : Rare and endemic. 'Konkan' (Cooke, op. cit.).

var. **maffeii** (Chiov.) Ali in Bot. Notis. 111: 559. 1958; Sanj. in Legumes of India 197. 1991 & in Hajra et al. Fasc. Fl. India 21: 146, f. 55. 1995. *I. maffeii* Chiov. in Attr. Ist Bot. Pavia 4, 7: 128, t. 5. 1996. *I. oreophila* Sant. & Panth. in J. Bombay Na. Hist. Soc 54: 222, t. 1. 1956.

Undershrubs, 1.5–2.0 m high. Leaflets 3, 1.8–4.5 x 1.0–1.5 cm, elliptic–oblong, apex rounded, apiculate, base obtuse, densely pubescent beneath. Flowers red, in axillary racemes.

Fls. & Frts. : August–January.

Illus. : Sant. & Panth. op. cit.; Sanj. op. cit. 1991.

Distrib. : In open forest, rare. Nasik, Pune, Thane.

var. **purandharensis** Sanj. in Bull. Bot. Surv. India 26: 117. 1985 & Legumes of India 197. & 1991 & in Hajra et al. Fasc. Fl. India 21: 150, f. 56. 1995.

This variey differs from var. *trita* in having longer racemes and flowers as well as shorter, compact and deflexed pods.

Fls. & Frts. : August–November.

Illus. : Sanj. in Hajra et al. op. cit.

Distrib. : Slopes of dry hills between 800 and 900 m. Pune, Maharashtra–Endemic.

var. **scabra** (Roth) Ali in Bot. Notis. 111. 558. 1958; Sanj. in Bull. Bot. Surv. India 26: 118. 1985 & Legumes of India 197. 1991 & in Hajra et al. Fasc. Fl. India 21: 150, f. 57. 1995. *I. scabra* Roth, Nov. Pl. Sp. 359 1821. *I. subulata* auct. non Vahl ex Poir. 1789; Baker in Hook f. Fl. Brit. India 2: 96. 1876 excl. syn.

This variety differs from var. *trita* in having longer, 5–7-foliolate leaves; 5–7 cm long racemes (much longer in fruits), 3–4 cm long, curved, hanging pods.

Fls. & Frts. : September–December.

Illus. : Sanj. in Hajra et al. op. cit.

Distrib. : Khandesh & 'Konkan'.

I. wightii Grah. ex Wight & Arn. Prodr. 202. 1834; Baker in Hook. f. Fl. Brit India 2: 99. 1876; Cooke Fl. Pres. Bombay 1: 340. 1958 (Repr.); Sanj. Legumes of India. 198. 1991 & in Hajra et al. Fasc. Fl. India 21: 155. 1995.

Undershrubs; branches many, grey hairy. Leaflets opposite 0.5–1.5 x 0.6 cm, elliptic or oblanceolate, apex rounded and mucronate, base acute. Flowers red in dense, subsessile racemes. Pods cylindric, mucronate, appressed white–pubescent. Seeds 8–12.

Fls. & Frts. : August–October.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4:t. 182. 1988.

Distrib. : Rare. Kolhapur, 'Konkan' (Cooke, op. cit.).

LABLAB Adans.

Lablab purpureus (L.) Sweet, Hort. Brit. ed. 1, 481. 1827; Sanj. Legumes of India. 199. 1991. *Dolichos purpureus* L. Sp. Pl. ed. 2. 1021. 1763. *D. lablab* L. Sp. Pl. 725. 1753; Baker in Hook. f. Fl. Brit. India 2:209. 1876; Cooke Fl. Pres. Bombay 1:406. 1958 (Repr.). *'Pavta'*, *'Valpapdi.'*

Twiners, extensive. Leaflets broadly ovate–rhomboid. Flowers white or lilac, in axillary and terminal racemes. Pods falcate, linear–oblong, compressed, 3–6–seeded.

Fls. & Frts. : September–March.

Illus. : Matthew Fur. Illus. Fl. Tamilnadu Carnatic. 4: t. 183. 1988.

Distrib. : Usually cultivated, at times escape on bunds of fields, on bushes sete.

LATHYRUS L.

1.	All leaflets modified into tendrils; stem not winged	...	*L. aphaca*
1.	Upper leaflets only modified into tendrils; stem winged :		
	2. Stipules foliaceous; flowers solitary	...	*L. sativus*
	2. Stipules not as above; flowers in racemes	...	*L. odoratus*

Lathyrus aphaca L. Sp. Pl. 729. 1753; Baker in Hook. f. Fl. Brit. India 2:179. 1876; Sanj. Legumes of India 200. 1991. *'Ranawatana'*.

Herbs. Stipules ovate–triangular. Flowers yellow, axillary. Pods linear–oblong, wingless, 4–6–seeded.

Fls. & Frts. : January–March.

Distrib. : Cultivated or found as an escape. Nagpur, Nanded.

L. odoratus L. Sp. Pl. 732. 1753; Sanj. Legumes of India 201. 1991.

Climbing herbs. Leaflets ovate–oblong. Flowers white, rosy or purple. Pods flat.

Fls. & Frts. : August–February.

Illus. : Matthew, Illus. Fl. Palni Hills t. 190. 1996.

Distrib. : Mostly cultivated as an ornamental, rarely found as an escape. Pune.

L. sativus L. Sp. Pl. 730. 1753; Baker in Hook. f. Fl. Brit. India 2:179. 1876; Cooke, Fl. Pres. Bombay 1:384. 1958 (Repr.); Sanj. Legumes of India 202. 1991. *'Kasaris lang'*.

Herbs, diffuse or ascending. Leaflets linear–lanceolate. Flowers violet or bluish–purple. Pods winged.

Fls. & Frts. : December–January.

Illus. : Anon. Wealth of India 6:37, ff. 19–20. 1962.

Distrib. : Cultivated or as an escape. Osmanabad, Pune, Thane.

LUPINUS L.

Lupinus mutabilis Sweet, Brit. Flow. Gard. 1, 2: t. 130. 1825; Bailey, Man. Cult. Pl. ed. 2, 565. 1949.

Herbs, stout, showy annuals. Leaflets lanceolate–oblong, obtuse. Flowers white but yellow and sometimes violet on standard. Pods pubescent. Seeds white, flat.

Fls. & Frts. : February–March.

Distrib. : Pune.

MACROPTILIUM (Bth.) Urb.

Macroptilium atropurpureum (DC.) Urb. Symb. Anill. 9: 457. 1828; Verdc. in Kew Bull. 24 : 517. 1970 (in foot notes); Sanj. Legumes of India 206. 1991. *Phaseolus aropurpureus* DC. Prodr. 2: 395. 1825; Tosh & Vartak in J. Econ. Tax. Bot. 6: 203, ff. 1–7. 1985.

Climbers, perennial. Leaves alternate, 3–foliolate; leaflets 2.5–4.0 x 2–3 cm, ovate, terminal ones rhomboidal, more tomentose on lower than upper surface, apex apiculate, base rounded or truncate. Flowers purple, in axillary racemes. Fruits terete, beaked, silky–tomentose. Seeds dark–brown or black, rectangular with bulging at centre

Fls. & Frts. : September.

Illus. : Tosh & Vartak, op. cit.

Distrib. : Pune.

MACROTYLOMA (Wight & Arn.) Verdc.

Macrotyloma uniflorum (Lam.) Verdc. in Kew Bull. 24: 322, 401. 1970 & Hook. Ic. Pl. 38: 37. 1982; Sanj. Legumes of India 208. 1991; Naik, Fl. Marathwada 1 : 286. 1998. *Dolichos uniflorus* Lam. Encycl. 2: 299. 1786. *D. biflorus* auct. non L. 1753; Baker in Hook. f. Fl. Brit. India 2: 210. 1876; Cooke, Fl. Pres. Bombay 1:407. 1958 (Repr.).

Climbers. Leaflets 1.5–4.0 x 1.0–3.5 cm, hairy. Flowers solitary or paired, axillary. Pods hairy, beak pointed, curved.

Fls. & Frts. : September–November.

Illus. : Verdc. op. cit. t. 3781. 1982; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 185. 1988.

Distrib. : Cultivated, occasionally spread as an escape. Ahmednagar, Marathwada (Naik, op. cit.), Nasik, Pune.

MEDICAGO L.

1.	Diffuse or trailing herbs: corolla yellow	...	*M. polymorpha*
1.	Erect herbs; corolla purple, blue or white	...	*M. sativa*

Medicago polymorpha L. Sp. Pl. 779. 1753 emend. Shin. in Rhodora 58 : 310. 1956; Sanj Legumes of India 210. 1991; Naik, Fl. Marathwada 1: 287. 1998. *M. denticulata* Willd. Sp. Pl. 3 : 1414. 1802; Baker in Hook. f. Fl. Brit India 2 : 90. 1876; Cooke, Fl. Pres. Bombay 1 : 327. 1958 (Repr.).

Herbs. Leaves 3–foljolate; leaflets 0.5–2.0 x 0.5–1.8 cm, obovate, shallowly notched and mucronate at apex, cuneate at base, denticulate in the upper half, glabrous. Flowers 1–4, in short, peduncled racemes. Pods 2–3 times coiled, armed with c 2 mm long–hooked projections. Seeds 3–4, reniform, dark brown, glabrous.

Fls. & Frts. : September–November.

Distrib. : Along the river banks, occasional. Aurangabad (Naik, op. cit.).

M. sativa L. Sp. Pl. 778. 1753; Baker in Hook f. Fl. Brit. India 2:90. 1876; Cooke, Fl. Pres. Bombay 1:327. 1958 (Repr.); Sanj. Legumes of India 210. 1991. *'Lasan ghas', 'Vilayati ghas'*.

Herbs, 30–90 cm high, perennial, erect. Leaflets 3, 1.2–2.0 x 0.3–0.5 cm, obovate–oblanceolate, dentate along upper half. Flowers pink to purple, in axillary and terminal racemes. Pods pale brown.

Fls. & Frts. : May.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 186, ff. 1–11. 1988.

Distrib. : Cultivated, throughout as green fodder, also as an escape.

MELILOTUS Mill.

1.	Flowers white; pods 1–2–seeded	...	*M. alba*
1.	Flowers yellow; pods 1–seeded	...	*M. indica*

Melilotus alba Medik. ex Desr. in Lam. Encycl. 4:63. 1796; Baker in Hook. f. Fl. Brit. India 2: 89. 1876; Sanj. Legumes of India 211. 1991.

Herbs, 30–120 cm high, erect. Leaflets 3, 0.8–2.5 x 0.4–1.0 cm, obovate, oblong, margins entire or distinctly serrate. Flowers in groups

of 2 in compact, terminal racemes. Pods turgid, reticulately veined. Seeds globose.

Fls & Frts. : February–March.

Illus. : Anon. Wealth of India 6: 328, f. 114. 1962.

Distrib. : Common as a weed in cultivated fields.

M. indica (L.) All. Fl. Pedem. 1: 308. 1785; Cooke, Fl. Pres. Bombay 1:325. 1958 (Repr.); Sanj. Legumes of India 211. 1991. *Trifolium indicum* L. Sp. Pl. 765. 1753. *Melilotus parviflorus* Desf. Fl. Atl. 2:192. 1799; Baker in Hook. f. Fl. Brit. India 2:89. 1876. *'Ran–methi'*.

Herbs, 30–45 cm high, erect. Leaflets 0.4–2.0 x 0.2–0.7 cm, elliptic–obovate or oblanceolate, apex rounded, truncate or retuse, base cuneate. Flowers in terminal, spicate, congested racemes. Pods ellipsoid–oblong, tapering at both ends. Seeds brown, compressed.

Fls. & Frts. : December–February.

Illus. : Mahesh. Illus. Fl. Delhi f. 53. 1966.

Distrib. : In pasture grounds, frequent.

MILLETTIA WIGHT & ARN.

1.	Trees	...	*M. peguensis*
1.	Climbers :		
2.	Standard auriculate; stamens monadelphous; pods flattened, velvety	...	*M. extensa*
2.	Standard not auriculate; stamens diadelphous; pods torulose, glabrous :		
3.	Flowers white; bracts longer, 1.0–1.2 cm long, overtopping the flower buds	...	*M. racemosa*
3.	Flowers pink or red; bracts minute, shorter than flower buds 0.7 cm long	...	*M. orissae*

Millettia extensa (Bth.) Baker in Hook. f. Fl. Brit. India 2: 109. 1876; Sanj. Legumes of India 213. 1991. *Otosema macrophylla* Bth. in Miq. Pl. Jungh. 249. 1852. *Milleia auriculata* Baker ex Brandis, For. Fl. Ind. 138. 1874; Baker in Hook. f. op. cit. 108.

Climbers, woody. Leaflets, 7–9, 10–25 x 5–12 cm, obovate–oblong. Flowers yellow, in racemes at ends of axillary branches. Pods browny–tomentose, thickened along sutures. Seeds dark–brown, rounded, compressed.

Fls. & Frts. : July–March.

Illus. : Chavan & Bedi, op. cit.

Distrib. : Rare. Amravati, Dhule.

M. orissae Panigr. et S.C. Mishra in Indian J. Forestry 8(3): 234. 1985. *Robinsa racemosa* Roxb. Fl. Ind. ed 2, 3: 329. 1832. *Millettia racemosa* sensu Baker in Hook. f. Fl. Brit. India 2: 105. 1876 p.p.

Climbing shrubs; young branches glabrous, dark scabrous. Leaves imparipinate, upto 40 cm long; leaflets 7–11, 4–10 x 3–5 cm, ovate, apex acute, base rounded, glabrous on both sides. Flowers pink or red, on axillary, c 15 cm long racemes. Pods straight, flattened, pendulous. Seeds 5–6.

Fls. & Frts. : May–March.

Distrib. : In rocky ravines and in open sal–forests upto 600 m alt. Maharashtra.

Notes. : Plants made into paste and applied to cure white leprosy (Panigr. in RRL Bull. 1: 113. 1963).

M. peguensis Ali in Kew Bull. 21:489. 1968; Shah & Yogi in J. Bombay Nat. Hist. Soc. 69: 445. 1972; Sanj. Legumes of India 214. 1991. *M. ovalifolia* Kurz in J. Asiat. Soc. Bengal 42: 68. 1873; Baker in Hook. f. Fl. Brit. India 2: 107. 1876 non *Pongamia ovalifolia* Wight & Arn. 1834.

Trees, medium sized. Leaflets 7, 1.2–2.5 cm long, ovate–elliptic, shortly acuminate. Flowers blue, in slender, axillary racemes. Pods linear, 2–3–seeded at middle, sub–lignose, incurved, narrowed to base, sparsely verucose.

Fls. & Frts. : March–October.

Distrib. : Usually cultivated, occasionally found as an escape. Bombay, Pune.

M. racemosa Bth. in Miq. Pl. Jungh. 249. 1851; Baker in Hook. f. Fl. Brit. India 2:105. 1876; Cooke, Fl. Pres. Bombay 1:343. 1958 (Repr.); Sanj. Legumes of India 214. 1991.

Climbers, extensive, woody. Leaflets 13–15, opposite, 5.0–14.5 x 2.5–4.4 cm, oblong or obovate–oblong, membranous or subcoriaceous. Flowers yellowish–white, in compact, axillary and terminal racemes. Pods linear. Seeds 2–5, ovoid.

Fls. & Frts. : April–June.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1:384, f. 218. 1909.

Distrib. : Rare in deciduous forests. Pune, Raigad.

MUCUNA Adans (nom. cons.)

1. Perennials; pods winged :
   2. Pods transversely plaited on faces ... *M. monosperma*
   2. Pods not transversely plaited on faces ... *M. gigantea*
1. Annuals; pods not winged:
   3. Leaflets smaller; seeds 2 ... *M. minima*
   3. Leaflets larger; seeds 5–6 *M. pruriens*

Mucuna gigantea (Willd.) DC. Prodr. 2:405. 1825; Baker in Hook. f. Fl. Brit. India 2:186. 1876; Cooke, Fl. Pres. Bombay 1: 389. 1958 (Repr.); Wilmot–Dear in Kew Bull. 39: 56. 1984 & Ibid. 42: 38. 1987; Sanj. Legumes of India 216. 1991. *Dolichos giganteus* Willd. Sp. Pl. 3: 1041. 1802.

Twiners, large, woody. Leaves 12.5–22.5 cm long; leaflets 3, 10.0–12.5 x 5.0–6.2 cm, ovate or elliptic, acuminate. Flowers greenish–yellow, in umbelliform corymbs. Pods 7–15 cm long, clothed with deciduous, yellowish–brown, irritant bristles, 2–6 seeded.

Fls. & Frts. : December–March.

Distrib. : Rare along the sea–coast. 'Konkan' (Cooke, op. cit.).

M. minima Haines in J. Asiat. Soc. Bengal 15: 7. 1919 et Bot. Bihar & Orissa 2 : 297. 1961 (Repr. ed.); Naik, Fl. Marathwada 1: 289. 1998.

Herbs, twining. Leaves 3–foliolate; leaflets 1.5–6.0 x 1.5–5.0 cm, ovate to broadly lanceolate, lateral ones unequal sided at base, terminal ones rhomboid–obovate, all obtuse or rounded at apex, thinly pubescent above, densely appressed silky beneath. Flowers purple, in axillary, short, 1.5–2.5 cm long racemes. Pods 'S' shaped, densely clothed with greyish - brown bristles. Seeds 2.

Fls. & Frts. : December–February.

Distrib. : On fences around fields, frequent. Aurangabad, Nanded.

M. monosperma DC. ex Wight in Hook Bot. Misc. 2: 346. 1831; Baker in Hook. f. Fl. Brit. India. 2:185. 1876; Cooke, Fl. Pres. Bombay 1:388. 1958 (Repr.); Sanj. Legumes of India 216. 1991.

Twiners. Leaflets 5–10 x 4.0–7.5 cm, elliptic or ovate–oblong, pubescent beneath, apex shortly acuminate, base rounded. Flowers purple, in 8–15 cm long racemes; calyx irritant, bristly. Pods 4–6 cm long, thick, brown hairy, 1–seeded.

Fls. Frts. : November–March.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1:398, f. 224. 1909.

Distrib. : Along the ghats, frequent. Kolhapur, Ratnagiri, Satara.

M. pruriens (L.) DC. Prodr. 2:405. 1825; Baker in Hook. f. Fl. Brit. India 2:187. 1876; Cooke, Fl. Pres. Bombay 1:389. 1958 (Repr.); Wilmot–Dear in Kew Bull. 39: 61. 1984; Sanj. Legumes of India 217. 1991. *Dolichos pruriens* L. in Stickman, Diss. Herb. Amb. 23. 1754. *'Khaj–kuilee,' 'Kavach'.*

Twiners, extensive. Leaflets 3, 4.2–15.0 x 2.0–9.5 cm, ovate–triangular, rhomboid–ovate, apex subacute, base cuneate or inequilateral, appressed silky–hairy. Flowers purple–mauve to black in axillary, pendulous cymes. Pods falcately curved on both ends, densely bristly. Seeds 4–6, ellipsoid, dark–brown., spotted black.

Fls. Frts. : August–January.

Illus. : Mahesh. Illus. Fl. Delhi f. 73. 1966; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 207. 1982.

Distrib. : Common throughout the State along hedges and on small trees.

MUNDULEA (A. P. DC.) Bth.

Mundulea sericea (Willd.) A. Chev. Compt. Rend. Acad. Sci. Par. 180: 1521. 1925; Gillett et al. in Milne–Redhead & Polhill, Fl. Trop. E. Afr. Leguminosae subfam. Papilionoideae 3(1) : 155, f. 28. 1971; Sanj. Legumes of India 219. 1991. *Cytisus sericeous* Willd. Sp. Pl. 3: 1121. 1802. *Mundulea suberosa* (DC.) Bth. in Miq. Pl. Jungh 248. 1852; Baker in Hook. f. Fl. Brit. India 2:110. 1876; Cooke, Fl. Pres. Bombay 1:343. 1958 (Repr.) *'Supti'.*

Shrubs, 3.0–4.5 m high; large branches sericeous. Leaflets 3–15, alternate 1.0–4.7 x 0.5–1.4 cm, oblong–lanceolate, apex acute, base rounded or subacute. Flowers pinkish–violet, in terminal congested

racemes. Pods 6–9 cm long, linear, flattened, thickened at sutures. Seeds yellowish–brown.

Fls. & Frts. : September–October.

Illus. : Gillett, et al. in Milne Redhead & Polhill, op. cit.; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 208. 1982.

Distrib. : In deciduous forests, infrequent. Ahmednagar, 'Konkan' (Cooke, op. cit.), Nasik.

NEONOTONIA (Wight & Arn.) Lackey

Neonotonia wightii (Wight & Arn.) Lackey in Phytologia 37 : 210. 1977; Sanj. Legumes of India 219. 1991. *Notonia wightii* Wight & Arn. Prodr. 208. 1834. *Glycine javanica* L. Sp. Pl. 754. 1753; Baker in Hook. f. Fl. Brit. India 2: 183. 1876; Cooke, Fl. Pres. Bombay 1:386. 1958 (Repr.). *G. wightii* (Graph. ex Wight & Arn.) Verdc. in Taxon 15 (1) : 35. 1966.

Extensive, herbaceous twiners, densely hairy. Leaves 3–foliolate; leaflets 5.0–11.2 x 3.7–7.5 cm, appressed–pubescent beneath, apex subacute, base rounded. Flowers reddish, many, crowded in axillary racemes. Pods linear, compressed, densely hairy, 4–5–seeded.

Fls. & Frts. : November.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 209. 1982.

Distrib. : In plains and ghats, frequent. 'Konkan' (Cooke, op. cit.), Osmanabad, Pune, Satara.

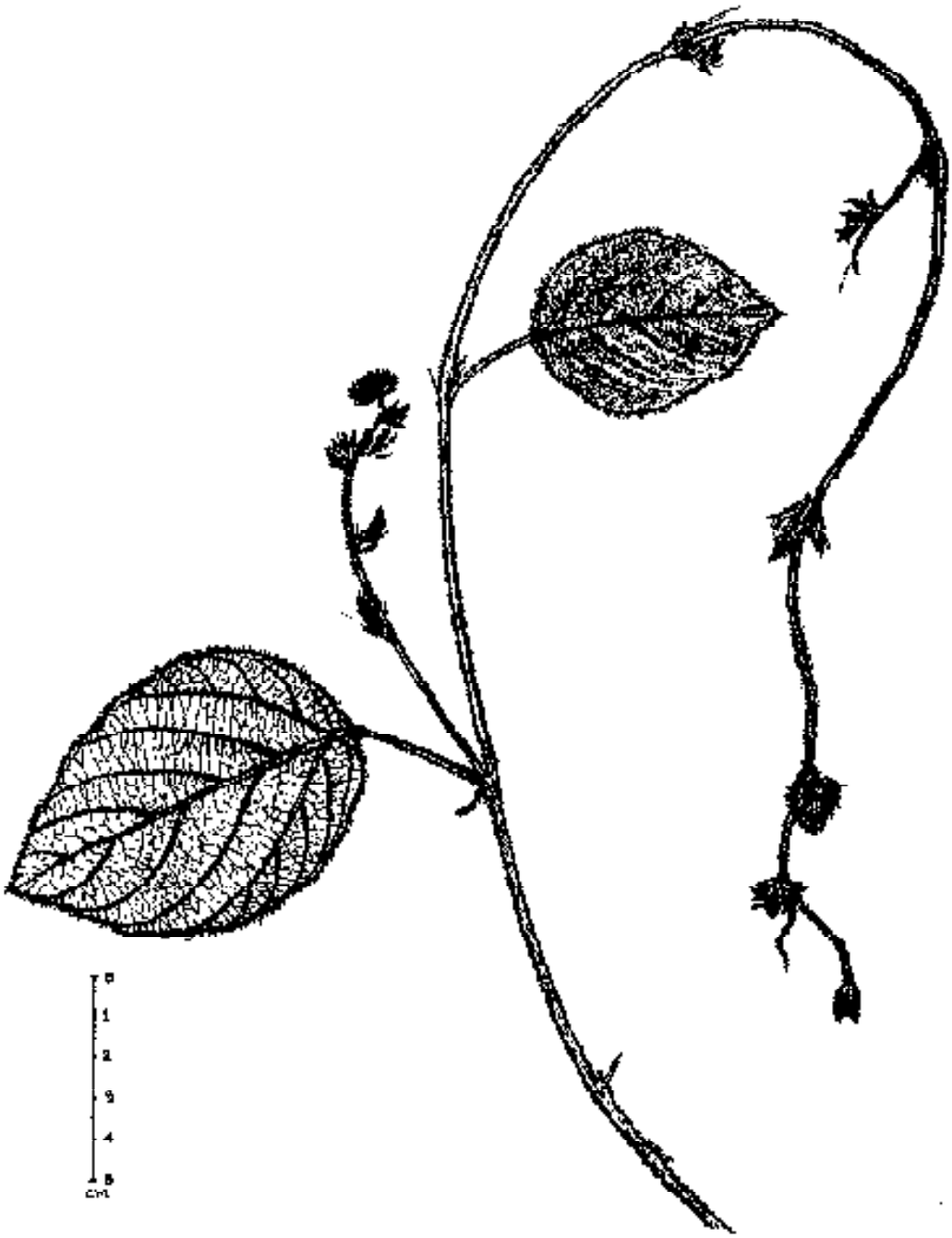
NOGRA Merr.

Nogra dalzellii (Baker) Merr. in Trans. Amer. Phil. Soc. n. s. 2, 24 : 201. 1935; Sanj Legumes of India 220. 1991. *Grona dalzellii* Baker in Hook. f. Fl. Brit. India. 2:191. 1876; Cooke, Fl. Pres. Bombay 1: 392. 1958 (Repr.). *Nogra simplicifolia* (Dalz.) Raiz. in Indian Forester 93: 755. 1967; Bole & Almeida in J. Bombay Nat. Hist. Soc. 78: 563. 1981.

Herbs; stem twining. Leaflets 4–10 x 3–1.0 cm, ovate, hairy beneath, apex acute or mucronate, base cordate. Flowers in dense racemes. Pods linear, densely hairy.

Fls. & Frts. : September–October.

Distrib. : Along the hilly forests, rare. Ahmednagar, Satara, Thane.



Nogra dalzelhi (Baker) Merr.

OPHRESTIA Forbes

Ophrestia pentaphylla (Dalz.) Verdc. Kew Bull. 24: 259. 1970; Sanj. Legumes of India 222. 1991. *Glycine pentaphylla* Dalz. in Hook. J. Bot. 4: 344. 1852; Baker in Hook. f. Fl. Brit. India 2: 184. 1876; Cooke, Fl. Pres. Bombay 1: 386. 1958 (Repr.).

Herbs, twining. Leaflets 2.5–8.0 x 0.9–3.0 cm, apex acute or mucronate, base rounded. Flowers reddish, in axillary, lax racemes. Pods linear, flat, silky hairy.

Fls. & Frts. : August–November.

Distrib. : Along the ghats, not common. Ratnagiri.

OUGEINIA Bth.

Ougeinia oojeinensis (Roxb.) Hochr. in Bull. Soc. Bot. Geneva 13 & 14:51. 1909 (*oogeinensis*); Sanj. Legumes of India 224. 1991. *Dalbergia oojeinensis* Roxb. Fl. Ind. 3: 220. 1832. *Ougeinia dalbergioides* Bth. in Miq. Pl. Jungh. 216. 1852; Baker in Hook. f. Fl. Brit. India 2: 161. 1876. Cooke, Fl. Pres. Bombay 1 : 373. 1958 (Repr.). *'Kala–palas,'Thisa', 'Tiwas'.*

Trees, 6–12 m high. Leaflets 6.2–10.5 x 4–10 cm, terminal broadly elliptic or roundish, laterals obliquely ovate, cordate. Flowers many in fascicled racemes. Pods reticulately veined.

Fls. & Frts. : March–June.

Illus. : Wight, Ic. t. 391. 1840 *(Dalbergia ojeinensis)*.

Distrib. : In deciduous forests, frequent.

PARACALYX Ali

Paracalyx scariosus (Roxb.) Ali in Univ. Studies Karachi 5 (3) : 95. 1968; Sanj Legumes of India 227. 1991. *Cylista scariosa* Roxb. Pl. Cor. 1: 64, t. 92. 1798; Baker in Hook. f. Fl. Brit. India 2 : 219. 1876; Cooke, Fl. Pres. Bombay 412. 1958 (Repr.). *'Ran–ghevda'.*

Twiners, extensive; stems and branches woody, finely downy or tomentose. Leaflets 3.2–10.0 x 2–6 cm, terminal rhomboid, laterals obliquely ovate, velvety pubescent, apex acute, base rounded. Flowers yellow, in axillary peduncled racemes. Pods oblique, downy, 1–seeded.

Fls. & Frts. : November–April.

Illus. : Wight, Ic. t. 1597. 1850 (*Cylista scariosa*) ; Talb For. Fl. Bombay Pres. & Sind 1:415, f. 234. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2:t. 211. 1982.

In dry deciduous forests, common.

Notes : Aiton (1789) published *Cylista* with the type species *C. villosa*. However, it was the same as *Rhynchosia hirta* (Andr.) Meikle & Verdc. in Taxon 16:462. 1967. Thus it has been found that *Cylista* antedates *Rhychosia Lour.* (1790). To avoid adopting *Cylista* for the large genus *Rhynchosia* (c 300 species) and the resultant new combinations, Ali (1967) has proposed to conserve *Cylista* with the type specie of *C. scariosa* Roxb. However, it was not accepted by the committee for Spermatophyta. As *Cylista* is synonymous to *Rhynchosia* and is not available, Ali proposed *Paracalyx* to accommodate *C. scariosa* Roxb.

PONGAMIA Vent. (nom. cons.)

Pongamia pinnata (L.) Pierre, For. Fl. Cochinch. t. 385. 1899; Thoth. in Bull. Bot. Surv. India 3 : 418, t. 1. (1961) 1962 & in Taxon 30: 44. 1981; Sanj. Legumes of India 230. 1991. *Cytisus pinnatus* L. Sp. Pl. 741. 1753 non *Derris pinnata* Lour. *Pongamia glabra* Vent. Jard. Mal. t. 28. 1803; Baker in Hook. f. Fl. Brit. India 2: 240. 1876; Cooke, Fl. Pres. Bombay 1 : 429. 1958 (Repr.). *Derris indica* (Lam.) Bennet in J. Bombay Nat. Hist. Soc. 68: 303. 1971. *'Karanj'*.

Trees, 7–15 m. high. Leaflets 5–9, 3.5–12.0 x 1.8–8.2 cm, broadly ovate or elliptic. Flowers white with purple tinge in axillary, drooping racemes. Pods elliptic–oblong, thick, compressed. Seeds reddish–brown, reniform, rugose.

Fls. & Frts. : February–May.

Illus. : Wight. Ic. t. 59. 1838. Talb. For. Fl. Bombay Pres. & Sind 1: 433, f. 243. 1909 (*Pongamia glabra*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 212. 1982.

Distrib. : Common throughout the state along the river banks, also cultivated.

Notes. : Bennet (1971) reduced the genus *Pongamia* as a section under *Derris* as in his opinion wingless nature of the pod which was used to distinguish the genus *Pongamia* from *Derris* was not very distinct. However, Verdcourt (1977) is of the opinion that there seemed to him little to be gained from sinking *Pongamia* into *Derris* but still having to keep it as a separate section.

PSEUDARTHRIA Wight & Arn.

Pseudarthria viscida (L.) Wight & Arn. Prodr. 209. 1834; Baker in Hook. f. Fl. Brit. India 2:154. 1876; Cooke, Fl. Pres. Bombay 1:366. 1958 (Repr.); Sanj. Legumes of India 230. 1991. *Hedysarum viscidum* L. Sp. Pl. 747. 1753.

Scandent undershrubs; stem viscidly–pubescent. Leaflets 3, 2.3–8.0 x 1.5–5.0 cm, ovate–oblong or ovate–obovoid, hairy, apex acute, base rounded, ciliate on margins. Flowers reddish–purple, in terminal and axillary racemes. Pods linear–oblong, compressed, beaked, viscidly hairy. Seeds 2–6, subreniform, dark–brown.

Fls. & Frts. : August–December.

Illus. : Wight, Ic. t. 286. 1840; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 213. 1982.

Distrib. : In deciduous forests, frequent. Amravati, Chandrapur, Kolhapur, Raigad, Ratnagiri, Satara.

PTEROCARPUS Jacq. (nom. cons.)

Pterocarpus marsupium Roxb. Pl. Cor 2:9, t. 116. 1799; Baker in Hook. f. Fl. Brit. India 2:239. 1876; Cooke, Fl. Pres. Bombay 1:427. 1958 (Repr.); Sanj. Legumes of India 232. 1991.

1. Leaflets obtuse, rounded or retuse at apex ... *var. marsupium*
1. Leaflets cuspidately acuminate at apex ... *var. acuminata*

var. **marsupium.** *'Asana', 'Bibla'.*

Trees, 10–15 m high. Leaflets 5–7, 6–10 x 3.2–5.0 cm, oblong or elliptic–ovate, base rounded. Flowers yellow, in terminal panicles. Pods orbicular, winged, 1–seeded.

Fls. & Frts. : December–March.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1:431, f. 242. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 216. 1982.

Distrib.: In deciduous forests, common.

var. **acuminata** Prain in J. Asiat. Soc. Bengal 66:455. 1897; Cooke, Fl. Pres. Bombay 1:428. 1958 (Repr.); Sanj. Legumes of India 232. 1991. *'Bivla', 'Biya'.*

Trees, 12–18 m high; bark yellowish–grey, fissured. Leaflets 5–9, 5.0 -11.0 x 4.2 – 7.0 cm, ovate or ovate–oblong or lanceolate, base rounded or acute. Flowers yellow, in terminal and axillary panicles. Pods orbicular.

Fls. & Frts. : October–January.

Distrib. : In deciduous forests, not common. Ahmednagar, Nasik, Pune (Cooke, op. cit.), Thane.

PUERARIA DC.

1.	Pods upto 2.5 cm long, appressedly hairy; roots not tuberous	...	*P. montana*
1.	Pods 5.0–7.5 cm long, bristly hairy; roots tuberous	...	*P. tuberosa*

Pueraria montana (Lour.) Merr. in Trans. Am. Phil. Soc. 24: 10, 210. 1935; Verdc. in Taxon 15:36. 1966. *Dolichos montanus* Lour. Pl. Cochinch. 2: 440. 1790.

1.	Twining shrubs; leaflets entire or 2–3 lobed; flowers violet with a yellow spot	...	var. *lobata*
1.	Twining herbs; leaflets 3; flowers reddish or bluish–purple	...	var. *montana*

var. **montana.**

Herbs, twining; branches hairy. Leaflets 5–10 x 2.5–4.5, broadly ovate, hairy beneath, apex mucronate, base rounded, oblique. Flowers reddish, in dense, axillary racemes. Pods linear–oblong, compressed, hairy. Seeds 4–8.

Fls. & Frts. : Novmeber.

Distrib. : Rare. Satara.

var. **lobata** (Willd). Sanj. Legumes of India 287. 1991. *Dolichos lobata* Willd. Sp. Pl. 3: 1047. 1802. *Pueraria lobata* (Willd.) Ohwi in Bull. Tokyo Sci. Mus. 18: 16. 1947; Verdc in Taxon 17: 170. 1968; Sanj. Legumes of India 233. 1991.

Shrubs; stem twining, hairy. Flowers fragrant, in 20–50 cm long racemes. Pods flat, densely brown hairy. Seeds 8–20.

Fls. & Frts. : January –June.

Distrib. : Among grasses, infrequent. Kolhapur.

P. tuberosa (Roxb. ex Willd.) DC. in Ann. Sci. Nat. 4: 97. 1825; Baker in Hook. f. Fl. Brit. India 2:197. 1876; Cooke, Fl. Pres. Bombay 1: 399. 1958 (Repr.); Sanj, Legumes of India 235. 1991. *Hedysarum tuberosum* Roxb. ex Willd. Sp. Pl. 3: 1197. 1802. *'Khalvel', 'Pithana'.*

Twiners, extensive. Leaflets 10–16 x 8–14 cm, terminal ones broadly ovate, apex acuminate, base cuneate, laterals ovate–oblong, inequilateral, base truncate. Flowers axillary or terminal, in lax, leafless racemes. Pods linear, flat, constricted between seeds. Seeds 3–6, reddish–brown, ellipsoid–oblong.

Fls. & Frts. : February–April.

Illus. : Wight, Ic. t. 412. 1840; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 217. 1982.

Distrib. : Frequent in deciduous forests, occasionally occur near sea–shore. Ahmednagar, Amravati, Aurangabad, Bombay, Dhule, Nanded, Nasik, Pune, Ratnagiri, Thane.

PYCNOSPORA R. Br. ex Wight & Arn.

Pycnospora lutescens (Poir.) Schindl. in J. Bot. 64:145. 1926; van Meeuwen in Reinwardtia 5:437. 1960; Sanj. Legumes of India 236. 1991. *Hedysarum lutescens* Poir. in Lam. Encycl. 6: 417. 1805. *Pycnospora hedysaroides* R. Br. ex Wight & Arn. Prodr. 197. 1834; Baker in Hook. f. Fl. Brit. India 2:153. 1876; Cooke, Fl. Pres. Bombay 1: 365. 1958 (Repr.).

Herbs, 20–30 cm high, suberect. Leaflets 1.5–2.5 x 0.8–2.4 cm, obovate, pubescent, apex obtuse, rounded or emarginate, base acute. Flowers purple, in lax racemes. Pods oblong–ellipsoid, turgid, pubescent, 6–10–seeded.

Fls. & Frts. : September–October.

Illus. : Gillett et al. in Milne–Redhead & Polhill, Fl. Trop. E. Afr. Leguminosae subfam. Papilionoideae pt. 3 (1):481, f. 68. 1971; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4:t. 188. 1988.

Distrib. : In deciduous forests, rare. Ratnagiri.

RHYNCHOSIA Lour. (nom. cons.)

1. Leaflets upto 5.5 cm long :

   2. Trailing herbs; flowers in capitate racemes; pods almost orbicular; seeds with a waxy strophiole ... *R. capitata*

   2. Twining herbs; flowers distant in elongate racemes; pods elliptic–lanceolate; seeds without a waxy strophiole :

3. Calyx teeth three times as long as tube; seeds blue ... *R. hirta*

3. Calyx teeth twice as short or equalling tube; seeds black:

4. Plants woody; leaflets coriaceous, downy on both surfaces; pods 2.5–3.5 cm long ... *R. bracteata*

4. Plants herbaceous; leaflets membranous, glabrous above, pubescent on nerves beneath; pods 1.0–1.5 cm long :

5. Inflorescence upto 8 cm long ... *R. rufescens*

5. Inflorescence upto12 cm long ... *R. minima*

1. Leaflets more than 5.5 cm long ... *R. rothii*

Rhynchosia bracteata Bth. ex Baker in Hook. f. Fl. Brit. India 2:225. 1876. Cooke, Fl. Pres. Bombay 1:415. 1958 (Repr.); Sanj. Legumes of India 237. 1991.

Climbers; stem velvety–pubescent. Leaflets 3, 3.0–5.2 cm long and almost as much broad, terminal rhomboid–orbicular, laterals obliquely ovate. Flowers yellow, many in axillary racemes. Pods flat, turgid, mucronate, narrowed at base. Seeds dark–brown, nigro–punctate.

Fls. & Frts. : October–November.

Distrib. : Along river banks, rare. 'Jalgaon' (Cooke, op. cit.), Nagpur, Nanded.

R. capitata (Heyne ex Roth) DC. Prodr. 2:386. 1825; Sanj. Legumes of India 237. 1991. *Glycine capitata* Heyne ex Roth, Nov. Pl. Sp. 346. 1821 non *Nomismia capitata* (Heyne ex Roth) Wight & Arn. Prodr. 237. 1834. *Rhynchosia aurea* auct. non (Willd.) DC. 1828; Baker in Hook f. Fl. Brit. India 2:221. 1876; Cooke, Fl. Pres Bombay 1:415. 1958 (Repr.). *'Papra'*

Herbs. Leaves alternate, 3–foliolate; leaflets subsessile, 1.5–4.3 x 1.8–4.6 cm, ovate, obovate or ovate–rhomboid, sparsely hairy, apex acute or subacute, base rounded or subacute. Flowers yellow, axillary. Pods oblique, mucronate, transversely striate, hairy. Seeds 2, dark–brown, reniform.

Fls. & Frts. : August–October.

Illus. : Wight, Ic. t. 295. 1840 (*Nomismia capitata);* Mahesh. Illus. Fl. Delhi f. 77. 1966; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 189.1988.

Distrib. : Among grasses in plains, rare. Aurangabad, Chandrapur, Dhule, Nagpur, Nanded, Yavatmal.

R. hirta (Andr.) Meikle & Verdc. in Taxon 16: 462. 1967; Sanj. Legumes of India 238. 1991. *Dolichos hirtus* Andr. Bot. Rep. 7:t. 446. 1807. *Rhynchosia cyanosperma* Bth. ex Baker in Oliv. Fl. Trop. Afr. 2: 218. 1871 & in Hook. f. Fl. Brit. India 2: 222. 1876; Cooke, Fl. Pres. Bombay 1: 1:413. 1958 (Repr.).

Twiners, woody. Leaflets 3, 10 x 6 cm, ovate or rhomboid, velvety pubescent, apex acuminate, base rounded. Flowers pale yellowish–white, in peduncled racemes. Pods deeply torulose, densely velvety. Seeds 2, subglobose, shining.

Fls. & Frts. : October–February.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1:416, f. 335. 1909 (*Rhynchosia cyanosperma);* Matthew, Illus. Fl. Tamilndu Carnatic 2:t. 218. 1982.

Distrib. : Kolhapur, 'Konkan' (Cooke, op. cit.).

R. minima (L.) DC. Prodr. 2: 385. 1825; Baker in Hook. f. Fl. Brit. India 2:223. 1876; Cooke, Fl. Pres. Bombay 1:414. 1958 (Repr.); Nooteb. in Reinwardtia 5: 439. 1961; Sanj. Legumes of India 239. 1991. *Dolichos minimus* L. Sp. Pl. 726. 1753. *Rhynchosia minima* var. *laxiflora* (Camb.) Baker in Hook. f. op. cit; Cooke, op. cit.

Herbs, slender, twining or trailling. Leaflets 1.4–4.5 x 0.3–2.2 cm, ovate–rhomboid, lanceolate–rhomboid or nearly orbicular, pubescent below, apex obtuse, subacute or acute to acuminate at apex, base rounded or subacute. Flowers reddish-yellow, 6–12, in axillary, lax racemes. Pods obliquely–oblong, compressed. Seeds globose.

Fls. & Frts. : September–October.

Illus. : Mahesh. Illus. Fl. Delhi f. 76. 1966; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 193. 1988.

Distrib. : Along the hedges and border of cultivated fields. Common throughout the State.

R. rothii Bth. ex Ait. Cat. Pl. Punjab & Sind 50. 1869; Verdc. in Kew Bull. 25: 91. 1971; Sanj. Legumes of India 240. 1991. *R. sericea* Span. in Linnaea 15:195. 1841 non Guill. ex Hook. & Arn. 1833; Baker in Hook. f. Fl. Brit. India 2:225. 1876.

Twiners, extensive, woody. Leaflets 6.0–10.5 x 3–8 cm, softly pubescent, terminal ones rhomboid–ovate–equilateral, laterals obliquely ovate or ovate– triangular. Flowers yellow with purple dots in

axillary racemes. Pods oblanceolate, hairy. Seeds ellipsoid–oblong, mottled.

Fls. & Frts. : September–December.

Distrib. : Along the hedges and in deciduous forests, frequent. Aurangabad, Beed, Chandrapur, Dhule, Jalgaon, Jalna, Nanded, Nasik, Pune, Thane.

R. rufescens (Willd.) DC. Prodr. 2: 387. 1825; Baker in Hook f. Fl. Brit. India 2:220. 1876; van Meeuwen et al. in Reinwardtia 5:439. 1961; Sanj. Legumes of India 240. 1991. *Glycine rufescens* Willd. Nov. Act. Berol. 222. 1803.

Herbs, suberect, twining. Leaflets 3, 2.0–4.5 x 1.5–3.5 cm, ovate–rhomboid, pubescent, apex acute, base obtuse or subacute. Flowers yellow, in recemes. Pods ovoid, 1–seeded.

Fls. & Frts. : November–February.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4:t. 194. 1988.

Distrib. : In plains, rare. Pune.

ROTHIA Pers. (nom. cons.)

