

FLORA OF INDIA
Series 2

Flora of Saurashtra

PART II

(ASTERACEAE TO CASUARINACEAE)

P. V. BOLE & J. M. PATHAK



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**Dedicated to the memory of the late
Rev. Father H. Santapau, S. J.
who initiated this work.**

FOREWORD

Flora of Saurashtra was studied by Rev. Father H. Santapau and published as a small book by the Saurashtra Research Society, Rajkot in 1962 covering the families from Ranunculaceae to Rubiaceae as Part I of the flora. The present work is comprehensive and deals with the families from Asteraceae to Poaceae in two parts. Prof. Bole and Dr. Pathak continued the studies of the Flora of Saurashtra and the results of these studies form a continuation of Rev. Fr. Santapau's work. The authors have placed their work at the disposal of the Botanical Survey of India for publication. Part II of the Flora covers the families from Asteraceae to Casuarinaceae and Part III covers the families Hydrocharitaceae to Poaceae. Appropriately the authors have dedicated this work to the memory of Rev. Fr. H. Santapau, a former Director of the Botanical Survey of India.

Saurashtra is now included as a part of Gujarat State and it presents a variable topography and extreme climatic conditions. The sea coast of this region is semi arid with heavy to low degree salinity in the soil, the western region comes under arid type, whereas the northern and eastern regions come under deciduous forests and grasslands. In this study, Bentham and Hooker's system of classification is followed.

Both the parts of this Flora contain a reference to about 632 genera and 1649 species. I do hope that this flora will help in the identification of the plants of this region and indirectly help in the conservation of plant species.

Calcutta
23 March, 1988

M.P. NAYAR
Director
Botanical Survey of India

INTRODUCTION

This work is offered as a fulfilment of the debt of honour to the students of floristics in India by the Blatter Herbarium, St. Xavier's College, Bombay. It is a continuation of the project FLORA OF SAURASHTRA by the late Rev. Dr. H. Santapau of which Part-I (Ranunculaceae-Rubiaceae) was published in 1962 by Saurashtra Research Society, Rajkot.

The 2nd and 3rd parts promised by him could not be worked out and completed on account of his various assignments. Realizing the undue delay, Dr. Santapau published a check-list of plants of the Flora of Saurashtra in 1967 with the help of Dr. K. P. Janardhanan, Botanical Survey of India.

In June, 1969, he took up the thread again after his retirement from the post of Director, BSI, but his ill health did not allow him to make any progress. After his demise in January, 1970, the work was left unattended for over 5 years until the junior author was assigned the task of completing the same in 1975 for his Ph. D. thesis of the University of Bombay and completed in the year 1980 under the guidance of the senior author.

The history of the Flora of Saurashtra has been given by Dr. H. Santapau in his Flora of Saurashtra, Part I and hence will not bear a repetition here. Since then, collections have been added by Dr. T. A. Rao of Botanical Survey of India who had studied the coastal vegetation of Saurashtra and by Dr. G. L. Shah, Sardar Patel University, Anand, who published the Flora of Gujarat State and who also provided us valuable information on the family Cyperaceae.

The pattern of the original work is maintained deliberately, as in the first part. Each species is treated under its scientific name with important references. In citing references, we follow Appendix-V of the 'Code' (International Code of Botanical Nomenclature, 1978, Utrecht).

The order of the families in this work is generally that of the "Flora of Presidency of Bombay" by T. Cooke which is about the same as that of J. D. Hooker in the "Flora of British India". However, in a number of cases, the circumscription of the families has been restricted in the light of recent revisions. Keys have been provided to the genera and species; such keys are wholly artificial and wherever possible are based on gross characters which may be visible without taking recourse to microscopic dissections. The genera and species are generally given in alphabetical order.

Separate indices to botanical and local names referred to in the text and an Appendix giving the nomenclatural changes of plants contained in Part-I of the flora published in 1962 are provided at the end.

It is hoped that the work will give a comprehensive account of the Flora of Saurashtra. The peninsula of Saurashtra is of great botanical interest as it forms the meeting ground of the two streams of botanical colonization, viz., the North African stream and the Indo-Malayan stream. In the northern parts, the African element predominates almost to the complete exclusion of any other type ; in the southern and south-eastern parts, it is the Indo-Malayan stream that is more typically represented. Grasslands and hills of this region hold valuable floristic elements of fodder plants and forest components and are in need of conservation.

P. V. BOLE
J. M. PATHAK

ABBREVIATIONS

- Cooke** : T. Cooke : The Flora of the Presidency of Bombay. London. 1901-1908. (Reprint 1958).
- FBI** : J. D. Hooker and others : The Flora of British India. London, 1872-1897.
- Gir** : H. Santapau & M. B. Raizada : Contribution to the Flora of the Gir Forest in Saurashtra. Indian Forest Records 4 : 105-170, Dehra Dun, 1955.
- ICBN** : International Code of Botanical Nomenclature, Utrecht, Netherlands, 1978.
- Indraji** : Jayakrishna Indraji Thaker : Botany, a complete and comprehensive account of the Flora of the Barda Mountain (Kathiawad). Bombay, 1910.
- JBNHS** : Journal of the Bombay Natural History Society.
- Pl. Saur.** : H. Santapau : Plants of Saurashtra—A preliminary list. Rajkot, 1953.
- Santapau & Jan.** : H. Santapau & K. P. Janardhanan : The Flora of Saurashtra, check list. Bull. Bot. Surv. Ind. Calcutta, Suppl. No. 1, Vol. 8, 1967.
- WI** : The Wealth of India. A Dictionary of Indian Raw Materials and Industrial Products. C. S. I. R., New Delhi.

ASTERACEAE

All florets on same head white :

Florets all tubular :

Stems and leaves white-cottony pubescent :

Leaves deeply pinnatifid, spinous at margins
and tips, white cottony beneath

Echinops

Leaves entire, not spinous cottony pubescent
on both sides

Dicoma

Stems and leaves more or less pubescent, but not
cottony, erect or suberect :

Stems winged, heads spherical

Sphaeranthus

Stems not winged, heads not spherical :

Involucral bracts connate for about 1/2
way into a tube ; pappus a short fibrilate
cup

Lagascea

Involucral bracts not connate, very
acute, ribbed on the back, margins
ciliolate and scarious

Ageratum

Involucral bracts multiseriate, 3-nerved,
scarious, margins not ciliolate

Chromolaena

Outer florets ligulate, inner tubular :

Leaves sessile ; paleae of receptacle flat, narrow ;
achenes compressed with narrow wing

Eclipta

Leaves petiolate ; paleae concave embracing the
achenes :

Achenes ciliate, Pappus 0

Spilanthes

Achenes not ciliate ; Pappus a few scales or
short bristles

Blainvillea

All florets on same head red-pink-purple violet-blue :

Leaves sessile or subsessile :

Leaves radical, flat on ground *Elephantopus*

Leaves radical and cauline, the latter alternate :

Leaves clearly decurrent in to stem :

Leaves glabrous *Cyathocline*

Leaves not glabrous :

Heads globose, Pappus 0 *Sphaeranthus*

Heads not globose, Pappus hairs abundant *Laggera*

Leaves not decurrent in to stem :

Pappus present :

Pappus hairs slender, uniseriate *Pluchea*

Pappus paleaceous, many seriate :

Florets rose coloured *Conocaulon*

Florets purple, violet or blue *Oligochaeta*

Pappus not paleaceous, copious usually 2 seriate *Vernonia*

Pappus 0 or of a few short hairs *Tricholepis*

Leaves usually petiolate and alternate :

Leaves decurrent into stem *Laggera*

Leaves not decurrent into stem :

Lower leaves petioled, upper amplexicaul and auricled *Emilia*

All leaves petioled :

Pappus of 5 scales *Ageratum*

Pappus uniseriate *Blumea (mollis)*

Pappus 2-many seriate *Vernonia*

Florets of two or more colours on same head :

Leaves compound, florets white or yellow and deeper yellow *Tagetes*

Leaves simple :

Leaves opposite, florets yellow above, red or purplish beneath *Stegesbeckia*

Leaves alternate :

Leaves petiolate :

Inner florets yellow or white, outer purple or pink	<i>Dichrocephala</i>
Outer florets yellow or white, inner deeper yellow	<i>Tridax</i>
Leaves sessile or shortly petioled, outer florets blue or violet, then a row of white, the innermost yellow	<i>Erigeron</i>
Florets all yellow :	
Leaves crenate, not deeply lobed	<i>Flaveria</i>
Leaves deeply lobed :	
Leaves opposite :	
Pappus of 2-4 rigid, retrorsely hispid hairs	<i>Bidens</i>
Pappus bristles retrorsely barbellate, not plumose	<i>Cosmos</i>
Pappus of many aristate, feathery bristles	<i>Tridax</i>
Pappus bristles simple	<i>Taraxacum</i>
Leaves mostly radical :	
Pappus of 2 retrorsely scabrid spreading hairs	<i>Glossogyne</i>
Pappus of many simple hairs :	
Achenes compressed, truncate above tapering below	<i>Sonchus</i>
Achenes columnar, truncate at both ends	<i>Launaea</i>
Achenes more or less compressed, tapering into a clear beak above	<i>Lactuca</i>
Leaves alternate :	
Prostrate plants :	
Pappus a short tube with fimbriate mouth	<i>Grangea</i>
Pappus of 2 small stiff awns	<i>Glossocardia</i>
Erect plants :	
Florets all ligulate	<i>Sonchus</i>
Florets all tubular	<i>Artemisia</i>
Outer florets ligulate, inner tubular :	

Segments of leaves linear	<i>Clossocardia</i>
Segments of leaves not linear	<i>Senecio</i>
Florets tubular and apetalous, not ligulate	<i>Xanthium</i>
Leaves entire or toothed, but not lobed :	
Leaves mainly radical :	
Outer florets ligulate, inner tubular	<i>Senecio</i>
Florets all ligulate :	
Achenes compressed, truncate above, tapering below	<i>Sonchus</i>
Achenes columnar, truncate at both ends	<i>Launaea</i>
Achenes tapering to a clear beak above	<i>Lactuca</i>
Leaves cauline, opposite :	
Achenes ciliate	<i>Sptlanthes</i>
Achenes not ciliate	
Achenes cuneiform ; pappus of 2-3 unequal bristles	<i>Blainvillia</i>
Achenes not cuneiform ; Pappus 0 or a short ring :	
Achenes gibbous-curved	<i>Sclerocarpus</i>
Achenes not gibbous-curved, each enclosed in boat-shaped bract	<i>Siegesbeckia</i>
Leaves cauline alternate :	
Florets all ligulate :	
Achenes truncate above	<i>Sonchus</i>
Achenes beaked above	<i>Lactuca</i>
Outer florets ligulate, inner tubular :	
Leaves sessile or subsessile :	
Involucral bracts 1-2 - seriate, equal	<i>Senecio</i>
Involucral bracts few-seriate, subequal	<i>Pulicaria</i>
Involucral bracts many seriate, unequal and with scarious margins	<i>Vicoa</i>

Leaves petioled :

Achenes prickly *Acanthospermum*

Achenes not prickly :

Achenes truncate,
triquetrous *Blainvillea*

Achenes not truncate nor
triquetrous :

Achenes glabrous :

Leaves white
cottony
beneath *Senecio*

Leaves not
white cottony *Helianthus*

Achenes hairy :

Stems rigid,
unbranched
below *Vicoa*

Stems not
rigid, more
or less
branched
below *Senecio*

Florets are tubular, or if ligulate, then
ligules inconspicuous, minute :

Leaves petioled :

Pappus 0 ; Achenes very small *Artemisia*

Pappus uniseriate, slender,
achenes small *Blumea*

Leaves sessile or subsessile :

Pappus 0 *Artemisia*

Pappus 1-2 seriate :

Pappus 2 seriate *Pulicaria*

Pappus uniseriate :

All bisexual florets
fertile *Helichrysum*

Less than half bisexual
florets fertile *Gnaphalium*

Pappus many seriate *Dicoma*

Florets tubular and apetalous, not
ligulate ; involucre in fruit ovoid, prickly *Xanthium*

ACANTHOSPERMUM Schrank.

Acanthospermum hispidum DC. Prodr. 5 : 522. 1836 ; Santapau, Fl. Khandala 139. 1936 ; Santapau, Pl. Saur. 398. 1953 ; Santapau & Jan. 27. 1967.

An annual, erect herb ; stems hispid, leafy much branched. Leaves ovate, sessile, membranous, sub-hispid, sub-dentate, base cuneate. Flower heads many-flowered, heterogamous ; ray florets in one series, female ; disc florets tubular, male. Involucral bracts in one series, usually about 5 in number. Pappus 0. The achenes are tightly covered with prickly bracts of paleae. The florets are all pale yellow.

Flowers : August to December ; in moist spots the whole year.

Occurrence : Collected from Junagadh, along the road to the Girnar temple, very abundant ; Junagadh in the river bed, also in the grounds of the Forest College, etc., Girnar, where forest has been cut down, along road Junagadh to Veraval ; Sasan in the Gir Forest, masses in silted ground near large river dam ; Satadhar station, abundant just outside the station near the railway line ; Okha, along the railway line, rare ; Rajkot, Jilla Park abundant near the river.

Uses : This plant is used in the treatment of leprosy. (Caius in JBNHS 41 (3) : 614. 1940)

AGERATUM Linn.

Ageratum conyzoides Linn. Sp. Pl. 839. 1753 ; FBI. 3 : 243 ; Indraj, 398. 1910 ; Santapau, Pl. Saur. 399. 1953 ; Santapau & Jan. 27. 1967.

An annual herb, 12-40 cm high, seldom higher, growing in moist ground throughout the year. Leaves variable in size and shape, opposite or the upper alternate, 8-7 × 2-5 cm crenate more or less hairy on both sides ; base cuneate. Heads small, numerous, pure white or occasionally pale blue in colour, corollas regular, tubular ; pappus of 5 scales ; about equalling the corolla.

Local name : Ajagandha, Gandhari Sedardi, Mankadmari.

Flowers : From october onwards.

Occurrence : Common as a garden weed all over Saurashtra; collected from Kileshwar on the Baroa Hills, in garden; Junagadh along the road to the Girnar, common ; Girnar hill, common on the lower slopes especi-

ally near the road and steps, Gir forest, common near water (at Sasangir, Kankai, Junwania etc.) ; in moist places throughout the year, but seldom abundant.

Uses : The leaves are used in wounds as a good styptic remedy ; a fermentation of the leaves is used in skin diseases and sores (WI).

ARTEMISIA Linn.

Artemisia parviflora Buch.-Ham. ex Roxb. Fl. Indica 3 : 420. 1832 ; FBI 3 : 322 ; Cooke 2 : 104 ; Santapau, Pl. Saur. 401. 1953 ; Santapau & Jan. 27. 1967.

Erect, perennial herb or undershrub ; stem branched, branches slender, closely adpressed to main stem. Leaves sessile, cuneate, variously toothed, apex rounded, upper leaves linear, entire or variously divided. Flowers minute, in very small heads, which are pedicelled, the colour of the florets is difficult to find on account of the small size of the same, but appears simply greenish.

Local name : Khoto-Davano.

Flowers : October onwards.

Occurrence : Collected it in flower on the slopes of the Girnar ; Blatter collected it from Junagadh in Dec. 1907 ; Indrajī also collected it from the slopes of Girnar in 1916.

Note : The plant has none of the scent that is so typical of the genus.

BIDENS Linn.

Bidens biternata (Lour.) Merr. & Sherff. ex Sherff in Bot. Gaz. 88 : 293. 1929 ; Santapau, Pl. Saur. 402. 1953 ; Gir 178. Santapau & Jan. 27. 1967. *Coreopsis biternata* Lour. Fl. Cochinch. 508. 1790. *Bidens pilosa* auct. (non Linn. 1753) ; FBI 3 : 309 ; Indrajī 412. 1910.

Annual, erect, 0.5-1.5 m high. Leaves at least the lower ones bipinnate or tripinnate, membranous, glabrous or nearly so. Heads up to 12 mm diam. elongating in fruit, ray florets ligulate, disc florets tubular, all yellow or the ray florets sometimes whitish, the disc florets always yellow ; involucre bracts glandular hairy at base, the outer ones narrowly linear acute or subacute ; the inner ones ovate lanceolate or elliptic, narrowed near the apex into a hairy tip, the margins scarious. Achenes

linear, black or nearly so, up to 2 cm long ; pappus of 2-4 rigid spreading awns.

Local name : Samarokadi, Samara kokadi.

Flowers : In moist places nearly all the year.

Occurrence : Jamnagar and its neighbourhood, common Kileshwar on the Barda hills, rare ; Rajkot, common in moist places ; Girnar slopes, occasional below, more common half way up the step to the temples ; Gondal, near Lake and in public gardens, Chotila, in hedges, common ; Sasan, along the stream bed ; Beyt island near Dwarka, occasional in hedges.

Uses : This plant is an aromatic herb used medicinally. An infusion of plant is said to be taken in Malaya for coughs. It is reported to be eaten readily by cattles. (WI)

Note : This plant is often confused in the literature and in herbaria with the real *B. pilosa* Linn. from which it differs among other points by the leaves, which are simply pinnate in *pilosa*, 2-3-pinnate in *bipinnata* ; further the external involucre bracts are dilated towards the apex in *pilosa*, narrowed in *bipinnata*.

BLAINVILLEA Cass.

Blainvillea acmella (Linn.) Philip. in *Blumea* 6 : 350. 1950 ; Santapau & Jan. 27. 1967. *Verbesina acmella* Linn. Sp. Pl. 901. 1753. *Blainvillea rhomboides* Cass. Nat. Dict. Sci. Nat. 29 : 494. 1823, Cooke 2 : 97. *Blainvillea latifolia* (Linn. f.) DC. in Wight Contrib. 17. 1834 ; FBI. 3 : 305, Indrajai 411. 1910. *Eclipta latifolia* Linn. f. Suppl. 378. 1781.

An annual erect herb, with striate stem, which is also very hairy with stiff hairs, up to 1.2 m high. Leaves ovate or ovate lanceolate, alternate or opposite, acute, crenate, serrate, hispid, 3-nerved from the base. Heads 8-12 mm across, usually white in colour, the ray florets very small and scarcely noticeable the disc florets tubular and regular. Pappus of a few scales ; achenes cuneiform, straight or curved, very typical in shape.

Local name : Dholufuladu.

Flowers : August to October.

Occurrence : This plant was found very common all over Saurashtra, by the sides of roads, etc. Beyt island, common and abundant in waste lands ; Dwarka occasional ; Gorinja station near Dwarka, common along the

railway line ; Okna to Mithapur, common along the railway line, Jamnagar, abundant in waste lands ; Beyt, near talao common ; Kota in waste lands, common ; Rajkot, abundant as a weed in cultivated fields, Abhapara slopes on the Barda Hills ; Gondal ; Junagadh, Girnar along paths and near the main road ; common ; Junagadh, on the slopes and in garden near Willingdon dam, Sasan and Kankai in Gir forest, Kansia-nes station and neighbourhood, occasional ; Rajkot to Surendranagar, common, along the railway line, Chotila, not common.

Uses : The whole plant is used medicinally, it is used to obtain black colour dye by mixing with the leaves of Bhangra. Leaves are used in rheumatism, flowers are used for headache. (Indraji 411. 1910).

BLUMEA A. P. de Candolle (non. cons.)

Florets purple, not yellow	<i>mollis</i>
Florets usually yellow, occasionally purple :	
Leaves thick, densely woolly	<i>malcolmiti</i>
Leaves membranous, more or less pubescent but not woolly :	
Heads few, solitary or 2 together, peduncled at ends of branches ; bracts tipped with long hair :	
Leaves remotely denticulate, 1.5-8.0 × 0.2-0.8 cm ; connective appendage tapering at apex	<i>bovet</i>
Leaves serrate-dentate, 0.5-6.0 × 0.25-2.0 cm ; connective appendage rounded at apex	<i>obliqua</i>
Heads many small ; bracts not tipped with long hair :	
Heads in spike-like cymes or panicles :	
Receptacles pubescent ; achenes ribbed	<i>fistulosa</i>
Receptacles glabrous ; achenes not ribbed	<i>lacera</i>
Heads in open corymbs	<i>membranacea</i>

Blumea mollis (D. Don) Merrill. in Phil. J. Sci. Bot. 5 : 395. 1910 ; Santapau, Pl. Saur. 408. 1953 ; Randeria, 10 : 261. 1960 ; Santapau & Jan. 27. 1967. *Erigeron molle* D. Don., Prodr. Fl. Nep. 172. 1825. *Blumea wightiana* DC. in Wight, Contrib. 14. 1834 ; FBI 3 : 261, Cooke 2 : 76 ; Indráji 400. 1910.

An erect, softly hairy or villous herb ; leaves obovate, irregularly serrate or toothed, heads small, many in spike like clusters. Florets purple. Achenes minute, oblong, 4-5-angled, not ribbed, hairy.

Local name : Chanchadmari.

Flowers : October onwards.

Occurrence : Collected from Girnar Hills, Junagaon, Kileshwar on the Barda Hills, in moist and shaded spots ; Gir Forest, at Sasangir, in the undergrowth ; Kankeshwari, in sheltered spots in forests.

Uses : The name in vernacular is suggestive of its use as an insecticide. Commercial use not known.

Blumea obliqua (Linn.) Druce in Rep. Bot. Exch. Cl. Brit. Isles 4 : 609. 1917 ; Santapau & Jan. 27. 1967. *Erigeron obliqua* Linn. Mant. 573. 1771. *Blumea amplexans* DC. in Wight, Contrib. 13. 1834 ; FBI 3 : 261. Cooke 2 : 75 ; Santapau, Pl. Saur. 404. 1953.

A small annual herb, more or less hairy all over. Leaves auricled at the base, sharply toothed, up to 5 cm long. Floral heads few, solitary or 2 together, peduncled at the ends of branches. The peduncles often longer than the leaves. Florets yellow ; receptacle glabrous ; pappus pink.

Local name : Kapurio.

Flowers : December onwards.

Occurrence : Wankaner ; this plant is given on the authority of Cooke.

Blumea bovei (DC.) Vatke, Linnaea 39 : 485. 1875 ; Randeria, 288. 1960 ; Santapau & Jan. 27. 1967. *Conyza bovei* DC. Ann. Sci. Nat. Bot. 261. 1834.

Herb 20-40 cm high, stems branched from the base, terete, glabrous. Leaves linear-oblong, sessile, sparsely hairy on both sides, tips apiculate, margins distinctly denticulate, base auriculate with rounded lobes. Heads axillary and terminal, florets are said to be yellow but in Saurashtra specimens it was noted as purple at the time of collection.

This is a new record for Saurashtra, and probably also for India. The specimens have been identified at Kew as *B. bovei*.

Flowers : October to November.

Occurrence : Collected from Sasan near river in Gir Forest ; Jamnagar ; Dwarka near station ; Syke's Point near Salaya ; Ranjit Sagar, Jamnagar ; Gondal.

Blumea fistulosa (Roxb.) Kurz in Journ. As. Soc. Beng. 46 (2) : 167. 1877. *Conyza fistulosa* Roxb. Fl. Ind. 3 : 429. 1832. *Blumea glomerata*

DC. in Wight, Contrib. 15. 1834 ; FBI 3 : 262 ; Cooke 2 : 20 ; Santapau, Pl. Saur. 405. 1953.

An erect annual herb ; lower leaves petioled, upper ones much smaller and subsessile, all serrate, silky pubescent; the lower leaves at times are deeply incised or lyrate. Heads small, sessile in small groups along the branches ; florets yellow ; receptacles pubescent ; achenes ribbed.

Flowers : October.

Occurrence : Collected from Ghumli, on the Barda Hills and from Bordevi on the Girnar and from Sasangir.

Blumea lacera (Burm. f.) DC. in Wight, Contrib. 14. 1834 ; FBI. 3 : 263 ; Clarke. 76 ; Cooke 2 : 76 ; Indrajit 400. 1910 ; Santapau, Pl. Saur. 405. 1953 ; Santapau & Jan. 27. 1967. *Conyza lacera* Burm. f. Fl. Ind. 180, t. f. 1. 1768.

An annual erect herb, with a strong odour of turpentine, which however is not distinctive of this species. Florets yellow, for the rest very similar to *B. mollis* (D. Don) Merr.

Local name : Kapurio, Kalhar.

Flowers : October onwards.

Occurrence : Rajkot, in moist places, with strong scent in the leaves ; Gir Forest, at Sasan, near the river; on the Barda Hills, in sheltered spots ; Junagadh and Jamnagar.

Uses : It is used as a febrifuge deobstruent and stimulant. The juice of the leaves is mixed with black pepper is given in cholera. This plant is hot, bitter, antipyretic, cures bronchitis, blood disease, fevers, burning sensation, thirst. Root kept in the mouth cures mouth diseases. [Gaz. A (1), 40. 1953]

Blumea malcolmii (Clarke) Hook. f. Fl. Brit. Ind. 3 : 266. 1882, Cooke 2 : 78 (Reprinted ed. 1958). Randeria, *Blumea* 10 (1) : 278. 1960 ; Santapau & Jan. 27. 1967, *Pluchea malcolmii* Clarke, Comp. Ind. 95. 1876. *Pluchea lanuginosa* Hook. f. Fl. Brit. Ind. 3 : 266. 1882, in Syn. *Blumea lanuginosa* Law ex Cooke, Fl. Bombay 2 : 23. 1908.

A stout herb, with thick leaves and leaves are densely covered all over with hairs or white silky wool. Leaves large, sharply and closely toothed, densely woolly, tapering to the petiole. Heads medium-sized for the genus, all woolly, flowers yellow. Achenes obscurely angled, silky.

Flowers : Winter months.

Occurrence : In Blatter Herbarium there is a sheet collected in Dec. 1907 from Junagadh (No. 20536), which seems to belong to the present species.

Blumea membranacea DC. Prodr. 5 : 440. 1836 ; FBI 3 : 265 ; Cooke 2 : 77 ; Santapau, Pl. Saur. 407. 1953 ; Santapau & Jan. 27. 1967.

An erect annual herb, about the tallest in the genus, often 1 m or more in height, more or less extensively branched above ; stems, leaves and inflorescence glandular pubescent. Leaves membranous, deeply and irregularly incised, decurrent into an obscure petiole. Heads numerous, small, on glandular-hairy peduncles ; florets yellow. Achenes ribbed. Pappus white.

Flowers : October to May.

Occurrence : This plant was noted at Laloi near Jamnagar ; at Junagadh, on the slopes of the Girnar ; at Kileshwar and Ghumli in the Barda Hills ; at Sasan and Shirwan in the Gir Forest, near water, up to 1.10 m high.

CHROMOLAENA A. P. de Candolle

Chromolaena odorata (Linn.) King & Robinson, Phytologia 20 : 204. 1970 ; C. J. Saldhana & D. H. Nicolson in Fl. Hassan. 608. 1976. *Eupatorium odoratum* Linn. Syst. ed. 10, 1250. 1759. FBI 3 : 244. *E. repandum* Ssensu Santapau & Jan. 28. 1967. (non Willd. 1767).

An annual erect undershrub, up to 1 m high. Stems branched, terete, pubescent. Leaves opposite, acute or acuminate, glabrous above, more or less pubescent or silky beneath, margins sinuate-dentate, the upper leaves few-toothed. Flowers in small heads, dirty white in colour or pale blue ; heads about 1 cm long, cylindric, 0.5 cm broad ; involucrel bracts multiseriate, 3-nerved, scarious, the outer ones the shortest. Corollas all tubular.

Flowers : October onwards.

Occurrence : Rajkot Catholic Church Compound ; also in the neighbourhood of the Willingdon dam at Junagadh.

COSMOS Cav.

Cosmos sulphureus Cav. IC. 1 : 56, t. 79. 1791 ; FBI 3 : 310. 1883 ; Bailey 999. 1949 ; Santapau & Jan. 27. 1967.

An erect annual herb, much branched. Leaves pinnate or bipinnate, opposite, the lobes lanceolate, acute. Heads on long peduncles, 4-7 cm across, yellow ; outer florets rayed, the rays strongly 3-toothed at apex ; inner florets tubular, the anthers exserted ; achenes beaked.

Flowers : Most of the year.

Occurrence : Only seen under cultivation in gardens in various parts of Saurashtra, Rajkot, in Jubilee Gardens ; Sasan in the Gir Forest, in Garden ; Junagadh, along the road to the foot of the Girnar, near a garden, possibly escape.

Uses : An ornamental plant. Recently some chemicals are extracted from the dried ray florets of the plant. (WI)

CYATHOCLINE Cass.

Cyathocline purpurea (Don.) O. Kuntze. Rev. Gen. Pl. 333. 1891 ; Santapau, Pl. Saur. 410. 1953 ; Santapau, Fl. Khandala 124. 1960 ; Santapau & Jan. 27. 1967. *Tanacetum purpureum* Ham. ex Don., Prodr. 181. 1825. *Cyathocline lyrata* Cass. in Ann. Sc. Nat. Ser. 1, 17 : 420. 1829, FBI 3 : 246 ; Cooke 2 : 71, Indrajī 398. 1910.

An erect soft herb, at first with a rosette of leaves at ground level, which however soon disappear ; cauline leaves sessile, pinnatifid, more or less pubescent. Flowers in small heads, the outer ones ligulate, the inner tubular, regular, all purple. Pappus 0 ; achenes oblong, minute. The whole plant is fairly strongly and sweetly scented.

Local name : Gangotri, Okhrad.

Flowers : Post monsoon months.

Occurrence : Girnar, near water at Bordevi, common though not abundant ; Junagadh, on river banks ; Junwania, common near water ; Shirwan, along stream bed ; Kankai, common and abundant on stream banks ; Sasan, on earth banks and moist spots, in shade, common.

Uses : Whole plant is used medicinally ; fresh plant is tied on the abdomen to relieve urine. (Indrajī 398. 1910)

DICOMA Cass.

Dicoma tomentosa Cass. in Bull. Soc. Philom. 47, t. 556. 1818 ; FBI 3 : 387 ; Cooke 2 : 116 ; Indrajī 417. 1910 ; Santapau, Pl. Saur. 411. 1953 ; Sant. & Jan. 27. 1967.

An annual much branched herb, the whole plant ashy pubescent. Leaves sessile, entire, linear or linear-obovate, densely wooly tomentose on both side. Heads numerous, corollas all tubular, white or pale yellow ; involueral bracts spinous, longer than the florets, more or less spreading but not recurved. Pappus longer than the achenes, achenes truncate, silky hairy.

Local name : Dholo-harancharo.

Flowers : August onwards.

Occurrence : Khatia near Jamnagar in waste lands ; Abhapara lower slopes and plains at the foot, common ; Kota near Khambaliya, common in cultivated fields ; Matwa Matli ; Rajkot Pradumna Park, abundant among short grasses on stony ground ; Gondal, in dry ground near lake, common ; Chotila, in open ground generally ; Porbandar.

Uses : It is strongly bitter and is used as a febrifuge. especially in febrile attacks after child-birth. (WI)

ECHINOPS Linn.

Echinops echinatus Roxb. Fl. Ind. 3 : 447. 1832 ; FBI 3 : 358 ; Cooke 2 : 112 ; Indrajī 413. 1910 ; Santapau, Pl. Saur. 412, 1953 ; Santapau & Jan. 27. 1967.

An annual erect herb, much branched from below, the branches covered with cottony pubescence. Leaves sessile, oblong, deeply pinnatifid, spiny at the edges, somewhat pubescent above, densely araneously pubescent beneath. Heads in balls, white e. 5-3 cm diam. ; flowers regular, tubular, usually white or pale lilac in colour ; involucre very spiny, the spines coming from the apices of the involueral bracts. Pappus short ; achenes short, densely villous.

Local name : Shuliyo, Utkanto, Utkato.

Flowers : October onwards, during winter.

Occurrence : In dry stony ground all over the drier parts of Saurashtra, Bhanvad, in cultivated fields ; Ghumli in waste lands ; Kileshwar on

the Barda Hills, occasional in waste lands ; Rajkot in waste lands near the river and Pradumna Park common ; Gondal occasional ; Bhavnagar, in waste lands about Victoria Park ; Chotila, common ; Rajkot to Gondal, Jetalsar, and Junagadh along the railway line, occasional ; Mangrol and Porbandar in waste lands, common ; Gir Forest, fairly common ; Tulsishyam, common ; Sasan, waste lands near village, common ; Somnath area, abundant in hedges ; Dwarka, etc. fairly common in winter.

Uses : The plant is bitter, tonic and diuretic. It is used in hoarse cough, hysteria, dyspepsia, scrofula and ophthalmia. The root is applied to wounds on cattle to destroy maggots. Mixed with Acacia gum, it is applied to the hair to destroy lice. (WI)

ECLIPTA Linn.

Eclipta alba (Linn.) Hassk. Pl. Jav. Rar. 528. 1848 ; FBI 3 ; 304 ; Cooke 2 : 96 ; Indraji 408. 1910 ; Santapau, Pl. Saur. 413. 1953. Saldhana & Nicolson, Fl. Hassan, 612. 1976. *Verbesina alba* Linn. Sp. Pl. 902. 1753. *V. prostrata* Linn. *Ibid.* 902. *V. pseudoacmella* Linn. *Ibid.* 901. 1753. *Eclipta prostrata* (Linn.) Linn. Mant. Alt. 286. 1771 ; Santapau, Fl. Khandala, ed. 3, 133. 1967, Santapau & Jan. 27. 1967.

An annual herb, erect, suberect or prostrate, often rooting at the nodes ; when growing in water the stem may become swollen and rather soft ; stems and branches strigose ; leaves sessile, usually oblong lanceolate, subentire, more or less hairy on both sides. Heads in axillary peduncles ; flowers white ; ray florets ligulate, but legules small and inconspicuous ; disc florets tubular. Involucral bracts green in colour, about 8 in number, strigose. Achenes cuneate, winged, warted. Pappus 0.

Local name : Bhangra, Babri, Kalobhangro, Kalugandhi.

Flowers : Throughout the year, at least in moist places.

Occurrence : It was found all over Saurashtra ; usually it is common in moist ground, in river beds, etc. It is common in the Gir Forest ; It is occasional on the drier slopes of Abhapara on the Barda Hills.

Uses : The herb is used as tonic and deobstruent in hepatic and spleen enlargements and in skin diseases. The plant juice is administered in combination with aromatics for catarrhal jaundice. The expressed leaf juice along with honey is a popular remedy for catarrh in infants. (WI).

Note : "The last example of article 57 (I. C. B. N. 1978) cites *Eclipta alba* as the name to use when united with *E. prostrata* since Hass-

karl was the first author to unite these taxa (under *E. alba*)."

ELEPHANTOPUS Linn.

Elephantopus scaber Linn. Sp. Pl. 814. 1753 ; FBI 3 : 242 ; Cooke 2 : 68 ; Indrajai 398. 1910 ; Santapau, Pl. Saur. 414. 1953 ; Santapau & Jan. 27. 1967.

An erect, annual or perennial herb ; rootstock short giving off many stout roots ; the rootstock seems to be at least biennial. Leaves generally coming out at the surface of the ground, and laying flat forming a large rosette. Inflorescence on a scape-like. Usually leafless stem ; heads very small, consisting of 2-5 flowers, but united to form a head-like cluster, enclosed by three large, leafy bracts. Flowers regular, purple in colour.

Local name : Bhopatri, Kharsabhopatri.

Flowers : September to December.

Occurrence : Recorded here on the authority of Indrajai. He reported it from the Barda Hills, as growing in fairly good numbers under the protection of mango and other trees on nearly bare ground.

Uses : The plant is mucilaginous, astringent and tonic. A decoction of the roots and leaves is used as emollient and is given in dysuria, diarrhoea, dysentery and swelling or pains in the stomach. The root is given to arrest vomiting, powdered with pepper it is applied in tooth-ache. Bruined leaves boiled in coconut oil are applied to ulcers and eczema. (W1)

EMILIA Cass.

Emilia sonchifolia (Linn.) DC. in Wight, Contrib. 24. 1834 ; FBI 3 : 336 ; Cooke 2 : 107 ; Santapau & Jan. 28. 1967. *Cacalia sonchifolia* Linn. Sp. Pl. 835. 1753.

An erect or suberect annual herb, often unbranched, pubescent to nearly glabrous. Leaves variable ; the lower ones large, lyrate, toothed, petioled ; the cauline leaves sessile, amplexicaul, the base of the leaves auricled. Heads few, on slender peduncles ; florets purple, all tubular, hermaphrodite. Involucral bracts acute, margins scarious, the whole involucre cylindric and glabrous or nearly so, Pappus abundant, soft white.

Local name : Hirankhuri.

Flowers : August to October.

Occurrence : In moist shaded spots in the Gir and Girnar forest, Bordevi, abundant near water ; Junagadh in river bed, common ; Girnar, abundant on higher ground along the road ; Gir forest at Shirwan, near water ; Kankai, Jamwalla and Sasan near streams, common.

Uses : It is edible and is used as a salad plant before flowering. The leaves are cooked and eaten as vegetable. They have slightly acid taste with a touch of bitterness and a delicate flavour. The plant is sudorific. A decoction of it is used as febrifuge in infantile tympanites and in bowel complaints. The root is used for sore ears, sore eyes and night blindness. The plant is also used for cuts and wounds. (WI)

ERIGERON Linn.

Erigeron asteroides Roxb. Fl. Ind. 3 : 432. 1832 ; FBI 3 : 254 ; Cooke 2 : 73 ; Santapau, Pl. Saur. 416. 1953 ; Santapau & Jan. 28. 1967.

An erect annual herb, with much branched stems, which are clothed with spreading hairs. Leaves sessile or nearly so, those of the stem auriculate, half-amplexicaul, toothed or sublobed. Heads 6-12 mm diam., few ; bracts with scarious margins. Flowers of various colours ; outer florets purple, then one or more rows of white florets ; centre ones pure yellow.

Local name : Maredi.

Flowers : August to December.

Occurrence : It was abundant in a dense clump on the sides of the lake in Pradumua Park, just out of water.

Uses : It is used as a stimulating diuretic in febrile conditions. (WI)

Notes : The outer row or rows consists of ligulate bluish purple florets ; then there are a few rows of female white florets ; the inner group of yellow florets consists of hermaphrodite or bisexual florets.

FLAVERIA JUSS.

Flaveria trinervia (Spreng.) C. Mohr. in Contrib. U. S. Nat. Herb. 6 : 810. 1910 ; Raizada et Sharma, Ind. For. 88 (5) : 363. 1962 ; Santapau and Jan. 28. 1967. *Oadera trinervia* Spreng. Bot. Cart. Halle 63. 1800.

An erect, glabrous, dichotomously branching herb, 15-50 cm high. Leaves opposite, linear lanceolate, 3-nerved from the base, sessile or

petiolate ; petioled leaves expand at the junction between petiole and stem; sessile leaves are those below the flower heads, which broaden out into a rather broad base. Heads consisting of 5-6 florets yellow, enclosed by slender paleaceous bracts ; compound heads up to 8-13 mm diam. subtended by a leaf and several bracts. Achenes nearly black, strongly ridged.

Local name : Pilo-bhangro.

Flowers : October onwards.

Occurrence : Lalpari talao, Rajkot ; abundant in almost pure stands on sides of Pradumna Park ; Jilla Park, near water, Rajkot ; Veraval near Dwarka ; Jamnagar, cultivated in the Jail, Beyt near Dwarka, near talao.

Uses : This plant is a fodder plant for cattle, it is also used in dying industry, leaves are applied to the wounds, sometimes whole plant is crushed and boiled with oil and applied on the wounds. (Indraji 410. 1910)

GLOSSOCARDIA Cass.

Glossocardia bosvallea (Linn. f.) DC. in Wight, Contrib. 19. 1834 ; Santapau, Pl. Saur. 418. 1953 ; Santapau & Jan. 28. 1967. *Verbesina bosvallea* Linn. f. Suppl. 379. 1781. *Glossocardia linearifolia* Cass. in Dict. Sci. Nat. 19 : 62. 1821 ; FBI 3 : 308 ; Cooke 2 : 100.

A small prostrate or suberect annual herb, much branched from the base, the branches spreading, leaves cauline, alternate, much dissected into linear segments. Heads minute, yellow, outer involucra^l bracts, more or less acute, margins ciliate and membranous, the midrib green ; pappus of 2 stiff spreading awns ; achenes brown, flattened, densely hairy on the edges.

Local name : Adbausuva, Pattharsuva.

Flowers : August to October.

Occurrence : In very dry places, Khatia on rocky ground ; Beyt, near Dwarka, in waste lands ; Abhapara slopes occasional ; Rajkot, abundant on dam of Pradumna Park, and beyond the talao on very dry slopes ; Chotila hill, occasional ; Gondal, abundant near lake ; Rajkot to Gondal, noted in stations along the railway line as abundant ; Junagadh along the main road to Girnar, common in Sasan, in waste lands.

Uses : The plant has a bitter taste and fennel like odour. It is eaten as a vegetable especially in times of scarcity. It is also used as emmenagogue. (WI)

GLOSSOGYNE Cass.

Glossogyne bidens (Retz.) Alston. in Trim. Hand. Fl. Ceyl. 6 : 168. 1931 ; Santapau & Jan. 28. 1967. *Zinnia bidens* Retz. Obs. 5 : 28. 1789. *Glossogyne pinnatifida* DC. in Wight. Contrib. 19. 1834 ; FBI 3 : 310 ; Cooke 2 : 102 ; Indrajai 413. 1910.

A perennial herb, much branched from a stout root ; leaves mostly radical, leathery, dissected into a few segments flowering. Flowering branches almost leafless, glabrous. Involucral bracts connate at the base ; ray florets ligulate, yellow, the ligule 3-toothed. Achenes glabrous ; Pappus of 2 spreading awns.

Local name : Pardesibhangro.

Flowers : September to October.

Occurrence ; Rajkot in the dry places in the river bed and near the railway line.

Uses : The root of this plant is used for toothache. (WI)

GNAPHALIUM Linn.

Heads in corymbose leafless clusters

luteo-album

Heads in leafy spikes

polycaulon

Gnaphalium luteo-album Linn. Sp. Pl. 851. 1753 ; FBI 3 : 288 ; Cooke 2 : 86 ; Santapau, Pl. Saur. 421. 1953 ; Santapau & Jan. 28. 1967.

An erect or more or less procumbent woolly herb, sometimes woody at the base ; stems simple, softly woolly. Leaves simple, spatulate-oblong, often mucronate at the apex, margins entire or obscurely toothed. Heads minute, crowded on elongated leafless scapes ; involucral bracts shining, many-seriate ; style arms of the hermaphrodite flowers short and slender ; pappus hairs free from each other or slightly connate at the base, uni-seriate ; achenes minute.

Flowers : October to December, in moist places longer.

Occurrence : Okha and Dwarka, on moist soil away from the shore ; Laloi near Jamnagar, among grasses in moist soil ; Junagadh, at the foot of the Girnar Hill, in moist soil ; Ghumli on the Barda Hills ; Jamnagar near Jail.

Gnaphalium polycaulon Persoon, Syn. 2 : 421. 1807 ; C. Saldanha & D. Nicolson, Fl. Hassan 616. 1976. *G. indicum* auct. (non Linn. 1753) Indrajai 404. 1910 ; Santapau & Jan. 28. 1967.

Similar to the preceding species, but usually smaller ; heads on a scape that is leafy throughout.

Local name : Pulvo.

Flowers : October to December.

Occurrence : Common in moist river beds after the monsoon, in bunds of cultivated fields ; Rajkot, in river bed ; Rajkot, Pradumna Park, in cultivated fields and waste lands, abundant.

GONIOCAULON Cass.

Goniocaulon indicum (Klein ex Willd.) C. B. Clarke, Comp. Ind. 236. 1876. *Serratula indica* Klein ex Willd. Sp. Pl. 3 : 1642, 1803. *Goniocaulon glabrum* Cass. in Dict. Sci. Nat. 19 : 201. 1818 ; FBI 3 : 377 ; Cooke 2 : 113 ; Santapau & Jan. 28. 1967.

An erect slender herb, 1-2 m high ; stems glabrous ; angled and striate, at first green, later on straw-coloured. Leaves sessile, linear oblong, serrate, marked with dark dots on both sides. Heads about twice or thrice as long as broad, with only 4-6 florets in each, the florets rose or purple in colour. Involucral bracts many seriate, almost white.

Flowers : October onwards.

Occurrence : On earth bunds of cultivated fields between Veraval and Sasangir, occasional ; in cultivated fields, very abundant, between Visavadar and Junagadh ; cultivated as a medicinal plant in Sardar Baug, Junagadh.

GRANGEA Adans.

Grangea maderaspatana (Linn.) Foir. in Lam. Encys. Method. Suppl. 2 : 825. 1811 ; FBI 3 : 247 ; Cooke 2 : 72 ; Indrajai 399. 1910 ; Santapau,

Pl. Saur. 422. 1953 ; Santapau & Jan. 28. 1967. *Artemisia maderaspatana*
Linn. Sp. Pl. 849. 1753.

A prostrate herb, stem radially spreading from a stout root ; leaves sessile, stiff, pinnatifid, the segments coarsely serrate, all more or less hairy. Heads few, fairly stout, on short leaf opposed peduncles, flowers pure yellow. Pappus a short tube.

Local name : Nahani mundi, Jhinki mundi.

Flowers : December to May.

Occurrence : Rozi and Ranjit Sagar, near Jamnagar, in drying pools or in moist ground near water ; Rajkot, in cultivated fields near Pradumna Park, and in the Park just above water level near the talao, very abundant; Junagadh, cultivated as a medicinal plant in Sardar Baug ; Dwarka, large numbers of seedlings in drying talao.

Uses : The leaves are regarded as stomachic, deobstruent and anti-spasmodic and prescribed as infusion or electuary. They are considered good for irregular menses. They are used in antiseptic and anodyne fomentations. (WI)

HELIANTHUS Linn.

Helianthus annuus Linn. Sp. Pl. 904. 1753 ; Roxb. Fl. Ind. 3 : 443. 1824 ; Cooke 2 : 66 ; Santapau, Pl. Saur. 423. 1953 ; Gir 189, Santapau & Jan. 28. 1967.

An erect annual herb, up to 3 m high. Stems pubescent or hirsute. Leaves alternate, very large, acuminate at the apex toothed. Heads varying much in size according to the variety ; in some varieties, which are cultivated in Saurashtra, up to 30 cm diam. ; outer florets ligulate, the ligules up to 3 cm long ; all florets yellow.

Local name : Surajmukhi.

Flowers : Most of the year under cultivation.

Occurrence : Only seen under cultivation in gardens. Rajkot, commonly cultivated as a garden plant ; Sasan ; in gardens ; Okha, extensively cultivated in gardens.

Uses : Seeds are diuretic and expectorant. They have been used in bronchial, laryngeal and pulmonary affections, coughs and cold. A tincture

of flowers and leaves is recommended, in combination with balsams, for bronchiastasia. Leaves are reported to be employed in the treatment of malarial fevers. The Sunflower are good source of honey, they furnish a yellow dye. Though cultivated mainly as a garden plant, Sunflowers owes its economic value to its utility as an oil-seed or fodder crop. The seeds are used mainly for the extraction of oil. (WI)

Notes : In view of the valuable seed-oil obtained from this plant, its extensive cultivation is highly recommended for Saurashtra.

HELICHRYSUM Mill. corr. Persoon

Helichrysum cutchicum (Clarke) R.S. Rao & Deshpande in Bull. Bot. Surv. Ind. 10 : 225-227. 1968 (1969). *Anaphalis cutchica* C. B. Clarke in Comp. Ind. 111. 1876 ; FBI 3 : 284 ; Cooke 2 : 85 ; Santapau, Pl. Saur. 400. 1953 ; Santapau & Jan. 27. 1967.

This specimen was much confused with *Anaphalis* and *Gnaphalium* but according to the key given by R. S. Rao & U. R. Deshpande (loc. cit.), the specimens from Saurashtra fall under the genus *Helichrysum*.

<i>Anaphalis</i> DC.	<i>Helichrysum</i> Mill. corr. Persoon	<i>Gnaphalium</i> Linn.
1. All bisexual florets sterile	All bisexual florets fertile	Less than half bisexual - florets fertile.
2. Female florets - multi-seriate	Female florets uni-seriate, rarely two-seriate	Female florets two-multi-seriate
3. Style with slightly notched stigma	Style with two arms of stigma	Style with two short arms of stigma
4. Pappus hairs scabrid, free at the base.	Pappus hairs barbellate or plumose, connate at the base.	Pappus hairs—scabrid, slightly thickened at the base, free or connate at the base.

The following is the description given by R.S. Rao & U.R. Deshpande (loc. cit.).

“Plant diffuse herb, about 40 cm high, clothed with white, cottony, adpressed hairs. Roots with tap root. Prominent, about 10-15 cm long.

Leaves sessile, oblanceolate or linear, white-tomentose beneath but with loose, cottony hairs on upper surface, 2-5 cm long 1-10 cm broad. Inflorescence multiple head, terminal, very rarely axillary, very shortly branched at tip in cymose pattern with heads grouped in cluster; peduncle 2-15 cm long, rarely up to 25 cm. Heads white, glistening, heterogamous, involucrel bracts, many seriate, scarious, outer smaller; ovate, irregularly toothed at tip, inner ovate-oblong, slightly longer than the outer, both outer and inner transparent, glabrous inside and with small, oval, white-cottony hairy patch at the bottom on outside. Female florets on periphery only, papillate, fertile, few, usually 6-7; corolla smaller, fragile, filiform, minutely toothed; style uniform with two arms of stigma at top; ovary finely hairy. Bisexual florets at the centre only, papillate, fertile, slightly more in number, usually 8-10; corolla larger, 5-toothed, trumpet-shaped; stamens 5, syngenesious, anthers sagitate, lower part of lobe slightly caudate; style slender with two arms of stigma at top and slightly swollen at base; ovary finely hairy. Achenes oblong, verrucose; Pappus hairs uniseriate, barbellate, connate at base."

Flowers : October onwards.

Occurrence : Collected from Jamnagar; Laloi among grasses; Abhapra slopes one of the commonest herbs along the main path of the hill; Kota near Khambhaliya in open fields; Beyt island, common in open fields, near Okha (Ansari 54265); Beyt Dwarka, off the northern coast of Saurashtra, near Okha (Rolla Rao 102892).

LACTUCA Linn.

Stout herbs, leaves up to 30 cm long; heads sessile or nearly so *runcinata*

Slender herbs, leaves rarely over 10 cm long, heads on slender peduncles which are about as long or longer than the heads *remotiflora*

Lactuca runcinata DC. in Wight, Contrib. 26. 1834; Cooke 2: 118; Santapau & Jan. 28. 1967. *Lactuca hayneana* DC. Prodr. 7: 140. 1838; FBI 3: 403; Indrajai 417. 1910; Santapau, Pl. Saur. 425. 1953.

A tall, glabrous herb, with very large lower leaves; cauline leaves up to 30 cm long, amplexicaul, with long auricles. Heads solitary or in small distant clusters; flowers yellow, ligulate. Achenes compressed, tapering into a beak at the apex, muriculate. The shape and structure of the achenes distinguish this plant from *Launaea*, which has achenes clearly truncate at both ends, and from *Sonchus*, in which achenes taper at the base; but are suddenly truncate at the apex. The three genera, *Lactuca*, *Launaea* and *Sonchus* are milky herbs.

Local name : Pathari, Sonki, Gudval.

Flowers : August onwards.

Occurrence : Fairly common in Saurashtra, Junagadh, as a weed in Forest College garden ; Barda Hills, occasional ; Ghumli, on the N. W. slopes of Barda Hills, in moist spots ; Mangalpur, in Sorath Dist., Sasan along the river, over 1 m tall and much branched, common on sandy soil ; Somnath, common on sandy soil.

Uses : Reported to be diuretic tonic and slightly aperient. It is eaten by cattle and may also have some value as a vegetable. (WI)

Lactuca remotiflora DC. in Wight, Contrib. 26. 1834 ; FBI 3 : 403 ; Cooke 2 : 118 ; Indraji 417. 1910 ; Santapau, Pl. Saur. 414. 1953 ; Santapau & Jan. 28. 1967.

Herbaceous, slender plant. Stem slender ; leaves mostly radical ; flowers yellow ; heads paniculate, each on a slender peduncle that is as long as or longer than the head. Achenes long, compressed, faintly ribbed, muriculate, black, tapering into a beak which is suddenly dilated into a cup-like disc beneath the pappus.

Local name : Pathardi, Pathari.

Flowers : October onwards.

Occurrence : On the lower slopes of the Barda Hills near Ghumli ; on the sea shore at Okha and on Beyt island.

Uses : It is reported to be used for chronic obstructions of liver and bowels, and as diuretic in calculous affections. (WI)

LAGASCEA Cav. (nom. cons.)

Lagascea mollis Cav. in Anal. Cienc. Nat. 6 : 331, t. 44. 1803 ; FBI 3 : 302 ; Cooke 2 : 93 ; Santapau, Pl. Saur. 426. 1953 ; Santapau & Jan. 28. 1967.

An erect slender herb, glaucous in appearance, pubescent all over. Leaves ovate, acute or acuminate, crenate, silky beneath, base cuneate. Heads in clusters resembling simple heads, but consisting of several small heads grouped together ; flowers white ; peduncles long and slender. Involucral bracts connate for about half their length into a tube, glaucous,

ciliate. Corolla regular, tubular, hairy on the back near the tips of the petals. Pappus a short fimbriate cup.

Flowers : Most of the year.

Occurrence : Seen in great abundance near the talao in Victoria Park, Bhavnagar on several occasions; Sasan, along the road of the village, locally abundant.

LAGGERA Sch.-Bip. ex Oliver

Stems winged	<i>alata</i>
Stems not winged	<i>aurita</i>

Laggera alata (D. Don) Sch.-Bip. ex Oliver in Trans. Linn. Soc. 39 : 94. 1873 ; FBI. 3 : 271 ; Cooke 2 : 80 ; Indrajai 401. 1910 ; Santapau, Pl. Saur. 427. 1953 ; Santapau & Jan. 28. 1967. *Erigeron alatum* D. Don, Prodr. 171. 1825.

An erect herbaceous plant, with winged stem, fairly densely hairy, at times glandular. Leaves sessile, decurrent into the stem and forming the "wings", toothed occasionally entire, narrowly oblong, rather small, pubescent on both sides. Heads few or solitary, often drooping; flowers purple, all tubular and regular. Pappus white.

Local name : Bodiyo Kalhar.

Flowers : October onwards.

Occurrence : Barda Hills.

Uses : This herb is used as a disinfectant. [Caius in JBNHS 41 (4) : 849. 1940].

Laggera aurita (Linn. f.) Sch.-Bip., Schweinf. Beitr. Flor. 151. 1867 ; FBI 3 : 271 ; Cooke, 2 : 80 ; Indrajai 401. 1910 ; Santapau, Pl. Saur. 428. 1953 ; Santapau & Jan. 28. 1967. *Conyza aurita* Linn. f. Suppl. Pl. 367. 1781 ; Willd. Sp. Pl. 3 : 1929. 1804.

A perennial erect herb, 30-100 cm high ; stems erect with many ascending branches, viscous hairy, not winged. Leaves many, sessile, or nearly so, obovate, toothed, lobed or pinnatifid, the lower ones large, the upper ones very small, bract-like. Heads in terminal panicles, flowers pink. Involucral bracts ; the outer very short, the inner much longer, scarious ; Pappus white.

Local name : Bhintmulo, Matapatri (Kutch), Adbau-mulo.

Flowers : Winter.

Occurrence : Mangrol ; on Barda Hills, on old walls.

Note : The authority of the basionym is wrongly attributed to Willdenow who himself based his name on earlier name of Linn. f. Suppl. Pl. 367. 1781.

LAUNAEA Cass.

Achenes winged	<i>glomerata</i>
Achenes not winged :	
Heads in terminal panicles	<i>residifolia</i>
Heads racemose or fascicled, not paniculate :	
Stems and branches rooting at nodes	<i>sarmentosa</i>
Stems and branches not rooting at nodes	<i>procumbens</i>

Launaea glomerata (Jaub. & Spach.) Hook. f. in FBI 3 : 417. 1881 ; Santapau & Jan. 28. 1967. *Microhynchus glomeratus* Jaub. & Spach. III. Pl. Orient. 3 : 105, t. 275. 1847.

Glaucous, glabrous, diffuse or suberect herbs. Leaves radical, 7-15 × 2.5-4 cm, sessile, pinnatifid. Heads yellow 1.2-1.8 cm long, bell-shaped, clustered at ends of branches. Achenes oblong truncate at both ends, winged.

Flowers : October.

Occurrence : This plant has been noted by Borgessen in the Okha-Dwarka area.

Uses : A decoction of the herb mixed with wheat meal is applied as a poultice to sore eyes. (WI)

Launaea residifolia (Linn.) O. Ktze. Rev. Gen. Pl. 1 : 351. 1891 (Sphalm., Launaya) ; Druce in Rep. Bot. Exch. Cl. Brit. Isl. 1913 ; 3 : 420. 1914, Santapau & Jan. 28. 1967 ; Steward in Fl. W. Pakistan 763. 1972. *Scorzonera residifolia* Linn. Sp. Pl. 1198. 1753. *Microhynchus chondrilloides* Clarke, Comp. Ind. 277. 1876 ; (not of Sch.-Bip.). *Launaea chondrilloides* (DC.) Hook. in FBI 3 : 415. 1881 ; Cooke 2 : 221 ; Santapau, Pl. Saur. 429. 1953.

A perennial, nearly glabrous herb ; stem extensively branched. Radical leaves forming a rosette on ground, pinnatifid, with numerous unequal lobes ; cauline leaves similar, but usually smaller. Heads terminal on stem and branches ; pappus white, achenes truncate at both ends, strongly ribbed. Flowers yellow.

Flowers : October onwards.