Rothia indica (L.) Druce, Rep. Bot. Exch. Club. Soc. Brit. Isles 3: 423. 1914; Sanj. Legumes of Inda 242. 1991; Naik, Fl. Marathwada 1 : 299. 1998. *Trigonella indica* L. Sp. Pl. 778. 1753. *Rothia trifoliata* Roth, Pers. Syn. Pl. 2:302 & 659. 1807; Baker in Hook. f. Fl. Brit. Inda 2:63. 1876; Cooke, Fl. Pres. Bombay 1:308. 1958 (Repr.).

Herbs, subererct, diffuse, villous. Leaflets 3, 1.0–3.5 x 0.3–0.6 cm, elliptic-oblong or oblong-lanceolate, appressed silky hairy, apex obtuse, acute or mucronate, base rounded or subacute Flowers creamy white or yellowish, axillary, solitary, geminate or in short, axillary racemes. Pods linear, apiculate, silky hairy. Seeds many, yellowish–brown.

Fls. & Frts. : August–October.

Illus. : Wight, Ic. t. 199. 1839; Matthew, Illus. Fl. Tamilnadu Carnatic 2:t. 219. 1982.

Distrib. : Rare on sandy soils. Nanded (Naik, op. cit.), 'Solapur' (Cooke, op. cit.).

SESBANIA Scop. (nom. cons.)

1. Pods 5–8 cm long ... *S. procumbens*
1. Pods 15–30 cm long :
   2. Stem armed; corolla yellow, spotted purple on vexillum outside ... *S. bispinosa*
   2. Stem unarmed; corolla pure yellow :
      3. Herbs or undershrubs, pods usually falcate ... *S. cannabina*
      3. Large shurbs or small trees; pods not falcate ... *S. sesban*

Sesbania bispinosa (Jacq.) W. F. Wight in U. S. Dept. Agr. Bur. Pl. Ind. Bull. 137: 15. 1909; Gillett in kew Bull. 17: 129. 1963.; Sanj. Legumes of India 242. 1991. *Aeschynomene bispinosa* Jacq. Ic. Pl. Rar. 3: 13, t. 564. 1792. *Sesbania aculeata* (Willd.) Poir. in Lam. Encycl. 7: 128:1806 (*'Sesban aculeatus'*) nom illog.; Baker in Hook. f. Fl. Brit. India 2: 114. 1876; Cooke, Fl. Pres. Bombay 1: 350. 1958 (Repr.). *'Chuncha'*, *'Ranseyari'*.

Herbs or undershrubs, 1–2 m high. Leaflets 10–30 pairs, 0.6–1.5 x 0.2–0.3 cm, linear–oblong or elliptic–oblong, apex obtuse or apiculate, base rounded. Flowers 3–6, in axillary, lax, drooping racemes. Pods 6–25 cm long, falcate, torulose, beaked.

Fls. & Frts. : August–November.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4:t. 197. 1988.

Distrib. : Common throughout the state in wet places.

S. cannabina (Retz.) Poir. in Lam. Encycl. 7: 130. 1806; Shah & Badrinath in J. Econ. Tax. Bot. 6:125. 1985; Sanj. Legumes of India 243. 1991; Naik, Fl. Marathwada 1 : 299. 1998. *Aeschynomene cannabina* Retz. Obs. Bot. 5 :26. 1786. *Sesbania aculeata* var. *cannabina* (Retz.) Baker in Hook. f. Fl. Brit. India 2:115. 1876.

Herbs; branches obscurely muricated. Leaflets 41–81, linear–oblong. Flowers 3–4, in short racemes. Pods beaked with persistent style.

Fls. & Frts. : August–November.

Distrib. : Occasional in moist places, frequent. Aurangabad, Jalna, Nanded (Naik, op. cit.), Thane (Shah & Badrinath op. cit.)

S. procumbens (Roxb.) Wight & Arn. Prodr. 215. 1834; Baker in Hook. f. Fl. Brit. India 2:115. 1876; Cooke, Fl. Pres.Bombay 1: 350. 1958

(Repr.); Sanj. Legumes of India 243. 1991. *Aeschynomene procumbens* Roxb. Fl. Ind. 3:337. 1832.

Herbs, 30–40 cm high, diffuse, prickly. Leaflets 15–20 pairs, c 0.6 x 0.3 cm, linear–oblong, apex obtuse–apiculate, base rounded. Flowers yellow, 2–4, in racemes. Pods straight, erect, beaked.

Fls. & Frts. : February–March.

Distrib. : In moist places, infrequent. Bombay, Ratnagiri.

S. sesban (L.) Merr. in Philipp. J. Sci. Bot 7: 235. 1912; Sanj. Legumes of India 243. 1991. *Aeschynomene sesban* L. Sp. Pl. 714. 1753. *Sesbania aegyptica* Poir. in Lam. Encycl. 7: 128. 1806 *('Sesban aegypticum');* Baker in Hook. f. Fl. Brit. India 2: 114. 1876. *S. aegyptica* var. *bicolor* Wight & Arn. Prodr. 214. 1834; Cooke, Fl. Pres. Bombay 1: 350. 1958 (Repr.ed.). *S. aegyptica* var. *picta* Prain in J. Asiat. Soc. Bengal 66: 367. 1897; Cooke op. cit. 349. *S. sesban* var. *picta* (Prain) Sant. Fl. Saurashtra 263. 1953. *'Jayanti', 'Shevari'.*

Shrubs, 2–4 m high. Leaflets linear–oblong. Flowers yellow, many, in racemes. Pods linear, twisted, torulose.

Fls. & Frts. : Throughout the year.

Illus. : Wight, Ic. t. 32. 1840.

Distrib. : Commonly cultivated, occasionally found as an escape.

SHUTERIA Wight & Arn. (nom. cons.)

Shuteria vestita (Grah. in Wall.) Wight & Arn. Prodr. 207. 1834; Baker in Hook. f. Fl. Brit. India 2: 182. 1876; Cooke, Fl. Pres. Bombay 1: 384. 1958 (Repr.); Sanj. Legumes of India 245. 1991. *Glycine vestita* Grah. in Wall. Cat. 5512. 1831–32 nom nud.

Twiners; stems woody, slender, hairy. Leaflets 3, 3.0–3.7 x 2.0–2.5 cm, terminal rhomboid, obovate, laterals ovate–oblong or elliptic, hairy, rounded at both ends. Flowers purplish–red, in racemes. Pods linear. Seeds ellipsoid, compressed, brownish–black.

Fls. & Frts. : October–December.

Illus. : Wight, Ic. t. 165. 1839; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 221. 1982.

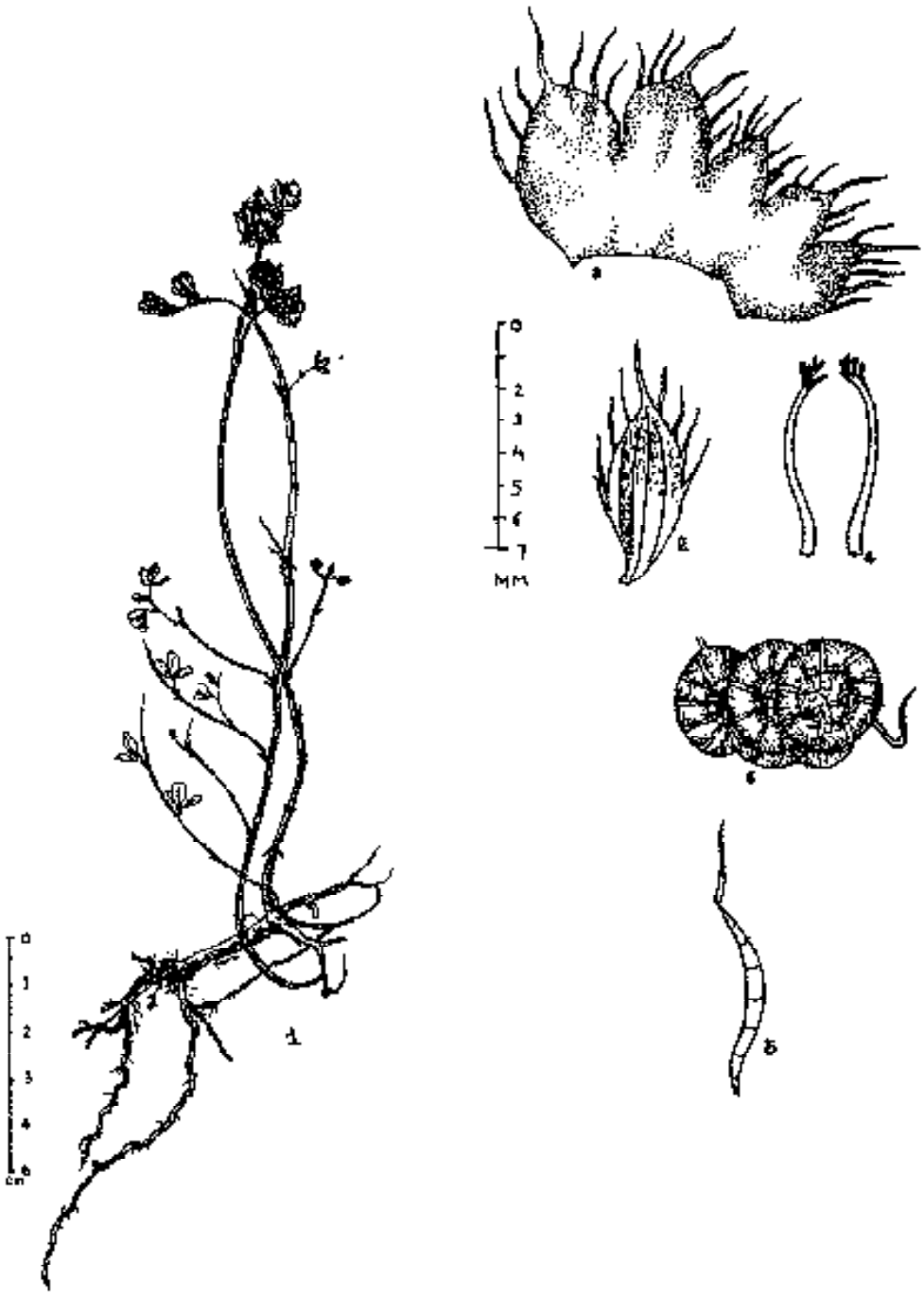
Distrib. : In hilly forests, infrequent. Jalgaon, Pune, Raigad.

SMITHIA Ait. (nom. cons.)

1. Calyx rigid, veins close, parallel, simple :
   2. Stems densely bristly ... *S. setulosa*
   2. Stems not bristly :
      3. Flowers purple ... *S. purpurea*
      3. Flowers yellow :
         4. Flowers solitary or in pairs in axils of crowded leaves at branch ends ... *S. conferta*
         4. Flowers in short racemes:
            5. Slender herbs, 20–40 cm high; flowers 0.7–0.9 cm long ... *S. sensitiva*
            5. Robust herbs, 50–100 cm high; flowers c 1.3 cm long ... *S. laxiflora*

1. Calyx membranous, veins distinctly anastomosing :
   6. Flowers solitary or 2–together ... *S. oligantha*
   6. Flowers not as above :
      7. Flowers in terminal globose heads :
         8. Leaflets 3–4 pairs ... *S. pycnantha*
         8. Leaflets 9–15 paris ... *S. capitata*
      7. Flowers in racemes or panicles :
         9. Flowers in dichotomous, corymbose panicles ... *S. salsuginea*
         9. Flowers in racemes :
            10. Lower lip of calyx entire ... *S. hirsuta*
            10. Lower lip of calyx 3–lobed :
               11. Leaflets 2 pairs ... *S. bigemina*
               11. Leaflets more than 2 pairs :
                  12. Pods 3–5–jointed, joints not veined ... *S. agharkarii*
                  12. Pods 5–8 –jointed, joints veined :
                     13. Stems glabrous or minutely bristly; leaflets 4–6 ... *S. gracilis*
                     13. Stems densely bristly; leaflets 6–10 ... *S. racemosa*

Smithia agharkarii Hem. in Indian Forester 97:67, ff. 4–8. 1971; Sanj. Legumes of India 246. 1991.



Smithia agharkarii Hem.
1- Habit; 2-Bracteole; 3- Calyx spread open; 4- Androecium; 5- Gynoecium; F- Fruit.

Herbs, 9–15 cm high, suberect. Leaflets 0.5–1.2 x 0.2–0.4 cm, sparsely strigose beneath, apex obtuse. Flowers yellow, 2–4, in racemes. Pod joints folded.

Fls. & Frts. : September–October.

Illus. : Hem. op. cit.

Distrib. : Along the upper ghats and on open plateau in moist situations. Rare. Pune, Ratnagiri, Satara.

S. bigemina Dalz. in Hook. Kew J. Bot. 3:208. 1851; Baker in Hook. f. Fl. Brit. India 2:149. 1876; Cooke, Fl. Pres. Bombay 1:360. 1958 (Repr.); Sanj. Legumes of India 246. 1991. *'Berki'*.

Herbs, diffuse, c 15 cm high. Leaves abruptly pinnate; leaftlets 0.5–1.0 x 0.2–0.5 cm, oblanceolate, obtuse at apex, cuneate at base. Flowers yellow, 2–8 in copious axillary racemes, crowded towards tips. Pods jointed, tubercled.

Fls. & Frts. : August–January.

Illus. : Matthew, Illus Fl. Tamilnadu Carnatic 2: t. 222 1982.

Distrib. : In open wet places, common. Ahmednagar, Amravati, Kolhapur, Nasik, Pune, Ratnagiri, Satara, Thane.

S. capitata Dalz. in Hook Kew J. Bot. 3: 208. 1851; Baker in Hook. f. Fl. Brit. India 2:150. 1876; Cooke, Fl. Pres. Bombay 1:359. 1958 (Repr.); Steenis in Reinwardtia 5:445. 1961; Sanj. Legumes of India 246. 1991.

Annual herbs, 30–60 cm high. Leaves pinnate, rachis bristly; leaflets linear–oblong, apex obtuse, base rounded, ciliate. Flowers blue. Pods 5–7–jointed.

Fls. & Frts. : September–October.

Illus. : Bedd. Ic. t. 244, 1874.

Distrib. : In hilly forests, rare. 'Konkan' (Cooke, op. cit.).

S. conferta J. E. Sm. in Rees Cyclop. 33: no. 2. 1816; Cooke, Fl.Pres. Bombay 1:358. 1958 (Repr.); Steenis in Reinwardtia 5: 445. 1961; Sanj. Legumes of India 246. 1991. *S. geminiflora* Roth, Nov. Pl. Sp. 352. 1821; Baker in Hook. f. Fl. Brit. India 2:149. 1876. *'Kasai'*, *'Kaulla'*.

Herbs, straggling, 60–120 cm high. Leaflets in 5 pairs, 0.5–1.2 x 0.3–0.6 cm, linear–oblong, bristly on margins and midrib beneath. Flowers yellow. Pods 3–6–jointed, joints turgid, papillose.

Fls. & Frts. : August–January.

Distrib. : In moist places, common. Chandrapur, Kolhapur, Nasik, Pune, Raigad,Ratnagiri, Satara, Thane.

S. gracilis Bth. in Linnaea 24:642. 1851; Baker in Hook. f. Fl. Brit. India 2:150. 1876; Sanj, Legumes of India 247. 1991.

Herbs, diffuse. Leaflets 4–6, obovate–oblong, minutely bristly. Flowers yellow, in axillary racemes. Pods 6–8–jointed, joints reticulately veined.

Fls. & Frts. : August–October.

Distrib. : In open moist places, rare. Pune.

S. hirsuta Dalz. in Hook. J. Bot. & Kew Gard. Misc. 3:135 1851; Cooke, Fl. Pres. Bomaby 1:361. 1958 (Repr.); Sanj. Legumes of India 247. 1991. *S. blanda* Wall. ex Wight & Wight & Arn. var. *racemosa* (Heyne ex Wight & Arn.) Baker in Hook. f. Fl. Brit. India 2: 151 1876. p.p.

Herbs, 30–50 cm high, erect. Leaflets 6–8, oblanceolate, sparsely hairy beneath, apex rounded, bristle tipped, base cuneate, oblique, ciliate on margins. Flowers bright yellow. Pods 4–7–jointed, joints reticulately veined.

Fls. & Frts. : September–October.

Distrib. : In hilly forests, frequent. Ahmednagar, Kolhapur, Pune, Satara.

S. laxiflora Bth. in Miq. Pl. Jungh. 211. 1832; Sanj. Legumes of India 247. 1991. *S. flava* Dalz. ex Prain in J. Asiat. Soc. Bengal 66: 378. 1897. *S. sensitiva* Ait. var. *flava* (Dalz. ex Prain) T. Cooke, Fl. Pres. Bombay 1: 331. 1903 [1: 358. 1958 (Repr.)].

Herbs; stems stout. Leaflets 3–13 pairs, 0.5–1.2 x 0.2–0.3 cm, sparsely bristly on midvein beneath and margins. Flowers yellow, few, in axillary racemes. Pod joints slightly papillose.

Fls & Frts. : November–January.

Distrib. : In open situations, rare. Nasik, Pune, Raigad, Thane.

S. oligantha Blatt. in J. & Proc. Asiat. Soc. Bengal (1930) n. s. 26:342. 1931; Karthik. et al. in Rec. Bot. Surv. India 21 (2) : 164. 1981; Sanj. Legumes of India 247. 1991.

Herbs, c 6 cm high; stem and branches purplish, glabrous except for a few long spreading stiff hairs. Leaves pinnate; leaflets 2 pairs, 6.5

x 3.5 mm, first pair obovate, second obliquely obovate, tip rounded, downy on lower surface, margins bristly. Flowers solitary or 2 together; corolla white, turning yellowish. Pods stalked, joints of pod about 10, thin, suborbicular, 4 mm in diam., shaped like a dinner plate.

Fls. & Frts. : January.

Distrib. : Bombay (Blatt. op. cit.).

S. purpurea Hook. Bot. Mag. 73:t. 4283. 1847; Baker in Hook. f. Fl. Brit. India 2:149. 1876; Cooke, Fl. Pres Bombay 1:359. 1958 (Repr.); Sanj. Legumes of India 247. 1991. *'Burkar'*.

Herbs, erect, branched. Leaflets 6–15 pairs, c 0.5 x 0.1 cm, oblong–lanceolate, apex subacute, bristle tipped, base rounded. Flowers 6–12, in axillary racemes. Pods 10–12–jointed, joints orbicular–oblong, reticulately veined.

Fls. & Frts. : September–February.

Illus. : Lakshminarasimhan & Sharma, Fl. Nasik Dt. 181, f. 11. 1991.

Distrib. : In open plateaus, not common. Ahmednagar, Nasik, Pune, Satara, Thane.

S. pycnantha Bth. ex Baker in Hook. f. Fl. Brit. India 2:150. 1876; Cooke, Fl. Pres. Bombay 1:360. 1958 (Repr.); Sanj. Legumes of India 248. 1991.

Herbs, 15–60 cm high, suberect; stem and branches bristly. Leaflets subsessile, 1.0–1.5 x 0.3–0.6 cm, linear, oblong–obovate, apex rounded, base cuneate. Flowers yellow, in dense, globose heads. Pods 5–9–jointed, joints venose.

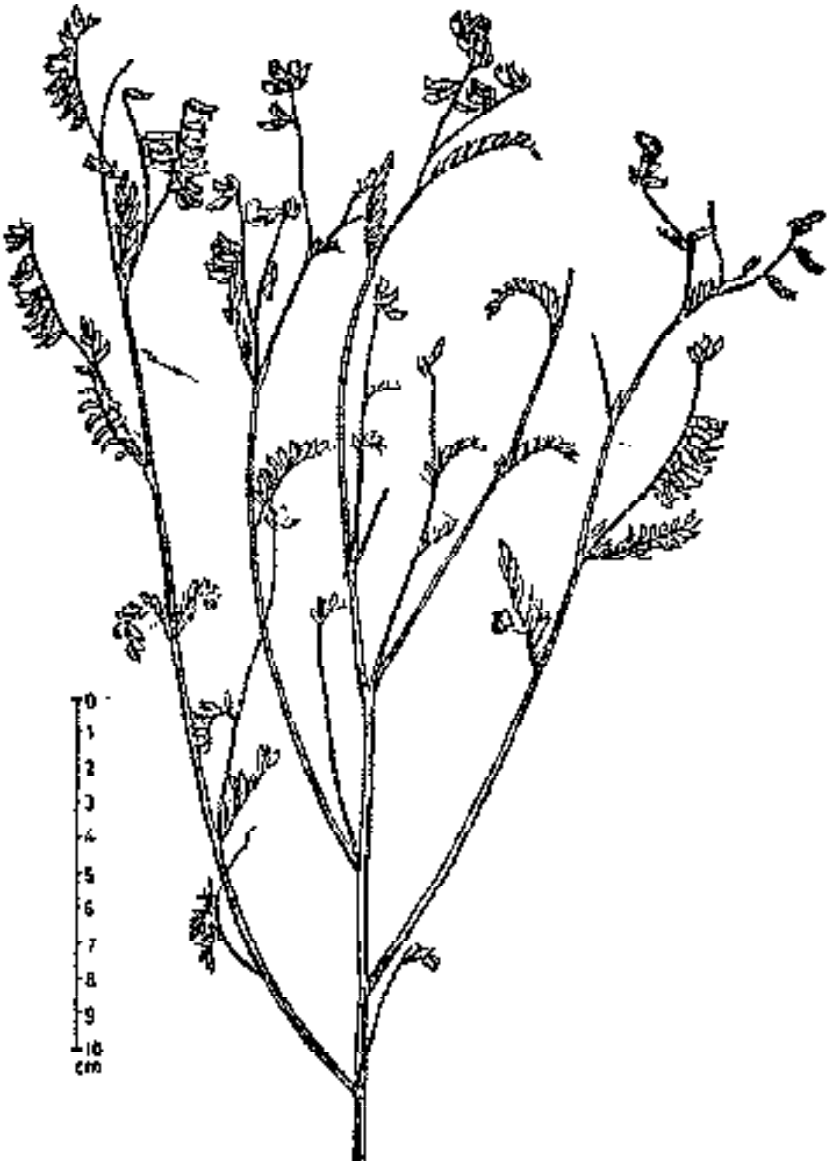
Fls. & Frts. : August–November.

Distrib. : Along the hill slopes, rare. Ahmednagar, Kolhapur, 'Konkan' (Cooke, op. cit.), Pune.

S. racemosa Heyne ex Wight & Arn. Prodr. 221. 1834; Sanj. Legumes of India 248. 1991. *S. blanda* var. *racemosa* (Heyne ex Wight & Arn.) Baker in Hook. f. Fl. Brit. India 2:151. 1876 p.p.; Cooke, Fl. Pres. Bombay 1:361 1958 (Repr.).

Herbs, diffuse. Leaflets 0.5–1.0 x 0.2 cm,oblanceolate–oblong, apex and base rounded. Flowers yellow, in terminal and lateral, leaf opposed or axillary subcapitate racemes. Pods 4–7–jointed, joints reticulately veined, rugose.

Fls. & Frts. : August–December.



Smithia purpurea Hook.

Distrib. : In open hilly plateaus, infrequent. Ahmednagar, Kolhapur, Nasik, Pune, Ratnagiri, Satara, Thane.

S. salsuginea Hance in J. Bot. 7:164. 1869; Cooke, Fl. Pres. Bombay 1:362. 1958 (Repr.); Sanj. Legumes of India 248. 1991. *S. dichotoma* Dalz. ex Baker in Hook. f. Fl. Brit. India 2:150. 1876.

Herbs, 30–90 cm high, erect; stem reddish–brown. Leaflets 2 pairs, 0.4–1.3 x 0.3–0.5 cm, oblanceolate–oblong, apex obtuse, base rounded. Flowers yellow. Pods 10–15–jointed, joints orbicular.

Fls. & Frts. : August–October.

Distrib. : Among grasses on hill slopes and roadsides, frequent. Nasik, Pune, Raigad, Ratnagiri, Thane.

S. sensitiva Ait. Hort. Kew. ed. 1, 3: 496. 1789; Baker in Hook. f. Fl. Brit. India. 2:148. 1876; Cooke, Fl. Pres. Bombay 1:357. 1958 (Repr.); Steenis in Reinwardtia 5: 444. 1961; Sanj. Legumes of India. 248. 1991.

Herbs, slender. Leaves pinnate; leaflets 3–10 pairs, 0.3–1.2 x 0.2–0.4 cm, linear–oblong, apex obtuse, bristle pointed, base rounded. Flowers yellow, in axillary racemes. Pods flattened, 3–6–jointed, joints orbicular, reddish–brown.

Fls. & Frts. : August–May.

Distrib. : Frequent in moist places. Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara, Thane.

S. setulosa Dalz. in Hook. Kew J. Bot. 3:208. 1851; Baker in Hook. f. Fl. Brit. India 2: 149. 1876; Cooke, Fl. Pres. Bombay 1:359. 1958 (Repr.) ; Sanj. Legumes of India 248. 1991.

Herbs, 90–120 cm high, erect, dichotomously branched. Leaflets 4–6 pairs, 1.0–5.6 x 0.5–1.0 cm, linear–oblong, bristly on margins and midrib beneath. Flowers bright yellow in axillary and terminal dichotomously branched racemes. Pod joints orbicular, reticulate.

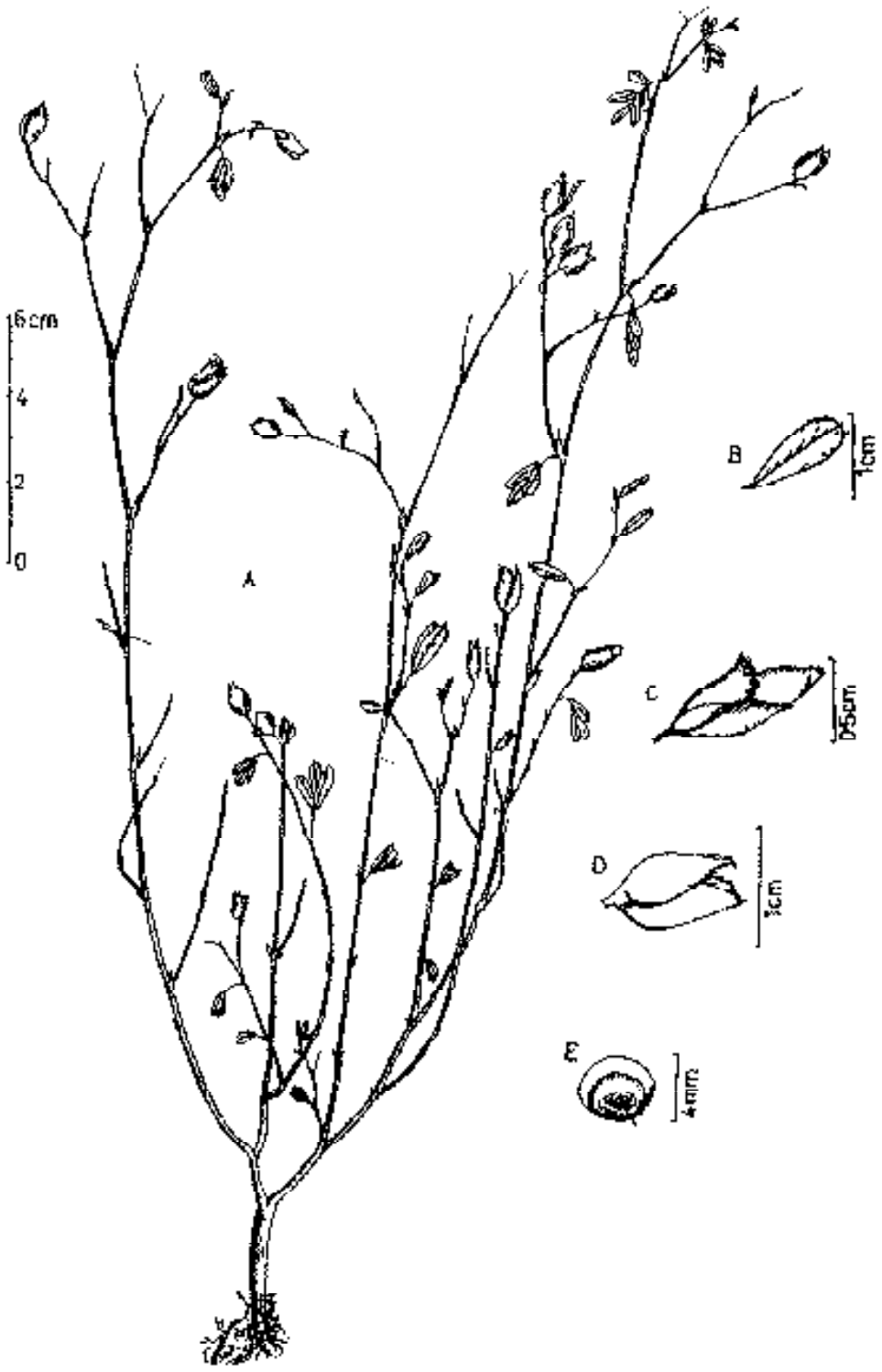
Fls. & Frts. : August–December.

Illus. : Bedd. Ic. Pl. Ind. Or. t. 243. 1874.

Distrib. : Along the hill slopes, frequent, Ahmednagar, Kolhapur, Nasik, Pune, Raigad, Ratnagiri,Satara, Thane.

SOPHORA L.

Sophora wightii Baker in Hook. f. Fl. Brit. India 2:250. 1878; Cooke, Fl. Pres. Bombay 1: 434. 1958 (Repr.); Sanj. Legumes of India 250. 1991.



Smithia salsuginea Hance
A- Habit; B- Leaflet; C- Flower; D- Fruit enclosed by sepals;
E- Part of a pod.

Shrubs; young branches with persistent velvety brown pubescence. Leaflets 11–15, 3.7–7.5 x 1.2– 2.5 cm, lanceolate, glaucous beneath, acuminate. Flowers yellow, in leaf opposed racemes. Pods stalked, constricted between seeds; joints ellipsoid–oblong. Seeds bright red.

Fls. & Frts. : August–October.

Illus. : *S. heterophylla* Wight, Ic. t. 1155. 1846 non L. 1753.

Distrib. : On hills, rare. 'Konkan' (Cooke, op. cit.).

SPATHOLOBUS Hassk.

1. Pods tomentose, stalked ... *S. parviflorus*

1. Pods glabrous, sessile ... *S. purpureus*

Spatholobus parviflorus (Roxb. ex DC.) O. Ktze. Rev. Gen. Pl. 1:205. 1891; Ridder–Numan & Wiriad. in Reinwardtia 10:187. 1985; Sanj. Legumes of India 251. 1991. *Butea parviflorus* Roxb. ex DC. Prodr. 2: 415. 1825. *Spatholobus roxburghii* Bth. in Miq. Pl. Jungh. 3: 238. 1852 nom. illeg.; Baker in Hook. f. Fl. Brit. India 2:193 1876; Cooke, Fl. Pres. Bombay 1:394 1958 (Repr.). *'Phalsani'*.

Lianas. Leaflets 4.5–10.0 x 3.0–11.2 cm, obovate–rhomoboid or broadly elliptic, glabrous above, thinly silky pubescent beneath. Flowers in terminal and axillary racemes or panicles. Pods 6–12 x 1.5–3.2 cm, brown, stalked, hairy, reticulately veined.

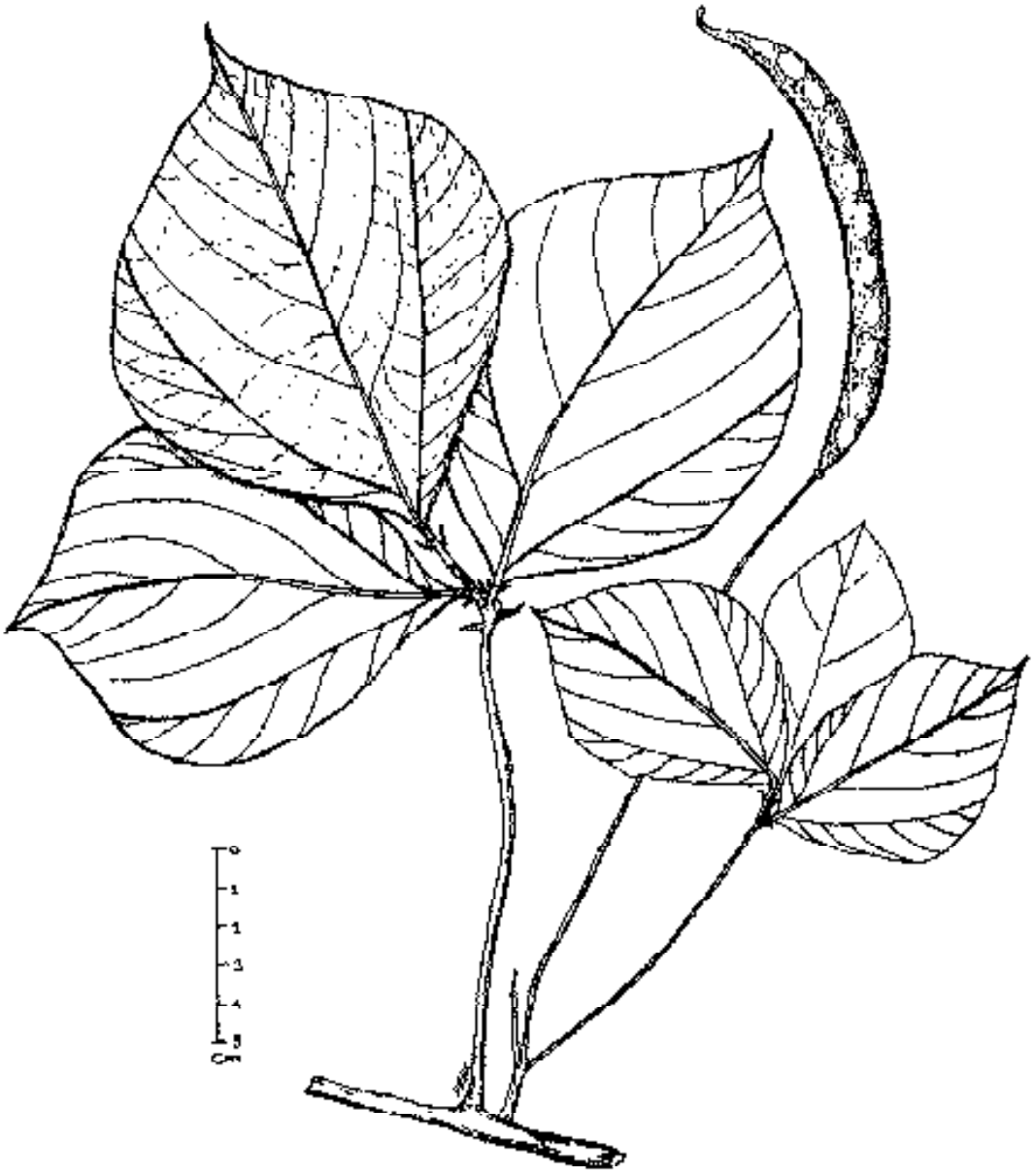
Fls. & Frts. : January–October.

Illus. : Ic Roxb. Fasc. 5, t. 19. 1971 [Repr. (*Spatholobus roxburghii*)]; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 185. 1982 & Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 115. 1988.

Distrib. : In moist deciduous forests, frequent. Bombay, Nasik, (Cooke, op. cit.), Pune, Raigad, Thane.

S. purpureus Bth. ex Baker in Hook. f. Fl. Brit. India 2: 194. 1876; Cooke, Fl. Pres. Bombay 1:395. 1958 (Repr. ed.); Ridder–Numan & Wiriad. in Reinwardtia 10: 192. 1985; Sanj. Legumes of India 252. 1991.

Climbers, lofty. Leaflets 3, 7.5–2.5 x 3.7–6.2 cm, oblong–elliptic, subcoriaceous, apex acuminate, base rounded. Flowers purple, many in terminal and axillary, branched panicles. Pods c 10 x 12 cm, reticulately veined.



Sphenostylis bracteata (Baker) Gillett

Fls. & Frts. : December–February.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 408, f. 230. 1909.

Distrib. : In semi evergreen forests, rare. 'Konkan' (Cooke, op. cit.).

SPHENOSTYLIS E. Mey.

Sphenostylis bracteata (Baker) Gillett in Kew Bull. 20:103. 1966; Sanj. Legumes of India 252 1991. *Dolichos bracteatus* Baker in Hook. f. Fl. Brit. India 2: 210. 1876 non Wall. 1831–32. *Dolichos ghaticus* Sant. & Panthaki in J. Bombay Nat. Hist. Soc. 53: 502. 1955; Cooke, Fl. Pres. Bombay1:406. 1958 (Repr.).*'Bhendri', 'Thapti–Sing'.*

Climbers, extensive. Leaflets ovate, deltoid, oblique, apex rounded, base cuneate. Flowers bluish–purple in racemes on 0.25 cm long peduncles. Pods linear, flat, turgid.

Fls. & Frts. : September–October.

Distrib. : Along the hills, rare. Pune, Satara, Thane.

STYLOSANTHES Sw.

Stylosanthes fruticosa (Retz.) Alst. in Trim. Handb. Fl. Ceylon 6: (Suppl.) 77. 1931; Mohlenbroock in Ann. Bot. Gard. 44:318. 1957; Sanj. Legumes of India 254. 1991. *Arachis fruticosa* Retz. Obs. Bot. 5: 26. 1788. *Stylosanthes mucronata* Willd. Sp. Pl. 3:1166. 1802 nom. illeg.; Baker in Hook. f. Fl. Brit. India. 2:148. 1876.

Herbs or undershrubs. Leaflets c 2.5 x 0.5 cm, lanceolate, apex mucronate, base subacute. Flowers yellow, solitary, axillary. Pods oblong c 0.5 cm long.

Fls. & Frts. : September.

Illus. : Matthew, Illus Fl. Tamilnadu Carnatic 2: t. 224. 1982.

Distrib. : Considered to be a good fodder, occasional as an escape. Ahmednagar, Nanded, Nasik, Satara.

TAVERNIERA DC.

Taverniera cuneifolia (Roth.) Arn. Nov. Act. Nat. Cur. 18 (1): 332. 1836; Ali in Biologia 12: 75. 1966; Sanj. Legumes of India 254. 1991. *Hedysarum cuneifolium* Roth, Nov. Pl. Sp. 358. 1825.

Taverniera nummularifolia auct. non DC. 1825; Baker in Hook. f. Fl. Brit. India 2:140. 1876 *('nummulari')*; Cooke, Fl. Pres. Bombay 1: 353. 1958 (Repr.). *'Jethmad'*.

Undershrubs, 30–60 cm high. Leaves 1–foliolate; leaflets 0.3–1.4 x 0.2–0.9 cm, obovate or orbicular, pubescent. Flowers red, 2–6 in axillary, lax racemes. Pods 1–2–jointed, compressed. Seeds yellowish –brown, subreniform.

Fls. & Frts. : August–November.

Illus. : Wight, Ic. t. 1055. 1846.

Distrib. : Common in waste places.

TEPHROSIA Pers. (nom. cons.)

1. Leaves simple ... *T. strigosa*
1. Leaves compound :
   2. Pods villous :
      3. Flowers bright purple in 4–10 cm long, spiciform racemes ... *T. villosa*
      3. Flowers creamy in 12–20 cm long, lax racemes ... *T. collina*
   2. Pods slightly pilose or silky :
      4. Flowers 1–2 in leaf axils :
         5. Pods straight :
            6. Flowers geminate in leaf axils ... *T. subtriflora*
            6. Flowers solitary in leaf axils ... *T. uniflora* subsp. *petrosa*
         5. Pods much recurved ... *T. sentiosa*
      4. Flowers in elongated racemes :
         7. Racemes axillary; style bearded :
            8. Leaflets 7–13, elliptic–oblong :
               9. Leaflets upto 7 x 3 cm ... *T. tinctoria*
               9. Leaflets much smaller i.e. upto 3 x 1.2 cm ... *T. canarensis*
            8. Leaflets 5, obovate ... *T. coccinea*
         7. Racemes extra axillary; style not bearded :
            10. Plants procumbent; racemes 1–3–flowered ... *T. pumila*
            10. Plants erect or suberect; racemes many flowered:

11. Bracts longer than pedicels	...	*T. hookeriana*
11. Bracts as long as pedicels :		
12. Branches and racemes slender	...	*T. leptostachya*
12. Branches and recemes comparatively stout	...	*T. purpurea*

Tephrosia canarensis J. R. Drumm. in Gamble, Fl. Pres. Madras 319. 1918 [1:225. 1967 (Repr.)]; Sanj. Legumes of India 256.1991.

Undershrubs; branches velvety. Flowers 3–12, in lax racemes. Pods linear, mucronate. Seeds 8–12, mottled.

Fls. & Frts.: October.

Distrib. : On plateaus, rare. Pune, Raigad.

T. coccinea Wall. Pl. Asiat. Rar. 1: 49, t. 60. 1830; Cooke, Fl. Pres. Bombay 1: 346. 1958 (Repr.); Sanj, Legumes of India 256. 1991. *T. tinctoria* var. *coccinea* (Wall.) Baker in Hook. f. Fl. Brit. India 2:112. 1876.

Undershrubs; branches silky pubescent. Leaflets imparipinnate, appressed silky hairy beneath, apex mucronate, base cuneate. Flowers brick–red, in lax racemes. Pods linear, flat, mucronate, silky pubescent.

Fls. & Frts. : September–January.

Distrib. : On gravelly soils, rare. Aurangabad, Pune, Raigad, Ratnagiri, Satara.

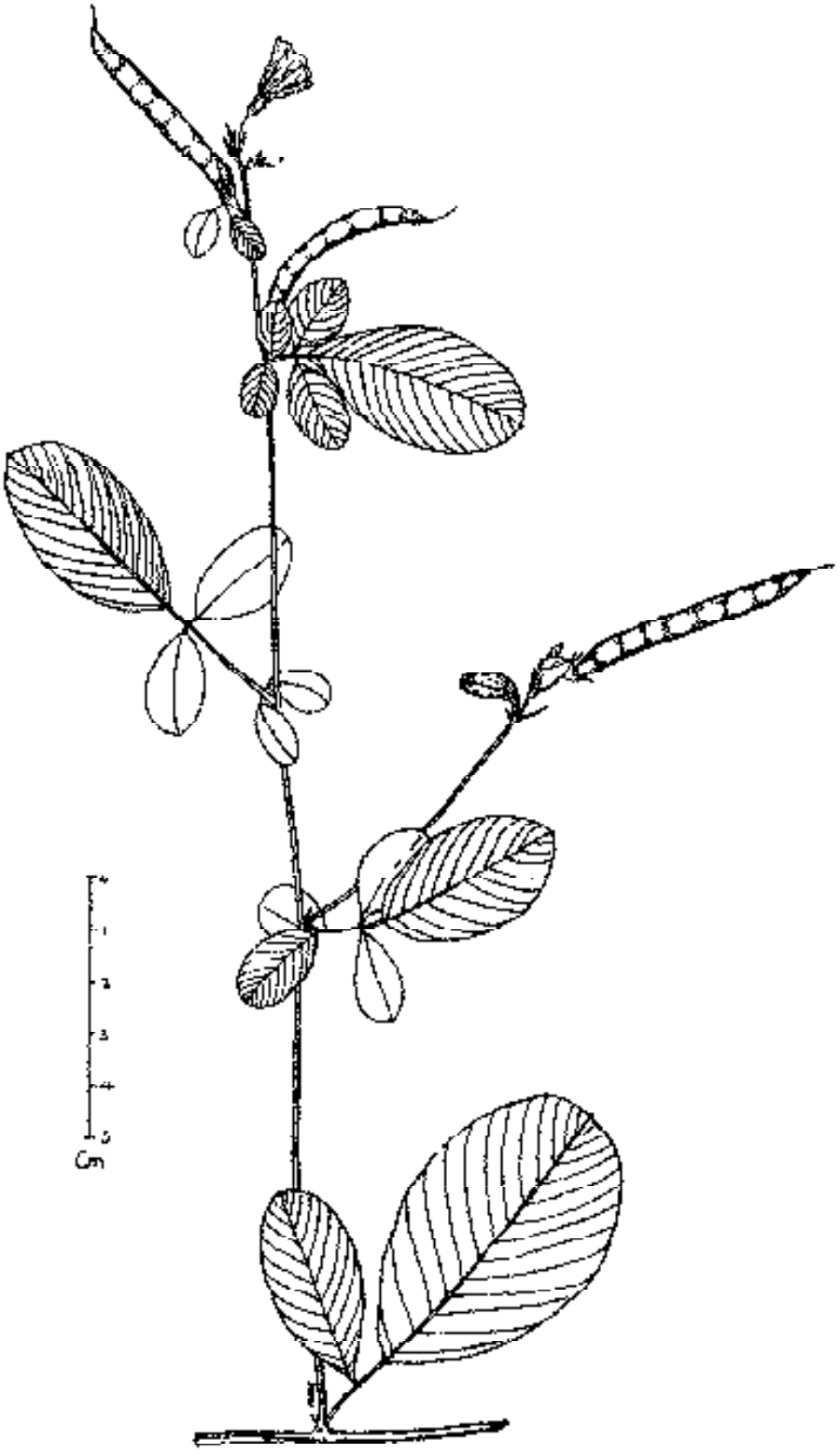
T. collina Sharma in J. Bombay Nat. Hist. Soc. 60:755, ff. A–H. 1964; Pataskar & Moorthy in M. V. M. Patrika 5:26. 1970; Sanj. Legumes of India 256. 1991.

Herbs, 30–50 cm high. Leaflets 9–11, 2–5 x 0.5–1.0 cm, elliptic–oblong, apex mucronate, base attenuate. Flowers in terminal or leaf opposed racemes. Pods brownish–golden yellow, thickened on sutures. Seeds 8–10, brownish–reniform.

Fls. & Frts. : August–October.

Illus. : Sharma, op. cit.

Distrib. : Among grasses in plains, rare. Dhule.



Tephrosia coccinea Wall.



Tephrosia collina Sharma

T. hookeriana Wight & Arn. Prodr. 212. 1834; Baker in Hook. f. Fl. Brit India 2 : 113. 1876 p.p.; Sanj. Legumes of India 256. 1991; Naik, Fl. Marathwada1: 305. 1998.

Undershrubs, 30-60 cm high; stem woody, branched, pubescent. Leaves pinnate, 6–15 cm long; leaflets 9–19, 2–3 x 0.7–1.0 cm, narrowly oblanceolate, cuneate above, thinly silky beneath. Flowers deep pink, in 15–20 cm long, extra axillary racemes. Pods linear–oblong, up to 5 cm long, slightly recurved, hairy. Seeds 8–10, oblong, yellowish.

Fls. & Frts. : September–December.

Distrib. : One wastlands, occasional. Aurangabad.

T. leptostachya DC. Prodr. 2 : 251. t. 2. 1825; Naik, Fl. Marathwada 1 : 305. 1998. *T. purpurea* sensu Baker in Hook. f. Fl. Brit. India 2 : 112. 1876 p.p. non (L.) Pers. 1807.

Herbs, 30–60 cm high; stem diffuse, woody at base, hairy. Leaves pinnate, 5–8 cm long; leaflets 7–9, 8–25 x 4–8 mm, oblanceolate, emarginate and mucronate at apex, pubescent above, densely hairy beneath. Flowers pink in racemes. Pods oblong, 4–5 cm long, flat, curved upwards. Seeds 3–6, subreniform, brown.

Fls. & Frts. : September–December.

Distrib. : On hill slopes, occasional. Nanded.

T. pumila (Lam.) Pers. Syn. Pl. 2:330. 1807; Sanj. Legumes of India 257. 1991. *Galega pumila* Lam. Encycl. 2:599. 1786. *Tephrosia purpurea* var. *pumila* (Lam.) Baker in Hook. f. Fl. Brit. India 2: 113. 1876; Cooke, Fl. Pres. Bombay 1: 347. 1958 (Repr.).

Herbs; stem hairy. Leaflets 9–13, 0.5–2.5 x 0.3–0.6 cm, obovate–oblong or lanceolate, appressed hairy, apex truncate to retuse, base subacute. Flowers rosy purple, in terminal or leaf opposed racemes. Pods 0.5–4.0 cm long, curved, hairy. Seeds 8–10.

Fls. & Frts. : February–March.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 204. 1988.

Distrib. : On hill slopes, frequent. Amravati, Aurangabad, Beed, Jalna, Nanded, Osmanabad, Parbhani, Thane.

T. purpurea (L.) Pers. Syn. Pl. 2:329. 1807; Baker in Hook. f. Fl. Brit. India 2: 112. 1876 p. p.; Cooke, Fl. Pres. Bombay 1: 346. 1958 (Repr.); Bosman & de Hass in Blumea 28:464. 1983; Sanj. Legumes of

India 258. 1991. *Cracca purpurea* L. Sp. Pl. 752. 1753. T. *purpurea* var. *pubescens* Baker in Oliver, Fl. Trop. Africa 2:125. 1871 & in Hook. f. op. cit. 113. *T. hamiltonii* J. R. Drumm. ex Gamble, Fl. Pres. Madras 520.1918 [1:226. 1967 (Repr.)]. *'Sarpunka', 'Unhali'*.

Herbs or undershrubs, 0.5–1.0 m high. Leaflets 13–19, oblanceolate, apex obtuse, retuse or mucronate, base cuneate. Flowers bright rosy–purple or violet. Pods linear, slightley curved, mucronate. Seeds 5–6.

Fls. & Frts. : Almost throughout the year.

Illus. : Mahesh, Illus. Fl. Delhi f. 63. 1966; Matthew, Illus. Fl. Tamilnadu Carnatic 2:225. 1982 & Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 205. 1988.

Distrib. : Common throughout the waste places and plains.

T. senticosa (L.) Pers. Syn. Pl. 2:330. 1807; Baker in Hook. f. Fl. Brit. India 2:112. 1876.; Cooke, Fl. Pres. Bombay 1:348. 1958 (Repr.); Sanj. Legumes of India 258. 1991. *Galega senticosa* L. Sp. Pl. 752. 1753. *Tephrosia tinctoria* var. *intermedia* (Wight & Arn.) Baker in Hook. f. op. cit.; Cooke, op. cit.

Shrubs or undershurbs, much branched, argenteo–canescent. Leaves alternate; leaflets 0.5–3.2 x 0.1–0.5 cm, oblanceolate, argenteo–canescent beneath, apex emarginate, base cuneate. Flowers 1–2, in axils of leaves. Pods linear, flattened, apiculate, densely hairy. Seeds 6–8, oblong–ellipsoid.

Fls. & Frts. : Septomber–November.

Illus. : Wight, Ic. t. 370. 1840.

Distrib. : Along the hill slopes, infrequent. Akola, Aurangabad, Dhule, 'Konkan' (Cooke, op. cit.), Jalna, Nanded, Pune, Satara, Solapur (Cooke, op. cit.).

T. strigosa (Dalz.) Sant. & Mahesh. in J. Bombay Nat. Hist. Soc. 54: 805. 1957; Sanj. Legumes of India 259. 1991. *Macronyx strigosus* Dalz. in Hook. Kew. J. Bot. 2:35. 1850. *Tephrosia tenuis* Wall. ex Dalz. & Gibs. Bombay Fl. 61. 1861; Baker in Hook. f. Fl. Brit. India 2: 111. 1876; Cooke, Fl. Pres. Bombay 1: 344. 1958 (Repr.).

Herbs, erect or suberect, caespitose. Leaves 1.2–4.7 x 0.2–0.8 cm, linear–lanceolate, densely hairy beneath, apex narrow, long apiculate, base narrowed, subacute. Flowers pink, solitary or in leaf–opposed racemes. Pods linear, compressed. Seeds 6–10, roundish.

Fls. & Frts. : September–December.

Illus. : Mahesh. Illus. Fl. Delhi f. 61. 1966; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 207. 1988.

Distrib. : Among grasses, common throughout.

T. subtriflora Baker in Oliver,Fl. Trop. Africa 2:117. 1871; Gillett in Kew Bull. 13:112. 1958; Sanj. Legumes of India 259.1991. *T. pauciflora* Grah. ex Baker in Hook. f. Fl. Brit. India 2: 114. 1876; Cooke, Fl. Pres. Bombay 1: 348. 1958 (Repr.).

Herbs, prostrate, 10–30 cm high. Leaflets 5–9, 0.6–1.2 x 0.2–0.6 cm, obovate or lanceolate, apex rounded or obtuse, base subacute. Flowers bright purple. Pods linear, compressed, recurved, mucronate. Seeds 8–10, brown.

Fls. & Frts. : September–November.

Distrib. : Rare. Kolhapur.

T. tinctoria (L.) Pers. Syn. Pl. 2:329.1807; Baker in Hook. f. Fl. Brit. India 2: 111. 1876; Cooke, Fl. Pres Bombay 1: 345. 1958 (Repr.); Sanj. Legumes of India 259. 1991. *Galega tinctoria* L. Syst. Nat. ed. 10, 1172. 1759. *'Guli', 'Nil'.*

Undershrubs, 20–150 cm high. Leaflets 1.2–7.0 x 0.6–3.0 cm, elliptic–oblong or oblanceolate, subcoriaceous, densely silky beneath, terminal largest, apex acute, obtuse or emarginate, base rounded or subacute. Flowers pale–scarlet or brick–pink, 2–8, in racemes. Pods flat, oblong , hairy, 8–12–seeded.

Fls. & Frts. : July–November.

Illus. : Wight, Ic. t. 388. 1840; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4:t. 208. 1988.

Distrib. : Along hill slopes in open, frequent. Ahmednagar, Kolhapur, Pune, Ratnagiri, Satara.

T. uniflora Pers. subsp. **petrosa** (Blatt. & Hallb.) Gillett & Ali in Kew Bull. 13:114. 1958; Sanj. Legumes of India 259. 1991. *T. petrosa* Blatt. & Hallb. in J. Bombay Nat. Hist. Soc. 26:239. 1918.

Herbs, 60–100 cm high; stem suffruticose, silky pubescent. Leaflets 5–9 (13), 3.0–5.5 x 0.8–1.3 cm, obovate–oblanceolate, appressed–silky beneath. Flowers pinkish–red. Pods linear, flat, appressed hairy. Seeds 7–8, greenish–yellow, roundish.

Fls. & Frts. ; September–October.

Distrib. : Near sea–coast, occasional. Raigad.

T. villosa (L.) Pers. Syn. Pl. 2: 329. 1807; Baker in Hook. f. Fl. Brit. India 2: 113. 1876; Cooke, Fl. Pres. Bombay 1:347. 1958 (Repr. ed.); Bossman & de Hass in Blumea 28:476. 1983; Sanj. Legumes of India 260. 1991. *Cracca villosa* L. Sp. Pl. 752. 1753. *Tephrosia villosa* var. *incana* (Roxb.) Baker in Hook. f. op. cit.

Herbs, perennials; branches white appressed hairy. Leaflets 11–19, 1–2 x 0.5 cm, obovate–oblanceolate, silky pubescent beneath, apex emarginate, base subacute. Flowers fascicled, in racemes. Pods linear–oblong, falcate. Seeds 5–8, rectangular.

Fls. & Frts. : August–September.

Illus. : Mahesh. Illus. Fl. Delhi f. 62. 1966; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 209. 1988.

Distrib. In hilly forests, common throughout.

TERAMNUS P. Br.

1.	Leaflets strigosely hairy; racemes and pods villous with downy, spreading hairs; calyx teeth shorter than tube:		
	2. Flowers bluish	...	*T. mollis*
	2. Flowers reddish	...	*T. repens* sep. *gracilis*
1.	Leaflets and racemes nearly glabrous; calyx not as above; pods glabrous but for a few acicular hairs	...	*T. labialis*

Teramnus labialis (L. f.) Spreng. Syst. Veg. 3:235. 1826; Baker in Hook. f. Fl. Brit. India 2:184. 1876; Cooke, Fl. Pres. Bombay 1: 387. 1958 (Répr.); Sanj. Legumes of India 261. 1991. *Glycine labialis* L. f. Suppl. 325. 1781. *'Ran–udid'*.

Herbs; stem twining. Leaflets 1.5–9.0 x 0.8–5.4 cm, ovate-elliptic or oblong, appressed–hairy beneath. Flowers violet–purple, fading pale blue or white, in axillary and terminal racemes. Pods linear, flat, turgid, beaked. Seeds 2–9.

Fls. & Frts. : Setember–Decemher.

Illus. : Wight, Ic. t. 168. 1839 *(Glycine labialis)*; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 226. 1982.

Distrib. : Common throughout the state over hedges and under shrubs or sometimes trailing.

T. mollis Bth. in J. Linn. Soc. Bot. 8: 265. 1865 non *Glycine mollis* Wight & Arn. Prodr. 209. 1834; Verdc.in Kew Bull. 24: 276. 1970; Sanj. Legumes of India 261. 1991. *T. labialis* var *mollis* (Wight & Arn.) Baker in Hook. f. Fl. Brit. India 2: 184. 1876; Cooke, Fl. Pres. Bombay 1: 387. 1958 (Repr.).

Herbs; stem twining, hairy, stems with longer and more spreading hairs. Flowers bluish, in terminal and axillary racemes.

Fls. & Frts. : September–December.

Distrib. : On hedges, infrequent. Bombay, Konkan (Cooke, op. cit.), Nanded, Yavatmal.

T. repens (Taub.) Baker f. ssp. **gracilis** (Chiov.) Verdc. in Kew Bull. 24:275. 1970; Sanj. Legumes of India 261.1991. *T. gracilis* Chiov. Ann. Inst. Bot. Roma 8:432.1908.

Herbs; stems slender, prostrate, hairy. Leaflets round, pubescent beneath. Flowers reddish, in racemes. Pods linear, hairy. Seeds 8-12. 'rough'.

Fls. & Frts. : Aughust–September.

Distrib. : Bombay (Verdc. op. cit.).

TRIGONELLA L.

Trigonella occulta Del. Fl. Aegypt. Illus. 71. 1812; Baker in Hook. f. Fl. Brit. India 2: 87. 1876; Cooke, Fl. Pres. Bombay 1: 325. 1958 (Repr.); Sanj. Legumes of India 265. 1991

Herbs, caespitose. Leaflets 3, 1.4–2.2 x 0.6–1.0 cm, obovate or oblanceolate, apex obtuse or rounded, base cuneate, sharply toothed, sparsely silky–hairy beneath. Flowers yellow, 2–4 in sessile, axillary clusters. Pods oblong–ellipsoid, veined, hairy. Seeds 1–2, oblong, yellowish–brown.

Fls. & Frts. : January–March.

Distrib. : Occasional, along margins of tanks, Aurangabad, Jalna, Nasik, Pune.

URARIA Desv.

1. Leaves 5–7–foliolate; leaflets usually linear–lanceolate ... *U. picta*
1. Leaves 1 and 3–foliolate, mixed; leaflets not as above:
   2. Leaf apex mucronate; flowers pink ... *U. lagopus*
   2. Leaf apex obtuse; flowers purple :
      3. Pods 1–2–jointed, joints not hispid ... *U. lagopodioides*
      3. Pods 4–8–jointed, joints hispid ... *U. rufescens*

Uraria lagopus DC. Ann. Sci. Nat. 4:10. Jan. 1825 & Prod. 2:324. 1825; Baker in Hook. f. Fl. Brit. India 2: 287. 1876; Sanj. Legumes of India 267. 1991. *Doodia alopecuroides* Roxb. Fl. Ind. 3:368.1832. *Uraria alopecuroides* (Roxb) Wight, Ic. t. 290. 1840.

Herbs, suffruticose; stem clothed with hooked hairs. Leaflets c 7 x 5 cm, ovate, elliptic or oblong, base rounded or subcordate. Flowers in axillary and terminal, dense racemes. Pods 1–2–jointed, hidden in bracts. Seeds 2, greenish–yellow.

Fls. & Frts. : July–September.

Illus. : Wight, op. cit.

Distrib. : As undergrowth in dry deciduous forests, rare. Chandrapur, Nanded, Yavatmal.

U. lagopodioides (L.) Desv. Mem. Soc. Linn. Paris 4:309. 1826; van Meeuwen in Reinwardtia 5: 451. 1961; Sanj. Legumes of India 268. 1991. *Hedysarum lagopodioides* L. Sp. Pl. 1198. 1753. *Uraria lagopoides* (Burm. f.) DC. Prodr.2:324.1825; Baker in Hook. f. Fl. Brit. India 2:156.1876.

Herbs, suberect; branches many, slender. Leaves 1–3–foliolate; leaflets 2–8 x 5–6 cm, orbicular–oblong, obovate, base rounded, tomentose beneath. Flowers in short, dense, cylindric spikes. Pods brown.

Fls. & Frts. : August–September.

Illus. : Wight, Ic. t. 289. 1840; Matthew, Illus. Fl. Palni Hills t.213. 1996.

Distrib. : As undergrowth in dry deciduous forests, rare. Chandrapur, Nagpur, Pune.

U. picta (Jacq.) Desv. ex DC. Prodr. 2:324. 1825; Baker in Hook. f. Fl. Brit. India 2: 155. 1876; Cooke, Fl. Pres. Bombay 1:367. 1958 (Repr.); van Meeuwen in Reinwardtia 5: 452. 1961; Sanj. Legumes of India 268. 1991. *Hedysarum pictum* Jacq. Coll. Bot. 2: 262. 1788. *'Natya', 'Pithvan', 'Prishnaparni'.*

Undershubs, 1–2 m high. Leaflets 3.5–22.0 x 1.3–2.6 cm, apex acute, base rounded. Flowers purple or white, in close fascicles and 15–30 cm long racemes. Pods 3–6–jointed, placed one above the other. Seeds yellowish or reddish–brown, reniform.

Fls. & Frts. : August–Spetember.

Illus. : Gillett et. al. in Milne–Redhead & Polhill, Fl. Trop. E. Afr. Leguminosae, subf. Papilionoideae pt. 3 (1): 479, f. 67. 1971.

Distrib. : In deciduous forests and Islands, infrequent. Akola, Amravati, Bombay, Chandrapur, Nanded, Raigad, Thane, Yavatmal.

U. rufescens (DC.) Schindl. in Feddes Report. 21:14.1925; van Meeuwen in Reinwardtia 5:453. 1961; Sanj. Legumes of India 268. 1991. *Desmodium rufescens* DC. in Ann. Sci. Nat. Hist. Paris 4:101. 1825. *Uraria hamosa* Wall ex Brit. Wight & Arn. Prodr. 222. 1834; Baker Hook. f. Fl. Brit. India 2:156. 1876.

Undershrubs; branches fulvous pubescent Leaves 1 & 3–foliolate, mixed; leaflets 2.0–8.5 x 1–6 cm, ovate or ellipitic, oblong, pubescent beneath. Flowers bright purple, in terminal and axillary racemes. Pods turgid, joints annular. Seeds yellowish–brown, globose or subreniform.

Fls. & Frts. : September,–February.

Illus. : Wight, Ic. t. 284. 1840; Matthew, Illus. Fl. Palni Hills t. 214. 1996.

Distrib. : As an undergrowth in deciduous forests, frequent. Amravati, Chandrapur, Nanded, Nasik, Raigad, Ratnagiri, Thane, Yavatmal.

VICIA L.

1. Leaflets 0.2–0.4 cm broad:
   2. Pods upto 3 cm long, 5–6–seeded ... *V. peregrina*
   2 Pods upto 5 cm long, 8–10–seeded ... *V. sativa*
1. Leaflets 0.05–0.1 cm broad, hirsute ... *V. hirsuta*

Vicia hirsuta (L.) S. F. Gray, Nat. Arr. Brit. Pl. 2:614. 1821; Baker in Hook. f. Fl. Brit. India. 2: 177. 1876; Kamble in J. Econ. Tax. Bot. 16 : 557. 1992; Sanj. Legumes of India 269. 1991. *Ervum hirsutum* L. Sp. Pl. 738. 1753.

Herbs, slender straggling or climbing. Leaflets 5–10 pairs, 0.5 –2.0 cm long, appressed pubescent. Flowers in axillary racemes. Pods c 1 cm long, obliquc, hairy, 2–seeded.

Fls. & Frts. : August–October.

Distrib. : As a weed in cultivated field and waste places, frequent. Akola, Pune.

V. peregrina L. Sp. Pl. 737. 1753; Baker in Hook. f. Fl. Brit. India 2 : 178. 1876; Sanj. Legumes of India 270. 1991; Naik, Fl. Marathwada 1 : 311. 1998.

Herbs, 30–90 cm long; stem slender, climbing, glabrous. Leaves abruptly pinnate; leaflets 8–12, 2–3 x 0.2–0.4 cm, linear–oblong, acute or obtuse at apex, glabrous. Flowers purplish–red, solitary, axillary. Pods linear–oblong, 2.5–3.0 cm long, flat, at length cylndric, deflexed, glabrous. Seeds 5–6, ellipsoid.

Fls. & Frts. : December–January.

Distrib. : Probably immigrated from Punjab, now naturalized, occasional. Aurangabad.

V. sativa L. Sp. Pl. 736. 1753; Baker in Hook. f. Fl. Brit. India 2: 178. 1876; Shinde & S. M. Almeida in J Bombay nat. Hist. Soc. 84: 466, f. 2. (1987) 1988; Sanj. Legumes of India 270. 1991.

Herbs, slender, tendrillar. Leaves 1.8–2.5 cm long; leaflets 4–8 pairs, 0.4–1.5 cm long, appressed pubescent, upper leaflets modified into tendrils. Flowers red–blue, solitary or geminate.

Fls. & Frts. : September–January.

Illus. : Shinde & S. M. Almeida, op. cit.; Matthew, Illus. Fl. Palni Hills t. 216. 1996.

Distrib. : Rare. Nasik (Shinde & S. M. Almeida, op. cit.).

VIGNA Savi

1. Keel spirally twisted :
   2. Pods hirsute :

3.	Stipules foliaceous, upto 4.2 x 2.5 cm	...	*V. khandalensis*
3.	Stipules not as above :		
4.	Pods radially spreading or deflexed, flat	...	*V. sublobata*
4.	Pods erect or suberect, cylindrical	...	*V. angularis*
2.	Pods glabrous or puberulous :		
5.	Leaflets shallowly or deeply lobed; pods usually cylindric :		
6.	Leaflets deeply 2–7–lobed; stipules lanceolate, not foliaceous	...	*V. aconitifolia*
6.	Leaflets shallowly or deeply lobed; stipules ovate–oblong, foliaceous	...	*V. trilobata*
5.	Leaflets entire or obscurely lobed; pods sub–compressed :		
7.	Stem and pods densely hairy; leaflets more than 5 cm long	...	*V. umbellata*
7.	Stem and pods glabrous or nearly so; leaflets under 5 cm long	...	*V. dalzelliana*
1.	Keel not as above :		
8.	Roots fusiform; stipules basifixed; flowers 3.5– 4.0 cm broad	...	*V. vexillata*
8.	Roots and stipules not as above; flowers less than 3.5 cm broad	...	*V. unguiculata*

Vigna aconitifolia (Jacq.) Marechal in Bull. Jard. Bot. Nat. Belg. 39: 160. 1969: Verdc. in Kew Bull. 23:469. 1969; Sanj. Legumes of India 271. 1991. *Phaseolus aconitifolius* Jacq. Obs. Bot. 3:2, f. 52. 1768; Baker in Hook. f. Fl. Brit. India 2:202. 1876; Cooke, Fl. Pres. Bombay 1: 403. 1958 (Repr.). *Matki.*

Herbs, diffuse, trailling. Leaflets 3–5, 1.4–6.5 x 2.2– 4.6 cm, lobed, lobes linear, lanceolate. Flowers pale bright yellow, in capitate racemes. Pods 3–8–seeded.

Fls. & Frts. : August–January.

Illus. : Matthew, Illus. Fl. Palni hills t. 217. 1996.

Distrib. : Usually cultivated, occasionally found as an escape. Ahmednagar, Aurangabad, Osmanabad, Pune, Thane, Wardha, Yavatmal.

V. angularis (Willd.) Ohwi & Ohashi in J. Jap. Bot. 44:29. 1969; Verdc. in Kew Bull. 24:557. 1970; Sanj. Legumes of India 272. 1991; Naik, Fl. Marathwada 1 : 313. 1998. *Dolichos angularis* Willd. Sp. Pl. 3:1051. 1802. *'Mung'*.

Herbs, hairy. Leaflets 2.5–9.0 x 1.5–10.5 cm, broadly ovate or ovate–rhomboid, appressed pubescent. Flowers yellow, in capitate racemes. Pods 1.5–4.0 cm long, linear–oblong, densely hairy. Seeds subquadrate or orbicular, blackish.

Fls. & Frts. : September–October.

Distrib. : Cultivated, often found as an escape. Ahmednagar, Marathwada (Naik, op. cit.), Nagpur, Pune, Raigad, Satara.

V. dalzelliana (O. Ktze.) Verdc. in Kew Bull. 24:558. 1970; Sanj. Legumes of India 272. 1991. *Phaseolus dalzellianus* O. Ktze. Rev. Gen. Pl. 1:202. 1891. *P. pauciflorus* Dalz. in Hook. Kew. J. Bot. 3: 209. 1851 non G. Don. 1823 nec Bth. 1837 & Dalz. & Gibs. 1861; Baker in Hook. f. Fl. Brit. India 2:202. 1876. *P. dalzellii* T. Cooke, Fl. Pres. Bombay 1: 376. 1902 [1: 401. 1958 (Repr.)].

Herbs; stem filiform, striate. Leaflets 2–5 x 1.5–3.5 cm, ovate or ovate–rhomboid, glabrescent. Flowers yellow in axillary racemes. Pods 3.0– 5.2 cm long, subcylindric. Seeds 6–8, dark brown.

Fls. & Frts. : August–December.

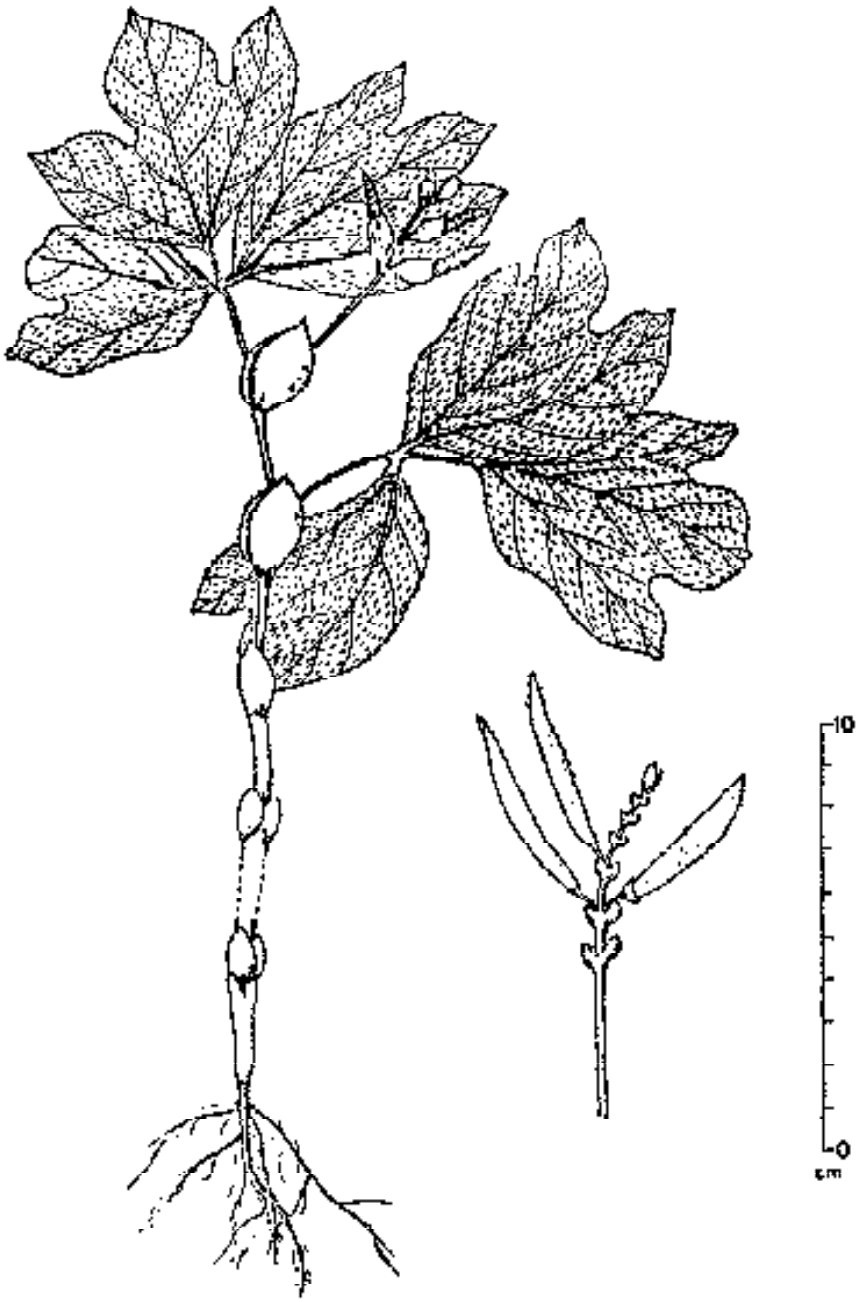
Illus. : Matthew, Illus. Fl. Palni Hills t. 218. 1996.

Distrib. : Along the hill slopes and ghats, frequent. Ahmednagar, Chandrapur, Kolhapur, Nanded, Nasik, Pune, Raigad, Ratnagiri, Satara, Thane.

V. khandalensis (Sant.) Raghavan & Wadhwa in Curr. Sci. 41:429. 1972; Sanj. Legumes of India 274. 1991. *Phaseolus khandalensis* Sant. in Kew Bull. 1948: 276. 1948. *P. grandis* Dalz. in Dalz & Gibs. Bombay Fl. 72. 1861 non Bth. 1852; Baker in Hook. f. Fl. Brit. India. 2:202. 1876; Cooke, Fl. Pres. Bombay 1:400. 1958 (Repr.). *'Badmung'*.

Herbs or undershrubs, up to 1.5 m high; stem strigosely hairy. Leaflets 7–13 x 5.5–14.0 cm. deltoid, terminal ones 3–lobed, laterals frequently 2-lobed, appressedly hairy. Flowers yellow, in axillary, spicate racemes. Pods 4.0–5.5 x 0.3– 0.5 cm, cylindric, hirsute. Seeds 8–10, dark brown.

Fls. & Frts. : September–October.



Vigna khandalensis (Sant.) Raghavan & Wadhwa–
Habit & young pods.

Illus. : Lakshminarasimhan & Sharma, Fl. Nasik Dt. 187, t. 12. 1991.

Distrib. : In hilly forests, infrequent. Ahmednagar, Bombay, Nasik, Pune, Raigad, Satara.

V. sublobata (Roxb.) Babu & Sharma in Bull. Bot. Surv. India 27: 21. 1987; Sanj. Legumes of India 276. 1991. *Phaseolus sublobatus* Roxb. Fl. Ind. 3:288. 1832. *P. trinervius* Heyne ex Wight & Arn. Prodr. 245. 1834; Baker in Hook. f. Fl. Brit. India 2: 206. 1876. *P. sublobatus* var. *setulosus* (Dalz.) Prain in J. As. Soc. Bengal 66: 423. 1897; Cooke, Fl. Pres. Bombay 1: 402. 1958 (Repr.). *Vigna radiata* var. *setulosa* (Dalz.) Ohwi & Ohashi in Jap. J. Bot. 44: 31. 1969. *V. radiata* var. *sublobata* (Roxb.) Verdc. in Kew Bull. 24: 559. 1970. *'Mukani', 'Ran-udid'.*

Herbs, twining or suberect; stem hairy. Leaflet 3.6–12.0 x 2.5–7.0 cm, ovate or ovate–rhomboid, appressed pubescent or setulose, apex acute, base rounded. Flowers yellow, 2–6 in axillary racemes. Pods 2.8–4.0 cm long, linear–cylindric, grey, hairy.

Fls. & Frts. : Almost throughout the year.

Illus. : Matthew, Illus. Fl. Palni Hills t. 220. 1996.

Distrib. : Along the hill slopes, frequent.

V. trilobata (L.) Verdc. in Taxon 17:172. 1968 & in Kew Bull. 24:560. 1970; Sanj. Legumes of India 276. 1991. *Dolichos trilobatus* L. Mant. Pl. 101. 1767. *Phaseolus trilobus* Ait. Hort. Kew. ed. 1, 3: 30. 1811 non *Dolichos trilobus* L. 1753; Baker in Hook. f. Fl. Brit. India 2:201. 1876; Cooke, Fl. Pres. Bombay 1:401 1958 (Repr.). *'Jangli Math', 'Mukni'.*

1. Leaflets up to 4.5 cm, shallowly lobed ... var. *trilobata*
1. Leaflets up to 3 cm, deeply 3–lobed ... var. *pusilla*

var. **trilobata.**

Herbs, suberect or trailing. Leaflets 1.5–4.5 x 0.8 – 5.3 cm, middle lobe largest, spathulate, laterals spathulate with subacute or obtuse apex, hairy on both sides. Flowers yellow in subcapitate racemes. Pods 1–2 cm long, slightly curved. Seeds 2–5, brownish–black.

Fls. & Frts. : August – September.

Illus. : Wight, Ic. t. 94. 1838 (*Phaseolus trilobus*); Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 227. 1982 & Fur. Illus. Fl Tamilnadu Carnatic. 4:t. 212. 1988.

Distrib. : Common throughout in plains.

var. **pusilla** Naik & Pokle in J. Econ. Tax. Bot. 7:670 (1985) 1966; Sanj. Legumes of India 276. 1991; Naik, Fl. Marathwada 1 : 5. 1998.

Herbs, trailing or twining, 15–100 cm. high. Leaves pinnately 3–foliolate or deeply 3–lobed, lobes 1.5–3.0 x 1.2– 2.5 cm, ovate, subacute or retuse at apex. Flowers yellow, 5–10 in dense, terminal clusters. Pods 1.5–2.0 cm long, hairy. Seeds 5–10, brown, granulate, truncate at both ends.

Fls. & Frts. : August–September.

Illus. : Naik & Pokle, op. cit. 672, f. 2. a–g.

Distrib. : In dry zones, common in Marathwada (Naik, op. cit.).

V. umbellata (Thunb.) Ohwi & Ohashi in J. Jap. Bot. 44: 31. 1969; Verde. in Kew Bull. 24: 560. 1970; Sanj. Legumes of India 276. 1992. *Dolichos umbellatus* Thunb. in Trans. Linn. Soc. London 2: 339. 1794. *Phaseolus calcaratus* Roxb. Fl. Ind. 3: 289. 1832; Baker in Hook. f. Fl. Brit. India 2: 203. 1876.

Herbs, prostrate or twining. Leaflets 3, 5–9 x 4–7 cm, ovate–ellipitic or ovate–rhomboid, apressed hairy on both sides, apex acuminate, base rounded. Flowers yellow, in congested racemes. Pods *c* 5 cm ong, compressed, subcylindric. Seeds 14–16, dark–green.

Fls. & Frts. : May–October.

Illus. : Matthew, Illus. Fl. Palni Hills t. 221. 1996.

Distrib. : Rare on gravelly soil in forests. Kolhapur, Nanded.

V. unguiculata (L.) Walp. Repert. 1. 779. 1842; Verde. in Kew Bull. 24: 543. 1970. *Dolichos unguiculatus* L. Sp. Pl. 725. 1753. *D. biflorus* L. Sp. Pl. 727. 1753; Baker in Hook. f. Fl. Brit. India. 2: 210. 1876; Cooke, Fl. Pres. Bombay 1: 407. 1958 (Repr.).

1. Flowers yellow ; pods 2.4 – 6.0 cm long, compressed, falcate . . subsp. *unguiculata*
1. Flowers purple, fading white, pods 6–20 cm long, cylindric .. subsp. *cylindrica*

subsp. **unguiculata.** *'Hulga', 'Kulthi'.*

Herbs, suberect or twining. Leaflets 3, 2.0–6.2 x 1.3–3.5 cm, ovate–elliptic, pilose. Flowers 1–3, axillary. Pods linear, hairy, subtorulose.

Fls. & Frts. : June– October.

Distrib. : Usually cultivated, also found as an escape. Chandrapur, Nagpur, Osmanabad, Pune.

subsp. **cylindrica** (L.) van Eseltine in Hendricks Veg. New York 1(2): 11. 1931; Verdc. in Kew Bull. 24: 544. 1970; Sanj. Legumes of India 277. 1991. *Phaseolus cylindricus* L. Herb. in Stickmann Amb. 23. 1754. *Vigna catjang* (Burm. f.) Walp. in Linnaea 13:533. 1839 nom. illeg.; Baker in Hook. f. Fl. Brit. India 2: 205. 1876; Cooke, Fl. Pres. Bombay 1: 405. 1958 (Repr.). *'Chavli'.*

Herbs; branches ascending. Leaflets 3, ovate–lanceolate or rhomboid. Flowers in axillary racemes. Pods linear, straight or curved. Seeds oblong, reddish.

Fls. & Frts. : April & October.

Illus. : Matthew, Fur. Ilus. Fl. Tamilnadu Carnatic 4: t. 213. 1988.

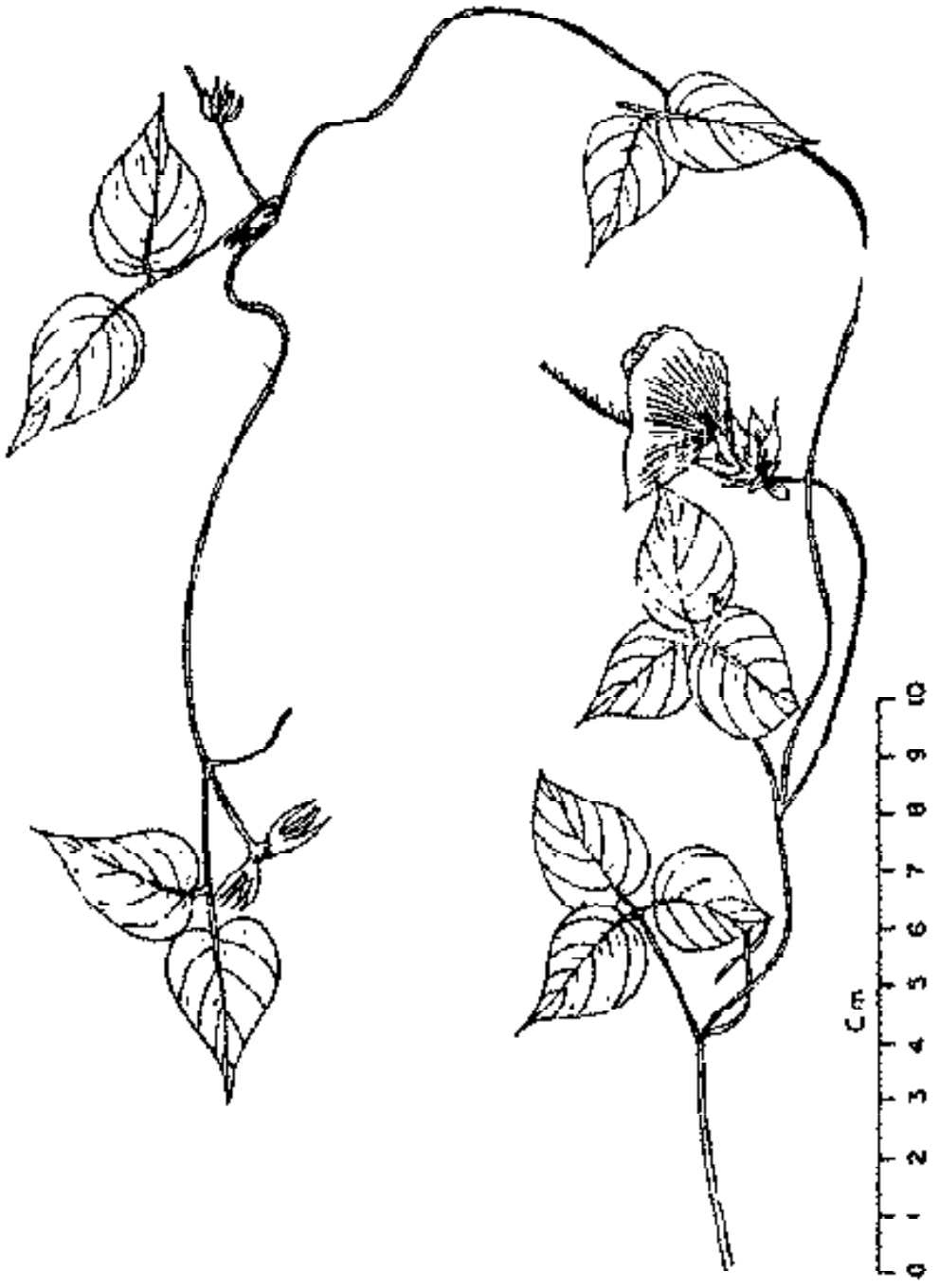
Usually cultivated as vegetable, often found as an escape.

V. vexillata (L.) A. Rich. in Hist. Fis. Polit. Nat. 1; 11: 191. 1845; Baker in Hook. f. Fl. Brit. India 2:206. 1876; Verdc. in Kew Bull. 24: 553. 1970; Sanj. Legumes of India 277. 1991. *Phaseolus vexillatus* L. Sp. Pl. 724. 1753. *Vigna capensis* (L.) Walp. in Linnaea 13:533. 1839; Cooke, Fl. Pres. Bombay 1:404. 1958 (Repr.).

1. Leaflets larger, ovate–rhomboid or lanceolate :
   2. Flowers pinkish to bluish–purple ... var. *vexillata*
   2. Flowers rosy ... var. *sepiaria*
1. Leaflets smaller, ovate ... var. *stocksii*

var. **vexillata.** *'Bhurmuli', 'Halunda'.*

Herbs, twining or trailing. Leaflets 2.5–8.0 x 2–4 cm, ovate, ovate–rhomboid or lanceolate sparsely hairy. Flowers pinkish or



Vigna vexillata (L.) A. Rich. var. **vexillata**

bluish–purple, few in capitate racemes. Pods 8–16 cm long, linear, hairy, beaked. Seeds 10–15, subreniform.

Fls. & Frts. : August–December.

Illus. : Wight, Ic. t. 202. 1839 (*Phaseolus pulniensis*); Matthew, Illus. Fl. Palni Hills t:222. 1996.

Distrib. : Along the hills common Ahmednagar, Aurangabad, Chandrpur, Nanded, Nasik, Pune, Raigad, Satara, Thane.

var. **sepiaria** (Dalz.) Babu & Sharma in Bull. Bot. Surv. India 27:27.1987; Sanj. Legumes of India 278. 1991. *Phaseolus sepiarius* Dalz. in Hook. J. Bot. Kew Gard. Misc. 2:33.1850.

Twiners; roots fusiform. Leaves 3–foliolate; leaflets ovate, apex acute or acuminate, base rounded, hairy on both sides. Flowers rosy, 2–4, crowded at ends of peduncles. Pods subterete, hairy. Seeds 10–15, subreniform.

Fls. & Frts. : September–October.

Distrib. : Maharashtra, infrequent.

Notes : This species is endemic to Western ghats.

var. **stocksii** Bth. ex Baker in Hook. f. Fl. Brit. India 2:206. 1876; Sanj. Legumes of India 278. 1991.

Herbs; leaflets small, ovate, brown hairy. Flowers reddish–purple, 2–4 at the end of long peduncles.

Fls. : September–October.

Distrib. : Konkan. Endemic.

ZORNIA J. F. Gmel.

1. Leaflets usually linear–lanceolate; pods not longer than bracts ... *Z. gibbosa*
1. Leaflets usually ovate; pods much longer than bracts .. *Z. diphylla*

Zornia gibbosa Span. in Linnaea 15:192. 1841; Dandy & Milne–Redhead in Kew Bull. 17:74. 1963; Sanj. Legumes of India 280. 1991. **Landgu'**.

Herbs, prostrate, diffuse or suberect, 10–30 cm high. Leaflets 2, 1–2 x 0.2 – 1.0 cm, linear–lanceolate or ovate– lanceolate or rounded, black–dotted beneath. Flowers yellow, 3–12, in terminal and axillary, spicate racemes. Pods 1–2 cm long, concealed by leafy peltate bracts. Seeds yellowish–brown.

Fls. Frts. : July–February.

Illus. : Mahesh. Illus. Fl. Delhi f. 64. 1966; Matthew, Fur. Illus. Fl. Tamilnadu carnatic 4: t. 214. 1988.

Distrib. : Common throughout amidst grasses in plains.

Z. diphylla (L.) Pers. Syn. Pl. 2:318.1807; Baker in Hook. f. Fl. Brit. India 2:147. 1876; Sanj. Legumes of India 279. 1991. *Hedysarum diphyllum* L. Sp. Pl. 747. 1753. *Zornia diphylla* var. *zeylonensis* (Pers.) Baker in Fl. Brit. India 2 : 148. 1876; Cooke, Fl. Pres. Bombay 1:356.1958 (Repr.).