Occurrence : Abundant on sands at Veraval and near Somnath ; Rajkot, in Jilla Park, on moist earth near river ; Okha on sandy shores ; Sasan in the Gir Forest, on moist ground near river ; occasional ; Dwarka on sands.

Uses : The plant is credited with the properties of a lactagogue. A decoction of the herb is administered in constipation. (WI)

Note : The combination was proposed by two different authors in two different publications at two different times first by O. Ktze. in Rev. Gen. Pl. 1 : 351. 1891 and later by Druce in Rep. Bot. Exch. Cl. Brit. Isl. 1913, 3 : 420. 1914 ; but according to the rule of priority this combination should be credited to O. Ktze.

Launaea sarmentosa (Willd.) Alston in Trim. Handb. Fl. Ceyl. 6 : 173. 1931 ; Santapau & Jan. 28. 1967. *Prenanthes sarmentosa* Willd. Sp. Pl. 3 : 1540. 1803. *Launaea pinnatifida* Cass. in Ann. Sci. Nat. Ser. 3 : 23 : 85. 1831 ; FBI 3 : 416 ; Cooke. 2 : 122 ; Indrajit 419. 1910 ; Santapau, Pl. Saur. 431. 1953.

Stems prostrate and rooting at the nodes ; at most of the nodes there is a set of roots on the lower side, a set of leaves on upper one, and often some heads. Leaves runcinate-pinnatifid, toothed, the teeth often cartilaginous. Flowers yellow, heads solitary or in clusters at the nodes. Achenes roughly tetragonous, truncate at both ends.

Local name : Bhonpatri.

Flowers : August onwards.

Occurrence : Rajkot, in Pradumna Park, during most of the year ; Porbandar, in Sandy soil ; Okha near the sea shore, on sands ; Gondal, in waste ground ; Dwarka, near sea shore. Woodrow noted it from Veraval (Cooke).

Uses : It is reported to possess tonic, soporific, diuretic and aperient properties. Leaves are eaten during famine. The herb is fed to buffaloes as a galactagogue. (WI)

Launaea procumbens (Roxb.) Ramayya & Rajagopal in Kew Bull. 23 (3) : 463. 1969. *Prenanthes procumbens* Roxb. Fl. Ind. 3 : 404. 1832. *Chondrilla nudicaulis* Linn. Mant. 273. 1767. *Launaea nudicaulis* (Linn.) Hk. f. in Hk. f. FBI 3 : 416. 1881. *Launaea fallax* (Jaub. & Spach.) O. Kuntze. Rev. Gen. Pl. 3 : 51. 1891 ; Santapau & Jan. 28. 1967. *Microorhynchus fallax* Jaub. & Spach. Pl. Or. t. 276. 1849.

A glabrous herb, with prostrate or decumbent stems and branches, but not rooting at nodes. Leaves mostly radical, entire or pinnatifid, glabrous. Heads solitary or a few together along the branches, flowers yellow. Achenes truncate at both ends, strongly 4-ribbed.

Local name : Moti Bhonpatri.

Flowers : October onwards.

Occurrence : Dwarka, on sandy soil ; Syke's point near Salaya on sandy soil, Dhunvao, Beyt and Ranjit Sagar near Jamnagar, common on sandy soil ; Rajkot, in Jubilee Park and elsewhere, common sandy soil ; Bhavnagar, near Victoria Lake ; Porbandar, Rest House ; Gondal ; Okha sea-shore ; Junagadh ; Veraval.

Uses : The plant is used as fodder for goats. It is also used in the preparation of a cooling sherbet. Leaves are used locally in curries. (WI)

OLIGOCHAETA (DC.) C. Koch.

Oligochaeta ramosa (Roxb.) Wagenitz in Verroffent Geobot. Inst. 37 : 323. 1962 ; Santapau & Jan. 28. 1967 ; Bhandari, Fl. Ind. Desert. 206. 1978. *Carduus ramosus* Roxb. Fl. Ind. 3 : 407. 1832. *Volutarella divaricata* Benth. in Benth. et Hook. Gen. Pl. 2 : 476. 1873 (pro parte) ; FBI 3 : 383. 1881 (et auct. mult. Ind.). *Volutarella ramosa* (Roxb.) Santapau, Pl. Saur. 22. 1953. *Amberboa ramosa* (Roxb.) Jeffery, Scientist 3 : 29. 1959.

An erect, much branched herb ; branches ribbed ; leaves oblong, entire or toothed, 12-18 mm diam. Involucral bracts ending in spines, which are spreading or recurved ; corollas all purple, tubular. Achenes glabrous or nearly so.

This common herb is sometimes confused with *Dicoma*, from which it clearly differs by its purple flowers and the leaves, which may be more or less hairy, but not cottony ; *Dicoma* has yellow flowers and densely cottony leaves.

Local name : Badaward, Bhoynadandi.

Flowers : August to November.

Occurrence : Collected from Girnar, large tank near the road from Junagadh, gregarious, Jamwalla nursery in the Gir Forest, in hedges, common ; Veraval on sea shore sands, abundant locally in flower ; Shapur, common and abundant in garden and near stream.

Uses : The plant is supposed to be tonic and laxative, on account of its mucilaginous properties, it is used in coughs ; it is also used as a febrifuge. (Kirt. & Basu 2 : 1426)

PLUCHEA Cass.

Heads subsolitary

arguta

Heads in compound corymbs

lanceolata

Pluchea arguta Boiss. Diag. (Ser. 2) fasc. 3 : 5. 1856 ; FBI 3 : 273 ; Cooke 2 : 82 ; Santapau, Pl. Saur. 432. 1953. *Pluchea frutescens* Benth. in Hook. Icon. Pl. 12, t. 1157. 1873. *Laggera arida* C. B. Clarke, Comp. Ind. 92. 1876.

A stout branches shrub, thick, soft and fleshy. When near the sea, shrubby and with thin leaves when inland. Leaves sessile, obovate, oblong, or inciso-pinnatifid, acutely serrate or dentate, narrowed at the base. Heads many small subsolitary. Achenes with a few appressed hairs, ribbed.

Local name : Rashna (a variety of true Rashna).

Flowers : January to February.

Occurrence : Chotila.

Pluchea lanceolata (DC.) Clarke, Comp. Ind. 94. 1876 ; FBI 3 : 272 ; Cooke 2 : 82 ; Indraj 402. 1910 ; Santapau, Pl. Saur. 433. 1953 ; Santapau & Jan. 28. 1967. *Berthelotia lanceolata* DC. Prodr. 5 : 376. 1836.

An erect ashy-pubescent herb or undershrub ; leaves sessile, stiff, oblong, ashy-pubescent on both sides. Heads in compound corymb, flowers purplish.

Local name : Nani Rashna (True Rashna).

Flowers : October to November.

Occurrence : Porbandar, Kantela to Miyani village ; Dwarka, Kota near Khambaliya ; Junwania in the Gir Forest ; Okhamandal.

Uses : The leaves are aperient. This plant has been tried as a possible cattle fodder. (WI).

PULICARIA Gaertn.

Ray flowers ligulate :

- | | |
|--------------------------------------------------------|---------------------|
| 30-60 cm high ; peduncles thickened upwards | <i>wightina</i> |
| Less than 30 cm high ; peduncles not thickened upwards | <i>angustifolia</i> |

Ray flowers tubular :

- | | |
|----------------|------------------|
| Ligule absent | <i>foliolosa</i> |
| Ligule present | <i>vulgaris</i> |

Pulicaria angustifolia DC. Prodr. 5 : 479. 1836 ; Woodrow in JBNHS 11 : 649. 1898 ; FBI 3 : 299 ; Cooke 2 : 90 ; Santapau, Pl. Saur. 434. 1953 ; Santapau & Jan. 28. 1967.

Very similar to the other species, but generally smaller in most of its parts ; the peduncle does not become thickened upwards below the floral head.

Local name : Sishoriya.

Flowers : August onwards.

Occurrence : In dry districts, more or less mixed with other species. Abhapara slopes, fairly common ; Rajkot in dry open fields, and in the river bed in sandy spots ; Dwarka, on sandy shores much branched and often prostrate due to the main stem being eaten by browsing animals, the branches spreading ; Junwania in the Gir Forest, on grassy slopes ; Girnar slopes common in dry ground among grasses ; Veraval, common and abundant on sands ; Bhadar river, Gomta, as widely distributed on dry sandy regions ; Mangrol ; Woodrow reports it from Porbandar.

Pulicaria foliolosa DC. Prodr. 5 : 480. 1836 ; FBI 3 : 298 ; Cooke 2 : 91 ; Santapau & Jan. 28. 1967.

Annual, erect herb ; 20-40 cm high ; stem and branches pubescent. Leaves linear-oblong, \pm amplexicaul at base, viscidly hairy. Heads small, woolly and glandular, peduncles slender, hairy, florets purple Achenes minute, oblong, terete, sparsely appressedly hairy.

Local name : Kakra.

Flowers : October.

Occurrence : T. A. Rao collected from sandy areas near Dwarka (Rao, 4021).

Pulicaria vulgaris Gaertn. Fruct. 2 (3) : 461, t. 173. 1791 ; FBI 3 : 298 ; Sant. & Jan. 28. 1967.

Annual, pubescent or softly tomentose. Leaves sessile, oblong-lanceolate from $\frac{1}{2}$ -amplexicaul base, lower petioled, heads on short stout peduncles, invol.-bracts subulate, ligules erect, very short, pappus dirty white, twice as long as the silky achenes, outer scales lanceolate serrate, free.

Flowers : September.

Occurrence : F. Borgesen reported it from Dwarka.

Pulicaria wightiana (DC.) Benth. ex Clarke, Comp. Ind. 128. 1876 ; FBI 3 : 298 ; Cooke 2 : 90 ; Indraj 405. 1910 ; Santapau, Pl. Saur. 435. 1953 ; Santapau & Jan. 28. 1967. *Callistephus wightianus* (DC.) DC. Prodr. 5 : 275. 1836. *Polea wightiana* DC. in Guill. Arch. Bot. (Paris) 2 : 515. 1833.

An erect herb, usually over 30 cm high, branched at times extensively from the middle or below ; the stem and branches pubescent. Leaves sessile, oblong, usually shallowly serrate, pubescent on both sides. Heads solitary on fairly long peduncles, all florets yellow, the outer ligulate, the inner tubular ; involucre bracts green, leaf-like, hairy ; inner bracts about as long as or a little shorter than the outer ones, scarious, acute. Pappus of two rows, outer one of scales forming a cup, inner of barbellate hairs.

Local name : Shinshoria, Sonasatia.

Flowers : August to October.

Occurrence : Fairly widespread in dry open fields, on rocky slopes, etc. Rozi near Jamnagar. occasional among grasses ; Bhanvad, common among grasses, in cultivated fields ; Kota near Khambaliya, common, Rajkot, common in the district in dry ground ; Somnath reclamation, common among grasses on the sea shore.

SCLEROCARPUS Jacq.

Sclerocarpus africanus Jacq. Icon. Pl. Rar. 1 : 17, t. 176. 1782 ; FBI 3 : 305 ; Cooke 2 : 96 ; Santapau, Pl. Saur. 436. 1953 ; Sant. & Jan. 28. 1967.

Annual, erect herb, up to 1.20 m high, usually 60-80 cm only. Stem and branches more or less hispid. Leaves alternate or subopposite especially the lower ones, ovate, acute, hairy on both sides, irregularly serrate, base cuneate. Heads yellow, solitary or nearly so, up to 15 mm diam. Involucral bracts green on the fresh plant, foliaceous; achenes the most typical part of the plant, gibbous, i.e. one side straight or nearly so, the other bulging noticeably.

Flowers : May onwards.

Occurrence : Fairly common and abundant in many parts of Saurashtra. Dwarka, along the railway line; Okhamandal; Beyt, rare near talao and in waste lands; Vijarkhi Lake near Jamnagar, rare; Barda hills, on the slopes of Abhapara Hill, abundant in undergrowth of forest at Ghumli, abundant in waste places at Bileshwar; Rajkot, in waste places and a weed in the Residency Park, common; Chotila, very abundant from the foot of the large hill to the top; Junagadh, common; Girnar slopes, occasional near road; Kansia-nes station, abundant locally near hedges; Gir forest, common and abundant; Sasan, near hedges abundant; on silted ground near main river dam; very abundant; Junwania near stream; Shirwan, occasional; etc.

SENECIO Linn.

Senecio grahmi Hook. f. Fl. Brit. Ind. 3 : 347. 1881; Cooke 2 : 110; Santapau & Jan. 28. 1967. *S. reticulatus* C. B. Clarke, Comp. Ind. 199. 1876 (not of DC. 1836).

An annual, erect herb, with grooved and glabrous stem. Leaves rhomboid ovate, acute, irregularly serrate, glabrous or nearly so above, white tomentose between the nerves beneath; nerves very conspicuous beneath; base tapering at the petiole. Heads yellow, with a few linear subulate bracteoles on the peduncles; outer florets ligulate, inner tubular; involucral bracts pubescent, connate for about half from the base; pappus of ray florets 0, of disc florets flattened or paleaceous below, setaceous above.

Flowers : September onwards to November.

Occurrence : Found along the steps leading to the Girnar temples.

SIEGESBECKIA Linn.

Siegesbeckia orientalis Linn. Sp. Pl. 900. 1753 ; FBI 3 : 304 ; Cooke 2 : 95 ; Indrajī 407. 1910 ; Santapau, Pl. Saur. 437. 1953 ; Santapau & Jan. 28. 1967.

An erect annual herb, 1-3 m, high, sparingly leafy, with horizontal branches ; leaves opposite, irregularly serrate, base cuneate. Flowers yellow in small heads in leafy panicles ; involueral bracts typical, in two rows, the outer ones spatulate, the upper surface covered with glandular very "sticky" hairs ; inner bracts small, glandular hairy. The outer florets ligulate, female ; the inner ones tubular hermaphrodite and fertile ; the innermost florets on the disc sometimes sterile. The ray florets are few in number usually 5 ; pappus 0. Achenes each enclosed in a boat-shaped bract.

Local name : Pili-badkadi.

Flowers : From October onwards.

Occurrence : On Barda Hills, on the road sides on the edges of fields and in bushes.

SONCHUS Linn.

Sonchus oleracens Linn. Sp. Pl. 794. 1753 ; FBI 3 : 414 ; Cooke 2 : 119 ; Indrajī 418. 1910 ; Santapau, Pl. Saur. 438. 1953 ; Santapau & Jan. 28. 1967 ; Caius in JBNHS 41 (4) : 861. 1940.

An annual erect herb with milky sap ; stem striate. Leaves sessile, large, half-amplexicaul with spreading acute auricles. Heads rather large, florets all ligulate, yellow. Achenes compressed, ribbed and muriculate.

Local name : Dudhali Sonki.

Flowers : October onwards, in moist places most of the year.

Occurrence : Collected from Chotilla and Mangrol, a weed in gardens and cultivated fields.

Uses : Añ infusion of the leaves and roots is used as a tonic and febrifuge. "The brownish gum formed by evaporation of the common Sowthistle when taken internally in a dose of 2-4 grains behaves as an intensely powerful hydragogue cathartic and acts powerfully upon the liver, duodenum and colon". (Kirtikar & Basu 2 : 1443)

SPHAERANTHUS Linn.

Sphaeranthus indicus Linn. Sp. Pl. 927. 1753 ; FBI 3 : 275 ; Cooke 2 : 84 ; Indrajai 403. 1910 ; Santapau, Pl. Saur. 439. 1953 ; Santapau & Jan. 28. 1967.

Erect, suberect or prostrate annual herb, the stem with toothed wings, glandular hairy and viscous. Leaves sessile, obovate oblong, viscous and glandular hairy. Heads up to 1-5 cm in diam., purple when in bud, white when in flower ; peduncles with toothed wings.

Local name : Gorakhamundi, Mundi.

Flowers : October to March.

Occurrence : Collected from Junwania Nes in the Gir Forest, where it was abundant and gregarious in moist ground.

Uses : The root and the seeds are considered anthelmintic. The powdered root is given as a tonic. The bark, ground and mixed with whey is a valuable remedy for piles. (Kirtikar & Basu 2 : 1347)

SPILANTHES N. Jacq.

Spilanthes paniculata Wall. ex DC. Prodr. 5 : 625. 1836 ; Santapau & Jan. 29. 1967. *S. acmella* auct. (non Murr. 1774) ; FBI 3 : 207.

An annual erect or suberect herb, with hairy stem. Leaves opposite, ovate, acute, irregularly crenate-serrate, glabrous. Heads 6-12 mm diam., ovoid, becoming elongated in fruit ; florets yellow ; involucre bracts pubescent, short, pappus 0. The heads sometimes consist of tubular florets only, some other heads have ray florets on the outer row ; all the florets are yellow.

Local name : Akkalkaro.

Flowers : October to November.

Occurrence : Collected from Wagheshwari near Junagadh and Beyt, near Dwarka.

Uses : The whole plant, but particularly the floral head is very pungent ; chewing the heads relieves toothache ; or a tincture made from the flower heads and applied in some lint to the teeth and gums is even more effective against tooth-ache. The plant is used as a specific for a variety of purposes all over India. (Kirtikar & Basu 2 : 1365)

TAGETES Linn.

Tagetes patula Linn. Sp. Pl. 887. 1753 ; Cooke 2 : 125 ; Santapau, Pl. Saur. 440. 1953 ; Santapau & Jan. 29. 1967.

An erect, highly scented annual herb, branched from near the base. Leaves pinnately divided into several segments, which are serrate and lanceolate or oblong. Heads solitary, 2-3 cm diam., the outer florets rayed, yellow or yellow-orange, the inner tubular, of the same colour. Pappus of a few awned scales.

Local name : Gulgoto, Guljharo.

Flowers : Most of the year.

Occurrence : This plant has been noted under cultivation in gardens at Morvi and at Okha.

Uses : Cultivated everywhere for its beautiful flowers much used by the males for preparing garlands. The leaves are good for piles, kidney troubles, the juice is used for earache and in ophthalmia.

Locally the flowers used internally to purify the blood ; externally the whole plant is used in the treatment of sores, ulcers and boils (Sutaria 293. 1969)

Note : There are two species of *Tagetes* often cultivated in India, *T. patula* L. and *T. erecta* L., which are rather similar in general structure; *T. erecta* has flowers which are 5-10 cm across. *T. patula* only 2-3 cm across ; both plants are highly scented.

TARAXACUM Hall.

Taraxacum officinale Webber in Wigg. Prim. Fl. Holsat. 58. 1780 ; Indrajit 418. 1910 ; Santapau, Pl. Saur. 441. 1953 ; Santapau & Jan. 29. 1967. *Leontodon taraxacum* Linn. Sp. Pl. 798. 1753.

A small perennial herb, juice milky. Leaves all radical sessile, variable in shape, runcinate or pinnatifid. Flowers yellow, solitary, heads on leafless stalks. Involucral-bracts linear, pappus copious, white, soft.

Local name : Pathardi.

Flowers : October.

Occurrence : On Barda Hills, on old walls and on moist places.

Uses : The rhizomes, roots and leaves are eaten raw in salads, used in soups and also cooked as vegetable. The rhizomes are substituted for chicory and coffee. The coffee made from the roasted and ground rhizomes is very pleasant and appetizing. The flower-buds are pickled. The leaves and opened flowers are employed in preparation of beer, wines, stouts and other diet-drinks. (WI)

TRICHOLEPIS A. P. de Candolle

Heads glabrous or nearly so, up to 8 mm diam	<i>glaberrima</i>
Heads more or less woolly pubescent :	
Heads up to 16 mm diam. ; pappus abundant	<i>radicans</i>
Heads 20-30 mm diam. ; pappus 0 or very scarce	<i>amplexicaulis</i>

Tricholepis amplexicaulis C. B. Clarke, Comp. Ind. 240. 1876 ; FBI 3 : 381 ; Cooke 2 : 115 ; Indrajai 416. 1910 ; Santapau, Pl. Saur. 442. 1953 ; Santapau & Jan. 29. 1967.

An erect, annual herb, 1-2 m high, stem up to 2.5 cm diam. below, unbranched in the lower ones amplexicaul or half-amplexicaul, elliptic oblong, acute, spinous serrate, clearly punctate ; the highest leaves very narrow and long. Heads up to 30 or more mm in diam. ; corollas regular, tubular, light purple or pinkish purple ; the head is woolly pubescent, and is supported by one or more leafy bracts. Pappus 0 or of a few deciduous hairs.

Local name : Ubho-mulo.

Flowers : October to December.

Occurrence : Found abundantly on the higher slopes of Abhapara in the Barda Hills, along the path.

Uses : The plant is used in leucoderma and skin diseases and in inflammations. (Indrajai 416. 1910)

Tricholepis glaberrima DC. Prodr. 6 : 754. 1837 ; FBI 3 : 381 ; Cooke 2 : 114 ; Indrajai 415. 1910 ; Santapau, Pl. Saur. 443, 1953 ; Santapau & Jan. 29. 1967.

An erect, slender annual herb, with glabrous and ribbed stem and branches. Leaves sessile, linear oblong, entire or spinous serrate, punctate.

Heads the smallest in the genus for Saurashtra, 6-8 mm in diam., glabrous; corollas tubular, regular, purple; involucrel bracts linear lanceolate, aristate acuminate, ciliolate, erect or recurved. Pappus abundant, shorter than the achenes.

Local name : Fusiaru, Brahmadandi.

Flowers : October to December.

Occurrence : Rozi near Jamnagar, by the road sides; Bhanvad, edges of cultivated fields; Sasan in the Gir Forest, large tall plants on the small hill north of Sasan, abundant near the top of hill; on the slopes of Girnar.

Uses : The plant is used in leucoderma and skin diseases, in inflammations. It is believed to be a nervine tonic and an aphrodisiac. [Caius, in JBNHS 41 (4) : 868. 1940].

Tricholepis radicans (Roxb.) DC. Prodr. 6 : 584. 1838 ; FBI 3 : 381 ; Cooke 2 : 114 ; Indraj 416. 1910 ; Santapau, Pl. Saur. 444. 1953 ; Santapau & Jan. 28. 1967. *Carduus radicans* Roxb. Fl. Ind. 3 : 408. 1832.

Erect or suberect herb, much branched from the base, the branches spreading, angled, scaberulous, leafy. Leaves sessile, oblong, coarsely serrate or pinnatisect, glabrous, punctate. Heads more or less woolly pubescent, 8-16 mm diam., the involucrel bracts glabrous, aristate acuminate, the bristles long, recurved; flowers purple, all tubular. Pappus abundant, a little shorter than the achenes.

Local name : Bethu-fusiaru.

Flowers : September to November.

Occurrence : Indraj mentions the plant occurring at the Mevaso forest.

Uses : Seeds are very nutritive, and is used as a constituent of masalas for horses. It is also used in treating various fevers and skin diseases. (Indraj 416. 1910)

TRIDAX Linn.

Tridax procumbens Linn. Sp. Pl. 900. 1753 ; FBI 3 : 311 ; Cooke 2 : 102 ; Indraj 413. 1910 ; Santapau, Pl. Saur. 445. 1953 ; Santapau & Jan. 29. 1967.

An annual herb, erect, suberect or procumbent ; stem and branches hairy. Leaves ovate-elliptic, acute, deeply dentate or pinnatifid, glandular hairy on both sides. Heads 12-15 mm diam., solitary on very long peduncles ; outer involucre bracts ashy green, hairy ; inner bracts membranous, pubescent on back ; ray florets ligulate, the ligules yellow, white or cream ; disc florets tubular, white. Pappus of aristate hairs, achenes small, silky.

Local name : Paradeshi-Bhangro.

Flowers : Throughout the year.

Occurrence : One of the commonest weeds of Saurashtra, in moist ground it may become very abundant, but it can also grow in very dry waste land. At Chotila this plant was noted growing among hedge plants and attaining over 1 m in height.

Uses : Ear-drops are prepared from the leaf-juice. It is also grown as an ornamental plant in the gardens. (Indraji 413. 1910)

VERNONIA Schoeb. (nom. cons.)

Floral heads 12-18 mm or more in diam. *anthelmintica*

Floral heads under 10 mm in diameter :

Leaves petioles, variously shaped but not spatulate *cinerea*

Leaves sessile, spatulate, entire or somewhat serrate or toothed *cinerascens*

Vernonia anthelmintica (Linn.) Willd. Sp. Pl. 3 : 1634. 1800 ; Cooke 2 : 66 ; Indraji 395. 1910 ; Santapau, Pl. Saur. 446. 1953 ; Gir 199 ; Santapau & Jan. 29. 1967. *Centratherum anthelminticum* Linn. Sp. Pl. (ed. 2) 1207. 1762.

An erect herb, 0.75-2 m high ; leaves 5-12 × 2.5-5 cm lanceolate, acute, serrate, tapering into a long petiole ; heads the largest of the genus in Saurashtra, up to 18 mm diam. occasionally larger ; the outer involucre bracts herbaceous, green corolla regular, tubular, purple in colour ; pappus reddish or whitish, the outer row very short, the inner row of flattened hairs, shorter than the corollas. Achenes up to 6 mm long, 10-ribbed, pubescent very bitter to taste.

Local name : Kalijiri, Kadvikiri.

Flowers : Octobers onwards.

Occurrence : Not common in Saurashtra, but when found usually in fairly noticeable clumps, by the road sides, etc. Barda Hills, on Abhapara ;

Girnar forest occasional ; Gir Forest, fairly common ; Porbandar and Dwarka.

Uses : Seeds acrid, astringent to bowels anthelmintic ; cure ulcers, used in skin diseases, leucoderma and fevers. Seeds are purgative, also used for asthma, kidney troubles, hiccup ; applied in inflammatory swelling ; remove blood from liver, good for sores and itching of eyes, a depilatory. [Gaz. 4 (1) : 224. 1953]

Vernonia cinerascens Sch.-Bip. in Scheweinf. Fl. Aethiop, 162. 1867 ; FBI 3 : 237 ; Cooke 2 : 66 ; Indrajī 397. 1910, Santapau, Pl. Saur. 447. 1953 ; Santapau & Jan. 29. 1967.

A small shrub, 30-90 cm high, the stems and branches pale or whitish in colour ; leaves small, sessile, spatulate, rounded or obtuse at the apex, serrate. Involucral bracts small, not herbaceous, pubescent, the heads only about 5-8 mm diam. Corolla purple, regular ; achenes 2-3 mm long, densely silky, pappus hairy, shorter than the corolla.

Local name : Moti-sedardi.

Flowers : August onwards.

Occurrence : Collected from Modpur Vidi ; Dwarka and Jamnagar.

Uses : Root is given for dropsy ; the flowers are administered for blood-shot eyes (conjunctivitis). (Indrajī 397. 1910).

Vernonia cinerea (Linn.) Less. in Linnæa 4 : 291. 1829 ; FBI 3 : 233 ; Cooke 2 : 65 ; Indrajī 394. 1910 ; Santapau, Pl. Saur. 448. 1953 ; Gir. 200 ; Santapau & Jan. 29. 1967. *Conyza cinerea* Linn. Sp. Pl. 862. 1753.

An annual herb, 10-90 cm high, stem striate, more or less pubescent, greyish in colour. Leaves petioled, up to 5×3 cm, elliptic or lanceolate, acute or obtuse or rounded at the apex, irregularly serrate or dentate, pubescent on both sides. Heads about 6-8 mm diam., flowers regular ; the colour of the corolla is deep purple during the dry season, paler during or just after the rainy season. Achenes small.

Local name : Sedardi, Sehadadi.

Flowers : Monsoon and winter months.

Occurrence : Very common, Rozi, in drying pools ; Dhunvao ; Jamnagar and its neighbourhood, common after the monsoon ; Dwarka, occasional ; Bhanvad, in cultivated fields and their hedges ; Ghumli and Abhapara on the Barda Hills, Kileshwar, rare ; Rajkot, not common, Gondal, a weed in Kailas Baug, common and abundant ; Bhavnagar,

occasional in Park ; Mangrol, occasional in summer ; Chotila, among Euphorbia clumps common ; Junagadh, in Sardar Baug and along the road to the Girnar, occasional ; Gir forest, common at Junwania, Shirwan, Kankai, Sasan, etc. Somnath, common on shores, prostrate form ; Keshod, in hedges ; Visavadar, in hedges, tall form.

Uses : The whole plant is used in fevers, to promote perspiration ; when used in conjunction with quinine, it seems to enhance the action of the latter. (Indraji 394. 1910)

VICOA Cass.

Vicoa indica (Linn.) DC. in Wight, Contrib. 10. 1834 ; Santapau, Rec. Bot. Surv. Ind. 16 (1) : 149. 1953 ; Santapau, Pl. Saur. 449. 1953 ; Santapau & Jan. 29. 1967. *Inula indica* Linn. Sp. Pl. ed. 2, 1236. 1762. *Vicoa auriculata* Cass. in Ann. Sci. Nat. (ser. 1) 17 : 418. 1829 ; FBI 3 : 297 ; Cooke 2 : 89.

An erect annual herb, unbranched in the lower half, often much branched above. Leaves usually small, oblong, lanceolate acute, hairy on both sides, base broadened and auricled, petioles 0. Heads 6-18 mm diam. on long peduncles, bright yellow ; ray florets ligulate, disc florets tubular. Involucral bracts linear, more or less hairy, with membranous margins. Pappus of ray florets 0, of disc florets scanty. Achenes very small, sparsely hairy.

Local name : Sonasali.

Flowers : October onwards.

Occurrence : Occasional on grassy slopes at Laloi ; Bhanvad in cultivated fields ; Abhapara slopes common at higher levels ; Kota near Khambaliya, in open ground, common ; along the railway line near Kansia-nes station, occasional.

XANTHIUM Linn.

Xanthium strumarium Linn. Sp. Pl. 987. 1753 ; FBI 3 : 303 ; Cooke 2 : 94, Indraji 406. 1910 ; Santapau, Pl. Saur. 451. 1953 ; Gir 203, Santapau & Jan. 29. 1967. *Xanthium indicum* Koenig ex Roxb. Fl. Ind. 3 : 601. 1832.

An erect, gregarious herb or under shrub, up to 1-5 m high, annual. Leaves numerous, entire or somewhat lobed hairy on both sides. Flowers

inconspicuous, yellow, the involucre of fertile heads ovoid in fruit, spinous all over, with two large hooked spines at the apex.

Local name : Gadariyun.

Flowers : October onwards.

Occurrence : Common all over Saurashtra, at least in the less dry places, along the roads, near water ditches, etc. Jamnagar and its neighbourhood ; Beyt ; Rajkot, very common ; Junagadh, along the road to the Girnar, gregarious, and along the river bed ; Bordevi in the Girnar forest, abundant locally ; Girnar forest, occasionally along the main road to Bordevi ; Junagadh to Veraval, in very dense growth, in almost pure formation ; Bhavnagar, rare ; Sasan very abundant in silted ground above main river dam ; Kansia-nes station, occasionally ; Shirwan, abundant in large clumps near the village, etc. Along the railway line from Viramgam to Rajkot, abundant.

Uses : In the form of a decoction it is administered in cases of long-standing malaria. The leaves are given in the form of a decoction in the treatment of skin diseases. (Indraji 406. 1910)

GOODENIACEAE

SCAEVOLA Linn.

Scaevola taccada (Gaertn.) Roxb. Hort. Beng. 15. 1814 and Fl. Ind. 1 : 528. 1832 ; Santapau and Jan. 29. 1967. *Lobelia taccada* Gaertn. Fruct. 1 : 119, t. 25. 1788 ; *Scaevola koenigi* Vahl Symb. Bot. 3 : 36. 1794 ; FBI 3 : 421. 1881. Cooke 2 : 128.

An erect shrub about 0.75 - 1 m high ; stem and branches terete, thick, pale green. Leaves alternate, gathered mostly towards the ends of the branches, alternate, obovate, obtuse, entire, glabrous, tapered at the base into a stout petiole. Flowers white, in few-flowered axillary cymes ; calyx lobes 5, 3-5 mm long, the tube about equal in length, accrescent in fruit. Corolla 2-3 cm long ; lobes 1-1.3 cm long, spreading, elliptic obovate, the central portion thick and stiff, the margins thin, membranous. Style stout, 2 cm long, Stamens 5. Fruit a drupe, 2 cm diam., furrowed with ripe and crowned by the persistent calyx lobes.

Local name : Bhadrak, Bhadraksh (Bombay).

Flowers : June onwards.

Occurrence : A coastal shrub, found only on the sandy shores at Okha. Rare in Saurashtra.

LOBELIACEAE

LOBELIA Linn.

Lobelia alsinoides Lamk. Encycl. 3 : 588. 1792 ; Moeliono and Gwyn in Fl. Malesiana Ser. 1, 6. 127. 1960 ; Santapau & Jan. 29. 1967. *Lobelia trigona* Roxb. Fl. Ind. 1 : 507. 1832. Cooke 2 : 130.

A prostrate small fleshy herb. Stem and branches somewhat trigonous, the ends of the branches with inflorescence erect or sub-erect. Lower leaves more or less circular, the others rotund-ovate to ovate oblong, about 5-16 × 5-12 mm. Serrate at the margins, petioles short. Flowers solitary, axillary, on fairly long and slender pedicels. Corolla lilac or bluish, 6-7 mm long, the tube paler than the lobes or nearly white. Anthers with a tuft of hairs at the apex. Seeds trigonous.

In general appearance this plant is often mistaken for one of the Schrophulariaceae ; the structure of the anthers and of the seeds clearly distinguish this from similar plants.

Flowers : From the middle of the monsoon onwards in moist spots until the hot season.

Occurrence : Moist spots at the foot of the Girnar, near Junagadh.

Uses : The leaves are used as pot-herb, they are eaten in times of scarcity, and an ornamental plant. (W1)

PLUMBAGINACEAE

Styles free from the base or nearly so

Limonium

Styles connate throughout their entire length :

Calyx densely glandular hairy

Plumbago

Calyx not glandular

Dyerophytum

DYEROPHYTUM Kunze.

Dyerophytum indicum (Gibs. ex Wt.) O. Kuntze, Rev. Gen. Pl. 394. 1891 ; Henry & Roy, Bull. Bot. Surv. Ind. 10 : 275. 1968. *Vogelia indica* Gibs. ex Wight, Icon. t. 1075. 1846 & in Calc. J. Nat. Hist. 7 : 17. 1847 ; FBI 3 : 481 ; Cooke 2 : 138 ; Indraj 422. 1910 ; Santapau, Pl. Saur. 456. 1953 ; Santapau & Jan. 29. 1967.

An erect shrub, in open country about 60 cm tall, when growing under the protection of *Euphorbia nivulia* clumps up to 3 m high ; branches

terete. Leaves glaucous green, thick, leathery, perfoliate, from oblong to orbicular, rounded at the apex, margins entire but wavy. Flowers pale orange yellow or flesh-coloured or reddish. Calyx without glands, tubular, strongly 5-ribbed, winged between the ribs. Corolla up to about 25 mm long; stamens included in the corolla. Style 1, with 5 stigmatic branches. Capsule splitting into 5 valves with membranous margins; seed one, pear-shaped.

Local name : Pavi, Rato-chitro (Junagadh).

Flowers : October onwards.

Occurrence : Very common and abundant in the neighbourhood of Rajkot, often growing among dense clumps of *Euphorbia nivulia* which seems to give some protection to the plant. Common also at Khatia, Laloi and Kota near Jamnagar, in grass fields; Kileshwar on the Barda Hills, occasional; Gorinja near Dwarka, among *Euphorbia* clumps; chotila Hill; among Indrajī's collection there is a plant from Porbander, collected in October 1915. Cooke also noted from Porbander in 1891.

Uses : Locally the plant seems to be used as fodder for animals, hence its relative scarcity except when growing among *Euphorbia nivulia* Buch.-Ham. clumps.

Note : *Vogelia* Lamk (1792) is a later homonym of *Vogelia* J.F. Gmel. (1791). *Vogelia* Lamk is replaced by *Dyerophytum* O. Ktze. (1891).

LIMONIUM Mill.

Limonium stocksii (Boiss.) O. Ktze. Rev. Gen. Pl. 396. 1891; Santarpau & Jan. 29. 1967. Stewart, Fl. W. Pakistan 545. 1972. *Statice stocksii* Boiss. in DC. Prodr. 12 : 664. 1848, FBI 3 : 480; Cooke 2 : 136; Santarpau, Pl. Saur. 455. 1953.

A small woody undershrub, 15-30 cm high; leaves up to 25 mm long, fleshy, spatulate, rounded at the apex, tapering below to an obscure petiole. Flowers small, in unilateral spikes on a leafless scape. Calyx 3 mm long, white when fresh, with reddish ribs. Petals pink, small truncate or emarginate at the apex; stamens exerted beyond the corolla. Styles 5. Fruit a small utricle, included in the calyx.

Local name : Chitrak.

Flowers : Winter months.

Occurrence : Bhiva, according to Cooke, reports the plant from Veraval; Boergesen has mentioned it for Dwarka. It was also noted from Okhamandal and Jamnagar.

PLUMBAGO LINN.

Corolla white, 12-15 mm diam.	<i>zeylanica</i>
Corolla light blue, 2-3 cm diam.	<i>auriculata</i>
Corolla red, 2-3 cm diam.	<i>indica</i>

Plumbago auriculata Lamk. *Encycl.* 2 : 270. 1786 ; Santapau, *Pl. Saur.* 452. 1953 ; Santapau & Jan. 29. 1967. *Plumbago capensis* Thunb. *Prodr. Cap.* 33. 1794 ; Cooke 2 : 137.

Cultivated in Jubilee Gardens in Rajkot, where it seems to thrive and produce plenty of light blue flowers. Similar to *P. zeylanica*, but flowers are distinctly pale blue to light lilac. It does not run wild in Saurashtra.

Local Name : Kalochitro.

Flowers : October onwards.

Occurrence : This plant has been noted in Jubilee Gardens, Rajkot and in a few other places, always under cultivation.

Uses : Decorative plant for gardens.

Plumbago indica Linn. in *Stickm. Herb. Amb.* 24. 1753 ; Santapau *Pl. Saur.* 453. 1953 ; Santapau & Jan. 29. 1967. *Plumbago rosea* Linn. *Sp. Pl.* ed. 2, 215. 1762 ; *FBI* 3 : 481, Cooke 2 : 137 ; Indrajii 422. 1910.

Similar to the other species, but clearly distinct at first sight on account of the red colour of its flowers. This plant is occasionally cultivated in gardens, though not as frequently as *P. auriculata*.

Local Name : Rato chitro.

Flowers : October onwards.

Occurrence : Given on the authority of Indrajii.

Uses : A paste of the root prepared with milk, salt and water is used as an external application in leprosy and other skin diseases of an obstinate

characters. It is used as an irritant to the skin, in the treatment of dyspepsia, piles, anasarca, diarrhoea and skin diseases. The drug is apt to cause abortion, even eating the leaves is said to cause similar action. (Indraji 422. 1910)

Plumbago zeylanica Linn. Sp. Pl. 151. 1753 ; FBI 3 : 480 ; Cooke 2 : 137 ; Indraji 421. 1910 ; Santapau, Pl. Saur. 454. 1953 ; Gir 204 ; Santapau & Jan. 29. 1967.

An erect or subscandent herb, 50-180 cm high, branches long, not rooting at nodes. Leaves alternate, 4.9 × 2.4 cm, ovate, entire, glabrous narrowed into a short petiole ; the petiole often enlarged at the base into two small auricles. Flowers in racemes, the rachis glandular, 6-30 cm long. Calyx up to 12 mm long, densely covered with stalked glands. Corolla tube 16-20 mm long, limb about 12-15 mm across, white. Stamens 5. Fruit an oblong, pointed capsule, furrowed, 1-seeded.

Local name : Chitrak, Dholo chitrak.

Flowers : September onwards.

Fruits : October onwards.

Occurrence : Jamnagar, edges of fields, occasional Abhapara slopes on the Barda Hills, rare ; Girnar, along the road in the forest to Bordevi, common and abundant, edges of cultivated fields, Junagadh ; Gir Forest, near river at Sasan, common ; Kankeshwari, in fruit, common in hedges ; Girnar, about one-third up the hill, common.

Uses : A paste of root prepared with milk, salt and water is used as an external application in leprosy and other skin diseases of an obstinate character. It is used as an irritant to the skin, in the treatment of dyspepsia, piles, anasarca, diarrhoea and skin diseases. The drug is apt to cause abortion, even eating the leaves is said to cause similar action. (Indraji 421. 1910).

PRIMULACEAE

ANAGALLIS Linn.

Anagallis arvensis Linn. var. *caerulea* Gren. & Godr. Fl. France 2 : 467. 1852 ; Santapau, Pl. Saur. 457. 1953 ; Santapau & Jan. 29. 1967. *Anagallis arvensis* Linn. Sp. Pl. 148. 1753, FBI 3 : 506 ; Cooke 2 : 139 ; Indraji 423. 1910.

An erect or procumbent, glabrous herb, much branched from the base. Leaves up to 15×8 mm ovate, acute, entire. Flowers axillary, solitary, on slender pedicels which are nearly as long as or longer than the leaves. Calyx spreading divided nearly to the base into narrow segments. Corolla blue or gentian blue, up to 12 mm diam. Capsule about 6-7 mm diam. Seeds numerous, minute, trigonous.

Local name : Kali fuladi, Chanak-chibhadi.

Flowers : October.

Occurrence : This is a European weed, introduced in India and found as a weed of cultivated fields. Only specimens were collected near water in Pradomna Park, Rajkot.

Uses : Grounded plant is made into poultices and applied on wounds, swellings and on various skin diseases. (Indraji 425, 1910)

In gout, cerebral affections, hydrophobia, leprosy, dropsy, epilepsy, mania, as fish poison in snake-bite. (Chopra et al. Gloss. Ind. Med. Pl. 17)

MYRSINACEAE

AEGICERAS Gaertn.

Aegiceras corniculatum (Linn.) Blanco, Fl. Filip. ed. 1, 79. 1837; Santapau & Jan. 30, 1967. *Rhizophora corniculata* Linn. Amoen. Acad. 4 : 123. 1760. *Aegiceras majus* Gaertn Fruct. 1 : 216, t. 46. 1788 ; FBI 3 : 533 ; Cooke 2 : 147.

A shrub or small tree, growing in salt marshes. Leaves obovate, obtuse, glabrous, petiole short and stout. Flowers white, in terminal, axillary or leaf-opposed umbels. Fruits curved like the horns of a ram, 3-6 cm long, tapering to a fine point.

Local name Halsi (Hindi).

Flowers : February onwards.

Occurrence : This plant is abundant in the Navalakhi creek, on the northern parts of Saurashtra.

Uses : It is used mostly for building huts and for fuel. (W1)

SAPOTACEAE

Calyx segments 4; stamens 12 or more; staminodes 0	<i>Madhuca</i>
Calyx segments 6; stamens 6; staminodes 6	<i>Manilkara</i>
Calyx segments 8; stamens 8; staminodes 8	<i>Mimusops</i>

MADHUCA J. F. Gmel.

Madhuca indica Gmelin, Syst. Nat. 2 : 799. 1791; Merrill in Journ. Arn. Arb. 29 : 190. 1948; Santapau, Pl. Saur. 458. 1953; Santapau & Jan. 30. 1967; Santapau, Fl. Khandala 141. 1967. *Bassia latifolia* Roxb. Pl. Cor. 1 : 20, t. 19. 1795; FBI 3 : 544; Cooke 2 : 152.

A deciduous large to very large tree with a spreading crown. Leaves near the ends of branches, leathery, reddish or coppery and velvety when young, pale green and glabrous when old; stipules densely pubescent, caducous. Flowers in fascicles at the ends of the branches, pedicels 3-4.5 cm long, drooping, rusty pubescent. Calyx divided nearly to the base, up to 12 mm long; segments usually 4, rarely 5, corolla white to cream coloured, fleshy, segments 7-14, usually 8-9. Stamens 20-30, anthers hairy at the back, staminodes 0. Fruit a berry, 3-5 cm long, ovoid.

Local name : Mahudo.

Flowers : January to April.

Occurrence : Often planted in gardens or fields, Junagadh, along the Girnar road, large trees; Gondal, along the lake; Shapur, large trees in gardens; Sasan, under cultivation in farms; Rajkot, in gardens.

Uses : The tree is planted as a shade tree, the seeds yield an oil that is used for soap-making, the flowers are eaten raw or cooked, or are used for the preparation of alcohol after fermentation and distillation. A decoction of the bark is astringent and tonic.

Note : In our floras the plant is generally given under the name of *Bassia latifolia* Roxb. 1795. The name *Bassia* Koen. ex Linn. Mant. 2 : 555. 1771, is a later homonym of *Bassia* Allioni, 1776, for a plant in the Chenopodiaceae, which at present goes under the name of *Kochia* Roth. This case is covered by Art. 64 (2) of the Code, which states that 'even if the earlier homonym is illegitimate, or is generally treated as a synonym on taxonomic grounds, the later homonym must be rejected'. According to this article, *Bassia* Koen. ex Linn. is an illegitimate name.

The specific name *latifolia* dates from 1795 ; there is an older one, *indica* Gmel. 1791, for the same plant, and according to the Code, Art. 54, the older name must be used for the plant.

MANILKARA Adans. Emend. Gilly

Petals without appendages	<i>zapota</i>
Petals with appendages	<i>hexandra</i>

Manilkara hexandra (Roxb.) Dubard. in Ann. Mus. Col. Marscilles 23 : 9, f. 2. 1915 ; Van Royen in Blumea 7 : 408. 1953 ; Santapau, Pl. Saur. 459. 1953 ; Gir, 206 ; Santapau & Jan. 30. 1367. *Mimusops hexandra* Roxb., Cor. Pl. 1 : 16, t. 15. 1795 ; FBI 3 : 549 ; Cooke 2 : 155, Indraji 428. 1910.

A large evergreen tree, its trunk often much disfigured by the constant cutting of branches. Leaves alternate leathery, obovate or oblong, rounded or emarginate at apex, glabrous 7.5-15 × 2.5-7.5 cm petioles about 12 mm long channelled above. Flowers solitary or fascicles of 2-6, white to dirty white, pedicels 6-12 mm long. Calyx rusty-pubescent outside ; segments 6. Corolla lobes about 18 in two series ; the inner 6 shortly clawed, the outer 12 narrower, acute. Stamens 6, staminodes 6 alternating with the stamens, bifid at the apex. Fruit a berry, usually 1-seeded, about 12 mm long.

Local name : Rayan, Ran.

Flowers : September onwards.

Occurrence : Common in forest, occasionally planted in gardens. Jamnagar and Laloi, occasional, Bileshwar, Ghumli and Abhapara hill in the Barda hills, common ; Girnar, forest at the foot, common ; Girnar along the steps, occasional, Sasan in the Gir forest, common, large trees at edges of forest. Kailash Baug, Gondal, cultivated : Rajkot, in nullas, occasional.

Uses : The fruit is a good tonic and aphrodisiac. Young branches are cut to make walking-sticks. The wood is hard and is used for turning. (Indraji 429. 1910).

Manilkara zapota (Linn.) van Royen in Blumea, 7 : 410. 1953 ; Santapau & Jan. 30. 1967. *Achras zapota* Linn. Sp. Pl. App. 1190. 1753 ; FBI 3 : 534 ; Cooke 2 : 155.

A small to medium-sized tree, with a dense crown. Leaves oblong-lanceolate or elliptic-oblong, obtuse or subacute, shining on both sides. Flowers white. Fruit globose 3.5-5 cm diam., brown outside, fleshy with 5 large black and shining seeds.

Local name : Chikali, Chiku.

Flowers : October.

Occurrence : Occasionally planted in Orchards for its fruit. Jilla Gardens, Rajkot, several trees with plenty of fruit.

Uses : The fruit is used against biliousness and febrile attacks ; the bark is tonic ; the seeds diuretic.

Note : The Chiku, also called sapodilla or sapota, is a native of Mexico in Tropical America. It is not known when it was first introduced into India.

MIMUSOPS Linn.

Mimusops elengi Linn. Sp. Pl. 349. 1753 ; FBI 3 : 548 ; Cooke 2 : 155, Indrajai 426. 1910 ; Santapau, Pl. Saur. 460. 1953 ; Santapau & Jan. 30. 1967.

A large evergreen tree, 4.5-7.5 m high with a short trunk and dense crown. Leaves 7.5-10×2.5-1.2 cm, elliptic glabrous, shortly acuminate. Flowers white, solitary or in fascicles of 1-8 fragrant. Calyx 10 mm long, rusty-pubescent. Corolla lobes about 24, in two series. The inner of 8, the outer of 16 segments, stamens 8, opposite the inner segments of corolla ; staminodes 8; alternating with stamens, covered with white hairs. Fruit a berry, 25 mm long, ovoid, fleshy, yellow when ripe. Seed 1, rarely 2, brown, shining.

Local name : Borsali, Bakul.

Flowers : January onwards.

Occurrence : Noted only in gardens at Okha, Rajkot etc.

Uses : The bark and fruit is astringent and tonic. The tree is planted in gardens as a shade tree. Timber is used for making furniture. (Indrajai 426. 1910)

EBENACEAE

DIOSPYROS Linn.

Diospyros melanoxylon Roxb. Pl. Cor. 1 : 36, t. 46. 1795, FBI 3 : 564 ; Hiern, Monogr. Eben. 159. 1873 ; Cooke 2 : 159 ; Santapau, Pl. Saur.

461, 1953 ; Santapau & Jan. 30, 1967. *D. tupru* Buch.-Ham. in Trans. Linn. Soc. 15 : 111. 1827 ; FBI 3 : 563 ; Indrajī 431. 1910.

A medium to large tree, deciduous ; bark distinctly tessellated (or marked with rather regular rectangular scales). Young leaves soft, reddish or rusty pubescent ; older leaves large, glabrous, stiff. Flowers dioecious, i.e. male and female flowers on different trees. Male flowers 3-12 together, in drooping cymes, the whole flower scarcely 12 mm long. Female flowers white, larger than the male ones, solitary, calyx hairy on both sides, accrescent in fruit ; corolla about twice as long as the calyx. Fruit supported by the enlarged calyx, up to 3.5 cm diam., slightly flattened at the poles, seeds 2-8.

Local name : Timbaroo, Timbru.

Flowers : February to April.

Occurrence : Common in forest all over Saurashtra. Laloi near Jamnagar ; Ghumli, Abhapara and Kileshwar. On the slopes of the Barda Hills, common and abundant ; Girnar slopes, very abundant, in plenty of fruit in October ; Bordevi on the Girnar, large trees ; Junagadh, near Willingdon dam, Gir Forest, at Junwania large trees ; Shirvan. Common and large trees ; Sasangir very common, some trees very large.

Uses : The ripe fruit is edible and rather tasty ; unripe fruits are very astringent, bark and leaves used as astringent ; the fresh leaves are used as wrappers for bidi. (Indrajī 431. 1910)

OLEACEAE

Shrubs, usually scandent ; fruit a berry	<i>Jasminum</i>
Shrubs or small trees, erect ; fruit a compressed capsule	<i>Nyctanthes</i>
Trees, medium to large sized ; fruit a woody pear-shaped capsule	<i>Schrebera</i>

JASMINUM Linn.

Leaves unifoliate	<i>multiflorum</i>
Leaves 3-or more-foliate :	
Leaflets 3-7, lateral ones acute	<i>officinale</i>
Leaflets 7-11, lateral ones usually very obtuse	<i>grandiflorum</i>
Leaves simple	<i>sambac</i>

Jasminum multiflorum (Burm. f.) Andrews, Bot. Rep. 8 : t. 496. 1807; Gir 208 ; Santapau & Jan. 30. 1967. *Nyctanthes multiflora* Burm. f. Fl. Ind. 5, t. 3, f. 1. 1768. *J. pubescens* Willd. Sp. Pl. 1 : 37. 1797 ; FBI 3 : 592 ; Cooke 2 : 173 ; Bor & Raizada, Some Com. Ind. Cl. 219, f. 129, t. 78.

A scandent shrub ; young parts velvety, often rusty. Leaves opposite, simple oval in shape, acute or acuminate, upper surface at first pubescent, later glabrous or nearly so, lower surface tomentose or pubescent especially on the nerves. Flowers in dense cymes, terminal on dwarf lateral branches, white fragrant. Calyx tube 10-14 mm long, teeth 6-9, twice as long as the tube. Corolla white ; tube 15-18 mm long ; lobes 6-9, oblong lanceolate. Stamens 2. Fruit an ellipsoid berry, about 12 mm long, black when ripe, supported by the calyx tube.

Local name : Chameli.

Flowers : December onwards.

Occurrence : Noted only near a stream at Kankai in the Gir Forest ; and from Junagadh.

Uses : Cultivated in gardens ; the flowers are aromatic.

Jasminum grandiflorum Linn. Sp. Pl. ed. 2, 9. 1762, FBI 3 : 503 ; Cooke 2 : 176 ; Santapau, Pl. Saur. 462. 1953 ; Santapau & Jan. 30. 1967.

An erect or subscaudent shrub. Leaves opposite, leaflets 7-11, the terminal slightly larger than the rest, the two lateral leaflets often confluent with the terminal one. Flowers white, very fragrant, in axillary or terminal cymes longer than the leaves ; calyx tube 2-3 mm long, teeth two or three times as long as tube ; corolla tube up to 25 mm long, lobes 5, elliptic or obovate, obtuse.

Local name : Chambeli.

Flowers : Hot and rainy season.

Occurrence : Occasionally planted in gardens. A very fine specimen in full bloom was noted in a garden at Morvi near Chotila.

Uses : Leaves are astringent ; the whole plant is said to be a good anthelmintic ; the perfume of the flowers is much valued.

Jasminum officinale Linn. Sp. Pl. 7. 1753 ; FBI 3 : 603 ; Cooke 2 : 175 ; Santapau, Pl. Saur. 463. 1953 ; Santapau & Jan. 30, 1967.

A scandent shrub. Leaves opposite ; leaflets 3-7, the terminal one much larger than the rest, all ovate or lanceolate, acuminate. Flowers white ; fragrant, in terminal corymbs or cymes. Shorter than the leaves. Calyx tube 2-5 mm long, lobes 5, 5-12 mm long ; corolla tube 12-16 mm long, lobes about as long, ovate or elliptic. Fruit ovoid and black when ripe, full of crimson juice.

Local name : Jai.

Flowers : May to June.

Occurrence : Occasionally planted in gardens. It was noted at Ghumli, at the foot of the Barda Hills, and at Rajkot. Also at Mithapur near Okha.

Uses : The root is said to be used in the treatment of ringworm. The leaves are chewed for relief in cases of ulceration of the mucous membrane of the mouth. Fresh juice of leaves is used as an application for corns ; an oil preparation containing the juice is used in otorrhoea. The whole plant is considered to be anthelmintic, diuretic and emmenagogic. The scented oil and attar from flowers are valued for their cooling effect and in skin diseases, headache and eye troubles. (WI)

Jasminum sambac Ait. Hort. Kew. 1 : 8. 1789 ; FBI 3 : 591, Cooke 2 : 172 ; Santapau & Jan. 30. 1967.

A suberect shrub, scarcely climbing ; young branches pubescent. Leaves opposite, membranous, 3.7-11.2 × 2.1-6.1 cm, variable in shape, broadly ovate or elliptic, obtuse, entire, glabrous, base rounded or subcordate, main nerves 4-6 pairs ; petiole 0.3-0.6 cm. long, hairy. Flowers white, fragrant, solitary or in 3-flowered terminal cymes ; bracts linear-subulate ; pedicels 0.6 cm long, hairy. Calyx 0.9-1.2. cm long, hairy ; teeth 5-9, linear-subulate. Corolla tube 1.2 cm long ; lobes as long as the tube, narrowly oblong, acute or obtuse. Ripe carpels 1-2 subglobose, 0.6 cm in diam., black surrounded by the suberect calyx-teeth.

Local name : Mogro.

Flowers : More or less throughout the year.

Occurrence : Collected from Jamnagar, Rajkot and Junagadh.

Uses : The plant is considered cool and sweet. It is used in cases of insanity, weakness of sight and affections of mouth. The leaves and flowers are considered valuable as a lactifuge. The applications of bruised material to the breasts arrests secretion of milk in the puerperal state in cases of threatened abscess. Dried leaves soaked in water and made into poultice are used in indolent ulcers. [Gaz. A (1) : 124. 1953].

NYCTANTHES Linn.

Nyctanthes arbor-tristis Linn. Sp. Pl. 6. 1753 ; FBI 3 : 603 ; Cooke 2 : 177 ; Santapau, Pl. Saur. 464. 1953 ; Santapau & Jan. 30. 1967.

A small tree, up to 7 m high. Leaves opposite, broadly ovate, acuminate, rough above with stiff hairs from bulbous bases, hairy beneath, entire ; petioles 5-10 m long. Flowers white, fragrant in the evening, axillary and in short terminal cymes. Calyx hairy outside. Corolla tube orange coloured, lobes white. Capsule up to 18 mm long and broad, compressed, obcordate.

Local name : Parijat, Har-shringar.

Flowers : August onwards.

Occurrence : Very common in gardens. Laloi and Ranjit Sagar, near Jamnagar, cultivated ; at the foot of Girnar, and on Girnar slopes, common and abundant, apparently indigenous ; Junagadh, gardens and slopes near Willingdon dam, Mithapur near Okha in gardens.

Uses : The leaves are used in fevers and rheumatism ; the leaves have been proved effective in malaria. The dry leaves are used as fine sand-paper.

SCHREBERA Roxb.

Schrebera swietenoides Roxb. Fl. Cor. 2 : 1. 1798 ; FBI 3 : 604 ; Cooke 2 : 177, Indrajī 434. 1910 ; Santapau, Pl. Saur. 465. 1953 ; Santapan & Jan. 30. 1967.

A medium to large-sized tree, 450-750 cm high, with whitish coloured bark. Leaves opposite or subopposite, imparipinnate, up to 40 cm long, including the common petiole, which is up to 12 cm long below the lowest pair of leaflets : leaflets opposite, about three pairs and a terminal one, the lowest pair often smaller than the rest, all ovate, acute or acuminate, base often unequal sided ; petiolules of lateral leaflets up to 15 mm long, those of the terminal leaflets up to 6 cm long. Flower buds whitish or greenish yellow, corolla inside covered with papillae or glandular hairs of a rich chocolate brown ; stamens 2, anthers exerted ; style and stigma bright green capsule pear-shaped, drooping, strongly woody, 2 valved. The valves, when ripe, brown dotted with whitish dots. Seeds winged.

Local name : Markho, Nakti-Nu-Zad, Mokho, Marka.

Flowers : May.

Occurrence : Common on the Barda Hills, at Ghumli, Abhapara, Kileshwar, etc. Sasan in the Gir Forest, Common on upper slopes on hill North of Sasan across the river ; Girnar forest, occasional.

Uses : The root is used in leprosy and rheumatism. It is also used as salad. Timber is used for making toys, cradles and other domestic things. (Indraji 434. 1910)

SALVADORACEAE

SALVADORA Linn.

Leaves at least three times longer than broad	<i>oleoides</i>
Leaves a less than three times longer than broad	<i>persica</i>

Salvadora oleoides Decne. in Jacquem. Voy. Bot. 140. 1844 ; FBI 3 : 620 ; Cooke 2 : 183 ; Indraji 438. 1910 ; Santapau, Pl. Saur. 466. 1953 ; Santapau & Jan. 30. 1967.

A shrub or a small tree, 360-450 cm high with a thick and twisted trunk ; branches drooping like the "weeping willow". Leaves long and narrow, opposite, often 5×0.5 cm brittle glabrous. Flowers greenish white, sessile in axillary spikes. Calyx 1.5-2 cm long, divided to about the middle lobes 4. Corolla a little longer than the calyx. Stamens 4. Drupes 4-5 mm diam., yellow or white or red when ripe.

Local name : Mithijar, Piludi.

Flowers : January onwards.

Occurrence : Common in Saurashtra, along the railway lines or roads, not common near the sea ; Ghumli and Abhapara. on the Barda Hills, fairly good trees ; Chotila, on hill slopes ; Rajkot to Viramgam, common and abundant along the railway line. Junagadh occasional Barda, S. of Ghumli, Jamnagar.

Uses : The leaves are purgative, the root bark is vesicant ; the fruit is eaten by humans, and is said to be aphrodisiac. (Indraji 438. 1910)

Salvadora persica Linn. Sp. Pl. 122. 1753 ; FBI 3 : 619 ; Cooke 2 : 182 ; Indraji 436. 1910 ; Santapau, Pl. Saur. 467. 1953 ; Santapau & Jan. 30. 1967.

A large shrub or small tree ; 3-6 cm high, branches drooping. Leaves somewhat brittle, glaucous, 5-10×1.8-1.2 ovate to broadly ovate, acute or rounded at the apex ; petioles 6-15 mm long. Flowers yellowish, in compound terminal and axillary panicles ; calyx minute, corolla 4 mm long. Fruit a drupe, 3-5 mm diam. red when ripe.

Local name : Khari-jar, Piln.

Flowers : October onwards.

Occurrence : This plant was noted common near the sea. Ghumli and Kileshwar, on the Barda Hills, in flower and fruit ; Jodiya, in sandy soil ; Bhavnagar, with plenty of flowers and small fruits ; Chotila, cultivated in hedges ; Mangrol, near the sea and in gardens in hedges ; Porbander, in hedges ; Sasan to Somnath, common along the road sides ; Dwarka and Okha, fairly good trees, bent by the prevailing winds ; Beyt Island, common and abundant ; along the railway line between Rajkot and Surendranagar, common ; Rajkot to Junagadh, common.

Uses : Root-bark is remarkably acrid ; applied to the skin it acts as external stimulant ; sometimes it raises blisters, stem-bark is warm and acrid and is given in decoction in low fever and as a stimulant and tonic in amenorrhoea. Shoots and leaves are given as antidote to all poisons ; leaf-juice is given in scurvy, leaves are used as an external application in rheumatism. Fruits are deobstruent, carminative and diuretic. [Gaz. A (1) : 186. 1953 ; Indraj 437. 1910]

APOCYNACEAE

Leaves alternate :

Flowers wholly and uniformly yellow

Thevetia

Flowers not wholly yellow

Plumeria

Leaves whorled ; erect, unarmed plants

Nerium

Leaves opposite :

Plants armed with spines

Carissa

Plants without spines :

Climbing Plants

Beaumontia

Erect Plants :

Corolla with scales inside

Wrightia

Corolla without scales inside :

Herbs or undershrubs, up to 50 cm tall

Cathartanthus

Shrubs or small trees

Follicles linear, many-seeded ; seeds with a coma

Holarrhena

Follicles boat-shaped, stout few-seeded ; seeds without a coma

Tabernaemontana

BEAUMONTIA Wall.

Beaumontia grandiflora (Roxb.) Wall. Tent. Fl. Nep. 15, t. 7. 1824 ; FBI 2 : 139 ; Cooke 2 : 201 ; Santapau, Pl. Saur. 468. 1953 ; Irani, Taxo. Studies on the Fl. Bombay (Apocynales), 105. 1958 ; Santapau & Jan. 30. 1967. *Echites grandiflora* Roxb. Fl. Ind. 2 : 14. 1832 (excl. Fruct.).

A large climbing shrub. Leaves 14-30×6-11 cm obovate-oblong, acute at apex, shining ; mid-rib and nerves with 14-17 pairs of nerves prominent on the underside. Flowers white or creamy white, erect or pendulous, very fragrant, in terminal and axillary 5-7-flowered cymes. Calyx lobes foliaceous, 3.5×1.5 cm pubescent. Corolla campanulate, pubescent outside, 10 cm or more in length. Filaments 4.5 cm long, anthers 1.2 cm long, style 7 cm long pubescent. Fruit a follicle, up to 25 cm long, thick green and fleshy ; seeds each with a coma 3-5 cm long.

Flowers : November to March.

Occurrence : This plant was found under cultivation in the Kailash Baug in Gondal.

CARISSA Linn.

Seeds usually 4 ; leaves ovate :

Leaves 4-9 cm long *congesta*

Leaves under 3 cm long *spinarum*

Carissa congesta Wight, Icon. t. 1289. 1848; Haines in Indian For. 45 : 385 ; Santapau, Pl. Saur. 469. 1953 ; Irani, Taxo. Studies on the Fl. Bombay (Apocynales) 111. 1958 ; Santapau & Jan. 30. 1967. *C. carandas* (sensu Indrajii 440. 1910).

An erect or scandent shrub armed with stout, straight or somewhat curved spines ; spines on the upper branches simple, lower down simple or much branched. Leaves petiolate, glabrous and shining, 4-9×3-5 cm elliptic or ovate, subacute or obtuse at the apex, acute at the base, margins entire. Flowers white, scented, in terminal and axillary cymes. Calyx pubescent divided to about $\frac{1}{2}$ way down. Corolla tube about 12 mm long ; lobes 1-1.5×0.3-0.4 cm. Stamens inserted at the top of the tube. Berry 1-1.2 cm. diam., globose or slightly ovoid, at first green, finally deep purple to black. Seeds 4, compressed.

Local name : Karamda.

Flowers : December to March.

Occurrence : Common at Laloi and Kota in scrub forest ; Barda Hills, common at Ghumli, Abhapara, Kileshwar etc. Common on the Girnar slopes and at Bordevi in the Girnar forest ; a few plants at Junagadh, in the Willingdon dam area ; Gir forest, common usually at the edges of the forest or in hedges near villages (Junwania, Shirvan, Sasan etc.).

Uses : Root are given in stomachache. An infusion is given in fevers. Pickle is prepared from the fruits. Roots are boiled in water and given on snake-bite. (Indraji 441. 1910)

Carissa spinarum Linn. Mant. 2 : 559, 1771 ; FBI 3 : 631 ; Cooke 2 : 187 ; Santapau, Pl. Saur. 470. 1953 ; Irani, Taxo. Studies on the Fl. Bombay (Apocynales), 123. 1958 ; Santapau & Jan. 31. 1967.

A suberect or prostrate evergreen shrub ; young parts and inflorescence pubescent ; bark light-coloured ; branches rigid, often zigzag, terete, divaricate ; spines 1.2 - 2.8 cm long, horizontal, very sharp, often bifurcate. Leaves 2.0-2.5 × 1.2-1.8 cm coriaceous, elliptic, acute, petiole 0.4-0.6 cm long. Flowers white, sometimes tinged with pink, scented, in few-flowered pubescent corymbose, usually terminal cymes. Very often in threes on the top of short pubescent peduncles ; pedicels short ; bracts linear, pubescent. Calyx divided almost to the base ; lobes 0.3 cm long, lanceolate, acute, ciliate. Corolla tube 0.6 - 0.9 cm long, lobes slightly shorter than the tube, lanceolate, acute, spreading. Ovary 2-celled ; ovules 2 in each cell. Berry 0.6 cm in diam., subglobose, usually 4-seeded, dark-purple.

Local name : Kado.

Flowers : January to May.

Occurrence : Collected from the forest at the foot of the Girnar.

Uses : The unripe fruits are pickled and eaten in curries, the ripe fruits are tasty and edible, they are sometime made into jam ; the ripe fruits are mildly laxative and tonic, and are said to be antiscorbutic.

CATHARANTHUS G. Don.

Leaves lanceolate, corolla about 1 cm diam.

pusillus

Leaves obovate-oblong ; corolla about 3-4 cm diam.

rosus

Catharanthus pusillus (Murr.) G. Don. Gen. Syst. 4 : 95. 1837 ; Santapau & Jan. 31. 1967. *Vinca pusilla* Murr. in Nov. Comm. Soc. Reg. Sc. Gott. 3 : 66, tab. 2, Pl. 1. 1753 ; FBI 3 : 640 ; Indraji 442. 1910.

Lochnera pusilla K. Schum in Engl. & Prantl, Pflanzenf. 4 (2) : 145. 1895 ; Cooke 2 : 191 ; Irani, Taxo. Studies on the Fl. Bombay (Apocynales) 150. 1958.

An erect annual herb, 10-50 cm high, branches spreading. Leaves of a very bright light green colour when fresh shortly petiolate, 4-8 × 1.2 cm lanceolate, acute, glabrous. Flowers white, about 1 cm diam. when fully open, solitary or in pairs in axiles of leaves. Fruit of two follicles, 3-4.5 cm long, slender, glabrous. Seeds 9-12 in each follicle, small ribbed.

Local name : Karpati Rai, Parvati Rai.

Flowers : August to October.

Occurrence : Common and abundant in the neighbourhood of rocks in the river bed at Rajkot and in Pradumna Park. Occasional in cultivated fields, Chotila. Some dense patches among *Leucas* Plants in rocky fields.

Uses : The plant is said to be poisonous to cattle ; dried plant used in the treatment of lambago. (Indraji 442. 1910).

Catharanthus roseus (Linn.) G. Don, Gen. Syst. 4 : 95. 1837 ; Santapau & Jan. 31. 1967. *Vinca rosea* Linn. Syst. ed. 10, 944. 1759 ; FBI 3 : 640. *Lochnera rosea* (Linn.) Reich. Consp. Reg. Veg. 134. 1828 ; Cooke 2 : 192 ; Irani. Taxo. Studies on the Fl. Bombay (Apocynales), 151. 1958.

An erect undershrub, woody at the base. Leaves shortly petioled, 3-7 × 1.5-2 × 2.5 cm, obovate-oblong, glabrous or nearly so. Flowers white pink or purplish, solitary or in pairs, axillary. Corolla 2-3.5 cm diam., the tube 2.5-3 cm long, the throat hairy. Follicles 3-4 cm long ; seeds 3 × 1 mm, tubercled.

Local name : Sadafuli.

Flowers : More or less throughout the year.

Occurrence : Very commonly cultivated in gardens for its flowers, occasionally run wild in the neighbourhood of garden Rozi, Dhumvao and Jamnagar, in gardens, Bileshwar on the Barda Hills, cultivated ; Mithapur and Dwarka, in gardens, plenty of flowers in October. Rajkot in Jubilee Gardens and elsewhere under cultivation, Junagadh, cultivated and run wild ; Gir Forest, Sasan, Jasadhar, etc. in gardens ; Veraval, in gardens, etc.

Uses : The whole plant is used in the treatment of diabetes. The plant, however, is cultivated mostly for its flowers, which are colourful and last for a long time.

The juice of the leaves is used as an application for wasp stings. The root is considered toxic and stomachic. However, the discovery of tumour inhibiting properties as also the isolation of alkaloids useful as a sedative and for hypertension, has opened up new avenues for the use of this plant. Vinblastine sulphate is cytotoxic drug that arrests cell growth of the metaphase and used mainly for the treatment of Hodgkin's disease and other lymphomas and choriocarcinomas. Vincristine sulphate is cytotoxic drug which like Vinblastine sulphate, arrests mitosis in the metaphase. It is more effective in the treatment of acute leukaemia particularly in children. Other conditions in which vincristine sulphate has produced remission, are lymphosarcoma, reticulum sarcoma, neuroblastoma, Wilm's tumour and tumours of the breast, brain and lungs. (Export potential of selected medicinal plants and their derivatives. P. 20).

Note : *Catharanthus* in the recent past was variously placed under *Vinca*, *Lochnera* and *Catharanthus* ; Lawrence in Bailey 7 : 113-119. 1959, reviewed and discussed the status and nomenclature of these genera in detail. H. Santapau also has discussed the same in Bull. bot. Surv. Ind. 3: 15. 1961.

HOLARRHENA R. Br.

Holarrhena antidysenterica (Heyne ex Roth) A. DC. Prodr. 8 : 413. 1844 ; FBI 3 : 644, Cooke 2 : 195, Indraji 443. 1910 ; Santapau, Pl. Saur. 472, 1953 ; Irani, Taxo. Studies on the Fl. Bombay (Apocynales) 135, 1958 ; Santapau & Jan. 31. 1967. *Echites antidysenterica* Heyne ex Roth, Nov. Pl. Sp. 138. 1821.

An erect shrub or small tree. Leaves ovate, elliptic or elliptic-oblong, 6-30 × 4-14 cm, acute or acuminate at the apex, glabrous on both sides. Flowers white, fragrant, in terminal many-flowered corymbose cymes. Calyx tubular, divided nearly to the base. Corolla 2.3 cm across, the tube 1-1.4 cm long. Follicies in pairs, 20-30 cm long ; seeds linear oblong, light brown, coma 3-4.5 cm long.

Local name : Indrajav, Kado, Karikhado.

Flowers : January to August.

Occurrence : Common on the Barda and Girnar Hills, very rare elsewhere Abhapara Kileshwar on the Barda Hills, Girnar slopes, common to very common.

Uses : The bark of this plant is one of the main remedies against dysentery in India. Seeds used against dysentery. (Indraji 444. 1910).

NERIUM Linn.

Nerium indicum Mill. Gard. Dict. ed. 8, No. 2, 1768, Merrill, Enum. 3 : 336, 1923 ; Santapau, Pl. Saur. 475. 1953 ; Irani, Taxo. Studies, on the Fl. Bombay (Apocynales) 153. 1958. Santapau & Jan. 31. 1967. *Nerium odorum* Soland. in Hort. Kew. ed. 1, 1 : 297. 1789 ; FBI 3 : 655 ; Cooke 2 : 206.

A large perennial shrub, up to 3 m high. Leaves in whorls of 3, petiolate, up to 12×1.5 cm linear lanceolate stiff, acute at both ends, softly hairy on both surfaces. Flowers white, pink or red, single or double, in terminal cymes. Calyx lobes 4 mm long, linear, corolla 4-5 cm across, petals 5 in single, 10 in double flowers, lobes orbicular or obovate, glabrous. Corona of five scales at the base of the corolla, each scale split into 3-7 linear segments. Filaments short, hairy, the connective produced beyond the anthers. Fruit a follicle, 12-17 cm long straight or slightly falcate, strongly ribbed. Seeds 7-8 mm long, each with a coma 2 cm long.

Local name : Kaner, Karen.

Flowers : Winter months.

Occurrence : Commonly planted in gardens as a hedge plant ; the flowers vary from white to red, but all the flowers on a plant are uniform in colour. Dhunvao and Jamnagar, cultivated and escape ; Bhanvad, in gardens ; Ghumli at the base of Barda Hills, in gardens ; Rajkot, cultivated and escape ; Gondal, Bhavnagar, Jetalsar, Junagadh, Porbandar, etc. cultivated. Gir Forest near Forest bungalows, cultivated Okha, Mithapur and Beyt common in gardens.

Uses : Externally applied to reduce swellings, etc. Internally taken, it is a powerful cardiac poison. The plant is cultivated for its showy flower.

PLUMERIA Linn.

Plumeria rubra Linn. Sp. Pl. ed. 1, 1 : 209. 1753 ; Irani, Taxo. Studies on the Fl. Bombay (Apocynales), 161. 1958 ; Santapau & Jan. 31. 1967. *P. acuminata* R. Br. in Ait. Hort. Kew 2 : 70, 1811 ; Santapau, Pl. Saur. 476. 1953. *P. acutifolia* Poir. in Lam. Encycl. Suppl. 2 : 667. 1812 ; FBI 3 : 641 ; Cooke 2 : 205.

A soft-wooded erect tree, 5-8 m high. Leaves 10-25 × 6-8 cm obovate-oblong or broadly lanceolate ; acute at the apex, glabrous, stiff ; main nerves clear, parallel, joining in an intramarginal one. Flowers white, pale yellow or rose or reddish, with a yellow centre, in terminal, many flowered cymes. Calyx lobes 2-3 mm long retuse at the apex, pubes-

cent outside and ciliate at the margins. Corolla tube 2 cm long ; lobes 3-2 cm obovate, pubescent inside, glabrous outside. Follicles rarely produced in India, in pairs, 14-20 × 2.8-3 cm Seeds large, flat, glabrous.

Local name : Khad-champo.

Flowers : November to July.

Occurrence : This tree is commonly cultivated in gardens, not seen wild. Junagadh, Bhavnagar, Rajkot in gardens ; slopes of the Girnar, cultivated ; Willingdon dam, Junagadh, cultivated.

Uses : The bark is a violent purgative. The tree is cultivated for its flowers.

TABERNAEMONTANA Linn.

Tabernaemontana divaricata (Linn.) R. Br. in R. & S. Syst. 4 : 427, 1879 ; Merrill in Contr. Arn. Arb. 8 : 140. 1934 ; Santapau, Pl. Saur. 477. 1953 ; Irani, Taxo. Studies on the Fl. Bombay (Apocynales) 1 : 30. 1958 ; Santapau & Jan. 31. 1967 ; *Nerium divaricatum* Linn. Sp. Pl. 209. 1753 (Quoad Syn. Fl. Zeyl. excl. Syn. Hermann.). *Ervatamia coronaria* Stapf in Dyer. Fl. Trop. Africa 4 : 127. 1902 ; Cooke 2 : 134.

A shrub 2-3 m high. Leaves 5-20 × 2-4 cm elliptic or lanceolate, acute, glabrous and shining above, paler beneath. Flowers white, highly scented, terminal corymbose cymes. Corolla 3-4 cm across, lobes five or ten, overlapping to the left. Stamens five. Fruit not seen.

Local name : Sagar, Tagar.

Flowers : Winter and summer months.

Occurrence : This shrub has only been noted under cultivation in Kailash Baug, Gondal.

Uses : Cultivated in gardens mainly on account of its profuse, white flowers.

THEVETIA Adans. (non cons.)

Thevetia peruviana (Pers.) Merrill in Phil. Journ. Sci. Bot. 9 : 130. 1914 ; Santapau, Pl. Saur. 478. 1953 of Schum. Irani, Taxo. Studies on the

Fl. Bombay (Apocynales) 179, 1958 ; Santapau & Jan. 31, 1967. *Cerbera peruviana* Pers. Syn. 1 : 267.1805. *Thevetia nerifolia* Juss ex Steuf. Nom. ed. 2 : 680. 1841.

Large shrubs or small trees, scarcely ever over 3 m high. Leaves alternate, up to 15×1 cm linear, tapering at both ends, glabrous, midnerve clear, lateral ones very faint. Flowers in Saurashtra yellow, elsewhere white, yellow or pink, in few-flowered axillary cymes. Calyx lobes 3 mm long. Corolla funnel-shaped, 3-5 cm across, 3-4 cm long. Fruit a drupe angled, glabrous.

Local name : Pili Kaner, Pili-Karen.

Flowers : Most of the year.

Occurrence : In gardens all over Saurashtra. Cultivated as shrub or occasionally as a hedge plant.

Uses : Thevetia is cultivated for the sake of its showy yellow flowers. The plant is highly poisonous.

WRIGHTIA R. Br.

Leaves glabrous ; follicles slender, glabrous *tinctoria*

Leaves tomentose ; follicles stout, rough with white or whitish tubercles *tomentosa*

Wrightia tinctoria R. Br. in Mem. Werm. Soc. 1 : 74. 1809 ; FBI 3 : 653 ; Cooke 2 : 200 ; Indraj 446. 1910 ; Santapau, Pl. Saur. 479. 1953 ; Gir. 213 ; Irani, Taxo. Studies on the Fl. Bombay (Apocynales), 187. 1958. Santapau & Jan. 31. 1967.

Small to medium trees. Leaves petiolate, 4-10×2-3.5 cm, elliptic, acute or acuminate at the apex, glabrous, light green in colour, rather thin. Flowers white, fragrant in terminal cymes. Corolla 1.5-2 cm across ; corona of ten fimbriate scales at the mouth of the corolla. Follicles 20-40 cm long, slender, connate at the tip or free. Seeds with a coma 4-5 cm long.

Local name : Dudhalo, Mitho-Indrajava.

Flowers : March to July.

Occurrence : Common in Saurashtra, especially in forest and along streams. Laloi and Kota near Jamnagar ; Abhapara, Kileshwar and Ghumli on the Barda Hills, common and abundant, Girnar, very common

in the forest, about the commonest tree along the pilgrim steps ; Gir Forest, at Sasan, Tulsishyam, Shirwan, etc. common and in dense forest a large tree ; Chotila hill, very abundant on slopes.

Uses : The bark of this plant is one of the main remedies against dysentery in India. Dried-bark of the root and twig is applied on the swellings of gout. Bark and leaves are used in dyeing industries. (Indraji 447. 1910).

Wrightia tomentosa Roem. & Schult. Syst. 4 : 414. 1819 ; FBI 3 : 653, Cooke 2 : 199 ; Indraji 447. 1910 ; Santapau, Pl. Saur. 480. 1953 ; Irani, Taxo Studies on the Fl. Bombay (Apocynales) 189. 1958. Santapau & Jan. 31. 1967.

A medium sized tree. Leaves 7-15×4-7 cm, elliptic oblong, acuminate at apex, softly tomentose on both sides. Flowers white fading to yellow, in terminal corymbose cymes. Corolla 2-2.5 cm across ; corona of 5-10 scales at the mouth of the corolla. Fruit stout, 20-30 cm long, 1-1.5 cm thick, consisting of two follicles that are united the whole way.

Local name : Kala Indrajaui, Runchhalo-Dudhalo.

Flowers : May to August.

Occurrence : This plant was seen under cultivation in a medicinal garden at Morvi.

Uses : The bark is used in menstrual and renal complaints. Bark of the root is applied on poisonous stings. Leaves and roots are used for dyeing. (Indraji 448. 1910).

ASCLEPIADACEAE

Leafless plants :

Milky sap absent except in fruit ; corona double ; pollen masses erect

Leptadenia

Milky sap abundant throughout ; corona simple ; pollen masses pendulous

Sarcostemma

Leafy plants :

Erect plants ; pollen masses pendulous

Calotropis

Trailing or climbing plants.

- Anthers incumbent on style-apex without a membranous appendage :
- Corolla tubular, longer than broad *Ceropegia*
- Corolla rotate ; broader than long *Leptadenia*
- Anthers with membranous appendage :
- Pollen masses pendulous :
- Stem and leaves subhispidly hairy *Pergularia*
- Stem and leaves glabrous or nearly so :
- Corolla divided 1/2 way down :
- Leaves linear, under 1 cm broad *Oxystelma*
- Leaves 6-15 cm broad *Holostema*
- Corolla divided nearly to base :
- Corona lobes 5, compressed *Pentstemon*
- Corona of membranous ring with lobed or toothed margin *Cynanchum*
- Pollen masses erect or horizontal :
- Corolla rotate :
- Corolla green *Wartakaka*
- Corolla yellowish green with purple spots :
- Fruit up to 5 cm thick *Cosmostigma*
- Fruit up to 1 cm thick *Tylophora*
- Corolla brown or yellowish brown *Tylophora*
- Corolla urceolate, campanulate or salver-shaped :
- Corolla lobes 1 mm long *Gymnema*
- Corolla lobes 8-9 mm long *Telosma*

CALOTROPIS R. Br.

- Staminal column shorter than corona lobes up to 1.2 cm long *gigantea*
- Staminal column equal to or shorter than corona, 5-6 mm long *procera*

Calotropis gigantea (Linn.) R. Br. in Ait. Hort. Kew. ed. 2, 2 : 78. 1811; FBI 4 : 17 ; Cooke 2 : 214 ; Indrajit 458, 1910 ; Santapau, Pl. Saur. 481, 1953 ; Irani 200, 1958 ; Santapau & Jan. 31, 1967. *Asclepias gigantea* Linn. Sp. Pl. 214, 1753.

An erect shrub, 4-5 m high. Stem and branches ash-coloured, milky. Leaves subsessile or sessile, 10-17 × 6-9 cm, thick, broadly obovate,

subacute or obtuse at the apex, at first more or less cottony pubescent on both sides, at length more or less glabrous, base auricled or subamplixicaul. Flowers white or more commonly lilac or purple, in lateral umbellate cymes. Corolla 2.5-3.5 cm across; tube short, wide; lobes 1.2-1.7 × 0.6-0.8 cm, deltoid, spreading, glabrous. Cynostegium 1.3 cm long stout. Follicles in pairs, 7-10 × 3-4 cm boat-shaped, at length glabrous. Seeds flat, with a silky white coma 3.5 cm long.

Local name : Moto Ankado, Akro.

Flowers : Most of the year.

Occurrence : This is the common species of this genus found in the Gir Forest and on the Girnar slopes; elsewhere it is rare. From the Gir Forest common near the river, Kankaj, Jamwala, Junwania Ness, etc. Hadiana and Jamnagar, fairly common. Somnath, cultivated on the sea shore, a large plant with creamy white flowers, was noted, under cultivation at Morvi; the plant was either climbing or trained against the wall and about 4-5 m high.

Uses : The bast yields madar fibre; fresh leaves are applied as fermentations for swellings; the juice of the leaves is applied to flesh wounds. The plant is said to be dangerously poisonous, but in Saurashtra goats often eat the plant with impunity. (Santapau in JBNHS 54 : 218. 1956).

Calotropis procera (Ait.) R. Br. in Ait. Hort. Kew. ed. 2, 2 : 78. 1811; FBI 4 : 18, Cooke 2 : 215; Indraj 453. 1910; Santapau, Pl. Saur. 482. 1953; Irani 202, 1958, Santapau & Jan. 31. 1967. *Asclepias procera* Ait. Hort. Kew 1 : 305. 1789.

An erect shrub, 1-1.5 m high, milky. Stem and branches ashy grey, more or less cottony pubescent. Leaves sessile or nearly so 10-14 × 5-11 cm broadly ovate or obovate, acute at apex, at first pubescent, at length more or less glabrous. Flowers lilac, purple or violate, in lateral umbellate cymes. Corolla 2.5-3 cm across; gynostegium 5-6 mm long, much shorter than in *C. gigantea*. Follicles about the same as in the other species.

Local name : Ankado.

Flowers : More or less throughout the year.

Occurrence; It is common and abundant in waste places, on sandy stretches, etc. of the two species this is by far the commoner in the area. Porbandar near rest house.

Uses : About the same as for *C. gigantea*. This plant is often eaten by goats during the dry season.

Note : At times it is difficult to distinguish between the two species of *Calotropis*, the gynostegium of *C. gigantea* (L.) R. Br. is like the tall Muslim *topi* whilst that of *C. procera* (Ait.) R. Br. is like the shorter Hindu Maharashtra *topi*.

CEROPEGIA Linn.

Ceropegia bulbosa Roxb. Pl. Cor. 1 : 11, t. 7. 1795 ; FBI 4 : 67 ; Cooke 2 : 240 ; Indraj 467. 1910 ; Santapau, Pl. Saur. 483, 1953 ; Irani 217. 1958 ; Santapau & Jan. 31. 1967.

Twining or climbing herb. Tubers spherical or sub-spherical, up to 3 cm diam. Stems 1-2 cm long, glabrous. Leaves 2-4 × 1.5-2.3 cm longer about the middle of the stem, gradually decreasing towards apex and base. Flowers 6-10 in lateral umbellate cymes, the peduncles arising between the petioles of opposite leaves. Calyx minute. Corolla 1.5-2.5 cm long, somewhat curved, inflated at the base, narrowing in the middle and opening funnel-wise below the lobes, the colour greyish outside, purplish inside.

Local name : Kundher.

Flowers : July to October.

Occurrence : Indraj mentions this plant and several varieties from the Barda Hills and Okhamandal.

Uses : The tubers of this and other species of the same genus are eaten by the local people. (Indraj 467. 1910)

COSMOSTIGMA Wight

Cosmostigma racemosum (Roxb.) Wight, Contr. Ind. Bot. 42. 1834 . FBI 4 : 46 ; Cooke 2 : 232 ; Santapau, Pl. Saur. 486. 1953. Irani 231. 1958 ; Santapau & Jan. 31. 1967. *Asclepias racemosa* Roxb. Fl. Ind. 2 : 32. 1832.

A large perennial climber ; sap watery. Leaves about the largest in the family in Saurashtra, 7 20 × 6-34 cm, broadly ovate, acute ; lateral nerves 4-5 pairs. Flowers greenish yellow ; corolla about 1 cm in diam., divided 3/4 down. Fruits the largest in the family in these parts of India.

Flowers : Monsoon time.

Occurrence : This is a rather rare plant, it was only seen at Kileshwar on the Barda Hills, and at Sasan in the Gir Forest.

Uses : The plant is used in dyspepsia, the leaves are used in the treatment of ulcerous sores.

CYNANCHUM Linn.

Cynanchum callialata Ham. in Wight, contr. 56. 1834 ; FBI 4 : 24 ; Cooke 2 : 221 ; Irani 236. 1958 ; Santapau & Jan. 31. 1967.

A climbing stout herb or undershrub. Leaves 4.3 × 2.3.5 cm, elliptic oblong, acute at the tip ; glandular at the base of the mid-rib on the under side, glabrous. Flowers in axillary corymbose cymes ; pedicels 6-7 mm long, corolla pale brown in colour, 10-12 mm across ; corona conspicuous on account of its white colour, a rare colour in the family. Fruits up to 8 cm long, 2-2.5 cm thick, boat-shaped, with two strong wings on the sides. Coma 2-2.5 cm long.

Flowers : October to December.

Occurrence : Very rare, Okhamandal on the N-W parts of Saurashtra.

GYMNEMA R. Br.

Gymnema sylvestre (Retz.) Schult. in Roem. & Schult. Syst. Veg. ed. 15, 6 : 57. 1820 ; FBI 4 : 29 ; Cooke 2 : 224 ; Blatt. & McC. 530 ; Santapau, Pl. Saur. 488. 1953 ; Irani 251. 1958 ; Santapau in RBSI 3 : 17. 1961 ; Santapau & Jan. 31 ; Santapau, Fl. Khandala 152. 1967. *Periploca sylvestris* Retz. Obs. 2 : 15. 1781.

A much branched, climbing shrub. Leaves petiolate, 3.5-5.5 × 2.5-3.5 cm, ovate or elliptic, rather stiff when old, acute at the apex, rounded at the base. Flowers inconspicuous, greenish-yellow, corolla about 5 mm across ; fruits 6-8 cm long, 5-8 mm thick, tapering to an acute point, coma 3 cm long.

Local name : Gud-mar.

Flowers : April to July.

Occurrence : Morvi, where it was cultivated for its medicinal properties.

Uses : The leaves of this plant are often used in the treatment of diabetes ; it is known that chewing the leaves of this plant removes the taste for saccharine substances, but the effect on blood sugar seems to be doubtful. (Caius & Mhaskar in Ind. Med. Res. Mem. 16 : 1, 49, 1930).

Note : The combination or binomial of this plant is generally attributed in our floras to R. Brown in Mem. Wern Soc. 1 : 33, 1809. However, R. Brown did not make the combination in the sense required by Art. 32, para 3, of the Code. This combination was made for the first time by A.J. Schultes in 1820.

HOLOSTEMMA R. Br.

Holostemma annularium (Roxb.) K. Schum. in Engler & Prantl, Pflanzenfam. 4 (2) : 247, t. 71, J-K. 1895 ; Santapau, Pl. Saur. 490. 1953 ; Irani 259 1958 ; Santapau & Jan. 31. 1967. *Asclepias annularia* Roxb., Hort. Beng. 20, 1814 ; & Fl. Ind. 2 : 37, 1832. *Holostemma rheedianum* Cooke in Fl. Pres. Bombay 2 : 220. 1904 (non Spreng 1825). *Holostemma rheedi* Wall. Pl. As. Rar. 2 : 51. 1831 ; FBI 4 : 21 ; Indraji 460. 1910.

A shrubby climber, with abundant milky sap. Leaves membranous when dry, 7-17 × 5-15 cm, broadly ovate, glaucous, glabrous, with a few glands at the base of the mid-rib on the upper surface ; petioles 3-9 cm ; long. Flowers fleshy, pinkish-red, in few-flowered axillary cymes ; peduncles 2-4.5 cm long, pedicels 2-3 cm long. Corolla waxy, pinkish-white outside, deep wine-red within, glabrous, up to 3.5 cm across. Fruits 10-12 × 5-6 cm, green, boatshaped, bluing, tapering to a blunt point. Coma 3 cm long.

Local name : Khirdodi, Khaner.

Flowers : Monsoon time.

Occurrence : Rare in Saurashtra. Indraji mentions it for Barda Hills.

Uses : The roots made into a past are used in ophthalmia ; and mixed with milk in diabetes. (Indraji 460. 1910)

Note : The oldest specific name for this plant is clearly *annulare*, based on *Asclepias annularia* Roxb. 1814 ; this name of Roxburgh becomes validated by the reference to Rheede, Hort. Malab. Vol. 9, t. 7. The specific name, however, in the genus *Holostemma* should be *annularium* not *annulare*.

LEPTADENIA R. Br.

Erect, bushy shrubs, leafless or nearly so

pyrotechnica

Climbing shrub with large leaves

reticulata

Leptadenia pyrotechnica (Forsk.) Decne. in Ann. Sci. Nat. Ser. 2, 9 : 270. 1838 ; FBI 4 : 64 ; Santapau Pl. Saur. 491. 1953 ; Bullock in Kew Bull. 289. 1955 ; Irani 269. 1958 ; Santapau & Jan. 31. 1967. *L. spartium* Wight, Contrib. 48. 1834 ; FBI 4 : 64 ; Cooke, 2 : 237 ; Indrajī 465. 1910. *Cynanchum pyrotechnicum* Forsk. Fl. Aeg-Arab 53. 1775.

An erect much branched, bushy shrub ; leaves usually absent ; when present, in young shoots, up to 40×4 mm, fleshy, linear, puberulous on both sides. Flowers about 4-5 mm across, greenish yellow ; peduncles 4-10 mm long, pedicels 2-4 mm long. Corolla rotate, glabrous on the tube, pubescent on the lobes. Fruits 10-12 cm long, coma 4 cm long. The plant has abundant colourless sap.

Local name : Khīp.

Flowers : October to December.

Occurrence : In dry ground, fairly widespread, but nowhere abundant. Jamnagar and neighbourhood. Beyt, Kota, Viramgam to Rajkot along the railway line in drier parts ; Rajkot to Junagadh, along railway line. Occasional.

Leptadenia reticulata (Retz.) Wight. & Arn. in Wight. Contrib. 47. 1834 ; FBI 4 : 63 ; Cooke 2 : 237 ; Indrajī 464. 1910 ; Santapau, Pl. Saur. 492. 1953 ; Irani 271. 1958 ; Santapau & Jan. 31. 1967. *Cynanchum reticulatum* Retz. Obs. 2 : 15. 1781.

An extensive climbing shrub ; sap watery. Leaves 5-11×3.2-8 cm, somewhat leathery, ovate acute at the tip, rounded at base, densely pubescent ; petioles 1.5-3 cm. long. Flowers small, greenish, in lateral umbellate cymes ; corolla 7 mm across. Fruit 9×3 cm oblong, with a curved beak. Coma 3-4 cm long.

Local name : Khīr-Khōdi, Nani dōdi.

Flowers : May to October.

Occurrence : Very common all over Saurashtra, on hedges of cultivated fields, on shrubs in open courty, etc. Jamnagar, Beyt, Dhunvao, Khatia etc. Barda Hills from Bhanvad to Ghumli, Abhapara, etc. Kota and Khambaliya ; Dwarka, Beyt ; Rajkot and Gondal to Junagadh ; Bhavnagar ; Porbander, Sasan in the Gir Forest, etc.

Uses : The plant is used as a stimulant and tonic. (Indraji 464. 1910)

OXYSTELMA R. Br.

Oxystelma secamone (Linn.) Karst. Dent. Fl. 1031. 1880-1883; Irani 271. 1958; Santapau & Jan. 31. 1967. *Periploca secamone* Linn. Mant. 2 : 216. 1771. *Oxystelma esculentum* (Linn. f.) R. Br. in Mem. Worm. Soc. 1 : 40. 1811 ; FBI 4 : 17; Cooke 2 : 216 ; Indraji 451. 1910 ; Santapau, Pl. Saur. 494. 1953.

A climbing perennial plant ; stems somewhat woody at the base, herbaceous above ; leaves 5-9×0.4-0.6 cm, linear or linear-lanceolate, acute at tip, acute or rounded at base. Flowers showy in drooping cymes; peduncles 3-4.5 cm long, pedicels 1 cm long. Corolla saucer-shaped, 2 cm across, white outside, pink inside with purplish nerves. Fruit 4-7×1 cm, coma 1-5 cm long.

Local name : Jal-dudhi

Flowers : May to December.

Occurrence : Growing usually near water, often with the roots and lower part of the stem submerged, in ditches, talaos, etc. Gondal, near talao, climbing on *Typha* plants that grow in marshy parts ; Bhavnagar, sides of water reservoir in Victoria Park, Gir Forest, at Sasan, common on hedges in the Forest Nursery. Joupur Vidi in Sorath dist.

Uses : The fresh flowers are cooked and eaten as vegetables ; raw flowers are also eaten occasionally ; a decoction of the plant is used in sore throats and in ulceration of the mouth. (Indraji 451. 1910)

PENTATROPIS Wight. & Arn.

Flower buds sub-globose ; corolla lobes deltoid not tailed *capensis*

Flower buds acuminate ; corolla lobes with long linear tails *spiralis*

Pentatropis capensis (Linn. f.) Bullock in Kew Bull. 1955 ; 284. 1955 ; Irani 284. 1958 ; Santapau & Jan. 31. 1967. *Cyananchem capens* Linn. f. Suppl. 168. 1781. *Pentatropis microphylla* (Roxb.) Wight. & Arn. in Wight, Contr. 52. 1834 ; FBI 4 : 20 ; Cooke 2 : 218 ; Indraji 458. 1910 ; Santapau, Pl. Saur. 495. 1953.

A climbing undershrub. Leaves 2.5-4×7.5-2.5 cm, ovate or oblong, obtuse at apex, subcordate at base, petioles 5-8 mm long. Flowers in few-flowered cymes; peduncles very short or 0, pedicels 1.5-1.8 cm long filiform. Corolla rotate, 10 mm across, glabrous outside, pubescent within. Fruits 4-5×0.8 cm, tapering; coma 2 cm long.

Local name : Shingroti, Sudio.

Flowers : October to December.

Occurrence : This plant is given on the authority of Indrajī, he noted it from Barda Hill.

Uses : Ground material of the roots and infusion made from the roots are given in fevers and hydrocele. It is also applied on rheumatism. Pickles and vegetables are prepared by the poor. (Indrajī 460. 1910)

Pentstemon spiralis (Forsk.) Decne, in Ann. Sci. Nat. Ser. 2, 9 : 327, t. 11 E 1838 ; FBI 4 : 19 ; Cooke 2 : 218 ; Santapau, Pl. Saur. 496. 1953 ; Irani 286. 1958 ; Santapau & Jan. 31. 1967. *Asclepias spiralis* Forssk. Fl. Aegypt. Arab 49. 1775.

A perennial climbing undershrub, sap watery. Leaves 1.5×0.6-3.4 cm, rather thick, fleshy, ovate to sub-orbicular, pale-green; petioles 3-10 mm long. Flowers yellowish green, in few-flowered cymes; peduncles 3-4 mm long, pedicels 8-10 mm long. Corolla 1.5 cm across young, later one turning yellowish-green, with a reddish 'eye' in the centre; the lobes tapering into a long tail, which at first is straight, at length is more or less twisted and curled up. Fruits 6-7 cm long, 1 cm thick near the base, gradually tapering to a fine point.

Local name : Shingroti.

Flowers : May to October.

Occurrence : Common all over Saurashtra, on hedges along roads, etc. Jamnagar on hedges, Rozi very common, climbing on shrubs; Bcyt, Kota and Jodiya; Mangrol to Porbandar, on hedges. Bileshwar on Barda Hills, on hedges of cultivated fields, Rajkot, very abundant on hedges particularly near the central Jail, Dwarka, Okha, etc. abundant, often on *Euphorbia* bushes; Somnath, on hedges; Chotila, on *Euphorbia*, Jonpur-Mangalpur in Sorath Dt.

PERGULAIA Linn.

Pergularia daemia (Forsk.) Chiov. Res. Sc. Miss. Stefan. Paoli Somal. Ital. 1 : 115. 1916; Irani 291. 1938 ; Santapau, Pl. Saur. 497. 1953 ; Santapau & Irani, Bot. Mem. Univ. Bomb. No. 4, 74. 1962 ; Santapau & Jan. 32. 1967. *Asclepias daemia* Forsk. Fl. Aeg.-Arab. 51. 1775. *Daemia extensa* R. Br. in Mem. Wern. Soc. 1 : 50. 1811 ; FBI 4 : 21 ; Cooke 2 : 219.

A climbing undershrub ; stem and branches pale glaucous, more or less hair. Leaves 4-5×4 cm., ovate, acuminate, glabrous or nearly so above, pubescent beneath ; base cordate with a deep sinus ; petioles 2.5-3 cm long. Flowers greenish white, drooping ; Corolla glabrous outside, hairy inside, the margins of the lobes revolute and ciliate. Fruit 6×1 cm, reflexed, curved, pubescent, covered with soft warts of echinations all over. Coma 3 cm long.

Local name : Chamar dudhli.

Flowers : March to December.

Occurrence : Common and abundant in the drier districts of Saurashtra, particularly near villages, collected from Jamnagar and neighbourhood. Balachari, Hadiana, Beyt ; Bhanvad ; Ghumli, Abhapara, Kileshwar, Bileshwar, etc. on Barda Hills, Rajkot and neighbourhood ; Rajkot to Junagadh along the railway line. Girnar slopes ; Mangrol ; Gir Forest abundant in hedges particularly at Sasan, Shirwan, Jamwalla Somnath, forest nursery on hadges, abundant ; Dwarka and Beyt, etc.

Uses : The plant is expectorant and emetic.

SARCOSTEMMA R. Br.

Sarcostemma acidum (Roxb.) Voigt, Hort. Sub. Calc. 542. 1845 ; Santapau, Pl. Saur. 498. 1953 ; Irani 295. 1958 ; Santapau & Irani, Bot. Mem. Univ. Bomb. No. 4, 76. 1962 ; Santapau & Jan. 32. 1967. *Asclepias acida* Roxb. Fl. Ind. 2 : 31. 1832. *Sarcostemma brevistigma* Wight, & Arn. in Wight, Contrib. 59. 1834 ; FBI 4 : 26 ; Cooke 2 : 222 ; Indrajai 461. 1910.

A much branched, leafless shrub ; stem and branches terete, green or glaucous-green, erect, spreading or pendulous. Flowers in terminal umbels. fragrant, cream in colour ; pedicels 8-12 mm long. Corolla up to 1.5 cm across, fleshy-glabrous. Fruit up to 10 cm long, tapering at both ends.

Local name : Sandhiya-vel, Somvel ; Thor-vel ; Chiradi.

Flowers : June to October.

Occurrence : This plant was seen at Chotila ; The plant was growing protected by dense *Euphorbia* clumps, on the lower of the two hills near Chotila or on the plains, noted from Chorwad on the wall of old fort.

Uses : Small twigs of the plant are used by the farmers to remove the white ants. Stems are boiled in water and the bath is given to the women after the delivery for relaxation. The plant is used in the treatment of rheumatism. This plant is eaten by the camels. The plant is bitter, cooling, alterative. Cures biliousness, thirst. The juice of the plant is drunk during Yagna by the brahmins. (Indraji 462. 1910)

TELOSMA Cav.

Telosma pallida (Roxb.) Craib, in Kew Bull. 1911 ; 418. 1911 ; Santapau, Pl. Saur. 499. 1953 ; Irani 305. 1958 ; Santapau & Jan. 32. 1967. *Asclepias pallida* Roxb. Fl. Ind. 2 : 48. 1832. *Pergularia pallida* Wight & Arn. in Wight, Contrib. 42. 1834 ; FBI 4 : 38 ; Cooke 2 : 229.

A climbing undershrub ; sap watery. Leaves 5-9 × 3.5-6 cm, membranous, ovate, acuminate at the tip, cordate at base with a broad sinus, pubescent when young, at length glabrous or nearly so ; petioles 2-6 cm long. Flowers pale yellow, in many flowered umbels ; peduncles 6 mm long, pedicels 1-1.2 cm long. Corolla salver-shaped about 14 mm across. Fruit 10 × 2 cm, woody lanceolate ; coma 2 2.5 cm long.

Flowers : September to October.

Occurrence : This is a rare plant in Saurashtra. It was collected from Pradumna park near Rajkot.

TYLOPHORA R. Br.

Corona wholly adnate to the staminal-column without free points above

dalzellii

Corona-apex free, the point reaching as high as the style-apex

indica

Tylophora indica (Burm. f.) Merrill. in Philip. Journ. Sci. 19 : 373. 1921 & in Trans. Amer. Phil. Soc. N.S. 24 (2) : 319. 1935 ; Santapau,

Pl. Saur. 500. 1953 ; Irani 315. 1958 ; Santapau & Irani, Bot. Mem. Univ. Bomb. No. 4, 88. 1962 ; Santapau & Jan. 32. 1967. *T. asthmatica* (L.f.) Wight & Arn. in Wight, Contrib. 51. 1934 ; FBI 4 : 44 ; Cooke 2 : 228. *Cynanchum indicum* Burm. f. Fl. Ind. 70. 1768.

A perennial climbing undershrub ; sap watery yellow. Leaves 7-10 × 4-5.5 cm, ovate-oblong, acute at tip rounded at base, glaucous and glabrous above, pale green and pubescent beneath ; petioles about 1 cm long. Flowers in umbellate cymes ; peduncles up to 3 cm long ; pedicels 1.5 cm long, filiform, pubescent. Corolla 1-1.5 cm across, yellowish-green with purple spots at the tips of lobes. Fruits in pairs, 6-7 × 0.7-1 cm, lanceolate, tapering ; coma 2.5 cm long.

Local name : Damnivel (Rajkot).

Flowers : October onwards.

Occurrence : Noted only once in Saurashtra, it was cultivated in Rajkot as a medicinal plant.

Uses : The leaves of the plant are chewed in early morning. Whilst fasting, and are very effective in the treatment of some kinds of asthma.

Note : This is an important medicinal plant, which is often confused with *T. dalzellii* Hook. which it much resembles. The two species can be separated from each other by the structure of the corona. In *T. indica* (Burm. f.) Merrill the corona apex is free and reaches as high as the style apex, in *T. dalzellii* Hook. the corona is completely adnate to the staminal column without free points above.

Tylophora dalzellii Hook. f. in FBI 4 : 43. 1883 ; Cooke 2 : 227 ; Indrajit 462. 1910 ; Irani 314. 1958 ; Santapau & Irani, Bot. Mem. Univ. Bomb. No. 4, 87. 1962 ; Santapau & Jan. 32. 1967.

A twining perennial ; stems slender, terete, glabrous or the young ones pubescent. Leaves 5-11.2 × 2.5-6.2 cm, ovate-oblong, acute or acuminate, often mucronate, glabrous, rounded or cordate ; petioles 1.2 cm long. Flowers yellow ; in sessile or pedunculate lateral cymes or with umbels or racemes at the flexures of a somewhat zigzag rhachis, which is hispid or with a number of linear-lanceolate bracts at the insertion of the pedicels, pedicels 0.6-2.5 cm long, filiform, glabrous. Calyx hispid outside, divided almost to the base, Corolla 0.3 cm long ; corona of 5 dark-coloured processes, rounded at the base ; pollen masses minute. Follicles 7.5-10 cm long, tapering to the fine point at the apex, scarcely tapering towards the base, finely striate, glabrous. Seeds 0.8 cm long, ovate-oblong, flattened.

Local name : Radarudi.

Flowers : During monsoon season.

Occurrence : This is mentioned by Indrajī as occurring in rocky places in pasture lands in Saurashtra.

WATTAKAKA Hassk.

Wattakaka volubilis (Linn. f.) Stapf. in Curtis, Bot. Mag. sub. t. 8976. 1923 ; Huber in Abeywickrama, Fl. Ceylon 1 : 50. 1973 ; Bhandari. Fl. Ind. Desert. 227. 1978. *Asclepias volubilis* Linn. f., Suppl. 170. 1781. *Hoya viridiflora* R. Br. Mem. Wern. Nat. Hist. Soc. 1 : 27. 1810 *Dregea volubilis* (Linn. f.) Benthām ex J. Hooker, Fl. Brit. India 4 : 46. 1883 ; Indrajī 463. 1910 ; Irani 242. 1958 ; Santapau & Jan. 31. 1967. *Marsdenia volubilis* Cooke, Fl. Pres. Bombay 2 : 166. 1904 ; Santapau, Pl. Saur. 493. 1953.

An extensive shrubby climber, going over high trees. Older stems lenticelled. Leaves petiolate, 6-10 × 4-7 cm. pubescent when young, glabrous when old, with numerous glands on the upper surface near the base of the midrib. Flowers yellowish-green in many flowered, drooping umbels ; peduncles 2-3 cm long ; pedicels 3 cm long. Corolla glabrous, 12-14 mm across, the lobes divided 3/4 down. Fruit stout, up to 9 × 4 cm, velvety when young, more or less hairy when old. Coma 4-5 cm long.

Local name : Dodi, Moti-dodi.

Flowers : Monsoon time.

Occurrence : Collected from the slopes of the Girnar, about half way up to the Girnar temples, and from along the road between the Girnar and Junagadh.

Uses : The leaves are used in the treatment of boils and abscesses, the roots and tender stems are said to be expectorant and emetic. (Indrajī 463. 1910)

Note : Genus *Wattakaka* has been synonymised with the African genus *Dregea* by some authors, whereas others have put it as a sub-genus of *Dregea*. In putting *Wattakaka* as a distinct genus, the author has followed Huber in Abeywickrama, Fl. Ceylon 1 (1) : 50. 1973.

PERIPLOCACEAE

Bullock in Kew Bull. 1956 : 503, separated this family from Asclepiadaceae on the following grounds :

Filaments free from each other, anthers without horny wings, pollen granular, in tetrads, transported on a spatulate carrier	<i>Periplocaceae</i>
Filaments united, often very short ; anthers with horny wings ; pollen masses waxy, transported by means of a horny corpuscle to which they are attached by caudicles of varying form and size	<i>Asclepiadaceae</i>
Woody climbers ; flowers 6-8 cm across, whitish tinged with purple	<i>Cryptostegia</i>
Climbing undershrubs ; flowers greenish-purple, under 1 cm across	<i>Hemidesmus</i>

CRYPTOSTEGIA R. Br.

Cryptostegia grandiflora R. Br. in Bot. Reg. 5 : t. 435. 1819 ; FBI 4 : 6 ; Cooke 2 : 245 ; Santapau, Pl. Saur. 487. 1953 ; Irani, Fl. Bombay (Apocynales) 323. 1958. Santapau & Jan. 32. 1967.

A suberect or climbing shrub, with long sarmentose branches ; terete, swollen at the nodes. Leaves 6.5-9 × 3.5-4.5 cm, elliptic branches oblong, obtuse at apex, tapering at base, wavy on the margin, glaucous above, paler beneath ; petioles 5-7 cm long. Flowers showy, white with a tinge of purple or rose. Corolla up to 8 cm across, 6-7 cm long in bud, velvety. Fruit 12 × 3.5 cm, coma 4 cm long.

Local name : Rubber-vel.

Flowers : May to October.

Occurrence : Jamnagar, occasional in hedges ; Rajkot, common and abundant along hedges, in waste lands, etc. Gondal, abundant in gardens and in waste lands as an escape ; Bhavnagar, abundant in Victoria park and near the city, Bileshwar Hills, forming dense jungle in low-lying lands, very abundant ; Chotila, occasional ; Jetalsar, rare ; Viramgam to Rajkot, along the railway line, occasional, becoming more abundant near Rajkot. Beyt near Okha in gardens as a hedge plant.

Uses : The plant is said to be toxic. It has been extensively cultivated as a garden plant and for the sake of the rubber obtained from its latex (W1).

HEMIDESMUS R. Br.

Hemidesmus indicus (Linn.) Schult. in Roem. & Schult. Syst. Veg. 6 : 126. 1819 ; FBI 3 : 5 ; Cooke 2 : 147 ; Indraj 449. 1910 ; Santapau & Irani, Bot. Mem. Univ. Bomb. 4 : 96 ; Santapau, Pl. Saur. 489 1953. Irani, Fl. Bombay (Apocynales), 326. 1958 ; Santapau & Jan. 32. 1967 ; Santapau, Fl. Khandala 150. 1967. *periploca indica* Linn. Sp. Pl. 211. 1753.

A perennial prostrate or climbing undershrub ; leaves 8-11 × 1-4 cm linear, or lanceolate, or obovate-oblong, acute at the apex, rounded at the base, dark green, glabrous, petioles 4 mm long. The shape and width of the leaves seems to vary according to the situation in which the plant grows. Flowers yellowish-green with a purple centre ; peduncles short, pedicels 2 mm long. Corolla 1 cm across, lobes divided 2/3 down. Fruit in pairs, divaricate, 11-17 × 0.5-0.7 cm, coma 3.5-4 cm long.

Local name : Upalsari, Sariya, Kapoori-Madhuri.

Flowers : July to January.

Occurrence : Fairly common in forest on hills, Barda Hills, occasional (Abhapara, Kileshwar etc.) Jamnagar and neighbourhood ; Girnar slopes, common, Gir Forest, occasional at Junwania, Shirwan, Kankai, Sasan etc.

Uses : The dried Indian Sarsaparilla roots are medicinal and constitute the Hemidesmus or Anantmul which is official in Indian Pharmacopocia. The drug has long enjoyed a reputation as tonic, alternative, demulcent, diaphoretic, diuretic and blood purifier. It is employed in nutritional disorders, syphilis, chronic rheumatism, gravel and other urinary diseases and skin affections. (W1).

Notes : The name is generally attributed to R.Br. But this is not in accordance with Art. 32 (2) of the Code, 1956 edit. R.Br. in Mem. Werm. Soc. 1 : 57. 1909 gives the following note under the genus *Hemidesmus*. 'This genus is composed of *Periploca*'. This statement does not constitute publication of the combination *Hemidesmus indicus* since he did not indicate that combination was to be used. Schultes (1820) was the first to make the combination.

LOGANIACEAE

CYNOCOTONUM Gmel.

Cynoctonum mitreola (Linn.) Britton in Mem. Torr. Bot. Cl. 5 : 258, 1894 ; Santapau & Wagh, Bull. Bot. Surv. Ind. 5 : 106, 1963 ; Santapau & Jan. 32, 1967. *Ophiorrhiza mitreola* Linn. Sp. Pl. 150. 1753. *Mitreola oldenlandioides* Wall. ex DC. Prodr. 9 : 9. 1845 ; FBI 4 : 79 ; Hook. Icon. t. 827 ; Cooke 2 : 246 ; Santapau in RBSI 16 (1) : 141. 1960.

An annual herb ; stems 15-50 cm high. Leaves thin up to 10 × 4 cm, oblong, acute or acuminate, base tapering to the petiole. Flowers in axillary and terminal dichotomous cymes ; corolla white, minute ; fruit mitre-shaped with two horns. Seeds minute, shining.

Local name : Dasmuli (Junagadh).

Flowers : August-October.

Occurrence : This plant was first seen in the under growth of forest on the Girnar slopes on the way to Bordevi, there it was gregarious and abundant, thereafter it has been seen on numerous occasions, often gregarious, in the under-growth of the Girnar and Gir forests. The plant had not been reported previously from Saurashtra.

Uses : No use is made of this plant in Saurashtra perhaps because it is rather localised in distribution. Members of the family Loganiaceae are to be used with caution on account of their poisonous qualities. The name *Cynoctonum* means 'Dog-killer'.

GENTIANACEAE

Corolla more or less irregular :

Flowers red or pink, occasionally white

Canscora

Flowers greenish yellow or pale yellow

Hoppea

Corolla regular :

Calyx winged, flowers blue to lilac

Exacum

Calyx not winged :

Flowers usually red, on slender pedicels

Centaurium

Flowers white, sessile or nearly so

Encostema

CANSCORA Lamk.