Herbs. Leaves 2–foliolate; leaflets, ovate. Flowers in spicate recemes. Pods much longer than bracts; joints longer than in type.

Fls. : August–October.

Distrib. : This variety is known for plains of western peninsula. (Baker op. cit.; Sanj. op. cit.).

CULTIVATED SPECIES :

Arachis hypogoea L. Sp. Pl. 741. 1753; Baker in Hook. f. Fl. Brit. India 2:161. 1876; Cooke, Fl. Pres. Bombay 1:435. 1958 (Repr.); Sanj. Legumes of India 83. 1991. *'Bhui–mug'*.

Herbs, diffuse or suberect. Leaves pinnate, alternate; leaflets 4, ovate–lanceolate. Flowers yellow or white, axillary, solitary. Pods underground, reticulately veined, constricted between seeds. Seeds 1–5.

Fls. & Frts. : September–October.

Distrib. : Probably a native of Brazil, usually cultivated for oil seeds, also found as an escape. Ahmednagar, Dhule, Jalgaon, Nasik, Osmanabad, Pune.

Castanospermum australe A. Cunn. & Fraser in Hook. Bot. Misc. 1: 241, t. 51, 1830; Bailey, Man. Cult. Pl. 563. 1949; Sanj. Legumes of India 110. 1991. *'Black-Bean'*.

Trees, c 1.8 *m* high. Leaves imparipinnate; leaflets 11–15, elliptic or ovate–oblong. Flowers yellow–orange or reddish, in racemes. Pods oblong or terete, woody. Seeds chestnut–like.

Fls. & Frts. : September–December.

Distrib. : Cultivated. Kolhapur.

Centrosema pubescens Bth. Comm. Legum. Gen. 55. 1837; S. M. & M. R. Almeida in J. Bombay Nat. Hist. Soc. 85: 519. 1988; Sanj. Legumes of India 111. 1991.

A twiner. Leaflets ovate, apex acute, base rounded. Flowers dark–violet, 2–3, clustered on 4–5 cm long, axillary, peduncles. Pods flat, linear, 9–16 cm long. Seeds reniform, glossy, blotched.

Fls. & Frts. : July–August.

Distrib. : A native of tropical America, rarely found along the margins of forests as an escape. Savantwadi.

C. virginium (L.) Bth. in Ann. Wien. Mus. 2:120. 1838; Sanj. Legumes of India 111. 1991. *Clitoria virginiana* L. Sp. Pl. 753. 1753.

Climbers. Leaves 3–foliolate; leaflets ovate, apex acute, base rounded. Flowers violet, clustered on axillary peduncles. Pods linear, puberulous along margins. Seeds kidney shaped, blotched.

Fls. & Frts. : April–June

Illus. : Subramanian in Bull. Bot. Surv. India 3(2) : 202 t. 1.1961.

Distrib. : A native of Troical America, introduced in gardens, Pune.

Cicer arietinum L. Sp. Pl. 738. 1753; Baker in Hook. f. Fl. Brit. India. 2: 176. 1876; Cooke, Fl. Pres. Bombay 1:435. 1958 (Repr.); Sanj. Legumes of India 113. 1991. *'Harbara'*.

Herbs, diffuse. Leaflets 9–19, ovate–oblong or obovate. Flowers violet–purple, axillary, solitary. Pods turgid, 1–2–seeded.

Fls. & Frts. : October–March.

Illus. : Gillett et al. in Milne–Redhead & Polhill, Fl. Trop. E. Afr. Leguminosae 2:1066, f. 152. 1971.

Distrib. : Usually cultivated for its seeds, also found as an escape.

Dioclea lasiocarpa Bth., Ann. Wien. Mus. 2 : 133. 1838; Baker in Hook. f. Fl. Brit. India 2 : 196. 1876; Sanj. Legumes of India 282. 1991.

Climbing shrubs. Leaves pinnately 3–foliolate, stipellate. Flowers blue or white, in lax racemes. Pods oblong, strap – shaped. Seeds 6–8.

Distrib. : A native of tropical America, cultivated in Maharashtra (Konkan).

Erythrina crista-galli L. Mant. 1:99. 1767; Bailey, Man. Cult. Pl. 578. 1949; Sanj. Legumes of India 174.1991.

Shrubs or small trees c 3 m high. Leaves 3–foliolate; leaflets ovate-oblong or lanceolate, oblique, apex acute. Flowers brilliant crimson, fascicled or in terminal, dense racemes.

Fls. & Frts. : November–March.

Illus. :Engler in Pflanzenfam. 3(3) : 363, ff. 132 A&B. 1894.

Distrib. : A native of Brazil, cultivated in Pune.

E. herbacea L. Sp. Pl. 706.1753; Bailey, Man. Cult. Pl. 578. 1949.

Undershrubs, 60–120 cm high. Leaflets deltoid, hastate or angled, ovate. Flowers scarlet, in fascicles, pairs or in dense recemes. Pods beaked. Seeds scarlet with black spot.

Distrbi. : Cultivated. Bombay.

Gliricidia sepium (Jacq.) Kunth ex Walp. Rep. 1:679. 1842; Sanj. Legumes of India 181. 1991. *Robinia sepium* Jacq. Enum. Pl. Carib. 28. 1760.

Trees, 3–5 m high. Leaflets 2.2–8.5 x 1.3–3.4 cm., ovate–oblong or lanceolate, glaucous green. Flowers pinkish–white, in terminal, drooping racemes. Pods linear, pendulous. Seeds yellowish–black, ellipsoid.

Fls. & Frts. : Febuary–March.

Illus. : Matthew, Illus. Fl. Tamilnadu Caranatic 2: t. 203. 1982 & Fur. Illus. Fl. Tamilnadu Carnatic 4 : t. 165 1988.

Distrib : It is a native of Central America. Usually planted in gardens and along roadsides.

Glycine max (L.) Merr. Interpr. Rumph. Herb. Amboin. 274. 1917; Sanj. Legumes of India 182. 1991. *Phaseolus max* L. Sp. Pl. 725. 1753. *Glycine soja* auct. non Sieb. & Zucc. 1843; Baker in Hook. f. Fl. Brit. India 2:184. 1876.

Herbs , erect or suberect, hairy. Leaflets membranous, acute. Flowers reddish, few in racemes. Pods linear-oblong, recurved. Seeds 2–4, globose, green-brown.

Fls. & Frts. : October–May.

Distrib. : Usually cultivated, occasionally occur as an escape. Nagpur, Nanded, Parbhani, Pune.

Lablab purpureus var. **lignosus** (L.) King in J. Asiat. Soc. Bengal 66 : 55. 1898; Naik, Fl. Marathwada 1 : 285. 1998. *Dolichos lignosus* L. Sp. Pl. 725. 1753. *'Waal'*.

This variety is similar to var. *purpureus* but differs in having longer and broader pods.

Distrib. : Cultivated for its pods, used as vegetable. Marathwada (Naik, op. cit.).

Lens culinaris Medik. Vorles. Churpf. Phys. Ges. 1:361. (1787) 1788 (*'culinare'*); Sanj. Legumes of India 202. 1991. *L. esculenta* Moench. Meth. Pl. 131. 1794; Cooke, Fl. Pres. Bombay 1:435. 1958 (Repr.). *'Masur'*.

Herbs, suberect, hairy. Leaflets lanceolate, rachis ending in a tendril or bristle. Flowers pale-purple. Pods compressed, 2–seeded.

Fls. & Frts. : December–February.

Distrib. : Usually cultivated for its edible seeds. Occasionally as an escape. Nagpur, Pune.

Lotus jacobaeus L. Sp. Pl. 775. 1753; Bailey, Man. Cult. Pl. 571. 1949.

Undershrubs, 30–90 cm high. Leaflets 3–5, linear, sessile, hairy. Flowers black–purple, 3–6, sessile in umbels. Pods cylindric.

Fls. & Frts. : October–December.

Distrib. : Cultivated. Bombay.

Macroptilium lathyroides (L.) Urban var. **semierectum** (L.) Urban, Symb. Antill. 9: 457. 1928. *Phaseolus semierectus* L. Mant. 100. 1767; Baker in Hook. f. Fl. Brit. India 2:201. 1876; Cooke, Fl. Pres. Bombay 1:400. 1958 (Repr.).

Shrubs 60–90 cm high. Leaflets 3, 3.5–7.0 x 1.2–4.7 cm, oblong–lanceoate, apex acute, minutely apiculate, base cuneate. Flowers purple, in spicate racemes. Pods cylindric, beaked. Seeds c 20, dark–brown, truncate at both ends.

Fls. & Frts. : October–December.

Illus. : Wight. Ic. t. 249. 1849 (*P. psoraleoides* Wight & Arn. Prodr. 244. 1834.).

Fls. Frts. : October–December.

Distrib. : Native of Central and S. America and of the West Indies. Indtroduced or found as an escape. Pune.

Pachyrhizus erosus (L.) Urban. Symb. Antill. 4:311. 1905; Bailey, Man. Cult. Pl. 573. 1949; Sorensen in Nord. J. Bot. 8:177. 1988; Sanj. Legumes of India 227. 1991. *Dolichos erosus* L. Sp. Pl. 726. 1753. *Pachyrhizus angulatus* L. C. Rich. ex DC. Prodr. 2:402. 1825; Baker in Hook. f. Fl. Brith. India 2:207. 1876. *'Yam–bean'.*

Twining herbs; roots tuberous. Leaflets 3, terminal rhomboid, all dentate, lobed. Flowers violet or white, in lax racemes. Pods compressed or slightly turgid, strigose. Seeds square.

Fls. & Frts. : August–April.

Distrib. : Native of Mexico and Central America. Cultivated, Pune.

Phaseelus lunatus L. Sp. Pl. 724. 1753; Baker in Hook. f. Fl. Brit. India 2:200. 1876; Cooke, Fl. Pres. Bombay 1:402. 1958 (Repr.); Sanj. Legumes of India 228. 1991. *'Lobiaya'*

Herbs, twining, biennial or perennial. Leaflets–3. Flowers in axillary racemes. Pods flat, beaked. Seeds ivory–whie or mottled.

Fls. Frts. : December–March.

Illus. : Matthew, Illus. Fl. Palni Hills t. 199. 1996.

Distrib. : In a native of America. Usually cultivated, occasionally found as an escape. Osmanabad, Pune, Satara.

P. vulgaris L. Sp. Pl. 1753; Baker in Hook. f. Fl. Brit, India 2:200.1876; Bailey, Man. Cult. Pl. 574. 1949; Sanj. Legumes of India 228. 1991.*'Fansi', 'Kidney-bean', 'Loba'.*

Herbs, trailing. Leaflets 3, broadly ovate or rhomboid, acuminate. Flowers lilac, few to many, in racemes. Pods linear–oblong, beaked.

Fls. & Frts. : November–February.

Illus. : Anon. Wealth of India 8: 8, f. 7. 1969.

Distrib. : The french bean according to De Candolle is a native of S. America, now cultivated throughout the Marathwada, Pune, Satara.

Pisum arvense L. Sp. Pl. 727. 1753; Baker in Hook. f. Fl. Brit. India 2: 181. 1876; Cooke, Fl. Pres. Bombay 1:436. 1958 (Repr.); Sanj. Legumes of India 229. 1991. *'Watna'.*

Climbing annuals. Leaflets 1–2 pairs modified into tendrils. Flowers white, solitary, axillary. Pods cylindric. Seeds 2–6.

Fls. & Frts. : December–February.

Distrib. : Usually cultivated, occasionally found as escape. Osmanabad, Satara.

P. sativum L. Sp. Pl. 727. 1753; Baker in Hook. f. Fl. Brit. India 2:181. 1876; Cooke, Fl. Pres. Bombay 1:436. 1958 (Repr.); Sanj. Legumes of India 229. 1991. *'Vatana'.*

Herbs, climbing. Leaflets 11 of which 5 terminal modified into tendrils. Flowers white. Pods turgid, linear–oblong. Seeds globose, bright green or greenish–white.

Fls. & Frts. : August–September.

Illus. : Matthew, Illus. Fl. Palni Hills t:201. 1996.

Distrib. : Usually cultivated, occasionally found as an escape. Ahmednagar, Osmanabad, Pune, Satara.

Psophocarpus tetragonoloubs (L.) DC. Prodr. 2:403. 1825; Baker in Fl. Brit. India 2:211. 1876; Cooke, Fl. Pres. Bombay 1:435. 1958 (Repr.); Bailey, Man. Cult. Pl. 572. 1949; Sanj. Legumes of India 230. 1991. *Dolichos tetragonolobus* L. Syst. Nat. ed. 10. 1162. 1759.*'Chaudhari', 'Ghevda'*.

Climbers. Leaflets 3, rhomboid–ovate, acuminate. Flowers purple, few or several in a close nodulose racemes. Pods 4– angled with crisped and toothed wings on angles. Seeds globular, brown, shining.

Fls. & Frts. : October–March.

Distrib. : Usually cultivated for its fruits, occasionally found as an escape. Pune, Satara.

Pterocarpus santalinus L. f. Suppl. 318. 1781; Baker in Hook. f. Fl. Brit. India 2:239. 1876; Sanj. Legumes of India 232. 1991. *'Tambda chandan'*.

Trees, c 12 m high. Leves 3–foliolate; leaflets ovate–orbicular, rounded at both ends. Flowers yellow, in c 8 cm racemes. Pods silky when young, beaked, narrowly winged. Seeds reddish–brown, smooth, leathery.

Fls. Frts. : September–February.

Distrib. : In gardens, Thane.

Notes : This species is endemic to India (Andhra Pradesh, Tamilnadu). Occasionally introduced in gardens.

Sesbania grandiflora (L.) Poir. in Lam. Encycl. 7:127. 1806; Baker in Hook. f. Fl. Brit. India 2: 115. 1876; Cooke, Fl. Pres. Bombay 1:350. 1958 (Repr.); Sanj. Legumes of India 244. 1991; Naik, Fl. Marathwada1: 300. 1998. *Robinia grandiflora* L. Sp. Pl. 722. 1753. *Agati grandiflora* (L.) Desv. in J. Bot. 1:120. 1813; Bailey, Man. Cult. Pl. 557. 1949. *'Agasta', 'Agati', 'Hadga'*.

Small trees, 8-10 m high. Leaves 15–30 cm long; leaflets oblong or slightly obovate, glabrous. Flowers white, in axillary racemes. Pods woody, pendulous, torulose, beaked. Seeds 17–20, oblong–ellipsoid brown.

Fls. & Frts. : November–February.

Illus. : Anon. Wealth of India 9:295, ff. 94–95. 1972.

Distrib. : Cultivated around villages and in betle–wine yards, Marathwada (Naik, op. cit.), Nagpur, Pune, Thane.

Sophora tomentosa L. Sp. Pl. 373. 1753; Baker in Hook. f. Fl. Brit. India 2: 249. 1878; Cooke, Fl. Pres. Bombay 1:435. 1958 (Repr.); Sanj. Legumes of India 250. 1991.

Shrubs. Leaves imparipinnate; leafletes 15–17, broadly elliptic. Flowers yellow, pea-like, in terminal racemes or panicles. Pods terete grey, velvety downy, 3–8–jointed. Seeds many.

Fls. & Frts. : October–Dcember.

Distrib. : Planted as an ornamental in gardens. Pune.

Tephrosia candida DC. Prodr. 2:240. 1825; Baker in Hook. f. Fl. Brit. India 2:111. 1876; Cooke, Fl. Pres. Bombay 1:349. 1958 (Repr.); Sanj. Legumes of India 256.1991.

Undershrubs. Leaflets 19–25, silky beneath. Flowers white or red, in racemes. Pods brown, silky pubescent. Seeds 10–15.

Fls. & Frts. : June–September.

Illus. : Matthew, Illus. Fl. Palni Hills t. 207. 1996.

Distrib. : A native of Himalayas, W. Indo–China and Malay Archipelago, occasionally planted in gardens. Pune.

Trigonella foenum-graecum L. Sp. Pl. 777.1753; Baker in Hook. f. Fl. Brit. India 2:87.1876; Bailey, Man. Cult. Pl. 583. 1949; Sanj. Legumes of India 264. 1991.*'Methi'*.

Herbs; stem glabrous or sparsely hairy. Leaflets 3, obovate or oblanceolate, glabrous. Flowers creamy–yellow, in terminal, solitary or a few in condensed racemes. Pods linear, subtorulose. Seeds oblong, yellowish-brown.

Fls. & Frts. : Almost throughout the year.

Illus. : Matthew, Illus. Fl. Palni Hills t. 211. 1996.

Distrib. : Cultivated throughout for its leaves and seeds.

Vicia faba L. Sp. Pl. 737. 1753; Baker in Hook. f. Fl. Brit. India 2:179. 1876; Bailey, Man. Cult. Pl. 552. 1949; Sanj. Legumes of India 269. 1991. *'Broad-bean'*.

Climbing herbs. Leaves paripinnate; leaflets 1–3 pairs, ovate–oblong, obtuse, glabrous. Flowers dull white with purplish spot, solitary or in racemes. Pods thick, flat, 5–10 cm long. Seeds many, globular, brown or black.

Fls. & Frts. : September–November.

Illus. : Matthew, Illus. Fl. Palni Hills t. 215. 1996.

Distrib. : Probably a native of N. Africa and S.W. Asia, cultivated for its seeds. Nagpur, Pune.

Vigna adenantha (G. F. Meyer) Marechal et al. in Taxon 27: 202. 1978; Sanj. Legumes of India 272. 1991. *Phaseolus adenanthus* G. F. Meyer, Prim. Fl. Esseq. 239. 1818; Baker in Hook. f. Fl. Brit. India 2:200. 1876.

Herbs. Leaves compound; leaflets 7.5–10.0 cm long, entire, subacute. Flowers showy, in racemes. Pods much recurved, glabrous. Seeds 10–15, subtorulose.

Fls. Frts. : Not known.

Distrib. : A native of S. America, usually cultivated, rarely found in Savantwadi (Sindhudurg Dt.) as an escape or naturalised.

V. mungo (L.) Hepper in Kew Bull. 1956: 128. 1956; Sanj. Legeumes of India 275. 1991. *Phaeolus mungo* L. Mant. Pl. 101. 1767; Cooke, Fl. Pres. Bombay 1:403. 1958 (Repr.). *'Udid'*.

Twining or suberect herbs. Leaflets elliptic–ovate or oblong–lanceolate, apex acute to acuminate. Flowers yellow, 8–12 on c 10–15 cm long peduncles. Pods terete, compressed, hairy c 10 seeded.

Fls. & Frts. : August–November.

Distrib. : Cultivated for its seeds. Jalgaon, Osmanabad, Pune, Satara.

V. radiata (L.) R. Wilczek, Fl. Cong. Belg. Ruand. Uru. 6:386. 1954; Verdc. in Kew Bull. 24:559.1970; Sanj. Legumes of India 275. 1991. *Phaseolus radiatus* L. Sp. Pl. 725. 1753; Baker in Hook. f. Fl. Brit. India 2:203. 1876; Cooke, Fl. Pres. Bombay 1:403. 1958 (Repr.). *'Sona–mug'*.

Climbers; stem hirsute. Leaflets ovate–rhomboid, appressed–pubescent. Flowers yellow, in capitate racemes. Pods linear–cylindric, slightly curved. Seeds many, green.

Fls. & Frts. : September–December.

Illus. : Matthew, Illus. Fl. Palni Hills t. 219. 1996.

Distrib. : Cultivated throughout the State.

CAESALPINIACEAE

(S. Moorthy)

1. Leaves bi–foliolate; leaflets not distinct, usually united into one ... BAUHINIA

1. Leaves 1–2 pinnate; leaflets distinct :

2. Leaves bipinnate :

3. Flowers in elongate spikes ... MOULLAVA

3. Flowers in racemes or panicles ... CAESALPINIA

2. Leaves unipinnate :

4. Calyx tube elongate, more than 1.0 cm long ... TAMARINDUS

4. Calyx tube short, less than 0.5 cm long :

5. Petals 5 :

6. Pods many seeded; seeds albuminous ... CASSIA

6. Pods1–seeded; seeds exalbuminous ... CYNOMETRA

5. Petals absent :

7. Calyx tube short; ovary sessile, ovules 2 ... HARDWICKIA

7. Calyx tube elongate; ovary stalked, ovules many ... SARACA

BAUHINIA L.

1. Fertile stamens 3–5:

2. Erect trees: ... *B. vahlii*

3. Flowers large, petals purple, pink or white; pods more than 15 cm, upto 30 cm long, more than 2.5 cm broad ... *B. purpurea*

3. Flowers small, petals yellow or yellow with purple streaks; pods less than 15 cm long, more than 3.5 cm broad :

4. Petals yellow ... *B. semla*

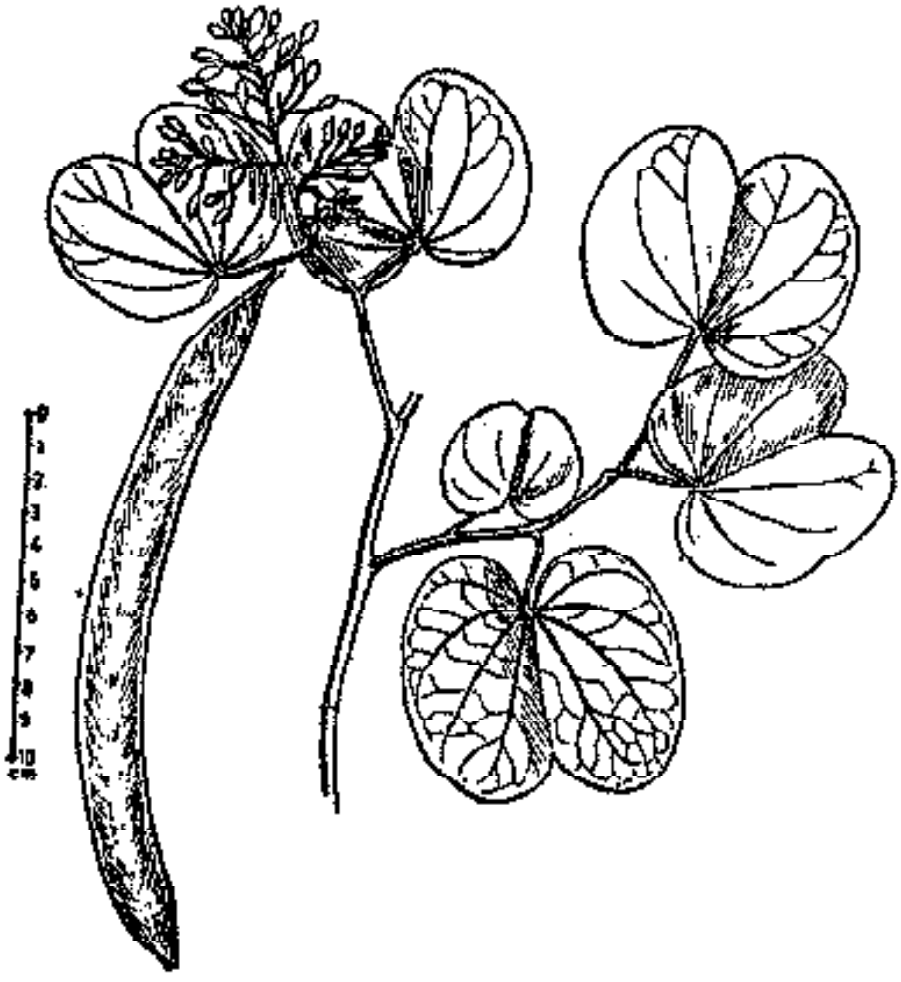
4. Petals yellow with purple streaks ... *B. roxburghiana*

2. Climbers, lianas :

5. Fertile stamens 3, conspicuous; tendrils and corymbs densely tawny villous; pods more than 22 cm long and 5 cm broad, velvety ... *B. vahlii*

5. Fertile stamens 4–5; tendrils absent; corymbs finely ferruginous pubescent; pods less than 15 cm long and 2.5 cm broad, sightly pubescent ... *B. phoenicea*

1. Fertile stamens 10 :



Bauhinia malabarica Roxb.

6. Calyx spathaceous :

7. Flowers small, numerous in copious racemes ... *B. racemosa*

7. Flowers large, 1–3, on short peduncles ... *B. tomentosa*

6. Calyx limb divided into 5 segments :

8. Leaves 7–9–nerved ... *B. malabarica*

8. Leaves 15–17–nerved ... *B. foveolata*

Bauhinia foveolata Dalz. in J. Linn. Soc. 13: 188. 1873; Cooke, Fl. Pres. Bombay 1: 460. 1958 (Repr.); Sanj. Leg. India 2. 1991. *B. lawii* Bth. ex Baker in Hook. f. Fl. Brit. India 2:277. 1878. *Piliostigma foveolatum* (Dalz.) Thoth. in Bull. Bot. Soc. Bengal 19: 131. 1965. *'Chemel'*.

Trees, c 5 m high. Leaves 14.5–17.0 cm long, as broad as long, shortly divided at the apex into 2 subacute lobes. Flowers scarlet red, subsessile, in dense, branched panicles. Pods 12–18 x 1.5–2.5 cm, stalked, linear–oblong.

Fls. & Frts. : October–December.

Distrib. : In moist deciduous forests. Infrequent. Nasik, Pune, Raigad, Sindhudurg, Thane.

B. malabarica Roxb. Fl. Ind. 2:321 1832; Baker in Hook. f. Fl. Brit. India 2:277. 1878; Cooke, Fl. Pres. Bombay 1: 460. 1958 (Repr.); Sanj. Leg. India 3. 1991. *Piliostigma malabaricum* (Roxb.) Bth. in Miq. Fl. Jungh. 261. 1852; de Wit in Reinwardtia 3: 531. 1956. *'Chamel'*.

Trees, 10 m high. Leaves deeply bifid at apex into 2 obtuse lobes. Flowers subsessile in axillary racemes. Pods 20–25 x 2.0–2.5 cm stalked, turgid. Seeds 20–30, globose–ovoid.

Fls. & Frts. : September–February.

Illus. : Lakshminarasimhan & Sharma, Fl. Nasik Dt. 200, f. 13. 1991.

Distrib. : In deciduous forests. Frequent. Chandrapur, Nanded, Nasik, Pune, Raigad, Sindhudurg, Thane, Yavatmal.

B. phoenicea Heyne ex Wight & Arn. Prodr. 296. 1834; Baker in Hook f. Fl. Brit. India 2: 283. 1878; Sanj. Leg. India 4. 1991. *Phanera phoenicea* (Wight & Arn.) Bth. in Miq. Pl. Jungh. 212. 1852. *Bauhinia benthami* Bedd. Ic. Pl. Ind. Or. 22, t. 107. 1868–74.

Lianas; branchlets ferruginous pubescent. Leaves upto 10 x 8 cm, base corlate, apex cleft to the middle, lobes obtuse. Flowers brick–red in axillary corymbose racemes. Pods 15 x 2.5 cm, stalked, oblong, flattened, shortly pointed at apex, sparsely pubescent.

Fls. & Frts. : November–December.

Illus. : Beed. op. cit.

Distrib. : Maharashtra (Sanj. op. cit.).

B. purpurea L. Sp. Pl. 375. 1753; Baker in Hook. f. Fl. Brit. India 2: 284. 1878; Cooke, Fl. Pres. Bombay 1: 461. 1958 (Repr.); de Wit in Reinwardtia 3: 406. 1956; K. K. N. Nair in J. Bombay Nat. Hist. Soc. 81: 532. 1984; Sanj. Leg. India 5. 1991. *'Kurul', 'Rakta–Kanchan'*.

Trees, c 15 m high. Leaves 3.5–13.0 x 3.5–15.0 cm, suborbicular, apex obtuse, subacute, base cordate. Flowers 3–8 cm across, in terminal racemes. Pods flat, pointed at both ends, reddish–brown, obliquely oriented. Seeds 12–16, oblong–ellipsoid.

Fls. & Frts. : October–January.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4:t. 215. 1988.

Distrib. : Common in deciduous forests, also planted in gardens and along roadsides.

B. racemosa Lam. Encycl. 1:390. 1785; Baker in Hook. f. Fl. Brit. India 2:276. 1878; Cooke, Fl. Pres. Bombay 1: 459. 1958 (Repr.); de Wit in Reinwardtia 3: 537. 1956; Sanj. Leg. India 5. 1991. *'Apta', 'Sheethsona', 'Vanu–raja'*.

Trees, 3–5 m high. Leaves 2.5–8.0 x 3.5–8.0 cm, glabrous above, whitish tomentose beneath, apex obtuse, mucronate. Flowers white or yellow in c 6 cm long, elongate, slender racemes. Pods 9.5–12.0 x 1.5–1.8 cm, stalked, flat, turgid. Seeds 12–20, oblong.

Fls. & Frts. : April–October.

Illus. : Bedd. Fl. Sylv. t. 182. 1872; Talb. For. Fl. Bombay Pres. & Sind 1: 462 & 463, ff. 262 & 263. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 229. 1982.

Distrib. : Common throught the state in deciduous forests.

B. roxburghiana Voigt. Hort. Suburb. Calc. 254. 1845; K. & S. Larsen in Taxon 28: 591. 1979 p.p. excl. syn.; Panigr. in Taxon 35: 162. 1986; Sanj. Leg. India 5.1991. *B. emarginata* Wall. ex G. Don, Syst. 2: 462. 1832 non P. Miller (1768) nec Jack (1822).

Trees, moderate sized, deciduous; bark dark–brown, rough. Leaf–lets 10–15 cm long, connate almost to the apex, coriaceous. Flowers yellow with purple streaks in large terminal panicles. Pods 7.5–15 cm long, 3.7cm broad, flattened, gradually widening to an obtuse tip.

Fls. & Frts. : January–May.

Distrib. : In open forests. Infrequent. Chandrapur.

Notes. : Wood is said to be red with darker patches and streaks, hard and of good quality. It also said to give a clear gum-like gum arabic. but less soluble in water.

B. semla Wunderlin in Taxon 25: 362. 1976 p.p.; Panigr. in Taxon 35: 162. 1986. *B. retusa* Roxb. Fl. Ind. 3: 322. 1832 non Poir. 1811 nec Roxb. ex DC. 1825; Voigt, Hort. Suburb. Calc. 254. 1845; Baker in Hook. f. Fl. Brit. India 2; 279. 1878; Naik, Fl. Marathwada 1: 321. 1998. *Phanera retusa* Bth. in Miq. Pl. Jungh. 263. 1852. *Lasiobema retusa* (Bth.) de Wit in Reinwardtia 3: 358. 1956.

Trees. Leaves broader than long, 9–nerved, glabrous, base deeply cordate. Flowers in terminal panicles. Receptacles short or absent; sepals upto 0.5 cm; petals twice as long as sepals; stamens 3–5. Pods 15 x 4 cm, glabrous, flattened, gradually widening to an obtuse tip.

Fls. & Frts. ; September–March.

Distrib. : In open forests. Infrequent. Chandrapur, Marathwada (Naik, op. cit.).

B. tomentosa L. Sp. Pl. 375. 1753; Baker in Hook. f. Fl. Brit. India 2: 275. 1878; Cooke, Fl. Pres. Bombay 1:459. 1958 (Repr.); de Wit in Reinwardtia 3: 409. 1956; Sanj. Leg. India 6. 1991.

Shrubs, 5 m tall; young parts tomentose. Leaves 2–4 x 4–7 cm, broader than long, glabrous above, pubescent beneath, apex obtuse or subacute, base truncate. Flowers 1–3 in axillary or leaf opposed racemes. Pods 10–15 cm long, flat, oblong, distinctly reticulate, puberulous. Seeds 10, 0.8 x 0.5 cm, ovoid.

Fls. & Frts. : September–January.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 216. 1988.

Distrib. : Frequent in deciduous forests. Also found planted.

B. vahlii Wight & Arn. Prodr. 297. 1834; Baker in Hook. f. Fl. Brit. India. 2:279. 1878; Sanj. Leg. India 6.1991. *B. racemosa* Vahl,

Symb. Bot. 3:56, t. 62. 1794 non Lam. 1785. *Phanera vahlii* (Wight & Arn.) Bth. in Miq. Pl. Jungh. 263. 1852. *P. integrifolia* (Roxb.) Bth. in Miq. op. cit.; de Wit in Reinwardtia 3: 478, f. 18. 1956.

Lianas; branchlets terminating in pair of opposite revolute tendrils. Leaves large, deeply 2–lobed, base cordate. Flowers white in terminal corymbs. Pods woody, flat, velvety.

Fls. & Frts. : April–June.

Illus. : de Wit, op. cit.

Distrib. : In moist deciduous forests. Frequent. Amravati, Chandrapur, Nagpur, Pune, Raigad, Yavatmal.

CAESALPINIA L.

1. Pods papery winged along the upper margins, compressed ... *C. cucullata*
1. Pods not winged, thick, turgid :
    2. Pods bristly or prickly :
        3. Pods woody, more than 4.5 cm across, apical beak more than 1 cm long ... *C. bonduc*
        3. Pods thin, less than 2.5 cm across, apical beak less than 0.4 cm long ... *C. mimosoides*
    2. Pods smooth :
        4. Leaflets 2–3 pairs ... *C. crista*
        4. Leaflets 8–10 pairs ... *C. decapetala*

Caesalpinia bonduc (L.) Roxb. Fl. Ind. 2: 362. 1832 p.p. excl. Pl. descr. emend. Dandy & Exell in J. Bot. 76: 179. 1938; Hattink in Reinwardtia 9:17. 1974; Sanj. Leg. India 9. 1991. *Guilandina bonduc* L. Sp. Pl. 381. 1753. *Caesalpinia bonducella* (L.) Fleming in Asiat. Res. 11: 159. 1810 nom. illeg.; Baker in Hook. f. Fl. Brit. India 2:254. 1878; Cooke, Fl. Pres. Bombay 1: 437. 1958 (Repr.). *'Gaja '*, *'Sagargota'*.

Stragglers, armed; stems pubescent, armed with hooked, yellowish spines. Petioles armed with prickles, pinnae 6–8 pairs; leaflets 6–8 pairs, 1.5–2.0 x 1.0–1.2 cm, elliptic. Flowers yellow in terminal and supra–axillary racemes, dense at top and lax at bottom. Pods 4.5–7.5 x 3.5 cm, oblong, ellipsoid, dehiscent, valves coriaceous. Seeds 1–2, globose to subglobose.

Fls. & Frts. : August–February.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 230. 1982 & Fl. Tamilnadu Carnatic 3 (1) 491, t. 41a. 1983.

Distrib. : Common in deciduous forests and on hedges.

C. crista L. Sp. Pl. 380. 1753 (p.p. excl. syn. Pluk. et Breyn.) emend. Dandy & Excell. in J. Bot. 76: 179. 1938; Hattink in Reinwardtia 9: 20. 1974; Sanj. Leg. India 10. 1991. *C. nuga* (L.) Ait. f. Hort. Kew. ed. 2, 3: 32. 1811; Baker in Hook. f. Fl. Brit. India. 2: 255. 1878; Cooke, Fl. Pres. Bombay 1: 438. 1958 (Repr.).

Extensive armed climbers. Leaflets 2.5–4.5 x 1.5–2.5 cm, ovate or elliptic, glabrous above, glaucous beneath. Flowers 1.5–2.0 cm across, yellow, in terminal racemes. Pods c 5 x 3 cm, obliquely ellipsoid.

Fls. & Frts. : October–February.

Illus. : Wight, Ic. t. 36. 1838 *(C. paniculata).*

Distrib. : Along the coastal areas. Raigad, Ratnagiri. Sindhudurg.

C. cucullata Roxb. Fl. Ind. 2: 358. 1832; Hattink in Reinwardtia 9:22. 1974; Sanj. Leg. India 10.1991.*Mezoneuron cucullatum* (Roxb.) Wight & Arn. Prodr. 283. 1834; Baker in Hook. f. Fl. Brit. India 2: 258. 1878; Cooke, Fl. Pres. Bombay 1:441. 1958 (Repr.). *'Ragi'*.

Climbing shrubs, woody, armed with dark coloured, purplish hooked spines. Leaves 2 pinnate; leaflets 4–5 pairs. Flowers yellow. Pods oblong, thin, reddish–green to reddish–brown, winged along upper sutures.

Fls. & Frts. : December–June.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 443, f. 250. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 234. 1982.

Distrib. : Along the ghats. Frequent. Pune, Raigad, Satara, Sindhudurg, Thane.

C. decapetala (Roth) Alst. in Trim. Handb. Fl. Ceylon (Suppl.) 6: 89. 1931; Sant. & Wagh in Bull. Bot. Surv. India 5: 108. (1963) 1964; Sanj. Leg. India 11. 1991. *Reichardia decapetala* Roth, Nov. Pl. Sp. 212. 1821. *Caesalpinia sepiaria* Roxb. Fl. Ind. 2:360. 1832; Baker in Hook. f. Fl. Brit. India. 2: 256. 1878; Cooke, Fl. Pres. Bombay 1:439. 1958 (Repr.). *'Chilhar'*.

Stragglers, armed, bushy. Petioles armed wtih recurved, hooked prickles, pinnae c 7 pairs; leaflets 8–10 pairs, c 1.2 x 0.5 cm, oblong. Flowers yellow in simple racemes at ends of main or lateral branches. Pods 6.0–6.5 x 1.0–2.2 cm, oblong, flat, turgid. Seeds c 8, ellipsoid.

Fls. & Frts. : February–May.

Illus. : Wight, Ic. t. 37. 1838; Ic. Roxb. Fasc. 6, t. 9. 1973 [Repr. ed. *(Caesalpinia sepiaria)]*; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4:t. 219. 1988.

Distrib. : Common as hedge around fields.

C. mimosoides Lam. Encycl. 1:462. 1785; Baker in Hook. f. Fl. Brit. India 2:256. 1878; Cooke, Fl. Pres. Bombay 1: 439. 1958 (Repr.); Sanj. Leg. India 12. 1991.

Shrubs, scandent, armed, prickles straight; young branches yellowish. Leaflets subsessile, 10–20 pairs, 0.8–1.0 x 0.2 –0.25 cm, oblong, apex rounded, apiculate. Flowers 2.0–2.5 cm across, in racemes. Pods 4–5 cm long, obliquely oblong. Seeds 1–3.

Fls. & Frts. : November–February.

Illus. : Wight, Ic. t. 392. 1840; Talb For. Fl. Bombay Pres. & Sind 1:442, f. 249. 1909; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic. 4: t. 220. 1988.

Distrib. : In deciduous forests. Bombay (Cooke, op. cit.); Pune, Ratnagiri, Satara, Sindhudurg, Thane.

CASSIA L.

1. Leaves imparipinnate ... *C. kolabensis*
1. Leaves paripinnate :
    2. Pods 30–60 cm long, terete ... *C. fistula*
    2. Pods less than 30 cm long, more or less flattened :
        3. Fertile stamens 5, staminodes absent :
            4. Leaflets 2 pairs ... *C. absus*
            4. Leaflets 10–20 pairs ... *C. pumila*
        3. Fertile stamens more than 5, staminodes present
            5. Fertile stamesns 7 :
                6. Glands present :
                    7. Glands on the leaf rhachis solitary, inserted beneath the leaflets :
                        8. Leaflets 3–5 pairs ... *C. occidentalis*
                        8. Leaflets 6–10 pairs :
                            9. Leaves 15–20 cm long, rachis not grooved ... *C. sophera*
                            9. Leaves 5–7.5 cm long, rachis grooved ... *C. purpurea*

7. Glands inserted between one or more pairs of leaflets

10. Leaflets 3 pairs :

11. Gland between each of the 2 lowest pairs of leaflets; plants foetid ... *C. tora*

11. Gland between the lowest pair of leaflets only; plants not foetid ... *C. obtusifolia*

10. Leaflets more than 3 pairs :

12. Leaflets 4(–5) pairs ... *C. uniflora*

12. Leaflets 8–20 pairs ... *C. auriculata*

6. Glands absent :

13. Pods upto 5 cm long ... *C. italica*

13. Pods 7–15 cm long ... *C. timoriensis*

5. Fertile stamens 10 :

14. Trees ... *C. surattensis* ssp. *glauca*

14. Herbs :

15. Leaflets 8–20 pairs, gland stalked, peltate ... *C. kleinii*

15. Leaflets 40–60 pairs; gland sessile, flat ... *C. mimosoides*

Cassia absus L. Sp. Pl. 376. 1753; Baker in Hook. f. Fl. Brit. India 2: 265. 1878; Cooke, Fl. Pres. Bombay 1:451. 1958 (Repr.); de Wit in Webbia 11:279. 1955; Pandey in J. Bombay nat. Hist. Soc. 68: 317. 1971; Sanj. Leg. India 14. 1991. *'Chankan', 'Chimar', 'Supalyel'.*

Herbs, 12–35 cm high, annuals, glandular–pubescent. Leaflets 0.8–2.8 x 0.5–1.5 cm, obliquely elliptic or obovate. Flowers reddish–yellow, in terminal or leaf opposed, few flowered racemes. Pods c 4.0 x 0.5 cm, flat, setose hairy. Seeds 4–6, compressed, broadly ovoid, black, shining.

Fls. & Frts. : August–November.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 231. 1982.

Distrib. : Common throughout the state, in open situations.

C. auriculata L. Sp. Pl. 379. 1753; Baker in Hook. f. Fl. Brit. India 2: 264. 1878; Cooke, Fl. Pres. Bombay 1: 448. 1958 (Repr.); Pandey in J. Bombay nat. Hist. Soc. 68:316. 1971. Sanj. Leg. India 14. 1991. *'Arat', 'Awal', 'Tarvad'.*

Shrubs, 1.2–2.4 m tall; branches pubescent. Leaflets elliptic–oblong, finely downy. Flowers yellow in axillary and terminal

corymbs. Pods 4.5–10.0 x 0.5–1.5 cm, oblong–linear, flattened, pale brown, beaked. Seeds 10–20, ovate–oblong, purplish–brown, compressed.

Fls. & Frts. : January–July.

Illus. : Talb. For Fl. Bombay Pres. & Sind 1: 450, f. 254. 1909; Matthew, Fur. Illus. Fl. Tamilnadu, Carnatic 4:t. 222. 1988.

Distrib. : Along the drier tracts in open situations.

C. fistula L. Sp. Pl. 377. 1753; Baker in Hook. f. Fl. Brit. India 2: 261. 1878; Cooke, Fl. Pres. Bombay 1:444. 1958 (Repr.); Pandey in J. Bombay nat. Hist. Soc. 68: 313. 1971; Sanj. Leg. India 15. 1991. *'Amaltas', 'Bava', 'Garma'.*

Trees, c 10 m tall. Leaflets 4–8 pairs, 5.0–12.5 x 2.5–6.0 cm, ovate. Flowers yellow, in 24–40 cm long, lax, drooping racemes. Pods 2.0–2.5 cm across, indehiscent. Seeds numerous, embedded in dark coloured pulp.

Fls. & Frts. : April–October.

Illus. : Wight, Ic. t. 269. 1840 *(C. rhombifolia);* Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 2: tt. 224, ff. 1–15 & 225, ff. 1–2. 1988.

Distrib. : Common throughout the state in deciduous forests. Also planted in home gardens.

C. italica (Mill.) Spreng. Bot. Gard. Univ. Halle 21.1800; Singh in J. Bombay nat. Hist. Soc. 75: 436, f. 1. 1979; Sanj. Leg. India. 16. 1991. *Senna italica* Mill. Gard. Dict. ed. 8, no. 2. 1768. *Cassia obtusa* Roxb. ex Wight. & Arn. Prodr. 288. 1834; Cooke, Fl. Pres. Bombay 1: 448. 1958 (Repr.). *C. obovata* Colad. Hist. Cassia 92, t. 15 A. 1816 nom. superfl.; Baker in Hook. f. Fl. Brit. India 2: 264. 1878. *'Bhui–tarvad'.*

Herbs, 30–90 cm high, diffuse, perennials; stems obtusely angular, striate. Leaves 5–10 cm long; leaflets 3–6 pairs, 2.0–2.5 x 1.0–1.2 cm, broadly oblong or obovate–oblong. Flowers yellow, in axillary, peduncled recemes. Pods 1.2–2.0 cm wide, flat, thin, papery, rounded at both ends. Seeds 6–12, wedge shaped, c 0.6 x 0.3 cm, finely reticulate–rugose, dark brown.

Fls. & Frts. : November–February.

Illus. : Wight. Ic. t. 757. 1844; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 231. 1988 *(Cassia obtusa);* Singh. op. cit.