Flowers supported by perfoliate bracts	<i>perfoliata</i>
Flowers not supported by perfoliate bracts:	
Calyx sharply acute, winged	<i>khandalensis</i>
Calyx not winged	<i>diffusa</i>

Canscora diffusa R. Br. Prodr. 451, in Obs. 1810; FBI 4 : 103 ; Cooke 2 : 257 ; Santapau, Pl. Saur. 503. 1953 ; Santapau & Jan. 32. 1967.

A slender herb, much branched, erect, glabrous ; stems 12-40 cm high, more or less quadrangular. Lower leaves (during the monsoon) rather large, up to 6 × 4 cm soon falling off ; upper leaves much smaller, 8-15 × 6-8 mm, intermediate ones up to 30 × 15 mm, all 3-nerved from the base, glabrous, acute at apex, upper leaves sessile, lower ones petiolate. Flowers numerous on filiform pedicels, bright rose purple in colour ; calyx about 5-6 mm long, not winged ; corolla about twice as long as calyx, petals 4, unequal. Stamens 4 of which 3 are equal, one longer than the others. Fruit a small capsule covered nearly in its entirety by the persistent calyx ; seeds many, minute.

Flowers : October onwards.

Occurrence : Common on rocks in river bed at Rajkot, also in the Gir forest in stream beds ; common on rocks and on earth banks at the foot of the Girnar. In moist places flowers may persist till June.

Uses : The whole plant is supposed to be a nerve tonic in Western India ; most species of the Gentianaceae are used in the treatment of fevers.

Canscora khandalensis Santapau in Kew Bull. 1948 : 485. 1949 and in RBSI 16 (1) : 182 ; Santapau & Jan. 32. 1967 ; Santapau, Fl. Khandala 162, 1967. *Canscora decurrens* Dalz. in Kew Journ. Bot. 2 : 136. 1850 ; FBI 4 : 103 ; Cooke 2 : 257 ; Santapau, Pl. Saur. 502. 1953 (non Dalz. 1850).

An erect herb, slender, 10-25 cm high ; stem 4-winged of very strongly and acutely quadrangular ; branches opposite or alternate. Leaves sessile or subsessile, those about the middle of the stem the largest, up to 6 × 2.5 cm ovate, elliptic or lanceolate, subacute or obtuse, attenuated towards the base, decurrent into an obscure petiole ; upper leaves much smaller, acute or subacute, sessile. Flowers in dichotomous cymes ; pedicels quadrangular, obscurely winged 1.5-10 mm long ; bracts minute, ovate, acute calyx not winged, but sharply quadrangular, 4-keeled, 9-10 mm long ; teeth 1.5 mm long, triangular, acute. Corolla pale, rose in

colour, 10-13 mm long ; tube 6-7 mm long, lobes obtuse. Ovary oblong ; stigma 2-lobed, the lobes obtuse, recurved, style 4-4.5 mm long. Capsule 7×3 mm.

Flowers : October.

Occurrence : This seems to be the more common species in Jamnagar and its neighbourhood ; it was also found at Dhunvav, Khatia, Beyt, Ghumli and on Barda Hills near Kileshwar ; it is also abundant some way up Girnar hill.

Uses : The plant is used in the treatment of fevers.

Canscora perfoliata Lamk. Encyc. Method. 1 : 601. 1783 ; FBI 4 : 104 ; Cooke 2 : 258. Indrajī 470. 1910 ; Santapau, Pl. Saur. 504. 1953 ; Santapau & Jan. 32. 1967.

Similar to the preceding species, but differing in that each flower is supported by a large perfoliate bract.

Local name : Ratu Kariyatun.

Flowers : "Winter months".

Occurrence : Indrajī mention this plant from the banks on the Minsar stream near Porbandar, also from the banks of the Vastu river near Paravada village. It is a rare plant.

Uses : The drug Ratu Kariatu is a tonic for brain & nerves. (Indrajī 471. 1910)

CENTAURIUM Hill

Centaurium roxburghii (Don) Druce in Rep. Bot. Exch. club. Brit. Ist. 4 : 614. 1916 ; Santapau, Pl. Saur. 505, 1953 ; Santapau & Jan. 32. 1967. *Erythraea roxburghii* D. Don, Gen. Syst. 4 : 206. 1837 ; FBI 4 : 102 ; Cooke 2 : 255 ; Indrajī 470. 1910.

An elegant herb 5-25 cm high ; lower leaves forming a rosette on the ground, 2.5×0.6 cm, obtuse ; higher leaves smaller, linear-oblong, acute. Flowers in dichotomous cymes with a flower in each fork. Corolla regular, about 8-10 mm ; across, usually bright red in colour, occasionally pure white or intermediate between red and white.

Local name : Zinkun kariyatun.

Flowers : October to May.

Occurrence : This plant is given on the authority of Indrajī, he found at the boundaries of fields and hedges where rain water accumulates also on banks of streams and rivers. This is a very elegant small plant in which the colour is generally red or pink, but where all intermediate colours between red and white seem to occur.

Uses : The whole plant is very bitter, and is used as a substitute for chiretta. It is given in fevers. (Indrajī 470. 1910).

ENICOSTEMA Blume

Enicostema hyssopifolium (Willd.) I.C. Verd. in *Bothalia* 7 : 462-463, 1961 ; Backer, *Fl. Java* 2 : 439. 1965 ; Santapau & Jan. 32. 1967. *Exacum hyssopifolium* Willd. *Sp. Pl.* 1 : 640. 1798. *Enicostema littorale* Blume. *Bijdr.* 848. 1926 ; *FBI* 4 : 101 ; *Cooke* 2 : 255 ; Indrajī 469. 1910 ; Santapau, *Pl. Saur.* 506. 1953.

A variable herb ; stem 2-65 cm long, at first erect, later more or less procumbent, simple or branched from the base, subquadrangular, terete. Leaves sessile, linear to elliptic or lanceolate, 2.5-7 × 0.5-2.5 cm, more often long and narrow, acute or obtuse, glabrous strongly 3-nerved. Flowers sessile, in small clusters in most axils. Calyx of 5 sepals united at the base; corolla of 5 petals, white, united below into a tube, free above. Stamens 5, on the corolla. Capsules glabrous and shining, seeds many minute.

Local name : Nanu Kariyatun, Mamejavo.

Flowers : Most of the year.

Occurrence : This is one of the more widely spread plants of Saurashtra, found in all districts but chiefly near the sea ; among grasses when growing in good soil away from the sea; this plant attains much larger size than near the sea, and the leaves are larger and broader.

Uses : An infusion of the plant is used as a bitter tonic, it is brought in considerable quantity to Bombay from Gujarat (*Cooke l.c.*). But in Fr. Santapau's field diaries for Kileshwar, on the Barda Hills where the larger type of plant was at the time abundant, it is noted : "Not bitter to taste".

EXACUM Linn.

Flowers pale blue or lilac; corolla lobes lanceolate ; acute	<i>petiolare</i>
Flowers deep gentian blue, occasionally white, corolla lobes suborbicular obtuse	<i>pumilum</i>

Exacum petiolare Griseb. in DC. Prodr. 9 : 46. 1845 ; FBI 4 : 98 ; Santapau & Jan. 32. 1967. *Exacum pedunculatum* var. *petiolare* Trim. Hand. Fl. Cey. 3 : 182, 1893 ; Cooke 2 : 253.

Annual, erect, fleshy herb up to 45 cm high ; stems simple or only sparsely branched ; leaves broadly ovate or lanceolate, subacute, very thin, narrowing into a clear petiole, in size up to 7.5×3.5 cm. Flowers in terminal cymes, pedicels thin, calyx green, very strongly winged, the wings subcrenate or entire. Corolla pale blue or lilac.

Flowers : September to November.

Occurrence : This elegant herb was found in the Gir Forest along water courses, usually in the shade. It was also found on the lower slopes of Girnar and from Kota near Jamnagar.

Uses : A substitute for Gentian and Chiretta.

Exacum pumilum Griseb. in DC. Prodr. 9 : 46. 1845 ; FBI 4 : 68 ; Cooke, 2 : 254 ; Santapau, Pl. Saur. 508. 1953; Santapau & Jan. 32. 1967.

A slender, elegant herb, 10-26 cm high, often much branched ; stem and branches tetragonal. Leaves sessile, those near the base the smallest, 12-20×6-8 mm lanceolate, 3-nerved. Flowers usually dark violet or gentian blue, occasionally white, on slender pedicels. Calyx winged, the wings only about 1 mm broad. Corolla up to 22 mm across, usually smaller ; anthers bright yellow. Capsules ovoid or subglobose, about 5 mm in diam.

Flowers : August to November.

Occurrence : Rare in Saurashtra, collected from Ranjit Sagar and Khatia near Jamnagar.

Uses : A substitute for gentian and chiretta.

HOPPEA Willd.

Hoppea dichotoma Willd. in Ges. Naturf. Fr. neue Schr. 3 : 434, 1801 ; FBI 4 : 100 ; Cooke, 2 : 256 ; Santapau, Pl. Saur. 509, 1953 ; Gir, 224 ; Santapau & Jan. 32. 1967.

An erect, slender herb, 3-15 cm high, light green in colour ; stems quadrangular. Leaves 10 × 8 mm, broadly ovate, more or less acute, opposite. Flowers pale yellow or greenish yellow, in open cymes, calyx

campanulate, 2.5 mm long, the lobes over-topping the corolla, corolla tubular, 2.5-3 mm long. Stamens 1 fertile, 3 barren. Capsules minute, ellipsoid ; seeds minute.

Local name : 'Zinku Kariyatun'.

Flowers : October to November.

Occurrence : Usually among low grasses in moist soil, near Jamnagar, in Pradumna Park near Rajkot, in moist ground at Gondal ; in the river bed at Sasan in the Gir forest.

Uses : "Used in piles and snake bite". (Chopra et al. Glossary, 136. 1956).

EHRETIACEAE

Style twice-forked, or styles 4	<i>Cordia</i>
Style once-forked, or styles 2	<i>Ehretia</i>

CORDIA Linn.

Flowers red	<i>sebestena</i>
Flowers white :	
Leaves opposite :	
Leaves oblanceolate-oblong, obtuse, entire or undulate	<i>gharaf</i>
Leaves elliptic-obovate, obtuse or emarginate, entire or subcrenate	<i>perrottetii</i>
Leaves alternate :	
Filaments hairy at the base :	
Leaves not tomentose beneath	<i>dichotoma</i>
Leaves stellately tomentose beneath	<i>wallichii</i>
Filaments glabrous :	
Leaves reaching 15 cm long	<i>domestica</i>
Leaves not exceeding 7.6 cm long	<i>monoica</i>

Cordia dichotoma Forst. f. Fl. Ins. Austr. 18. 1786 ; Santapau, Pl. Saur. 511. 1953 ; Santapau & Jan. 32, 1967. *Cordia obliqua* Willd. Phytogr. 4, t. 4. 1794 ; FBI 4 : 137 excl. Vars. Hutchinson in Kew Bull. 1918 : 217. *Cordia myxa* auct. plur. Cooke 2 : 265 (non Linn. 1753).

An erect, middle-sized or small tree ; young branchlets green and glabrous. Leaves often as broad as long, 7-12 × 6-10 cm, alternate, 3- or occasionally 5- nerved from the base. Flowers white, polygamous, in terminal panicles. Calyx up to 7 mm long, glabrous outside, splitting irregularly into 5 lobes. Corolla lobes emarginate ; filaments hairy at base. Fruit a drupe 15-25 mm diam., at first creamy, at length nearly black, very mucilaginous when ripe.

Local name : Vad-gundo, Gunda

Flowers : March to May.

Occurrence : Widespread in forests, often cultivated. It was seen at Dhunvao near Jamnagar, at Ghumli, and Kileshwar on the Barda Hills ; at Junagadh, Chotila, Morvi often under cultivation, at sasan and Shirvan in the Gir Forest, and in hedges of cultivated fields at Rajkot.

Uses : The fruit is employed as a demulcent, unripe fruits are pickled ; ripe fruits are sweet to taste.

The identity of this species is rather confused ; the true *C. myxa* Linn. is an African plant distinguished by its style arms, which are short and broad, from *C. dichotoma* Forst. which has long and slender style arms.

Cordia domestica Roth, Nov. Sp. 123. 1821 ; FBI 4 : 137 ; Santapau & Jan. 33, 1967. *Cordia fulvosa* Wight, Icon. 4 (2) : 15, t. 1380. 1850 ; FBI 4 : 140 ; Cooke 2 : 267 ; Santapau, Pl. Saur. 512. 1953.

A small tree, 6 m high, young shoots softly hirsute. Leaves alternate, ovate or ovate-orbicular, acute, serrate spinulose, 4.5-7.5 × 2.5-6.5 cm, scabrous with deciduous white hair having persistent white bulbous bases ; petioles 5-35 mm long, scabrous. Panicle terminal, 8 × 12 cm. Calyx 3.5 mm long, ribbed, hirsute. Corolla 7 mm long, broadly campanulate, creamy, shortly lobed. Stamens 5 included, 4 mm long, filaments often with few hair at the base ; anthers 1.5 mm long. Ovary ovoid, 1 mm long ; style 5 mm long, ultimate branches 0.8 mm long, often obscure. Fruit glabrous, pink, oblong-orbicular, 1-1.3 cm long.

Flowers : May onwards.

Occurrence : Collected from Mangrol and Junagadh.

Cordia gharaf (Forsk.) Ehrenb. ex Asch. in Sitzung. Berichte Ges. Naturf. Fr. Berlin 1879 ; 46. 1879 ; Santapau & Jan. 33. 1967. *Cornus gharaf* Forsk. Fl. Aeg.-Arab. 94. 1775. *Cordia rothii* Roem. & Schult. Syst. 4 : 798. 1819 ; FBI 4 : 138 ; Cooke 2 : 268 ; Santapau, Pl. Saur. 515. 1953.

A small tree. Leaves opposite or nearly so, lanceolate or oblong, rounded at the apex, rough above, tapering into a short petiole ; nerves several pairs all along the midnerve. Flowers white, in lax terminal paniculate cymes ; corolla of usually 4 lobes, about 6 mm across. Drupe ovoid 7-10 mm long, pulp mucilaginous, edible.

Local name : Liargundi ; Gundi.

Flowers : October onwards.

Occurrence : Indrajī writes that the tree grows in hedges of cultivated fields and clumps of *Acacia* or *Euphorbia* bushes. This plant was found in the neighbourhood of Jamnagar, on the Barda Hills, at Rajkot, Chotila, Mangrol, Porbandar and on Beyt Island.

Uses : "A decoction of the bark possesses astringent properties, and is used as a gargle. The fruit is eaten by the poorer classes and is also pickled. The wood is used for fuel and in the manufacture of agricultural implements". (Cooke 2 : 268).

Cordia monoica Roxb. Pl. Cor. 1 : 43, t. 58. 1795 ; FBI 4 : 137 ; Cooke 2 : 267 ; Indrajī 472. 1910 ; Santapau, Pl. Saur. 513. 1953 ; Santapau & Jan. 33. 1967.

A small tree 3.5-5 m high. Leaves alternate, 2.5-7.5 × 3.5-5.0 cm, ovate or elliptic, obtuse or subacute, subentire or crenate, rough with white discs (cystoliths) above, pubescent or villous beneath, base rounded or cuneate, 3-nerved ; petioles round, 0.5-0.8 cm long. Flowers white ; subsessile, in small dense paniculate tomentose cymes ; male and fertile flowers on separate branches. Calyx 8.6 cm long, obconic, tomentose outside, glabrous inside. Corolla 0.8 cm long. Stamens exerted ; filaments glabrous. Drupe size of a cherry, ovoid, apiculate, smooth, bright yellow ; seated on the cup-shaped, fulvous-pubescent, veined, irregularly lobed, persistent calyx.

Local name : Kath-gundi, Karpati-gundi.

Flowers : During summer.

Occurrence : It grows wild on waste places and in gardens near Barda Hill.

Uses : An infusion of dried ground leaves mixed with sugarcubes is given in diabetes. Flowers and unripe fruits are given in burning of urine. Inner bark boiled with milk is applied on swellings of aptha. Fruits are used to prepare pickles and vegetables. (Indraji 472. 1910)

Cordia perrottetii Wight, Icon. t. 1381. 1848, (non of A. DC. 1845) ; FBI 4 : 138 ; Indraji 474. 1910. Santapau, Pl. Saur. 514. 1953 ; Santapau & Jan. 33. 1967.

A small tree, reaching a height of 120-180 cm. Leaves opposite or slightly alternate, 2.5-5 × 1.2-2.5 cm, elliptic-obovate, obtuse or emarginate; entire or subcrenate, sometimes dentate at the top, rough. Flowers yellowish-green in colour.

Local name : Adbau-gundi.

Flowers : During summer.

Occurrence : It is mentioned by Indraji, as seen at Rajvadi among *Euphorbia* shrubs and in marshy places.

Uses : An infusion of all the parts of the tree is given in diabetes. Pounded leaves are applied on blotches. An infusion of dried leaves is given in bronchites and consumption with honey. Bark yields a good fibre, and is used by the local people for making ropes. Leaves are eaten during scarcity. (Indraji 474. 1910)

Cordia sebestena Linn. Sp. Pl. 190. 1853 ; FBI 4 : 136 ; Cooke 2 : 268 ; Santapau, Pl. Sour. 516, 1953 ; Santapau & Jan. 33. 1967.

A small evergreen tree, with alternate large leaves. Flowers orange red to red. 2-3 cm across ; the fruit is pure white, up to 3 × 2 cm, enclosed in the persistent calyx.

Flowers : January to March, but may occur almost throughout the year.

Occurrence : Noted in cultivation in Rajkumar College, Rajkot.

Uses : An ornamental tree which flowers all the round.

Cordia wallichii G. Don, Gen. Syst. 4 : 379. 1837 ; FBI 4 : 137 ; Santapau & Jan. 33. 1967. *C. obliqua* auct. non Willd. 1798. *C. obliqua* var. *wallichi* (Don.) C. B. Clarke in J. Hooker, Fl. Brit. India 4 : 137. 1883.

A moderate-sized tree. Leaves 10-12.5 cm long and about as broad as long, orbicular-ovate, without white discs (cystoliths) above, densely clothed with stellate, fulvous or white tomentum beneath, base subcordate, 3-5 nerved; petioles 2.5-3.7 cm long. Flowers white, in terminal and lateral paniculate cymes. Calyx 0.6-0.8 cm long, closed round the corolla in bud, pubescent inside; tube slightly tomentose or nearly glabrous; the teeth densely tomentose. Corolla about twice as long as the calyx. Filaments hairy at the base. Drupe ovoid, long-acuminate.

Flowers : September onwards.

Occurrence : This is a common plant in Saurashtra. It was collected from Rajkot, river bed; and Gondal.

EHRETIA Linn.

Leaves sometimes reaching 12.5 cm long, glabrous beneath	<i>laevis</i>
Leaves not reaching 7.5 cm long, persistently hairy beneath	<i>aspera</i>

Ehretia aspera Roxb. Pl. Cor. 1 : 41, t. 55. 1795; Cooke 2 : 270.
Ehretia obtusifolia Hochst. ex DC. Prodr. 9 : 507. 1845; FBI 4 : 142; Indrajī, 475. 1910; Santapau, Pl. Saur. 518. 1953.

A shrub, branches usually glabrous, short, terete. Leaves very variable, 1.8-6.2 × 1.2-3.7 cm, elliptic-oblong or obovate rounded or shortly acuminate, slightly hairy above, persistently hairy beneath, petioles 0.6-1.8 cm long. Flowers white, in paniculate cymes which are at first close, corymbose and apparently terminal, afterwards lax and lateral. Calyx 0.25 cm long, hairy outside. Corolla 0.6-0.8 cm long; tube longer than the calyx. Ovary ovoid; style 0.5-0.6 cm. long, bifid 1/3 the way down; stigmas capitate. Drupe depressed-globose, 0.6 cm across; pyrens usually 4, bony.

Local name : Nani-Vadhvardi, Vadhvardi, Vedhivalo.

Flowers : During summer.

Occurrence : Collected from Barda mountain and from the forest of Rajvadi and Adityana.

Uses : An infusion of the root-bark is given in rheumatism. Fruit are eaten by the poor. Fibres obtained from the plant is used for making strings. (Indrajī 475. 1910).

Ehretia laevis Roxb. Pl. Cor. 1 : 42, t. 56. 1795 ; FBI 4 : 141 ; Cooke 2 : 269 ; Indraj 474. 1910 ; Santapau, Pl. Saur. 517. 1953 ; Santapau & Jan. 33. 1967.

A small tree. Leaves 8 - 12 × 3 - 7 cm, often very small alternate, elliptic-oblong, entire, glabrous or nearly so. Flowers white, up to 8 - 10 mm across. Fruit a small drupe, at first red, at length black.

Local name : Dat-rang, Vadhvardi.

Flowers : "Hot season".

Occurrence : This plant was seen at the foot of the Girnar and in the Gir Forest near Sasan, this tree is occasionally cultivated.

Uses : The root and bark of trees of the genus are used in the treatment of venereal diseases. (Indraj 474. 1910)

BORAGINACEAE

Style once forked, or styles 2	<i>Coldenia</i>
Style one, terminal or subterminal :	
Connectives of stamens much produced	<i>Trichodesma</i>
Connectives of stamens not at all produced	<i>Heliotropium</i>
Style gynobasic	<i>Sericostema</i>

COLDENIA Linn.

Coldenia procumbence Linn. Sp. Pl. 125. 1753 ; FBI 4 : 144 ; Cooke 2 : 271 ; Indraj 476. 1910 ; Johnston in Journ. Arn. Arb. 32 : 13. 1951. Santapau, Pl. Saur. 510. 1953 ; Santapau & Jan. 33. 1967.

A prostrate annual herb, spreading flat on the ground, 10 - 15 cm. in diam.; leaves very strongly nerved, coarsely toothed hairy. Flowers minute, white ; fruit 3 - 5 mm thick roughly ovoid, beaked, 4-lobed. *Coldenia* can develop and flourish on sunbaked soil subjected to drought, great heat and intense light.

Local name : Basariyo-okhrad, Tripankhi, Gunda.

Flowers : Post-monsoon months.

Occurrence : In dry fields, in dry ta'as etc. often growing in large numbers. Collected from Kileshwar on the Barda Hills, Bhavnagar, Rajkot, Chotila, Junagadh and in the Gir Forest.

HELIOtropium Linn.

Leaves up to 10 cm broad ; fruit glabrous, matrifolm, 4-beaked	<i>indicum</i>
Leaves under 2 cm broad ; fruit not matrifolm, not beaked, hairy :	
Corolla lobes caudate-acuminate	<i>subulatum</i>
Corolla lobes not caudate-acuminate :	
Fruit enclosed by the calyx	<i>supinum</i>
Fruit not enclosed by the calyx :	
Leaves elliptic or obovate, subentire, the lower ones with long petioles	<i>ovalifolium</i>
Leaves linear, acute, shortly petiolate	<i>paniculatum</i>
Leaves lanceolate, sessile, crenulate	<i>bacciferum</i>
Leaves small or very narrow, subentire, sessile or subsessile :	
Inflorescence at maturity, slender and 2-10 cm long ; flowers loosely arranged (not clearly in two ranks)	<i>strigosum</i>
Inflorescence at maturity under 4 cm long, dense with flowers crowded in two ranks.	<i>marifolium</i>

Heliotropium bacciferum Forsk. Fl. Aegypt.-Arab. 38. 1775 ; Burtt. Kew Bull. 1949 : 137. 1949 ; Santapau & Jan. 33, 1967 ; Bhandari, Fl. Indian Desert, 233. 1978. *H. tuberosum* Boiss. Fl. Orient. 4 : 147. 1879 ; Cooke 2 : 278 ; Santapau, Pl. Saur. 524. 1953. *H. undulatum* Vahl, Symb. 1 : 13. 1790 ; FBI 4 : 150.

An erect rigid undershrub, much branched ; stems and branches scabrid. Leaves 10-40 × 2.5-5 mm, lanceolate, densely hairy, crenulate, sessile. Flowers clearly in two rows arranged in dense short spikes. Corolla tubular, about 4-5 mm long, densely hairy outside. Fruit about 2.5 mm diam., glabrous or softly hairy.

Flowers : August onwards.

Occurrence : This is a bushy ± gregarious plant of the sea-shore, abundant in Okhamandal ; when fresh it is fleshy and strikingly brittle.

Uses : Used in bites of scorpions and venomous reptiles and as cure for carrels' bad eyes. (Chopra et al Glossary 131).

***Heliotropium indicum** Linn. Sp. Pl. 130. 1753 ; FBI 4 : 152 ; Cooke 2 : 273 ; Indrajī, 477. 1910 ; Santapau, Pl. Saur. 519. 1953 ; Santapau & Jan. 33. 1967.

Rough annual herb, 20-50 cm tall, hairy all over. Leaves the largest for the genus in Saurashtra, 4-15 × 2-10 cm acute at apex,

tapering into a ± winged petiole. Inflorescence abracteate in scorpioid cymes; flowers in two rows, crowded, bluish or white, Fruit glabrous, deeply bilobed, the lobes mitre-like split at apex.

Local name : Hathi sundha

Flowers : Most of the year in moist places.

Occurrence : Rather rare in Saurashtra, in moist places and manure heaps all over India.

Uses : The plant is diuretic, it is used in the treatment of boils and open ulcers. (Indraji 477, 1910).

Heliotropium marifolium Retz. Obs. Bot. 2 : 8. 1781 ; Backer & Bakh. f. Fl. Java 2 : 462. 1965 ; Rieol in Rechinger. Fl. Iran 48 : 16. 1967 ; Cooke, 2 : 280 ; Indraji, 478. 1910 ; Santapau & Jan. 33, 1967. *H. scabrum* Retz. Obs. Bot. 2 : 8. 1781 ; FBI 4 : 152 ; Santapau, Pl. Saur. 521. 1953.

In many respects this species approaches. *H. strigosum* from which it differs mainly by its short inflorescence, in which flowers are crowded in to rows. This plant was not seen in the field in Saurashtra, and consequently it is given here on the authority of Indraji, who simply mentions that it is a monsoon plant growing in grasslands. T.A. Rao reports it on sandy sea coasts.

Local name : Zinku-Hathisundhu.

Flowers : Monsoon season.

Occurrence : T. A. Rao reports it from the sandy coats of Dwarka (T A. Rao E. 305).

Uses : It is applied on the stings of poisonous animals. Leaves are used as poultice. The dried plant pounded and Bhasma is mixed with butter or ghee and is applied on blotches. (Indraji 478. 1910)

Heliotropium ovalifolium Forsk. Fl. Aeg. 38. 1775 ; FBI 4 : 150 ; Cooke 2 : 278 ; Indraji 477. 1910 ; Santapau, Pl. Saur. 520. 1953 ; Santapau & Jan. 33. 1967.

An annual, erect or procumbent, densely hairy herb. Leaves 6-18 × 4-8 mm elliptic, hairy ; petioles of lower leaves up to 12 mm long. Flowers white, in two rows on long spikes. Corolla 2.5-3 mm long. Fruit rounded, about 1.5 mm diam., hairy.

Local name : Velalun-Hathisundha.

Flowers : Noted in flower in May, August, October.

Occurrence : In cultivated fields on moist ground. It was seen growing gregariously at Jamnagar, Rajkot, Gonal and Okhamandal, Indrajī gives it as common in Sind and Kutch.

Uses : It is applied on the stings of poisonous animals. Leaves are used as poultice. The dried plant pounded and Bhasma is mixed with butter or ghee and is applied on blotches. (Indrajī 478. 1910)

Heliotropium paniculatum R. Br. Prodr. 494. 1810 (not of Roxb. 1832); FBI 4 : 151; Cooke 2 : 279; Santapau & Jan. 33. 1967. *H. zeylanicum* Heyne ex C. B. Clarke in Hook. f. FBI 4 : 151. 1883.

Herbaceous, 30-60 cm high, with numerous twiggy ascending branches; hairy or glabrous. Leaves 0.6-2.5 × 0.12-0.3 cm, subsessile or very shortly petiolate, linear, acute, hairy or glabrous above, the margins recurved. Flowers shortly pedicellate, in slender simple or forked racemes 5-15 cm long usually with linear-lanceolate hairy sessile bracts 0.3 cm long. Calyx appressedly hairy outside, divided almost to the base. Corolla 0.4 cm long, hairy outside; tube slightly swollen and with a ring of hairs in the throat. Stamens inserted rather low down in the corolla-tube; filaments filiform, short; anthers 0.08 cm long, broadly ovate, acute. Style about 0.05 cm long; stigma a little longer than the style, conical at the apex, the stigmatic ring conspicuous. Fruit globose; nutlets 4, hairy on the convex back, acute at the apex cuneate on the face.

Flowers : October onwards.

Occurrence : Recorded on the authority of H. Santapau & Janardhanan.

Heliotropium strigosum Willd. Sp. Pl. 1 (2) : 743. 1798; FBI 4 : 151; Johnston in JAA 32 : 112, 1951; Santapau & Jan. 33. 1967.

A very typical plant, in many respects like *H. ovalifolium* but for the shape of the leaves and the rather lax inflorescence. Slender herb with prostrate or ascending branches, subwoody towards the base; stem and branches glaucous green, covered with appressed short stiff hairs. Leaves numerous, linear-lanceolate 3-10 × 0.3-1.5 mm, sessile or subsessile. Flowers white in lax spikes, arranged in a single row; corolla white, minute. Fruit depressed globose, more or less hairy.

Flowers : August onwards.

Occurrence : Okhamandal; it was found common at Dwarka and

Okha, Rajkot and Chotila.

Uses : The plant is diuretic.

Heliotropium supinum Linn. Sp. Pl. 130. 1753 ; FBI 4 : 149 ; Cooke 2 : 175 ; Indrajī 476. 1910 ; Santapau, Pl. Saur, 523. 1953 ; Santapau & Jan. 33. 1967. *H. supinum* var. *malabaricum* C. B. Clarke in Hook. f. FBI 3 : 149. 1883.

A prostrate, much branched spreading herb, hairy with soft white hairs. Leaves broadly ovate, obtuse, strongly plicate, up to about 12 mm diam., petioles distinct. Flowers in dense short scorpioid cymes, densely hairy with white silky hairs. Corolla white, up to 4-5 mm long. Fruit densely hairy, ovoid.

Local name : Chediyo-okhrad.

Flowers : Commonly in flower and fruit in October, probably at other times also.

Occurrence : In river bed at Rajkot, Jamnagar and Bhavnagar.

Uses : Used as a fodder plant. The dried plant made into ash and mixed with oil is applied on eczema. (Indrajī 477. 1910)

Heliotropium subulatum Hochst. ex DC. Prodr. 9 : 528. 1845 ; Santapau, Pl. Saur. 25. 1953. *Heliotropium zeylanicum* Clarke in FBI 4 : 148. 1883 (non Lamk 1789).

An erect gregarious herb 30-50 cm high, coarsely hairy with stiff hairs. Leaves usually up to 6 cm long, 6-10 mm wide, occasionally up to 12 × 1.8 cm, margins entire or irregularly cut. Flowers sessile in one row. In the field the corolla were noted as pale yellow or yellowish, petals caudate-acuminate.

Local name : Bhurundi.

Flowers : August onwards.

Occurrence : Common and gregarious at Dwarka, Okha and Beyt Island ; also near Veraval on Sandy soil. Occasional at Rajkot in cultivated fields.

SERICOSTEMA Stocks

Sericostema pauciflorum Stocks ex Wight, Icon. t. 1377. 1848 ; FBI 4 : 175 ; Dalz. & Gibs. 172. 1861. Woodrow in JBNHS 12 : 170. 1898 ;

Cooke 2 : 288 ; Indrajī 480, 1910 ; Santapau, Pl. Saur. 525. 1953 ; Santapau & Jan. 33. 1967.

Shrub, stems woody, much branched, from a stout long tap root ; stems, branches and leaves hairy, glaucous green in colour. Leaves cauline, 5 35 × 2 10 mm, hairy with stiff hairs from bulbous bases, fleshy. Flowers in few-flowered cymes, white, inconspicuous. Calyx minute, hairy with stiff hairs ; corolla up to 5 mm diam., densely hairy inside, glabrous outside. Stamens minute, hidden in the corolla tube and covered by the corolla hairs. Fruit of 4 nutlets with a short gynobasic style.

Local name : Karvas.

Flowers : May to November.

Occurrence : This is a very common and abundant along the coasts of Saurashtra, it forms independent 'cushions' up to 1 m diam., 0.5 0.75 m tall ; on several occasions these plants seemed to have been heavily grazed upon by goats or cattle. Dalzell noted the plant as "plentiful low spreading shrub along the coast of Kathiawar ;" Woodrow noted the plant at Veraval. It was collected from Jodiya near Jamnagar, Veraval, Mangrol, Forbandar, Dwarka and neighbourhood and Beyt, Island near Okha where the plant was noted as common in distribution and abundant along the Saurashtra sea shores.

Uses : This plant is used medicinally in the treatment of dysentery, asthma, etc. It is very useful plant for stabilizing the sands of the sea-shore.

TRICHODESMA R. Br.

Fruit broad, oblong in outline :

Calyx subconiform in outline, cordate bases acute, narrow often spreading

indicum

Fruit broad, ovoid in outline :

Calyx divided nearly to the base, hairy all over, rounded at the base

zeylanicum

Calyx ovate in outline, cordate bases broad, obliquely truncate below, never spreading

sedgwickianum

Trichodesma indicum (Linn.) Lahmann, Pl. Fam. Asperif. 193. 1818 ('indica'); Santapau, Pl. Saur. 527. 1953; Santapau & Jan. 33. 1967; C. Saldanha & D. Nicolson, Fl. Hassan Distr. Karnataka, 483. 1976. *Borago indica* Linn. Sp. Pl. 137. 1753.

An annual, much branched hispid herb 12-45 cm high; leaves sessile, ovate or oblong, obtuse, clothed above with stiff hairs from bulbous bases. Flowers solitary or in few-flowered cymes, pedicels often nodding, hispid. The most typical part of the flower is the calyx with its acute auricles, which are spreading out. Corolla about 12-15 mm across. Fruit broad, oblong in outline.

Local name : Undha-fuli.

Flowers : August onwards.

Occurrence : The plant is common all over Saurashtra, during the monsoon and the immediate post-monsoon period; it is occasionally found on sandy beaches along the seashores, in which case the plant is rather small and stiff hairs more prominent.

Trichodesma sedgwickianum Banerjee, in Bull. Bot. Soc. Beng. 16 : 10. 1962; Santapau & Jan. 33. 1967. *Trichodesma amplexicaule* DC. Prodr. 10 : 172. 1846; Sedgewick in RBSI 6 : 347, 1913, (non Roth 1821); FBI 4 : 153; P.P., Brand in Pfreich 78 : 39. 1921, P.P. *Trichodesma indicum* var. *amplexicaule* Cooke, Fl. Pres. Bombay 2 : 215. 1905 PP.

An erect herb, 30-60 cm high, branched above. Leaves sessile and sub-amplexicaul, margins not revolute, scabrid with distant stiff hairs arising from prominent bulbous bases. Fruit broad, ovoid in outline.

Flowers : October onwards.

Occurrence : Collected from Veraval.

Trichodesma zeylanicum (Burm. f.) R. Br. Prodr. 496. 1810; FBI 4 : 154; Cooke 2 : 282; Santapau & Jan. 33. 1967. *Borago zeylanica* Burm. f. Fl. Ind. 41. 1768.

Annual, erect, up to 1 m high; stem and branches clothed with rather stiff stinging hairs and with soft hairs. Leaves up to 9 × 2.2 cm, lanceolate or oblong, subobtuse, densely clothed above with hairs from bulbous bases, which on the dry plant appear white; petioles very short. Flowers light blue in terminal paniculate cymes on slender hairy pedicels. Calyx divided nearly to the base, hairy all over, rounded at the base. Fruit broadly ovoid, subobtuse.

Flowers : October onwards.

Occurrence : This plant was found in cultivated fields at Shapur (Sorath).

CONVOLVULACEAE

Corolla tube usually uniformly enlarged from the base to apex, the 5 bands rarely clearly defined from the intervening spaces ; pollen not echinulate :

Yellow parasitic leafless twining herbs *Cuscuta*

Green, non-parasitic leafy herbs or shrubs :

Styles 2, free or partly united below :

Corolla lobes imbricate, flowers axillary, solitary, styles quite free, stamens exerted *Cressa*

Corolla lobes in duplicate-contorted ; flowers cymose, stamens not exerted :

Capsule 4-valved ; styles free, each 2-branched ; stigmas on inner face of style arms *Evolvulus*

Capsule irregularly dehiscent; styles usually partly united below, not branched above ; stigma 2, capitate *Seddera*

Style 1, entire ; stigmas usually 2 :

Ovary 1-celled, capsule 4-valved, 3-seeded, stigmas short, oblong *Hewittia*

Ovary 2-celled (sometimes 4-celled) :

Stigma elongated :

Stems erect or prostrate, rarely twining ; stigmas oblong or linear ; capsule 4-valved *Convolvulus*

Stems twining, rarely prostrate ; stigmas elliptic ; capsule usually 8-valved *Jacquemontia*

Stigmas globose *Merremia*

Corolla tube not uniformly enlarged from base to apex, the 5-bands on lobes clearly defined by 2 prominent lines ; pollen echinulate :

Fruit dehiscent, or if indehiscent then with thin fragil walls	<i>Ipomoea</i>
Fruit indehiscent, woody, mealy or fleshy :	
Fruit woody, corolla hypocrateriform ; stigmas elliptic-oblong	<i>Rivea</i>
Fruit mealy or fleshy ; corolla not or very rarely hypocrateriform ; stigma globose	<i>Argyreia</i>

ARGYREIA Lour.

Leaves dark green, shining and glabrous above white-woolly tomentose beneath ; young fruit woody and mealy	<i>nervosa</i>
Leaves hairy or glabrescent above, pilose beneath ; young fruit leathery or generally fleshy	<i>sericea</i>

Argyreia nervosa (Burm. f.) Boj. Hort. Maurit. 224. 1837 ; Oostroom in *Blumea* 5 : 364, No. 2. 1943 ; Santapau, Pl. Saur. 528. 1953 ; Santapau & Jan. 33. 1967. *Convolvulus nervosa* Burm. f. FL. Ind. 48, t. 20, f. 1. 1768. *Argyreia speciosa* Sweet, Hort. Brit. 289. 1827. (non Boj. 1837). FBI 4 : 185 ; Cooke 2 : 324 ; Indrajit 484. 1910.

Large perennial climber ; stems silky white when young ; at length woody and more or less glabrous. Leaves entire, broadly ovate, acute or acuminate at apex, 10 33 × 8 26 cm, dark green, shining and glabrous above, silky white beneath, cordate at base ; petioles 10 20 cm long, silky white. Flowers in cymes ; peduncles 10 42 cm long ; outer involucral bracts 5 5.5 × 3.5 5 cm, ovate caducous ; inner ones smaller ; pedicels up to 10 mm long. Calyx tubular, 13 16 mm long, silky white outside, the sepals enlarging in fruit. Corolla violate, 4.5 8 cm long, densely silky white outside. Ovary glabrous, 4-celled. Fruit a berry, pale brown, up to 18 mm in diam., woody and mealy. Seeds 2-4 each 8 mm long.

Local name : Vardharo, Samudrasosha.

Flowers : October onwards.

Occurrence : A very showy large climber, it was found at Kileshwar on the Barda Hills, possibly cultivated ; Girnar forest, common near Road and between Girnar and Junagadh.

Uses : Roots are smeared in water and applied on poisonous stings, and on swellings on rheumatism and apoplexy. Roots and rice pounded in water is applied on hemicrania. Root is purgative. (Indraji 386. 1910).

Argyrea sericea Dalz. in Dalz. & Gibs. Bombay Fl. 169. 1861 ; FBI 188 ; Cooke 2 : 326 ; Santapau, Fl. Saur. 529 .1953 ; Gir. 230 ; Santapau & Jan. 33. 1967.

Large perennial climber. Leaves hairy or glabrous above, pilose beneath, broadly ovate, 13 - 21 × 10 - 17 cm ; nerves 8 - 10 ; petioles 5 cm ; long, densely silky. Flowers in few to several flowered capitate cymes; peduncles up to 14 cm long, silky bracts prominent, ovate - oblong or elliptic ; pedicels very short or 0. Calyx infundibuliform ; the 2 outer sepals longer than the rest, the 3 inner ones 8 - 12 mm long. Corolla infundibuliform, 4.5 - 6 cm long, purple ; tube and midpataline bands hairy. Filaments tomentose, anthers subsagittate. Ovary 2 - 4 celled, glabrous. Fruit glabrous or subglobose, 12 mm in diam., fleshy, green turning orange yellow. Seeds 2 - 4, brown, each 4.5 mm long.

Flowers : Monsoon and post-monsoon time.

Occurrence : Girnar Hill, near gate leading to pilgrims steps, abundant, possibly cultivated, Gondal, cultivated, Gir forest at Sasan and Junwania, occasional in dense forest.

CONVOLVULUS Linn.

Prostrate herbs or undershrubs, not twining (except in *C. auricomus* var. *volubilis*) :

Stigmas filiform :

Corolla infundibuliform, very shallowly lobed ; seeds not tuberculate

microphyllus

Corolla tubular, deeply lobed ; seeds minutely tuberculate

rhyniospermus

Stigmas clavate or elliptic-oblong, not filiform

auricomus

Twining herb ; stems twisted together

arvensis

Erect undershrubs, neither twining nor prostrate

rotlerianus

Convolvulus arvensis : Linn. Sp. 153. 1753 ; FBI 4 : 219 ; Cooke 2 : 303 ; Indrajī 511. 1910 ; Santapau, Pl. Saur. 532. 1953 ; Santapau & Jan. 33. 1967.

A twining herb with a subwoody rootstock. Leaves 4-6 × 0.4-1.5 cm, glabrous on both sides, ovate or oblong, sagittate or hastate at base ; petioles up to 2 cm long. Flowers in one to few flowered cymes, peduncles up to 9 cm long, slender, glabrous ; bracts 5-10 mm long, linear ; pedicels up to 15 mm long. Calyx lobes subequal, 6 mm long. Corolla white or pinkish funnel shaped, up to 2 cm long ; mid-petaline bands pale red or greenish, glabrous outside. Stamens unequal. Ovary and style glabrous ; stigmas linear, 4 mm long. Fruit globose, glabrous. Seeds 4, dark brown, each 4 mm long, minutely puberulous.

Local name : Khetrau fudardi, Veladi.

Flowers : August onwards.

Occurrence : Rajkot in Jubilee Gardens and Pradumna Park ; Chotila in cultivated fields, Ghumli on the slopes of Barda Hills.

Uses : The root is said to be purgative. Vines are used as a vegetable and applied on wounds also. (Indrajī 512. 1910)

Convolvulus auricomus (Rich.) Bhandari. Bull. BSI 6 (2-4) : 327. 1964 (Oct. 1965) ; Santapau & Jan. 33. 1967. *Ipomoea auricoma* A. Rich. Tent. Fl. Abyss. 2 : 67. 1851. *Convolvulus glomeratus* Choisy ex Prodr 9 : 401. 1845 (non Thunb. 1792) ; FBI 4 : 219 ; Cooke 2 : 302 ; Indrajī 511. 1910 ; Santapau, Pl. Saur. 533. 1953.

A prostrate herb, 45-90 cm diam. Leaves 2.5-4 × 0.9-1.5 cm, oblong, apiculate slightly pubescent. Flowers in dense globose heads, hairy ; heads axillary, solitary ; peduncles slender, hairy 1.5-7.5 cm long ; bracts foliaceous 12-19 mm long, hairy with ciliate margins. Calyx densely silky, inner 3 sepals narrower than the outer ones. Corolla tubular, 12.5 mm long, white. Stamens equal. Ovary glabrous ; stigmas clavate or elliptic-oblong.

Local name : Runchhali-Veladi.

Flowers : October.

Occurrence : Jamnagar and neighbourhood, Dwarka, Okha and Beyt ; and Morvi.

Uses : The whole plant is said to be purgative. (Indrajī 511. 1910).

Convolvulus auricomus var. *volubilis* (C.B. Clarke) Bhandari, Bull. Bot. Surv. Ind. 6 (2-4): 327. 1954. *C. glomeratus* var. *volubilis* Clarke in FBI 4: 219. 1883; Cooke 2: 303; Santapau, Pl. Saur. 534. 1953.

Very similar to the typical variety, from which it differs mainly by its climbing habit and its larger leaves and heads.

Flowers : October.

Occurrence : Dwarka near railway station; Jamnagar and neighbourhood; Veraval.

Note : In the check list of the Flora of Saurashtra, H. Santapau has given *Convolvulus auricomus* var. *volubilis* as Comb. nov. which was published in the Suppl. No. 1 Bull. Bot. Surv. India Vol. 8: 1966 (Published in 1967). But Dr. M.M. Bhandari had published the same combination in Bull. Bot. Surv. India Vol. 6 in 1964. So according to the priority, credit of this combination should go to Dr. M.M. Bhandari.

Convolvulus microphyllus Sieb ex Spreng., Syst. Veg. 1: 611. 1824; FBI 4: 218; Cooke 2: 303; Indraj 509. 1910; Santapau, Pl. Saur. 535. 1953; Gir. 231; Bose & Shah in JBNHS 58: 838-39. 1961; Santapau & Jan. 34. 1967.

A procumbent or suberect herb; stems branching from the base; branches terete, slender, grey or fulvous-villous. Leaves sessile, variable in shape and size, fulvous-villous on both sides. Flowers 1-5; peduncles 0-2 cm long, oppressed villous; bracts 3-5 mm long, linear-lanceolate; pedicels 2-3 mm long. Calyx tubular, 7-8 mm long; sepals ovate, lanceolate, acute hairy, the outer 2 sepals broader than the inner ones. Corolla infundibuliform, 8-12 mm long, pinkish-white, glabrous, shallowly lobed; mid-petaline bands hairy outside. Stamens sub-equal. Ovary glabrous; stigmas filiform. Fruit ovoid, glabrous, 4 mm long. Seeds glabrous or somewhat pubescent, 2-4.

Local name : Shankhawali.

Flowers : August to October.

Occurrence : Common all over Saurashtra in open ground, extending to sandy shores. Jamnagar, the Barda Hills, Rajkot, Junagadh, Mangrol, Veraval, Porbandar, Dwarka, Okha and Mithapur, etc. It was not found in the Gir forest except in open dry spots from which the forest has been removed.

Uses : This plant has a high repute in indigenous system of medicine.

***Convolvulus microphyllus* var. *boissieri* Clarke in FBI 4 : 218. 1883.**

This variety differs from the typical one in being covered with appressedly rusty hairs and having axillary, solitary flowers.

Flowers : August to October.

Occurrence : Okhamandal.

***Convolvulus rhyniospermus* Hochst ex Choisy. in DC. Prodr. 9 : 405. 1845 ; FBI 4 : 218 ; Cooke 2 : 302 ; Santapau & Jan. 34. 1967.**

An annual herb, 15-37 cm high. Leaves subsessile, oblong-lanceolate, 1.2-2.5 cm long, sparsely hairy. Flowers in axillary clusters, densely hairy ; peduncles 0-3 mm long ; bracts 6-8 mm long, densely hairy. Calyx silky hairy ; inner sepals shorter and narrower than the outer ones. Corolla up to 17 mm long, tubular, 5-lobed. Ovary glabrous ; stigma filiform. Fruit 4 mm in diam., globose, glabrous.

Flowers : October

Occurrence : Rajkot, Pradumna Park ; Dwarka and Okhamandal.

***Convolvulus rotlerianus* Choisy in Mem. Soc. Phys. Geneve 6 : 477. 1833 ; FBI 4 : 219 ; Cooke 2 : 401 ; Santapau, Pl. Saur. 536. 1953 ; Santapau & Jan. 34. 1967.**

Erect, shrubby, perennial ; stems slender, silky-villous. Leaves sessile or nearly so, linear, acute or some-what rounded at apex, appressedly silky hairy on both sides, 3-6 × 0.7 cm. Flowers in 1-3 flowered lax racemes ; peduncles very slender, minutely silky hairy, 2.5-7.5 mm long ; bracts linear, 4-5 mm long, hispid ; pedicels 3-5 mm long. Calyx 4 mm long ; sepals subequal, hirsute outside. Corolla 8 mm long tubular ; limb distinctly 5-lobed ; mid-petaline bands hairy outside. Stamens unequal. Ovary glabrous, conical. Fruit subglobose, 4-6 mm in diam, pale brown. Seeds 2-4, somewhat pubescent.

Local name : Ubhi-shankhavali.

Flowers : November.

Occurrence : Jamnagar & neighbourhood ; Okhamandal.

CUSCUTA Linn.

Style one ; stigmas conical	<i>reflexa</i>
Styles 2 ; stigmas globose-peltate :	
Infra-staminal absent	<i>hyalina</i>
Infra-staminal scales present :	
Scales 1.8 mm long, oblong, fimbriate only on upper half	<i>chinensis</i>
Scales 1.5 mm long, spatulate, truncate or rarely emarginate, fimbriate from near the base	<i>chinensis</i> var. <i>ciliaris</i>

Cuscuta chinensis Lamk. *Encycl. Method.* 2 : 229. 1786 ; *FBI* 4 : 226 ; *Cooke* 2 : 293 ; *Indraji* 515. 1910 ; *Santapau Pl. Saur.* 538. 1953 ; *Santapau & Jan.* 34. 1967.

Stems filiform, leafless, yellowish. Flowers in dense clusters. Calyx equalling the corolla tube ; sepals subequal. Corolla 2.3 - 3 mm long ; lobes ovate-oblong, equally the tube. Stamens shorter than the corolla lobes ; filaments as long as the anthers ; infrastaminal scales 1.8 mm long, oblong, reaching to the base of the filaments. fimbriate on the upper half. Styles two, unequal in length ; stigmas capitate. Fruit 2.5 - 5 mm in diam., globose circumscissile. Seeds 1 - 1.5 mm long, glabrous.

Local name : Amavel.

Flowers : October possibly earlier.

Occurrence : Rajkot on *Lawsonia alba* Lam. hedges.

Uses : The plant is purgative, and is used in the treatment of protracted fevers (*Indraji* 515. 1910).

Cuscuta chinensis var. *ciliaris* Engelm. in *Trans. Acad. Sc. St. Louis* 1 : 480. 1859 ; *Santapau & Jan.* 34. 1967.

Similar to the typical variety, from which it differs by its larger flowers ; the staminal filaments are shorter than the anthers ; the infrastaminal scales are broadened upwards, truncate, rarely emarginate, 1.5 mm long, fimbriate, from near the base ; styles somewhat thicker.

Local name : Amavel.

Flowers : May onwards.

Occurrence : In Saurashtra this is much more common than the typical variety. Mangrol, on *Medicago sativa* Linn. Dwarka in open fields, common and abundant on *Indigofera cordifolia* Heyne *Monechma*, various grasses, etc. and on *Lepidagathis*.

Uses : The plant is purgative.

Cuscuta hyalina : Roth, Nov. Pl. Sp. 100. 1821 ; FBI 4 : 226 ; Cooke 2 : 292 ; Indrajī 515. 1910 ; Santapau, Pl. Saur. 539. 1953.

Stems slender, climbing, yellowish, leafless. Flowers 2.5-3.5 mm long in pedunculate cymes ; bracts up to 3 mm long, lanceolate. Calyx funnel-shaped, 2.5-3 mm long. Corolla 3-3.5 mm long, 5-lobed, lobes lanceolate, acute or acuminate. Infrastaminal scales absent. Fruit 3-4 mm in diam., subglobose, circumscissile. Seeds 1.5 mm long.

Local name : Chidiyo, Makhaniopindo.

Flowers : Monsoon and Post-monsoon months.

Occurrence : Dwarka near railway station, on *Leucas*, *Trianthema*, *Amaranthus* etc. Okhamandal.

Uses : It is used as a poultice on aptha and wounds. Flowers and black pepper are given in fever. It is also given in gout and apoplexy with some other medicine. (Indrajī 515. 1910)

Cuscuta reflexa : Roxb. Pl. Corom. 2 : 3, t. 104. 1799 ; FBI 4 : 225 ; Hook. Exot. Fl. t. 150. 1898 ; Cooke 2 : 292 ; Indrajī 515. 1910 ; Santapau, Pl. Saur. 540. 1953 ; Santapau & Jan. 34. 1967.

Stems yellowish, glabrous, occasionally with reddish dots or spots, leafless. Flowers 6-8 mm long, in pedicellate cymose clusters ; pedicels 3 mm long ; bracts 1 mm long. Calyx lobes subequal, 2-3 mm long, fleshy. Corolla white, 6-8 mm long. Infrastaminal scales about one-third as long as the corolla, oblong, fimbriate, incurved at the tip. Ovary globose, glabrous, 2 mm in diam. Stigmas 2, fleshy, thick. Fruit globose, glabrous, 6 mm in diam., 5-8 mm long. Seeds 1-2, each 3.5 mm in diam., brown, glabrous.

Local name : Amavel.

Flowers : Winter months.

Occurrence : This species is given on the authority of H. Santapau & Janardhanan.

Uses : The plant is purgative. It is used externally against itch, and internally in protracted fevers, retention of wind, and induration of the liver. The stems are specially useful in bilious disorders. (Kirtikar & Basu 3 : 174^s)

CRESSA Linn.

Cressa cretica : Linn. Sp. Pl. 223. 1753 ; FBI 4 : 225 ; Cooke 2 : 296 ; Indrajī 513. 1910 ; Santapau, Pl. Saur. 537. 1953 ; Santapau & Jan. 34. 1967.

An erect herb 8-30 cm high ; stems somewhat woody, Leaves ovate or lanceolate, 4-10 mm long, hairy on both sides. Flowers solitary in the axils of upper leaves ; bracts 2 mm long, linear, hairy outside. Calyx tubular, 3 mm long ; sepals subequal, hairy. Corolla white, 5-7 mm long, 5-lobed, the lobes hairy at the tips. Stamens subequal, exserted. Ovary 2-celled ; stigmas capitate. Fruit 4 mm long, ovoid, bearded at the apex.

Local name : Paliyo.

Flowers : October onwards.

Occurrence : A sea-shore plant, often growing in dense almost pure stands, from Jodiya westwards to Okha and southwards to veraval. Occasionally noted this plant away from the sea, e.g. at Bileshwar on the Barda Hills and near Viramgam in cultivated fields.

Uses : All the parts of the plant are used as tonic. (Indrajī 513. 1910)

EVOLVULUS Linn.

Evolvulus alsinoides (Linn.) Linn. Sp. Pl. ed. 2, 392. 1762 ; FBI 4 : 220 ; Cooke 2 : 297 ; Indrajī 512. 1910 ; Santapau, Pl. Saur. 541. 1953 ; Gir 232 ; Santapau & Jan. 34. 1967. *Convolvulus alsinoides* Linn. Sp. Pl. 1 : 157. 1753.

A perennial prostrate herb ; stems appressedly hairy or at times nearly glabrous. Leaves 6-22 × 2-10 mm, hairy on both sides, oblong, elliptic or orbicular, retuse, or mucronulate at the tip. Flowers solitary,

axillary ; peduncles 3-35 mm long, filiform ; bracts lanceolate, 1.5 mm long ; pedicels 4-6 mm long, filiform. Calyx densely silky, 3-4 mm long, lobes lanceolate. Corolla rotate, 5 mm long, blue. Stamens equal ; styles two, each divided into two clavate stigmas. Fruit globose, 4 mm in diam. Seeds 4, black, glabrous.

Local name : Kali-shankhawali.

Flowers : August to November.

Occurrence : One of the commonest herbs in Saurashtra, collected from Jamnagar and its neighbourhood ; Dwarka and Okha ; Kileshwar and other places on the Barda Hills, Gondal, Junagadh, and lower slopes of the Girnar ; Veraval ; Gir forest at Sasan etc. Chotila, Rajkot etc. Usually in grass lands, abundant in the post monsoon-period.

Uses : The whole plant is said to be a very good remedy for dysentery ; the leaves are smoked in the form of cigarettes against asthma. (Indraji 512. 1910)

KEY TO THE VARIETIES OF *Evolvulus alsinoides* (Linn.) Linn.

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Leaves more or less distinctly in two rows, close together ; internodes up to 4 mm ; stems prostrate, rarely ascending | <i>var. hirsutus</i> |
| Leaves mostly not distinctly in two rows, more remote ; internodes mostly longer ; stems mostly ascending, sometimes erect, rarely prostrate : | |
| Leaves approximately $1\frac{1}{2}$ — $2\frac{1}{2}$ times as long as broad, obtuse to emarginate at the apex | <i>var. alsinoides</i> |
| Leaves $2\frac{1}{2}$ or more times as long as broad, mostly acute to acuminate, basal ones sometimes slightly obtuse | <i>var. decumbens</i> |

Evolvulus alsinoides var. *alsinoides* Oostr. in Fl. Males. 4(4) : 395, f. 4-5, 1953.

A perennial herb. Leaves oblong, elliptic or spatulate, rounded at the base or attenuate into the short petiole, obtuse or shallowly emarginate and mucronate at the apex, more or less densely appressed-pilose on both sides, or sometimes glabrous above. Flowers blue.

Flowers : August to November.

Occurrence : Dwarka neighbourhood of station and Girnar Forest along road.

Evolvulus alsinoides var. *decumbens* (R. Br.) Oostr. Mon. Evolv. 38. 1934 and in Fl. Males 4 (4) : 396, f. 4-5, 1953. *Evolvulus decumbens* R. Br. Prodr. 489. 1910.

Herb ; stems erect with ascending branches, slender. Leaves lanceolate to linear, rounded to acute at the base, acute or acuminate at the apex, appressed-pilose on both sides ; basal leaves sometimes broader. Flowers blue.

Flowers : August to November.