Distrib. : In open places. Ahmednagar, Pune.

C. kleinii Wight & Arn. Prodr. 293. 1834; Baker in Hook. f. Fl. Brit. India 2: 266. 1878; Cooke, Fl. Pres. Bombay 1: 452. 1958 (Repr.); Vartak in Jain & Rao, Ass. Threat. Pl. Ind. 173. 1983; Sanj. Leg. India 17. 1991.

Herbs, 60–120 cm high, robust, hairy. Leaflets linear–oblong, apex subacute, glabrescent. Flowers yellow, 1–3, axillary. Pods linear–oblong, flat or slightly falcate. Seeds 10–15, dark brown.

Fls. & Frts. : October.

Illus. : Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4:t. 228. 1988.

Distrib. : Rare, Raigad.

C. kolabensis Kothari, Moorthy & Nayar in Proc. Indian Acad. Sci. (Pl. Sci.) 90(3) :199, ff. 1–9. 1981; Sanj. Leg. India 17. 1991; Kothari & Moorthy, Fl. Raigad Dt. 130. 1993.

Herbs, 30–50 cm high; stem reddish or brownish–green. Leaflets 5–9, 1.0–1.4 x 0.3–0.4 cm, linear–oblong, terminal one 1.2–1.5 x 0.7–0.9 cm, elliptic–oblong or obovate–oblong. Flowers yellow, 1 to 3, rarely solitary and supra–axillary. Pods compressed, pilose. Seeds 4–8, compressed, subrhomboid, black, smooth.

Fls. & Frts. : August–October.

Illus. : Kothari et al. op. cit.

Distrib. : Rare among grasses in open as well as hilly forests and along roadsides. Raigad, Thane.

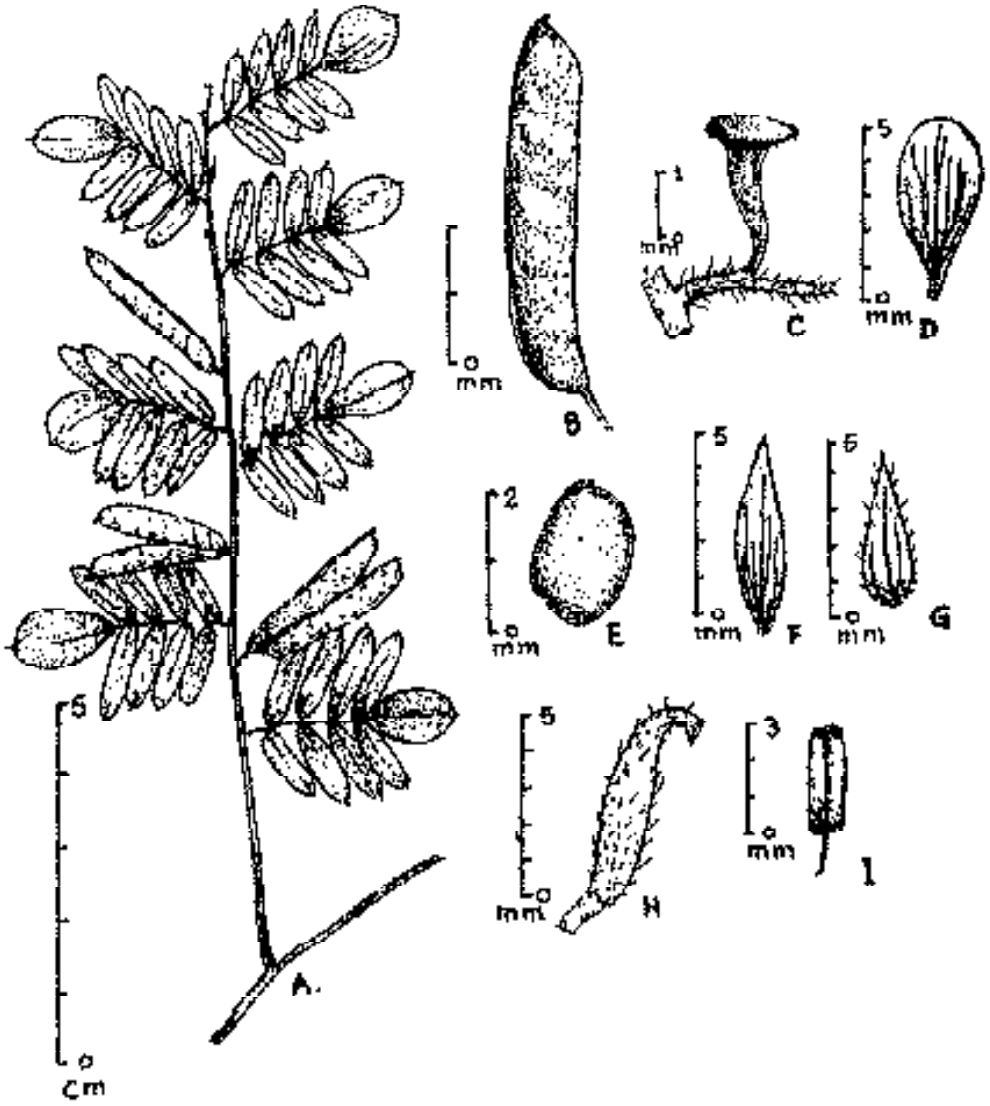
C. mimosoides L. Sp. Pl. 379. 1753; Baker in Hook. f. Fl. Brit. India 2 : 266. 1878; Cooke, Fl. Pres. Bombay 1 : 453. 1958 (Repr.); V. Singh in J. Bombay nat. Hist. Soc. 75 : 439. 1978; Sanj. Leg. India 17. 1991.

Herbs, 30 cm high, perennials, diffuse or erect. Leaflets 0.8–1.0 x 0.1–0.2 cm, linear–oblong. Flowers yellow, solitary on the upper axils. Pods 3.5–5.0 x 0.4 cm, linear, appressed hairy. Seeds 15–25, obliquely obovoid, brown, shining.

Fls. & Frts. : July–December.

Illus. : Collett, Fl. Siml. 148, f. 42. 1902; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4 : t. 229. 1988.

Distrib. : In moist places of plains and along the ghats. Ahmednagar, Aurangabad, Chandrapur, Jalgaon, Kolhapur, Nanded, Nasik, Pune, Raigd, Satara, Sindhudurg, Thane.



Cassia kolabensis Kothari, Moorthy et Nayar
A- A twig of the plant; B- Pod; C- A stalked peltate gland on petiole; D- Petal; E- Seed; F- Sepal; G- Bracteole; H- Pistil; I- Stamen.

C. obtusifolia L. Sp. Pl. 377. 1753; Cooke, Fl. Pres. Bombay 1:447. 1958 (Repr.); V. Singh in J. Bombay nat. Hist. Soc. 75. 437. 1978; Sanj. Leg. India 19.1991. *C. tora* sensu Baker in Hook. f. Fl. Brit. India 2: 263. 1878 p.p. non L. 1753. *'Takla', 'Tarwad'.*

Herbs, annuals. Leaflets 3 pairs, 1.5–3.2 x 0.5–2.0 cm, obovate–oblong, glabrous above, appressedly hairy beneath. Flowers yellow, subsessile in pairs in leaf axils. Pods 16–20 x c 0.5 cm, subterete. Seeds 30–35, rhomboidal.

Fls. & Frts. : September–October.

Distrib. : Common throughout the state in waste places and as an undergrowth of deciduous forests.

Notes : *C. obtusifolia* has been treated by Bentham (1871) as synonymous to *C. tora. Baker* followed this in J. D. Hooker's Flora of Brit. India so did many others till recently including Maheshwari (1962). de Wit (1955) & Brenan (1958) have clearly shown that the two taxa are distinct. Shah & Nanda (1962) on the basis of Palynological differences provided distinction of these two taxa.

C. occidentalis L. Sp. Pl. 377. 1753; Baker in Hook. f. Fl. Brit. India 2:262. 1878; Cooke, Fl. Pres. Bombay 1: 445. 1958 (Repr.); de Wit in Webbia 11: 256. 1955; Pandey in J. Bombay nat. Hist. Soc. 68:316, t. 2, f. 26–31. 1971; Sanj. Leg. India 19. 1991. *'Kasivda', 'Ran–takla'., 'Takla', 'Tarwad'.*

Undershrubs. Leaflets 2.5–10.0 x c 3.5 cm, ovate–lanceolate. Flowers yellow in 2–6–flowered, short peduncled racemes corymbose, axillary and forming a terminal panicle. Pods 10.0–12.5 x c 0.7 cm, transversely septate, distinctly torulose. Seeds 20–30, ovoid.

Fls. & Frts. : August–December.

Illus. : Pandey, op. cit.; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 232. 1988.

Distrib. : Common, along the waste lands.

C. pumila Lam. Encycl. 651. 1785; Baker in Hook. f. Fl. Brit. India 2:266. 1878; Cooke, Fl. Pres. Bombay 1:452. 1958 (Repr.); de Wit in Webbia 11: 288. 1955; Pandey in J. Bombay nat. Hist. Soc. 68:318, t. 2, ff. 18–25. 1971; V. Singh, Ibid. 75: 442. 1978; Sanj. Leg. India 19. 1991. *'Sarmal'.*

Herbs, diffuse or procumbent. Leaflets 0.3–0.7 x 0.05–0.1 cm, linear–oblong, glands of the petioles persistent, those on the rachis

deciduous or absent. Flowers yellow, solitary or 2–3–together, supra axillary. Pods 1.5–4.0 x 0.1–0.4 cm, linear, pubescent or sparsely hairy. Seeds 10–25, obliquely obovoid, brown, shining.

Fls. & Frts. : August–December.

Illus. : Pandey, op. cit.; Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4; t. 233. 1988.

Distrib. : Common throughout the state in pastures and as forest undergrowth.

C. purpurea Roxb. ex Lindl. Bot. Reg. t. 857. 1824; Sanj. Leg. India 19. 1991; Naik, Fl. Marathwada 1: 332. 1998. *C. sophera* L. var. *purpurea* (Roxb.) Voigt, Hort. Suburb. Calc. 248. 1845; Baker in Hook. f. Fl. Brit. India 2: 263. 1878. *Senna purpurea* Roxb. Fl. Ind. 342. 1832.

Undershrubs, 1–1.5 m tall; branches slender, tinged with purple. Leaves 5–7.5 cm long, rhachis grooved with a solitary conical gland near the base; leaflets 3–5 pairs, 1–2.5 x 0.4–0.8 cm, lanceolate, base rounded, apex acute or obtuse, glaucous beneath. Flowers yellow with purple veins in axillary corymbose racemes. Pods 4.5–7.5 cm long, slightly curved, glabrous. Seeds 20–30, 10.5 x 0.4 cm, compressed, dark–brown.

Fls. & Frts. : October–December.

Distrib. :All districts of Marathwada (Naik, op. cit.).

C. sophera L. Sp. Pl. 379. 1753; Baker in Hook. f. Fl. Brit. India 2: 262. 1878; Cooke, Fl. Pres. Bombay 1:446. 1958 (Repr.); de Wit in Webbia 11:265. 1955; Sanj. Leg. India 21. 1991. *'Jangli–takla'*, *'Ran–takla'*.

Undershrubs or shrubs. Leaves 15–20 cm long; leaflets opposite, 3.5–6.5 x c 1.2 cm, membranous, glaucous, lanceolate, apex acute or acuminate, base usually rounded. Flowers yellow in axillary, short, few flowered, corymbose cymes. Pods 7–10 x 0.2–0.5 cm, thick, slightly recurved, somewhat turgid, septate between seeds. Seeds 30–40, broadly ovoid, acute, compressed, dark brown.

Fls. & Frts. : November–March.

Distrib. : Common in waste places.

C. surattensis Burm. f. ssp. **glauca** (Lam.) K. & S. Larsen in Fl. C. L. V. 18:102. 1980; Sanj. Leg. India 21. 1991. *C. glauca* Lam. Encycl. 1: 647. 1784; Baker in Hook. f. Fl. Brit. India 2: 265. 1878; Cooke, Fl

Pres. Bombay 1: 453. 1958 (Repr.). *C. arborescens* Vahl, Symb. Bot. 3: 56. 1794. *Senna arborescens* (Vahl) Roxb. Fl. Ind. 2 : 345. 1832. *'Motha–tarvad'.*

Trees, 5–8 m tall. Leaves 12–25 cm long; leaflets 4–6 pairs, 3–8 x 2–3 cm, elliptic–oblong, apex acute, base rounded. Flowers yellow in axillary, corymbose racemes. Pods striaght, flat, tapering at both ends. Seeds 20–30, oblong.

Fls. & Frts. : September–March.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 453, f. 256. 1909 (*C. glauca*); Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 237, ff. 1–10. 1988.

Distrib. : In deciduous forests. Also found planted. Aurangabad, Beed, Jalna, Kolhapur, Latur, Nanded, Osmanabad, Parbhani, Pune.

C. timoriensis DC. Prodr. 2: 499. 1825; Baker in Hook. f. Fl. Brit. India 2:265. 1878; Cooke, Fl. Pres. Bombay 1: 451. 1958 (Repr.); Sanj. Leg. India 22. 1991.

Shrubs or trees, 3–5 m tall; young parts fulvous hairy. Leaflets 10–20 pairs, 2–3 x 0.6–1.0 cm, oblong, hairy on both sides, apex mucronate, base rounded. Flowers 1.0–1.5 cm across, bright yellow in corymbose racemes. Pods oblong, flat, shining, black when dry.

Fls. & Frts. : October–May.

Distrib. : Along the ghats, rare. Pune. Ratnagiri, Sindhudurg.

C. tora L. Sp. Pl. 376. 1753; Baker in Hook. f. Fl. Brit. India 2: 263. 1878 p. p.; Cooke, Fl. Pres. Bombay 1: 447. 1958 (Repr.); de Wit in Webbia 11: 276. 1955; Pandey in J. Bombay nat. Hist. Soc. 68:316, t. 2, ff. 32–38. 1971; V. Singh, Ibid. 75: 437. 1978; Sanj. Leg. India 22. 1991. *'Takla', 'Tarota'.*

Herbs, 30–60 cm high, annuals, erect. Leaflets 1.7–4.2 x 1.0 –2.7 cm, obovate–oblong, glaucous. Flowers yellow, axillary, solitary or in pairs. Pods 10–16 x 0.5 cm, obliquely septate. Seeds 25–30, rhomboid.

Fls. & Frts. : August–February.

Illus. : Pandey, op. cit., Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 4: t. 238. 1988.

Distrib. : Common throughout the state in waste places.

C. uniflora Mill. Gard. Dict. ed. 8, no. 5. 1768 non Spreng.; Raghavan in Bull. Bot. Surv. India 22: 225. (1980) 1982; Singh in Curr. Sci. 52 (13) : 644. 1983; Sanj. Leg. India 24. 1991. *C. sericea* Sw. Prodr. 66. 1788 & Fl. Ind. Occ. 2 (1): 724. 1798; Singh in Bull. Bot. Surv. India 21: 203, ff. 1 17. (1979) 1981.

Herbs, erect, annuals; young parts pubescent, at length glabrescent. Leaves 6–9 cm long; leaflets opposite, 2–4 pairs with a stalked gland (c 3.5 mm long) between each pair, 2.5–3.5 x 1.2 –2.0 cm, obovate–oblong, base cuneate, apex rounded, apiculate. Flowers 3–4 in axillary racemes. Pods subcompressed, thickened on both the sutures, beaked with persistent style and stigma. Seeds upto 10, subquadrangular, rhomboidal, smooth, dull brown.

Fls. & Frts. : August–November.

Illus. : Singh, op. cit.

Distrib. : In waste places. Rare. Pune.

CYNOMETRA L.

Cynometra iripa Kostel. Allg. Med. Pharm. Fl. 4:1341. 1835; van Meeuwen in Blumea 18: 21. 1970; Nicols. et al. Interp. van Rheede Hort. Malab. 134. 1988; Sanj. Leg. India 26. 1991. *C. ramiflora* Wight & Arn. var. *mimosoides* Baker in Hook. f. Fl. Brit. India 2: 267. 1878; Cooke, Fl. Pres. Bombay 1: 465. 1958 (Repr.). *'Irapu'*.

Trees, small or shrubs. Leaves 7.5–12.5 cm long; leaflets 2 pairs, 3.7–8.7 x 2.0–3.7 cm, obliquely obovate–oblong, apex often emarginate, base obliquely cuneate. Flowers white, in small, axillary, corymbose racemes. Pods 1.2–2.5 cm long, fleshy, turgid, irregularly oblong or ovoid, with a thick, fleshy, pointed tip.

Fls. & Frts. : March May.

Distrib. : Along sea coast. Rare. 'S. Konkan' (Cooke, op. cit.).

HARDWICKIA Roxb.

Hardwickia binata Roxb. Pl. Cor 3:6, t. 209. 1819; Baker in Hook. f. Fl. Brit. India 2: 270. 1878; Cooke, Fl. Pres. Bombay 1: 456. 1958 (Repr.); Sanj. Leg. India 29. 1991.

Trees, 6.0–7.5 m tall. Leaflets 1 pair, subsessile, 1.5–3.1 x 2.0–3.4 cm, obliquely ovate. Flowers yellowish–green, in axillary and terminal panicles. Pods 5–7 x 1.5–2.0 cm, strap–shaped, veined, narrowed at both ends. Seeds solitary.

Fls. & Frts. : August–January.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2:tt. 233 & 958 a, b. 1982.

Distrib. : In deciduous forests. Common.

MOULLAVA (Rheede) Adans.

Moullava spicata (Dalz.) Nicols. in Manilal, Bot. Hist. Hort. Malab. 184. 1980; Sanj. Leg. India 33. 1991. *Caesalpinia spicata* Dalz. in Hook. Kew Gard. Misc. 3: 90. 1851. *Wagatea spicata* (Dalz.) Wight, Ic. t. 1995. 1853; Baker in Hook. f. Fl. Brit. India 2: 261. 1878; Cooke, Fl. Pres. Bombay 1: 443. 1958 (Repr.). *'Vakeri', Waghati'*.

Shrubs, scandent ; main rhachis with recurved prickles. Leaflets 5–6 pairs, 2–4 x 1–2 cm, shining above, pale beneath, apex obtuse, base rounded. Flowers in 8–12 cm long spikes, rachis brown pubescent, armed with prickles; calyx scarlet, densely pubescent; petals spathulate. Pods 5–7 cm long, tomentose when young.

Fls. & Frts. : November–April.

Illus. : Wight, op. cit.; Talb. For. Fl. Bombay Pres. & Sind 1:447, f. 252. 1909 (*Wagatea spicata*).

Distrib. : In moist deciduous forests. Frequent. Bombay (Cooke, op. cit.), Kolhapur, Parbhani, Pune, Raigad, Ratnagiri, Satara, Sindhudurg.

SARACA L.

Saraca asoca (Roxb.) de Wilde in Blumea 15:393. 1968; Zuiderhoudt, Ibid. 422; Sanj. Leg. India 35. 1991. *Jonesia asoca* Roxb. in Asiat. Res. 4:365. 1795. *Saraca indica* auct. non L. (1753); Baker in Hook. f. Fl. Brit. India 2: 271. 1878; Cooke, Fl. Pres. Bombay 1:456. 1958 (Repr.). *'Ashok', 'Jasvant'*.

Trees, 8–10 m tall. Leaflets 4 pairs, 6–16 x 3–4 cm, oblong–elliptic, apex acute or acuminate. Flowers orange–yellow, in corymbose panicles. Pods 11–18 x 3.5–4.5 cm, oblong, compressed, slightly turgid, apiculate.

Fls. & Frts. : January–June.

Illus. : Wight Ic. t. 296. 1839; Bedd. Fl. Sylv. t. 57. 1870; Talb. For. Fl. Bombay Pres. & Sind 1:458, f. 259. 1909 (*Jonesia asoca*).

Distrib. : In moist deciduous and semi evergreen forests. Ahmednagar (cultivated in gardens), Bombay, Kolhapur, Pune, Raigad, Ratnagiri, Satara (cultivated), Thane.

TAMARINDUS L.

Tamarindus indica L. Sp. Pl. 34. 1753; Baker in Hook. f. Fl.Brit. India 2:273. 1878; Cooke, Fl. Pres. Bombay 1:457 1958 (Repr.); Sanj. Leg. India 36. 1991. *'Amli', 'Chinch'*.

Trees, 15 m tall. Leaflets c 14 pairs, 1.6 x 0.5 cm, oblong. Flowers yellow in lax, few flowered racemes at tips of brachlets. Pods 10–15 x 0.5–2.5 cm, subcompressed, brown. Seeds upto 12, obovoid–oblong.

Fls. & Frts. : February–June.

Illus. : Bedd. Fl. Sylv. t. 184. 1872; Talb. For. Fl. Bombay Pres. & Sind 1: 460–61, ff. 260 & 261. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 238. 1982.

Distrib. : As an escape in the outskirts of forests and also found planted around villlages.

CULTIVATED SPECIES :

Bauhinia acuminata L. Sp. Pl. 375. 1753; Baker in Hook. f. Fl. Brit. India 2:276. 1878; Bor & Raiz. in J. Bombay nat. Hist. Soc. 42:5. 1940; Cooke, Fl. Pres. Bombay 1:462. 1958 (Repr.); Sanj. Leg. India 2. 1991. *'Kanchan'*.

Shrubs c 2.5 m high, erect; young parts greyish–wooly pubescent. Leaves divided less than 1/2 way down into 2 usually subacute lobes. Flowers white in lateral, short racemes. Pods 10.0–12.5 cm long, less than 2 cm wide, linear, septate, 3–11–seeded with sharp rimmed, raised sutures. Seeds upto 1 cm across, flattened.

Fls. & Frts. : January–June.

Illus. : de Wit in Reinwardtia 3:395, f. 1. 1956.

Distrib. : Planted. Bombay, Punc.

B. diphylla Buch.–Ham. in Symes Emb. ed. 2, 3: 311, t. 24. 1800; Baker in Hook. f. Fl. Brit. India 2: 278; 1878; Cooke, Fl. Pres. Bombay 1:458. 1958 (Repr.); Sanj. Leg. India 2. 1991.

Climbers; tendrils circinate. Leaves of 2 distinct leaflets; leaflets c 6.2 x 3.7 cm, semi–orbicular or subreniform. Flowers white in lax, terminal racemes. Pods 22.5–30.0 x 3.7–6.2 cm, flat, stalked, thin, reticulately veined. Seeds 30–40, ovoid, slightly compressed, pale brown, shining.

Fls. & Frts. : January–June.

Distrib. : Planted. *'Konkan'* (Cooke, op. cit.), Pune.

Notes. : de Wit (1956) opines it an Indian species while Vartak & Chitnis (1971) report that the native locality for this species as Myanmar (Burma) and Baker op. cit. record for Malesia is an error. (Prain in J. As. Soc. Bengal. 66(2) : 178. 1897). However, Sanj. op. cit. includes Malesia too, probably an error of Baker, repeated for an obvious reason of ignorance of Prain's reference.

B. galpinii N. E. Br. in Gard. Chron. 9:725. 1891; Bor & Raiz. in J. Bombay nat. Hist. Soc. 42: 7 Pl. 1940; Sanj. Leg. India 1.1991.

Shrubs, climbing; ultimate branches puberulous. Leaves divided 1/2 way, orbicular, broader than long; base broadly, shallowly cordate, top lobes broadly rounded, blunt; lower surface sparsely, minutely puberulous and with a marginal zone of small yellow scales. Flowers brick–red in few flowered, short, lateral, rusty puberulous, lax recemes. Pods 5–7 cm long, c 1.5 cm wide, rather thick. Seeds 3–5, glossy, 0.8 cm across, brown.

Fls. & Frts. : February–June.

Illus. : de Wit in Reinwardtia 3:399, f. 2. 1956.

Distrib. : Planted. Satara.

Notes : Native of S. Africa.

B. monandra Kurz in J. As. Soc. Beng. 42(2): 73. 1873 & in For. Fl. Brit. Burma 1:395. 1877; Baker in Hook. f. Fl. Brit. India 2:285. 1878; Cooke, Fl. Pres. Bombay 1:462. 1958 (Repr.); Sanj. Leg. India 7.1991.

Shrubs or small trees; young parts rusty pubescent. Leaves 7–15 cm across, broadly ovate, often broader than long, nearly half way bifid, base truncate to very shallowly cordate; top lobes rounded to acutish. Flowers white dotted purple in short, densely pubescent racemes. Pods upto 20 cm long, 2 cm wide, thick, smooth, nearly septate. Seeds 10–20.

Fls. & Frts. : January–June.

Distrib. : Planted. Pune.

Notes : A native of Burma.

B. variegata L. Sp. Pl. 375. 1753; Baker in Hook. f. Fl. Brit. India 2:284. 1878; Cooke, Fl. Pres. Bombay 1:462. 1958 (Repr.); Sanj. Leg. India 6.1991. *Phanera variegata* (L.) Benth. in Miq. Pl. Jungh. 262. 1852. *'Chamol', 'Kachnar', 'Kanchan'*

Trees, c 15 m high; young parts grey–puberulous. Leaves 6–14 cm across, broadly ovate, often broader than long, divided to 1/3, bifid, base cordate, apical lobes broadly rounded. Flowers variegated, white or purplish in few flowered very short, grey tomentose, in terminal or

axillary racemes or corymbs. Pods 30 cm long, c 2.5 cm wide, nearly smooth, variegated with redish–brown streaks. Seeds 12–26, c 1.5 cm across, flat, orbicular, brown.

Fls. & Frts. : Throughout the year.

Distrib. : Planted. Chandrapur, Nasik, Osmanabad, Pune, Satara, Thane.

Caesalpinia coriaria (Jacq.) Willd. Sp. Pl. 2: 532, 1800; Cooke, Fl. Pres. Bombay 1:440. 1958 (Repr.); Sanj. Leg. India 10.1991. *Poinciana coriaria* Jacq. Select. Am. Hist. 123, t, 175, f. 36. 1763. 'Dividivi', *'libi–dibi'*.

Trees, small; bark black, fissured. Leaves bipinnate; pinnae 10–17, rhachis 2.5–8.0 cm long; leaflets 0.5–12.0 x 0.15–0.35 cm, 16–22 pairs, oblong. Flowers c 0.8 cm across, yellow in racemose panicles. Pods 3.5–6.0 x 1.5–2.5 cm, brown, ellipsoid–oblong, flattened, twisted.

Fls. & Frts. : September–December.

Distrib. : Planted. Pune.

Notes : Native of S. America (The American Sumach).

C. pulcherrima (L.) Sw. Obs. Bot. 166. 1791; Baker in Hook. f. Fl. Brit. India 2 : 255. 1878; Cooke, Fl. Pres. Bombay 1 : 440. 1958 (Repr.); Sanj. Leg. India 13. 1991. *Poinciana pulcherrima* L. Sp. Pl. 380. 1753. *'Shankasur'*.

Shrubs, 2–4 m. high. Leaves 10–15 cm long; pinnae 6–8 pairs, 3.8 cm long; leaflets 5–9 pairs, 0.5–1.7 x 0.5–1.0 cm, oblong or obovate–oblong. Flowers c 4 cm across, yellow or red in racemes. Pods 5–7 x 1.5 cm, oblong, flat. Seeds 5–10.

Fls. & Frts. : Almost throughout the year.

Distrib. : Planted in gardens.

Notes : A native of S. America.

C. sappan L. Sp. Pl. 381. 1753; Baker in Hook f. Fl. Brit. India 2:255. 1878; Cooke, Fl. Pres. Bombay 1 : 438. 1958 (Repr.); Sanj. Leg. India 12. 1991. *'Patang'*.

Trees, small to medium sized, prickly. Leaves nearly glabrous; pinnae 10–13 pairs; leaflets 10–20 pairs, obtuse, very oblique. Flowers yellow. Pods obovoid, obliquely truncate, cuspidate, thick, polished. Seeds 3–6.

Fls. & Frts. : September–December.

Distrib. : Planted in gardens. Bombay, Kolhapur, Pune.

Cassia alata L. Sp. Pl. 378. 1753; Baker in Hook. f. Fl. Brit. India 2 : 264.1878; Cooke, Fl. Pres. Bombay 1 : 454. 1958 (Repr.); Sanj. Leg. India 14. 1991. *C. bracteata* L. f. Suppl. 232. 1781. *Senna alata* (L.) Roxb. Fl. Ind. 2 : 348. 1832. *'Shimai–agase'.*

Shrubs, up to 2 m high. Leaves 30–60 cm long; leaflets 8–14 pairs, 5–12 x 2.5–8.0 cm, lower oblong–elliptic, upper broadly obovate. Flowers 2.5 cm across, yellow or orange. Pods 10–20 cm long, 1.5 cm broad with a wing down the middle of each valve, oblong, thin, shortly stipitate. Seeds many, transverse.

Fls. & Frts. : September–December.

Distrib. : Planted. Pune.

Notes : Native of S. America.

C. bicapsularis L. Sp. Pl. 376. 1753; Baker in Hook. f. Fl. Brit. India 2 : 263. 1878; Cooke, Fl. Pres. Bombay 1 : 454. 1958 (Repr.); Sanj. Leg. India 22. 1991. *Senna bicapsularis* (L.) Roxb. Fl. Ind. 2:242. 1832.

Shrubs. Leaflets 3–4 pairs. Flowers bright yellow. Pods c 15 cm long. sausage shaped.

Fls. & Frts. : September–December.

Distrib. : Planted in gardens throughout the state.

Notes : A native S. America.

C. corymbosa Lam. Encycl. 1 : 644. 1785; Sanj. Leg. India 23. 1991.

Shrubs. Leaflets 2–3 pairs, 2–4 cm, oblong or oblong–lanceolate with stipitate gland between the lowest pair. Flowers c 2.5 cm across, pale yellow in axillary, corymbose racemes mostly in the upper axils. Pods 7–10 cm long, 0.8 cm broad, straw coloured, straight. Seeds embedded in dark brown viscid pulp.

Fls. & Frts. : September–December.

Distrib. : Planted. Pune.

Notes : A native of S. America.

C. floribunda Cav. Descr. 132. 1802; Ohasi in Hara, An Enum. Fl. Pl. Nepal 2 : 111. 1979; Sanj. Leg. India 15. 1991.

Shrubs or small trees up to 3 m tall. Leaflets 15–20 x 9–12 cm; leaflets 3–5 pairs, 4–8 x 1.5–2.0 cm, ovate to lanceolate with a gland between the petiolules of leaflets. Flowers bright yellow in axillary and terminal, 6–8–flowered racemes. Pods 7.5–10.0 x 0.8–1.0 cm, subterete, segmented between seeds, brown. Seeds 20–30, horizontal.

Fls. & Frts. : October–March.

Distrib. : Grown in gardens. Pune.

Notes : A native of Tropical America.

C. grandis L. f. Suppl. Pl. 230. 1781; Gowda & Krishnas. Pl. Wealth, Lalbagh 35. 1968; Cooke, Fl. Pres. Bombay 1: 454. 1958 (Repr.); Sanj. Leg. India 23. 1991.

Trees, 15–25 m. tall. Leaves dichotomously arranged, silky–tomentose; leaflets 12–15 pairs, 4–6 x 1–2 cm, oblong, closely nerved, sharply mucronate. Flowers red, profuse when leafless. Pods 45–60 cm long, thick, woody, slightly torrulose, specially at the end. Seeds 1.0–1.5 cm long, variously shaped, ivory white, many, arranged around the gummy and foul smelling pulp.

Fls. & Frts. : March–June.

Distrib. : Introduced into gardens. Pune.

Notes : Native of Tropical America.

C. hirsuta L. Sp. Pl. 378. 1753; Baker in Hook. f. Fl. Brit. India 2: 263. 1878; Sanj. Leg. India 15. 1991. *Senna hirsuta* (L.) Irwin & Barneby in Phytologia 44 : 499. 1979.

Shrubs, up to 2 m tall. Leaves 15–20 cm long; leaflets 4–6 pairs, 3.0–8.5 x 1.5–3.0 cm, ovate–oblong; petioles with a gland at base. Flowers in more than 1.5 cm long, axillary, corymbose panicles. Pods subterete, sessile, ribbed, hirsute. Seeds transverse.

Fls. & Frts. : September–December.

Distrib. : Grown in gardens. Pune.

Notes. : Native of Tropical America.

C. hochstetteri Ghesq. in Bull. J. Gard. Bot. Brux. 9 : 155. 1932; Sanj. Leg. India 15. 1991. *C. mimosoides* var. *dimidiata* (Roxb.) Baker in Hook. f. Fl. Brit. India 2 : 266. 1878.

Herbs, annuals, erect or prostrate, covered with long, white spreading hairs. Leaflets 20–30 pairs, 0.5–1.0 x 0.1–0.2 cm, oblong–lanceolate, ciliolate, apiculate, base oblique. Flowers 1–4, yellow in the axils of leaves. Pods flat, straight, hairy. Seeds 4–15, rhomboid, brown, smooth.

Fls. & Frts. : October–May.

Distrib. : In gardens. Pune.

C. javanica L. Sp. Pl. 379. 1753; Baker in Hook. f. Fl. Brit. India 2: 267. 1878; Sanj. Leg. India 16. 1991.

Trees, 7–15m high; bark grey, fissured. Leaves c 30 cm long; leaflets 10–16 pairs, ovate. Flowers pink in terminal and axillary racemes. Pods 30–50 cm long, 2 cm thick, cylindrical, black.

Fls. & Frts. : April–June.

Distrib. : Planted as an ornamental. Osmanabad, Pune.

C. nigricans Vahl, Symb. Bot. 1. 30. 1791; Cooke, Fl. Pres. Bombay 1 : 446. 1958 (Repr.); Sanj. Leg. India 18. 1991. *Chamaecrista nigricans* (Vahl) Green in Pittonia 4 : 30. 1899.

Undershrubs or shrubs up to 3 m high; young branches pubescent. Leaves 5–10 cm long, furnished with an obscure, sessile gland below the lowest pair of leaflets; leaflets sessile, 8–18 pairs, 1.0–2.5 x 0.3–0.45 cm, linear–oblong, base unequal sided, apex obtuse, mucronate, hairy on both surfaces. Flowers 0.6–0.8 cm across, yellowish–red, solitary or 2–5 together, supra–axillary. Pods 2–3 x 0.3–0.45 cm, linear–oblong, straight, compressed, transversely oblique marked lines between the seeds, appressed hairy. Seeds 6–11, trapezoid–ovoid, compressed, brown, shining.

Fls. & Frts. : October–March.

Distrib. : In gardens, Maharashtra (Sanj. op. cit.).

C. nodosa Buch.–Ham. ex Roxb. Fl.Ind. 2 : 336. 1832; Baker in Hook. f. Fl. Brit. India 2 : 261. 1878; Sanj. Leg. India 16. 1991. *C. javanica* L. var. *agnes* de Wit in Webbia 11 : 220. 1955. *C. agnes* (de Wit) Brenan in Kew Bull. 13 : 180 1958. *C. javanica* L. ssp. *nodosa* (Buch.–Ham. ex Roxb.) K. & S. Larsen in Nat. Hist. Siam. Soc. 25 : 205. 1974.

Trees, 10–12 m high; bark greyish–black, fissured. Leaves 7–12 cm long, abruptly pinnate; leaflets 9–12, oblong, obtuse. Flowers c 5 cm across, rose coloured in racemes.

Fls. & Frts. : September–December.

Distrib. : Planted. Pune. Thane.

Notes : Flowers fragrant.

C. renigera Wall. ex. Bth. in Trans. Linn. Soc. 27 : 518. 1871; Sanj. Leg. India 20. 1991.

Trees, 8–15 m high; bark brownish–black; branches softly tomentose. Leaves 15–20 cm long; leaflets 8–20 pairs, oblong, apex obtuse, softly pubescent on both sides. Flowers pink or red in short, erect, axillary racemes. Pods c 20 x 4 cm, cylindric, dark brown or black, rough.

Fls. & Frts. : October–March.

Distrib. : Frequently grown in gardens for showy flowers. Aurangabad, Beed, Bombay, Jalna, Latur, Nagpur, Nanded, Osmanabad, Parbhani, Sindhudurg.

C. roxburghii DC. Prodr. 2 : 489. 1825; Sant. & Wagh in Bull. Bot. Surv. India 5 : 106. 1963; Singh in Bull. Bot. Surv. India 18 : 97. 1979; Sanj. Leg. India 20. 1991. *C. marginata* Roxb. Fl. Ind. 2 : 338. 1832; Baker in Hook. f. Fl. Brit. India 2 : 262. 1878; Cooke, Fl. Pres. Bombay 1 : 454. 1958 (Repr.). *'Urmedi', 'Uskiamen'.*

Trees, 15–25 m high; bark greyish–black. Leaves 10–20 cm long, abruptly pinnate; leaflets 30–40 pairs. Flowers pink in racemes or panicled racemes. Pods c. 30 cm long, 1.5 cm wide, cylindric.

Fls. & Frts. : July–December.

Distrib. : Planted in gardens and along roadsides. Ahmednagar, Aurangabad, Beed, Jalgaon, Jalna, Latur, Nanded, Osmanabad, Parbhani, Pune.

Notes. : It is a native of Sri Lanka.

C. senna L. Sp. Pl. 377. 1753; Brenan in Kew Bull. 13. 243. 1958; Sanj. Leg. India 20. 1991. *C. angustifolia* Vahl, Symb. Bot. 1 : 29. 1790; Baker in Hook. f. Fl. Brit. India 2 : 264. 1878; Cooke, Fl. Pres. Bombay 1 : 450. 1958 (Repr.).

Shrubs, up to 1.5 m; bark pale yellowish brown. Leaves 10 x 4.5 cm; leaflets 4–7 pairs, opposite, 1.5–3.0 x 0.5–0.8 cm, narrow, lanceolate. Flowers 1.5 cm across, yellow in c 8 cm long racemes. Pods 5 x 2 cm, flat, compressed, strongly nerved, shortly stipitate. Seeds 8, ovoid, membranous.

Fls. & Frts. : Almost throughout the year.

Distrib. : Planted. Pune, Sindhudurg.

Notes : A native of Tropical Africa.

C. siamea Lam. Encycl. 1: 648. 1785; Baker in Hook. f. Fl. Brit. India 2 : 264. 1878; Cooke, Fl. Pres. Bombay 1 ; 454. 1958 (Repr.); Sanj.

Leg. India 20. 1991. *Senna sumatrana* Roxb. Fl. Ind. 2 : 254. 1832. *S. siamea* (Lam.) Irwin & Barneby Mem. N. Y. Bot. Gard. 35 : 98. 1982 *'Kashid', 'Kassod'.*

Trees, 10–15 m. high; bark grey. Leaves 15–30 cm long, abruptly pinnate; leaflets 8–12 pairs, 3–7 x 1–2 cm, ovate–elliptic or elliptic–oblong, coriaceous. Flowers yellow, c 2 cm across, in large panicles. Pods 15–25 x 1.0–1.3 cm, brown, beaked,compressed, broadly oblong.

Fls. & Frts. : August–June.

Distrib. : Usually planted along road–sides.

Notes : A native of Sri Lanka.

C. surattensis Burm. f. Fl. Ind. 97. 1768; D. Chatterjee in J. Bombay Nat. Hist. Soc. 57: 697. 1960. *Senna surattensis* (Burm. f.) Irwin & Barneby, Mem. N. Y. Bot. Gard. 35: 600. 1982 ssp. **surattensis.**

var. **surattensis.**

Trees, 5–6.5 m tall; young branches minutely pubescent, at length glabrous. Leaves 15–22 cm long; leaflets 4–6 pairs, 5–10 x 2.5–4 cm, one gland between each lower pair, elliptic or oblong–elliptic, ovate, entire, subacute. Flowers bright yellow–orange in corymbs. Pods flat, 10–17 x 1.5 cm, straight, margins raised, drooping, glabrous. Seeds 20–30, biseriate, ovoid, dark brown.

Fls. Frts. : January–June.

Distrib. : Planted in gardens. Jalgaon, Kolhapur, Osmanabad, Pune, Sindhudurg.

var. **suffruticosa** (Koen. ex Roth) D. Chatterjee in J. Bombay Nat. Hist. Soc. 57 : 697. 1960. *Cassia suffruticosa* Koen. ex Roth, Nov. Pl. Sp.213. 1821; Wight & Arn. Prodr. 289. 1834; Singh in Bull. Bot. Surv. India 18 : 91. 1979. *C. glauca* Lam. var. *suffruticosa* (Koen. ex Roth) Baker in Hook. f. Fl. Brit. India 2 : 265. 1878. *'Devawali'.*

Shrubs; young branches uppermost the largest, gradually smaller downwards, appressed hairy. Leaflets 4–10 pairs, obovate–oblong. Flowers creamy–yellow in axillary, corymbose racemes. Pods flat. black at maturity.

Fls. & Frts. : January–June.

Distrib. : Planted. Nasik, Pune.

Notes : In Warshi, Chandwad range of Nasik District, it is reported to be wild in occurrence.

C. tomentosa L. f. Suppl. Pl. 231. 1781; Baker in Hook. f. Fl. Brit. India 2 : 263. 1878; Cooke, Fl. Pres. Bombay 1 : 454. 1958 (Repr.); Sanj. Leg. India 22. 1991.

Shrubs. Leaflets 6–8 pairs, 2.5–3.0 x 0.5–0.6 cm, oblong–obtuse, pubescent on the upper–side and dark green, prominently 1–nerved with a gland between the two of all or most pairs.

Fls. & Frts. : January–June.

Distrib. : Planted. Pune.

Notes. : Native of Tropical America.

Ceratonia siliqua L. Sp. Pl. 1026. 1753; Parker, For. Fl. Punj. 182. 1918; Cooke, Fl. Pres. Bombay 1 : 486. 1958 (Repr.); Sanj. Leg. India 25 : 1991. *'Meccaniamli'*.

Trees. Leaves paripinnate; leaflets 3–5 pairs, 2–5 cm long, opposite, elliptic or broadly obovate, emarginate, glabrous above, minutely pubescent beneath. Flowers unisexual, green, minute in 5–30 cm long spike–like, racemes arising from oldwood. Pods 7–12 x 1.0–2.5 cm, curved, compressed, dark red. Seeds pale brown, shining, embedded in a pulp.

Fls. & Frts. : October–December.

Distrib. : Planted. Pune.

Notes : A native of Mediterranean region. Pulp is sweet and said to be edible.

Colvillea racemosa Boj. in Hook. Bot. Mag. t. 3325–3326. 1834; Gowda & Krishnas, Pl. Wealth, Lalbagh 49. 1968; Sanj. Leg. India 25. 1991.

Trees; bark grey. Leaves bipinnate, alternate; pinnae 12–16 pairs, opposite, 10 cm long; leaflets 20–28 pairs, each leaflet 0.8–1.2 x 0.3–0.4 cm, oblong. Flowers bright orange in large, drooping, dense subpaniculate racemes. Pods elongate, straight, turgid, dehiscent. Seeds many.

Fls. & Frts. : September–October.

Distrib. : Planted. Aurangabad, Beed, Bombay, Jalna, Latur, Nanded, Osmanabad, Parbhani, Pune.

Notes. : A native of Madagascar.

Delonix elata (L.) Gamble, Fl. Pres. Madras 1 : 396. 1919 [(1 : 280. 1957 (Repr.)]; Sanj. Leg. India 27. 1991. *Poinciana elata* L. Cent. Pl. 2 : 16. 1756; Baker in Hook. f. Fl. Brit. India 2 : 260. 1878; Cooke, Fl. Pres. Bombay 1 : 441. 1958 (Repr.).

Trees, 6–10 m tall; bark ash–coloured. Leaves abruptly 2–pinnate, 10–20 cm long; pinnae 10–20 pairs, opposite; leaflets 10–20 pairs, subsessile, 0.8 x 0.3 cm, closely set along the rhachis, linear–oblong, base rounded, apex usually apiculate. Flowers yellow on finely pubescent stout pedicels in terminal, few flowered, cymbiform racemes. Pods 12–18 x 2–3 cm, attenuated at both ends, reticulately veined. Seeds 4–8.

Fls. & Frts. : June–December.

Illus. : Bedd. Fl. Sylv. t. 178. 1871.

Distrib. : Planted. Akola, Bombay, Dhule, Kolhapur, Osmanabad, Pune, Raigad, Thane.

Notes. : It is a native of Tropical Africa.

D. regia (Boj. ex Hook.) Raf. Fl. Tellur 2 : 92. 1836; Sanj. Leg. India 27. 1991. *Poinciana regia* Boj. in Hook. Bot. Mag. 56 : 5, t. 2884. 1829; Baker in Hook. f. Fl. Brit. India 2 : 260. 1878; Cooke, Fl. Pres. Bombay 1 : 442. 1958 (Repr.). *'Gul–mohor'*.

Trees, 10–15 m high; bark grey. Leaves 30–60 cm long, pinnae 10–20 pairs, 3–10 cm long; leaflets 5–25 pairs, 0.3–0.8 x 0.25 cm, narrowly oblong. Flowers scarlet or reddish–orange, in terminal and axillary lax racemes. Pods 30–50 cm long, 4–5 cm wide, linear–oblong, flattened, woody.

Fls. & Frts. : April–September.

Distrib. : Planted throughout the state along road–sides and in gardens.

Notes. : A native of Madagascar. Flowers are attractive and the spreading canopy provides good shade in summer.

Haematoxylon campechianum L. Sp. Pl. 384. 1753; Sen & Naskar in Bull. Bot. Surv. India 7 : 46. 1968; Sanj. Leg. India 29. 1991; Cooke, Fl. Pres. Bombay 1 : 486. 1958 (Repr.). *'Patangi'*.

Shrubs or small trees, 3 m tall, thorny. Leaves 2–5 cm long; leaflets 2–5 pairs, 1.0–2.5 cm long, obovate or obovate–oblong, apex obtuse, emarginate. Flowers 1.2 cm across, yellow in crowded spikes. Pods upto 3.7 cm long, 0.8–1.0 cm broad, membranous, narrowed at both ends. Seeds solitary.

Fls. & Frts. : January–June.

Distrib. : Planted. Aurangabad, Beed, Bombay, Jalna, Latur, Nanded, Osmanabad, Parbhani, *'Deccan'*, Pune, Sindhudurg.

Notes : A native of S. America. The flowers are attractive and fragrant.

Parkinsonia aculeata L. Sp. Pl. 375. 1753; Baker in Hook. f. Fl. Brit. India 2 : 260. 1878; Cooke, Fl. Pres. Bombay 1 : 442. 1958 (Repr.); Sanj. Leg. India 33. 1991.

Shrubs, armed. Leaves bipinnate; pinnae 1–3 pairs, 25–35 cm long; leaflets numerous, minute, oblanceolate. Flowers 1.5–2.0 cm, yellow in lax, axillary, short racemes. Pods 4–14 x 0.6–0.08 cm, yellow, linear–oblong, torrulose, moniliform, finely veined. Seeds 1–6, oblong.

Fls. & Frts. : April–November.

Illus. : Bedd. Fl. Sylv. t. 91. 1871.

Distrib. : Planted along roadsides and also naturalised on waste lands.

Notes : Native of Tropical America.

Peltophorum pterocarpum (DC.) Baker ex K. Heyne, Nutt. Pl. Ned. Ind. ed. 2, 2: 755. 1927; Sanj. Leg. India 33. 1991. *Inga pterocarpa* DC. Prodr. 2 : 441. 1825. *Peltophorum ferrugenium* (Decne.) Benth. Fl. Austral 2 : 279. 1864; Baker in Hook. f. Fl. Brit. India 2 : 257. 1878. *P. roxburghii* (G. Don) Degener, Fl. How. Fam. 1696. 1938; Blatt. et al. Some Beaut. Indian Trees 109. 1954.

Trees, 15–25 m high; bark black, fissured. Leaves bipinnate; leaflets 8–22 pairs. Flowers c 3–5 cm across, golden yellow in axillary and terminal panicles. Pods 5–11 x 1.7–2.7 cm, ellipsoid–oblong, flat, dark–brown. Seeds 1–4.

Fls. & Frts. : January–June.

Distrib. : Planted in gardens and along road sides. Ahmednagar, Bhandara, Bombay, Chandrapur, Osmanabad, Pune, Raigad, Sindhudurg, Thane.

Notes : It is a Native of Australia.

Schotia brachypetala Sond. in Linnaea 23 : 39. 1850; Sanj. Leg. India 285. 1991.

Trees, small. Leaves paripinnate; leaflets 4–7 pairs, 3.5–6.5 cm long, opposite, oblong–obovate, rounded to emarginate, coriaceous. Flowers deep red in congested panicles arising often from old wood. Pods c 5 m long, oblong, coriaceous, upper suture winged. Seeds yellow, few, arillate.

Fls. & Frts. : January–June.

Distrib. : Planted. Pune.

Notes. : Native of Zimbabve, S. Africa.

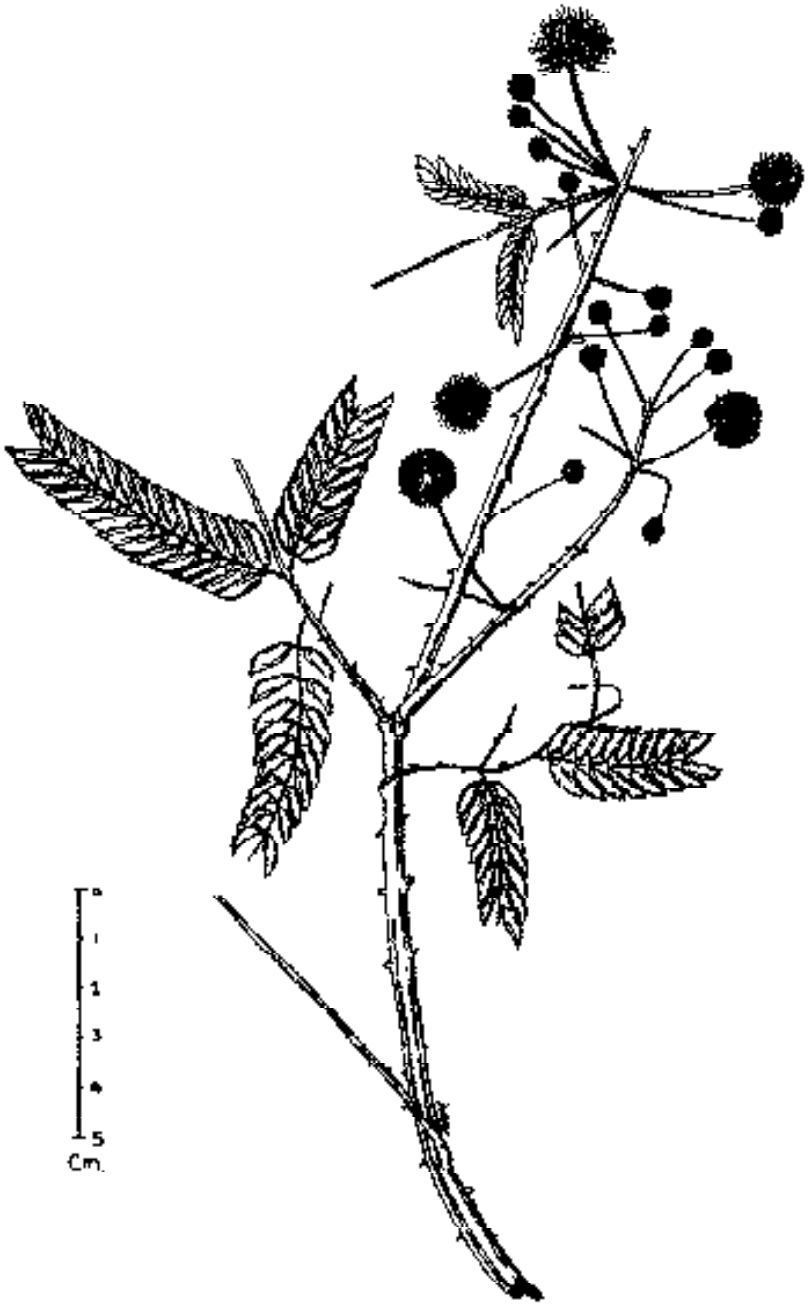
MIMOSACEAE

(A. N. Londhe)

1. Lianas ... ENTADA
1. Herbs, shrubs or trees :
   2. Stamens monadelphous :
      3. Pods straight, flat ... ALBIZIA
      3. Pods circinate, twisted ... ARCHIDENDRON
   2. Stamens free :
      4. Stamens indefinite ... ACACIA
      4. Stamens definite, 5–10 :
         5. Herbs without prickles ... NEPTUNIA
         5. Usually shrubs or trees, if herbs then with prickles :
            6. Flowers in globose heads ... XYLIA
            6. Flowers in spikes :
               7. Anthers gland crested :
                  8. Pinnae 1–5 pairs ... PROSOPIS
                  8. Pinnae 8–15 pairs ... DICHROSTACHYS
               7. Anthers not gland crested ... MIMOSA

ACACIA Willd.

1. Pods moniliform or more or less constricted between seeds ... *A. nilotica*
1. Pods not as above :
   2. Flowers in globose heads :
      3. Erect trees or shrubs :
         4. Flowers white; pods ligulate ... *A. tomentosa*
         4. Flowers yellow; pods not ligulate :
            5. Pods turgid ... *A. farnesiana*
            5. Pods thin, flat :
               6. Pods tomentose ... *A. leucophloea*
               6. Pods glabrous :
                  7. Corolla red–purple; thorns white ... *A. eburnea*
                  7. Corolla pink; thorns not white ... *A. campbelli*
      3. Climbing shrubs :



Acacia caesia (L.) Willd.

8.	Leaflets 40–50 pairs	...	*A. pennata*
8.	Leaflets 12–30 pairs :		
9.	Main rachis armed with hooked prickles, glabrous ;		
10.	Pods thick, fleshy, wrinkled when dry	...	*A. concinna*
10.	Pods thin, flat, coriaceous	...	*A. torta*
9.	Main rachis not armed with hooked prickles, pubescent	...	*A. caesia*
2.	Flowers spicate :		
11.	Pinnae 10–40 pairs :		
12.	Calyx, petals and rachis glabrous	...	*A. chundra*
12.	Calyx, petals and rachis pubescent	...	*A. catechu*
11.	Pinnae 1–6 pairs :		
13.	Spikes 2–8 cm long, not dense :		
14.	Spines of 2 kinds; leaflets linear; pods 2–4–seeded	...	*A. horrida*
14.	Spines of one kind; leaflets obovate; pods 6–8–seeded	...	*A. modesta*
13.	Spikes 8–10 cm long, dense	...	*A. ferruginea*

Acacia caesia (L.) Willd. Sp. Pl. 4:1090. 1806; Nielsen in Adansonia 2, 19: 348. 1980; Sanj. Legumes of India 37. 1991; Naik, Fl. Marathwada 1 : 341. 1998. *Mimosa caesia* L. Sp. Pl. 522. 1753 p.p. *Acacia intsia* (L.) Willd. var. *caesia* (L.) Wight & Arn. ex. Baker in Hook. f. Fl. Brit. India. 2:297. 1878. *A. columnaris* Craib in Kew Bull. Misc. Inf. 1915: 410. 1915; Parker in Indian Forester 55: 331. 1929.

Climbing shrubs; young branches, petioles and inflorescence densely pubescent. Pinnea 6–8 pairs, petiolar gland solitary, columnar; leaflets 8–17 pairs, c 1 x 0.3 cm, pilosa. Heads 30–40–flowered, bracteate. Pods c 10 cm long.

Fls. & Frts. : April–September.

Distrib. : Occasional on hill slopes. Bombay (Parker, op. cit.), Nanded (Naik op. cit.).

A. campbelli Arn. in Nov. Act. Phys.–Med. Acad. Caes. Leop.–Carol. Nat. Cur. 18: 333. 1836; Naik, Fl. Marathwada 1 : 341. 1998; Sanj. Legumes of India 38. 1991.

Trees. Leaves 2–4 cm long, pinnae 4–6 pairs; leaflets 6–12 pairs c 0.2 cm long. Flowers yellow in globose heads. Pods 6–15 cm long, oblong, flat.

Fls. & Frts. : January–March.

Distrib. : Frequent along river banks and on bunds of fields. Aurangabad, Beed, Jalna & Osmanabad (Naik op. cit.).

A. catechu (L. f.) Willd. Sp. Pl. 4: 1079. 1806; Baker in Hook. f. Fl. Brit. India 2: 295. 1878; Cooke, Fl. Pres. Bombay 1:476. 1958 (Repr.); Sanj. Legumes of India 38. 1991. *Mimosa catechu* L. f. Suppl. Pl. 439. 1781. *Acacia polyacantha* Willd. Sp. Pl. 4: 1079. 1806; Brenan in Kew Bull. 1956: 195. 1957 *A. suma* (Roxb.) Buch.–Ham. ex Voigt, Hort. Subur. Calc. 260. 1845; Baker in Hook. f. op. cit. 294; Cooke, op. cit. *'Babhal', 'Ghubata', 'Khair', 'Kumtia', 'Son-khairi'.*

Trees, 5–10 m tall. Leaves bipinnate, 24–25 cm long, pinnae 10–30 pairs; leaflets 30–50 pairs, *c* 0.5 x 0.1. cm linear. Flowers pale yellow or greenish–white in spikes, 6–8 cm, long. Pods 8.5–14.0 x 1.5–2.0 cm, flat, brown, stalked, beaked; reticulately veined. Seeds 3–10.

Fls. & Frts. : July–February.

Illus. : Bedd. Fl. Sylv. t. 49. 1870 (*A. catechu* Wight & Arn. Prodr. 272. 1834); Mahesh. Illus. Fl. Delhi f. 83. 1966.

Distrib. : Common in deciduous forests.

A. chundra (Roxb. ex Rottl.) Willd. Sp. Pl. 4: 1078. 1806; Sanj. Legumes of India 38. 1991. *Mimosa sundra* Roxb. ex Rottl. in Ges. Naturf. Fr. Berl. Neue Schr. f 4:207. 1803. *Acacia sundra* (Roxb. ex. Rottl.) DC. Prodr. 2:458. 1825; Baker in Hook. f. Fl. Brit. India 2:295. 1878 *'(Sandra)'. A. catechu* var. *sundra* (Roxb.) Prain in J. Asiat. Soc. Bengal 66 : 508. 1897; Cooke, Fl. Pres. Bombay 1:477. 1958 (Repr.). *'Khair', 'Lal–khair'.*

Trees, 3–8 m high; bark dark coloured. Pinnae 10–30 pairs. Flowers pale yellow, in axillary spikes. Pods 8–9 x 1.5–1.8 cm, flat, brownish, beaked at apex. Seeds 3–10.

Fls. & Frts. : More or less throughout the year.

Illus. : Bedd. Fl. Sylv. t. 50. 1870 (*Acacia sundra*); Talb For Fl. Bombay Pres. & Sind 1: 488, f. 277. 1909 (*A. catechu* var. *sundra*).

Distrib. : Common throughout in dry deciduous forests.

Notes : This species is often confused with *A. catechu* Willd. from which it differs in having pubescent rachis, calyx and corolla.

A. concinna (Willd.) DC. Prodr. 2. 464. 1825; Baker in Hook. f. Fl. Brit. India 2: 296. 1878; Cooke, Fl. Pres. Bombay 1: 479. 1958 (Repr.); Nielsen in Adansonia 19: 348. 1980; Sanj. Legumes of India 38. 1991. *Mimosa concinna* Willd. Sp. Pl. 4: 1039. 1806. *Acacia concinna* var. *rugata* (Lam.) Baker in Hook. f. op. cit. 297. *'Sikakai'*.

Climbing shrubs; prickly branches grooved, dark brown. Main rachis armed with hooked prickles. Pinnae 4–8 pairs; leaflets 0.6–1.0 x 0.1–0.2 cm, linear–oblong. Flowers red. Pods 6–10 x 2–3 cm, linear–oblong. Seeds 6–10.

Fls. & Frts. : More or less throughout the year.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 491, f. 278. 1909 (seedling).

Distrib. : Occasional on hill slopes. Akola, Chandrapur, Kolhapur, Nasik, Pune, Raigad, Ratnagiri, Satara.

A. eburnea (L. f.) Willd. Sp. Pl. 4: 1081; 1806; Baker in Hook. f. Fl. Brit. India 2: 293. 1878; Cooke, Fl. Pres. Bombay 1: 474. 1958 (Repr.); Witt, List 35. 1908; Sanj. Legumes of India 39. 1991. *Mimosa eburnea* L. f. Suppl. Pl. 437. 1781. *'Murmati'*.

Small trees; young branches purplish–brown. Leaves *c* 2.5 cm long, pinnae up to 7 pairs, *c* 1.5 cm long; leaflets 5–8 pairs, *c* 0.4 cm long, linear, subobtuse; stipular spines straight. Flowers bright yellow. Pods *c* 15 x 1 cm, slightly curved, longitudinally veined. Seeds 6–10.

Fls. & Frts. : November–February.

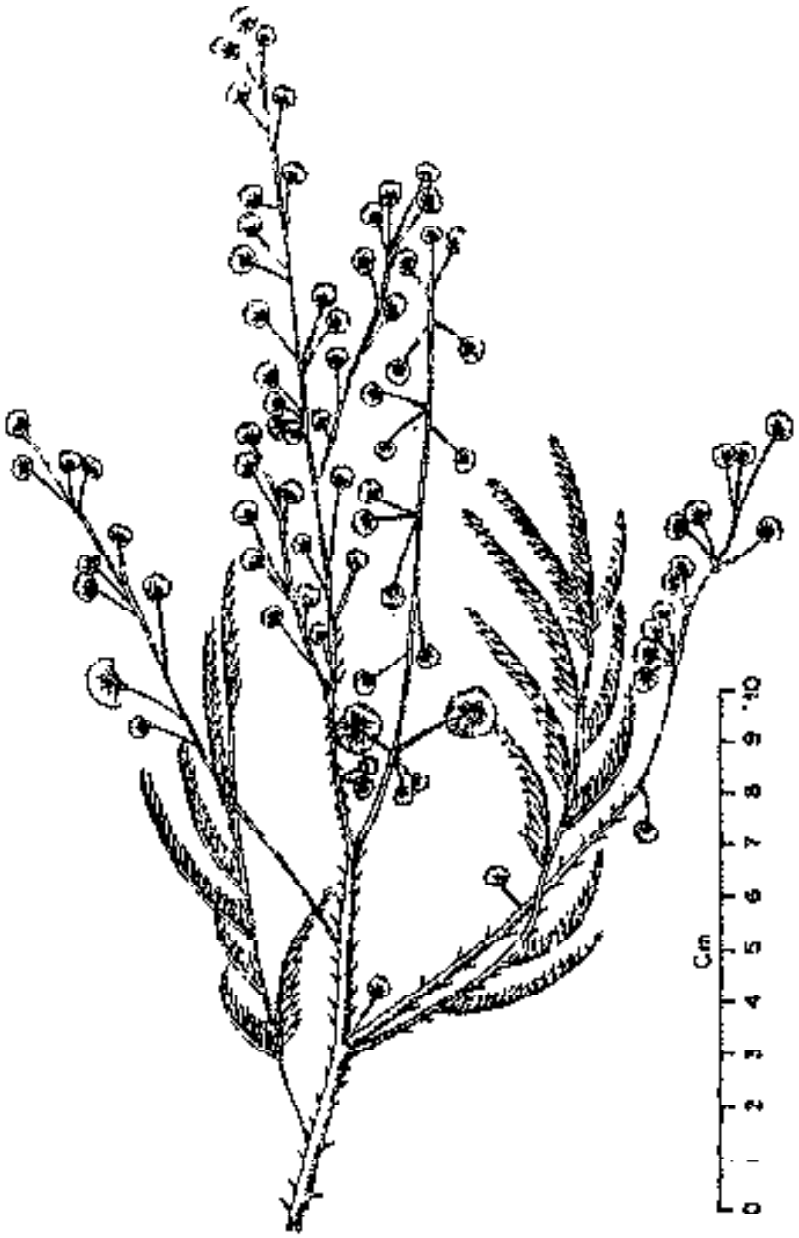
Illus. : Talb. For Fl. Bombay. Pres. & Sind 1: 483, f. 274. 1909.

Distrib. : Planted in hedges, also naturalised in some villages. Yavatmal (Witt, op. cit.).

A. farnesiana (L.) Willd. Sp. Pl. 4: 1083. 1806; Baker in Hook. f. Fl. Brit. India 2: 292. 1878; Cooke, Fl. Pres. Bombay 1: 473. 1958 (Repr.); Sanj. Legumes of India 39. 1991. *Mimosa farnesiana* L. Sp. Pl. 521. 1753. *'Dev–babhal'*, *'Kankri'*, *'Shengati'*.

Shrubs or small trees, 5–10 m tall. Leaflets 10–20 pairs, *c* 1.5 x 0.1 cm, linear–oblong; stipules spinescent. Heads yellow. Pods 5.0–8.5 x 1.2 cm, subcylindric, turgid. Seeds biseriate, globose.

Fls. & Frts. : August–May.



Acacia concinna (Willd.) DC.

Illus. : Wight, Ic. t. 300. 1840 (*Vachellia farnesina* (L.) Wight & Arn. Prodr. 272. 1834); Talb. For. Fl. Bombay Pres. & Sind 1: 479, f. 271. 1909.

Distrib. : Planted in hedges, also naturalised in some villages. Bombay, Nasik, Pune, Osmanabad, Ratnagiri, Thane, Yavatmal.

A. ferruginea DC. Prodr. 2:458. 1825; Baker in Hook. f. Fl. Brit. India 2:295. 1878; Cooke, Fl. Pres Bombay 1:477. 1958 (Repr.); Sanj. Legumes of India 39, 40. 1991. *'Ichan'*, *'Kanti'*, *'Pandhara–Khair'*.

Trees, 5–12 m tall; bark rough, rusty brown. Leaves bipinnate, pinnae distant; leaflets 10–25 pairs, 0.5–1.5 x 0.1–0.2 cm, linear oblong. Flowers creamy–white, sessile, densely arranged in spikes. Pods 7–15 x 1.5– 2.0 cm, brown, reticulately veined, beaked.

Fls. & Frts. : May–October.

Illus. : Bedd. Fl. Sylv. t. 52. 1870.

Distrib. : Common in villages. Aurangabad, Dhule, 'Konkan' (Cooke, op. cit.), Nanded, Nasik, Pune, Yavatmal.

A. horrida (L.) Willd. Sp. Pl. 4: 1082. 1806, Hillcoat & Brenan in Kew Bull. 19: 40. 1958; Sanj. Legumes of India 40. 1991. *Mimosa horrida* L. Sp. Pl. 521. 1753. *Acacia latronum* (L. f.) Willd. Sp. Pl. 4: 1077. 1806; Baker in Hook. f. Fl. Brit. India 2: 296. 1878; Cooke, Fl. Pres. Bombay 1: 478. 1958 (Repr.). *'Bhesa'*, *'Dev–babhal'*, *'Tamuti'*.

Shrubs or small trees, 5–6 m tall; branches brown; stipular spines unequal, smaller, c 2.5 cm long, larger 5–6 cm long, yellow, shining, pinnae 2–5 pairs; leaflets 6–13 pairs. Flowers in lax spikes, turning yellow from white. Pods 2.5–4.0 x 1.5–2.0 cm, falcate, dark–brown, reticulately veined.

Fls. & Frts. : June–February.

Illus. : Wight, Ic. t. 1157. 1846.

Distrib. : Rare in scrub jungles. Pune, Satara.

A. leucophloea (Roxb.) Willd. Sp. Pl. 4: 1083. 1806; Baker in Hook. f. Fl. Brit. India 2: 294. 1878; Cooke, Fl. Pres Bombay 1:475. 1958 (Repr.); Sanj. Legumes of India. 41. 1991. *Mimosa leucophloea* Roxb. Pl. Cor. 2: 27, t. 150. 1800. *'Hivar'*.

Trees, 3–6 m tall. Pinnae 5–10 pairs; leaflets 11–20 pairs, cup shaped gland between each pair of pinnae. Flowers whitish–yellow, in

terminal paniculate heads. Pods 5–14 x 0.5–0.7 cm, linear–oblong, flat, yellowish–brown, tomentose. Seeds 10–20.

Fls. & Frts. : August–February.

Illus. : Bedd. Fl. Sylv. t. 48. 1870; Mahesh. Illus. Fl. Delhi f. 80. 1966.

Distrib. . Common throughout in scrub forests.

A. modesta Wall. Pl. Asiat. Rar. 2:27, t. 130. 1831; Baker in Hook. f. Fl. Brit. India 2: 296. 1878; Sanj. Legumes of India 41. 1991.

Trees, small, woody bark black. Leaves bipinnate with pair of flattened, recurved prickles at base. Pinnae 2–3 pairs; leaflets 8–12; obovate. Flowers yellow or creamy–white in cylindric, drooping spikes. Pods stalked, oblong, flat. Seeds 3 5.

Fls. & Frts. : April – August.

Distrib. : Rare. Nagpur, Pune.

A. nilotica (L.) Willd. ex Del. Desir. Egypte Hist. Nat. 3: 79. 1813. *Mimosa nilotica* L. Sp. Pl. 521. 1753.

1. Bark much fissured ... ssp. *astringens*
1. Bark very less fissured :
   2. Young branches and pods pubescent ... ssp. *subulata*
   2. Plants not as above :
      3. Branches arranged like cupressus tree ..ssp. *cupressiformis*
      3. Branches not as above ... ssp. *indica*

ssp. **astringens** (Schum. & Thonn.) Roberty in Candollea 11:150. 1948; Ali in Nasir & Ali, Fl. W. Pak. 36: 12. 1973; Sanj. Legumes of India 41. 1991. *Mimosa astringens* Schum. & Thonn. Beskr. Guin. Pl. 327. 1827. *Acacia nilotica* ssp. *indica* var. *vediana* (T. Cooke) Vajrav. & Kamble in J. Bombay Nat. Hist. Soc. 79: 708. (1982) 1983; Naik, Fl. Marathwada, 1 : 346. 1998. *A. arabica* (Lam.) Willd. var. *vediana* T. Cooke, Fl. Pres. Bombay 1 : 444. 1903 [1 : 473. 1958 (Repr.)]. *'Vedi–babhal'*.

Trees, small; bark more deeply cracked and exfoliating crown formed of twisted, angular, interlocking branches, spines usually white, stout *c* 6.2 cm long. Pods flat, shortly stalked, 10–12 x c 2 cm, little constricted between the seeds.

Fls. & Frts. : August–December.

Distrib. : Dhule, Jalgaon, Marathwada (Naik op. cit.), Pune, Solapur.

ssp. **cupressiformis** (J. L. Stewart) Ali & Faruqui in Pak. J. Bot. 1: 4. 1969; Ali & Nasir in Bot. J. Linn. Soc. 80: 69. 1980; Sanj. Legumes of India 42. 1991. *A. arabica* var *cupressiformis* J. L. Stewart Punj. Pl. 51. 1869; Cooke, Fl. Pres. Bombay 1: 473. 1958 (Repr.). *A. nilotica* ssp. *indica* var. *cupressiformis* (J. L. Stewart) Vajrav. & Kamble in J. Bombay Nat. Hist. Soc. 79 : 708. (1982) 1983. *'Ramkanta'*.

Trees, small; branches closing up like a Cuppressus tree.

Fls. & Frts. : August–February.

Distrib. : Bombay (Ali & Nasir, op. cit.), 'Deccan' (Cooke, op. cit.).

ssp. **indica** (Bth) Brenan in Kew Bull. 12:84. 1957; Ali & Qasir in Bot. J. Linn. Soc. 80:70. 1980; Sanj. Legumes of India 42, 1991. *A. arabica* (Lam.) Willd. var. *indica* Bth. in Hook. London J. Bot. 1:500. 1842. *A. arabica* auct. non (Lam.) Willd. 1806; Baker in Hook. f. Fl. Brit. India 2: 298. 1878; Cooke, Fl. Pres. Bombay 1: 472. 1958 (Repr.). *'Babul'*.

Trees, 4.5–6.0 m high; bark longitudinally cracked. Pinnae 4–7 pairs; leaflets 10–25 pairs, c 0.4 x 0.1 cm, linear–oblong. Flowers yellow, in globose heads. Pods 3.2–13.0 x 0.5–1.5 cm, green, flat, beaked, shortly stalked. Seeds 2–12 per pod.

Fls. & Frts. : More or less throughout the year.

Illus. : Bedd. Fl. Sylv. t. 47. 1870; Talb. For. Fl. Bombay Pres. & Sind 1:480, f. 272. 1909 (*A. arabica*).

Distrib. : Common throughout in scrub & plains, planted also.

ssp. **subulata** (Vatke) Brenan in Kew Bull. 1957: 85. 1957; Ali & Qasir in Bot. J. Linn. Soc. 80 (1): 70. 1980. *A. subulata* Vatke in Oosterr. Bot. Zeitschr 30: 276. 1880.

Trees, small; young branches pubescent. Pods pubescent, margins straight or slightly crenate.

Fls. & Frts. :July–December.

Distrib. : Bombay & Deccan (Ali & Qasir, op. cit.).

A. pennata (L.) Willd, Sp. Pl. 4: 1090. 1806; Baker in Hook. f. Fl. Brit. India 2: 297.1878 p. p.; Cooke, Fl. Pres. Bombay 1: 480. 1958

(Repr.); Nielsen in Adansonia 19:352. 1980; Sanj. Legumes of India 42. 1991. *Mimosa pennata* L. Sp. Pl. 522. 1753. *'Chilar', 'Ghattad–khair', 'Shemabadi', 'Shembi'.*

Scandent shrubs, armed with hooked spines on stem. Pinnae 5–11 pairs; loaflets c 1.0 x 0.1 cm, linear, obtuse. Flowers white or pale yellow. Pods 5–18 x 0.5–3.0 cm, stalked, strap–shaped, brown. Seeds 6–10.

Fls. & Frts. : August–March.

Distrib. : Common.

A. tomentosa Willd. Sp. Pl. 4: 1087. 1806; Baker in Hook. f. Fl. Brit. India 2: 294. 1878; Cooke, Fl. Pres. Bombay 1: 475. 1958 (Repr.); Kosterm. in Dassan. & Fosberg, Rev. Handb. Fl. Ceylon 1: 492. 1980; Sanj. Legumes of India 44. 1991. *'Anjar'.*

Trees, 3–5 m tall; bark grey–black. Leaves crowded on axillary branches, pinnae 5–10 pairs; leaflets 8–16 pairs, 0.3–0.4 x 0.15–0.2 cm. Flowers deep red (Yavatmal specimens) in axillary, pedunculate heads. Pods 10–15 x 1.0–1.5 cm, ligulate, thin, flat, slightly falcate, dehiscent along both sutures, shortly stalked. Seeds 6–10, oval, flat, brownish–green, aerolate.

Fls. & Frts. : December–March.

Illus. : Bedd. Fl. Sylv. t. 95. 1811.

Distrib. : Rare. Pune, Raigad, Solapur (Cooke, op. cit.), Yavatmal.

A. torta (Roxb.) Craib in Kew Bull. Misc. Inf. 1915:410. 1915; Nielsen in Adansonia 19: 360. 1980; Sanj. Legumes of India 44. 1991. *Mimosa torta* Roxb. Fl. Ind. 2: 566. 1832. *Acacia intsia* auct. non Willd. 1806; Baker in Hook. f. Fl. Brit. India 2: 297. 1878; Cooke, Fl. Pres. Bombay 1: 479. 1958 (Repr.). *A. caesia* Wight & Arn. Prodr. 278. 1834 non Willd. 1806; Cooke, op. cit. 480. *'Chilar'.*

Climbing shrubs; branches grooved, yellow or dark brown. Pinnae 5–10 pairs; leaflets 10–25 pairs, c 0.5 x 0.1 cm. linear–oblong. Flowers yellowish–white. Pods 5.0–15.0 x 0.5–3.5 cm, linear, dark brown to pale brown, flat, apiculate. Seeds 9–11.

Fls. & Frts. : February–October.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1:493, f. 279. 1909 (*Acacia intsia*).

Distrib. : Common on bushes in hill forests.

ALBIZIA Durazz.

1. Stamens 4 times as long as corolla ... *A. chinensis*

1. Stamens less or 2 times (3 times in *A. julibrissin*) as long as corolla :

   2. Pinnae 6–20 pairs; leaflets less than 0.6 cm broad :

      3. Calyx c 10 cm long; pods 15–22.5 x 1.8–2.5 cm ... *A. amara*

      3. Calyx 0.31–0.41 cm long; pods 12.5–15.0 x 1.8–0.5 cm ... *A. julibrissin*

   2. Pinnae 2–4 pairs; leaflets more than 0.6 cm broad:

      4. Heads in umbells; flowers pedicelled ... *A. lebbeok*

      4. Heads in panicles; flowers sessile:

         5. Filaments connate at base into tube, as long as corolla tube; seeds pale brown ... *A. procera*

         5. Filaments connate at base into tube, half as long as corolla tube; seeds yellow ... *A. odoratissima*

Albizia amara (Roxb.) Boiv. Encycl. 19, siecle 2: 34. 1834; Baker in Hook. f. Fl. Brit. India 2: 301. 1878; Cooke, Fl. Pres. Bombay 1: 483. 1958 (Repr.); Sanj. Legumes of India 54. 1991. *Mimosa amara* Roxb. Pl. Cor. 1:40, t. 122. 1799. *'Kansar', 'Lalai', 'Tugli'.*

Trees, 3–4 m tall. Leaves 2–pinnate; leaflets sessile, 10–30 pairs c 0.5 x 0.1 cm. Flowers yellow. Pods 5–15 x 0.5–1.5 cm, pale brown, thin, flat, subacute at both ends. Seeds 6–8.

Fls. & Frts. : April–August.

Illus. : Bedd. Fl. Sylv. t. 61. 1870.

Distrib. : Frequent in hill forest. Aurangabad, Beed, Kolhapur, Nanded, Nasik, Pune, Raigad, Satara, Solapur.

A. chinensis (Osb.) Merr. in Amer. J. Bot. 3: 575. 1916; Sanj. Legumes of India 54. 1991. *Mimosa chinensis* Osb. Dag. Ostind. Resa 233. 1757. *Albizia stipulata* (Roxb.) Boiv. Encycl. 19, siecle 2:33. 1834; Baker in Hook. f. Fl. Brit India 2: 300. 1878; Cooke, Fl. Pres. Bombay 1: 483. 1958 (Repr.). *'Phalara', 'Udal'.*

Trees, 10–15 m tall; young branches, rachis and inflorescence yellow, pubescent. Leaves with 7–15 pairs of pinnae; leaflets 5–40 pairs, 0.4–0.8 x 1 cm, oblong–lanceolate. Flowers pinkish–white, in heads, 1.5–2.0 cm across; calyx and corolla densely hairy outside. Pods c 20 x 2.5 cm, oblong, pale brown, flat.

Fls & Frts. : April–December.

Illus. : Bedd. Fl. Sylv. t. 55. 1870 (*Albizia stipulata*).

Distrib. : Common. Kolhapur, Pune, Raigad, Ratnagiri, Satara, Thane.

A. julibrissin Durazz. in Mag. Josc. III 4 : 11. 1772; Bth in Hook. J. Bot. 91. 1844; Baker in Hook. f. Fl. Brit. India 2: 300. 1878; Naik, Fl. Marathwada 1 : 348. 1998.

Trees, 5–10 m tall, unarmed. Leaves 4–8 cm long; main rachis finely downy; stipules caducous; pinnae 2.5 cm long; leaflets sessile, membranous. Flowers in globose heads on clustered erecto–patent peduncles; calyx funnel shaped, shortly toothed; corolla cream–coloured, 8–12 mm long. Pods oblong, 7–14 x 2.0–3.5 cm, rounded or shortly beaked at apex, red–brown. Seeds 8–12, ovoid, smooth.

Fls. & Frts. : March–June.

Distrib. : Frequent in Beed only (Naik, op. cit.).

A. lebbeck (L.) Bth. in Hook. London J. Bot. 3: 87. 1844 p.p. (*'lebbek'*) & in Trans. Linn. Soc. 30: 562. 1875 p.p.; Baker in Hook. f. Fl. Brit. India 2: 298. 1878; Cooke, Fl. Pres. Bombay 1: 481. 1958 (Repr.); Sanj. Legumes of India 56. 1991. *Mimosa lebbeck* L. Sp. Pl. 516. 1753. *'Bate', 'Chinehola', 'Kalasiris', 'Siras'.*

1. Branches and leaflets beneath densely pubescent ... var. *pubescens*
1. Branches and leaflets beneath glabrescent :
   2. Bark of the branches smooth; pods obtuse or blunt at apex ... var. *lebbeck*
   2. Bark of the branches rough; pods with a long, sharp beak ... var. *rostrata*

var lebbeck.

Trees, 7–12 m high. Leaves abruptly pinnate; leaflets 4–9 pairs, 2.0–5.5 x 1.0–2.5 cm, lateral, elliptic–oblong, terminal ovate–oblong. Flowers white, fragrant. Pods 8–30 x 4–6 cm, pale yellow. Seeds 4–12.

Fls. & Frts. : March–December.

Illus. : Bedd. Fl. Sylv. t. 53. 1850; Talb. For Fl. Bombay Pres. & Sind 1 : 495, ff. 280 & 281. 1909; Matthew, Illus. Fl. Tamilnadu Carnatic 2 : t. 241. 1982.

Distrib. : Common throughout in dry deciduous forests, also planted along roadsides.

var. **pubescens** Haines, Bot. Bih. & Or. pt. 3, 332. 1922 [1: 347. 1961 (Repr.)].

Leaflets often upto 13 pairs, tomentose or permanently densely pubescent beneath, so are also the branchlets & peduncles.

Fls. & Frts. : March–August.

Distrib. : Planted along roadsides, less common. Aurangabad, Beed, Jalna, Latur, Nanded, Osmanabad, Parbhani.

var. **rostrata** Haines, Bot. Bih. & Or. pt. 3, 332. 1922 [1: 347. 1961 (Repr.)]. *'Shirish'*.

Pods 20–30 x 3.0–5.5 cm, with a very long, sharp beak (pods sometimes have wavy margins).

Fls. & Frts. : March–August.

Distrib. : Common, along roadsides, river–banks, etc. Aurangabad, Beed, Jalna, Latur, Nanded, Osmanabad, Parbhani.

A. odoratissima (L. f.) Bth. in Hook. London J. Bot. 3: 88. 1844; Baker in Hook. f. Fl. Brit. India 2: 299. 1878; Cooke, Fl. Pres. Bombay 1: 482. 1958 (Repr.); Sanj. Legumes of India 57. 1991. *Mimosa odoratissima* L. f. Suppl. Pl. 437. 1781. *Albizia odoratissima* var. *mollis* Bth. ex Baker in Hook. f. op. cit. *'Chichva', 'Kala–siras'*.

Trees, 4.5–9.0 m tall. Leaves abruptly 2–pinnate; leaflets 7–15 pairs, 0.5–3.0 x 0.5–1.0 cm, obliquely oblong, apex rounded, base obliquely rounded. Corolla white, peduncles upto 2.5 cm long. Pods 6–20 x 1.5– 2.0 cm, flat, stalked. Seeds 3–8.

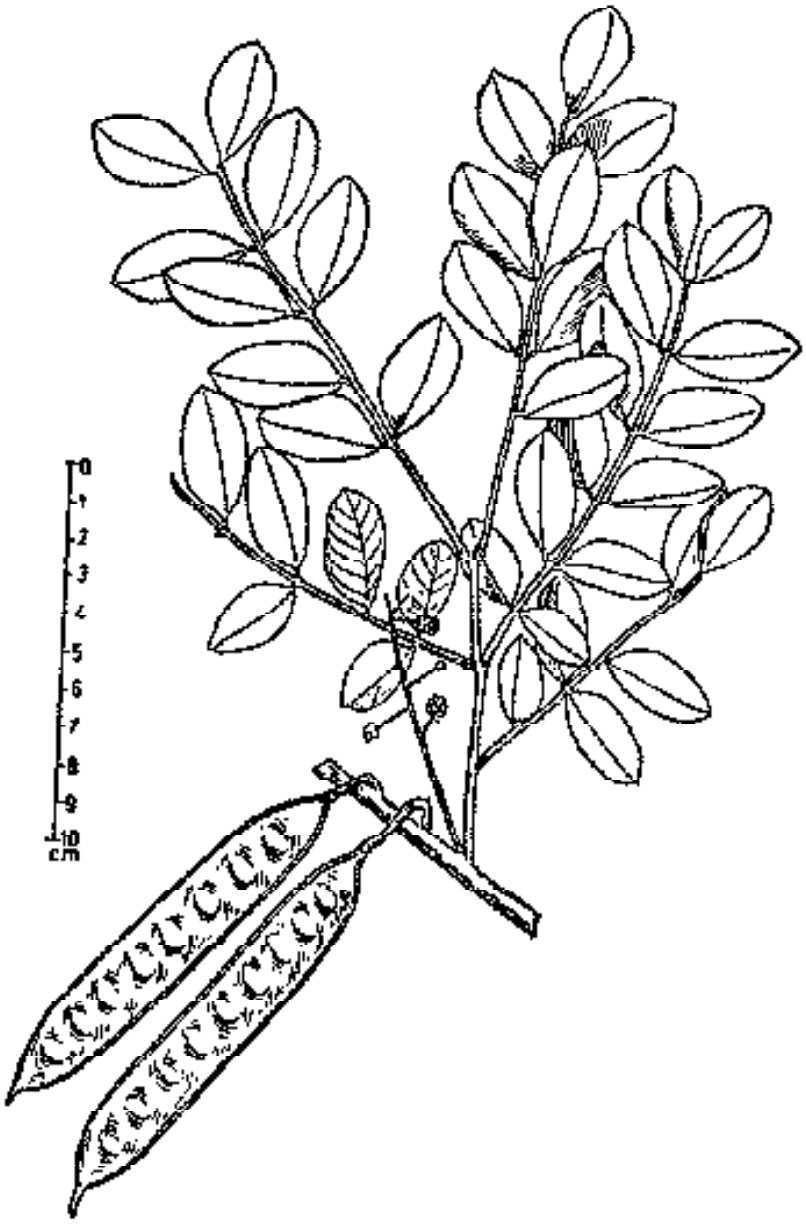
Fls. & Frts. : May–December.

Illus. : Bedd. Fl. Sylv. t. 54. 1870; Talb. For Fl. Bombay Pres. & Sind 1:498, f. 283. 1909.

Distrib. : Common.

A. procera (Roxb.) Bth. in Hook. London J. Bot. 3: 89. 1844; Baker in Hook. f. Fl. Brit. India 2: 299. 1878; Cooke, Fl. Pres. Bombay 1: 482. 1958 (Repr.); Nielsen in Adansonia 19: 223. 1979; Sanj. Legumes of India 58. 1991. *Mimosa procera* Roxb. Pl. Cor. 2: 12, t. 121. 1799. *Albizia procera* var. *elata* (Roxb.) Baker in Hook. f. op. cit. *'Bclati', 'Kilal', 'Kinkal', 'Safed siras'*.

Trees, 4.5–18.0 m tall. Leaves 2–pinnate; leaflets 6–12 pairs, 2.5–4.5 x 1.5–2.0 cm, ovate–oblong or elliptic–oblong. Flowers yellowish. Pods 11–15 x c 12 cm, flat, green or brown, tinged with red. Seeds 3–8.



Albizia procera (Roxb.) Bth.

Fls. & Frts. : May–December.

Illus. : Ic. Roxb. Fasc. 6, t. 15. 1973 (Repr. ed.).

Distrib. : Common. Akola, Chandrapur, Nasik, Pune, Raigad, Yavatmal.

ARCHIDENDRON F. V. Muell.

Archidendron monadelphum (Roxb.) Nielsen in Adansonia 19:21. 1979; Sanj. Legumes of India 61. 1991. *Mimosa monadelpha* Roxb. Fl. Ind. 2: 544. 1832. *Pithecellobium bigeminum* auct. non (L.) Mart ex Bth. 1844; Baker in Hook. f. Fl. Brit. India. 2: 303. 1878; Cooke, Fl. Pres Bombay 1: 485. 1958 (Repr.). *'Kachlor'*.

Trees, unarmed. Leaves 2–pinnate; leaflets 1–2 pairs, 7.5–15.0 x c 3.7 cm, elliptic–lanceolate or obovate–oblong, acuminate or acute. Flowers pale yellow or cream coloured, in few flowered heads in small, peduncled clusters, on long branches of pubescent panicles, nearly glabrous, reddish–brown outside, bright red inside. Pods spirally curved, red within. Seeds 5–8.

Fls. & Frts. : January–March.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 502 & 503, ff. 284 & 285. 1909. *(Pithecellobium bigeminatum).*

Distrib. : 'Konkan' (Cooke, op. cit.).

DICHROSTACHYS (DC.) Wight & Arn. (nom. coms.)