Occurrence : Jamnagar, Vijarkhi lake. It was found common in grass lands.

Evolvulus alsinoides var. *hirsutus* (Lamk) Oostr. Mon. Evolv. 29. 1934 and in Fl. Males 4 (4) : 395, f. 4-5, 1953. *Evolvulus hirsutus* Lamk, Enc. 3 : 538. 1789.

Stems prostrate, tomentose in the young parts with more or less ferruginous hairs. Leaves more or less in two rows, oblong or ovate-oblong to elliptic, rounded at the base, obtuse and mucronulate at the apex ; hairy like the stem, shortly petioled.

Flowers : August to November.

Occurrence : Rajkot in river bed.

HAWITIA Wight & Arn.

Hewittia sublobata (Linn. f.) O. Kuntze, Rev. Gen. Pl. 441. 1891 ; Gir. 333 ; Santapau & Jan. 34. 1967. *Convolvulus sublobatus* Linn. f. Suppl. 135. 1781. *H. bicolor* Wight & Arn. in Madras Journ. Lit. & Sc. 5 : 22. 1837 ; Fl 4 : 216 ; Cooke 2 : 299.

A climbing or prostrate herb ; stems glabrous or pubescent. Leaves 3-12 × 2.5-11 cm, broadly ovate. Cordate at base, acute at apex. Flowers axillary, in one to few flower cymes ; peduncles 1-13 cm long, pubescent ; bracts 5-15 mm long ; linear-lanceolate hairy ; pedicels 3 mm long, pubescent. Calyx 12-15 mm long ; outer 3 sepals larger than the rest, all silky hairy with ciliate margins. Corolla 2-2.5 cm long, pale yellow with purple 'eye' ; midpetaline bands hairy outside. Fruit subglobose, 10 mm in diam., patently hairy. Seeds 4 mm long, black or brown.

Flowers : October onwards.

Occurrence : Rozi and Ranjit Sagar near Jamnagar, Ghumli on the Barda Hills, Sasan in the Gir Forest, in river bed or in forest undergrowth ; Okhamandal.

IPOMOEA Linn.

Flowers or inflorescence sessile or subsessile in leaf axils ;
corolla up to 9 mm long :

Capsules glabrous ; corolla white or whitish *sindica*

Capsules hairy :

Corolla mauve ; seeds ashy grey, glabrous *ericarpa*

Corolla yellow ; seeds pubescent *vagans*

Flowers or inflorescence distinctly pedunculate ; corolla over
9 mm long :

Outer sepals distinctly cordate at base with large rounded
basal lobes ; corolla white *sinensis*

Outer sepals rounded or truncate, not cordate at base :

Corolla hypocrateriform :

Outer sepals distinctly awned or aristate at or below
apex ; corolla tube long and narrow ; stamens and
style mostly exserted :

Corolla 3 - 4.5 cm long, scarlet, rarely white *quamoclit*

Corolla 7 - 14 cm long, never under 5 cm, not
scarlet :

Corolla white, tube 7 - 9 cm long, not widened above *alba*

Corolla mauve, tube 3 - 5 cm long, distinctly
widened above *turbinata*

Outer sepals obtuse, rounded or emarginate often mucronu-
late at apex ; corolla tube rarely long and narrow ;
stamens exserted or included :

Inflorescence in dense heads at the ends of peduncles,
supported by large foliaceous bracts ; sepals hairy ;
corolla pale pink *pes-tigridis*

Inflorescence usually not in heads, not supported by
foliaceous bracts ; sepals glabrous ; corolla pale pink
to white *sepiaria*

Corolla campanulate, infundibuliform or tubular, never
hypocrateriform :

Stems creeping and rooting at nodes, rarely ascending or
twining at ends :

Marshy or aquatic plants ; stems with hollow or
spongy internodes, without milky sap ; leaves often
sagittate at base but entire at apex ; corolla pale
purple or whitish *aquatica*

Sandy sea-shore plants ; leaves variously shaped at base, usually deeply divided into two more or less rounded lobes ; stems solid with milky sap, corolla rose or violet

pes-caprae

Stems mostly twining, rarely prostrate, not rooting at nodes :

Sepals entirely glabrous :

Leaves palmately-lobed to palmate compound :

Corolla purple, occasionaly white *cairica*

Corolla yellow with purple tube and throat *dasyperma*

Leaves entire or nearly so :

Corolla 7-10 cm long, white with purplish tinge *illustris*

Corolla 2-5 cm long, creamy white or pale yellow *obscura*

Sepals hairy outside, or fimbriate at margins :

Sepals various, obtuse or rounded ; corolla pale lilac *fistulosa*

Sepals narrowly long-attenuate or acuminate :

Leaves white woolly beneath ; corolla 1.5-2 cm long, mauve ; seeds pubescent with occasional long hairs *dichroa*

Leaves hairy, but not white woolly beneath ; corolla 5-10 cm long, light blue fading to pink ; seeds glabrous or hairy, but without long hairs *nil*

Ipomoea alba Linn. Sp. Pl. 161. 1753 ; Santapau Pl. Saur. 542. 1953 ; Santapau & Jan. 34. 1967. *I. bona-nox* Linn. *ibid* 228. 1762 ; FBI 4 : 197. *Calonyction speciosum* Choisy in Nem. Soc. Phys. Geneve 6 : 441, t. 1, f. 4, 1833 (excl. vars.) Cooke 2 : 322.

A large glabrous climber stems muricate. Leaves ovate to broadly ovate, 4 - 13 × 3.6 - 11 cm cordate at base ; petioles up to 20 cm long. Flowers in several-flowered cymes ; peduncles up to 24 cm long ; bracts caducous pedicels up to 12 mm long. Calyx tubular 15 - 20 mm long, the outer three sepals shorter than the inner ones. Corolla salver-shaped, white 7 - 9 cm long, and about as wide or wider ; midpetaline bands green. Stamens and style exerted. Ovary glabrous. Fruit ovoid, 2.5 cm long, 4-valved. Seeds glabrous, 1 cm long.

Local name : Kali-Shankhvali.

Flowers : Post monsoon season.

Occurrence : Rare : probably cultivated, in the Residency Garden Rajkot.

Uses : It is an ornamental plant, cultivated in the garden.

Ipomoea dichroa (Roem. & Schult.) Choisy in DC. Prodr. 9 : 364. 1845 ; Santapau et Patel in Trans. Bose Res. Inst. Cal. 22 : 38. 1958 ; Bhandari, Fl. Indian Desert 253. 1978. *Convolvulus dichrous* Roem. & Schult. Syst. 4 : 263. 1819 ; *Ipomoea arachnosperma* Weiw. Apont. Phytogeogr. 588. 1858 ; Santapau & Jan. 34. 1967. *I. pilosa* (Roxb) Sweet, Hort. Brit. ed. 1, 289. 1827 ; FBI 4 : 213 ; Cooke 2 : 313 (non Hoult. 1777, nee Gavanilles 1797).

An annual climbing stout herb ; stems covered with hairs arising from bulbous bases. Leaves ovate to orbicular, 4 13 × 3 11 cm, acute at the apex, appressedly pilose on the upper, white-tomentose on the lower surface ; petioles hairy, 2 13 cm long, with a pair of reniform pseudostipules at the base. Flowers single or in few-flowered cymes ; peduncles 2 13 cm long, hairy ; bracts persistent, linear lanceolate, hirsute outside. Calyx campanulate ; sepals narrow lanceolate, hairy outside, ciliate at the margins corolla infundibuliform, 1.5 2 cm long, mauve in colour ; midpetaline bands hirsute outside. Fruit globose, 7 mm diam. Seeds 2 or 4, each 4 mm long, pubescent with long cottony hairs.

Flowers : October onwards.

Occurrence : Dwarka, Sasan and Kankai in Gir Forest ; Junagadh where it was abundant and fairly common in moist spots. Okhamandal.

Ipomoea aquatica Forsk. Fl. Aeg.-Arab. 44. 1775 ; FBI 4 : 210 ; Cooke 2 : 315 ; Indrajit 502. 1910 ; Santapau, Pl. Saur. 543. 1953 ; Santapau & Jan. 34. 1967.

A prostrate and creeping plant, growing in moist soil or in water ; stems hollow, glabrous, rooting at the nodes. Leaves variable in shape, acute and mucronulate at apex, cordate or hastate at base, the basal lobes sharply acute to rounded ; petioles 2.5 13 cm long. Flowers in 1 - 5 flowered cymes ; peduncles up to 10 cm long ; bracts small, linear-lanceolate ; pedicels 2 5 cm long. Calyx funnel-shaped, glabrous ; sepals subequal, ovate, oblong-lanceolate. Corolla infundibuliform, 2.5 5 cm long, pale, purple. Stamens included ; filaments hairy at the base Ovary glabrous. Fruit glabrous, ovoid.

Local name : Nada-ni-bhaji, Nada-ni-vel, Nar-ni-vel.

Flowers : October onwards.

Occurrence : Common in marshy ground and in ditches and ponds, it was found especially abundant near Jamnagar, Junagadh, Bhavnagar, Dwarka, etc. and along the railway line in ditches.

Uses : Young shoots of this plant are used as vegetables ; the plant is considered a good general tonic. (Indraji 503. 1910)

Ipomoea cairica (Linn.) Sweet, Hort. Brit. 287. 1827 ; Santapau, Pl. Saur. 544. 1953 ; Santapau & Jan. 34. 1967. *Convolvulus cairicus* Linn. Syst. ed. 10, 922. 1759. *Ipomoea palmata* Forsk. Fl. Aeg. Arab. 43. 1775 ; FBI 4 : 214 ; Cooke 2 : 319.

A perennial climber ; stems glabrous, the older ones often tubercled. Leaves digitately 5 - 7 lobed, each 3 - 11 cm in diam., cordate at base ; segments broadly elliptic or lanceolate ; petioles 1 - 8 cm long, with a pair of pseudo-stipules at the base. Flowers in cymes 1 - 3 flowered ; peduncles 0.5 - 5 cm long, bracts minute. Calyx infundibuliform, glabrous, sepals subequal, or the outer ones, slightly shorter than the rest, corolla infundibuliform, 4 - 7 cm long, purple, occasionally white. Fruit subglobose, about 12 mm in diam., glabrous, 2 celled. Seeds 4, tomentose with long silky hairs along the margins.

Flowers : October.

Occurrence : Common as a hedge plant in gardens, it was found at Junagadh near the Willingdon Dam and at Mithapur, Beyt etc.

Uses : Planted in gardens as a hedge plant.

Ipomoea dasysperma : Jacq. Eclog. 1 : 132, t. 89, 1891 - 1816 ; van Oostroom in Fl. Males ser. I, 4 : 488, 1953 ; FBI 4 : 215 ; Cooke 2 : 321 ; Indraji 508, 1910 ; Santapau, Pl. Saur. 546. 1953 ; Santapau & Jan. 34. 1967.

A glabrous climber. Leaves palmately lobed. Corolla yellow with a purplish tube. "Probably a cultivated form of *I. palmata*" (Clarke in FBI 4 : 215).

Local name : Dipadvel.

Occurrence : On Barda Hill, in the forest of Hadiya and Torania ; and in Rajvadi and Maharaj Baug in Porbander.

Flowers : October onwards.

Uses : Roots and leaves are used in the treatment of apoplexy and guineaworm. It is applied on the swellings. Seeds are said to be a purgative. (Indraji 509. 1910)

Ipomoea eriocarpa R. Br. Prodr. 484. 1810 ; FBI 4 : 204 ; Cooke 2 : 312 ; Santapau & Jan. 34. 1967. *Ipomoea hispida* Roem. & Schult. Syst. 4 : 238. 1819 (non Zucc. 1809) ; Indraji 495. 1910 ; Santapau in JBNHS 47(2) : 346. 1947. Santapau, Pl. Saur. 547. 1953.

A slender climber ; stems patent, villous. Leaves ovate or ovate-lanceolate, deeply cordate at base, acute and mucronulate at apex, hairy on both sides. Flowers in few-flowered heads, sessile or subsessile ; bracts linear-lanceolate, hairy ; pedicels very short or 0. Calyx very hairy ; sepals enlarged in fruit. Corolla violet, 7-9 mm long, midpetaline, bands pilose outside. Capsule globose, 6-7 mm diam, hairy. Seeds 4, each 4 mm long, glabrous, minutely foveolate.

Local name : Badi fudardi.

Flowers : October onwards.

Occurrence : Rozi near Jamnagar, Rajkot in neighbourhood of Jubilee Gardens and at Pradumna Park, Sasan to Junwania in the Gir Forest, fairly abundant ; Girnar Forest, along the road, very common, Okhamandal.

Uses : Boiled in oil, the plant is used in the treatment of ulcers and skin infections. (Indraji 495. 1910)

Ipomoea fistulosa Mart ex Choisy in DC. Prodr. 9 : 349. 1845 ; van Steenis in Fl. Males Ser. 1. 4 : 599. 1954 ; Santapau & Patel, Trans. Bose Res. Inst. 21 : 40. 1958. Santapau & Jan. 34. 1967. *Ipomoea carnea* Cooke 2 : 321, et aliorum auct. Plur. (non Jacq. 1760) ; Gir. 235.

A perennial subscandent or more or less erect shrub ; stems pubescent in younger parts, glabrescent in older ones. Leaves ovate or broadly ovate, acuminate at apex. Cordate at base, 6-15 × 4-8 cm, more or less pubescent on both sides ; petioles 3-9 cm long. Flowers axillary, in cymes, rather showy ; peduncles 2-14 cm long, puberulous ; bracts minute, caducous ; pedicels 12-17 mm long. Calyx 5-7 mm long, sepals subequal. Corolla 8-10 cm long, pale lilac, minutely pubescent outside. Stamens and styles included. Ovary glabrous.

Flowers : October onwards.

Occurrence : Fairly common under cultivation in gardens, particularly at Rajkot, Mangrol, Junagadh, and in forest, nurseries in the Gir Forest ; planted in the reclamation schemes on sandy soil near Somnath.

Uses : Planted as a decorative shrub in gardens.

Ipomoea illustris (C. B. Clarke) Prain, Beng. Pl. 735, 1903; Oostroom in Steenis, Fl. Males. ser. 1 : 4; 485, 1953; Santapau & Jan. 34, 1967. *Ipomoea campanulata* Choisy in Mem. Soc. Phys. Geneve 6 : 451, 1833; FBI 4 : 211; Cooke 2 : 316, (non Linn. 1753). *Ipomoea campanulata* var. *illustris* Clarke in FBI 4 : 211, 1883.

A large shrubby climber. Leaves 11 27 × 9 19 cm. broadly ovate or ovate-oblong, acuminate at apex, cordate at base, glabrous or minutely puberulous on both sides, petioles 2.5 12 cm long; side nerves numerous, parallel among themselves, clear beneath. Flowers in much-branched corymbose cymes; peduncles as long as or shorter than the petioles; bracts caducous; pedicels 1 1.5 cm long. Calyx 13 17 mm long; sepals orbicular-oblong, glabrous or pubescent. Corolla 7 10 cm long, white with purplish tinge, rather showy. Fruit globose, about 12 mm diam. Seeds 4, covered with long, silky hairs.

Flowers : In summer before the monsoon.

Occurrence : This is one of the most elegant plants of this family. Mangrol, in gardens under cultivation; Rajkot, in Jubilee Gardens and along the railway line to Surendranagar, apparently cultivated.

Ipomoea nil : (Linn.) Roth Cat. Bot. 1 : 36, 1797; Santapau JBNHS 43(3) : 348, 1947; Santapau, Pl. Saur. 550, 1953; Gir. 237; Santapau & Jan. 34, 1967. *Convolvulus nil* Linn. Sp. Pl. 219, 1762. *Ipomoea hederacea* (auct. Plur. non Jacq. 1786); Cooke 2 : 321, Indraji 490, 1910.

A hispid climber; stems terete, retrorsely hispid. Leaves 3 lobed, rarely entire, widely cordate at base, mucronulate at apex, appressedly hairy on both sides; petioles 2.5 9 cm long, retrorsely hirsute. Flowers in 3 5 flowered cymes; peduncles 1 3 8 cm long, hirsute; bracts 5 12 mm long, linear, hairy outside, pedicels 5 10 mm long, hairy. Calyx infundibuliform 16 25 mm long, elongating in fruit to 35 mm, sepals patently hirsute in the basal portion. Corolla 5 10 cm long, light blue fading to pink, then to brick red. Stamens included, hairy at the base. Ovary glabrous; stigma 3 lobed. Fruit globose, 10 12 mm diam. Seeds 6 or fewer, each 5 7 mm long, black, glabrous or hairy.

Local name : Kaladana, Gharjo.

Flowers : August to October.

Fruits : October onwards.

Occurrence : Rozi and other places near Jamnagar, Abhapara and Kileshwar on the Barda Hills, Junagadh Bordevi and other sides near the

Girnar, Gir Forest, common on hedges, Rajkot, occasional on hedges ; Chotila, fairly abundant on hill slopes.

Uses : The seeds are used as a purgative, a substitute for jalap. (Indraji 490. 1910)

Note : This plant is often confused with *I. hederacea* Jacq., an American species, which distinguished from the Indian plant in having recurved sepals, flowers smaller and leaves with lobes, which are narrowed at the base.

Ipomoea obscura (Linn.) Ker-Gawl in Bot. Reg. 3 : t. 239. 1817 ; FBI : 4 : 207 ; Cooke 2 : 317 ; Indraji 499 1910 ; Santapau, Pl. Saur. 551. 1953 ; Santapau & Jan. 34. 1967. *Convolvulus obscurus* Linn. Sp. Pl. 220. 1762.

An annual slender climber ; stems slender, glabrous, occasionally hairy. Leaves 1.7 7.5 × 1.5 6.5 cm, broadly ovate, acuminate at the apex, entire on the margins, glabrous ; petioles 1.2 11 cm long, glabrous or sparsely hairy. Flowers solitary or in 2 3 flowered cymes ; peduncles filiform, 0.7 9 cm long ; bracts 1 2 mm long, linear-lanceolate ; pedicels 8 20 mm long. Sepals glabrous, subequal, oblong, shortly apiculate corolla infundibuliform, 19 22 mm long, creamy white or pale yellow. Fruits ovoid, about 8 mm long. Seeds 4, each 4 - 5 mm long, black, velvety.

Local name : Vaj-vel.

Flowers : Most of the year.

Occurrence : Jamnagar and neighbourhood, Rajkot near station and on river bed ; Kileshwar and other places on Barda Hills, Gondal, Junagadh ; on lower slopes of Girnar.

Uses : The powdered leaves are said to be effective in the treatment of ulcers of mucous membranes. (Indraji 499. 1910)

Ipomoea pes-caprae (Linn.) Sweet, Hort. sub. Lond. 35. 1818 ; Oostroom in Fl. Males. 1, 4 : 475. 1953 ; Santapau, Pl. Saur. 552. 1953 ; Santapau & Jan. 34. 1967. *Convolvulus pes-caprae* Linn. Sp. Pl. 159. 1753. *Ipomoea biloba* Forsk. Fl. Aeg.-Arb. 44. 1775 ; FBI 4 : 212. 1883 ; Cooke 2 : 317 ; Indraji 505. 1910.

A perennial stout creeper, growing on sandy sea shores ; stems rooting at nodes. Leaves 4 8 × 6 12 cm, distinctly bilobed, parallel-veined, glabrous ; petioles 3 15 cm. Flowers solitary or in 3 flowered cymes ; peduncles 3 10 cm long, tinged with deep purple or red ; bracts caducous ; pedicels up to 4 cm long. Calyx infundibuliform, sepals

outer 2 oblong, obtuse and mucronulate, 8-12 mm long, the inner sepals ovate-oblong, retuse, mucronulate, 12-15 mm long. Corolla infundibuliform, glabrous, 7-8 cm long, rose or violet in colour. Stamens included; filaments dilated and hairy at base. Fruit 1-7 cm diam., globose, glabrous. Seeds 4, each 8 mm long, covered with brown tomentum.

Local name : Maryad-vel, Arvel.

Flowers : Most of the year.

Occurrence : A sea-shore plant noted as abundant at Mangrol, Porbandar. Okha etc. cultivated in the reclamation at Somnath. Noted also at Mithapur on rubbish heaps away from the sea-shore.

Uses : In Saurashtra this plant is used to cover the sands with vegetation in the schemes for the reclamation of the sandy shores of Somnath.

Ipomoea pes-tigridis Linn. Sp. Pl. 162. 1753 ; FBI 4 : 204 ; Cooke 2 : 320 ; Indrajī 494. 1910 ; Santapau, Pl. Saur. 553. 1953 ; Gir 238 ; Santapau & Jan. 34. 1967.

A herbaceous climber ; stems terete, hairy with spreading hairs. Leaves deeply palmately 5-9 lobed ; lobes ovate or elliptic-oblong, acute at the apex ; narrowed at the base, densely hairy on both sides ; base of leaf deeply cordate. Flowers inconspicuous, fading very soon, in axillary cymes ; peduncles 2-14 cm long, hirsute ; bracts 1.5-3.5 × 1-12 cm, oblong or ovate-oblong ; floral bracts 9-11 mm long ; pedicels 0. Calyx 9-11 mm long, densely hairy. Corolla campanulate, pale pink colour, up to about 1.5 cm long. Fruit 7 mm diam., glabrous. Seeds 4, each 4 mm long, dark brown.

Local name : Vagh-padi.

Flowers : From the end of the monsoon to winter.

Occurrence : One of the commonest species of the genus in Saurashtra, and very typical on account of the structure of the leaves. It is particularly abundant along roadsides with thick hedges and along roads in the forest.

Uses : The root is used as a purgative. (Indrajī 494. 1910)

Note : The leaves of this plant are so very typical that identification can be effected from them, flowers are small and seem to fade very soon ; so that it is rather rare to find a good herbarium-specimen showing flowers in an open condition.

Ipomoea quamoclit Linn. Sp. Pl. 159. 1753 ; FBI 4 : 199 :

Oostroom in Fl. Males. 4 : 482. 1953 ; Santapau & Jan. 34. 1967. *Quamoclit vulgaris* Choisy in Mem. Soc. Phys. Hist. Nat. Geneve. 6 : 464. 1833 ; Cooke 2 : 331.

A handsome annual climber with slender stems. Leaves ovate-oblong in outline, up to 9×7 cm, deeply pinnatisect almost to the midrib ; petioles 2-4 cm long ; a pair of pseudo-stipules is present at the base of the petiole. Flowers in 3-5 flowered cymes ; peduncles 3-15 cm long ; bracts minute, ovate to linear-lanceolate ; pedicels up to 15 mm long. Sepals unequal, the inner ones longer. Corolla hypocrateriform, 3-3.5 cm. long, deep scarlet or crimson red, occasionally white. Stamens exserted, unequal ; filaments white ; hairy at the base. Fruit ovoid-oblong. 6-8 mm diam. Seeds 4, each 5 mm long, murmurate with tufts of minute hairs.

Flowers : End of the monsoon and post-monsoon period.

Occurrence : This plant was seen on hedges near the Willingdon Dam at Junagadh, where it was cultivated and had run wild. This is one of the most colourful and elegant of the Convolvulacea of India. According to O'Donnell in Lilloa 22 : 74. 1959, the type of the plant is from India, but is cultivated all over the tropical world, hence it is difficult to say which is the original home of this plant.

Ipomoea sepiaria Roxb. Fl. Ind. 2 : 90. 1824 ; Verdcourt in Kew Bull. 15 : 8. 1961 ; Santapau & Jan. 34. 1967. *Convolvulus diversifolius* Schumach. & Thom. Beskr. Guin Pl. 94. 1829. *Batatas abyssinica* A. Rich. Tent. Fl. Abyss. 2 : 64. 1851. *Ipomoea maxima* auct. mult. non (L. f.) Sweet.

A perennial climber ; stems hairy or glabrous. Leaves glabrous, ovate, mucronulate at apex, deeply cordate at base, the basal lobes rounded. Petioles 1-5.5 cm long, glabrous. Flowers in umbellate cymes ; peduncles 1-17 cm long, bracts small, lanceolate ; pedicels 5-7 mm long, thickened in fruit. Calyx tubular, sepals equal or unequal, glabrous, enlarged in fruit. Corolla salver-shaped pale pink to white in colour ; midpetaline bands glabrous. Fruit about 6-8 mm diam., brown, glabrous, 4-valved. Seeds 4, each 3 mm long, grey tomentose.

Local name : Hanuman-vel.

Flowers : October onwards.

Occurrence : Dhunvao near Jamnagar, and Rajkot in hedges, and from Thar Jungle, near Dwarka.

Uses : The juice of the plant is said to be diuretic and an antidote to arsenical poisoning.

Ipomoea sindica Stapf. in Kew Bull. 93 : 346, 1. 1894 ; Cooke 2 : 313 ; Santapau, Pl. Saur. 554. 1953 ; Santapau & Jan. 34. 1967.

A prostrate or climbing slender annual with hispid stems. Leaves deltoid hastate, long than broad, 1.9-7 cm. long, hirsute on both sides ; petioles 1-4 cm long, hispid. Flowers in axillary cymes, occasionally solitary, sessile ; bracts 2-2.5 mm, long. Calyx lanceolate, hairy outside, accrescent in fruit, Corolla white, infundibuliform. Fruit globose, 6 mm diam. Seeds black, grey-puberulous.

Flowers : End of monsoon onwards.

Occurrence : Chotila, in plains, Morvi, common ; Rajkot, Pradumna Park ; Ghumli, on lower slopes of Barda Hills ; Dwarka, along the railway line.

Ipomoea sinensis (Desr.) Choisy in Mem. Phys. Soc. Geneve 6 : 459. 1834 ; Verdcourt in Kew Bull. 204. 1958 ; Santapau & Jan. 34. 1967. *Convolvulus sinensis* Desr. in Lam. Encycl. 3 : 557. 1791. *Ipomoea calycina* Benth. ex Clarke in FBI 4 : 201. 1883 ; Cooke 2 : 311, Indrajai 492. 1910 ; Santapau, Pl. Saur. 545. 1953 ; Gir 234. *Ipomoea tropica* Santapau & Patel in JBNHS 54 : 798. 1957.

An extensive climber ; stems sparingly hairy. Leaves 2-12 × 1.6-8 cm long, ovate, entire, acuminate, cordate at base, more or less hairy ; petioles 1-4 cm long, hairy. Flowers solitary or in 2-3-flowered cymes, peduncles hairy ; bracts 3-5 mm long, linear-lanceolate ; pedicels hairy. Calyx up to 7 mm long ; outer sepals ovate-lanceolate, the inner lanceolate in fruit the outer sepals becomes somewhat winged. Corolla pure-white, up to 15 mm long and about equally broad. Capsule 10 mm long, ovoid, glabrous. Seeds 4, each 5 mm long, silky-hairy.

Local name : Dholi-fudardi.

Flowers : October onwards.

Occurrence : Noted as common and locally abundant in various parts of the Gir and Girnar Forests.

Uses : Roots pounded in water and is applied on poisonous stings. Ground leaves are applied on swellings of guineaworm ; delicate branches, flowers and fruits are boiled in oil and is applied on eczema and skin diseases. (Indrajai 442. 1910)

Ipomoea turbinate Lag. Gen. Sp. Pl. 10. 1816 ; Guan. Proc. Ass. Off. Seed. Anal. 59, 119, f. 2. 1969 et in Brittonia 24 : 163. t. 5. 1972 ; Bhandari, Fl. Indian Desert. 260. 1978. *Convolvulus muricatus* Linn. Mant. 44. 1767. *Ipomoea muricata* (nom. illegit., non cav. 1799). (Linn.)

Jacq. Hort. Schoenbr 3 : 40, t. 323. 1798; FBI 4 : 197 ; Indraj 488, 1910 ; Santapau, Pl. Saur. 549. 1953 ; Gir 236 ; Santapau & Jan. 34. 1967.

A stout glabrous climber ; stems muricated. Leaves 7-15 × 5.5-12 cm, broadly ovate, acuminate, deeply cordate at base ; petioles 4-18 cm long. Flowers solitary or a few flowered cymes ; peduncles 1.5-9 cm long, bracts caducous ; pedicels 12-15 mm long, thickened and elongated in fruit. Calyx tubular, glabrous ; sepals equal in length, aristate. Corolla hypocrateriform ; tube 3-5 cm long ; limb mauve in colour. Fruit 16-28 × 14-17 mm, ovoid, stray-coloured. Seeds 4, each 8 mm long, black.

Local name : Kantalo gariyo.

Flowers : October onwards.

Occurrence : Common in the neighbourhood of Sasan in the Gir Gir Forest ; also at the base of the Girnar and in other places near Junagadh ; Barda Hills, on the northern slopes ; Rajkot, in hedges.

Uses : The seeds are used as a purgative and febrifuge. (Indraj 488, 1910).

Ipomoea vagans : Baker in Kew Bull. 70. 1894 ; Santapau & Jan. 35. 1967. *Ipomoea sulphurea* Hochst. ex Choisy in DC. Prodr. 9 : 356. 1845 (non Silva Manso 1836, nec Don 1838).

Stem thin slender, hairs all over. Leaves, ablong, short-petioled, entire, cordate at base, hairs on both the sides. Inflorescence 2-3-flowered, flowers small yellow, seeds pubescent.

Flowers : October.

Occurrence : Seen only at Rozi, near Jamnagar.

This plant which constitutes new record for India, is given on the strength of a specimen Santapau 7667, collected in flower on Oct. 17. 1945 at Rozi near Jamnagar. Identification was made by matching this specimen with those in the Central National Herbarium, Calcutta. At the time of collection, flowers were noted as "small, yellowish".

JACQUEMONTIA Choisy

Flowers usually white

paniculata

Flowers usually blue

pentantha

Jacquemontia paniculata (Burm. f.) Hall. f. in Bot. Jahrb. 16 : 541. 1893 ; Cooke 2 : 303 ; Santapau & Jan. 35. 1967. *Ipomoea paniculata* Burm. f. Fl. Ind. 50, t. 21, f. 3. 1768. *Convolvulus parviflorus* Vahl Symb. Bot. 3 : 29. 1794 ; FBI 4 : 220.

A slender climber with terete stems ; young parts pubescent, at length glabrous. Leaves ovate, acuminate at apex, cordate at base ; petioles 1-4 cm long ; minutely pilose. Flowers in umbellate cymes ; peduncles 8-45 mm long, sparsely tomentose ; bracts 3 mm long, linear ; pedicels 4 mm long, sparsely tomentose. Calyx 5-7 mm long, pubescent ; segments ovate, acuminate. Corolla white, up to 10 mm long, midpetaline bands glabrous, 2-nerved at apex. Stigmas 1.5-2 mm long, elliptic, curled. Fruit 4-5 mm diam, 8-valved, yellowish-brown, glabrous-seeds 4, each 2.5 mm diam., slightly tuberculate and with narrow wings at edges.

Flowers : October onwards.

Occurrence : This is a very elegant plant, noted only on the Barda Hills at Kileshwar and neighbourhood.

Jacquemontia pentantha : G. Don, Gen. Syst. 4 : 283. 1838 ; Oostroom in Blumea 3 : 278. 1939 & in Fl. Males. I, 4 : 435. 1953 ; Santapau & Patel in Agharkar Comm. Vol. 15. 1961. Santapau & Jan. 35. 1967. *J. coerulea* Cooke 2 : 304. 1905 (non Choisy in Mem. Soc. Phys. Geneve. 6 : 476. 1833) ; FBI 4 : 220.

A glabrous slender climber ; leaves broadly ovate, mucronate at apex, 3-12 × 2-7 cm, cordate or truncate at base ; petioles up to 3 cm long. Flowers in umbellate cymes ; peduncles 2-10 cm long, glabrous ; pedicels 3-5 mm long, puberulous. Calyx up to 7 mm long, corolla infundibuliform, 12-17 mm long, and about as much in diam, deep blue in colour, white at the base. Stigmas elliptic. Fruit about 5 mm long, 8-valved. Seeds 4, minutely papillose.

Flowers : More or less throughout the year.

Occurrence : Noted under cultivation at Rajkot in Jubilee Gardens where it made an impressive display on trellis work and on hedges. It is a South American plant which has now been cultivated in many tropical countries ; in India it is a popular garden climber. It does not seem to run wild.

MERREMIA Dennst.

Leaves entire or occasionally 3-lobed :

Inner sepals 2-lobed at apex ; leaves reniform, as broad or broader than long

gangetica

Inner sepals not lobed at apex ; leaves distinctly longer than broad :	
Flowers 1-3 on axillary peduncles ; seeds glabrous	<i>tridentata</i>
Flowers in dense axillary racemose cymes ; seeds with fulvous velvety pubescence	<i>hederacea</i>
Leaves palmately 5-7 lobed :	
Outer sepals hirsute ; corolla bright yellow	<i>vittifolia</i>
Outer sepals glabrous ; corolla pale yellow	<i>rhyncorhiza</i>
Leaves digitately 5-partite :	
Leaves glabrous, coarsely dentate, undulate or nearly entire ; peduncles glandular and hairy at the upper end ; outer sepals glabrous ; seeds hairy with short appressed curled hairs	<i>quinquefolia</i>
Leaves appressed hairy on both sides ; peduncles villous, not glandular ; outer sepals hirsute ; seeds glabrous	<i>aegyptia</i>
Leaves variable in shape	<i>turpethum</i>

Merremia aegyptia (Linn.) Urban. Symb. Ant. 4 : 505. 1910 ; Santapau, Pl. Saur. 557. 1953 ; Gir. 240 ; Santapau & Jan. 35. 1967. *Ipomoea aegyptia* Linn. Sp. Pl. ed. 1 : 162. 1773. *Ipomoea pentaphylla* Jacq. collect 2 : 297. 1788 ; FBI 4 : 202. 1883 ; Indrajai 493. 1910. *Merremia pentaphylla* Hall. f. in Engler Bot. Jahrb. 15 : 552. 1893 ; Cooke 2 : 308.

An annual, climbing plant ; stems covered with fulvous hairs from bulbous bases. Leaves digitately 5 lobed ; lobes elliptic or narrower, acute or acuminate, appressedly fulvous hairy on both sides. Flowers in 3-5 flowered cymes ; peduncles 2-6 cm long, elongating to 17 cm in fruit, patent hairy ; pedicels 1-3 cm long, hairy. Calyx densely fulvous hairy outside ; outer 2 sepals 15 mm long, elliptic-oblong ; inner ones ovate, acute, glabrous. Corolla up to 2.5 cm long, white. Ovary glabrous, 4-celled ; stigma bilobed. Fruit ovoid, about 12 mm diam., the walls papery ; seeds 4, each 5 mm long, glabrous.

Local name : Panch-Pan-ni-fudardi.

Flowers : October onwards.

Occurrence : Fairly common in the Gir Forest at Sasan Sirwan, etc. and at the foot of the Girnar ; Okhamandal.

Uses ; Roots pounded in water is applied on poisonous stings ; ground leaves are applied on swellings of guineaworm ; delicate branches,

flowers and fruits are boiled in oil and the oil is applied on eczema and skin diseases. (Indraji 492, 1910).

Merremia gangetica (Linn.) Cufod. Bull. Jard. Bot. Etat. 31 (Suppl.) : 743. 1961. Santapau & Jan. 35. 1967 ; C. J. Saldanha in Fl. Hassan Dist. Karnataka, 473. 1976 ; *Convolvulus gangeticus* Linn. in Torner, Cent. II Pl. 9. 1756. *Merremia emarginata* (N. Burm.) H. Hallier, Bot. Jahrb. 16, 552. 1893. Cooke 2 : 305 ; Santapau, Pl. Saur. 558. 1953. Gir. 241. *Ipomoea reniformis* Choisy, Convolv. Orient. in Mem. Soc. Phys. Genev. 6 : 446, 1834; FBI 4 : 206.

Prostrate and creeping herbs, stems covered with soft hairs. Leaves entire, suborbicular or reniform, 1.3-3.5 × 1.7-3.5 cm, mucronate at apex ; petioles 2.5-5 cm long, hairy. Flowers solitary or in 2-3 flowered, shortly pedunculate axillary cymes. Calyx 5-6 cm long ; outer sepals fimbriate at margins, ovate ; inner sepals subquadrate, divided into two small lobes at apex, fimbriate at margins. Corolla yellow, 6-9 mm long. Ovary glabrous, stigma globose. Fruit 5-6 mm diam., brown ; seeds 2 or 4, each 2.5 mm long.

Local name : Undarkani.

Flowers : October onwards.

Fruits : November onwards.

Occurrence : Common all over Saurashtra, especially in the drier areas, but always growing in moist soil. Dhunvao ; Hadiana, Beyt Kota ; Jamnagar and Jodiya at Rajkot especially in the Pradumna Park, at Gondal near lake at Junagadh and at the food of the Girnar ; in the Gir Forest at Sasan, etc. On the Barda Hills at Bileshwar ; and along the railway lines from Rajkot to Jetalsar and to Viramgam.

Uses : The plant is said to be a diuretic, and useful in rheumatism and neuralgia.

Merremia hederacea (Burm. f.) Hall. f. in Engl. Bot. Jahrb. 18 : 118. 1894 ; Ooststroom in Blumea 3 : 302. 1939 ; Gir 242 ; Santapau & Jan. 35. 1967. *Evolvulus hederaceus* Burm. f. Fl. Ind. 77, t. 30, f. 2. 1768. *Ipomoea chryseides* Ker. Gawl. in Bot. Reg. t. 270. 1818 ; FBI 4 : 206 ; *Merremia chryseides* Hall. f. in Bot. Jahrb. 16 : 552. 1893 ; Cooke 2 : 307.

A climber with stems minutely muriculate or tuberculate. Leaves entire or occasionally more or less deeply 3-lobed, ovate, cordate at base, entire or crenate at margins, 2-7.5 × 1.5-6 cm. Flowers solitary or in few to many-flowered cymes. Calyx infundibuliform, 6 mm long. Corolla yellow, campanulate, 7-10 mm long. Stamens slightly exserted, hairy at

the base ; the hairs fused to form a fimbriate scale. Fruit 8 mm. diam somewhat quadrangular, reticulately wrinkled ; seeds 4, brown, valvety fulvous pubescent.

Flowers : October onwards.

Occurrence : A rare plant, though locally abundant ; noted it as particularly abundant at Sasan and Junwania Nes in the Gir Forest ; also at Junagadh near Willingdon dam.

Merremia quinquefolia (Linn.) Hall. f. in Engler Bot. Jahrb. 16 : 552. 1893 ; Ooststroom in Blumea 3 : 324, 1939 & Fl. Males 4 (4) : 446, f. 28. 1953 ; Santapau & Patel in JBNHS 53 : 215, t. 2. 1955 ; Santapau & Jan. 35. 1967. *Ipomoea quinquefolia* Linn. Sp. Pl. 162. 1753.

A climbing herb, stems slender, glabrous. Leaves compound ; leaflets shortly petiolate or sessile, narrowly oblong or lanceolate ; petioles of leaves 1.5 - 5 cm long. Flowers axillary, solitary or in 3 - 5 flowered cymes ; peduncles as long as the petioles, glandular and hairy near the lamina ; pedicels 3 - 7 mm long, glabrous. Calyx tubular, 8 - 9 mm long. Corolla white or pale yellow, 1.6 - 2 cm long. Stamens included ; anthers at length spirally twisted. Fruit globose, 1 cm diam., 4-celled ; seeds 4, each 4 mm long, black, hairy with short appressed hairs.

Flowers : October onwards.

Occurrence : A rare plant noted at Jilla Park, Rajkot, on hedges ; at Sasan in the Gir Forest ; on hedges near the river, Dwarka.

Merremia rhynchorhiza : (Dalz.) Hall. f. in Bot. Jahrb. 16 : 552. 1893 ; Cooke 2 : 307 ; Santapau, Pl. Saur. 965. 1953 ; Gir 243 ; Santapau & Jan. 35. 1967. *Ipomoea rhynchorhiza* Dalz. in Kew Journ. Bot. 3 : 179. 1851 ; FBI 4 : 214.

A large herbaceous climber. Stems terete, glabrous. Leaves palmately cut into 5 - 7 segments, sparsely hairy above, more hairy on the nerves beneath, with fulvous hairs ; petioles 1.5 - 4.5 cm long. Flowers solitary or in 2 - 3 flowered cymes ; peduncles up to 4.5 cm long, filiform ; pedicels 10 - 13 mm long. Calyx infundibuliform, 18 - 20 mm long ; sepals unequal, the outer ones slightly shorter corolla pale yellow. Anthers 7 mm long, spirally twisted. Fruit 8-valved, subglobose. Seeds 4, brown, fulvous hairy.

Flowers : Monsoon season.

Occurrence : This is a rare plant, noted in the Gir Forest in moist spots.

Merremia tridentata (Linn.) Hall. f. in Bot. Jahrb. 16 : 552. 1893 ; Ooststroom, Blumea 3 : 315. 1939 ; Cooke 2 : 306 ; Santapau, Pl. Saur. 559 ; Santapau & Jan. 35. 1967. *Evolvulus tridentatus* Linn. Sp. Pl. ed. 2, 392 1762. *Ipomoea tridentata* Roth, in Roem. Arch. Bot. 1, 2 : 38. 1798 ; FBI 4 : 205. 1883 ; Indrajī 496. 1910. *Convolvulus tridentatus* Linn. Sp. Pl. 157. 1753.

A slender perennial prostrate herb, with angular stems. Leaves various in shape and size, but deeply emarginate and 3-toothed at the apex, cordate at base, the basal lobes clasping the stem ; petioles very short or 0. Flowers axillary, solitary. Calyx 4 - 5 mm long, infundibuliform, outer sepals shorter than inner. Corolla 10 - 12 mm long, pale yellow. Fruit 6 mm. pale brown, glabrous, seeds trigonous, glabrous.

Local name : Bhintagariyo.

Flowers : Monsoon season.

Occurrence : This plant is given here on the authority of Indrajī, he particularly noted this from Khambara lake at Barda Hill.

Uses : Roots and seeds are used with the medicines which is given in the treatment of rheumatism. Leaves are applied on wounds and the whole plant is boiled in oil and the oil is applied on blotches. (Indrajī 497. 1910).

Merremia vitifolia (Burm. f.) Hall. f. in Bot. Jahrb. 16 : 552. 1893 ; Ooststroom in Blumea 3 : 329. 1939 ; Cooke 2 : 307 ; Santapau, Pl. Saur. 560. 1953 ; Santapau & Jan. 35. 1967. *Convolvulus vitifolius* Burm. f. Fl. Ind. 45, t. 18, f. 1. 1768. *Ipomoea vitifolia* Blume, Bijdr. 709. 1825 ; FBI 4 : 213.

A fairly extensive perennial climber ; stems patently hairy when young. Leaves orbicular, palmately divided into 5-7 lobes, deeply cordate at base, coarsely serrate at the margins, hairy above and on the nerves beneath, 4 - 20 cm diam. Petioles 1-6 cm long, patently hairy. Flowers solitary or in 2 - 7 flowered cymes ; peduncles up to 6 cm long, hairy. Calyx 13 - 20 mm long, enlarging in fruit ; sepals hairy outside. Corolla yellow, 4 - 5 cm long ; midpetaline bands lineate. Fruit depressed globose, 10 - 13 mm diam, glabrous ; seeds 4, glabrous.

Flowers : October onwards.

Occurrence : Growing on hedges in a far near the foot of the Girnar Hill.

Merremia turpethum (Linn.) Shah & Bhatt. J. Bomb. Nat. Hist. Soc. 74 (3) : 567. 1977. *Convolvulus turpethum* Linn. Sp. Pl. 155. 1753. *Ipomoea turpethum* R. Br. Prodr. 485. 1810 ; FBI 4 : 212. *Operculina turpethum* (Linn.) Silva-Manso, Enum. Subst. Bras. 16 & 49, 1836 ; Cooke 2 : 309 ; Indrajai 503. 1910 ; Santapau & Jan. 35. 1967.

A perennial extensive climber, with milky sap ; stems narrowly winged, pubescent. Leaves variable in shape, 4.5-14 × 3-13 cm, cordate or truncate at base, pubescent on both sides. Flowers solitary or in few-flowered cymes ; peduncles 1.5-9 cm long. Calyx 15-20 mm long, lobes subequal, minutely pubescent, much enlarged in fruit. Corolla 3.5-5 cm long, white. Fruit depressed globose, 15-20 mm diam. Seeds dull black, obscurely trigonous.

Local name : Nasottar.

Flowers : October onwards.

Occurrence : Jamnagar and neighbourhood, common, Ghumli on the Barda Hills ; on river sides at Junagadh, Sasan in the Gir Forest, rare ; Somnath, abundant, under cultivation, Rajkot Jilla Park on hedges, wild.

Uses : The root of the plant has been used for long as a valuable purgative, known in commerce under the name of Turpeth Root or Indian Jalap. (Indrajai 503. 1910).

Note : The genus *Merremia* Dennest. ex Endl. is conserved over *Operculina* Silva-Manso by the International Code of Botanical Nomenclature (1972 p. 377).

RIVEA Choisy

Peduncles usually 1-flowered ; sepals obtuse, ovate ; fruit longer than the fruiting calyx ; leaves about as broad as long

hypocrateriformis

Peduncles 3 or more-flowered ; sepals lanceolate, acute ; fruit shorter than the fruiting calyx ; leaves usually broader than long

ornata

Rivea hypocrateriformis (Desr.) Choisy in Mem. Soc. Phys. Geneve 6 : 408. 1834 ; FBI 4 : 184 ; Cooke 2 : 323 ; Indrajai 482. 1910 ; Santapau, Pl. Saur. 562. 1953 ; Gir 245 ; Santapau & Jan. 35. 1967. *Convolvulus hypocrateriformis* Derr. in Lam. Encycl. 4 : 561. 1792.

A large climbing shrub. Leaves orbicular, obtuse, glabrous, cordate, 2-10 × 2.5-13 cm. Flowers axillary, usually shortly ; peduncles 1-10 cm

long, elongated in fruit. Calyx 10-14 mm long, lobes ovate-elliptic, obtuse, silky hairy outside. Corolla white, 7.5-10 cm long, 5-7 cm across; mid-petaline bands glabrous or pubescent in the upper part outside. Fruit 20 mm long. Shiny brown, glabrous; seeds brown.

Local name : Fang.

Flowers : Monsoon season.

Occurrence : Kileshwar on the Barda Hills, Chotila, Dwarka, Rajkot, Jetalsar; Gir Forest at Sasan and Tulsi-shyam; usually on hedges or on *Euphorbia nivulia* Buch.-Ham. Clumps.

Uses : Roots pounded in water is applied on poisonous stings and on swellings of guineaworm. An infusion of the stem is given to cows and buffalows at the time of delivery. Leaves are tied up on swellings of rheumatism, and are eaten during the scarcity. Flowers are sweet in odour and is given for smelling to the mentally dull people. (Indraji 484. 1910)

Rivea ornata Choisy in Mem. Soc. Phys. Geneve 6 : 409. 1934. FBI 4 : 183; Cooke 2 : 323; Santapau, Pl. Saur. 563; Santapau & Jan. 35, 1967.

A large climbing shrub, young parts densely silky hairy; very similar in many respects to the preceding species, from which it differs by the many-flowered cymes, the acute sepals, which in fruit are larger than the fruit, and the leaves that often are broader than long.

Flowers : Monsoon season.

Occurrence : Jamnagar and neighbourhood, rare; Barda Hills at Abhapara, Kileshwar, etc. Dwarka, Visavadar, along railway line from Junagadh to Sasan.

SEODERA Hochst.

Seddera latifolia Hochst. & Steud. ex Hochst. in Flora 27, Bes. Beilage : 8, t. 5. f. B - C, 1844; Heine in Kew Bull. 16 : 206. 1962; Cooke 2 : 298; Santapau & Jan. 35. 1967. *Breweria latifolia* Benth. ex Clarke in FBI 4 : 224. 1883; Woodrow in JBNHS 12 : 172. 1898. *Bonamia latifolia* (Hochst. et Steud.) Santapau in Journ. Bomb. Nat. Hist. Soc. 47 (2) : 342. 1947.

An erect, low-branched shrub, 30 cm high; stem and branches silvery; leaves 6-13 mm long, elliptic, densely silky. Flowers sessile,

axillary, 1-3 together; bracteoles 2, linear lanceolate, 2 mm long. Calyx silky outside; sepals 4-5 mm long. Corolla equalling the calyx. Style free nearly to the base. Fruit ovoid, 4 mm in diam. Seeds 2, each 3-4 mm long.

Flowers : December.

Occurrence : Woodrow reports this plant from Veraval. It was not seen in the field. 'In the Bombay Presidency confined to Kathiawar and Sind' (Cooke).

SOLANACEAE

Fruit a fleshy or dry indehiscent berry :

Corolla rotate or campanulate; flowers solitary or in few-flowered cymes :

Anthers dehiscing by apical pores

Solanum

Anthers dehiscing by longitudinal slits :

Anthers connivent around the style, the cells extended into a narrow sterile terminal part; leaves pinnately or bipinnately divided

Lycopersicon

Anthers not connivent around the style, the cells not extended terminally; leaves entire or sinuate or repandentate :

Fruiting calyx accrescent, bladderlike, completely enclosing the berry; berry fleshy or pulpy :

Mature berry red; flowers in fascicles, rarely solitary, bi- or uni-sexual, dioecious; corolla green-yellow; leaves with smooth entire margins

Withania

Mature berry yellow or pale orange; flowers usually solitary, rarely in fascicles, always bisexual; corolla yellow with or without spots near base; leaves usually with irregularly dentate or serrate margins

Physalis

Fruiting calyx not at all or only slightly enlarged in fruit supporting the berry at the base :

Unarmed herbaceous or suffruticose plants

Capsicum

Armed shrubs or undershrubs

Lycium

Corolla infundibuliform or hypocrateriform	<i>Cestrum</i>
Fruit spindle-shaped, devoid of calyx	<i>Brugmansia</i>
Fruit capsular, dehiscent or irregularly splitting :	
Fruiting calyx persistent, nearly or entirely covering the fruits; fruit with membranous smooth pericarp, septicidally dehiscent by two valves; seeds spherical or elliptic	<i>Nicotiana</i>
Fruiting calyx circumscissile at base, the basal part enlarged and reflexed or falling off, rarely calyx persistent; fruit with thick prickly or tuberculate, rarely smooth, pericarp loculicidally dehiscent or irregularly splitting; seeds discoid or reniform, laterally compressed	<i>Datura</i>

BRUGMANSIA Pers.

Brugmansia suaveolens (Hums. & Bonpl. ex Willd.) Bercht. & Presl., Rostl. T. Solanaceae 45. 1823; Santapau & Jan. 35. 1967. *Datura suaveolens* H. & Bonpl. ex Willd. Enum. Pl. Hort. Berol. 227. 1809.

Shrub ; 3 - 5 m high. Leaves ovate-oblong, petioled, often unequal at base, entire, acute, glabrous, 15 - 30 cm long. Flowers white about 30 cm long, nodding, on pedicels ; calyx inflated, angled ; corolla tube plicate. Capsule unarmed, spindle-shaped, about 12.5 cm long, devoid of calyx.

Flowers : September onwards.

Occurrence : Junagadh, Motibaug.

Uses : Grown in gardens for its large, sweet-scented, drooping flowers. The plant presents or splendid appearance when in full bloom in the hot season. (WI).

CAPSICUM Linn.

Capsicum annum Linn. Sp. Pl. 188. 1753 ; Fingerh. Monogr. Gen. Caps. 12, t. 2, fig. 9, 1832 ; Cooke 2 : 347 ; Santapau, Pl. Saur. 566. 1953; Gir 246. Santapau & Jan. 35. 1967. Helber & Pickersgill, Taxon 18 : 278. 1969.

Herb or undershrub, 60 - 90 cm high. Leaves ovate or oblong-elliptic, acute or acuminate at apex, acute or rounded at base ; petioles variable in length. Flowers solitary. Calyx capulate, more or less clearly toothed, more or less enlarged in fruit. Corolla white or dingy white,

about 10-12 mm across. Ovary style glabrous. Fruit variable, usually elongated, in colour at first green, at length often bright red.

Local name : Marachan.

Flowers : August to winter.

Occurrence : Cultivated in various parts of Saurashtra for the sake of its fruits.

Uses : The fruit is generally employed in seasoning curries.

Capsicum annum var. *acuminatum* Fingerh. Monogr. Gen. Caps. 13, t. 2, C. 1832 ; Cooke 2 : 347 ; Santapau & Jan. 35. 1967.

Similar to the typical variety, but the fruit of the present variety is slender, elongated, red or yellow, 1.3-11.5 × 0.6-1 cm smooth, with rather strong pungent flavour.

Local name : Marachan.

Flowers : October onwards.

Occurrence : Sasan, Iran river up stream.

Uses : Fruit is used very widely in the preparation of various curries and chutneys. Capsicum preparations are used as counter-irritants in lumbago, neuralgia and rheumatic disorders. Taken internally capsicum has a tonic, and carminative action and is specially useful in chronic dyspepsia. (WI).

CESTRUM Linn.

Cestrum nocturnum Linn. Sp. Pl. 191. 1753 ; (excl. Syn. Plukenet, Sloane, Fewill et Patria Chile) ; Francey in Candollea 7 : 67, 1936 ; Bor & Raizada, Indian Climbers & Shrubs 119, t. 45. 1954. Santapau, Pl. Saur, 568. 1953 ; Santapau & Jan. 35. 1967.

A large shrub or small tree, very sweetly and strongly scented in the evening and night. Leaves ovate-lanceolate or lanceolate, acute or shortly acuminate at the apex, rounded at the base, glabrous, 4.5-17.3 × 1-6 cm, petioles 4-18 mm long. Flowers in cymose panicles, very numerous in the upper ends of branches ; peduncles slender ; pedicels 1-2 mm long ; bracts 3-4 mm long, the lower ones somewhat folia-

ceous. Calyx 3 mm long, glabrous, shortly 5-6 lobed. Corolla about 25 mm long, 5-8 mm diam., shortly 5-6 lobed, yellowish or whitish. Fruit ovoid, 8-10 mm long, green, turning white.

Local name : Rat-Ki-Rani.

Flowers : April to October and later.

Occurrence : Cultivated in gardens on account of the sweet scent of its flowers ; noted at Junagadh, Khaveda, Rajkot, etc. In other parts of India this plant is at times known under the name of *Rat-Ki-Rani*, and in English as Queen of the Night.

Uses : Cultivated in the gardens for its small greenish flowers which are very sweet-scented at night.

DATURA LINN.

Corolla white or slightly purple, 5-toothed, or often double or treble; fruit covered with prickles or tubercles; leaves glabrous covered with a fine 'dusty' bloom

metel

Corolla white, 10-toothed, simple; fruits covered with weak spines; leaves softly pubescent

innoxia

Datura innoxia Mill. Dict. (ed. 8) n. 5. 1768 ; Safford in Ann. Rep. Smithsonian. Inst. 1920 ; 549-550, ff. 3 (2) & 4-5 & t. 2 ; Santapau in JBNHS 47 : 659. 1948. Santapau, Pl. Saur. 570. 1953 ; Gir 247 ; Santapau & Jan. 35. 1967. *Datura metel* Siam in Curtis Bot. Mag. t. 1440, 1812. FBI 4 : 243 ; Cooke 2 ; 273.

A perennial pubescent herb or undershrub, with stems green or purplish hairy. Leaves ovate, acute or obtuse at apex truncate and unequal sides at base ; margins entire or sinuate, pubescent on both sides. Flowers white ; solitary ; pedicels 15-20 mm long, stout, pubescent. Calyx 9-10 cm long, pubescent outside, green tubular 5-toothed. Corolla infundibuliform, 17-20 cm long, white, glabrous outside, puberulous on the inside, 10-toothed. Stamens included, filaments slender, glabrous. Ovary clothed with soft white. Fruit 3-4 cm diam., covered with soft weak spines, irregularly dehiscent. Seeds numerous, pale brown, reniform, minutely foveolate.

Local name : Kalo-dhaturo.

Flowers : May to October.

Occurrence : Rajkot cultivated fields ; Kankai Gir forest, Rajkot Jilla Park, Chotila Hill, Porbandar, common and abundant at some spots.

Uses : The seeds and leaves are narcotic and antispasmodic immediate relief comes after smoking a small quantity of leaves in asthma. The seeds are highly poisonous and have been in use for centuries for criminal purposes. The juice of the plant is believed to be the cure for hydrophobia. (Sutaria 112. 1962)

Datura metel Linn. Sp. 179. 1753 ; Santapau, Pl. Saur. 569. 1953 ; Gir 248 ; Santapau & Jan. 35. 1967. *D. fastuosa* Linn. Syst. Nat. (ed. 10) 2 : 932. 1759 ; FBI 4 : 242 ; Cooke 2 : 343 ; Indraj 527 & 532. 1910.

A herb or undershrub, 75-150 cm tall ; stems terete, glabrous. Leaves broadly triangular-ovate, 9-25 × 6-23 cm acute at apex, truncate at base and unequal-sided, entire at the margins or irregularly dentate, covered with a fine mealy pubescence or glabrous on both sides. Flowers solitary, showy, often double or triple, one corolla issuing from another. Calyx green, tubular, 5-8 cm long, minutely pubescent outside, 5-toothed at the rim, the teeth triangular. Corolla 13-20 cm long, pure white, or more or less tinged with purple, the rim 5-toothed, ovary covered with soft prickles. Fruit nodding, globose, 3-4 cm across, supported on the reflexed base of the calyx, covered with short tubercles, splitting open irregularly. Seeds numerous, reniform, flat, pale brown.

Local name : Kalo Dhaturu.

Flowers : August to October.

Occurrence : It was found from waste lands from Okha sea shore ; Kankai in Gir Forest ; Girnar and Dwarka along railway line.

Uses : Seeds-acrid, bitter, heating, tonic, febrifuge, anthelmintic, alexiteric, emetic, useful in leucoderma, skin-diseases, ulcers, bronchitis, biliousness, jaundice, piles. The whole plant is narcotic, toxic, aphrodisiac ; applied topically it removes pain of tumours and piles. Leaves after heating are applied locally to relieve eye pain, headache, nose-trouble, enlargement of testicles and boils. Root useful in reducing inflammation. [Gaz. A(1) : 88. 1953]

Roots and leaves are applied on swellings and on poisonous stings. Fruits are dried and made into powder, mixed with tobacco is smoked by some local people. It cures asthma. Leaves are bruised and rubbed into ring-worm both in human being and cattle. Leaves mixed with the leaves of *Trianthema monogyna* Linn. are ground and mixed with opium is

applied in rheumatism. Fruits are useful in various skin diseases. This plant is useful in hydrophobia and ague fever also. Leaves are made into Bidi and are smoked in asthma, hiccup and bronchitis. (Indraji 529, 1910).

LYCIUM Linn.

Corolla red or pale rose fading to white; lobes more than half as long as the tube *barbarum*

Corolla pale purple to white; lobes not half so long as the tube *europaeum*

Lycium barbarum Linn. Sp. Pl. 192. 1753 ; FBI 4 : 241 ; Cooke 2 : 342 ; Santapau, Pl. Saur. 572. 1953 ; Santapau & Jan. 35. 1967.

A spiny shrub 3 m high, branches white or grey. Leaves very variable, solitary or in fascicles, 4.5 cm × 6 mm, glabrous. Flowers solitary or in fascicles ; pedicels filiform up to 1.5 cm long. Calyx glabrous, 4-6 toothed ; corolla 1.5 cm, pale rose fading to whitish, glabrous, lobes more than half as long as tube. Stamens exserted, filaments glabrous at the base, anthers orbicular, ovary and style glabrous, stigma mushroom shaped, 2 lamellate. Fruit a bright red berry, 6 mm in diam. Seeds very minutely pitted, orange yellow.

Local name : Khichar, Kohtor.

Flowers : September onwards.

Occurrence : Collected from Dwarka, Jamnagar and Porbander.

Uses : The fresh flowering plant is used as a diuretic in homoeopathy. Berries are considered to possess aphrodisiac properties, they contain zeaxanthin. (W1).

Lycium europaeum Linn. Sp. Pl. 192. 1753 ; Parkar, For. Fl. Punjab 372, 1924 ; FBI 4 : 240 ; Indraji 526. 1910 ; Santapau, Pl. Saur 571. 1953 ; Santapau & Jan. 35. 1967.

A spinous, glabrous or pruinose shrub. Leaves 1.3 cm long, clustered at the joints, linear, oblong, obtuse at the apex, tapering at the base. Flowers solitary or in clusters at the joints. Calyx 3 mm long, often 2 lipped, teeth 5, not enlarging in fruit. Corolla funnel-shaped, lobes 4 - 5, less than half the length of the tube, purplish white or white in colour. Stamens 4 - 5, glabrous at the base. Fruit 4 - 5 mm diam., nearly round, many seeded.

Local name : Khichar, Kagmendi, Kaehuro.

Flowers : November.

Occurrence : Collected from Dwarka, Porbandar, Motwa Matli, Beyt island, and from Okhamandal.

Uses : The plant is browsed by camels and goats. Branches are used in the construction of wattled frames for the walls of huts. (W1).

LYCOPERSICON Mill.

Lycopersicon lycopersicum (Linn.) Airy-Shaw in Willis Dist. ed. 7th, 676. 1966 ; Santapau & Jan. 35. 1967. *Solanum lycopersicum* Linn. Sp. Pl. 185. 1753. *Lycopersicon esculentum* Mill. Gard. Dict, ed. 8. n. 2. 1768 ; FBI 4 : 237 ; Santapau, Pl. Saur. 573. 1953 ; Gir 249.

An annual or perennial herb. Stem terete, pubescent. Leaves 8 - 38 × 5 - 12 cm pinnate or bipinnate, ovate-lanceolate. Flowers in few 10- flowered cymes, peduncles 1 - 7 cm long, pubescent, pedicels 10 - 15 mm long, pubescent. Calyx 5 - 10 mm long, 6 - 10 lobed almost to the base lobes narrowly lanceolate pilose. Corolla lemon-yellow, 10 - 13 mm long. Stamens 5 - 10, almost sessile, staminal column often breaking up into 2 or 3 groups ; anthers appendaged. Ovary glabrous, style slightly exerted. Berry 3 - 8 cm ranging from yellow-red to deep scarlet when ripe. Seeds many, each 3 mm. long, ovoid, flat.

Local name : Tameta.

Flowers : Flowers and fruiting time depends upon the time of cultivation.

Occurrence : Found very commonly in the fields in Saurashtra. Cultivated all over. Spontaneously growing from seeds as weeds. Collected from Jamnagar, Amarjund ; Hadiana ; Jodiya Port ; Dwarka ; Rajkot Pradumna Park ; river bed ; Sasan ; cultivated ; Ranjit Sagar ; Beyt ; Girnar Junagadh Visavadar ; Okha ; Rajkot Jilla Park in wastes ; Dwarka Thar Jungle.

Uses : Fresh ripe fruits are refreshing and appetizing and are consumed raw in salads or after cooking. Unripe fruits are canned. Tomatoes are consumed also in the form of juice, paste, ketchup, sauce, soup and powder. (W1).

Note : Airy-Shaw in Wills Dict. ed. 7th, attributes the name to Karsten. But Karsten produced a tautonym. Airy-Shaw published his name one or more years earlier than Santapau. Therefore credit of the combination should go to Airy-Shaw.

NICOTIANA Linn.

Nicotiana tabacum Linn. Sp. Pl. 180. 1753 ; FBI 4 : 245 ; Cooke 2 : 346 ; Santapau & Jan. 35. 1967.

A viscid-pubescent, stout herb, 1-3 m tall. Leaves 8-30 × 3-15 cm, ovate, elliptic or lanceolate, acute or acuminate at the apex, truncate at the base. Flowers in terminal compound panicles. Pedicels 6-11 mm long. Calyx 12-20 mm long, viscid-pubescent, 5-toothed. Corolla tubular, infundibuliform, puberulent outside, tube and throat greenish or reddish upwards, limb pale to dark pink, 5-lobed. Stamens unequal, 2 exerted 3 inserted. Fruit ovoid, 15-20 mm long, partially included within the fruiting calyx. Seeds globose or elliptic each 0.5 mm in diam., brown, reticulated.

Local name : Tamaku.

Flowers : October.

Occurrence : Cultivated as an economic crop in some parts of Saurashtra.

Uses : Cultivated for its leaves, which are used for bidi, narcotic and sedative.

PHYSALIS Linn.

Corolla not spotted at the base, campanulate-tubular, 6-7 mm long, limb 4-6 mm in diam., anthers yellow

minima

Corolla 5, spotted or brownish coloured at the base, campanulate, 7-12 mm long, limb 8-15 mm in diam., anthers greenish or grey-blue

Plants erect sparingly puberulous or glabrous ; berry distinctly 2 celled acid to taste

longifolia

Plants diffuse, low pubescent-tomentose or viscid-pubescent; berry obscurely 2-celled, fragrant, sweet-acid to taste

peruviana

Physalis longifolia Nutt. in Trans. Amer. Phil. Soc. II, 5 : 193. 1834 ; Santapau in RBSI 16(1) : 290. 1960 ; Santapau & Jan. 36. 1967.

A perennial herb, 1-2 m tall, stem hollow, angular, finely pubescent in the younger parts, glabrescent in the older parts. Leaves ovate or

oblong-ovate, margin subentire or irregularly serrate, apex acute or shortly acuminate; base cuneate sometimes unequal sides, up to 17×10 cm, glabrous above, minutely puberulous beneath, petioles 2-12 cm long. Flowers solitary-pedicels 10-20 mm. long, slender, elongated in fruit. Calyx 3-6 mm long, puberulous outside, calyx lobes triangular, short acuminate; in fruit calyx accrescent straw coloured. Corolla 8-10 mm. long, pale yellow with brown spots at the base inside. Stamens equal; filaments glabrous, yellow; anthers grey or greenish blue. Ovary glabrous. Fruit Subglobose 12-13 mm long, yellow, glabrous. Seeds auriculate, each 1.5 mm long yellow, minutely tuberculate.

Flowers : May to October.

Occurrence : As a weed collected from Rajkot, Pradumna Park, Junagadh, foot of Girnar; Forest College, Junagadh; Junwania, not common; Girnar common. Bileshwar in cultivated field; Tulshishyam in cultivated ground.

Physalis minima Linn. Sp. Pl. 183. 1753; FBI 4 : 238; Cooke, 2 : 340; Indrajit 522. 1910; Santapau, Pl. Saur. 574. 1953; Santapau & Jan. 36. 1967.

An annual herb, upto 75 cm in height. Stem viscid-pubescent, hollow. Leaves ovate or ovate-oblong, acute or shortly acuminate at the apex, cuneate at the base; margins shortly toothed; minutely pubescent on both sides. Flowers solitary pedicels, 6-9 mm long. Caly 3-4 mm long, enlarging up to 2.5 cm in fruit. Corolla 6-7 mm long, pale yellow. Stamens equal, subequal or subspherical, 8 mm long, yellow when ripe. Seeds minutely tuberculate.

Local name : Parpoti, Popati.

Flowers : August to November.

Occurrence : Weed; Joupur; Mangalpur, Jamnagar, Rozi, Bapu's Vav; Ranjit Sagar, Kota; Mithapur; Junagadh, Forest Road, Girnar, Bordevi; Rajkot, Pradumna Park, along river bed; Dwarka, Thar Jungle.

Physalis peruviana : Linn. Sp. Pl. ed. 2, 1670. 1753; FBI 4 : 238; Cooke 2 : 340; Indrajit 523. 1910; Santapau, Pl. Saur. 575. 1953; Santapau & Jan. 36. 1967.

A diffuse perennial, 60-65 cm high. Stem hollow, densely pubescent especially in the younger parts. Leaves ovate, $2.7-8 \times 2-6.5$ cm, acute or shortly acuminate at the apex; truncate at the base, margins shallow lobed; pubescent on both sides. Flowers solitary; pedicels 1-1.5

cm Calyx campanulate, 7-9 mm long, distinctly lobed, lobes equal or subequal, enlarges in fruit to 4.5×2 cm, glabrescent. Corolla campanulate, 12 mm long, yellow with 5 purplish or black spots on the inside at the base. Filaments bluish, anthers green-blue, 3 mm long, ovary glabrous; style white, blue tinged. Fruit yellow or pale orange, $18-27 \times 15-20$ mm. Seeds discoid, each about 2 mm in diam., faintly tuberculate.

Local name : Moti popati.

Flowers : August to November.

Occurrence : Cultivated in the gardens in Porbander.

Uses : Cultivated in the gardens for its edible berries. (Indraji 523. 1910).

SOLANUM Linn.

Plants unarmed; inflorescences subumbellate cymes; flowers all bisexual, corolla white, 12 mm or less in diam; deeply lobed; berry globose, 5-7 mm in diam., black or red

nigrum

Plants armed with prickles :

Herbs :

Inflorescences with 1 perfect flower, or few-flowered, the lowest flower bisexual, all the rest males; berry subglobose or obovate, 5-30 cm long

melongena

Inflorescences with all the flowers bisexual; berry globose, 2-4 cm in diam

surattense

Large shrubs or undershrubs :

Leaves not prickly

gracilipes

Leaves rarely prickly

albicaulae

Leaves prickly :

Calyx enlarged in fruit :

Calyx enlarged and inflated covering nearly entire fruit; fruit glabrous

dubium

Fruiting calyx accrescent, fruit berry

arundo

Calyx not enlarged in fruit :

Inflorescences with the lowest flower bisexual all the rest males; berry 20-25 mm in diam.

incanum

Inflorescences with all flowers bisexual, berry 7-10 mm in diam. :

Erect shrub; prickles straight; leaves ovate-oblong, 4-22 cm long; ovary and style stellate hairy
berry orange

indicum

Trailing or scandent undershrubs; prickles hooked; leaves deltoid-ovate, 1.5-3 cm long; ovary and style glabrous, berry yellow

trilobatum

Solanum albicaule : Kotschy ex Dunal in DC. Prodr. 13 (1) : 204. 1852 ; Heine in Kew Bull. 16 : 204. 1962 ; Cooke : 338 ; Santapau, Pl. Saur. 576. 1953 ; Santapau & Jan. 36. 1967.

A very prickly undershrub ; stem woody, 30 cm or more high ; branches elongate, terete ; prickles numerous, compressed or sometimes conical, very sharp and recurved at the apex from a broad base, usually tomentose in the basal part. Leaves solitary or the upper twin, one of the pair shorter than the other, 1.8 3.7 × 1.4 2.5 cm, variable in shape, ovate-oblong or subpanduriform, acute or obtuse, entire or slightly lobate, softly hairy above, white with dense stellate tomentum beneath, base subcordate, main nerves 2 4 pairs ; petioles 0.6 1.8 cm. long, rarely prickly. Flowers in racemose cymes. Calyx densely woolly-tomentose. Corolla purple, stellately pubescent outside ; tube very short, 0.15 cm long. Filaments very short, almost 0 ; anthers narrowly oblong-lanceolate, 0.6 cm long, opening by small pores. Ovary glabrous ; style glabrous, curved at the top. Berry 0.4 0.6 cm in diam., globose, glabrous, yellow. Seeds 0.3 cm in diam., subreniform, slightly tuberculate.

Flowers : October onwards.

Occurrence : Junagadh ; Mangrol ; Gondal.

Solanum arundo Mattei in Boll. Ort. Bot. Palermo 7 : 188. 1908 ; G. Sen Gupta in Indian For. 89 : 481 482, ff. 1 2. 1963 ; Santapau & Jan. 36. 1967.

A shrub, up to 1.2 m high. Stem terete, rigid, unbranched, hairy, very prickly. Leaves in pairs, unequal in size, 15 32 mm long, 10 20 mm wide, obovate, ovate or elliptic, sinuate repand, acute or obtuse, base rounded or sharply cuneate and decurrent. Somewhat oblique ; lamina thick, fleshy, somewhat undulate ; lateral veins in 3 4 pairs ; both surfaces sparsely stellately pubescent, petiole short 2 5 mm long, hoary tomentose, sometimes prickly. Inflorescence pedunculate, scorpioid cymes, 3 9 flowered, leaf opposed, sometimes apparently terminal ; peduncle 1-2 cm long, erect, hoary tomentose, unarmed. Flowers pedicellate. Corolla

campanulate 16 × 24 mm in diam. White. Fruit a berry, globose, more than 2 cm diam., fruiting calyx accrescent.

Flowers : February.

Occurrence : Coast, on the way to Mangrol from Chorwad Road Station ; and from Porbandar.

Solanum dubium Fresen. in Mus Senckenb. 1 : 166. 1833; Santapau & Jan. 36 1967.

An erect spinous shrubby plant, mealy tomentose, at length glabrous. Leaves 3-7.5 cm long, ovate or ovate-lanceolate, apex acuminate or obtuse, margins wavy or slightly lobed, clothed with stellate tomentum on both surfaces, petioles 1-3.5 cm long. Flowers in leaf opposed, few, flowered cyme. Pedicels and peduncles stellate tomentose, enlarged in fruit. Calyx campanulate, spiny lobes ovate, acuminate. Corolla violet, stellately hairy outside, lobes ovate-lanceolate, acute, reflexed. Stamens 5, one longer than the rest, anthers oblong, obtuse, pore terminal, ovary globose, hirsute at the apex ; style thickened upwards, declinate, hairy at the base. Fruit globose 0.5-1 cm in diam., yellow nearly covered by the inflated spiny calyx.

Flowers : August to October.

Occurrence : Recorded from Dwarka, neighbourhood of station, Okha-Mithapur common along railway line ; Dwarka in open fields ; Okha in open fields near village ; Okhanandal ; Beyt island on sandy slacks.

Solanum gracilipes Decne. in Jacquem. Voy. Bot. 113, t. 119. 1844. FBI 4 : 237 ; Cooke 2 : 338, Santapau & Jan. 36. 1967.

An undershrub, 120-240 cm diam. and 60 cm. tall. Stem ashy-tomentose ; branches sparingly prickly with small, sharp, straight or recurved prickles. Leaves rotund-ovate 1.9-4 cm long, and nearly as broad as long, minutely hairy on both sides, base subcordate or truncate ; petioles slender up to 3.5 cm long. Flowers in extra axillary or subaxillary few-flowered fascicles. Pedicels filiform up to 4.5 cm long. Calyx up to 5 mm, stellately pubescent. Corolla about 1 cm long, deeply lobed. Fruit 6 mm in diam., red, globose, glabrous. Seeds minutely tuberculate.

Flowers : October onwards.

Occurrence : Okha ; Dwarka Beyt, abundant in open fields.

Solanum incanum Linn. Sp. Pl. 188. 1753 ; Cooke 2 : 337 ; Santapau, Pl. Saur. 577. 1953 ; Santapau & Jan. 36. 1967. *Solanum coagulans* Forsk. Fl. Aeg.-Arab. 47. 1775 ; FBI 4 : 236 ; Indrajit 519. 1910.

An erect prickly shrub, densely covered with soft stellate tomentum. Stem prickly, terete. Prickles straight sharp. Leaves 4-10 × 2.6-8 cm, sinuately lobed, acute at the apex, tapering at the base, prickly along the nerves, stellate tomentose on both sides, more densely on the lower side, petioles up to 4 cm long, tomentose, prickly. Flower in few-flowered cyme, peduncles up to 4 cm long, lowest flower bi-sexual, the rest only males. Pedicels 6-10 mm long, minutely prickly. Calyx 5-7 mm long, densely stellately woolly, prickly in the fertile flower. Corolla 12-15 mm long, violet in colour, glabrous; deeply lobed, stellate tomentose outside and inside along the midpetaline bands. Ovary and base of the style stellate, tomentose. Fruit globose, 20-25 mm in diam., yellow, glabrous.

Local name : Ubhi-ringani.

Flowers : October.

Occurrence : Junwania Nes ; Shirwan ; Jumwalla in dry hedges ; outskirts of the Gir, along the main road from Veraval to Sasan ; Sasan along the road to station, Sasan, West to river ford, in hedges, several plants, Mithapur ; Girnar Bordevi ; Junagadh roadside ; Junwania ; Dwarka.

Solanum indicum Linn. Sp. Pl. 187. 1753 ; FBI 4 : 234 ; Cooke 2 : 336 ; Indraj 518. 1910 ; Santapau, Pl. Saur. 578. 1953 ; Santapau & Jan. 36. 1967.

A prickly shrub or undershrub, 1-2 m tall, prickles slightly recurved, thick yellow. Stem prickly, often purple, densely stellate tomentose. Leaves ovate, 4-22 × 2-15 cm, subentire or irregularly dentate ; apex acute ; base cuneate and often unequal-sided, prickly along the nerves ; upper side clothed with simple and stellate hairs ; stellate hairs on the lower side ; petioles 9-14 cm long, prickly hairy. Flowers in 1-8 flowered cymes ; peduncles stellate-hairy ; pedicels 9-14 mm long, stellate hairy, prickly. Calyx 3-4 mm long, stellate hairy, teeth triangular corolla 10-13 mm long, purple in colour ; limb 15-25 mm in diam, stellate, tomentose outside along the midpetaline bands ovary and style stellate-hairy. Fruit globose 7-10 mm in diam., orange, glabrous.

Local name : Moti-ringani, Dorali, Vad-ringani, Ubhibhony-ringani.

Flowers : August to November.

Occurrence : Recorded from Bapu's Veu ; Abhapara top ; Kileshwar rare. Syke's point to Salaya ; Kota 4 km from station of Khambalia port ; Okhamandal.

Uses : Root is carminative and expectorant, useful in coughs and catarrhal affections, dysuria and colic. A decoction of root is prescribed as a tonic and is also used in difficult parturition. Root is pounded and used for the treatment of nasal ulcers. (WI).

Roots are useful in dyspepsia and rheumatism. Dry leaves are smoked to cure asthma and bronchitis. It is also useful for toothache. Root is hot, it cures cough, rheumatism, fevers, leucoderma, anorexia, vomiting, asthma, worms and chest diseases. (Indraji 518. 1910)

Solanum melongena Linn. Sp. Pl. 186. 1753 ; Nees in Trans. Linn. Soc. 17 : 48. FBI 235 ; Cooke 2 : 339 ; Santapau, Pl. Saur. 579. 1953 ; Santapau & Jan. 36. 1967.

A perennial herb, 1 m tall, prickly. Stem terete, prickly, stellate tomentose in younger parts. Leaves ovate or ovate-oblong, irregularly lobed, acute at the apex, truncate or rounded at the base, 5-15 × 3.5-10 cm, stellately tomentose on both sides, prickly along the nerves, petioles 1.5 cm long. Flowers extra-axillary 1-flowered or few-flowered, and sessile, the lowest only perfect nodding. Pedicels 10-25 mm long, stellate tomentose. Calyx campanulate 10-20 mm stellate, tomentose, strongly prickly in the fertile flowers, 5-7 lobed, lobes elliptic ; acute, tomentose on the inner surface. Corolla violate, 20-25 mm long ; tube green glabrous ; limb 25-40 mm in diam., 5-7 lobed, midpetaline bands densely white-stellate-tomentose on both sides. Stamens 5-7 equal. Fruit fleshy berry, variable in size from 4-30 cm in length in cultivation, suborbicular or obovate or pyriform, shining, cream-coloured or streaked with purple or deep purple uniformly. Seeds very small, pale yellow.

Local name : Ringana, Vanatak, Vengana.

Flowers : Mostly depends upon the time of cultivation.

Occurrence : Found under cultivation at Jamnagar jail, Dhunvao, Bapu's Vau, Chotila, Rajkot, Junagadh, Jasadhar. Okhamandal.

Uses : Cultivated as vegetable. It improves appetite, aphrodisiac, enriches blood.

Solanum nigrum Linn. Sp. Pl. 186. 1753 ; FBI 4 : 229. 1883 ; Cooke 2 : 332 ; Indraji 516. 1910 ; Santapau, Pl. Saur. 580. 1953 ; Santapau & Jan. 36, 1967.

Annual herb, unarmed, variable in appearance. Stem divaricately branched, minutely puberulous or glabrous. Leaves 3-15 × 1.5-9 cm,

lanccolate-ovate or ovate-elliptic, acute or obtuse at the apex ; base tapering into the petiole, minutely puberulous on both sides, at length glabrous. Petioles 0.5 - 8 cm long. Flowers 3 - 8 in extra-axillary subumbellate cymes, peduncles 7 - 17 cm, pedicels 5 - 10 mm slender. Calyx 1.5 - 3 mm long, 5 lobed, lobes ovate, obtuse. Corolla white 4-9 mm long, tube green, limb 5 - 13 mm in diam., puberulous outside, lobes oblong, acute ; ovary globose, glabrous. Fruit globose, 6 - 8 mm in diam., deep-red or black when ripe. Seeds discoid, each 1-1.5 mm long, yellow, minutely pitted.

Local name : Pihudi, Kangani.

Flowers : May to October.

Occurrence : Recorded from Dhunvav ; Ranjit Sagar ; Vijarkhi lake ; Beyt ; Chotila ; Morvi ; Sasan ; Girnar ; Visavadar ; Dwarka not common, and Rajkot Jilla Park.

Uses : Roots are useful in various skin diseases. Juice of the plant is applied on all sorts of swellings. Whole plant is pounded with the leaves of *Datura* and is tied on the bubonic plague. Fruits are tonic, it has been used as diuretic and diaphoretic for a long time. It is also useful in fevers and diarrhoea. Fruit juice is applied on hydrophobia. This plant cures swellings, angina pectoris, cough, piles, hiccup, it improves voice and cures mental diseases. (Indraji 516. 1910)

Solanum surattense Burm. f. Fl. Ind. 57. 1968 (excl. Syn. Pluk. et Raj.). Santapau in Bull. Bot. Surv. Ind. 3 (1) : 20. 1961 ; Santapau & Jan. 36. 1967. *S. xanthocarpum* Schrad & Wendl. Sert. 1 : 8, t. 2. 1795 ; FBI 4 : 236 ; Cooke 2 : 335 ; Indraji 520. 1910 ; Santapau, Pl. Saur. 581. 1953.

A very prickly diffuse bright-green herb, prickles yellow, sharp, straight, compressed. Leaves ovate or elliptic, 3 - 14 × 2 - 8 cm, acute at the apex, truncate at the base, stellately hairy on both sides, prickly along the nerves, irregularly lobed, petioles 3 - 6.5 cm long, stellate hairy. Flowers in extra-axillary few-flowered cyme, peduncles prickly ; pedicels 8 - 15 mm long, stellately hairy, prickly. Calyx campanulate, 6 mm long, densely hairy, prickly, lobes ovate-oblong. Corolla purple, 18 mm long, lobes triangular hairy outside. Fruit globose 20 - 25 mm in diam., yellow. Seeds subreniform, each 2 mm in diam., minutely foveolate.

Local name : Bhoyn-ringani.

Flowers : May to November.

Occurrence : Collected from various places in Saurashtra, Dhunvau ; Kabrastan ; Hadiana ; Vijarkhi lake, Bapu's Vau ; Abhapara top ; Kota ; Syke's point Salaya ; Jodiya port on stony ground ; Ghumli ; Rajkot lakes

and Pradumna Park ; Gondal lake ; Chotila ; Mangrol ; Junagadh ; Sasan ; Jamwalla ; Mithapur ; Dwarka ; Rajkot railway line ; Okha ; Rozi on rubbish heaps near village ; common at Ranjit Sagar ; Motwa Matli, Rajkot along river bed. Abundant at Bhavnagar lake.

Uses : Whole plant is ground and boiled in milk and ghee and is used against chest diseases. Fruits are useful for toothach. Roots are reported to be appetiser. It cures cough, rheumatism, fevers, asthma, bronchitis and colds. Fruit cures leucoderma, cough and rheumatism. (Indraji, 521, 1910)

Solanum trilobatum : Linn., Sp. Pl. 188, 1753 ; FBI 4 : 236 ; Cooke 2 : 337 ; Santapau & Jan. 36. 1967.

A large prickly undershrub. Stems prickly pubescent, later glabrescent. Leaves 1.5 - 3 × 1 - 3 cm, broadly ovate, irregularly sinuate, apex acute or obtuse, base truncate at times unequal sides, densely stellately-tomentose on both sides, petioles 5 - 20 mm long, pubescent, prickly. Flowers in umbellate cymes. Peduncles short. Pedicels 10 - 17 mm long, prickly. Calyx infundibuliform, 3 - 4 mm long. Corolla violet, 11 - 15 mm long, stellately hairy outside. Ovary ovoid or subglobose, glabrous. Fruit a berry about 10 mm in diam., scarlet when ripe, glabrous. Seeds minutely pitted, each 3 mm in diam.

Flowers : May to November.

Occurrence : Okhamandal.

WITHANIA Pauquy

Withania somnifera (Linn.) Dunal. in DC. Prodr. 13(1) : 458. 1852; FBI 4 : 239 ; Cooke 2 : 341 ; Indraji 523. 1910 ; Santapau, Pl. Saur. 582, 1953 ; Santapau & Jan. 36. 1967. *Physalis somnifera* Linn. Sp. Pl. 182. 1753.

An erect branched undershrub, covered with stellate ashy-tomentum. Leaves ovate or ovate-lanceolate, apex obtuse ; base rounded ; 2.7 - 6 × 1.7 - 2.5 cm, ashy tomentose on both sides. Petioles up to 20 mm long. Flowers 3 - 10 in axillary fascicles. Pedicels 2 mm long. Calyx 5 mm long, tomentose outside 5-toothed. Corolla tubular, yellow, about 7 mm long. Stamens equal ; anthers yellow. Ovary glabrous. Fruit loosely enclosed within the accrescent calyx, subglobose, 6 mm. in diam., green turning red, glabrous. Seeds discoid, each 2 mm in diam., minutely foveolate.

Local name : Ghodakum, Asandh, Ghoda-asun.

Flowers : August to October.

Occurrence : Recorded from Jamnagar ; Balachari ; Ranjit Sagar ; Kota ; Rajkot Pradumna Park ; Bhavnagar ; common at Dwarka along railway line and at Rajkot Jilla Park, rare.

Uses : Roots are useful in plague, leaves are applied on wounds. Root is regarded as tonic, alternative, aphrodisiac and is used in consumption, rheumatism, lumber pains. It is a narcotic. (Indraji 523. 1910)

SCROPHULARIACEAE

Leaves alternate

Verbascum

Leaves the lower at least, if not all, opposite :

Corolla spurred or subsaccate at the base in front ;
capsule opening by pores :

Corolla spurred ; anther-cells distincta

Kickxia

Corolla subsaccate ; anther-cells confluent above

Schweinfurthia

Corolla not spurred nor subsaccate ; capsule dehiscing by
valves :

Corolla with upper lip or 2 upper lobes outermost, and
lower lobes innermost in bud :

Corolla elongate, tube cylindric with more or less ex-
panded throat; limb with subequal lobes or 2-lipped ;
stamens 4 or 2 :

Stem 4, inserted within the corolla tube :

Corolla lobes rounded subequal :

Anther-cells contiguous though distinct, parallel ;
capsule septicidal and loculicidal

Bacopa

Anther-cells divaricate ; confluent 1-locular ;
capsule septicidal

Russelia

Corolla distinctly 2-lipped :

Placentas either separating in fruit or if conjoined in
a column, the column not winged ; seeds terete

Stemodia

Placentas always conjoined in a column, which is
winged by the remains of the septa ; seeds angular,
usually truncatate

Limnophila

- Stamens 2 perfect, the lower pair reduced to staminodes, all inserted in the corolla tube *Dopatrium*
- Stamens if 4, the lower pair; if 2, the staminodes inserted in the corolla-throat; the upper or only perfect pair inserted in the corolla-tube *Lindernia*
- Corolla small; tube very short; stamens 2 *Peplidium*
- Corolla with upper lip or 2 upper lobes innermost and lower lobes outermost in bud; stamens 4
- Calyx tubular, 5-toothed or 5-fid:
- Corolla-tube straight or nearly so; lobes subequal, lower leaves much larger than the upper *Buchnera*
- Corolla-tube abruptly incurved at or above the middle, 2 upper lobes smaller than the others; lower leaves not much larger than the upper *Striga*
- Calyx campanulate, 5-fid or 5-lobed:
- Anthers 2-celled, one of the cells barren; leaves always pinnatisect, corolla-tube short with dilated throat *Sopubia*
- Anthers 2-celled, both cells fertile; leaves toothed, not pinatisect *Lindcubergia*
- Calyx spathaceous, split down the front *Centranthera*

BACOPA Aublet (nom. cons.)

- Corolla campanulate, outer sepal ovate, 2-3 times wider than the inner-most sepal, leaf blades cuneate, rounded, 1-veined, prostrate or creeping plant *mouneri*
- Corolla zygomorphic; outer sepal rotund, more than 4 times wider than the innermost; leaf blades linear-lanceolate; attenuate to an obtuse apex, pinnately veined; erect plants *floribunda*

Bacopa floribunda (R. Br.) Wettst. in Engl. & Prantl. Pfam. 4(36) : 76. 1891; Santapau, Pl. Saur. 583. 1953; Saldanha 1 : 72. 1963; Santapau & Jan. 36. 1967. *Herpestis floribunda* R. Br. Prodr. 442. 1810; FBI 4 : 273; *Moniera floribunda* Cooke, Fl. Pres. Bomb. 2 : 357. 1904.

An erect herb, 7-30 cm high. Stem subquadrangular, glabrous. Leaves sessile, up to 2.8 cm long, linear, acute. Flowers axillary, 1-3 together. Bracteoles 2, subulate, inserted on the pedicel little below the calyx. Pedicel slender, up to 0.5 cm long. Calyx puberulous, outermost sepal largest, ovate, reticulately veined, the two inner-most sepals linear-lanceolate.

Flowers : December to April.

Occurrence : Recorded from Ghumli, Abhapara top and Jamnagar.

Bacopa monnieri (Linn.) Wettst. in Engl. & Prantl, Pflanzenfam. 5(36) : 77. 1891 (Monniera), Santapau in JBNHS 49: 29. 1959 ; Santapau, Pl. Saur. 584. 1953 ; Saldanha, 1 : 73. 1963 ; Santapau & Jan. 36. 1967. *Lysimachia monnieri* Linn., Cent. Pl. 2 : 9. 1756. *Herpestis monniera* Benth., Scrop. Ind. 30. 1835 ; FBI 4 : 272 ; Indrajit 536. 1910.

A creeping much-branched herb, rooting at the nodes. Leaves 0.4-2.8 cm long, obovate-oblong or spatulate, lower surface dotted. Flowers axillary, solitary, pedicels slender up to 2.5 cm long. Bracteoles 2, linear, acute, 0.5 cm long. Calyx glabrous, unequal outermost sepal about 6 mm long, ovate ; 2 lateral sepals shorter than the outer sepal, ovate, acute ; 2 innermost sepals narrow, lanceolate and acute. Corolla bluish in colour, lobes subequal, glistening with shining dots when fresh. Stamens 4, included, anthers bluish-purple. Fruit ovoid, acute, 0.4 cm long, glabrous. Seeds many, oblong, striate.

Local name : Bam, Jalnevari, Kadvi-luni.

Flowers : January to May.

Occurrence : Recorded from Dhunvav in wet ground rare ; Jamnagar in river, Ranjit Sagar, Vijarkhi lake, wet ground ; Kota ; Rajkot, river bed ; Junagadh in large patches ; in river bed ; Gondal, near water ; Girnar in dense patches near water Billeshwar ; Dwarka very abundant near talao ; Junagadh very abundant in river bed ; Sasangir not abundant, in water ; Rajkot Jilla Park, in large patch near river.

Uses : Leaves mixed with black pepper is given in fever. An infusion of dried plant is given in rheumatism and in chronic indigestion. Kadavi luni is an effective drug in constipation and urinary diseases. It is a purgative. It cures poisonous stings. (Indrajit 537. 1910)

BUCHNERA Linn.

Buchnera hispida Buch.-Ham. ex D. Don. Prodr. Fl. Nepal 91. 1825 ; FBI 4 : 298 ; Cooke 2 : 373 ; Santapau, Pl. Saur. 585. 1953 ; Saldanha 1 : 313. 1963 ; Santapau & Jan. 36. 1967.

An erect herb, 15-60 cm high, hispid. Stem slender, hairy. Leaves sessile or tapered into a more or less obscure petiole. Upper leaves narrow, linear-lanceolate, passing into floral bracts. Lower leaves crowded obovate or oblong, 2.5-5 cm long. Flowers sessile, axillary forming a terminal spike, bracts linear, lanceolate, bracteoles subulate hispid. Calyx

tubular, hispid, up to 6 mm long. Corolla pale purple in colour, tube nearly 8 mm long, corolla hairy inside, glabrous outside, lobes obovate or obtuse. Stamens 4, included, anthers black. Fruit capsular oblong. Seeds minute, black.

Flowers : October.

Occurrence : Recorded from Jamnagar, Laloi 7 km khatia in grass-land.

CENTRANTHERA R. Br.

Centranthera indica (Linn.) Gamble, Fl. Madras, 971. 1924 ; Saldanha, 1 : 255. 1963 ; Santapau, Pl. Khandala 184. 1967. *Rhinanthus indica* Linn. Sp. Pl. 603. 1753. *Centranthera hispida* R. Br. Prodr. 438. 1810 ; FBI 4. 301 ; Cooke. 2 : 381. *C. nepalensis* Don., Prodr. 88. 1825 ; Santapau, Pl. Saur. 586. 1953 ; Santapau in RBSI 16(1) : 164. 1960 ; Santapau & Jan. 36. 1967.

Annual erect herbs. Stem 4 angled, hirsute, with spreading or ascending hairs. Leaves sessile, oblong to linear elliptic, hispid with tuberculate hairs, opposite below, alternate above. Flowers subsessile, axillary, solitary or forming lax spikes. Bracts 2, linear, just below calyx. Calyx spathaceous, split on lower sides, 3-5-toothed on upper side, hirsute. Corolla infundibuliform, white, yellow or tinged with pink or purple, 1.5-2.5 cm long ; tube elongated, narrow at base, dilated above, limb obscurely 2-lipped, subequally 5-lobed. Stamens 4, didynamous ; filaments usually villous ciliate. Ovary oblong-ovoid ; Capsule oblong ; included, loculicidal ; seeds numerous, minute, light brown.

Flowers : November.

Occurrence : Recorded from Jamnagar, Ranjit Sagar, abundant locally on moist grassy ground.

Uses : It is reported to be used in fevers and as an external application for sore eyes. (WI)

DOPATRIUM Buch.-Ham. ex Benth.

Dopatrium junceum (Roxb.) Buch.-Ham. ex Benth. Scroph. Ind. 31. 1835 ; FBI 4 : 274 ; Cooke 2 : 363 ; Blatt. & Hallb. in JBNHS 26 : 425 ; Saldanha, 1 : 126. 1963 ; Santapan & Jan. 36. 1967. *Gratiola juncea* Roxb. Pl. Cor. 2 : 16, t. 129. 1800.

A somewhat fleshy herb, glabrous, branching at the base, 15-30 cm high. Stem swollen and spongy below. Leaves opposite, sessile, lower

leaves oblong, obtuse 1.3-2.5 cm long. Upper leaves much smaller, bract like. Flowers axillary, opposite, distant, sessile or shortly pedicellate, pedicels slender, erect in fruit. Calyx tubular, 5-fid, segments oblong, obtuse. Corolla-bilabiate, lower lip broadly 3-lobed; upper lip bilobed. Stamens 2, anthers yellow, staminodes; fleshy hairs present near the base of the stamens and staminodes. Style short, stigma broad, almost flat on top. Fruit globular, glabrous, about 0.25 cm in diam. Seeds ellipsoid, strongly longitudinally ribbed; transversely rugose.

Flowers : August onwards.

Occurrence : Okhamandal, Junagadh, Girnar hill in puddles on rocky plateaux.

KICKXIA Dum.

Kickxia ramosissima (Wall.) Janch. in Oest. Bot. Zeit. 82 : 152. 1933; Sautapau in JBNHS 49 : 27. 1950; Santapau, Fl. Saur. 587. 1953; Saldanha, 1 : 261. 1963; Santapau & Jan. 36. 1967. *Linaria ramosissima* Wall. Pl. As. Rar. 2 : 43; t. 153. 1831; FBI 4 : 251; Cooke 2 : 353; Indrajii 534. 1910.

A perennial herb, much branched, branches terete, slender, glabrous. Leaves very variable, alternate, triangular, hastate, upper usually lanceolate, sagittate, petioles 6-12 mm long, filiform. Flowers axillary, solitary, pedicels filiform, 1.25-4 cm long. Calyx divided nearly to the base, segments linear-lanceolate, up to 5 mm long. Corolla yellow, spurred; up to 12 mm long. Stamens 4 included, ovary subglobose, style stout. Fruit a capsule, ovoid. Seeds minute, spinulose.

Local name : Kanoti, Bhintghilodi.

Flowers : May to November.

Occurrence : Recorded from Amarjund on old wall, on roofs of temple; Laloi grass fields; Barda Hill, rare; Abhapara top on the road in dense masses; Kileshwar on rocks, not common; Kota near water; Rajkot along river bed; very abundant on rocky banks, erect bushy; Rajkot, Pradumna Park, rare; Junagadh, rare; Dwarka railway line; Sasan, on earth banks of river; Somnath, abundant near old temple walls; Beyt on vertical earth banks.

Uses : The plant is very highly valued as a remedy for diabetes. Roots and leaves are effective on snake-bite. The plant is grounded and tied on wounds as a poultice. Leaves mixed with black pepper is given in fevers. (Indrajii 535. 1910)

LIMNOPHILA R. Br.

Limnophila indica (Linn.) Druce in Rep. Bot. Exch. Club. Soc. Brit. Is. 3 : 420. 1914 ; Pennell, Scroph. West. Himal. 26. 1943 ; Santapau in JBNHS 49 : 34. 1950 ; Santapau, Pl. Saur. 588. 1953 ; Saldanha 1 : 107. 1963 ; Santapau & Jan. 36. 1967. *Hottonia indica* Linn., Syst. Nat. (ed. 10) 919. 1759. *Limnophila gratioloides* R. Br. Prodr. 442. 1810 ; FBI 4 : 271 ; Cooke 2 : 362. *L. racemosa* Benth., Scroph. Ind. 26. 1835 ; FBI and Cooke loc. cit.

An aquatic herb, having a strong smell of turpentine, stem much branched, pubescent or hirsute, rooting from the base. Leaves whorled upper opposite, sessile, oblong-lanceolate, margins serrate, glabrous, strongly 3-5 nerved. Lower leaves capillaceo-multifid, submerged. Flowers solitary, axillary or in terminal racemes. Pedicels 0.4 cm to 1.7 cm long, filiform. Calyx membranous, 5-partite, segments glabrous, linear, acute or acuminate. Corolla 0.9-1.3 cm long, blue or pale violet or whitish with purple lilac spots on tip, bilabiate. Stamens 4, included. Fruit enclosed in the membranous calyx, subglobose, about 0.5 cm long. Seeds minute, truncate at both ends.

Local name : Turati.

Flowers : October to November.

Occurrence : Kileshwar, common Junwania in stream abundant ; Shirwan in water ; Tulsishyam rare ; Junwania in moist soil near water ; Sasan nursery beds ; Sasan down near river ; Gondal, Okhamandal and Modpur vidi.

Uses : The liniment made from the plant is used in elephantiasis.

Note : H. Santapau in Journ. Bomb. Nat. Hist. Soc. 49 : 34. 1950 has included both *L. racemosa* Benth. and *L. gratioloides* R. Br. and several intermediate varieties under *L. indica* (L.) Druce after examination of the literature and the Indian specimens preserved at Kew. He has merged all the species on the basis of the character of the calyx. He found no constant distinction between pubescent and glabrous form of the calyx in the specimens preserved at Kew, and the other character of the strong scent of turpentine, which is present in both the species in a greater or lesser degree.

LINDENBERGIA Lehm.

Calyx densely villous, lobes oblong obtuse
Calyx hirsute, lobes acute

muraria
macrostachya

Lindenbergia macrostachya (Benth.) Benth. Scroph. Indicae 22. 1835 ; Francis W. Pennell, Mon. No. 5, Scroph 25. 1943 ; FBI 4 : 262 ; Santapau & Jan. 36. 1967. *Stemodia macrostachya* Benth. in Wall. Number. List Spec. Ind. Mus. n. 3925. 1831.

Glabrate or pubescent, stem strict erect stout or slender. Leaves elliptic-ovate, serrate glabrous, flowers unilateral in rigid erect dense or lax-fid. Spikes, corolla yellow, calyx longer than the bracts, lobes short acute, ovary pubescent.

Flowers : April to May.

Occurrence : Junagadh, foot of Girnar.

Lindenbergia muraria (Roxb. ex D. Don) P. Bruehl in Journ. Dept. Sci. Cal. Univ. 2 (Bot.) 27. 1920 ; Saldanha, 1 : 270. 1963. *Stemodia muraria* Roxb. ex D. Don, Prodr. Fl. Nep. 89. 1825. *Dodartia indica*. Linn. Sp. Pl 633. 1753. *Lindenbergia urticaefolia* Lehm. in Link & Otto, Icon. Pl. Rar. Hort. Berol. 95, t. 31. 1828 ; FBI 4 : 262 ; Cooke 2 : 379 ; Indrajai 535. 1910. *Lindenbergia indica* (Linn.) O. Ktze. sensu Santapau & Jan. 36. 1967.

An erect herb, very variable, sometimes reaching up to 1.25 m high, glabrous or densely glandularly villous. Leaves ovate, elliptic, margin crenate-serrate, glandularly villous or softly villous on both sides or entirely glabrous. Flowers in densely leafy racemes or solitary axillary. Pedicels 0 or very short. Calyx 0.6 cm long, densely villous, lobes oblong obtuse. Corolla yellow in colour, more or less hairy outside, about 1.25 cm long. Stamens 4, included. Ovary ovoid. Fruit pubescent, about 0.6 cm long.

Local name : Patthar-chatti, Bhint-chatti.

Flowers : May to November.

Occurrence : Recorded from Dhunvav ; Amarjund ; Hadiana ; Ranjit Sagar ; Khatia ; Laloi ; Kileshwar ; *Kota Motwa-Matli ; Rajkot Pradumma Park ; Junagadh ; Gondal, Chotila ; Girnar, Bordevi ; Shirwan ; Kankai ; Junwania, Sasan ; Junagadh ; Rajkot river, Jilla Park in cultivated fields on walls of earth banks, on dry rocks.

Uses : Whole plant is boiled in water and vapour bath given in fever. The juice is given in chronic bronchitis. (Indrajai 535. 1910)

LINDERNIA Allioni

Capsule about equalling the calyx or shorter :

Flowering calyx cleft to the middle or less *crustacea*

Flowering calyx to the base or nearly so *multiflora*

Capsule twice as long as calyx or longer *parviflora*

Lindernia crustacea (Linn.) Muell. Syst. Cens. Auster. Pl. 97. 1882 ; Mukerjee in Journ. Ind. Bot. Soc. 24 : 130. 1945 ; Santapau in JBNHS 49 : 37. 1950 & in Rec. Bot. Surv. Ind. 16 (1) : 203. 1953 ; Santapau, Pl. Saur. 590. 1953 ; Saldanha, 1 : 163. 1963 ; Santapau & Jan. 36. 1967. *Capraria crustacea* Linn. Mant. 87. 1767. *Vandellia crustacea* Benth. Scroph. Ind. 35. 1835 ; FBI 4 : 279 ; Cooke 2 : 366.

An annual herb ; stem diffused glabrous 10-46 cm high, sparsely hairy. Leaves 0.5-2.5 cm long, ovate, entire or serrate, petioled. Flowers axillary, terminal ; pedicels 1.5-3.75 cm long, slender. Calyx 4-5 mm long, 5-ribbed, divided 1/4 way down, teeth triangular, acute. Corolla purple with white throat. Fruit ovoid, equalling or shorter than the calyx. Seeds ovoid with minute tail at one end, pale yellow, granulate.

Flowers: August to October.

Occurrence : Collected from Junagadh, on hill forming dense mass ; Bordevi ; Junwania near water ; Sasan in rice field ; Sasan in cultivated fields ; Sasan down in moist soil ; Girnar in moist spots ; Girnar Junagadh abundant in open roads in moist spots.

Uses : The plant is reported to contain a bitter principle. It is used for bilious affections and dysentery in Indo-China. Elsewhere it is used in poultices for boils, sores, ringworm and itches. (WI)

Lindernia multiflora (Roxb.) Mukerjee in Journ. Ind. Bot. Soc. 24 : 131. 1945 ; Saldanha 1 : 174. 1963 ; Santapau & Jan. 37. 1967. *Torenia multiflora* Roxb. Fl. Ind. 3 : 96. 1832. *Vandellia multiflora* G. Don. Gen. Syst. 4 : 549. 1838 ; FBI 4 : 280.

A glabrous herb, Leaves opposite, sessile or shortly petioled, oblong, ovate-oblong, obtuse, entire or sinuate. Flowers in terminal racemes, bracts minute, pedicels up to 7 mm long. Calyx cleft to the base, lobes lanceolate, acuminate, shorter than the capsule. Corolla white, bilabiate. Stamens 4, all perfect. Style slender, stigma bilamellate. Fruit 3-4 mm long, ovate equalling or slightly longer than calyx.

Flowers : October.

Occurrence : Recorded from Sasan Gir to Junwania, on moist part of path in dense forest.

Lindernia parviflora (Roxb.) Haines, Bot. Bih. & Or. 635. 1922 ; Mukerjee 132. 1945 ; Saldanha, 1 : 195. 1963 ; Santapau & Jan. 37. 1967. *Gratiola parviflora* Roxb. Pl. Cor. 3 : 3, t. 203. 1811. *Hysanthes parviflora* (Roxb.) Benth. in DC. Prodr. 10 : 419. 1846 ; FBI 4 : 283 ; Cooke 2 : 368.

A herb about 15 cm high. Leaves ovate lanceolate, sessile, obtuse, entire. Flowers axillary or in terminal racemes. Pedicels slender 0.6 to 1.8 cm long. Calyx 5 partite, deeply divided, lobes linear lanceolate, 1 nerved, acute. Corolla white or blue, bilabiate. Stamens 2, perfect, 2 staminodes. Fruits ovoid oblong, acute, about 4 mm long. Seeds many rugose.

Flowers : October.

Occurrence : Collected from Sasan Gir to Junwania in moist part of path in dense forest.

PEPLIDIUM Delile

Peplidium maritimum (Linn. f.) Aschers. in Schweinf. Beitr. Fl. Aethiop. 275, 306. 1882 ; Aschers & Schweinf. Illustr. Fl. Egypt 116. 1887. Santapau in JBNHS 49 (1) : 41. 1950 ; Raizada et Sharma, Ind. For. 88 (5) : 365. 1962 ; Saldanha 1 : 236. 1963 ; Santapau & Jan. 37. 1967 ; Bhandari in Fl. Indian Desert. 284. 1978. *Hedyotis maritima* Linn. f. Suppl. 119. 1781. *Peplidium hamifusum* Del. Descr. Egypt. 148, t. 4, 1812 ; FBI 4 : 287.

A prostrate herb, rooting at nodes, submerged or floating. Leaves fleshy, opposite, obovate, 0.3-0.6 cm long, base tapering into a short obscure petiole. Flowers solitary, axillary. Peduncles very short or sometimes 0. Calyx thinly membranous, up to 0.25 cm long, teeth 5, very short, obtuse. Corolla tube included in the calyx, 5 lobes, subequal. Stamens 2, included capsule globose, enclosed in enlarged membranous calyx, opening irregularly.

Flowers : October.

Occurrence : Mithapur in moist soil near pond.

RUSSELLIA Jacq.

Russelia equisetiformis Schl. & Cham. in Linnæa 6 : 377. 1831 ; Santapau, Pl. Saur. 591. 1953 ; Santapau & Jan. 37. 1967 ; Stewart, Fl. W. Pakistan 659. 1972. *Russelia juncea* Zucc. in Flora 15. 1832.

A very beautiful plant cultivated in gardens, 1-1.25 m high, glabrous, branches rush-like, drooping. Leaves linear, lanceolate or ovate, mostly reduced to minute bracts. Flowers 2.5 cm long, very numerous, scarlet, peduncles elongate, 1-3 fid.

Local name : Rasili.

Flowers : October.

Occurrence : Collected from Bhavnagar gardens, cultivated.

SCHWEINFURTHIA A. Br.

Schweinfurthia papilionacea (Linn.) Merrill. in Phil. Journ. Sci. 19 : 330. 1921 ; Bhandari in Fl. Indian Desert. 284. 1978. *Antirrhinum papilionaceum* Linn. Mant. 1 : 86. 1767. *Linaria sphaerocarpa* Benth. in DC. Prodr. 10 : 287. 1846. *Schweinfurthia sphaerocarpa* (Benth.) A. Braun. in Monatsb. Akad. Wiss. Berl. 875. 1866 ; FBI 4 : 252. Cooke 2 : 354 ; Indrajai 534. 1910 ; Santapau, Pl. Saur. 592. 1953 ; Santapau & Jan. 37. 1967.

A herb about 30 cm high. Stem glabrous. Leaves fleshy variable, elliptic or ovate or spatulate, 1.25-2.5 cm long, base attenuate. Flowers axillary. Calyx 5 partite, enlarged in fruit, upper sepal broadly ovate, acute, other sepals lanceolate, acute. Corolla dirty white, filaments hairy at the base. Fruit obliquely globose, 6-8 mm in diam. Seeds many, each about 2 mm long, truncate at both ends.

Local name : Sanepat.

Flowers : December.

Occurrence : This plant is given on the authority of Indrajai.

Uses : Used medicinally. The drug consists of the fruit broken up into small pieces along with the powdered leaves and portions of stem ; it is said to be slightly bitter with a tea-like taste. It is prescribed in prolonged fevers of the enteric group. It is also considered to be tonic and diuretic. As powder it is used as snuff to stop bleeding in the nose. Leaves are said to be used in the treatment of diabetes. (W1)

This plant is given during delirium, and hence perhaps the local name. (Indrajai 534. 1910)

SOPUBIA Buch. Ham.

Sopubia delphinifolia (Linn.) G. Don, Gen. Syst. 4 : 560. 1837 ; FBI 4 : 302 ; Cooke 2 : 378 ; Santapau, Pl. Saur. 593. 1953. Saldanha, 1 : 287. 1963 ; Santapan & Jan. 37. 1967. *Gerardia delphinifolia* Linn. Cent. Pl. 2 : 21. 1756 ; Roxb. Pl. Cor. 1. t. 90. 1795.

An erect branched herb, up to 1 m high. Stem grooved, quadrangular, often spotted with purple. Leaves opposite 2.5-5 cm long, pinnatisect, segments filiform, uppermost passing into bract. Flowers axillary, solitary or in long racemes, bracteoles little below the calyx, filiform. Calyx campanulate, glabrous, strongly ribbed, teeth linear-subulate. Corolla about 3.8 cm long, rose-coloured. Stamens 4, filaments hairy. Fruit 0.6-0.8 cm long, oblong. Seeds numerous, oblong, striate, cuneate at one end. It is a parasite.

Flowers : August to October.

Occurrence : Collected from Ranjit Sagar in grass fields. Parasitic on grass roots.

Uses : The juice of the herb is applied to heal sores on feet caused by exposure to moisture. (WI)

STEMODIA Linn.

Stemodia viscosa Roxb. Pl. Cor. 2 : 33, t. 163. 1802 ; FBI 4 : 265 ; Woodrow in JBNHS 12 : 174. 1878 ; Cooke 2 : 359 ; Santapan, Pl. Saur. 594. 1953 ; Saldanha, 1 : 117. 1963 ; Santapan & Jan. 37. 1967.

A viscidly pubescent perennial herb, aromatic. Leaves sessile, 1.5-4.3 cm long, oblong, acute, serrate or serrulate, base cordate or amplexicaule. Flowers axillary, solitary or in terminal racemes. Pedicels filiform up to 8 mm long. Bracteoles 2, linear-subulate, 2 mm long. Calyx 5-partite, sepals narrow, lanceolate, glandularly hairy, ciliate. Corolla glabrous, blue or violet in colour, bilipped, up to 8 mm long. Stamens 4, included, ovary glabrous. Fruit, ovoid-oblong, acuminate. Seeds minute, ellipsoid.

Local name : Nukachuni.

Flowers : October.

Occurrence : Recorded from Ranjit Sagar, Jamnagar and Ghumli. Woodrow reports it from Veraval.

Uses : The dried plant is fragrant.

STRIGA Lour.

Calyx 4-5 ribbed :

Parasitic on roots, leaves scale-like

gesneroides

Not parasitic, leaves linear not scale-like

densiflora

Calyx 10 - ribbed :

Flowers yellow

asiatica

Flowers white

asiatica var. *albiflora*

Calyx 15 - ribbed

angustifolia

Striga angustifolia (D. Don) Saldanha in Bull. Bot. Surv. India 5 : 70, 1963 ; Santapau & Jan. 37, 1967. *Buchnera angustifolia* Don, Prodr. Fl. Nepal. 91, 1825. *B. euphrasioides* auct. non Vahl, 1794 ; Benth. Scroph. Ind. 41, 1835. *Striga euphrasioides* Sensu Bentham, excl. basionym ; Benth. in Hook. Comp. Bot. Mag. 1 : 364, 1836 ; FBI 4 : 299 ; Cooke 2 : 376 ; Santapan in RBSI 16(1) : 164, 1960.

An annual herb, 15 - 60 cm high, parasitic. Leaves linear, sessile, scabrous, 1.4 to 5 cm long, entire or 1 - 2-toothed, acute. Flowers solitary, axillary, sessile or shortly pedicellate, in lax erect spike or raceme, upper bracts linear to subulate ; lower bracts leaflike, longer than the calyx, bracteoles linear, 0.3 - 0.6 cm long, Calyx 5 fid, strongly 15 nerved, calyx teeth equalling the tube, teeth linear, acute, enlarging in fruit. Corolla white, densely pilose, bilabiate ; upper lip much shorter than the lower lip. Stamens 4, didynamous. Fruit ovoid, apiculate, about 0.7 cm long.

Local name : Dholo-agiyo.

Flowers : October - November.

Occurrence : Recorded from various places in Saurashtra, Dwarka near station ; Rajkot, Pradumna Park and Public Park, Gondal irrigation lake and dam ; Ghumli ; Ranjit Sagar, Jamnagar ; Shirvao, Gir Forest, Sasan Iran river up stream ; cattle farm, Junagadh ; Joupur vidi. Rather large plants growing among grasses on rocky ground. Also abundant on moist sides of lake among grasses but smaller.

Striga asiatica (Linn.) Kuntze, Rev. Gen. Pl. 2 : 466, 1891 ; Saldanha 1 : 327, 1963 ; Hepper, Rhodora 76 : 46, 1974. Saldanha & Nicolson in Fl. Hassan Distr. 526, 1976. *Buchnera asiatica* Linn. Sp. Pl. 630, 1753. *Striga lutea* Lour. Fl. Cochinch. 22, 1790 ; FBI 4 : 299, 1884 ; Cooke 2 : 375 ; Indrajii 538, 1910 ; Santapau & Jan. 37, 1967. *Buchnera hirsuta* Benth. Scroph. Ind. 41, 1835.

An erect herb, 10 - 45 cm high, stem simple or branched, scabrid. Leaves sessile, linear or linear-lanceolate, acute hispid, 1 - 3 cm long. Flowers sessile in bracteate spikes. Bracts linear, acute, hispid, longer than the calyx. Bracteoles linear up to 0.25 cm long. Calyx tubular up to

0.6 cm long, 5-toothed, 10-ribbed, teeth scabrid or ribs. Corolla yellow, bilabiate, tube pubescent outside, incurved at the apex. Fruit oblong, dark brown, 0.16-0.4 cm long.