Dichrostachys cinerea var. **indica** Brenen & Brummit in Bot. Soc. Borter 39: 111. 1935; Sanj. Legumes of India 65. 1991. *D. cinerea* (L.) Wight & Arn. Prodr. 271. 1834; Baker in Hook. f. Fl. Brit. India 2; 288. 1878; Cooke, Fl. Pres. Bombay 1: 468. 1958 (Repr.). *'Sigam–kati'*, *'Velatur'*.

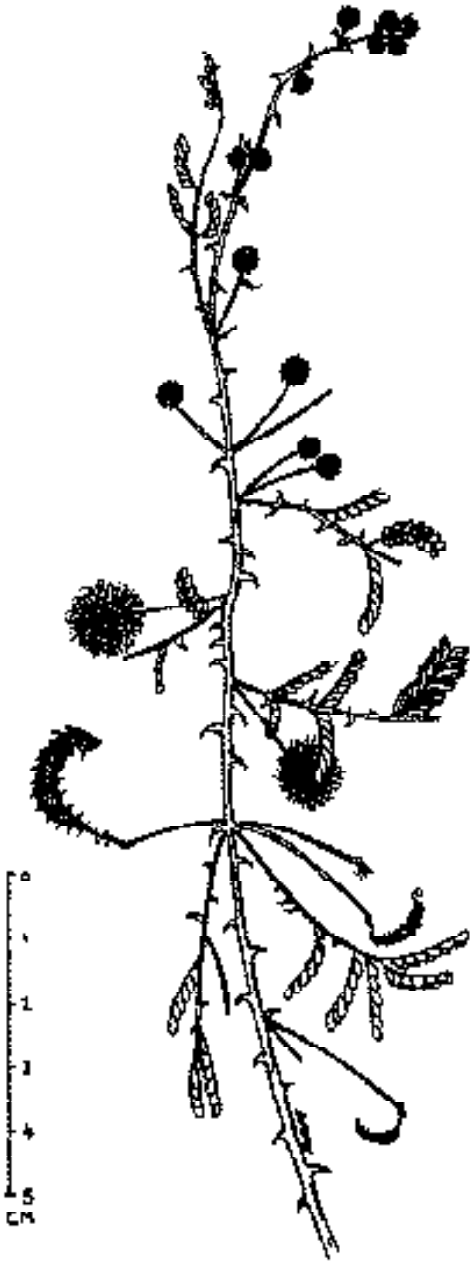
Shrubs, 2.0–2.5 m tall. Leaves bipinnate; leaflets 12–20, c 0.5 x 2.0 cm, narrowly linear–oblong, appressed hairy beneath. Spikes 2.5–3.7 cm long. Upper flowers yellow, lower red or pink. Pods 3.5–8.0 x 0.3–0.5 cm, flat, twisted. Seeds 5–14.

Fls. & Frts. : August–December.

Distrib. : Common throughout in scrub forest, around fields, roadsides etc.

ENTADA Adans. (nom. cons.)

Entada rheedei Spreng. Syst. Veg. 2: 325. 1825; Panigr. in Taxon 34: 714. 1985; Sanj. Legumes of India 66. 1991. *E. pusaetha* DC. Prodr. 2 : 425. 1825; Nayar in Bull. Bot. Surv. India 21: 229, t. l. 1979. *E. scandens* auct. non Bth. 1841; Baker in Hook. f. Fl. Brit. India 2: 287. 1878 p.p.; Cooke, Fl. Pres. Bombay 1: 465. 1958 (Repr.). *'Garambi'*, *'Garbi'*, *'Gardul'*.



Mimosa prainiana Gamble

Lianas, c 30 m long. Leaves 2–pinnate; pinnae 2 pairs; leaflets 4 pairs, 2.5–5.0 x 1.5–2.5 cm, ovate–obovate, apex obtuse, base subacute. Flowers cream coloured, polygamous, in pendulous, c 20 cm long spikes. Pods 50–70 x c 8 cm, woody, segmented. Seeds 6–15, orbicular or orbicular–oblong, 4–6 cm across, compressed, hard.

Fls. & Frts. : March–May.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 243. 1982.

Distrib. : Few. Bombay, Kolhapur, Pune, Raigad, Ratnagiri, Satara, Thane.

MIMOSA L.

1.	Leaves sensitive, digitately arranged	...	*M. pudica*
1.	Leaves not sensitive, bipinnate :		
2.	Pods pubescent	...	*M. hamata*
2.	Pods glabrous :		
3.	Leaves 5–7 cm long; sutures of pods with strong, recurved prickles	...	*M. prainiana*
3.	Leaves 12–18 cm long, suture of pods with few or no prickles	...	*M. rubicaulis*

Mimosa hamata Willd. Sp. Pl. 4: 1033. 1806; Baker in Hook. f. Fl. Brit. India 2: 291. 1878; Cooke, Fl. Pres. Bombay 1: 471. 1958 (Repr.); Sanj. Legumes of India 68. 1991. *'Arati', 'Arkar'*.

Shrubs, armed; prickles curved or straight. Leaflets 4–10 pairs. Flowers pink, in globose heads, 0.5–1.0 cm across. Pods 5–7 x 1.0–1.5 cm, reddish–brown, prickly on sutures. Seeds 4–8.

Fls. & Frts. : July–December.

Illus. : Talb. For. Fl. Bombay Pres. & Sind 1: 477, f. 270. 1909; Mahesh. Illus. Fl. Delhi f. 79. 1966.

Distrib. : Common throughout in dry places.

M. prainiana Gamble, Fl. Madras 421. 1919 [1: 299. 1957 (Repr.)] & in Kew Bull. Misc. Inf. 1920: 5. 1920; Calder & Narayansw. in Rec. Bot. Surv. India 11: 92. 1926; Sanj. Legumes of India 68. 1991.

Shrubs, straggling, thorny. Leaves 2–pinnate; pinnae 5–7 pairs. Flowers pink. Pods flat. Seeds 6–8, ovoid–orbicular.

Fls. & Frts. : August–October.

Distrib. : Rare. Chandrapur, Nagpur.

M. pudica L. Sp. Pl. 518. 1753; Baker in Hook. f. Fl. Brit. India 2: 291. 1878; Cooke, Fl. Pres. Bombay 1: 470. 1958 (Repr.); Sanj. Legumes of India 69. 1991. *'Lajalu', 'Lajari'.*

Herbs, woody, diffuse, prickly. Leaflets sessile 12–20 pairs coriaceous, sensitive, acute. Flowers pink, in globose heads, c 0.6 cm across. Pods 1.2–2.0 x 0.3 cm, flat, sutures clothed with yellowish bristles. Seeds 3–5.

Fls. & Frts. : September–January.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 246. 1982.

Distrib. : Common.

M. rubicaulis Lam. Encycl. 1:20. 1783; Baker in Hook. f. Fl. Brit. India 2: 291. 1878; Cooke, Fl. Pres. Bombay 1: 470. 1958 (Repr.); Sanj. Legumes of India 69. 1991. *'Arai'.*

Shrubs, straggling; branches grooved, furnished with numerous straw coloured, hooked prickles. Leaves 2–pinnate, 12.5–17.5 cm long; pinnae 5–11 pairs; leaflets 8–15 pairs. Flowers in globose heads. Pods 7.5–10.0 x 1.0–1.5 cm, flat, falcate.

Fls. & Frts. : June–October.

Distrib. : Rare. Aurangabad, Chandrapur, Wardha, Yavatmal. (Witt, 1909).

NEPTUNIA Lour.

1. Aquatic herbs; heads oblong ... *N. oleracea*

1. Terrestrial herbs; heads globose ... *N. triquetra*

Neptunia oleracea Lour Fl. Cochinch. 654. 1790; Baker in Hook. f. Fl Brit. India 2: 285. 1878; Cooke, Fl. Pres. Bombay 1: 463. 1958 (Repr.); Sanj. Legumes of India 69. 1991.

Herbs, annual; floating; stems stout, swollen with abundant fibrous roots from leaf and flower bearing nodes. Leaves 2–pinnate. Flowers yellow; peduncles 7–15 cm long, stout, erect with ovate bracts about the middle. Pods flat, 2.0–2.5 x 1.0–1.5 cm, broadly oblong, falcate, beaked, dehiscent. Seeds 6–10, smooth.

Fls. & Frts. : October–January.

Illus. : Windler in Austr. J. Bot. 14: 401, f. 10. 1966.

Distrib. : Common in moist places, ponds etc. Akola, Bombay, Konkan (Cooke, op. cit.).

N. triquetra (Vahl.) Bth. in Hook. London J. Bot. 4: 355. 1842; Baker in Hook. f. Fl. Brit. India 2: 286. 1878; Cooke, Fl. Pres. Bombay 1: 464. 1958 (Repr.); Mabb. in Taxon 34: 155. 1985; Sanj. Legumes of India 69. 1991. *Mimosa triquetra* Vahl, Symb. Bot. 3 : 102. 1794.

Herbs, perennial, rootstock woody; stems slender. Leaves 2–pinnate. Flowers yellow; peduncles slender. Pods c 3 cm long, oblong, flat, beaked at apex. Seeds 4–6 oblong, rounded at apex, compressed.

Fls. & Frts. : August–November.

Illus. : Wight, Ic. t. 75 b. 1844 *(Desmanthus triquetrus)*; Windler in Austr. J. Bot. 14: 396, f. 8. 1966.

Distrib. : Common.

PROSOPIS L.

1. Pods straight, slender, cylindric, torulose ... *P. cineraria*
1. Pods not as above ... *P. juliflora*

Prosopis cineraria (L.) Druce, Rep. Bot. Soc. Exch. Cl. Brit. Is. 1913, 3: 422. 1914; Burkart in J. Arnold Arbor 57: 450. 1976; Sanj. Legumes of India 71. 1991. *Mimosa cineraria* L. Sp. Pl. ed. 2, 2: 1500. 1763 *('cinerea')*. *Prosopis spicigera* L. Mant. 68. 1767; Baker in Hook. f. Fl. Brit. India 2: 288. 1878; Cooke, Fl. Pres Bombay 1: 467. 1958 (Repr.). *'Shemi'*.

Trees, 10–15 m tall, armed. Leaves bipinnate; pinnae 2 pairs; leaflets 7–12 pairs, 1.0–1.3 x 0.3–0.5 cm, oblong. Flowers yellow. Pods 6–14 cm long, Seeds 10–15, ovoid.

Fls. & Frts. : November–April.

Illus. : Bedd. Fl. Sylv. t. 56. 1870; Talb. For. Fl. Bombay Pres. & Sind. 1: 472, f. 267. 1909 (*Prosopis spicigera*).

Distrib. : Not very common. Kolhapur, Nasik, Pune, Satara, Thane, Yavatmal (Witt, 1908).

P. juliflora (Swartz) DC. Prodr. 2: 447. 1825; Burkart in J. Arnold Arbor. 57: 499. 1976; Sanj. Legumes of India 72. 1991. *Mimosa juliflora* Swartz, Prodr. 85. 1788.

Scandent shrubs or small trees. Leaves bipinnate; pinnae 1–3 pairs; leaflets c 20 pairs. Flowers light green or pale yellow, in dense, axillary, pendulous spikes. Pods 12–25 x 1.0–1.5 cm, oblong, flat.

Fls. & Frts. : February–May.

Illus. : Mahesh. Illus. Fl. Delhi f. 78. 1966.

Distrib. : Common along banks of rivers and on hill slopes. Akola, Chandrapur, Dhule, Osmanabad.

XYLIA Bth.

Xylia xylocarpa (Roxb.) Taub. Bot. Centralbl. 67:395. 1891; Sanj. Legumes of India 73. 1991. *Mimosa xylocarpa* Roxb. Pl. Cor. t. 100. 1798. *Xylia dolabriformis* Bth. in Hook. London J. Bot. 4:417. 1845; Baker in Hook. f. Fl. Brit. India 2:286. 1878; Cooke, Fl. Pres. Bombay 1:465. 1958 (Repr.). *'Jabla'*, *'Jamba'*, *'Yorul'*.

Trees, 10–15 m tall; young parts tomentose. Leaves pinnately compound, pinnae 2; leaflets 3–5 pairs, 6–15 x 2.5–4.0 cm, oblong–elliptic or lanceolate, subcoriaceous, apex acute. Flowers creamy white 1.8–2.0 cm across; calyx and corolla pubescent. Pods 10–15 x 4–6 cm, oblong, falcate, flat, woody, rusty tomentose, dehiscent. Seeds 6–10, oblong, brown, smooth.

Fls. & Frts. : March–December.

Illus. : Bedd. Fl. Sylv. t. 186. 1872; Talb. For. Fl. Bombay Pres. & Sind 1: 468, f. 265. 1909.

Distrib. : Chandrapur, Raigad, Ratnagiri, Satara.

CULTIVATED & INTRODUCED SPECIES :

Acacia auriculiformis A. Cunn. ex. Bth. in Hook. London J. Bot. 1 : 377. 1842; Sen & Naskar in Bull. Bot. Surv. india 7: 31. 1958; Sanj. Legumes of India 45. 1991.

Trees, with whitish bark.Phyllodes narrowed at both ends. Flowers in axillary spikeate inflorescence, yellow. Pods woody, much twisted.

Fls. & Frts. : August–June.

Distrib. : Planted on roadsides, etc. Pune, Raigad Satara, Thane.

A. balfouri Woodr. in J. Bombay nat. Hist. Soc. 11 : 429. 1898; Sanj. Legumes of India 58. 1991.

Trees with yellow flowers. Cultivated in Pune.

A. burkei Bth. in Hook. London J. Bot. 5 : 98. 846 & Trans. Linn. Soc. 30 : 518. 1875; Sanj. Legumes of India 45. 1991.

Cultivated in gardens. A native of Africa.

A. cornigera (L.) Willd. Sp. Pl. 4 : 1080. 1806. *Mimosa cornigera* L. Sp. Pl. 52. 1753; Sanj. Legumes of India 46. 1991.

Cultivated in gardens. A native of Mexico.

A. longifolia Willd. Sp. Pl. 4: 152. 1806; Bailey, Man. Cult. Pl. 59. 1949; Sanj. Legumes India 49. 1991.

Shrubs or small trees, upto 8 m tall. Phyllodes 5–15 x 0.75–1.5 cm, oblong–lanceolate, apex acute or obtuse, narrowed at base, dense, green. Inflorescence of 2–3 axillary spikes per phyllode, upto 5 cm long, with whorls of yellow heads, 1 cm across. Flowers 20–40 per head. Pods 3–8 cm long, terete c 0.75 cm broad, coriaceous. Seeds many, longitudinal, black.

Fls. & Frts. : October–April.

Illus. : Fyson, Fl. S. India Hill stat. 186, t. 145. 1932.

Distrib. : Cultivated in Bombay.

A. melanoxylon R. Br. in Ait. f. Hort. Kew ed. 2, 5 : 462. 1813; Baker in Hook. f. Fl. Brit. India 2 : 292. 1878; Gamble, Fl. Pres. Madras 1 : 429. 1957 (Repr.); Bailey, Man. Cult. Pl. 591. 1949; Sanj. Legumes of India 49. 1991.

Trees, 10–12 m or more tall, evergreen of pyramidal form and dense foliage; branches angular; bark furrowed. Phyllodes 6–12 x 0.5–1.5 cm, oblanceolate to lanceolate. Inflorescence of axillary racemes, 4–10 cm long with 40–50 cream coloured flowers in 3–5 heads. Pods 8–12 x 0.5–1.0 cm, reddish–brown, twisted. Seeds c 12, oblong, black.

Fls. & Frts. : December–June.

Illus. : Fyson, Fl. S. India Hill stat. 186, f. 143. 1932.

Distrib. : Cultivated. Thane.

A. planifrons Wight & Arn. Prodr. 276. 1834; Baker in Hook. f. Fl. Brit. India 2 : 293. 1878 p.p.; Cooke in Fl. Pres. Bombay 1: 474. 1958 (Repr.); Sanj. Legumes of India 43. 1991.

Trees, small, armed. Branches spreading like umbrella. Leaves 2–pinnate, stipulate; pinnae 3–6 pairs; leaflets 5–10 pairs, 1–2 mm long, linear. Flowers in globular heads, c 0.75 cm across, heads in axillary fascicles. Pods c 5 x 0.75 cm, subcylindric, turgid, acute, circinate.

Fls. & Frts. : November–March.

Distrib. : Cultivated in Pune.

A. thomsonii Brandis

A large deciduous tree with pale–yellow flowers and pink anthers.

Cultivated in gardens.

Adenanthera pavonina L. Sp. Pl. 384. 1753; Baker in Hook. f. Fl. Brit. India 2 : 287. 1878; Cooke, Fl. Pres. Bombay 1: 466. 1958 (Repr.); Sanj. Legumes of India 54. 1991. *'Thorla–gunj', 'Ratan–gunj'.*

Trees, 7–17 m tall, unarmed. Leaves 2–pinnate, pinnae 3–6 pairs, opposite; leaflets 4–8 pairs, 2–4 x 1–2 cm, elliptic–oblong, obtuse at apex and cuneate at base, oblique. Flowers in axillary or panicled, 5–15 cm long racemes; corolla pale yellow. Pods 15–25 x 0.25–2.0 cm, flat, falcately curved, pointed. Seeds 8–15.

Fls. & Frts. : March–May.

Distrib. : Often planted, rarely wild in moist deciduous forests. Bombay, Dhule, Jalgaon, Nagpur, Pune, Raigad.

Albizia lucidior (Steud.) Nielsen, in Adansonia 2, 19 : 222. 1979; Sanj. Legumes of India 56. 1991. *Inga lucidior* Steud. Nom. Bot. Ed. 2 : 810. 1840. *Albizia lucida* (Roxb.) Bth. in Hook. London J. Bot. 3 : 86. 1844; Baker in Hook. f. Fl. Brit. India 2 : 299. 1878, Cooke, Fl. Pres. Bombay 1 : 484. 1958 (Repr.).

Trees 15–20 m tall, unarmed, deciduous. Leaves with one pair of pinnae; leaflets large, 5–10 cm long, oblong, acute, membranous. Pods 15–25 cm long, smooth, glossy and bright orange or pale brown coloured, 6–8 seeded.

Distrib. : Infrequently cultivated. Pune, Raigad, Satara.

Calliandra haematocephala Hassk. Retzia 1 : 216. 1855; Parker, Fl. Punj. ed. 3 : 202. 1956; Sanj. Legumes of India 63. 1991.

Shrubs, 2–4 m tall. Leaves alternate, 2–pinnate, each pinnae with 8–10 pairs of leaflets; leaflets obliquely–oblong, coriaceous. Flowers axillary, in globose heads; stamens abundant, hairy, dark crimson or scarlet. Pods small, linear.

Fls. & Frts. : November–February.

Illus. : Chakraverty et al. Beaut. Trees & Shrubs of Calcutta 45. 1984.

Distrib. : Planted in Pune, Raigad, Satara.

Desmanthus virgatus (L.) Willd. Sp. Pl. 4 : 1047. 1806; Baker in Hook. f., Fl. Brit. India 2 : 290. 1878; Cooke in Fl. Pres. Bombay 1 : 486. 1958 (Repr.); Sanj. Legumes of India 64. 1991. *Mimosa virgata* L. Sp. Pl. 519. 1753.

Shrubs, perennial. Flowers in solitary, globose, axillary, peduncled heads. Pods 5–8 cm long. Seeds 20–30.

Fls. & Frts. : June–October.

Distrib. : It is native of Tropical America, grown as fodder and also naturalised in many parts. Aurangabad, Beed, Nanded, Parbhani, Pune, Thane.

Leucaena latisiliqua (L.) Gillis in Taxon 23 : 190. 1974; Sanj. Legumes of India 67. 1991. *Mimosa latisiliqua* L. Sp. Pl. 519. 1753. *Leucaena glauca* Bth. in Hook. London J. Bot. 4 : 416. 1845; Baker in Hook. f., Fl. Brit. India 2 : 290. 1878; Cooke, Fl. Pres. Bombay 1 : 469. 1958 (Repr.). *'Kubabhul', 'Subabhul'.*

Trees, c 9 m tall, evergreen, unarmed. Leaves 2–pinnate, 12–14 x 8–10 cm, pinnae 4–6 pairs; leaflets 10–15 pairs, 1.0–1.2 x 4–5 cm, oblong–linear to lanceolate, oblique at base. Inflorescence 3 in axils, dense, white, of globose heads, 2.5 cm across. Petals green, narrow, boat shaped. Pods 8–12 x 1.5–2.0 cm, broadly linear. Seeds 15–20.

Fls. & Frts. : Throughout the year.

Illus. : Chakraverty et al. Beaut. Trees & Shrubs of Calcutta 177. 1984.

Distrib. : It is native of Tropical America, planted along roadsides near villages, etc. also naturalised.

Parkia biglandulosa Wight & Arn. Prodr. 279. 1834; Baker in Hook. f. Fl. Brit. India 2 : 289. 1878; Cooke, Fl. Pres. Bombay 1 : 486. 1958 (Repr.); Sanj. Legumes of India 70. 1991. *'Chenduphal'.*

Trees, 8–10 m tall. Leaves 2–pinnate, pinnae 20–40 pairs and with 60–100 pairs of leaflets. Flowers in dense, subspherical heads, 3–5 cm across; peduncles 15–20 cm long. Pods 25–30 cm long.

Fls. & Frts. : December–May.

Distrib. : It is a native of Africa. Planted in gardens and along road sides. Osmanabad, Pune, Thane.

Pithecellobium dulce (Roxb.) Bth. in Hook. London J. Bot. 3: 199. 1844 *('Pithecolobium');* Baker in Hook. f. Fl. Brit. India 2: 302. 1878; Cooke, in Fl. Pres. Bombay 1: 485. 1958 (Repr.); Sanj. Legumes of India 71. 1991. *Mimosa dulcis* Roxb. Pl. Cor. 1: 67, t. 99. 1798. *'Vilayatiamli', 'Vilayati chinch'.*

Trees, with stipulate spines. Leaves with one pair of pinnae; leaflets 2 per pinnae, obovate–oblong. Flowers in terminal panicles of globose heads. Pods twisted, fleshy, dehiscent. Seeds with aril.

Fls. & Frts. : January–June.

Distrib. : It is a native of Arid regions of Mexico and Central America, planted in hedges and fast naturalising. Akola, Jalgaon, Kolhapur, Nasik, Osmanabad, Pune, Raigad, Thane, Yavatmal.

P. unguis–cati (L.) Bth. in Hook. London J. Bot. 3 : 20. 1844; Sanj. Legumes of India 71. 1991. *Mimosa unguis–cati* L. Sp. Pl. 517. 1753.

Shrubs or trees, c 6 m tall, armed or unarmed. Leaflets 4, thin, obliquely obovate–ovate, rounded or mucronate at apex; stipules spiny. Flowers in heads of terminal, axillary panicles; calyx turbinate campanulate; corolla glabrous; stamens twice as long as the corolla. Pods 8–12 cm long, contorted.

Distrib. : Cultivated in Bombay.

Samanea saman (Jacq.) Merr. in Journ. Wash. Acad. Sci. 6: 46. 1916; Sanj. Legumes of India 72. 1991. *Mimosa saman* Jacq. Frag. Bot. 15, t. 9. 1800. *Pithecolobium saman* (Willd.) Bth. in Hook. Lond. Journ. Bot. 3: 199. 1844; Cooke, in Fl. Pres. Bombay 1: 485. 1958 (Repr.).

Trees, large, evergreen with grey bark. Leaves with 3–7 pairs of pinnae, dark green. Flowers pink or rose in globose heads. Pods fleshy with firm sutures.

Fls. & Frts. : May–September.

Illus. : Chakraverty et al. Beaut. Trees & Shrubs of Calcutta 159. 1984.

Distrib. : It is a native of Tropical America. Planted along roadsides etc.

ROSACEAE

(S. K. Mudaliar & V. P. Prasad)

1. Annual herbs ... POTENTILLA
1. Trees or Shrubs :
   2. Plants unarmed trees; carpel 1 ... PRUNUS
   2. Plants prickly shrubs; carpels many ... RUBUS

POTENTILLA L.

Potentilla supina L. Sp. Pl. 497. 1753; Hook. f. Fl. Brit. India 2: 359. 1878; Cooke, Fl. Pres. Bombay 1: 490. 1958 (Repr.); Ugemuge, Fl. Nagpur 161, f. 57. 1986.

Annual, prostrate herbs with spreading branches. Leaves pinnate, densely hairy; leaflets 3–5, usually obovate; petioles very short or absent. Flowers solitary, axillary; pedicels hairy; calyx 5–lobed, hairy outside; petals oblong, smaller than calyx, yellow. Achenes numerous, minute, smooth.

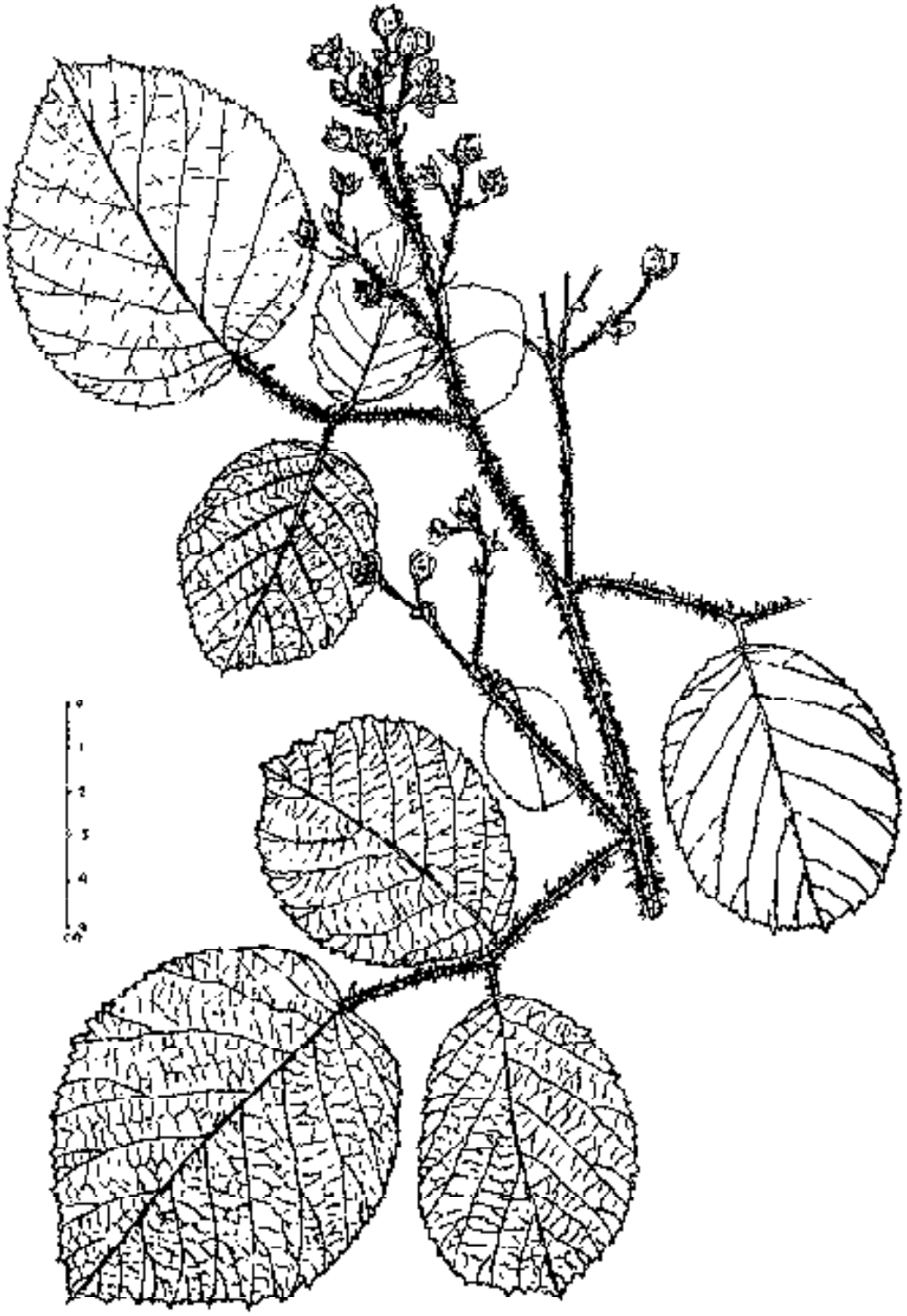
Fls. & Frts. : November–March.

Illus. : Ugemuge, op. cit.

Distrib. : Occassional on the dry margins of ponds, puddles and rivers. Amravati, Aurangabad, Nagpur, Nanded.

PRUNUS L.

Prunus ceylanica (Wight) Miq. Fl. Ind. Bat. 1(1) : 366. 1855; Kalkman in Blumea 13: 52. 1965; Chora & Panigr. in Fasc. Fl. India 18: 39. 1984. *Polydontia ceylanica* Wight, Illus. 1: 203. 1840 (*'Polyodontia'*). *Pygeum ceylanicum* non Gaertn. 1788; Hook. f. Fl. Brit. India 2: 321. 1878. *P. acuminatum* Colebr. in Trans. Linn. Soc. 12: 360, t. 18. 1818 non *Prunus acuminata* (Wall.) Dietr.; Hook. f. op. cit. 318. *P. wightianum* Bl. ex Muell. in Walp. Ann. 4: 642. 1857; Hook. f. op. cit. 319; Cooke, Fl. Pres. Bombay 1: 487. 1958 (Repr.). *P. wightianum* var. *parvifolium* Thw. ex Hook. f. op. cit. 319. *P. glaberrimum* Hook. f. op. cit. 2 : 319. *P. gardneri* Hook. f. op. cit. 321; Cooke, op. cit. 488. *'Daka'*, *'Kaula'*, *'Kogal'*.



Rubus ellipticus J. E. Sm.

Trees, c 25 m tall. Leaves 10–15 x 3–6 cm, elliptic–oblong to ovate–lanceolate, with 2 large basal glands. Flowers white, in 11–25–flowered racemes; sepals and petals villous. Drupes 1.2–1.8 cm, as broad as long, green, turning red to purple and ultimately black, smelling like bitter almonds.

Fls. : October–November. *Frts.* : January–February.

Illus. : Wight, Ic. t. 993. 1845; Talb. For. Fl. Bombay Pres. & Sind 1: 504, f. 286. 1909.

Distrib. : Frequent in semi evergreen forests along ghats. Kolhapur, Pune (Cooke, op. cit.), Satara, Sindhudurg.

RUBUS L.

1. Leaves simple ... *R. moluccanus*
1. Leaves 3–9–foliolate :
   2. Leaves 3–foliolate ... *R. ellipticus*
   2. Leaves 5–9 foliolate ... *R. niveus*

Rubus ellipticus J. E. Sm. in Rees Cycl. 30, Rubus, 16. 1819; Hook. f. Fl. Brit. Ind. 2:336. 1878 (incl. var. *hirta*); Cooke, Fl. Pres. Bombay 1: 489. 1958 (Repr.).

Prickly shaggy shrubs, 2.0–2.5 m tall, with trailing branches. Terminal leaflets 9–13 x 2–9 cm, nearly twice as long as the lateral. Flowers white, in axillary and terminal panicles. Drupelets globular, orange or golden yellow.

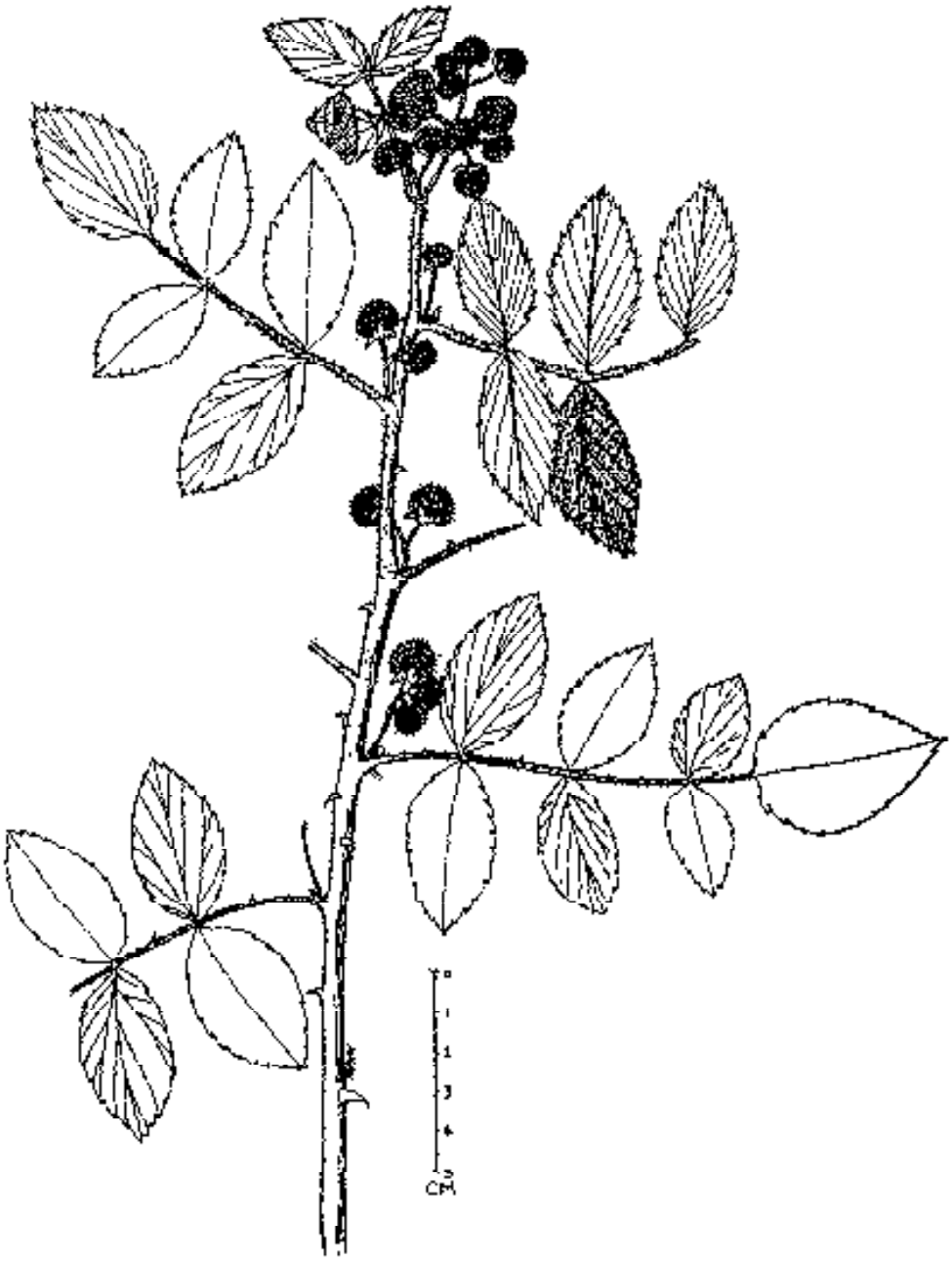
Fls. : October–February. *Frts.* : March–May.

Illus. : Wight, Ic. t. 231. 1839. (*R. wallichianus* Wight & Arn. Prodr. 298. 1834).

Distrib. : Occasional. Satara (Cooke, op. cit.).

R. moluccanus L. Sp. Pl. 1197. 1753; Hook. f. Fl. Brit. India 2: 330. 1878; Cooke, Fl. Pres. Bombay 1 : 488. 1958 (Repr.); Deshpande et al. Fl. Mahabaleshwar 1 : 220. 1993. *'Black–berry.'*

Subscandent shrubs with densely villous branches. Leaves simple, cordate, tomentose and prickly on the midrib beneath. Flowers in axillary and terminal panicles, white; bracts pectinate; calyx densely silky; petals obovate. Fruits globose, reddish.



Rubus niveus Thunb.

Fls. & Frts. : May.

Illus. : Wight, Ic. t. 225. 1839.

Distrib. : Rare in the ravines of Mahabaleswhar, Satara (Cooke, op. cit.).

Note. : This species is included on the authority of Cooke (op. cit.).

R. niveus Thunb. Disse. Bot. Med. de Rubo 9, f. 3. 1813. *R. lasiocarpus* J. E. Sm. in Rees Cycl. 30 : 6. 1819; Hook. f. Fl. Brit. India 2: 339. 1878; Cooke, Fl. Pres. Bombay 1: 489. 1958 (Repr.). *'Gauriphal', 'Mahabaleshwar raspberry'.*

Scandent shrubs, c 3 m long. Leaves 10–20 cm (including petiole); leaflets 5–9, ovate or elliptic, the terminal leaflet sometimes lobed, longer than the sessile lateral ones, base, cordate, apex acute. Flowers in axillary and terminal, tomentose corymbs, pink. Drupes *c* 1.2 cm across, dark purple, stone pitted.

Fls. & Frts. : September–November.

Illus. : Wight, Ic. t. 232. 1839 (*R. lasiocarpus*); Talb. For. Fl. Bombay & Sind 1: 508, f. 288. 1909.

Distrib. : Restricted to high ghats. Satara.

Notes : A naturalized prickly rambler of high ghats and also cultivated for its fruits used in jam preparations and as dessert. It is a native of colder and temperate regions of the northern hemisphere.

CULTIVATED SPECIES :

Cotoneaster frigidus Wall. ex Lindl. Bot. Reg. t. 1229. 1829; Hook. f. Fl. Brit. India 2: 385. 1875; Panigr. & Arvindkumar in Bull. Bot. Surv. India 28 : 68. (1986) 1988.

Tall shrubs or small trees with glabrous branches. Leaves elliptic to oblong–obovate, obtuse or acute at apex, cuneate at base, glabrous above, tomentose but usually becoming glabrous below. Flowers white, in dense tomentose clusters. Fruits subglobose, bright red. Nutlets 2.

Distrib. : Native of Himalayas. Planted. Raigad.

Eriobotrya japonica (Thunb.) Lindl. in Trans. Linn. Soc. Lond. 13 : 102. 1822; Hook. f. Fl. Brit. India 2 : 372. 1878; Bailey, Man. Cult. Pl. 511. 1949 (Rev. ed.). *Mespilus japonicum* Thunb. Fl. Jap. 206. 1784.

Small trees with rusty–tomentose branchlets. Leaves stiff, obovate to elliptic–oblong, acute or acuminate at apex, glossy above, rusty–tomentose beneath. Flowers white, in terminal panicles. Fruits pyriform, yellow. Seeds a few.

Planted in gardens for edible fruits. Bombay, Pune.

Fragaria nubicola Lindl. ex Lacaita in J. Linn. Soc. 43: 467. 1916; Sharma & Jamwal, Fl. Lidder Valley 183. 1988. *F. vesca* L. Sp. Pl. 494. 1753; Hook. f. Fl. Brit. India 2: 344. 1878; Cooke, Fl. Pres. Bombay 1: 492. 1958 (Repr.); Deshpande et al. Fl. Mahabaleshwar 1: 221. 1993. *'Strawberry'*.

Herbs with 3–foliolate leaves. Leaflets rhomboid–ovate, glabrous above, silky beneath. Flowers in clusters, reddish. Fruits minute, numerous, purple.

Fls. & Frts. . March–June.

Distrib. : Cultivated for edible fruits in Mahabaleshwar, Satara.

Prunus amygdalus Batsch. Beytr. Entw. Pragm. Gesch. Natur. 30. 1801, Hook. f. Fl. Brit. India 2: 313. 1878; Ghora & Panigr. in Fasc. Fl. India 18: 12. 1984.

Trees, c 7 m tall. Leaves oblong–lanceolate, acuminate at apex, very closely crenate–serrate, glabrous. Flowers solitary, sessile, large and showy, pink. Fruits large, oblong–ovoid, compressed,pubescent, splitting at maturity.

Fls. & Frts. : February–July.

Distrib. : Native of Central and Western Asia. Usually cultivated for fruits. Satara.

P. persica (L.) Batsch. Beytr. Entw. Pragm. Gesch. Natur. 30. 1801; Hook. f. Fl. Brit. India 2: 313. 1878; Ghora & Panigr. in Fasc. Fl. India 18: 12, f. 11. 1984. *Amygdalus persica* L. Sp. Pl. 472.1753. *'Alu', 'Peach'*.

Small trees with glabrous branchlets. Leaves oblong–lanceolate to broadly lanceolate, acuminate at apex, sharp–serrate at margins when young, glabrous, shining above. Flowers solitary, sessile, pink. Fruits variable in shape and size, yellow or red, pubescent.

Fls. & Frts. : January–June.

Illus. : Ghora & Panigr. op. cit.

Distrib. : Native of China. Cultivated in Satara.

Pyrus communis L. Sp. Pl. 479. 1753; Hook. f. Fl. Brit. India 2: 374, 1878; Bailey Man. Cult. Pl. 514. 1949 (Rev. ed.); Cooke, Fl. Pres. Bombay 1: 492. 1958 (Repr.). *'Pear'*.

Small trees. Leaves oblong–ovate, entire or lobed. Flowers in terminal corymbs, white. Fruits pyriform or subglobose, with persistent calyx–lobes.

Distrib.: An ornamental plant, commonly planted in Mahabaleshwar, Satara.

P. mahaleb L. Sp. Pl. 1: 474. 1753; Hook. f. Fl. Brit. India 2: 312; 1878; Ghora & Panigr. in Fasc. Fl. India 18 : 25. 1984.

Shrubs or rarely trees; branches brown–grey. Leaves 3–7 x 2.0–6.5 cm, orbicular–broadly ovate, apex shortly acuminate, base subcordate, margins finely dentate or crenate. Inflorescence of corymbose racemes, 3–6 cm long. Flowers c 1.5 cm across. Drupes 8–10 x 7–9 mm, ovoid, black, bitter.

Fls. & Frts. ; July–September.

Distrib. : Cultivated in Maharashtra (Ghora & Pangir. op. cit.).

P. malus L. Sp. Pl. 479. 1753; Hook. f. Fl. Brit. India 2: 373. 1878; Cooke, Fl. Pres. Bombay 1: 492. 1958 (Repr.); Bole & Almeida in J. Bombay nat. Hist. Soc. 78: 567. 1981; Deshpande et al. Fl. Mahabaleshwar 1: 221. 1993. *'Apple'*.

Small trees. Leaves ovate. acuminate at apex, tomentose beneath. Flowers pink. Fruits subglobose, with a depression at both ends.

Distrib. : Cultivated in Ahmednagar, Pune, Satara.

P. pyrifolia Nakai var. **culta** Nakai in Bot. Mag. Tokyo 40: 564. 1926; Bailey. Man. Cult. Pl. 514. 1949 (Rev. ed.); Deshpande et al. Fl. Mahabaleshwar 1: 221. 1993.

Trees, 5–6 m tall. Leaves oblong–ovate, acute at apex. Flowers white. Fruits mostly apple–shaped, very hard, usually rough.

Distrib. : Planted in Satara.

Rosa canina L. Sp. Pl. 492. 1753. Bailey, Man. Cult. Pl. 535. 1949 (Rev. ed); Naik, Fl. Osmanabad 130. 1979. *'Dog Rose', 'Gulab'.*

Scandent shrubs with hooked prickles. Leaflets ovate or elliptic, acute or acuminate at apex, sharp–serrate at margins. Flowers solitary or 2–5–together, white or pinkish. Fruits globose to ovoid, smooth, red.

Fls. : Almost throughout the year.

Distrib. : It is a Native of Euresia and West Asia, commonly grown in gardens.

R. cathayensis Bailey, Gentes Herbarum 29. 1920 & in Man. Cult. Pl. 533. 1949 (Rev. ed.).

Large, climbing, prickly shrubs. Leaflets 5–7, acuminate at apex. Flowers in axillary clusters of 5–7, pink or rose, fragrant.

Distrib. : Commonly cultivated as an ornamental in Satara.

R. damascena Mill. Gard. Dict. ed. 8, n. 15.1768; Hook. f. Fl. Brit. India 2 : 364. 1878; Bailey, Man. Cult. Pl. 535. 1949 (Rev. ed.). *'Damask Rose', 'Gulab'.*

Scandent prickly shrub. Leaflets usually 5, serrate, smooth above, pubescent beneath. Flowers 6–12, in a corymb, whitish to red, very fragrant.

Fls. : March–April and September–October.

Distrib. : A native of middle East Asia. Commonly planted for the fragrant flowers which are used in the preparation of rose–water.

R. indica L. Sp. Pl. 492. 1753; Hook. f. Fl. Brit. India 2: 364. 1878. *'Deshi gulab', 'Gulab'.*

Prickly shrubs. Leaves 5–15 cm long; stipules narrow, adnate almost to the top; leaflets 3–7, elliptic–lanceolate, 3–7 cm long. Flowers solitary or in short panicles, 3–5 cm across, red.