Local name : Dholo-agiyo.

Flowers : October to November.

Occurrence : Recorded from Jamnagar ; Okhamandal.

Uses : Same as *Striga gesneroides* (Willd.) Vatke. According to Kirtikar and Basu (3 : 1829) the plant is pungent bitter, indigestible ; improve both appetite and taste, useful in strangury and diseases of the blood.

Striga asiatica (L.) Kuntze var. *aibiflora* Kuntze, Rev. Gen. Plant. 466. 1891.

Differs from species in having white coloured flowers.

Flowers : October to November.

Occurrence : Reported from Ranjit Sagar among grasses on plain river ; Jaribupat, on roots of grasses near river ; Beyt near grass ; Bapu's Vav ; Ranitj Sagar cultivated fields. Kota in cultivated fields. Motiva Matli in Jowar fields.

Striga densiflora (Benth.) Benth. in Hook. Comp. Bot. Mag, 1 : 363, 1836 ; FBI 4 : 299 ; Cooke 2 : 375 ; Santapau Pl. Saur. 596. 1953 ; Saldanha, 1 : 323. 1963 ; Santapau & Jan. 37. 1967. *Buchnera densiflora* Benth. Scroph. Ind. 41. 1835.

An erect scabrid herb, 15-45 cm high. Leaves sessile, linear, scabrid, acute, 1.2-4 cm long, passing into floral bracts. Flowers sessile in terminal spikes. Lower floral bracts leaf like or exceeding the flower, bracteoles 2, linear, acute, ciliate. Calyx tubular, up to 0.6 cm long, with 5 strong scabrous ribs, teeth lanceolate, subulate, ciliate. Corolla white, bilabiate, upper lip shorter than the lower lip. Fruit oblong-obovoid. Seeds minute.

Flowers : May to August.

Occurrence : Collected from Mangrol in cultivated fields, Chotila in grass slopes not common ; Paneti vidi and Dhunvav, common.

Striga gesneroides (Willd.) Vatke in Oest. Bot. Zci. 25 : 11. 1875 ; Pennell, in Acad. Nat. Sc. Phil. Mon. 5 : 97. 1943 ; Santapau in JBNHS 49 : 42. 1950 ; et in Rec. Bot. Surv. Ind. 16 : 206. 1953 ; Saldanha, 1 : 320. 1963 ; Santapau, Pl. Saur. 598. 1953 ; Santapau & Jan. 37. 1967. *Buchnera*

gesneroides Willd. Sp. Pl. 3 : 338. 1803. *Striga orobanchioides* (R. Br. ex Endl.) Benth. in Comp. Bot. Mag. 1 : 361, t. 19. 1836 (*Orobanchioides*), nom illegit. FBI 4 : 299 ; Cooke 2 : 374 ; Indrajī 540. 1910.

An erect herb, parasite on roots, glabrous or puberulous, 15-42 cm high. Stem simple or branched, purplish in colour, turns black when dry. Leaves scale like, sessile, lanceolate, acute, slightly puberulous, passing into floral bracts. Flowers sessile in terminal spikes ; bracts lanceolate, nearly equalling the calyx, about 10 mm long, pilose, bracteoles linear, half as long as calyx about 5 mm long, pilose. Calyx 5-toothed, 5-ribbed, up to 10 mm long. Corolla bilabiate, pink or white tube up to 1.5 cm long, incurved above the middle, hairy in the throat, upper lip bilobed, shortly divided ; lower lip 3-lobed, divided. Stamens 4, didynamous ; included. Capsule ovoid-oblong, up to 0.6 cm long.

Local name : Rato-agiyo.

Flowers : August to November.

Occurrence : Recorded from Jamnagar, rare ; parasite on *Leptilaga this* sp. ; Rajkot Pradumna Park, abundant ; Dwarka, abundant ; Chotila on *Euphorbia* roots ; Dwarka in open field on *Lepidagathis* ; Rajkot on *Euphorbia nivulta* Buch. Ham. roots ; Girnar at 2000 feet.;

Uses : Ash of the plant mixed with edible oil is applied on cattle-wound by farmers. The plant is also used in diabetes. (Indrajī 539. 1910).

VERBASCUM Linn.

Verbascum chinense (Linn.) Santapau, Pl. Purandhar 90. 1957 ; Saldanha, 1 : 249. 1963. Santapau & Jan. 37. 1967 ; *Scrophularia chinensis* Linn. Mant. 2^o : 250. 1771. *Celstia coromandeliana* Vahl, Symb. 3 : 79. 1794 ; FBI 4 : 251 ; Cooke 2 : 352 ; Indrajī 535. 1910 ; *Verbascum coromandeliana* O.K., Rev. Gen. Pl. 468. 1891 ; Santapau, Pl. Saur. 599. 1953 ; Santapau in RBSI ed. 1, 16(1) : 200.

An erect hairy herb, 60-90 cm high. Leaves radical, lyrate, 5-10 cm long, pinnatisect, with petioles up to 7 cm long, lower cauline leaves similar but smaller and with short petioles. Upper cauline leaves gradually becoming smaller and sessile, passing into bracts, coarsely dentate. Flowers in simple terminal racemes, 30-60 cm long, rachis glandular pubescent, pedicels glandular pubescent, bracts foliaceous, ovate, acute, sessile, gradually becoming smaller upwards. Calyx deeply divided glandular pubescent. Corolla yellow, rotate, lobes 5, rounded. Stamens filaments densely bearded with purple hairs. Ovary globose, glabrous. Fruit 0.6-0.8 cm in diam., subglobose. Seeds oblong, truncate, warted.

Local name : Kaihar.

Flowers : May to November.

Occurrence : Recorded from Rajkot, Pradumna Park in cultivated fields ; Junagadh in river bed ; Rajkot, abundant all round lake ; Junagadh gregarious plant on bank of tank ; Gaumukhi Ganga, Junagadh in damp soil.

Uses : It is used in diabetes, leaf juice is sedative and astringent ; prescribed in several cases of acute and chronic dysentery with manifest advantage. The juice mixed with mustard oil, in equal proportions, is applied as an external application for relieving the burning sensation of hands and feet ; mixed with sugar and water it is used as a drink in bleeding piles. The juice of the whole plant, squeezed out by pounding, is used in cases of syphilitic eruption. (Indraji 533. 1910)

OROBANCHACEAE

Corolla-lobes all broad, subequal

Cistanche

Corolla 2-lipped, the upper lip 2-lobed, the lower lip 3-lobed

Orobanche

CISTANCHE Hoffm. & Link

Cistanche tubulosa Wight, Icon. t. 1420 bis 1850 ; FBI 4 : 324 ; Cooke 2 : 386 ; Bole in JBNHS 61 : 472-73. 1964 ; Santapan & Jan. 37. 1967. *Cistanche lutea* Wight, III. 2 : 180, t. 158 b. fig. 4 (not of Hoffm. & Link 1806) ; Bole in JBNHS : 62 : 600-602. 1965.

Plant yellow in colour, parasitic on *Salvadora* plant ; stem 15-150 cm high, 5 cm in diam., unbranched, furrowed, fleshy, glabrous or more or less pubescent, densely covered with triangular acute scales. Flowers numerous, in dense spikes, 15-25 cm long ; bracts lanceolate, longer than the calyx, linear lanceolate. Calyx tubular campanulate, 1.2-1.8 cm long ; lobes rounded, subequal. Corolla yellow, hairy at the base inside ; 2.5-5 cm long, the lower half tubular, erect, the upper half campanulate. Filaments woolly at the base ; anthers subexserted, woolly, not or scarcely apiculate. Style exserted, curved below the stigma. Capsules 2.5 cm long, ovoid-oblong, laterally compressed, beaked. Seeds numerous, subglobose.

Flowers : July onwards.

Occurrence : The entire plant and one flower, parasitic on the roots of *Salvadora persica* L. was collected by Coll. Mr. H. Abdul Ali from Pirotan island near Jamnagar.

Uses : It is used in the treatment of diarrhoea (W1).

OROBANCHE Linn.

Orobanche aegyptiaca Pers. Syn. 2 : 181. 1807. Ritter Beck. Monogr. Orob. in Biblioth. Bot. Heft. 19 : 100. fig. 14(1) : 1890 ; Cooke 2 : 387 ; Santapan & Jan. 37. 1967. *Orobanche indica* Buch. Ham. in Roxb. Fl. Ind. 3 : 271. 832 ; FBI 4 : 326.

A herb, parasitic on tobacco plants, 10-50 cm high, with very few lanceolate scales. Flowers in lax spikes ; bracts lanceolate, pubescent ; bracteoles narrowly linear, shorter than the calyx. Calyx campanulate, up to 9 mm. long, 4-toothed, teeth lanceolate-subulate, nearly equalling the tube, with 9 prominent midrid. Corolla up to 3.2 long, pubescent outside ; white in the lower part, blue or lilac in the upper part. Stamens filaments pubescent at the base, anthers woolly. Stigma 2-lobed, lobes semicircular in shape. Fruit oblong, acuminate, glabrous, about 1.2 cm long. Seeds minute, ovoid, reticulate.

Local name : Vakumba, Jogido.

Flowers : October.

Occurrence : Common on Solanaceous plants cultivated in fields in Jamnagar and elsewhere.

Uses : It is reported to be used medicinally to stop diarrhoea and as a cure for boils in the throat of cattle. For fodder purposes *Orobanche* is considered undesirable, as the seeds pass out of the alimentary canal of cattle in a viable state and help in their dispersal, when cattle manure from such animals is used. (WI.)

LENTIBULARIACEAE

UTRICULARIA Linn.

Terrestrial :

Leaves narrowly linear-oblong, usually deciduous ; seeds reticulate

reticulata

Leaves orbicular or reniform, persistent ; sepals very unequal ; seeds glochidiate

striatula

Aquatic ; leaves whorled, with capillary persistent segments ; seeds slightly winged margin

stellaris

Utricularia reticulata Smith, Exot. Bot. 2, t. 119. 1805 ; FBI 4 : 331 ; Cooke 2 : 393, Santapan & Jan. 37. 1967.

Glabrous. Leaves numerous, 1.2-1.8 cm long, narrowly linear-oblong, obtuse, usually deciduous before flowering. Scapes flower-bearing for half their length, slender, weak, flexuose, twining. 15-60 cm long, with 2 or 3 distant bracts. Flowers in raceme ; bracts 0.3-0.4 cm long, ovate, very acute, attached by their bases ; pedicels 0.6-0.8 cm

long, suberect. Calyx rather more than 0.4 cm long, in flower; sepals ovate, acute or acuminate, much enlarged and decurrent on the pedicel in fruit. Corolla large, bluish purple, veined with darker veins, upper lip 0.8 cm long, broadly obovate, entire, lower lip 1.2–1.5 cm in diam., suborbicular, entire, bullate in the centre, with a white spot near the base, spur 0.6 cm long, conic, nearly straight. Capsule 0.6 cm long, ellipsoid, enclosed by the greatly enlarged sepals. Seeds about 0.05 cm long, ovoid, reticulate.

Flowers : October onwards.

Occurrence : Collected from talao at Junagadh.

Utricularia stellaris Linn. f. *Suppl.* 86. 1781; Roxb. *Cor. Pl.* 2 : 42, t. 180. 1805 & *Fl. Ind.* 1 : 143. 1821; *FBI* 4 : 328; Cooke 2 : 389; Santapau in *JBNHS* 49 : 217; Santapau, *Pl. Saur.* 607. 1953; Saldanha in *Hass. Fl.* 565. 1976. *U. inflexa* Forsk. var. *stellaris* (Linn. f.) P. Taylor, *Mitt. Bot. Staatssamml. Munchen* 4 : 96. 1961; *Kew Bull.* 18 : 189. 1964; Santapau & Jan. 37. 1967.

An aquatic herb, with the flowers floating over the surface of the water by means of floats placed on the pedicel a little below the flowers. The floats seem to be transformed leaves, being the petiole of the leaf, the blade at times appearing as a bundle of filiform segments at the tip of the floats. Flowers in slender, erect, few flowered raceme. Peduncles 2.5–20 cm long. Floats in whorles of 4–8, broadly ellipsoid or ovoid. Bracts up to 2 cm long, broadly ovate; bracteoles 0. Calyx subequal, suborbicular, enlarged in fruit. Corolla spurred, bilipped, yellow. Fruit globose. Seeds prismatic in cross-section, 4–6-angled; slightly winged margin.

Local name : Ark jvar.

Flowers : August to December.

Occurrence : Recorded from Gondal Irrigation Lakes.

Utricularia striatola Smith, in *Rees. Cyclop.* 37, No. 17. 1817; Cooke 2 : 393; Santapau in *JBNHS* 49 : 220; Taylor in *Kew Bull.* 18 : 91, tt. 30–31. 1964; Santapau & Jan. 37. 1967. *U. orbiculata* Wall. ex. A. DC. *Prodr.* 8 : 18. 1844; *FBI* 4 : 334.

A small slender herb; 5 cm high; growing on wet rocks. Creeping with filiform stolons. Stolons bear leaves and bladders. Leaves usually in small rosettes at the base of the scapes, up to 3 mm in diam., orbicular or reniform, petioled, petioles 3–4 mm long, bladder about 1 mm long, obliquely ovoid, with two fimbriate processes at the mouth, scape filiform, bracts and bracteoles very minute. Sepals unequal, more or less orbicular. Corolla spurred, violet. Fruit subglobose. Seeds oblong, ellipsoid, glochidial.

Flowers : August onwards.

Occurrence : Collected from Girnar Hill, Junagadh, not common.

BIGNONIACEAE

Trees :

Leaves simple, undivided	<i>Tecomella</i>
Leaves 1-pinnate :	
Corolla yellow	<i>Stereospermum</i>
Corolla pale rose or white	<i>Heterophragma</i>
Corolla deep purple or crimson	<i>Kigelia</i>
Corolla orange	<i>Spathodea</i>
Leaves 2-3 pinnate :	
Corolla tube linear, stamens 4	<i>Millingtonia</i>
Corolla tube campanulate, stamens 5	<i>Oroxylon</i>

Shrubs :

Leaf digitate, 3 or 5 foliate, leaflets entire, corolla white	<i>Tabebuia</i>
Leaf 1-pinnate, 2-6 jugate, leaflets serrate or crenate ; corolla yellow	<i>Tecoma</i>
Climber ; leaves compound ; corolla orange-yellow	<i>Pyrostegia</i>

HETEROPHRAGMA DC.

Heterophragma quadriloculare (Roxb.) Schum. in Pfam. 4 (3b) : 243. 1895 ; Santapau, Pl. Saur. 600. 1953 ; Santapau & Jan. 37. 1967. *Bignonia quadrilocularis* Roxb. Pl. Cor. 2 : 24, t. 145. 1798. *Heterophragma roxburghii* A. DC. Prodr. 9 : 210. 1845 ; FBI 4 : 381 ; Cooke 2 : 404.

A large tree. Leaves pinnate 30-60 cm, tomentose when young ; leaflets elliptic-oblong, obtuse, entire or serrulate, base unequal sided, 5-12.5 cm long. Flowers in long terminal, tomentose panicles. Calyx densely tomentose outside, fulvous hairy inside, irregularly lobed or obscurely 2^o lipped. Corolla about 5 cm long, pale rose or white with pink margin. Filaments densely woolly at the base. Fruit up to 30 cm long, linear, pointed, velvety when young, seeds compressed, with a membranous wing at each end each up to 3.8 cm long.

Local name : Varas, Kharsing.

Flowers : February to April.

Occurrence : Noted from Abhapara top. Porbandar.

Uses : A thick fluid like tar extracted from the wood, it is said to be used for skin diseases. The wood is suitable for rough planking, rafters, scantlings and posts, but is hardly used except as fuel. It is also stated to be a useful cabinet wood. (WI)

KIGELIA DC.

Kigelia pinnata (Jacq.) DC. Prodr. 9 : 247. 1845 ; Cooke 2 : 411. Santapau & Jan. 37. 1967. *Crescentia pinnata* Jacq. Collect. 3 : 203, t. 18. 1789.

A handsome tall tree. Leaves pinnate. Flowers in pendulous racemes, red in colour. Fruit long stalked, gourd like. A native of Africa.

Flowers : March to July.

Occurrence : Gokuldas Bambhdai reported this plant from Jamnagar. It was found cultivated in gardens.

Uses ; Roasted seeds of the plant are reported to be eaten in times of scarcity. The dry fruit may be used for the preparation of active carbon. The bark is used in rheumatism, dysentery and venereal diseases. (WI)

MILLINGTONIA Linn. f.

Millingtonia hortensis Linn. f. Suppl. 291. 1781 ; FBI 4 : 377 ; Cooke 2 : 409 ; Indrajī 540. 1010 ; Santapau, Pl. Saur. 601. 1953 ; Santapau & Jan. 38. 1967.

A tall tree, generally planted in gardens, bark corky hence often called as Indian cork tree. Flowers fragrant, white with long slender corolla tube. A native of Burma and Malaya.

Local name : Akash-limbdo, Buch.

Flowers : October.

Occurrence : Recorded from Vjarkhi Lake, 8 m S. E. Jamnagar Barda, Ghumli, probably planted ; Rajkot, cultivated in streets and Jubilee garden.

Uses : The wood is suitable for furniture, ornamental work, tea boxes, drawing boards and plane tables. The bark yields an inferior type of cork. It contains a bitter substance and some tannin. (WI)

OROXYLUM Vent.

Oroxylum indicum (Linn.) Vent. Dec. Gen. Nov. 8. 1808; FBI 4 : 378, Cooke 2 : 401 ; Indrajī 540. 1910 ; Santapau, Pl. Saur. 602. 1953 ; Santapau & Jan. 38. 1967. *Bignonia indica* Linn. Sp. Pl. 625. 1753.

A small tree, 7.5-12 m high. Leaves 90-150 cm long, tripinnate, with opposite pinnac. Flowers in large racemes, 30-60 cm long, purple. Calyx 2.5×1.5 cm, leathery, oblong-campanulate, glabrous. Stamens 5, slightly exerted beyond the corolla-tube. Fruit elongated up to 90 cm long, tapering at both ends, flat, acute, valves semi-woody. Seeds numerous, winged except at the base, each up to 6.5 cm long.

Local name : Tentu, Aralu.

Flowers : May to August.

Occurrence: Recorded from Barda Hill.

Uses : The young shoots and unripe fruits are eaten as vegetables, flowers and bark are also reported to be eaten. The tree is lopped for fodder. Thin light seeds are said to be used as stuffing material for hats. Bark and fruits may be used as mordant in dyeing and tanning. The plant is reported to possess antiseptic properties. The wood is yellowish white and soft and may be used as fuel, it has been reported to be used for match boxes in Philippines. (WI)

PYROSTEGIA C. Presl.

Pyrostegia venusta (Ker.-Gawl.) Miers. in Proc. Roy. Hort. soc. 3 : 188. 1863 ; Santapau, Pl. Saur. 603. 1953 ; Santapau & Jan. 38. 1967. *Bignonia venusta* Ker.-Gawl. Bot. Reg. 249. 1818 ; 56. 1861 ; Bor & Raizada in JBNHS 41 : 455. 1940 ; Cooke 2 : 410 ; *Pyrostegia ignea* Presl. in Bot. Bemerk. 93. 1844.

A climber with stout, angular stem. Leaves compound consisting of 3 leaflets or sometimes two leaflets and a terminal one transformed into tendril, leaflets ovate or ovate-oblong. Flowers in corymbose cymes or racemes, drooping. Calyx campanulate. Corolla up to 7.5 cm long, orange-yellow. Stamens 4 unequal. A native of Brazil.

Flowers : December to February.

Occurrence : Recorded from Rajkot, Jubilee gardens, cultivated.

Uses : Cultivated in gardens everywhere for its beautiful vermilion orange-crimson coloured flowers.

SPATHODIA Beauv.

Spathodia campanulata Beauv. Fl. D'owar 1 : 47, t. 27. 1805 ; Hook. Bot. Mag. t. 5091. 1859 ; Sandwith, Bign. in Fl. Surin. 4(2) : 81. 1939 ; Santapau & Jan. 38. 1967 ; Cooke 2 : 410.

A handsome tree. Leaves odd-pinnate up to 40 cm long. Flowers in racemes or panicles, bell-shaped, up to 8 cm long scarlet or orange in colour. Fruit a capsule, flattened up to 20 cm long, glabrous. A native of Tropical America.

Flowers : December to March.

Occurrence : Gokuldas Bambhdai reported this plant cultivated in the Govt. Gardens at Jamnagar and near banks of the talao.

Uses : Commonly planted in the gardens or as an avenue tree on roads, a fine decorative tree.

STEREOSPERMUM Cham.

Stereospermum personatum (Hassk.) Chatterjee in Bull. Bot. Soc. Beng. 2 : 70. 1948 ; Santapau, Pl. Saur. 604. 1953 ; Santapau & Jan. 38. 1967. *Dipterosperma personatum* Hassk. in Flora 25(2), Beibl. 28. 1842. *Stereospermum chelonoides* auct. non (L. f.) DC. : Wight, IC. t. 1341. 1848.

A large deciduous tree, 10-20 m high, with many spreading branches, glabrous, bark thick, yellowish. Leaves 1-pinnate 30-45 cm long, leaflets 3-5 pairs, elliptic, glabrous, base acute or rounded, often unequal sided, main nerves 8-10 pairs with reticulate venation between. Flowers in lax terminal panicles, fragrant, yellow veined, tinged reddish purple. Fruit subquadrate, more or less spirally twisted. Seeds each up to 3 cm long, readily splitting along the transverse furrow.

Local name : Patla.

Flowers : April-May.

Occurrence : Collected from Junagadh, Girnar.

Uses : Root bark is an ingredient in Dashamula. It is regarded as cooling diuretic, tonic. Flowers rubbed up with honey are given to check hiccup. The ashes of the plant are used in the preparation of alkaline water and caustic paste. [Gaz. A(1) : 202. 1953]

TABEBUIA Gomes ex DC.

Tabebuia pentaphylla Hemsl. Biol. Centr. Am. Bot. 2 : 495 : Baily Man. Cult. Pl. 906. 1949 ; Santapau & Jan. 38. 1967.

A tree planted in the garden, 6-18 m high, somewhat scaly. Leaves long petioled leaflets elliptic to oblong-obovate, obtuse 7.5 to 15 cm long. Flowers rosy-pink or white, up to 10 cm long. Fruit 20-25 cm long. A native of Tropical America.

Flowers : October.

Occurrence : Jamnagar ; an exotic tree, in flowers and fruits in garden of Lal Bungalow.

TECOMA Juss.

Tecoma stans (Linn.) H.B.K. Nov. Gen. & Spec. 3 : 144. 1819 ; Chatterjee, 79 ; Bor & Raizada in JBNHS 41 : 683, f. 1, tt. opp. pp. 683 & 684 ; Santapau, Pl. Saur. 605. 1953 ; Santapau & Jan. 38. 1967. *Bignonia stans* Linn. Sp. Pl. ed. 2, 871. 1763 ; Cooke 2 : 410.

A small tree, branches somewhat quadrangular. Leaves 10-20 cm, leaflets 5-11, ovate, ovate-oblong, acuminate sharply serrate. Flowers in large terminal panicles. Calyx 5-lobed, glabrous or sparsely hairy. Corolla bright yellow, somewhat funnel-shaped. Stamens 4, fertile, one rudimentary (often 3 fertile and 1 unfertile are found). Style long, filiform. Fruit 15-22.5 cm long, compressed, green turning brown at maturity. Seeds many each with 2 large wings. A native of Tropical America.

Flowers : October.

Occurrence : Recorded from Amarjund, Jamnagar, planted ; Rajkot, R.C. Church compound ; Junagadh.

TECOMELLA Seem.

Tecomella undulata (Smith) Seem. in Ann. & Mag. Nat. Hist. ser. 3, 10 : 30. 1862 ; Cooke 2 : 402 ; Santapau, Pl. Saur. 606. 1953 ; Santapau & Jan. 32. 1967. *Bignonia undulata* Smith, Exot. Bot. 1 : 35. 1805. *Tecoma undulata* G. Don. Gen. Syst. 4 : 223. 1838 ; FBI 4 : 378 ; Indraji 541. 1910.

A shrub or small tree ; 2-3 m high, young branches stellately grey tomentose, older glabrous. Leaves up to 15 cm long, simple, oblong, obtuse, undulate margin. Flowers in corymbs ; pedicels 0.7-1.5 cm long. Calyx campanulate, lobes broadly ovate. Corolla orange-yellow, campanulate, stigma bilamellate, lobes spatulate oblong. Fruit up to 20 cm long, linear-oblong, acute, smooth. Seeds including the wing 2.5 cm long, wing very narrow round the apex of the seed, absent at its base.

Local name : Ragat-rohido.

Flowers : February to April.

Occurrence : Recorded from Ranjit Sagar, Vijarkhi lake, planted or cultivated ; M.I. Owen reported from Palitana (Owen 22800). A native of S.E. Asia and Africa.

Uses : The bark is used for syphilis. The wood is very strong and highly prized for furniture. An infusion of roots and branch-bark mixed with the milk is given internally on broken bones. Powder of the dry bark.

is boiled with the milk given in rheumatism, consumption and asthma. An infusion of leaves, with milk and sugar is given often during pregnancy. Bark of the plant pounded in water and applied on itch. Considered an important plant in Ayurvedic medicament. (Indraji 542. 1910)

PEDALIACEAE

Flowers yellow. Fruit spinous, indehiscent; seeds 2-1 in each cell

Pedaltum

Flowers white. Fruit capsular, 2-4-valved, spineless; seeds many in each cell

Sesamum

PEDALIUM Linn.

Pedaliium murex Linn. Syst. Nat. ed. 10, 1123. 1759; FBI 4 : 386; Cooke 2 : 412; Indraji 543. 1910; Santapau, Pl. Saur. 609. 1953; Santapau & Jan, 38. 1967.

A diffuse annual, much branched herb, 15-60 cm tall. Roots similar to turmeric in colour. Leaves simple, opposite, ovate or oblong-obovate, 1-4.5 × 0.5-3 cm, truncate or obtuse, irregularly and coarsely crenate-serrate, glabrous above, minutely scaly below, petiole 1-4 cm. Flowers 1.5-2 cm across, pedicel 1-2 mm long, increasing up to 4 mm in fruit. Calyx 0.2 mm long; teeth linear, scaly outside, persistent. Petals connate into a broad tube, 1-3 cm long; lobes obtuse. Stamens included, 0.5-1 cm long; filaments dilated, glandular hairy at the base; anthers kidney-shaped. Fruit indehiscent, abruptly narrowed at the base and with a patent spreading spine at each basal corner of the broader part, 1-1.8 cm long, 0.5-1 cm broad, spine 2-4 mm long. Seeds 2 or 1 per locule, oblong.

Local name : Mota gokhru, Ubhagokhru.

Flowers : During monsoon season.

Occurrence : Recorded from Rozi near Jamnagar, Okha; Dwarka, neighbourhood of station, Jamnagar jail.

Uses : An infusion of the plant is given in biles. The plant is considered to be a tonic. It is also given on diabetes. (Indraji 543. 1910)

The juice of the fruit is an emmenagogue ; used in puerperal diseases and to promote lochial discharges. The leaves are used as curry in splenic enlargement the decoction of the root is antibilious. [Gaz. A(1) : 164. 1953]

SESAMUM Linn.

An erect herb	<i>indicum</i>
A prostrate herb :	
Flowers purple with a yellow plate ; seeds obovoid oblong	<i>laciniatum</i>
Flowers purple ; seeds reticulate	<i>prostratum</i>

Sesamum indicum Linn. Sp. Pl. 634. 1753 ; Watt. Diet. Econ. Prod. 6 (2) : 502-541; FBI 4 : 387; Cooke 2 : 413; Santapau, Pl. Saur. 610. 1953; Santapau & Jan. 38. 1967.

Erect annual, up to 65 cm tall, puberulous. Leaves very variable on the same plant, linear narrowly oblong, ovate or lanceolate, entire, subentire, lobed or 3-partite, acute, 3-18 cm long, 0.5-4 cm broad, glabrous above, pubescent below, petiole 0.5-12 cm long. Flowers with strong unpleasant odour, bracteate ; pedicel up to 5 mm long with 2 glands on either side at the base. Calyx 2-6 mm long, lobes linear to narrowly lanceolate, hairy persistent. Petals 2-3 cm long, pubescent, obtuse. Stamens 1 cm long. Ovary 1-2 mm long, pilose, oblong. Fruit oblong, loculicidal, acuminate capsule, 1.5-2.5 cm long, 5-7 mm broad, slightly scabrid-pilos. Seeds black, brown or white, 2-3 mm long, 1-1.5 mm broad, wingless, almost smooth.

Local name : Tal.

Flowers : August to October.

Occurrence : Recorded from Dwarka along railway line and sandy slacks ; and Beyt island.

Uses : Commonly cultivated for its seeds which yield a very valuable edible oil-sesame or gingelly seeds are nourishing tonic, very useful in piles.

Sesamum laciniatum Klein ex Willd. Sp. Pl. 3 : 359. 1800 ; FBI 4 : 387; Indraj 546. 1910; Santayau, Pl. Saur. 611. 1953 ; Santayau & Jan. 38. 1967.

A prostrate herb, 30-90 cm tall; stems and branches grooved, sparsely hairy with long soft white hairs. Leaves 1.2-1.8 cm long, nearly as broad as long, orbicular or elliptic in outline, variously lobed and lacinate, sparsely hairy above, hairy on the nerves and clothed beneath with a white somewhat mealy tomentum; petioles 0-0.4 cm long. Flowers solitary; pedicels 0.4 cm long. Calyx 0.8 cm long, deeply divided hairy outside, segment linear, 1.2 cm long, strongly ciliate. Corolla 2.5-3 cm long, tubular-ventricose, minutely pubescent outside, purple, with a yellow plate. Capsule 0.5-0.8 cm scabrous-pilose, 2-valved, oblong, compressed, rounded and strongly mucronate at the apex. Seeds obovoid, oblong, faveolate, glabrous.

Local name : Vagdau tal, Adbau tal.

Flowers : During monsoon season.

Occurrence : Seen on the road sides and in the fields on Barda Hills.

Uses : Root of this plant is effective on rheumatism. Leaves, flowers and unripe fruits are fed with sugar on diabetes. Ash of the plant mixed with oil is applied on various skin diseases. The plant is also used as fodder for cattles. (Indraji 546, 1918).

Sesamum prostratum Retz. Obs. 4 : 28. 1786 ; FBI 4 : 387 ; Indraji 547. 1910 ; Santapau, Pl. Saur. 612. 1953 ; Santapau & Jan., 38. 1967.

A prostrate herb with long trailing branches from a thick tap root, the flowers purple, the seeds black and reticulate.

Local name : Kag-tal.

Flowers : During monsoon season.

Occurrence : Seen in the fields and on sea bank, Porbandar.

Uses : Same as *S. laciniatum* Klein (Indraji 547. 1910).

MARTYNIACEAE

MARTYNIA Nees

Martynia annua Linn. Sp. Pl. 618. 1753 ; Santapau, Pl. Saur. 608. 1953 ; Santapau & Jan. 38. 1967 ; Stewart. Fl. W. Pakistan 670. 1972. *Martynia diandra* Glox. Obs. Bot. 14, t. 1. 1785 ; FBI 4 : 386 ; Cooke 2 : 414 ; Indraji 547. 1910.

A branched herb ; up to 1.5 m tall. Stem succulent, tomentose-glandular. Leaves opposite, subcordate or cordate 7-15 × 7-20 cm, distantly dentate with the veins ending in denticles at the margin, glandular ; petiole slightly shorter than or as long as the lamina, glandular. Flowers showy, lilac, mottled red blue or yellow inside ; pedicels 1-5 cm long, up to 3 cm, in fruit, glandular villous. Sepals 5, free, oblong-lanceolate, unequal, 1-1.5 cm long, glandular. Corolla tube 2.7 cm long, gibbous, glandular outside, 5-lobed, the posterior lobe the largest, lobes tinged purple, obtuse. Fertile stamens 2 ; filaments 1.3 cm long, glandular at the base ; anthers bilobed ; lobes divergent, oblong 7 mm long, adnate when young to the other anther pair, dehiscing longitudinally ; staminodes 2, 4 mm long, slightly curved. Ovary globose, 2 mm broad, glabrous, situated on the top of the subglobose disc, style 2 cm long, slender, persistent ; stigmas 2, sensitive, flat. Capsule 3 cm long, more or less ovoid, 2 valved, with the style splitting into 2 curved, lignified and spiny processes.

Local name : Vinchhido.

Flowers : August to December.

Occurrence : Collected from Girnar Junagadh.

Uses : The leaves are given in epilepsy applied to the neck, the juice is used as a gargle for sore throat. Roots are boiled in milk and taken as a tonic. Flowers are considered to be good for diabetes. Fruits are pounded and applied on scorpion stings. (Indraji 456. 1910)

ACANTHACEAE

Seeds not supported on hard retinacula ; ovules many in each cell

Elytraria

Seeds supported on hard, upward-curved retinacula :

Corolla without an upper lip ; lower lip large, expanded, 3-lobed ; ovules 2 in each cell

Blepharis

Corolla 2-lipped or with 5 subequal lobes ;

Corolla lobes twisted to the left in bud :

Ovules more than 2 in each cell :

Capsule normally with 6 or more seeds :

Corolla distinctly 2-lipped :

Inflorescence spinous :

Leaves lanceolate, hispid	<i>Hygrophila</i>
Leaves oblong, subcoriaceous	<i>Thyrsacanthus</i>
Inflorescence not spinous	<i>Hemiadelphus</i>
Corolla subequally 5-lobed :	
Inflorescence in lax, axillary cymes ; cymes at times forming large terminal panicle	<i>Ruellia</i>
Inflorescence of single axillary flowers, or in axillary triods, or 2-3 flowers superposed	<i>Dipteracanthus</i>
Inflorescence a more or less elongated simple spike provided with but one kind of bracts	<i>Hemigraphis</i>
Ovules 2 in each cell ; capsule with 4 or fewer seeds :	
Corolla tube long, linear, slender ; stamens 2	<i>Eranthemum</i>
Corolla tube narrow below, usually infundibuliform upwards ; stamens usually 3	<i>Carvia</i>
Corolla lobes imbricate in bud :	
Ovules 3-10 in each cell ; capsule normally 6 or more-seeded :	
Flowers in paniced (often unilateral) racemes without axillary cladodes	<i>Andrographis</i>
Flowers clustered in the midst of axillary cladodes	<i>Haplantus</i>
Ovules 2 or rarely 1 in each cell :	
Corolla lobes 5, subequal	
Calyx 4-partite, the 2 opposite outer sepals much larger than the inner ; stamens 2 only perfect	<i>Barleria</i>
Calyx 2-lipped, 5-lobed ; stamens 4	<i>Neuracanthus</i>
Corolla distinctly 2-lipped :	
Stamens 4 ; anthers 2-celled	<i>Lepidagathis</i>
Stamens 2 :	
Placentas separating elastically from the valves from the base-upwards :	
Bracts in unilateral spikes	<i>Rungta</i>
Bracts clustered in the leaf-axils or laxly cymose	<i>Dicliptera</i>
Placentas not separating elastically from the valves :	

Anther cells at least the lower, with a basal spur-like appendage :

Capsule usually 4-seeded ; seeds rough or tuberculate

Justicia

Capsule 2-seeded ; seeds smooth, usually shining
Anther cells not spurred at base :

Monechma

Anther cells apiculate

Adhatoda

Anther cells muticous

Peristrophe

ADHATODA Mill

Adhatoda vasica Nees in Wall. Pl. As. Rar. 3 : 103. 1832 & in DC. Prodr. 11 : 387. 1847 ; FBI 4 : 540 : Cooke 2 : 493 ; Indrajai 462. 1910 ; Santapau, Uni. Bomb. Bot. Mem. No. 2, 92. 1951 ; Santapau, Pl. Saur. 631. 1953 ; Santapau & Jan. 37. 1967. *Justicia adhatoda* Linn. Sp. Pl. 15. 1753.

A bushy shrub, 1-1.5 m high, branches grey-pubescent, ascending. Leaves 10-20 × 3-5 cm, elliptic, acuminate, tapering at base, glabrous, entire main nerves 12-15 pairs, petioles 2.5 cm long. Spikes stout ; about 7 cm long ; bracts elliptic, 2 × 1 cm ; ovate or obovate ; bracteoles 1 × 0.25 cm falcate-oblong. Flowers white, 2 cm long, 2-lipped. Calyx glabrous or slightly pubescent, reticulately veined. Corolla 3 cm long ; tube short, with a few rose coloured hairs in the throat, pubescent outside, lower half 5 cm in diam. Cylindrical, upper half laterally inflated upper lip 2 × 1.2 cm ovate-oblong. Stamens glabrous, filaments hairy at the base. Ovary and styles-base minutely hairy. Capsules 2-3 × 1-1.5 cm, subacute, pubescent, clavate, 4-seeded. Seeds 0.5 cm in diam., glabrous, tubular verrucose.

Local name : Ardushi.

Flowers : August to November.

Occurrence : Recorded from Barda Hills.

Uses : This is a well-known drug in the Ayurvedic and Unani system of medicine, and is recommended for a variety of ailments such as bronchitis, asthma, fever, jaundice and consumption. The leaves and roots are antispasmodic and efficacious in coughs, the drug is useful as an expectorant and mild bronchial antispasmodic but is of no value in the treatment of tuberculosis. Insecticidal and antiseptic properties are attributed to vasicine. The leaves are said to yield a yellow dye. (WI)

ANDROGRAPHIS Wall.

Leaves acute, glabrous, small-petioled capsule glabrous	<i>paniculata</i>
Leaves obtuse, ciliated, sessile, capsule hairy	<i>echioides</i>

Andrographis echioides (Linn.) Nees in Wall. Pl. As. Rar. 3 : 117. 1832 ; FBI 4 : 505 ; Cooke 2 : 374 ; Indrajī 559. 1910 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 51. 1951 ; Santapau, Pl. Saur. 614. 1953 ; Gir. 264 ; Santapau & Jan. 38. 1967. *Justicia echioides* Linn. Sp. Pl. 16. 1753.

An erect herb, 20–50 cm high, annual, pubescent. Stems grooved, not much branched, branches, hairy. Leaves 4–6 × 1–2.5 cm sessile, oblong, obtuse, entire, base cuneate, ciliate on the margins ; main nerves 4–6 pairs. Flowers many in axillary racemes, rachis glandular hairy ; bracts 2 mm long lanceolate, bracteoles 1 mm. long, subulate. Calyx very small, adnate at the base. Corolla pubescent, pink or white, 2-lipped, upper lip 3-petals, lower lip 1-petal, the upper 3 coloured crimson inside stamens anthers much exserted, bearded dark purple with white hairs at the base. Ovary of 1 carpel, styles thin, pubescent, pinkish-red. Capsules pinkish 1.5 × 0.3 cm, elliptic lanceolate at both ends. Seeds large, dark ; glabrous, oblong, not compressed, rugose.

Local name : Kalukariyatun.

Flowers : August to October.

Occurrence : Recorded from Rajkot, along river bed ; Ranjit Sagar, Jamnagar ; Vijarkhi Lake, 8 m SE. Jamnagar, Girnar Forest, along road Gondal Road ; Rajkot, Shirvan, Gir Forest, Junwania Nes ; Dwarka.

Uses : An infusion is given with black pepper in fever and rheumatism, whole plant is boiled in water and vapour is given on fever. (Indrajī 559. 1910).

Andrographis paniculata (Burm. f.) Wall. ex Nees, Pl. As. Rar. 3 : 116. 1832 ; FBI 4 : 501 ; Cooke 2 : 374 ; Santapau, Uni. Bot. Mem. No. 2 : 50. 1951 ; Santapau, Pl. Saur. 615. 1953 ; Santapau & Jan. 38. 1967. *Justicia paniculata* Burm. f. Fl. Ind. 9. 1768.

An erect, annual, 20–100 cm high ; stems often winged in the upper part, base not pubescent. Leaves 5–8 × 1.5–2.5 cm glabrous, lanceolate, acute, never spatulate, main nerves 4–7 pairs, slender ; petioles very small. Flowers solitary or in axillary racemes, 3–10 cm ; pedicels very small, usually pubescent, bracts 0.2 cm long, linear, brac-

teoles smaller or absent. Sepals 0.4 cm long, linear-lanceolate, corolla 1.2-2 cm long, 2-lipped, white, tube 6 mm long, slightly enlarged, below the limb, upper lip oblong, 2-toothed at the apex, lower lip deeply 3-toothed. Anther bearded at the base, filaments more or less hirsute, flattened. Ovary glabrous, styles usually pubescent. Capsules 2×0.5 cm, when young slightly glandular-hairy, when mature glabrous, 12 seeded, linear-oblong. Seeds rugose, sub-quadrant, yellow or deep-brown.

Local name : Lilu Karyatun, Kalmegh.

Flowers : May to October.

Occurrence : Recorded from Bhavnagar and Ghumli.

Uses : The fresh juice of the leaves is mixed with spices, such as cardamon, cloves, cinnamon, etc. dried and made into pills for use as a household remedy for the minor digestive ailments of children. The plant also enjoys considerable reputation as a febrifuge, alterative and bitter tonic, and is often used as a substitute for chiretta. (W)

BARLERIA Linn.

Spinous plants :

Leaves elliptic or ovate *prionitis*

Leaves oblong or obovate *acanthoides*

Spineless plants :

Seeds hairy :

Outer sepals spinous *cristata*

Outer sepals not spinous *lawii*

Seeds glabrous *prattensis*

Barleria acanthoides Vahl, Symb. Bot. 1 : 47. 1790 ; Blatt. in RBSI No. 38 (3) : 356. 1921 ; Santapau & Jan. 38. 1967.

A stunted prickly branched undershrub scarcely 30 cm high ; branches hoary with short velvety pubescence. Leaves dark-green, $1.5-3.7 \times 0.8-1.2$ cm oblong or obovate, obtuse, mucronate, pubescent, attenuated at the base ; main nerves 5 pairs ; petiole 0-0.6 cm long. Flowers in unilateral condensed racemes often reduced to a single flower,

bracts 1.2-1.8 cm long, membranous. Calyx divided almost to the base; outer sepals subequal, broadly ovate, acute, very conspicuously nerved and reticulately veined; inner sepals lanceolate, corolla pubescent outside, pure white, 6.2-8.7 cm long or even longer, tube cylindrical, slightly enlarged just below the limb. Capsules 1.2 cm long, ellipsoid, attenuated at both ends, glabrous. Seeds 0.4 cm long, broadly ovoid, compressed silky-hairy.

Flowers : October onwards.

Occurrence : Mandvi Cutch; Bhuj Fort.

Barleria cristata Linn., Sp. Pl. 636. 1753; FBI 4 : 488; Cooke 2 : 460; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 59. 1951; Santapau & Jan. 38. 1967.

A herbaceous hairy undershrub; stems densely hairy at the nodes. Leaves 8-12 × 2-4 cm, yellow, hairy or lanceolate above, oblong or elliptic, acute, main nerves 6-8 pairs; petioles 3-8 mm long. Flowers in dense strigosely hairy spikes; bracts 1.25 cm long, linear-lanceolate, toothed. Calyx hairy at the base, outer sepals whitish, spinous-ciliate, ovate-lanceolate, prominently nerved and reticulate, about 2 cm. long; inner calyx lobes smaller. Corolla tube funnel-shaped in upper half. lobes 1 cm long, ovate, blue, pubescent outside. Capsules 1.8 cm in diam. 4-seeded, ellipsoid, acute. Seeds 5 mm in diam., orbicular, compressed, silky-hairy.

Local name : Gokran (Bombay).

Flowers : October to January.

Occurrence : Recorded from Rajkot, Jilla park and Catholic church, Jubilee Garden and Rajkumar College in garden hedges.

Uses : The leaves and roots are used for cough and in inflammation. (WI)

Barleria lawii T. Anders in Journ. Linn. Soc. 9 : 492. 1867; FBI 4 : 486; Cooke 2 : 460; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 59. 1951; Santapau & Jan. 38. 1967.

An erect shrub; branches strigose upwards, hairy. Leaves 10-15 × 3-5 cm, lanceolate, acuminate, slightly hairy, base tapering; main nerves about 6-7 pairs; petioles 6-8 mm long. Flowers in racemes, solitary or axillary with short pedicels, bracts linear, 8 mm long, oblong, glandular, bracteoles 7-10 mm long, hairy, linear, acute; calyx divided to the base; outer sepals hairy on both surfaces, inner sepals

acute hairy, lanceolate, with membranous ciliate margins. Corolla white, tube elongate, funnel-shaped, pubescent, 8-10 cm long; lobes 2.5 cm long, obovate-oblong. Capsules 2-2.5 × 0.6-0.8 cm oblong, compressed, glabrous, pointed, 4-seeded. Seeds 5-7 mm in diam., obtuse, silky-hairy.

Flowers : October onwards.

Occurrence : This many flowered plant was recorded from Junagadh, near cremation ground.

Barleria prattensis Santapau in Kew Bull. 1948 : 487. 1949 ; in Bot. Mem. Univ. Bombay 2 : 62. 1951 ; Santapau, Pl. Saur. 617. 1953 ; Gir 265 ; Santapau & Jan. 38. 1967. *Barleria gibsonii* Sensus Gamble, Fl. Madras 1061 (743). 1924 p.p., non Dalzell.

An erect, suffruticose, 30-50 cm high ; stems and branches terete or more or less quadrangular, glabrous or nearly so, with distinct nodes. Leaves 6-12 × 2-5 cm, elliptic, or ovate, entire, acuminate, membranous, glabrous, many raphides scattered on upper side ; main nerves 5-6 pairs, petioles 5-20 mm long. Flowers solitary, axillary or terminal, spikes or racemes, pedicels short ; bracteoles linear or subulate, margins ciliate. Outer sepals glabrous, leafy about 3 × 2 cm subequal, ovate, inner sepal 10-15 mm long, linear-lanceolate, glabrous. Corolla about 8 cm long ; tube 5 cm long, glabrous. Staminodes without anthers. Capsules brownish, glabrous, 17-20 mm long, oblong, acuminate, 4-seeded. Seeds blackish, orbicular, 4 mm in diam., thick, clothed with silky hairs.

Flowers : October onwards.

Occurrence : Recorded from Girnar forest along road, Junagadh ; Sasangir to Junwania, this was the most conspicuous plant in flower in undergrowth, very abundant. Also recorded from Kileshwar Hill and Jamnagar.

Barleria prionitis Linn. Sp. Pl. 636. 1753 ; FBI 4 : 482 ; Cooke 2 : 379 ; Indraj 555. 1910 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 57. 1951 ; Santapau, Pl. Saur. 618. 1953 ; Gir 266 ; Santapau & Jan. 38. 1967.

A shrub 30-75 cm high with sharp intrapetiolar spines, much branched, sometimes climber, stem and branches shining, glabrous. Leaves 5-20 × 3-10 cm, entire, elliptic, acuminate, glabrous above, pubescent beneath ; main nerves about 5 pairs ; petioles small, about 1 cm long, usually with 2-4 divaricate acicular spines in the axils. Flowers sessile, solitary in lower axils, spicate above, 4-6 cm long, bracts foliaceous, oblong, 1.5 × 0.5 cm, bracteoles 1.5 cm long. Calyx divided to the base, outer sepals and inner sepals 15 mm long and less than that respectively.

Corolla 3-4 cm long, yellow, pubescent outside, glabrous inside. Stamens 2; filaments of fertile stamens exerted beyond corolla tube, anthers yellow. Capsules ovoid with a solid beak, 2-seeded, 2-2.5 cm long; 6 mm broad. Seeds 8 mm in diam., compressed, clothed with silky hairs.

Local name : Kantashelio.

Flowers : October to January.

Occurrence : Recorded from Kileshwar, Jamnagar, Junagadh, Girnar along pilgrim steps, Girnar forest along road, and Dwarka, a long railway line.

BLEPHARIS JUSS

Herbs; solitary or 2-3 together:

Leaves petiolate, thin, acute	<i>maderaspatensis</i>
Leaves sessile, thick and fleshy, obtuse	<i>repens</i>
A small shrub; flowers in strobilate spikes	<i>sindica</i>

Blepharis maderaspatensis (Linn.) Roth, Nov. Pl. Sp. 320. 1821; Santapau, Uni. Bomb. Bot. Mem. No. 2: 15. 1951; Santapau, Pl. Saur. 619. 1953; Gir. 267. Santapau & Jan. 38. 1967. *Acanthus maderaspatensis* Linn. Sp. Pl. 639. 1753. *Blepharis boerhaviaefolia* Pers. Syn. Pl. 2: 180. 1806; FBI 4: 478; Cooke 2: 349; Indrajit 554. 1910.

A diffuse, prostrate herb, 30-90 cm high; stems much divaricately branched, pubescent, rooting at the nodes. Leaves 4 in 9 whorl, unequal, 2.5-8 × 1-3.5 cm membranous, coarsely toothed, entire, pubescent, elliptic, acute; petioles very small. Flowers solitary, axillary or 2-3 together, about 1 cm long, bracteoles cuneiform below, broadly spatulate and rounded above, 6-8 mm long. Calyx with outer lobe 2 cm long, pubescent, upper lip narrow; lower lip 3-angled, broad, pale blue with a yellow spot and red or sky-blue lines. Capsules ovoid, compressed, 2-seeded. Seeds echinate with obtuse spines.

Local name : Utingan.

Flowers : October onwards.

Occurrence : Recorded from Ghumli; Shirwan; outskirts of Gir; along main road, Veraval to Sasan, Junwani Nes.

Uses : The seeds are said to be tonic. They are soaked in water and administered for ulcers and on burning of urine. (Indraji 554. 1910)

Blepharis repens (Vahl) Roth, Nov. Pl. Sp. 321. 1821 ; Santapau & Jan. 38. 1967. *Acanthus repens* Vahl, Symb. 2 : 76. 1791. *Blepharis molluginifolia* Pers. Syn. Pl. 2 : 180. 1806 ; FBI 4 : 479 ; Cooke 2 : 349 ; Indraji 555. 1910 ; Santapau, Pl. Saur. 620. 1953 ; Gir 268.

A prostrate, wiry, perennial undershrub ; branches 10-20 cm, usually roughly hairy. Leaves subsessile, unequal, thick, oblong-obovate, obtuse, entire, with long scattered hairs, up to 2.5×1 cm. Flowers solitary or axillary, sessile ; bracts and bracteoles, bristle-ciliate, bracts shorter than the bracteoles, broadly obovate, concave, 3-nerved. Calyx divided to the base, segments acute with membranous margins ; outer segments about 1 cm long, 3-nerved ; opposite segments similar but little shorter, 9 mm long. Corolla 9 mm long ; tube 2.5 mm long, lower lip pubescent, mid lobe the narrowest. Capsules 6 mm long, compressed, glabrous, closely surrounded by bracteoles and sepals, 2-seeded. Seeds 4 mm long, ellipsoid, compressed.

Local name : Zinku utingan.

Flowers : August to October.

Occurrence : Recorded from Gondal Irrigation Lake ; Rajkot Pradumna Park ; Rajkot along river bed ; Jamnagar, Shirwan & Sasan in waste lands.

Uses : The seeds are said to be tonic. They are administered for ulcers and on burning of urine. (Indraji 554. 1910)

Blepharis sindica T. Anders. in Journ. Linn. Soc. 9 : 500. 1867 ; FBI 4 : 479 ; Cooke 2 : 350 ; Santapau, But. Mem. Uni. Bombay 2 : 16. 1952 ; Santapau, Pl. Saur. 621. 1953. *Acanthodium grossum* Wight, Icon, tt. 1535 & 1536. 1850 (non Nees 1830). *Blepharis linearifolia* Pers. Syn. 2 : 180. 1806 ; Santapau & Jan. 3. 1967.

A small dichotomously branched undershrub ; stems very short ; branches slender ; subterete, clothed. Leaves 3-5×0.2-0.4 cm, linear or narrowly oblong, pubescent, sessile, toothed, margin recurved. Flowers in strobilate spikes 2-8 cm long, solitary in upper fork, numerous in the lowest ones, bracts 1-2×0.8-1 cm, ovate, 5-nerved, hairy on both sides, bracteoles 8-10 mm long, linear, ciliate, with strong midnerve. Calyx divided to the base, softly hairy. Corolla 8-12 mm long ; tube 4 mm long, constricted below the limb, middle lobe of

lower lip quadrate, truncate. Capsules 7 mm long, compressed, ellipsoid, glabrous, narrowed at the ends, 2-seeded. Seeds 5 mm in diam., densely clothed with thick hairs.

Local name : Sidhhi Utingan.

Flowers : July to October.

Occurrence : Recorded from Dwarka and Okha.

Note : The author has followed H. Santapau's treatment of this species as given in his monographs (Santapau in Bot. Mem. Uni. Bombay 2 : 16. 1952), that is merging *B. linearifolia* Pers. and *B. indica* T. Anders.

CARVIA Bremek.

Carvia callosa (Nees) Bremek. in Mat. Mon. Strob. 173. 1944; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 46. 1951; Santapau, Pl. Saur. 622. 1953; Santapan & Jan. 39. 1967; *Strobilanthes callosus* Nees in Wall. Pl. As. Rar. 3 : 65. 1832; FBI 4 : 451; Cooke 2 : 444.

An erect, about 2-4 m high, stems simple or sparingly branched, glabrate, often warted or scabrous, rough. Leaves 12-20 × 4.5-11 cm elliptic or elliptic-lanceolate, acuminate, tapering at base and decurrent into the petiole which is up to 7 cm long, crenate and ciliate along the margins, minutely pubescent on both sides, nerves 8-16 pairs, slender, prominent. Flowers purplish-blue, in axillary simple or branched pedunculate spikes, 2.5-10 cm long, bracts 1-2 cm. long, elliptic or obovate, obtuse, glabrous; bracteoles absent. Fruiting bracts covered with oil glands. Calyx 1-1.5 cm long, elliptic or obovate, obtuse, glabrous, bracteoles absent. Corolla 4 cm long, subsymmetric, glabrous outside, hairy within, blue. Filaments of longer stamens bearded, hairy downwards. Pistil glabrous. Capsules 20 × 7 mm obovoid, acute, narrow at the base, 2-seeded. Seeds 1.2 × 1 mm obovate, acute, thin.

Local name : Karavi (Bombay).

Flowers : September to November.

Occurrence : This is given on the authority of H. Santapau. No locality given.

Uses : The stems are used for making the walls of huts with a plaster of mud and cowdung. Fruiting bracts aromatic.

DICLIPTERA Juss. (nom. cons.)

Dicliptera verticillata (Forsk) Christens. in Dansk. Bot. Arkiv. 4(3) : 11. 1922 ; Santapan & Jan. 39. 1967. Santapau, Fl. Khandala 207. 1967. *Dianthera verticillata* Forsk. Fl. Aeg.-Arab. 9. 1775. *Dicliptera micranthes* Nees in Wall. Pl. As. Rar. 3 : 112. 1832 ; FBI 4 : 553 ; Cooke 2 : 481 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 79. 1951 ; Santapau, Pl. Saur. 623 ; Santapau in RBSI ed. 1, 16(1) : 233. 1953 ; Gir, 269.

A branched herb 15-50 cm high ; branches striate, puberulous or glabrous. Leaves 4-8 × 2-4 cm ovate, acuminate ; petioles 1.5-4 cm long. Flowers in clusters, mostly in axillary whorls, sessile ; bracts 8-2 mm long, obovate, cuspidate-ciliate, unequal, veined ; each pair of bracts enclosing usually 3 flowers, bracteoles 5 mm long, linear-lanceolate, hairy. Calyx 3-4 mm long, hairy, lobes lanceolate-subulate, very acute. Corolla not exceeding 6 mm very slender ; tube narrow. Capsules 4 × 1.5 mm, clavate, shortly stalked, membranous, glabrous, 4-seeded. Seeds 1 mm in diam., orbicular, conspicuously verrucose.

Flowers : May to October.

Occurrence : Recorded from Junagadh, road right to steps, Girnar ; Gondal ; Beyt, Jamnagar, Shirwan in Gir Forest.

Uses : Used as a tonic. (WI)

DIPTERACANTHUS Nees (emend Bremek.)

Prostrate or climbing ; leaves sparsely hairy, acute ; ovary and capsule pubescent

prostratus

Suberect or erect ; leaves closely pubescent on both sides, obtuse ; ovary and capsule glabrous

patulus

Dipteracanthus patulus (Jacq.) Nees in Wall. Pl. As. Rar. 3 : 82. 1832 ; Santapau, Uni. Bomb. Bot. Mem. No. 2, 24. 1951. Santapau, Pl. Saur. 624. 1953 ; Gir 270 ; Santapau & Jan. 39. 1967. *Ruellia patula* Jacq. Misc. Bot. 2 : 358. 1781 ; FBI 4 : 412 ; Cooke 2 : 432 ; Indrajit 551. 1910.

A small hoary suberect undershrub ; stems much branched ; densely pubescent with white hairs. Leaves 1.5-6 × 1-4 cm., ovate obtuse, grey-pubescent on both sides ; base rounded ; petioles 3-25 mm long. Flowers axillary, 2-3 together ; subsessile, bracteoles 2, nearly 1 cm, spatulate elliptic, strongly ciliate on the margins. Calyx 6 mm long ; lobes lanceolate, acute, pubescent, one segment long, one shorter, other three more or less similar. Corolla 2.5-4 cm long, purplish blue, pubescent. Filaments, ovary and style glabrous. Capsules 1.5-2 × 0.6 cm, glabrous, clavate, about 12-seeded. Seeds suborbicular, glabrous, greenish-white or blue.

Local names : Dhramandhrokali.

Flowers : May to October.