Fls. : Almost throughout the years.

Distrib. : Native of India. Commonly grown for grafting ornamental varieties of roses on it.

R. macrophylla Lindl. Ros. Monog. 35, t. 6. 1820; Hook. f. Fl. Brit. India 2: 366. 1878.

Large shrubs; flowering branches with few prickles or unarmed. Leaflets 9–11, elliptic–ovate to elliptic–oblong, acute at apex. Flowers 1–3, red; sepals lanceolate, long–caudate. Fruits oblong–ovoid, red.

Distrib. : Planted in gardens.

R. multiflora Thunb. Fl. Jap. 214. 1784; Hook. f. Fl. Brit. India 2: 364. 1878; Bole & Almeida in J. Bombay nat. Hist. Soc. 78 : 567. 1981; Deshpande et al. Fl. Mahabaleshwar 1: 222. 1993. *'Pandhra–gulab'*

Prickly bush with long, climbing branches. Leaflets 5–11, broadly ovate or slightly obovate. Flowers many, in panicles, white, very fragrant. Fruits globular to ovoid, brownish–red.

Fls. : Almost throughout the year.

Distrib. : Native of Japan, occasionally grown as pot herbs for small flowers.

R. setigera Michx. Fl. Bor. Amer. 1: 295. 1803; Bailey, Man. Cult. Pl. 533. 1949 (Rev. ed.); Naik, Fl. Osmanabad 130. 1979. *'Gulab'.*

Shrubs with long branches; prickles nearly straight: Leaflets 3–5, ovate to oblong–ovate, acute or short–acuminate at apex, sharply serrate at margins. Flowers a few in corymbs, deep rose, fading whitish. Fruits globose.

Distrib. : Native of East and North America. Commonly cultivated in Maharashtra as a hedge.

R. rosaefolius Sm. Pl. Ic. Ined. 3: t. 60. 1791; Hook. f., Fl. Brit. India 2: 341. 1878; Cooke, Fl. Pres. Bombay 1: 490. 1958 (Repr.).

Erect or subscandent shrubs. Leaves odd–pinnate; leaflets 2–7 pairs, ovate–lanceolate or oblong–lanceolate, acuminate at apex. Flowers solitary or in few–flowered clusters, white, showy. Fruits erect, bright red.

Distrib. : Native of Himalayan region. At times grown in gardens for the showy flowers.

Spiraea corymbosa Roxb. Fl. Ind. 512. 1824; R. K. Gupta, Fl. Nainit. 112. 1968. *S. cantoniensis* Lour. Fl. Cochinch.322. 1790; Hook. f. Fl. Brit. India 2 : 321. 1878.

Shrubs with arching branches, 1–2 m high. Leaves oblong to rhombic–lanceolate, cuneate at base, inciso–serrate in the upper half. Flowers in umbel–like racemes; sepals ovate–triangular; petals orbicular, white. Follicles 5, many–seeded.

Distrib. : Cultivated as a hedge Plant.

HYDRANGEACEAE

(Archana Godbole & P. Lakshminarasimhan)

CULTIVATED SPECIES :

Hydrangea anomala D. Don, Prodr. Fl. Nep. 211. 1825; **Parker,** For. Fl. Punj. 554. 1984 (3rd Repr.). *H. altissima* Wall. Tent. Fl. **Nep. 2 :** t. 50. 1826; C. B. Cl. in Hook. f. Fl. Brit. India 2 : 404. 1878.

Shrubs, 2.4–4.5 m tall. Leaves 7.5–15.0 cm long, ovate–lanceolate, sometimes cordate or narrow–lanceolate, usually finely serrate or entire except near apex; upper petioles often winged and wooly hairy. Flowers in pilose corymbs. Capsules subhemispheric, compressed, broader than long.

Distrib. : Grown in gardens.

H. macrophylla (Thunb.) DC. Prodr. 4: 15. 1832; **Bailey, Man.** Cult. Pl. 475. 1949. *Viburnum macrophyllum* Thunb. Fl. Jap. 125. 1784.

Shrubs, 0.9–3.6 m tall. Leaves 7.5–15.0 cm long, elliptic, broadly ovate or obovate, acuminate at apex, cuneate at base and often decurrent into petiole. Flowers pink or blue, rarely white, in large dense cymes.

Distrib. : Bombay, Pune.

VAHLIACEAE

(Archana Godbole & Sujit Kumar Das Das)

VAHLIA Thunb. (nom. cons.)

Vahlia digyna (Retz.) Rev. Gen. Pl. 3: 227. 1891; Bridson in **Kew** Bull. 30: 164, f. 1 A–H. 1975; Bennet, Name Changes Fl. Pl. of **India &** Adj. Reg. 583. 1987. *Oldenlandia digyna* Retz. Obs. Bot. 4: 23. 1786. *Vahlia viscosa* Roxb. Fl. Ind. 2: 89. 1832; C.B. Cl. in Hook. f. Fl. **Brit.** India 2: 399. 1878; Cooke, Fl. Pres. Bombay 1: 493. 1958 (Repr.). *Bistella chigyna* (Retz.) Bullock in Acta Bot. Neerl 15: 85. 1966; Raghavan et al. in Rec. Bot. Surv. India 21: 3: 1981.

Herbs, 8–30 cm high, erect, viscous, profusely branched. Leaves ovate–oblong. Flowers yellowish, in axillary pairs or solitary. Capsules sub globose. Seeds ellipsoid, minute numerous.

Fls. & Frts. : October–April.

Illus. : Wight, Ic. t. 563. 1842 (*Vahlia viscosa*); Bridson, op. cit.

Distrib. : Frequent as weed in drying moist ground, harvested rice fields. Bombay (Cooke, op. cit.), Beed, Chandrapur, Kolhapur, Nanded, Osmanabad, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

Notes : Bridson (op. cit.) treats *Bistella* Dans. (1763) as congeneric with *Vahlia* Thunb. (1782).

CRASSULACEAE

(Archana Godbole & Sujit Kumar Das Das)

1. Stamens twice as many as petals ... KALANCHOE
1. Stamens as many as petals ... CRASSULA

CRASSULA L.

Crassula schimperi Fisch. & May, Ind. Sem. Hort. Petrop. 8: 14, 56. 1841; Wickens in Kew Bull. 36: 666. 1982. *Tillaea pentandra* Royle, Illus. Himal. 222. 1839; C.B.Cl. in Hook. f. Fl. Brit. India 2: 412. 1878; Cooke, Fl. Pres. Bombay 1: 494. 1958 (Repr.).

Subsucculent herbs; internodes shorter than leaves. Leaves entire, amplexicaul, linear-lanceolate, apex acute. Flowers minute, sessile, white, axillary solitary, fascicled; petals ovate, acuminate, not exceeding sepals. Seeds minute.

Fls. & Frts. : August–October.

Distrib. : Occurs on walls or rocks. 'Konkan' (Cooke, op. cit.).

KALANCHOE Adans.

1. Leaves pinnatifid ... *K. laciniata*
1. Leaves simple :
    2. Flowers yellow :
        3. Flowers pendulous ... *K. pinnata*
        3. Flowers erecto patent :
            4. Sepals almost free to base:
                5. Inflorescence of many–flowered cymose panicles ... *K. integra*
                5. Inflorescence a trichotomous corymbose cyme ... *K. lanceolata*

	4. Sepals divided to half their length	...	*K. lanceolata*
2.	Flowers white :		
	6. Inflorescence glandular hairy	...	*K. olivacea*
	6. Inflorescence eglandular	...	*K. bhidei*

Kalanchoe bhidei T. Cooke, Fl. Pres. Bombay 1: 467. 1903 [1: 497. 1958 (Repr.)]; S. D. Deshpande & Sharma in Bull. Bot. Surv. India 26: 238. 1986; Naik, Fl. Marathwada 1 : 362. 1998.

Herbs, pale brown, succulent. Leaves c 9.5 x 3.8 cm, elliptic–obovate, apex obtuse, cuneate at base, margins serrate. Inflorescence lax. Flowers erect; pedicels c 0.9 cm long; calyx lobes free to base, lanceolate, acuminate, c 0.5 cm long; petals c 2 cm long. Follicles elongated.

Fls. & Frts. : October–November.

Illus. : Gandhi in Sald. & Nicols. Fl. Hassan Dt. 208, f. 46 A. 1976.

Distrib. : Rare, found in dry scrub patches along the ghats. Satara. Also grown in gardens in Marathwada (Naik op. cit.).

Notes : Cooke, op. cit. described this species based on Bhide's collection in 1902 (1243). Deshpande & Sharma rediscovered it after a lapse of 80 years (*Deshpande* 166455 from the type locality).

K. integra (Medik.) O. Ktze. Rev. Gen. Pl. 1: 221. 1891. *Cotyledon integra* Medik. in Acta. Acad. Theod. Palat. 3: 200, t. 9. 1775. *Kalanchoe spathulata* DC. Pl. Hist. Succ. t. 65. 1811; C. B. Cl. in Hook. f. Fl. Brit. India 2: 414. 1878; Cooke, Fl. Pres. Bombay 1: 496. 1958 (Repr.).

Herbs, robust, fleshy with upper parts glandular–hairy. Leaves sessile, spathulate–oblong, obtuse, semi–amplexicaul at base, margins serrate–crenate. Peduncles c 11 cm long. Flowers in dense, many flowered cymose–panicles, c 2 cm long; calyx lobes c 0.7 cm long, elliptic–lanceolate. Follicles c 1 cm long.

Fls. & Frts. : October–November.

Distrib. : Occasionally found in scrub patches. Pune, Satara.

K. laciniata (L.) DC. Succ. Pl. & Grasses t. 100. 1802; C. B. Cl. in Hook. f. Fl. Brit. India 2: 415. 1878; Cooke, Fl. Pres. Bombay 1: 497.

1958. (Repr.); Naik, Fl. Marathwada 1: 364. 1998. *Cotyledon laciniata* L. Sp. Pl. 430. 1753. *'Parabij', 'Zakhmhyat'.*

Herbs, sparingly branched, upper parts glandular–hairy. Segments of leaves usually narrow, linear, entire or crenate–serrate, c 10 x 1.8 cm. Panicles shortly branched, compact; bracts linear–lanceolate. Flowers yellow, c 2 cm long; calyx divided to base. Follicles glabrous.

Fls. & Frts. : November–January.

Distrib. : Native of South Africa. Common along dry scrub patches. Pune, Satara (Cooke op. cit.). Grown in gardens in Marathwada (Naik, op. cit.).

K. lanceolata (Forssk.) Pres. Syn. Pl. 1: 446. 1805. *Cotyledon lanceolata* Forssk. Fl. Aeg. Arb. 89. 1775.

1.	Sepals glabrous	...	var. *glabra*
1.	Sepals densely glandular–pubescent	...	var. *glandulosa*

var. **glabra** (C.B.Cl.) Srinivasan in N.C. Nair et al. Fl. Tamilnadu State Analysis 1: 145. 1983. *K. floribunda* Wight & Arn. var. *glabra* C.B.Cl. in Hook. f. Fl. Brit. India 2: 415. 1878; Cooke, Fl. Pres. Bombay 1: 496. 1958 (Repr.).

Succulent herbs, c 1.5 m high, glabrous throughout. Leaves elliptic–obovate, obtuse or rounded at apex, cuneate at base. Flowers numerous; pedicles c 2 cm long; sepals c 0.5 cm long; petals c 1.8 cm long, glabrous, acute. Follicles glabrous.

Fls. & Frts. : November–December.

Distrib. : Rare, found in open dry places. Satara.

var. **glandulosa** (Hochst. ex A. Rich.) Cufod. in Webbia 19: 730. 1965. *K. glandulosa* Hochst. in A. Rich. Fl. Abyss. 1: 312 1847; C.B.Cl. in Hook. f. Fl. Brit. India 2: 414. 1878; Cooke, Fl. Pres. Bombay 1: 495. 1958 (Repr.).

Stout herbs, glandular hairy. Leaves ovate or obovate–lanceolate, glabrous or less pubescent or densely glandular pubescent. Flowers in dense paniculate glandular pubescent cymes, yellow; corolla tube c 1.2 cm long, glandular pubescent in the upper part. Seeds brownish.

Distrib. : Occasional on dry hills. Pune, Satara (Cooke, op. cit.).

K. olivacea Dalz. in Dalz. & Gibs. Bombay Fl. 313. 1861; Cooke, Fl. Pres. Bombay 1: 496. 1958 (Repr.).

Herbs, erect, brownish, succuleut. Leaves sessile, obovate, apex obtuse, entire or irregularly crenate–serrate, often dotted with red spots. Flowers in panicled cymes; bracts linear–lanceolate; sepals free to base, c 0.8 cm long. Carpels 4, c 0.5 cm long.

Fls. & Frts. : October–December.

Distrib. : Occasional along the dry hills above the ghats. Pune, Satara.

K. pinnata (Lam.) Pres. Syn. 446. 1805; Sant & Wagh in Bull. Bot. Surv. India 5:107. (1963) 1964. *Cotyledon pinnata* Lam. Encycl. 2:141. 1786. *Bryophyllum calycinum* Salisb. Parad. Lond. t. 3. 1805; C.B.Cl in Hook. f. Fl. Brit. India 2: 413. 1878; Cooke, Fl. Pres. Bombay 1:494. 1958 (Repr.) *'Ghaipat'*, *'Panphuti'*.

Succulent herbs; branches terete, reddish speckled with white. Leaves simple or 2–5–lobed, elliptic–oblong, obtuse, rounded or narrowed at base, c 12 x 6 cm, margins crenate–serrate. Flowers in lax panicles; pediels slender, c 1.5 cm long; calyx gamosepalous, lobes shorter than tube, c 4 cm long; corolla constricted below middle; stamens inserted on the middle of corolla–tube. Follicles enclosed in persistent, papery calyx and corolla. Seeds numerous, linear.

Fls. & Frts. : December–February.

Illus. : Backer in Steenis, F. Males 1, 4: 199, f. 1. 1951.

Distrib. : It is a Native of Tropical Africa. Planted in gardens and also naturalized near habitations.

CULTIVATED AND INTRODUCED SPECIES :

K. blossfeldiana Bailey, Man. Cult. Pl. 466. 1949; Naik, Fl. Marathwada 1: 364. 1998.

Perennial herbs, glabrous, 30–60 cm tall. Leaves oblong–spathulate or oblong–obovate, 3–8 x 2–5 cm, entire or shallowly crenate, green with red marginal line, obtuse. Flowers in dense terminal corymbose panicles; pedicels short; calyx membranous, 3–5 mm long, lobes ovate, acute; petals 4, ovate, scarlet, exceeding the calyx.

Fls. : October–February

Distrib. : Grown as pot herb in Marathwada (Naik, op. cit.).

Notes : It is a native of Madagascar.

K. diagremontiana R.–Hamet & Perr. in Ann. Mus. Col. Marseille 3, 2: 128. 1924; Bailey, Man. Cult. Pl. 467. 1949; Naik, Fl. Marathwada 1: 364. 1998.

Perennial, succulent herbs, glabrous, up to 1 m tall. Leaves coarsely dentate, producing numerous plantlets from the dentations; petioles stout, broad at base. Flowers 2–3 cm long, drooping, from trichotomously branched corymbs; pedicels slender; calyx tubular, 1.5–2.0 cm long, lobes broadly triangular–acute; corolla pink turning purple, much exserted, lobes ovate, acute.

Fls. : December–February.

Distrib. : It is grown in gardens as a curiosity. Aurangabad (Naik op. cit.).

Notes : It is a native of Madagascar.

K. tubiflora (Harvey) R.–Hamet in Beih. Bot. Centralbal. 29(2): 41. 1912; Srinivasan in N.C. Nair et al. Fl. Tamilnadu State Analysis 1: 146. 1983; Singh, Fl. Eastern Karnataka 1: 303. 1988; Naik, Fl. Marathwada 1 : 365. 1998. *Bryophyllum tubiflorum* Harvey in Harv. & Sond. Fl. Cap. 2 : 380. 1862. *Kalanchoe verticillata* Elliot. in J. Linn. Soc. 29 : 14. 1891; Naik, Fl. Osmanabad 132. 1979.

Perennial herbs, succulent, glabrous, 30–90 cm tall; stems simple. Leaves sessile, linear, subcylindric, 3–15 cm long, green mottled with violet brown, producing plantlets from the tip. Flowers pendent, in terminal paniculate cymes, 2.5 cm long; pedicels slender; calyx 1.0–1.5 cm long, lobes triangular, acute; corolla salmon to scarlet, lobes ovate, acute.

Fls. : December–January.

Distrib. : Cultivated as ornamental potted plants. Marathwada, Pune.

Notes : It is a native of South Africa.

DROSERACEAE

(Archana Godbole & Sujit Kumar Das Das)

DROSERA L.

1. Acaulescent herbs; leaves all radical, spathulate; capsules 5–valved ... *D. burmanni*

1. Caulescent herbs; leaves cauline, linear; capsules 3–valved ... *D. indica*

Drosera burmanni Vahl, Symb. Bot. 3:50. 1794; C. B. Cl. in Hook. f. Fl. Brit. India 2: 424. 1878; Cooke, Fl. Pres. Bombay 1: 499. 1958 (Repr.); Chavan et al. in M. V. M. Patrika 8: 7. 1973.

Herbs, acaulescent, c 15 cm. high. Leaves obovate or orbicular, stipulate, blade c 1 x 1 cm. Scapes terminal, circinate, few to many flowered. Flowers white; calyx 5–lobed, elliptic, acute; petals 5, obovate. Capsules 5–valved. Seeds numerous, reticulate.

Fls. & Frts. : December–February.

Illus. : Wight, Ic, t. 944. 1845; Raman in Sald. & Nicols. Fl. Hassan Dt. 158, f. 31 B. 1976.

Distrib. : Rare, found on exposed moist, sandy soils especially near tanks and streams. Insectivorous herb. Chandrapur, Kolhapur, Ratnagiri, Satara, Sindhudurg.

D. indica L. Sp. Pl. 282. 1753; C. B Cl. in Hook. f. Fl. Brit. India 2:424 1878; Cooke, Fl. Pres. Bombay 1:499. 1958 (Repr.).

Herbs, slender, caulescent, c 20 cm high with glandular–hairy stems. Leaves exstipulate; lower leaves recurved, upper leaves erect, filiform, c 3 cm long; shortly petioled. Inflorescence leaf–opposed. Flowers pink; sepals 5, acute; petals obovate. Capsules 3–valved. Seeds obovoid and strongly ridged.

Fls. & Frts. : October–November.

Illus. : Ramam. in Sald. & Nicols. Fl. Hassan Dt. 158, f. 31 A 1976.

Distrib. : Frequent in moist places on the ghats. Ahmednagar, Amravati, Bhandara, Kolhapur, Nanded, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane.

HALORAGACEAE

(Archana Godbole & Sujit Kumar Das Das)

MYRIOPHYLLUM L.

1. Floral leaves linear–oblanceolate; stigmas fimbriate; carpels tubercled ... *M. tuberculatum*

1. Floral leaves lanceolate; stigmas not as above; carpels muricate ... *M. oliganthum*

Myriophyllum oliganthum (Wight & Arn.) F. v. Muell. Fragm. Phyt. Austr. 10: 54. 1876; Van der Meijden in Blumea 17: 308. 1969. *Haloragis oligantha* Wight & Arn. Prodr. 338. 1834. *Myriophyllum intermedium* Wight, Illus. 2: 23. t. 102 excl. f. 8. 1850. non DC. 1828; C. B. Cl. in Hook. f. Fl. Brit. India 2: 433. 1878; Cooke, Fl. Pres. Bombay 1: 500. 1958 (Repr.).

Aquatic, perennial, submerged herbs, upper portion of stem floating. Leaves mostly in tufts of 1–3, whorled, 1–2 x 0.5–0.7 cm, linear, apex acute, margins entire or serrate; the submerged pectinately pinnatifid. Flowers pink, axillary. Fruits with dorsally rounded mericarps.

Fls. & Frts. : August–September.

Illus. : Wight Ic. t. 1061. 1846 (*Haloragis oligantha*).

Distrib. : Grows gregariously in moist grounds and water bodies, but terminal portions float. Satara.

M. tuberculatum Roxb. Fl. Ind. 1: 451. 1820; C. B. Cl. in Hook. f. Fl. Brit. India 2: 432. 1878; Vasudevan & K. Nair. in J. Bombay nat. Hist. Soc. 64: 391, f. 22. 1967; Van der Meijden in Blumea 17: 308. 1969. *M. spathulatum* Blatt. & Hallb. in J. Ind. Bot. Soc. 2: 44, t. 1. 1921; Sant. in Rec. Bot. Surv. India 16(1): 89. 1967 (3rd Rev. ed.).

Perennial, aquatic, submerged herbs in shallow stagnant water. Leaves c 2 cm long, linear, lower leaves pinnatisect, lanceolate, margins entire or dentate or toothed upwards. Flowers pink, axillary, sessile. Fruits with sharp ribs, ovoid, lobed.

Illus. : Vasudevan & K. Nair, op. cit.

Distrib. : Rare in moist places. Chandrapur, Pune (Sant. op. cit.).

RHIZOPHORACEAE

(P. Lakshminarasimhan & P. Venkanna)

1. Plants of inland habitat; seeds albuminous; radicle not protruding while the fruit is still on the tree ... CARALLIA

1. Plants of saline, swampy habitat; seeds exalbuminous; radicle large, protruding while the fruit is still on the tree :

   2. Stamens indefinite; ovary 1–celled ... KANDELIA

   2. Stamens 8–28; ovary 2–4–celled :

      3. Leaves mucronate; calyx 4–lobed ... RHIZOPHORA

      3. Leaves not as above; calyx 5–6–lobed or 8–14–lobed :

         4. Bracteoles 2–4; calyx lobes 5–6; stamens 10–12; ovary 3–celled ... CERIOPS

         4. Bracteoles absent; calyx lobes 8–14; stamens 16–28; ovary 2–4–celled ... BRUGUIERA

BRUGUIERA Lam.

1. Flowers axillary, solitary, 2.5–3.7 cm long ... *B. gymnorhiza*

1. Flowers in axillary cymes, less than 1.2 cm long :

   2. Lobes of calyx as 1/4 long as tube ... *B. parviflora*

   2. Lobes of calyx as long as tube ... *B. cylindrica*

Bruguiera cylindrica (L.) Bl. Enum. Pl. Jav. 1:93. 1827; Kothari & Rao in India Bot. Cont. 8: 57. 1991. *Rhizophora cylindrica* L. Sp. Pl. 443. 1753. *Bruguiera caryophylloides* (Burm. f.) Bl. op. cit.; Henslow in Hook. f. Fl. Brit. India 2: 438. 1878; Cooke, Fl. Pres. Bombay 1: 505. 1958 (Repr.).

Shrubs or small trees, 1.0–1.5 m high. Leaves 8–10 cm long, ovate–lanceolate, base tapering; stipules 2–3 cm long. Cymes greenish; calyx smooth; corolla erect, hairy outside, deeply bifid. Stamens 16. Fruits indehiscent, c 2 cm long, oblong–ovoid, smooth.

Fls. & Frts. : July–September.

Illus. : Kothari & Rao, op. cit.

Distrib. : Rare in tidal mangrove forest. Raigad, Sindhudurg, Thane.

B. gymnorhiza (L.) Savigny in Lam. Encycl. 4: 696. 1798; Henslow in Hook. f. Fl. Brit. India 2: 437. 1878; Cooke, Fl. Pres. Bombay 1: 504. 1958 (Repr.). *Rhizophora gymnorhiza* L. Sp. Pl. 443. 1753.

Trees, 5–10 m tall; branching mostly sympodial, young branches with prominent scars of leaves and stipules. Leaves 10–15 x 5–8 cm, leathery, ovate, apex acute, base tapering. Flowers 3.0–3.5 cm long, drooping; calyx reddish; corolla brown, deeply bifid, outer margins fringed towards base with white silky hairs. Fruits indehiscent, 2–3 cm long, hypocotyl conical, smooth, with blunt apex.

Fls. & Frts. : November–April.

Illus. : Wight, Ic. t. 239 A, 1–8. 1839 (*B. rheedii* Bl. Enum. Pl. Jav. 1 : 92. 1827); Talb. For. Fl. Bombay Pres. & Sind 2: 7, f. 291. 1911.

Distrib. : Rare, along the estuaries. Ratnagiri, Sindhudurg.

B. parviflora (Roxb.) Wight & Arn. ex Griff. in Trans. Med. Phys. Soc. Calc. 8: 10. 1836; Henslow in Hook. f. Fl. Brit. India 2: 438. 1878; Cooke, Fl. Pres. Bombay 1: 505. 1958 (Repr.). *Rhizophora parviflora* Roxb. Fl. Ind. 2: 461. 1832.

Shrubs or small trees, 3–5 m tall; young branches with scars of fallen leaves and stipules. Leaves 6–10 x 2.5–4.0 cm, oblong–lanceolate, apex acute, base cuneate. Flowers in erect cymes, pedicels slender; calyx 1.0–1.5 cm long, tube cylindric; corolla with white hairs at apex. Fruit indehiscent, 2.0–2.5 cm long, concealed by enlarged calyx, striate, truncate.

Fls. & Frts. : December–March.

Distrib. : Rare along salt marshes and along estuaries. Bombay (Cooke, op. cit.).

CARALLIA Roxb. (nom. cons.)

Carallia brachiata (Lour.) Merr. in Philip. J. Sci. Bot. 15: 249. 1919; Rathak. & Ram Saran in J. Bombay Nat. Hist. Soc. 80 : 665. (1983) 1984. *Diatoma brachiata* Lour. Fl. Cochinch. 296. 1790. *Carallia integerrima* DC. Prodr. 3:33. 1828; Henslow in Hook. f. Fl. Brit. India 2:439. 1878 p.p.; Cooke, Fl. Pres. Bombay 1:506. 1958 (Repr.). *'Phanashi'*.

Trees, 10–20 m tall, with erect trunk and wide spread crown. Leaves 10–15 x 5–8 cm, broadly elliptic, punctate beneath, base tapering; stipules 2 cm long, caducous. Flowers in small heads on stout branches of axillary cymes; corolla clawed, roundish. Fruits 0.6 cm long, berry like, smooth, red. Seeds with thick orange testa, lobulate.

Fls. & Frts. : October–February.

Illus. : Wight, Ic. t. 605. 1843; Bedd. Fl. Sylv. t. 193. 1872 & Talb. For. Fl. Bombay Pres. & Sind 2: 10, f. 292. 1911 (*Carallia integerrima*).

Distrib. : Common in semi evergreen and moist deciduous forests. Kolhapur, Pune, Raigad, Ratnagiri, Satara, Sindhudurg. Thane.

CERIOPS Arn.

Ceriops tagal (Perr.) C. B. Rob. in Philip. J. Sci. Bot. 3: 306. 1908; Ding Hou in Steenis, Fl. Males. 1, 5:469, f. 24. 1958. *Rhizophora tagal* Perr. in Mem. Soc. Linn. Paris 3: 138. 1824. *Ceriops candolleana* Arn. in Ann. Nat. Hist. 1: 364. 1838; Henslow in Hook. f. Fl. Brit. India 2: 436. 1878; Cooke, Fl. Pres. Bombay 1: 503. 1958 (Repr.). *'Chauri'*, *'Kirrari'*.

Shrubs or small trees, 2–3 m high; old twigs marked with scars of leaves. Leaves 4–8 x 3–4 cm, ovate–oblong,thick, yellowish–green, base tapering. Calyx segments ovate reflexed in fruits; petals with 3 hairs at tip. Drupes indehiscent, pendulous, 1.0–1.5 cm long, rough, hypocotyl ridged, emerging from a yellowish to reddish cotyledonary body when ripe.

Fls. & Frts. : February–May.

Illus. : Wight, Ic. t. 240. 1839; Talb. For. Fl. Bombay Pres. & Sind 2: 11, f. 293. 1911; Ding Hou, op. cit.

Distrib. : Common along tidal swamps. Bombay (Cooke, op. cit.), Raigad, Ratnagiri, Sindhudurg, Thane.

KANDELIA Wight & Arn.

Kandelia candel (L.) Druce in Rep. Bot. Exch. Club. Brit. Isles 1913, 3: 420. 1914; Ding Hou in Steenis, Fl. Males. 1, 5: 472, f. 26. 1958. *Rhizophora candel* L. Sp. Pl. 443. 1753. *Kandelia rheedii* Wight & Arn. Prodr. 1: 311. 1834 nom. illeg.; Henslow in Hook. f. Fl. Brit. India 2: 437. 1878; Cooke, Fl. Pres. Bombay 1: 504. 1958 (Repr.). *'Kanal'*.

Trees, 2–3 m high; branches terete. Leaves 8–12 x 3–6 cm, elliptic–oblong, apex obtuse, dark green, polished above, reddish–brown beneath, narrowed at base. Flowers 4–9 in axillary cymes; calyx 1.5–2.0 cm long, lobes narrow–linear, acute; corolla bifid, lobes divided into numerous capillary segments. Drupes indehiscent, 1.25–2.50 cm long, with reflexed calyx; protruded radicle 15–30 cm long, cylindric.

Fls. & Frts. : June–November.

Illus. : Wight, Ic. t. 239. 1839 (*Kandelia rheedii* Bl.); Bedd. Fl. Sylv. Ann. Gen. t. 13, f. 6. 1871; Talb. For. Fl. Bombay Pres. & Sind 2:6, f. 290. 1911; Ding Hou, op. cit.

Distrib. : Rare along sea coast in tidal swamps. Ratnagiri, Sindhudurg.

RHIZOPHORA L.

1. Cymes mostly 2–flowered; flowers sessile; corolla glabrous ... *R. apiculata*
1. Cymes more than 3–flowered; flowers pedicelled; corolla hairy ... *R. mucronata*

Rhizophora apiculata Bl. Enum. Pl. Jav. 1:91. 1827; Ding Hou in Steenis, Fl. Males. 1, 5: 452. 1958. *R. conjugata* sensu Arn. Ann. Mag. Nat. Hist. 1363. 1838 non L. 1753; Henslow in Hook. f. Fl. Brit. India 2:436. 1878; Cooke, Fl. Pres. Bombay 1:502. 1958 (Repr.).

Trees, 8–12 m high. Leaves 5–13 x 3.5–5.5 cm, elliptic–oblong or lanceolate, base cuneate. Flowers c 3.5 cm across; calyx segments oblong, ovate, acute; corolla white or yellow within, linear, flat, falling soon. Drupes indehiscent, 2.0–2.5 cm long; seedlings c 70 cm long before falling.

Fls. & Frts. : August–February.

Illus. : Matthew, Illus. Fl. Tamilnadu Carnatic 2: t. 260. 1988.

Distrib. : Rare in mangrove forests. Ratnagiri, Sindhudurg.

R. mucronata Poir. in Lam. Encycl. 2: 517. 1794; Henslow in Hook. f. Fl. Brit. India. 2: 435. 1878; Cooke, Fl. Pres. Bombay 1: 501. 1958 (Repr.). *'Kandal'*.

Trees, 6–12 m tall. Leaves 7–15 x 4.0–7.5 cm, oblong–elliptic, base cuneate. Cymes repeatedly branched; flowers 10–12 cm across; calyx segments keeled within; corolla white, shorter than calyx lobes. Drupes indehiscent, 4–5 cm long, ovoid–conical, pendulous, dark–brown; seedlings 65 cm before falling.

Fls. & Frts. : August–January.

Illus. : Wight, Ic. t. 238. 1839; Talb. For. Fl. Bombay Pres. & Sind 2: 3, f. 289. 1911.

Distrib. : Common along mangrove forests. Raigad, Ratnagiri, Sindhudurg, Thane.

★★★

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★★★

ADDENDA & CORRIGENDA

Page 13 Line 17 Delete , (See also Graph III)

Page 132 Line 18 Delete 1st *Centropus sinensis-parroti*,

BRASSICACEAE

Page 195 Shift & Mant. 1: 92. 1767. from line 8 to line 9 after 1754.

Page 199 Line 19 Add after *montanum* Hook. f. & Thoms. in J. Proc. Linn. Soc. Bot. 5: 139. 1861;

CAPPARACEAE

Page 221 Shift Raghavan in Sharma et al. Fl. India 2: 309, f. 59. 1993. from line 16 to line 13 after 1960;

POLYGALACEAE

Page 249 Line 19 Shift (*P. wallichiana* Wight) after 1840

CARYOPHYLLACEAE

Page 257 Line 25 Add after Dt. 79,

Page 259 Line 11 Delete India 1: 213. 1874.

PORTULACACEAE

Page 264 Citation of subsp. **grandiflora** is corrected as below :

subsp. **grandiflora** (Hook.) Geesink in Blumea 17: 297. 1969 & in Steenis, Fl. Males. 1, 7: 131. 1971. *P. grandiflora* Hook. in Bot. Mag. n.s. 3: t. 2885. 1829; M.K.V. Rao in Sharma et al. Fl. India 3: 3. 1993.

HYPERICACEAE

Page 273 Line 17 under *Illus.* : Delete Ic.

MALVACEAE

Page 319 Line 20 Delete in

Page 319 Line 27-28 under **M. sylvestris** Delete Paul in Sharma et al. Fl. India 3: 363, f. 37. 1988;

Page 334 Line 16 Add is before Asiatic

Page 335 Line 14 Shift *'Kapas', Rui'* to next line after *'Narma'* under var. **arborum.**

Page 342 Line 2 Delete with before yellow.

STERCULIACEAE

Page 373 Line 10 Add & after Engl.

ELAEOCARPACEAE

Page 410 Line 2 Add E- Fruit. under **Elaeocarpus tuberculatus**

AVERRHOACEAE

Page 435 Line 3 Add in after Edgew. & Hook. f.

OXALIDACEAE

Page 436 Line 22 Delete in before Abhand

Page 439 Line 33-34 Delete *O. latifolia* H.B & K. Nov. Gen. et Sp. 184, t. 467. 1821; Blatt. in J. Bombay nat. Hist. Soc. 34: 898. 1931.

Page 441 after **O. deppei**

Oxalis pubescens H.B. & K. Nov. Gen. Sp. 5: 240. 1820; Manna in Hajra et al. Fl. India 4: 253, f. 65. 1997; Bhogaonkar & Devarkar, Add. Fl. Melghat 8, figs. A–H. 1999.

Herbs, pubescent; stems red. Leaves 3–foliolate; petioles long; stipules hairy; leaflets obcordate, margins hairy, red. Inflorescences axillary, umbellate. Flowers yellow; filaments hairy; ovary hairy. Capsules cylindrical, hairy, torulose. Seeds transversely ribbed.

Fls. & Frts. : September–December.

Illus. : Manna in Hajra et al. op. cit.; Bhogaonkar & Devarkar, op. cit.

Distrib. : Amravati (Bhogaonkar & Devarkar, op. cit.).

RUTACEAE

Page 470 Line 2 under Caption of **Limonia acidissima** L. add F–C. s. of ovary; before G–Seeds.

Page 486 Last line under **C. lansium** Delete in

OCHNACEAE

Page 493 under *Illus.* : var. **gamblei**

Line 12 Add Fl. after Illus. and 4: before t. 83,

BURSERACEAE

Page 495 Line 11 Delete & before 1965.

LEEACEAE

Page 567 Line 22 Add of before axillary

FABACEAE

Page 614 after **C. platycarpus**

Cajanus rugosa (Wight& Arn.) van der Maesen in Agric. Univ. Wageningen Pap. 85 (4) : 179 (1985) 1986. *Atylosia rugosa* Wight & Arn. Prodr. 257. 1834; Baker in Hook. f. Fl. Brit. India 2: 215. 1876; Bhogaonkar & Devarkar, Add. Fl. Melghat 11, figs. A–F. 1999.

Climbers, perennial; young parts pubescent. Leaves 3–foliolate; leaflets ovate, lateral ones oblique, velvety hairy. Flowers yellow in short, axillary, few–flowered clusters; ovary densely hairy. Pods velvety pubescent, rounded at both ends, with a small stylar point. Seeds 3-5, brown at maturity, strophiole fleshy.

Fls. & Frts. : September–December.

Illus. : Bhogaonkar & Devarkar, op. cit.

Distrib. : Amravati (Bhogaonkar & Devarkar, op. cit.).

Page 677 Line 28 Add Illus. after Mahesh.

Page 680 Line 32 Add t. after Ic.

Page 682 Line19 Delete or after 2-3

Page 709 Line 16 Add et al. before Fasc.

Page 727 Line 2 Add in before Kew Bull.

Page 727 Line 28 Add 1: after Bombay

Page 730 Line 19 Add cm after 4.5

MIMOSACEAE

Page 808 Line 24 Delete f after Schr.

★★★

EMENDANDA

Page	Line	For	Read
7	14	coton	cotton
13	10	**Humdity**	**Humidity**
17	last line	325	32.5
22	19	956	256
23	23	Foest	Forest
35	1	There	These
62	8	*Calyophyllum*	*Calophyllum*
65	16	*ada–koden*	*ada–kodien*
68	4	fore	for
105	26	pracices	practices
107	8	reseroirs	reservoirs
119	27	*tilliifolia*	*tiliifolia*
121	26	unde	under
127	20	multipupose	multipurpose
136	5	occasionaly	occasionally
136	26	dedicuous	deciduous
139	38	umbrauculiform	umbraculiform
140	2	partiall	partially
148	16	DISCOREACEAE	DIOSCOREACEAE
156	6	1990	1909
171	25	op. cit.)	op. cit.
171	25	1990.	1990).
176	1	**hexapetauls**	**hexapetalus**
180	27	(D.C.)	(DC.)
182	Figure	1	A
		2	B
183	22	Miers.	Miers
184	9	*C. cordifolius*	*Cocculus cordifolius*
192	1	GAPSELLA	CAPSELLA
193	15	Chowdhary	Chowdhery
197	10	L. virginicum	**L. virginicum**
199	18	321.	131.
203	7	Cultvated	Cultivated

207	24	Jocobs	Jacobs
215	16	India. 298.	India 2: 298.
219	13	Occassional	Occasional
219	14	**C. burmanni**	**C. burmannii**
225	23	et al in	et al.
229	8	Thom.	Thoms.
231	26	(Cav)	(Cav.)
235	23	cospicuous :	conspicuous :
243	1	Roxp.	Roxb.
244	30	Peniusular	Peninsular
256	1	B-Flower;	B- Calyx cut open;
	2	C-Sepal; D-Petal; E- Stamens; F- Pistil	C-Petal; D–Stamens & Pistil; E-L.S. of Pistil; F-Seed
257	10	Occuring	Occurring
261	2	Silene armeria	**Silene armeria**
279	30	Arbr.	Arbor.
283	27	give	gives
285	1	15 cm	15m
287	12	Omamental	Ornamental
288	12	Stigams	Stigmas
288	29	crect	erect
294	33	*A. bidentatnm*	*A. bidentatum*
303	26	Occassional	Occasional
305	7	Handls.	Handb.
311	14	glabours	glabrous
311	26	segements	segments
315	31	22.	22:
316	4	wolly	woolly
317	29	suborbcular,	suborbicular,
320	19	mecricarp.	mericarp.
320	24	n	in
320	24	barreu	barren
321	2	Maricarps	Mericarps
323	10	Nayar et al.	Nayar in Nayar et al.
323	20	-lobes,	-lobed,

323	25	campaulate,	campanulate.
324	8	obvoid,	obovoid,
326	13	Tamilandu	Tamilnadu
326	23	hgih.	high.
326	35	home	name
328	25	dehiseing	dehiscing
330	21	crolla	corolla
330	28	rood sides	road sides
335	35	*wightianum*	*wightianum*
337	29	Involuveral	Involucral
341	4	Mat.	Mast.
341	last line	trilosed,	trilobed,
342	11	tailing.	trailing.
342	24	1973;	1979;
353	32	107	107:
356	15	18.	18:
356	26	repors	reports
357	7	Mathew,	Matthew,
379	12	1995.	1993.
385	23	globsoe	globose,
386	23	Occasonal	Occasional
386	10	Noizbl.	Notizbl.
386	14	crenae-	crenate-
388	23	1948.	1998.
398	2	Jalana,	Jalna,
398	26	*'Ltki'*,	*'Litki'*,
399	9	rhomboi–ovate	rhomboid–ovate,
400	9	Almieda,	Almeida,
410	2	D- Fruit.	D- Floral parts;
421	24	n	in
422	2	eoloured,	coloured,
425	21	*T. subramanyamii*	*T. subramanyemii*
427	15	m in diam.;	mm in diam.;
435	32	pedundes	peduncles
436	32	dstricts	districts
439	13	1986.	1996.

443	12	plancentation	placentation
443	31	Ecuador.	Equador.
449	26	pedical	pedicel
461	12	asccending,	ascending,
463	34	dialated	dilated
465	20	Muhajan,	Mahajan,
467	31	*willdenovii*);	*willdenowii*);
467	32	(*C. willdenovii*).	(*C. willdenowii*).
470	2	E- C. s. of ovary;	E- Pistil;
471	2	arbobea	arborea
475	23	1938.	1838
479	22	desorders	disorders
481	2	scandant;	scandent;
486	5	cloured,	coloured,
487	13	fleshly,	fleshy,
488	3	(Pres.)	(Pers.)
488	36	flattered	flattened
494	24	t. 130.	f. 130.
496	11	ablong	oblong
506	1	**anamalayense**	**anamalaiense**
508	11	abtuse	obtuse
508	27	Leafllets	Leaflets
512	15	Syls.	Sylv.
520	30	create	crenate
526	19	Steeins.	Steenis,
535	6	teminal	terminal
541	26	create-	crenate,
542	18	-lanccolate	-lanceolate
542	20	create.	crenate.
543	26	stipulaer	stípular
546	29	Bhansal	Bhansali
547	1	pubesecent,	pubescent,
547	8	Bhansal	Bhansali
547	13	fascided	fascicled
553	19	margings	margins
553	23	1831-33;	1831-32;
558	Figure	1.	A
		2.	B

560	Figure	1.	A
		2.	B
561	33	Gumble,	Gamble,
564	4	Occassional	Occasional
564	14	ellipic	elliptic
564	32	illcg.	illeg.
566	7	vcins	veins
567	2	Rheed's	Rheede's
568	10	t. 195.	f. 195.
569	9	f. 3. 6,5:	66, f. 5:
570	24	F.	Fl.
571	12	capusles	capsules
572	6	1079;	1790;
576	11	*emarginauts*	*emarginatus*
580	23	F.	f.
582	5	occassionaly	occasionally
586	18-19	t. 1175.	t.175.
587	30	t. 967.	t. 967 b.
589	19	43:	43.
596	8	flatened	flattened
600	9	**Alysicarus**	**Alysicarpus**
604	10	tropcal	tropical
620	13	recemes :	racemes :
623	23	*Crotalara*	*Crotalaria*
629	7	membrahous,	membranous,
629	9	Februrary	February
629	11	476.	2: 476.
633	13	oboviod-	obovoid-
635	19	specie	species
642	6	sracemes.	racemes.
642	17	0.2–0.5,	0.2–0.5 cm,
645	7	occassional.	occasional.
655	16	imparipinnae	imparipinnate
657	27	axillay,	axillary
665	24	1852	1852 &
668	25	lanceloate,	lanceolate,
669	3	pads	pods
670	24	Mathew,	Matthew,

670	last line	joined.	jointed.
675	4	Setember	September
675	31	twinning,	twining,
679	5	Ahamednagar	Ahmednagar,
679	24	denely	densely
686	6	diciduous	deciduous
691	24	brackts	bracts
699	12	of	at
699	13	Howerver,	However,
699	14	charcter.	character.
701	7	Gillet	Gillett
701	19	Seed	Seeds
703	23	Flower	Flowers
706	31	unershrubs,	undershrubs,
715	25	levaes	leaves
715	26	apprssed	appressed
716	25	variey	variety
719	9	*aropurpureus*	*atropurpureus*
721	31	*Milleia*	*Millettia*
725	29	-1.0 cm,	-10 cm,
728	11	specie	species
733	12	Tamilndu	Tamilnadu
735	8	shurbs	shrubs
737	19	paris	pairs
752	10	One	On
753	19	undershurbs,	undershrubs,
765	17	April &	April-
765	26	-parple	-purple
772	8	-lanceoate,	-lanceolate,
772	27	**Phaseelus**	**Phaseolus**
774	1	**tetragonoloubs**	**tetragonolobus**
780	1	ferruginons	ferruginous
795	13	recemes.	racemes.
807	27	Pinnea	Pinnae
816	21	var. *bubescens*	var. *pubescens*
842	23	F.	Fl.

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