Occurrence : Recorded from Bhavnagar, Mangrol ; Rajkot, Pradumna Park ; Okha sea-shore ; Dwarka, near the station ; Sasan, Iran river up stream on rocks, mostly in flowers in small clumps, common and abundant, Jamnagar, Junagadh, Willingdon Dam, Rajkot, along river bed ; Dwarka, neighbourhood of station ; Junagadh to Sasan ; Balachari, Dhunvao 6 ME. Jamnagar, Kabrastan, Jamnagar city and Kileshwar Hills ; Modpur-vidi, Halar district ; and Lalpari Talao.

Uses : Root is administered in various fevers. It is applied as a poultice on boils and glandular swellings. It is applied on guineaworm with opium. Fruits and seeds are given with sugar in diabetes. (Indraji 552, 1910)

Dipteracanthus prostratus (Poir.) Nees, in Wall. Pl. As. Rar. 3 : 81. 1832 ; Santapau in Ind. For. 79 : 321 ; Santapau, Bot. Mem. Univ. Bombay No. 2, 24. 1959. Santapau, Pl. Saur. 625. 1953 ; Gir 271 ; Santapau & Jan. 39. 1967. *Ruellia prostrata* Poir. in Lamk. Encycl. 6 : 349. 1804 ; FBI 4 : 411 ; var. *dejecta* C.B. Clarke in Hook. f. Fl. Brit. Ind. 4 : 412 ; Cooke 2 : 431.

Herbs or undershrubs ; stems 15-50 cm long, much branched, glabrous downwards, prostrate or straggling ; nodes short. Leaves 1.5-5 × 1.5-3 cm, ovate or elliptic, acute, glabrous or slightly hairy entire along the margins ; petioles 1-2 cm long. Flowers few together or often solitary, subsessile ; bracteoles 8-18 mm long, often like the leaves. Calyx 8-18 mm long, linear, acute. Corolla pale blue or purple, 3 cm long, pubescent ; lobes obovate-oblong, rounded at the apex. Filaments glabrous. Ovary and style pubescent. Capsule 8-20 × 6-7 mm, slightly pubescent, pointed at both ends. Seeds 16-20, 3 mm in diam., orbicular almost glabrous.

Local name : Kalidhraman dhokali, Kali dhawani.

Flowers : August to October.

Occurrence : Recorded from Junagadh, Girnar Hill, Forest Road ; Willingdon dam.

Uses : It is used as a remedy for ear-diseases. (W1)

ELYTRARIA Michx.

Elytraria acaulis (Linn. f.) Lindau in Engl. & Prantl. Pflanzenfam. Nachtr. 1 : 304. 1897; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 11. 1951 ; Santapau, Pl. Saur. 626. 1953 ; Santapau & Jan. 39. 1967. *Justicia acaulis* Linn. f., Suppl. 84. 1781. *Tubiflora acaulis* O. Kuntze. Rev. Gen. Pl. 1 : 500. 1891 ; Cooke 2 : 420. *Elytraria crenata* Vahl, Enum. 1 : 166. 1805 ; FBI 4 : 394 ; Indraj 549. 1910.

A scapigerous herb with small white flowers on long, bracteate scapes ; stem consists of stout, short, rhizome, like structure with many slender wiry roots. Leaves radical, 10-20 × 4-8 cm, spatulate or nearly so, decurrent into a petiole which is up to 8 cm long, obovate or elliptic, obtuse, base surrounded by woolly hairs. Sepals several, slender, radical, 10-30 cm long, clothed with spirally, imbricated bracts like scales. Flowers small, in close, rigid, simple or branched, harsh spikes 1-10 cm long, bracts 5-6 mm long, elliptic, acuminate. Calyx 5-6 mm long, lanceolate, scarious, entire, the broader one 2-fid at the apex. Corolla 6-8 mm long, white or bluish. Anthers mucous at the base, rudiments of 2 barren stamens sometimes present. Capsule 5-6 mm long, rigid, acute ; valves resilient. Seeds minute, ovoid.

Local name : Shatmulii.

Flowers : October onwards.

Occurrence : Recorded from Junagadh, Fort of Girnar ; Kabrastan, Jamnagar city ; Kileshwar Hills.

Uses : An infusion of root is given in fever and rheumatism with black-pepper. (Indraj 549. 1910)

ERANTHEMUM Linn.

Bracts white with green nerves ; calyx scarious :

Bracts elliptic ovate, cuspidate, nearly glabrous ; spikes in close panicles

nervosum

Bracts obovate, obtuse, mucronate or shortly apiculate, gland-strigose ; spikes in elongated panicles

roseum

Bracts green, rarely whitish when old

purpurascens

Eranthemum nervosum (Vahl) R. Br. Prodr. 477. 1810 ; Santapau, Acanth. Bomb. Univ. Bomb. Bot. Mem. No. 2, 35. 1951 ; Santapau & Jan. 39. 1967. *Justicia nervosa* Vahl, Enum 1 : 164. 1805 ; Bot. Mag. t. 1358. 1811. *Daedalacanthum nervosus* T. Anders. in Journ. Linn. Soc. 9 : 487. 1867. FBI 4 : 418 ; Cooke 2 : 441.

A shrub, 60-150 cm high. Bracts white with green nerves ; elliptic-ovate, cuspidate, nearly glabrous ; spikes 2.5-7.5 cm long, in close panicles ; calyx scarious.

Flowers : November onwards.

Occurrence : Junagadh foot of Girnar in a small nursery.

Uses : Cultivated in gardens for their attractive foliage and flowers.

Eranthemum purpurascens Nees in Wall. Pl. As. Rar. 3 : 106. 1832 ; Santapau, Uni. Bomb. Bot. Mem. No. 2, 35. 1951 ; Santapau, Pl. Saur. 627. 1953 ; Gir 272 ; Santapau & Jan. 39. 1967. *Daedalacanthus purpurascens* T. Anders. in Journ. Linn. Soc. 9 : 488. 1867 ; FBI 4 : 420 ; Cooke 2 : 440 ; Indrajit 554. 1910.

A shrubby plant about 30-60 cm high ; stems leafy. Leaves 8-20 × 3-8 cm, uppermost much smaller, ovate, acuminate, rounded at the base, sessile, nerves 7-9 pairs. Spikes 2.5-7.5 cm long, dense, long-peduncled, forming loose panicles. Flowers 2.5 cm long, green, rarely white when old, ovate-lanceolate, long, prominently many nerved ; bracteoles 5 mm long, green, linear-lanceolate, glandular. Calyx 7 mm long, lobed half way down, lobes lanceolate. Corolla 4 cm long, pubescent, or nearly glabrous, bluish. Anthers included filaments glabrous. Ovary glabrous. Capsules 1.5 cm long, pointed, glabrous, lower cylindrical portion short. Seeds 4 mm long, hygroscopically hairy.

Local name : Dashamuli.

Flowers : October onwards.

Occurrence : Recorded from Gir Forest ; Junwania Nes, in undergrowth of forest, Shirwan, Sasan, across the river, common in river banks.

Uses : Roots are used in rheumatism, fever and leucorrhoea. It is cultivated in the garden for their attractive foliage and flowers. (Indraji 544. 8910)

Eranthemum roseum (Vahl) R. Br. Prodr. 477. 1810 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 34. 1951 ; Santapau, Pl. Saur. 628. 1953 ; Santapau & Jan. 39. 1967. *Justicia rosea* Vahl, Enum. 1 : 165. 1804. *Daedalacanthus roseus* T. Anders in Journ. Linn. Soc. 9 : 487. 1867 ; FBI 4 : 419 ; Cooke 2 : 439.

A shrub about 30-100 cm high with rose coloured flowers. Leaves 12-20 × 4-8 cm ; upper leaves smaller but fewer oblong-lanceolate, acuminate, long, main nerves 9-11 pairs, petioles 1.5-3 cm long. Spikes 8-18 cm long, subinterrupted, lax axillary, bracts 1.5 cm long, obovate, obtuse, white with green hairs, bracteoles narrowly linear, acute, densely clothed on the back and ciliate with long white hairs. Calyx 5 mm long, white pubescent, scarious, lobes lanceolate, acute, with strong midrib. Corolla 2.5-4 cm long, tube slender ; lobes oblong-obovate, truncate at the apex. Filaments glabrous. Capsules 1.5 cm long, glabrous, pointed. Seeds 3 mm diam., much compressed.

Local name : Dashamuli.

Flowers : October onwards.

Occurrence : Recorded from Ghumli Abhapara top ; Jamnagar ; Girnar.

Uses : The spindle-shaped, tuberous root of the plant boiled in milk is a popular remedy for leucorrhoea. The root is also given to pregnant cattle to promote the growth of the foetus. (WI)

HAPLANTHUS Nees

Bracteoles longer than the calyx ; axillary spines exceeding 2.5 cm long ; capsule glabrous

verticillaris

Bracteoles shorter than the calyx ; axillary spines not exceeding 2.5 cm long ; capsule pubescent

tentaculatus

Haplanthus tentaculatus (Linn.) Nees in DC. Prodr. 11 : 513. 1847 ; FBI 4 : 507 ; Cooke 2 : 453 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 52. 1951 ; Santapau & Jan. 39. 1967. *Ruellia tentaculata* Linn. Cent. Pl. 2, in Amoen. Acad. 4 : 320. 1759.

A slender decumbent herb ; branches many from the base of stem, spreading, ascending and glandular-pubescent throughout. Leaves 4-10 × 2.5-6 cm ovate, subacute at the apex, cuneate at base and decurrent into the petiole, puberulous above, glabrous or nearly so beneath ; main nerves 8-10 pairs, slender. Cladodes very slender, subquadrangular, 1-1.5 cm long, ending in 2 or more teeth, villous, with many dense, soft needle like white hairs. Flowers sessile, lilac, or bright blue, collected in conspicuous soft terminal spikes 2-5 cm long ; bracteoles subulate, shorter than the calyx. Calyx 4-5 mm long, divided to the base ; lobes linear-subulate, with many patent needle like white hairs. Corolla 10-15 mm long, ovate, 2-lipped about 1/4 way down. Capsules 6-8 mm long, oblong acute, nearly hairy.

Flowers : December onwards.

Occurrence : Recorded from Gir Forest, Shirwan, common and abundant in undergrowth.

Uses : This herb is reported to be given in fevers. (WI)

Heplanthus verticillatus (Roxb.) Nees in DC. Prodr. 11 : 513. 1847 ; FBI 4 : 506 ; Cooke 2 : 452 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 51. 1951 ; Santapau, Pl Saur. 629. 1953 ; Gir 274 ; Santapau & Jan. 39. 1967. *Justicia verticillata* Roxb. Fl. Ind. 1 : 135. 1832.

A herbaceous plant up to 90 cm high ; stems pubescent upwards. Leaves 5-10 × 3-5 cm, acute ; main nerves 8-10 pairs ; petioles 2-4 cm long. Cladodes stout, quadrangular, 2-3 cm long, ending in 2 spinous teeth, villous and glandular hairy. Flowers sessile ; bracteoles finely pointed longer than calyx. Calyx 4 mm long ; lobes glandular-pubescent, lanceolate, corolla 1.5 cm long, pubescent outside, tubular ; limb dark lilac, with darker lines. Capsules 1 cm long, glabrous acute, grooved, white seeds 2-3 × 1 mm, compressed, yellowish brown.

Local name : Kalun Kariyatun.

Flowers : August onwards.

Occurrence : Recorded from Junagadh, right of steps Girnar, Junwania Nes, on sloping ground in undergrowth, abundant locally, Shirwan, Kankai near river.

Uses : The herb is reported to be given in fever. (WI)

HEMIADELPHUS Nees

Hemidelphus polyspermus Nees in Wall. Pl. As. Rar. 3 : 80. 1832 ; Srinivasan et Agarwal in Bull. Bot. Surv. Ind. 5 (1) : 83. 1963. Santapau & Jan. 39, 1967. *Hygrophila polysperma* (Roxb.) T. Anders. in JLS 9 : 456. 1867 ; FBI 4 : 406 ; Woodrow in JBNHS 12 : 355. 1899 ; Cooke 2 : 429 ; Santapau in RBSI 16 (1) : 173. 1960.

A branching and rooting small procumbent herb 15-35 cm. high. Leaves 1-4 × 0.4-1.0 cm, from narrowly oblong to ovate, mostly entire and glabrous, sessile. Flowers in terminal dense, oblong or linear spikes 2.5-10 cm long, somewhat pubescent ; bracts 6-8 × 3 mm, broadly elliptic, imbricate ; bracteoles 6 mm long lanceolate. Sepals 6 mm long, linear, hairy, with scarious ciliate margins. Corolla 8 mm long, pale blue, pubescent 2 anterior stamens fertile ; posterior stamens reduced to teeth ; anthers oblong, cells slightly divaricate at the base, mucous. Ovary hairy at the apex. Capsules 10 × 2 mm, glabrous. Seeds 20-32, orbicular.

Flowers : September onwards.

Occurrence : Woodrow reported it from Veraval and Rajkot.

HEMIGRAPHIS Nees

Hemigraphis latebrosa (Roth) Nees in DC. Prodr. 11 : 723. 1847 ; FBI 4 : 423 ; Cooke 2 : 434 ; Santapau & Jan. 39, 1967. *Ruellia latebrosa* Heyne ex Roth. Nov. Pl. Sp. 307. 1821.

A diffuse herb. Stems clothed with soft white hairs, especially in the basal part. Leaves membranous, 5-9 × 3-6 cm, ovate, acuminate at the apex, cuneate at the base, crenate-serrate along the margins, sparsely hairy on both the sides ; petioles 2-4 cm long. Flowers gentian blue, in axillary and terminal heads ; bracts elliptic, acute, hairy with densely ciliate margins. Sepals 5-6 mm long, subequal, linear-lanceolate, whitened, hairy and ciliate. Corolla 1.5-2 mm long, nearly straight, tube pale or yellowish, gradually narrowed upwards ; limb blue. Shorter filaments glabrous ; anthers narrowly oblong ; cells triangular, acute, ovary slightly pubescent, at the apex. Capsules 5-6 mm long, oblong, minutely pubescent, 6-seeded. Seeds 1-6 mm in diam, clothed with white hairs.

Flowers : October.

Occurrence : Recorded from Junwania Nes ; Jasadhar, abundant in undergrowth of forest in moist places.

HYGROPHILA R. Br.

Erect herbs, leaves rather large :

Bracteoles acute, lanceolate, leaves linear or linear-lanceolate *salicifolia*

Bracteoles long, narrow, linear-lanceolate ; leaves lanceolate, acute at apex, tapering at base *auriculata*

Prostrate herb, leaves small *serpyllum*

Hygrophila auriculata (Schumach.) Heine in Kew Bull. 16 (2) : 172. 1962 ; Santapau & Jan. 30. 1967 ; Santapau, Fl. Khandala, 194. 1967. *Barleria auriculata* Schum. in Schumach. & Thonn. Beskr. Guin. Pl. 285. 1827. *Asteracantha longifolia* (Linn.) Nees in Wall. Pl. As. Rar. 8 : 90. 1832 ; Cooke 2 : 428 ; Santapau, Pl. Saur. 616. 1953. *Hygrophila spinosa* Anders. in Thwaites Enum. Pl. Zey. 225. 1860. FBI 4 : 408 ; Indrajai 549. 1910.

A stout, erect, hispid herb of fresh water ditches and swamps ; stems 60 - 150 cm high, usually fasciated and undivided, thickened at the nodes. Leaves 6 at a node, lanceolate, acute at apex, tapering at base, sparsely hispid with long white hairs on both the sides ; the two outer leaves of the whorl the largest 10 - 13 × 2.5 - 3.5 cm, the four inner leaves 3 - 4 × 1 - 1.5 cm, axillary spines 2 - 3.5 cm long, straight, stout, yellow and very sharp, persisting after leaf-fall. Flowers 2 - 3 cm long, purplish-blue, in sessile axillary whorls surrounded by slightly recurved spines ; bracts 1.5 - 2.5 cm long, lanceolate, leafy hairy and ciliate ; bracteoles 6 - 10 mm long, narrow, linear-lanceolate, hairy and ciliate. Sepals lanceolate, coarsely and ciliate with white hairs especially on margins and back ; upper sepal the largest, 15 - 20 mm long ; the other three narrower, 10-15 mm long ; notch at the tip of the narrow sepal. Corolla 3 cm long ; tube 15 mm long, cylindrical below, enlarged above, 2-lipped ; the upper lip 2-lobed ; the lower 3-lobed with 2 crested folds on the palate, white pubescent. Filaments glabrous, anthers 2-celled. Styles linear, pubescent, stigmas simple, linear. Capsule linear-oblong, 8 × 3 mm, pointed, 4 - 8 seeded. Seed 1 - 2 mm long, flat and white hairy when wet.

Local name : Ekharo.

Flowers : June - January.

Occurrence : Recorded from Barda Hill, found abundantly on the river bank of Minsar and Vartu.

Uses : The roots, leaves and seeds are used in the Indian medicine as diuretics and have also been employed for jundice, dropsy, rheumatism, and diseases of the urino-genital. (WI)

Ash of the plant is used as a washing-soap. (Indraji 549. 1910)

Hygrophila salicifolia (Vahl) Nees in Wall. Pl. As. Rar. 3 : 81. 1832 ; FBI 4 : 407 ; Santapau, Univ. Bomb. Bot. Mem. No. 2 : 20. 1951 ; Santapau & Jan. 39. 1967. *Ruellia salicifolia* Vahl, Symb. 3 : 84. 1794. *Hygrophila augustifolia* Cooke 2 : 430 (non R. Br. Sec. Lindau).

Herbaceous, erect, often much branched, 30-90 cm high. Leaves glabrous usually entire, lower sometimes obovate or oblong ; upper lanceolate. Flowers sessile, in dense opposite axillary clusters forming rather distant whorls, bracts oblong, subobtuse, hairy, bracteoles lanceolate, acute, hairy. Calyx tubular, divided $\frac{1}{2}$ -way down in flower. Corolla hairy outside, pale purplish blue. Capsules narrow, subquadrangular. Seeds 20-28, orbicular.

Flowers : October onwards.

Occurrence : Collected from Shirwan, Sasangir.

Uses : The leaves are eaten as a pot-herb. It is strongly diuretic. (WI)

Hygropolia serpyllum (Nees) T. Anders. in Journ. Linn. Soc. 9 : 456. 1867 ; FBI 4 : 406 ; Cooke 2 : 429 ; Indraji 549. 1910 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 20. 1951 ; Santapau, Pl. Saur. 630. 1953 ; Santapau & Jan. 39. 1967. *Physichilus serpyllum* Nees in Hook. Comp. Bot. Mag. 2 : 311. 1837.

A small, branching prostrate herb from a woody rootstock. Stems 10-40 cm long, glabrous or slightly hairy, spreading and rooting at the nodes. Leaves 1-3 × 0.6-2 cm, elliptic or suborbicular, acute, obtuse or rounded at the apex and at the base, hairy on both sides, entire ; petiole 0-3 mm long but some basal leaves 1-2.5 cm long. Flowers blue in dense terminal white-strigose spikes, 1-2 cm long, ovate or shortly

oblong; bracts 6 mm long, elliptic, subacute, hairy; bracteoles 6 mm long, hairy. Calyx 5-6 mm long, segments linear, densely ciliate. Corolla 8-12 mm long, deeply 2-lipped; upper lip 2-lobed, lower lip 3-lobed; Filaments glabrous, the anthers of posterior pair smaller, 1 mm long, those of anterior pair 2 mm long. Styles hairy. Capsules 5-6 mm long, glabrous, pointed linear-oblong, 8-19-seeded. Seeds suborbicular.

Local name : Sarapat.

Flowers : During monsoon seasons.

Occurrence : Recorded from Barda Hill, it grows near the stream where rainy water accumulates.

Uses : Its fruits are edible; the leaves are eaten in times of famine. (WI)

Whole plant or leaves are ground and tied on wounds. (Indraji, 549. 1910)

JUSTICIA Linn.

Calyx 5-partite, segments equal or subequal :

Heads, flowers 1-4-nate, axillary

heterocarpa

Erect undershrubs; flowers clustered in the spike

gendarussa

Calyx lobes 4; herbs or undershrubs with flowers up to 12 mm long :

Spikes cylindric; bracts and bracteoles as long as or longer than the calyx lobes :

Bracts and bracteoles very slender and long, with distant spreading long bulbous-based white hairs. Leaves with raphides irregularly arranged in the middle, transversely near the margins

micrantha

Bracts and bracteoles linear, pectinately white-ciliate and scabrous hirsute; raphides concentrically transverse and curved

procumbens

Bracts elliptic-ovate, bracteoles narrower though similar; raphides concentrically transverse, bracts more than 2.5 mm broad; bracteoles and calyx lobes similar, narrower, all scarious margined and with soft whitish jointed hairs

simplex

Spikes linear; bracts and bracteoles shorter than the calyx lobes, all scarious-margined :

Bracts, bracteoles and calyx lobes obtuse at apex

quinqueangularis
var. *peplioides*

Bracts, bracteoles and calyx lobes acute at apex

diffusa

Justicia diffusa Willd. Sp. Pl. 1 : 87. 1789 ; FBI 4 : 538 ; Cooke 2 : 489 ; Santapau, Acantha. Bomb. Uni. Bomb. Bot. Mem. No. 2 : 87. 1951 ; Santapau, Pl. Saur. 631. 1953 ; Santapau & Jan. 39. 1867.

Stems diffuse, slender, with many divaricate branches, rooting at the lower nodes, glabrous or pubescent. Leaves 1.2 - 3.7 × 0.6 - 1.8 cm, variable, elliptic or ovate or lanceolate, usually obtuse at both ends, softly pubescent on both sides ; petioles 0.3 - 1.2 cm long. Flowers in rather dense cylindric, terminal spikes 1.2 - 3.7 cm long, bracts .05 - 0.1 cm, linear-lanceolate, acute hairy with ciliate margins ; bracteoles similar to the bracts. Calyx 0.4 cm long, divided almost to the base ; segments linear-subulate, narrower than the bracteoles. Corolla pale violet-pink, 0.6 cm long ; tube about equalling the limb, funnel-shaped ; upper lip broadly ovate and concave in the lower, narrowly subquadrate in the apical part, notched ; lower lip 3-lobed. Filaments glabrous. Ovary glabrous. Capsules 0.4 × 0.15 cm, oblong, shortly pointed ; solid stalk 0.12 cm long. Seeds 0.12 cm long, finely tuberculate.

Flowers : August to December.

Occurrence : Recorded from Gondal Irrigation lake and Jamnagar.

Justicia gendarussa Burm. f. in. Fl. Ind. 10. 1768, FBI 4 : 532 ; Cooke 2 : 492 ; T. Anders. in Journ. Linn. Soc. 9 : 513 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 91. 1951 ; Santapau, Pl. Saur. 632. 1953 ; Santapau & Jan. 39. 1967.

An erect undershrub 60-125 cm high. Leaves 8-12 by 1.5 - 2.5 cm, narrowly lanceolate, glabrous, main nerves about 7 pairs, not conspicuous; petioles 6-7 mm long. Flowers small, strong-scented, clustered, in axillary or terminal, branched often paniculate, spikes 5 - 13 × 2 cm, lower clusters usually distinct. Spikes puberulous or glabrous. Bracts 3 mm long, inconspicuous narrow, linear, shorter than the calyx, bracteoles absent. Calyx 4 mm long, lanceolate, slightly acute, glabrous. Corolla 1 - 1.5 cm long, nearly glabrous, white or rose with purple spots. Lower anthers-cells distinctly tailed. Capsules 10-15 mm long, glabrous, clavate, 4-seeded.

Local name : Kalo araduso.

Flowers : During monsoon season.

Occurrence : Recorded from various places in Saurashtra.

Uses : The plant is considered a febrifuge, emetic, ememenagogue and diaphoretic. The leaves are used as antiperiodic, alterative and insecticide. Fresh leaves are used topically in oedema of beriberi and rheumatism. Leaves and tender shoots are considered diaphoretic and an infusion of the leaves is given internally in cephalalgia, hemiplegia and facial paralysis. The juice of leaves is reported to possess the property of stopping internal haemorrhage; it is dropped into the ear for earache and into the nostril for hemicrania. It is used also for colic in children. The root is also reported to have several medicinal uses. The bark is considered emetic. (WI)

Justicia heterocarpa T. Anders. in Journ. Linn. Soc. 7 : 41. 1864 ; FBI 4 : 531 ; Woodrow in JBNHS 12 : 357. 1899 ; Cooke 2 : 486 ; Indrajī 561. 1910 ; Santapau, Pl. Saur. 633. 1953 ; Santapau & Jan. 39. 1967.

A slender annual herb, 20-40 cm high, minutely grey-pubescent. Leaves 2-4 × 0.6-1.5 cm, thin, ovate, acute, minutely lanceolate, subglabrous, cuneate, in axillary clusters, 1-4-gonate; bracts and bracteoles very small, linear. Calyx sub 5-partite, segments 3 mm long, linear, minutely hairy. Corolla 5-6 mm long, 2-lipped; upper lip shortly 2-lobed, oblong, obtuse; lower lip slightly longer than the upper one, transversely marked, shortly 3-lobed, obovate. Anther-cells ovate; lower white-tailed. Capsules heterocarpous; normal capsules 3-5 mm long, ellipsoid, acute at each end, hardly stalked, pubescent, 4-seeded; abnormal capsules 1-celled, 1-seeded, 3 mm, ellipsoid, with 3-6 vertical crested wings. Seeds of normal capsules papillose, subhispid; seeds of abnormal capsules larger than the normal nearly smooth, ovoid, on a nearly basal reticulum.

Local name : Khetarau Khadsalio.

Flowers : August to October.

Occurrence : Woodrow reports it from Porbandar (Cooke). Also recorded from Barda Hill, in the waste lands of Rajawadi.

Uses : Whole plant is boiled in water and vapour is inhaled. (Indrajī 562. 1910)

Justicia neesii Raman. in Fl. Hassan Dt. 551. 1976. *Justicia micrantha* Wall. ex. C. B. Clarke in J. Hooker Fl. Brit. India 4 : 536. 1885. non Pohl ex Nees 1847; Santapau, Bot. Mem. Univ. Bomb. No. 2 : 87. 1951; Santapau & Jan. 39. 1967.

A low much branched herb 10-25 cm high; stems and branches slender, grooved, glabrous or pubescent. Leaves 1.8-3.7 × 1.2-1.5 cm, ovate or elliptic, subobtuse, densely lineolate, main nerves 4-6 pairs, petioles 0.3-0.6 cm long. Flowers in terminal and axillary dense spikes 0.6-3.1 cm long, bracts 0.6 × 0.15 cm, linear, blunt, sparsely hispid with white long bristly hairs, often tipped with divaricate bristles, bracteoles similar to the bracts. Calyx 0.5 cm long, 4-partite almost to the base, segments 0.12 cm broad, the midrib green. Corolla 0.6 cm long, pale-purple, upper lip 0.3 cm long, deltoid-oblong, obtuse entire; lower lip 0.4 cm long, broadly obovate, with 3 rounded subequal lobes. Filaments glabrous. Ovary pubescent at the tip; lower half of style pubescent. Capsules 0.4 × 0.2 cm, tapering into a short about 0.12 cm long, 4-seeded. Seeds 0.12 cm in diam., finely rugose.

Flowers : October onwards.

Occurrence : Collected from Junagadh, Fort of Girnar.

Justicia procumbens Linn. Sp. Pl. 15. 1753; FBI 4 : 539; Cooke 2 : 491; Santapan, Uni. Bomb. Bot. Mem. No. 2 : 90. 1951; Santapou & Jan. 40. 1967.

Stems diffuse, slender, with many divaricate branches, rooting at the lower nodes, glabrous or pubescent. Leaves 1.2-3.7 × 0.6-1.8 cm, variable, elliptic or ovate, or lanceolate, usually obtuse at both ends, softly pubescent, petioles 0.3-1.2 cm long. Flowers in rather dense cylindrical terminal spikes 1.2-3.7 cm long; bracts 0.5 × 0.1 cm, linear-lanceolate, acute, hairy; bracteoles similar to the bracts. Calyx 0.4 cm long, divided almost to the base; segments linear-subulate. Corolla pale violet-pink, 0.6 cm long, tube about equalling the limb, funnel-shaped, upper lip broadly ovate and concave, notched; lower lip very shortly 3-lobed. Filaments glabrous. Ovary glabrous. Capsules 0.4 × 0.15 cm, oblong shortly pointed, solid stalk 0.14 cm long. Seeds 0.14 cm long, finely tuberculate.

Flowers : August to October.

Occurrence : Recorded from Sasan Gir to Junwania and Girnar Hill, Junagadh.

Uses : The juice of the leaves is squeezed into the eye in cases of ophthalmia. An infusion of the herb is given in asthma, cough, rheumatism, backache, pichora, flatulence and lumbago. A decoction of leaves is sometimes used in the treatment of curvature and diseases of the bone. Along with the black pepper it is used in the treatment of ague. (WI)

Justicia quinqueangularis Koen. ex Roxb. Fl. Ind. ed. Carey & Wall. 1 : 134. 1820 ; FBI 4 : 537 ; Cooke 2 : 490 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 89. 1951 ; Santapau, Pl. Saur. 635. 1953 ; Santapau & Jan, 40. 1967.

A slender herb reaching 50 cm high ; stems 4-5 angular with distant internodes, geniculate, glabrous. Leaves 2.5-7.5 × 0.3-0.9 cm, linear-oblong or linear-lanceolate, subobtusely, lineolate glabrous ; petioles 0-0.3 cm long. Flowers in slender elongate glabrous, terminal spikes 2.5-12.5 cm long, bracts 0.4 × 0.12 cm linear, obtuse, glabrous, and as well as the bracteoles and calyx, with scarious margins ; bracteoles as long as and similar to the bracts but narrower. Calyx glabrous, 0.4 cm long, 4-partite nearly to the base ; segments slightly broader than the bracteoles, linear, obtuse. Corolla nearly 0.9 cm long, glabrous, rose-coloured, upper lip 0.4 cm long, ovate, obtuse, 2-lobed, lower lip 0.5 cm long, and as broad as long, 3-lobed. Filaments glabrous. Ovary glabrous. Capsules 0.8 × 0.25 cm, oblong, acutely pointed, 4-seeded. Seeds 0.15 cm in diam., reticulately rugose.

Flowers : August to December.

Occurrence : Gondal Irrigation Lake.

Uses : The leaves of the plant are eaten as Pot herb. (WI)

Justicia quinqueangularis var. *peploides* (Nees) Clarke, Fl. Brit. Ind. 4 : 537. 1885 ; Cooke 2 : 490 ; Santapau, Uni. Bomb. Bot. Mem. No. 2. 89. 1951 ; Santapau & Jan. 40. 1967. *Rostellaria peploides* Nees in Wall. Pl. As. Rar. 3 : 101. 1832.

A slender very much branched herb, rooting at the nodes and giving erect branches 8-18 cm high ; internodes long. Leaves 1-3 × 0.6-1.9 cm oblong or ovate, obtuse, petioles reaching 1 cm long. Flowers small in dense spikes, shorter and broader, often subovate when young ; bracts and bracteoles shorter than the calyx-lobes, all with green midrib, scarious margins, linear-oblong, obtuse, glabrous. Calyx 4-8 mm long, linear-oblong, obtuse, glabrous, scarious-margined. Corolla reaching 1 cm long, glabrous outside, rose-coloured. Filaments glabrous. Ovary glabrous. Capsules large, reaching 12-14 mm, obovoid, glabrous. Seeds 1.5 diam., with wavy ridges.

Flowers : August to May.

Occurrence : Recorded from Gondal Irrigation Lake.

Justicia simplex D. Don. Prodr. Fl. Nep. 118. 1825 ; FBI 4 : 539. Woodrow in JBNHS 12 : 358. 1899 ; Cooke 2 : 490 ; Santapau, Pl. Saur. 636. 1953 ; Gir 277 ; Santapau & Jan. 40. 1967.

Erect, 30 cm high. Leaves 2-3.5 × 1-2 cm, ovate or oblong, sometimes linear, acute at base; petioles 3-6 mm long. Flowers in dense axillary on terminal spikes; bright light purples; 2-10 cm long, much broader and much hairy; bracts 3-4 × 2.5 mm, elliptic, shortly acute, scarious-marginate, very hairy with glistening many jointed whitish hairs, green-keeled; bracteoles narrower, lanceolate, obovate, hairy with scarious and ciliate margins. Calyx 3-5 mm long, lanceolate, acute, hairy nearly to their base. Corolla pale pink to lilac, 5-8 mm long, pubescent outside. Filaments glabrous except at their insertion. Ovary pubescent at the tip. Capsules 3-6 × 1 mm, oblong, scarcely mucronate, papery. Seeds 1 mm in diam., rugose.

Flowers : October to December.

Occurrence : Recorded from Junagadh to Sasan; found abundant on sands at Veraval and Somnath; Mangrol; Rajkot; Pradumna Park; Dwarka near station; Okha, Sasan Gir to Junwania, Ghumli abhapara top and Jamnagar. Woodrow reports it from Rajkot.

Justicia vahlii Roth, Nov. Pl. SP. 14. 1821; Santapau, Bot. Mem. Uni. Bomb. 2 : 88. 1952. *J. diffusa* Willd. var. *vahlii* Clarke in FBI 4 : 538. 1885; Cooke : 490.

Erect tall slender straggling herb; stems 30-60 cm high, glabrous or minutely pubescent; branches with long internodes, angular and scabrous. Leaves narrowly linear or lanceolate, 3-8 × 1-2 mm, lower ones ovate, raphides numerous, ascending; petioles 6-12 mm long. Flowers pale with a reddish tip, in axillary and terminal spikes 3-14 × 0.5 cm, bracts lanceolate, white margined, more or less scabrous, shorter than calyx, 2 mm long; bracteoles similar to the bracts but narrower. Calyx 3 mm long, lanceolate, subacute; tips minutely scabrous; segments with scarious margins. Corolla 5 mm long, slightly pubescent outside, lower portion ovate, the apical part slightly notched at the apex. Filaments more or less glabrous, ovary glabrous except at the lower portion of the style. Capsules 3-4 mm long, pubescent, oblong, shortly pointed. Seeds 1 mm long, papillose.

Flowers : October.

Occurrence : Collected from Rozi port of Jamnagar, Balachadi and from H. H. Banglow, Jamnagar; Dwarka, neighbourhood of Station; Rajkot.

LEPIDAGATHIS Willd.

Seeds 2 :

Leaves sessile, acute, entire, lanceolate above

trinervis

Seeds 4 :

Leaves petioled, lanceolate, acute or acuminate at apex

cuspidata

Lepidagathis cuspidata (Wall.) Nees in Wall. Pl. As. Rar. 3 : 97. 1832 ; & in DC. Prodr. 11 : 258. 1847 ; FBI 4 : 519 ; Cooke 2 : 474 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 73. 1951 ; Santapau, Pl. Saur. 637. 1953 ; Gir 278 ; Santapau & Jan. 40. 1967. *Ruellia cuspidata* Wall. Cat. 2405. 1830. (nom nudum)

An erect under-shrub, 30–100 cm high ; stems glabrous or pubescent towards the apex. Leaves on the main stem, large, up to 11.5 × 4.5 cm, lanceolate, acute or acuminate at apex, cuneate and decurrent into the long petiole to nearly its base, mucicous ; petioles 0.6–3.0 cm long ; leaves of the branches much smaller, up to 25 × 10 mm, almost linear, mucronate softly pubescent, spinous-pointed. Flowers in terminal spikes, variable in size and shape, sometimes 2.5 cm long, dense, when up to 15 cm, lax with the flowers in distinct opposite pairs ; bracts 10–15 × 4–6 mm, ovate, cuspidate, 3-nerved, glandular-pubescent and sharply spinous pointed ; bracteoles up to 10 mm long, 1-nerved, lanceolate, spinous-pointed. Calyx 1.5 cm long, 5-partite, glandular-hairy. Corolla white purplish spots, 10–15 mm long, ovate, acute ; tube short, slightly villous within. Filaments glabrous ; anther-cells bearded at different levels. Ovary glabrous, styles pubescent. Capsules 8–10 mm, long, acute, glabrous, 4-seeded, 2-valves ; tip not subsolid. Seeds 2 mm in diam., compressed, hygroscopically hairy especially on the margins.

Flowers : October to March.

Occurrence : Recorded from Ghumli, Abhapara top and Jamnagar.

Lepidagathis trinervis Wall. ex Nees in Wall. Pl. As. Rar. 3 : 96. 1832 ; FBI 4 : 517 ; Woodrow in JBNHS 12 : 357. 1899 ; Cooke 2 : 471 ; Indrajit 560. 1910 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 72. 1951 ; Santapau, Pl. Saur. 638. 1953 ; Gir 279 ; Santapau & Jan. 40. 1967.

A suffruticose diffuse plant with woody rootstock ; stems numerous, 15–25 mm, with many nodes and white hairs. Leaves 15–40 × 3–6 m, sessile, mucicous, acute, entire, lanceolate above ; midrib beneath distinct, with a slender nerves parallel to it, near the margins ; the

margins scabrid, otherwise more or less glabrous. Flowers in axillary spikes, 10-24 × 4-8 mm, sessile; ovoid, many, generally near the base of the stems, sometimes all conglomerated into a subradical globe; bracts 10-20 mm long, ovate, spinous-cuspidate-glabrous, often minutely pubescent at the apex and margin; bracteoles linear-lanceolate, softly membranous. Calyx membranous, non-spinescent, 5-partite, 5-8 mm long, unequal, linear-lanceolate, acute, white-pubescent. Corolla, 6-9 mm long, white, spotted with brown or purple, densely white-haired; tube short, up to 3 mm long. Filaments white, spotted with brown or yellow. Styles pubescent. Capsules 4-8 × 1-1.5 mm, ovoid-lanceolate, compressed, 2-seeded, yellowish-brown, shining, smooth-seeds 2.5 × 1 mm, brownish-black, rounded at the tip, with long mucilaginous hygroscopic hairs.

Local name : Harancharo, Paneru.

Flowers : October to December.

Occurrence : Recorded from Rajkot, Pradumna Park, Lakes and river bed : Junagadh; Dwarka near station, Okha : Syke's Point, 6 m NE. Salaya, Jamnagar; Balachari; H.H. Bunglow; Sasan along river, and Mangrol. Woodrow reports it from Kathiawar.

Uses : The plant is considered as a bitter tonic. (WI)

Ash of this plant is mixed with oil and applied on blotches, swellings etc. It is also applied on ringworm and itch with sulphur. Leaves are used as substitute for tea by some local people. (Indraji 561. 1910).

MONECHMA Hochst.

Monechma debile (Forsk.) Nees in DC. Prodr. 11 : 411. 1847; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 91. 1951; Santapau, Pl. Saur. 639. 1953; Santapau & Jan. 40. 1967. *Dianthera debilis* Forsk, Fl. Aegypt. Arab. 9 : 1775 (non Clarke); *Monechma bracteatum* Hochst. in Flora 24 : 375. 1841; Cooke 2 : 492.

An erect herb, 30-60 cm. high; stems softly pubescent, very little branched, grooved. Leaves 3-6 × 1-1.5 cm, oblong-lanceolate, obtuse, nearly glabrous, tapering into petiole at base; main nerves 4-6 pairs; petioles 1-2 cm long. Flowers in spikes, 25-50 cm long, subsessile; bracts 10-12 × 4-5 mm, elliptic, rounded at apex, tapering at the base into a short stalk, densely white-ciliated along the margins; bracteoles 1-2 mm long, ovate, lanceolate, hairy. Calyx 6-7 mm long, densely hairy, segments linear. Corolla 7-9 mm long, slightly pubescent; segments oblong-obovate. Anthers glabrous; lower anther-cells with a

white appendage, ovary densely hairy. Capsules $6-7 \times 2-3$ mm, with deflexed hairs, pointed 2-seeded. Seeds $2-3$ mm in diam, yellow, shining, smooth, glabrous.

Flowers : October to November.

Occurrence : Recorded from Amar Jund, Kabrastan, Jamnagar ; Kileshwar Hills ; Okha ; Bileshwar, on Barda Hills.

NEURACANTHUS Nees

Neuracanthus sphaerostachyus (Nees) Dalz. in Hook. Kew. Journ. Bot. 2 : 140. 1850 ; FBI 4 : 491 ; Cooke 2 : 465 ; Indraji 557. 1910 ; Bole & Santapau in JBNHS 56 : 428-430. 1951 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 66. 1951 ; Santapau, Pl. Saur. 640. 1953 ; Gir 280, Santapau & Jan. 40. 1967. *Lepidagathis sphaerostachya* Nees in DC. Prodr. 11 : 254. 1847.

An erect herb, 45-60 cm high ; branches numerous from the perennial root, scabrous-pubescent. Leaves $7-10 \times 3-6$ cm, elliptic-lanceolate, sessile, subacute, truncate or subcordate at base, lineolate above ; main nerves about 7-8 pairs ; margins finely white-pubescent, petioles 2 mm long. Spikes 25-50 mm, sometimes agglomerated into axillary globes 75-100 mm in diam., bracts purplish, $8-12 \times 5-9$ mm, ovate, sharply acuminate, hairy on both sides, 5-nerved, rarely 6-7-nerved. Calyx 14 mm long, 2-lipped ; one lip shortly 3-toothed, the other deeply 2-lobed, narrower than bracts ; lobes lanceolate, acute, densely white-ciliate. Corolla 1-1.5 cm long, entire ; tube white, smooth ; shining-limb a fine blue, obconic, subentire ; plicate ; lower lip of 3 very depressed triangular lobes, upper an emarginate subsimilar lobe. Anthers pubescent. Capsules $10-15 \times 6-8$ mm, shortly attenuated at the base, glabrous, 4-seeded. Seeds $4-6$ mm in diam., orbicular densely silky.

Local name : Ganther.

Flowers : August to October.

Occurrence : Reported from Junagadh, Girnar, between Jasadhar and Tulshishyam. Junwania Nes, Sasan down stream ; forest across the river, common.

Uses : The root of the plant is powdered and made into a paste which is used as a cure for ringworm. It is used also in indigestion. (WI)

Roots are used in rheumatism, ash of the plant is used by the local people on bronchitis and asthma with gur or honey. Flowers, unripe fruits and seeds are given with sugar in diabetes. (Indraji 559. 1910).

PERISTROPHE Nees

Peristrophe bicalyculata (Retz.) Nees in Wall. Pl. As. Rar. 3 : 113. 1832 ; FBI 4 : 554 ; Cooke 2 : 495 ; Indraji 565. 1910 ; Santapau, Uni. Bom. Bot. Mem. No. 2 : 93. 1951 ; Santapau, Pl. Saur. 641. 1953 ; Gir 281 ; Santapau & Jan. 40. 1967. *Dianthera bicalyculata* Retz. in Act. Holm. 297, t. 9. 1775.

A laxy paniculate spreading hispid herb 1 - 2 m high, thinly patentely hairy ; stems and branches 6-angled, scabrous along the angles. Leaves 5 - 9 × 2 - 5 cm, ovate ; acuminate, rounded at base, sometimes narrowed, more or less hairy on both sides ; petioles 6 - 15 m long. Flowers 1 cm long, in trichotomous cymes forming large divaricate pubescent ; bracts 2 - 8 × 10 × 1 mm, unequal, opposite, linear or linear-spathulate, acute, mucronate ; bracteoles 4, similar to the bracts but shorter. Calyx 3 - 4 mm long ; segments lanceolate-subulate with ciliate margins. Corolla pink, 8 - 14 mm long, elliptic, obtuse, entire. Filaments hairy ; anther-cells ovoid, remote, short, mucicose. Ovary hairy at the tip. Styles almost glabrous. Capsules 7 - 8 mm long, pubescent, pointed, 4-seeded. Seeds 2 - 3 mm. in diam, minutely glandular-papillose.

Local name : Kali-aghedi.

Flowers : September to January.

Occurrence : Recorded from Rajkot, Catholic church, Jubilee garden, beyond Rajkot station ; Junagadh to Sasan and Veraval.

Uses : The plant is said to be given as fodder for horses. A yellowish brown essential oil obtained by steam-distillation of the plant, shows tuberculostatic activity in vitro. (W1).

It is used as a substitute for chiretta, it is used on fever, dyspepsia, swellings and bronchitis, juice of the leaves is applied on glandular swelling. (Indraji 566. 1910)

RUELLIA Linn.

Ruellia tuberosa Linn. Sp. Pl. 635. 1753 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 23. 1951 ; Santapau, Pl. Saur. 642. 1953 ; & in Ind. For. 79 : 323 ; Santapau & Jan. 40. 1967.

An erect perennial herb with a cluster of tuberous roots which are 8-20 cm long; stems erect, ascending or diffuse, branched, quadrangular, deeply grooved, pubescent in younger parts, glabrous in older, greenish to dark-purple; internodes 6.3-9.3 cm long. Leaves 2.5-8.5 × 1-3 cm, obovate-oblong or elliptic-oblong, glabrous, dark-green, sub-acute or rounded at apex, attenuated at base, minutely hairy on both the sides; petioles 1-2.3 cm long. Flowers blue or purplish-blue 3.5-5 cm long, in axillary cymes; peduncles 2.5-3.0 cm long, greenish to dark-purple, slightly pubescent, grooved; pedicels 0.7-1.3 cm long, pubescent. Calyx 1.5-2.7 cm long; segments, persistent, pubescent. Corolla 3-4.5 cm long, 2.4-3.4 cm in diam., slightly pubescent outside. Capsules 1.5-2.2 cm long, cylindrical, shortly beaked, encircled by persistent sepals, green at first and finely changing to brownish. Seeds many, semicircular, pointed at one end, flat, with hairs which are extremely hygroscopic.

Flowers : July to May.

Occurrence : Recorded from Rajkot. Residency Park and Rajkumar College compound.

Uses : The herb possesses emetic properties and is employed as a substitute for ipecacuanha. It is also used for the treatment of stones in the bladder. A decoction of the leaves is given in chronic bronchitis (WI).

RUNGIA Ness

Bracts uniform; upper lip of corolla notched or emarginate :

Stems decumbent and rooting, neatly glabrous, capsule ovoid, acute

parviflora

Stems erect, densely hairy; capsule obovoid obtuse

elegans

Bracts dimorphic; upper lip of corolla acute, not notched

pectinata

Rungia elegans Dalz. in Dalz & Gibs. Bomb. Fl. 196. 1861; FBI 4; 549; Cooke 2: 480; Indraj 564. 1910; Santapau, Uni. Bomb. Bot. Mem. No. 2: 78. 1951; Santapau, Pl. Saur. 642. 1953; Santapau & Jan. 40, 1967.

An erect herb, 15-40 cm high; stems somewhat angular, patently white-hirsute. Leaves 3-6 × 1-3 cm, subsessile, elliptic-lanceolate, acuminate at apex, rounded at base, main nerves almost 7-8 pairs, prominent beneath, mostly patently white-hairy; petioles 0-2 mm long. Spikes 2-5 × 0.5-1 cm, sessile, terminal, often axillary, imperfectly 1-sided. Flowers bluish, bracts 7-10 × 6-7 mm, ovate, apiculate, roun-

ded at the apex, cuspidate, hairy on both the sides ; margins scarious, very prominent, sometimes coloured purplish ; bracteoles 4 6×1 mm, oblong-lanceolate, with scarious margins, minutely hairy, Calyx 5 mm long, thinly hairy ; segments linear-subulate. Corolla 1-1.5 cm long, hairy ; upper lip 2-lobed, 5 mm long, oblong ; lower lip 3-lobed, longer than the upper one, lobes obtuse. Filaments glabrous or minutely hairy ; anther-cells super-posed, lower white-tailed. Ovary pubescent. Capsules 4 $6 \times 2-3$ mm, thin, very hairy, obovoid, obtuse, shortly narrowed at the base. Seeds 1-2 mm long, yellowish brown, oblong, suborbicular, concentrically furrowed ; the ridges very sharp ; sometimes crested.

Local name : Dungari-Khadsaliyo.

Flowers : August to January.

Occurrence : Recorded from Rajkot, Pradumna Park, Rozi Port of Jamnagar ; Dhunvao vidi, Ranjit Sagar, Jamnagar, and beyt.

Rungia parviflora Nees in Wall. Pl. As. Rar. 3 : 110. 1832 & in DC Prodr. 11 : 469 (excl. Syn.) 1847 ; FBI 4 : 550 ; Santapau, Uni. Bomb. Bot. mem. No. 2 : 76. 1951 ; Santapau, Pl. Saur. 644. 1953 ; Santapau & Jan. 40. 1967.

A small herb, 30-60 cm high. Leaves small, ovate or lanceolate nearly glabrous, bracts dimorphic barren elliptic or oblong subobtusely striate hardly margined, fertile obovate glabrous scarious margined, ciliate, bracteoles elliptic scarcely acute. Spikes 1.8 \times 0.6 cm, nearly all terminal, flowers blue, barren bracts not cuspidate. Capsule 0.5 cm. Seeds small, minutely verrucose.

Local name : Khadsaliyo.

Flowers : October to January.

Occurrence : Shirvan Gir Forest ; Tulshishyam, Sasan along river ; Dhunvao vidi.

Uses : The herb is dried and pulverized for use in the treatment of cough and fever ; it is also credited with vermifugal and diuretic properties. Fresh bruised leaves are mixed with castor oil and applied to scalp to cure tinea capitis a scaly fungoid infection, usually occurring amongst children. (WI)?

Rungia pectinata (Linn.) Nees in DC. Prodr. 11 : 469. P.P. 1847 ; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 77. 1951 ; Santapau, Pl. Saur. 645. 1953 ; Gir. 283 ; Santapau & Jan. 40. 1967. *Justicia pectinata* Linn. Amoen. Acad. 4 : 299. 1759 ; *Rungia parviflora* var. *pectinata* Clarke in Fl. Brit. Ind. 4 : 550. 1885 ; Cooke 2 : 478.

A slender, annual, straggling, much-branched herb; branches spreading, subterete, slightly pubescent. Leaves $1.7 \times 0.4-2.0$ cm, elliptic-lanceolate or oblong-lanceolate, acute at apex, tapering at base, lineolate on both sides, glabrous or nearly so; petioles 1-4 mm long. Flowers blue, in terminal and axillary clustered, subsessile, distinctly 1-sided spikes, 2-25 mm long; sometimes 2-3 together at the ends of branches; barren bracts 4×2 mm, prominently pectinately arranged, lanceolate, cuspidate, scarcely margins on one or both sides; fertile 2-3 mm in diam., villous, orbicular, apiculate, scarious marginate hairy on both sides; bracteoles 2-3 mm long, elliptic-subacute concave with ciliate scarious margins which are 2-fid at the apex. Calyx 2 mm long; segments linear-lanceolate, pubescent. Corolla 5 mm long, pubescent outside, upper lip 1-2 mm long, ovate, acuminate; lower lip longer obovate. Filaments glabrous; anther cells superposed; lower white-tailed. Capsules 1-2 mm in diam. ovoid, acute, compressed with scarious faces. Seeds when 2 about 1 mm in diam., when 4 still smaller yellow, orbicular.

Local name : Moto Khadsaliyo.

Flowers : October to April.

Occurrence : Recorded from Junwania Nes; Shirwan, very abundant near water, Kankai, rather luxuriant forms near water; Sasan near river, very young small spikes were seen. Girnar, and Ghumli-abhapara top, Jamnagar.

Uses : The juice of the leaves is considered cooling and aperient, and is given to children suffering from smallpox. Bruised leaves are applied to confusions to relieve pain and reduce swelling. (WI).

THYRSACANTHUS Nees

Thyrsacanthus nitidus Nees, in DC. Prodr. 11 : 327. 1847; Santapau & Jan. 40. 1967.

Shrub, glabrous. Leaves oblong, shining, subcoriaceous. Inflorescences terminal, racemose, corolla two-lipped.

Flowers : October.

Occurrence : Sardar Baug, Junagadh, cultivated.

THUNBERGIACEAE

THUNBERGIA Retz.

Thunbergia erecta (Benth.) Anders. in Journ. Linn. Soc. 7 : 18. 1864 ; Cooke 2 : 418; Santapau, Uni. Bomb. Bot. Mem. No. 2 : 10. 1951 ; Santapau, Pl. Saur. 646. 1953 ; Santapau & Jan. 40. 1967. *Mevenia erecta* Benth. in Hook, Niger Fl. 476. 1849 ; Bot. Mag. 83 : t. 4013. 1857.

An erect bushy hardly branched glabrous shrub 1-2 m high, thriving in bright sun shine ; stems slender, 4-angled. Leaves 1-3 × 0.5-1.0 cm, ovate to elliptic-ovate, acuminate or acute at apex, entire or slightly angular-lobed along the margins, glabrous with a blunt tooth on each margin towards the upper part. Flowers axillary, often solitary ; bracts 2-3 cm long. Calyx-teeth 5-9, linear-lanceolate, obtuse, glabrous. Corolla purple-blue with white or yellowish tube ; tube 4-5 cm long, slender and constricted below, inflated and about 1 cm in diam above ; segments spreading, obovate, obtuse to acute, glabrous ; limb 3-4 cm in diam. Anthers bearded. Capsules thinly pubescent, shining, obovoid.

Local name : Mohan.

Flowers : August to January.

Occurrence : Junagadh at foot of Gitnar.

Uses : Cultivated in the gardens and often cut into beautiful shapes and designs for the topiarist's art.

AVICENNIACEAE

AVICENNIA Linn.

Leaves obtuse at apex, elliptic-oblong or obovate, attenuate at base, glabrous and shining above, minutely and closely brownish-pubescent beneath

officialis

Leaves acute at apex, ovate or lanceolate, cuneate at base, glabrous and shining above, minutely and closely tawny-pubescent

marina

Avicennia marina (Forssk.) Vierh. in Denkschr. Akad. Wien. Math. Nat. 71 : 435. 1907 ; Tackholm, Students Fl. Egypt. 153. 1956 ; Jafri in Fl. W. Pakistan 49 : 2. 1973. *Sceura marina* Forssk. Fl. Aegypt. Arab.

37. 1775. *A. alba* auct. (non Blume, 1826) Cooke 2 : 517 ; Santapau, Pl. Saur. 647. 1953 ; Santapau & Jan. 40. 1967. *A. officinalis* auct. (non Linn. 1753). *A. marina* var. *acutissima* Stapf & Moldenke in Phytogia 1 : 411. 1940 ; ibid 7 : 225. 1960 ; Balamani, 45. 1961 ; Santapau & Jan. 40, 1967. *A. officinalis* var. *alba* (Bl.) Clarke in FBI 4 : 604. 1885.

An evergreen shrub or small tree 1 - 3 m high ; bark pale or yellowish brown, smooth, lenticellate in younger parts, dark brown in older parts. Leaves 3 - 8 × 1.5 - 3.5 cm ovate lanceolate or narrowly lanceolate, apex slightly acute or acuminate, glabrous, bright green to dark green and shining above, whitish tomentose beneath, coriaceous, thick, base tapering or rounded ; petioles 3 - 5 mm long, glabrous. Flowers 4 - 6 mm across, sessile in terminal head ; peduncle stout, angular. Calyx divided almost to the base, 3 - 5 mm long ovate, obtuse, hairy. Corolla 5 mm in diam., ovate, acute, nearly equal. Stamens included. Ovary villous, styles shorter than ovary, Capsules 12 - 18 mm long, ovoid apiculate, greyish tomentose, compressed, seeds viviparous.

Local name : Tivar.

Flowers : March to May.

Occurrence : Recorded from Syke's point 6 m N. E. Salaya Jam nagar ; Veraval Somnath ; found on mud flats, and from Bhavnagar (S. K. Jain 17917).

Note : H. N. Moldenke (loc. cit.) identifies the west coast specimens as *A. marina* var. *acutissima* Stapf & Mold. and the east coast ones as *A. alba* Blume. The east coast specimens are trees. Their inflorescence is lax, their fruits are cylindrical and are not compressed laterally. The west coast specimens are generally shrubs, their inflorescence is compact and their fruits are flattened and compressed laterally. The specimens from Saurashtra are having the characters of *A. marina* var. *acutissima* Stapf & Mold. According to Jafri (loc. cit) the correct name for this plant is *A. marina* (Forssk.) Vierh.

Avicennia officinalis Linn. Sp. Pl. 110. 1753 ; FBI 4 : 604 ; Cooke 2 : 516 ; Indraj 516. 1910 ; Santapau, Pl. Saur. 648. 1953 ; Balamani, 47. 1961 ; Santapau & Jan. 40. 1967.

A small tree about 6 - 10 m tall, bark smooth, thin, pale ; wood brown or grey, hard. Leaves 5 - 9 × 3 - 4 cm, coriaceous, elliptic oblong or obovate, obtuse at the apex, base tapering, glabrous, smooth and shining above ; minutely and closely hard dumentum beneath ; main nerves 4 - 6 pairs ; petioles 5 - 7 mm long. Flowers 5 - 6 mm in diam., dingily yellow, sessile in small heads ; bracts 2 mm in diam, ovate,

ciliate ; bracteoles similar but smaller than bracts. Calyx 3-4 mm long, 5-partite to the base ; segments broadly ovate, obtuse minutely pubescent on the margins. Corolla 6-10 mm long ; lobes 4, ovate, acute ; limb glabrate, yellow, shining. Anthers exserted. Ovary hairy ; styles short distinct, elongate, tapering, hairy ; stigma bifid. Capsules 2.5-4 × 1.5-2 cm, ovoid, compressed, beaked, green or pale white, hard, wrinkled especially at the apex with persistent bracts and calyx. Seeds dark green, shining, pubescent on one side, completely filling the fruit and often germinating on the tree ; cotyledons leafy, thick.

Local name : Tavariya, Tivar.

Flowers : April to June.

Occurrence : On sea shore and mud flats all over Saurashtra.

Uses : The kernel of the fruit, though bitter, is reported to be edible. The green, bitter and somewhat aromatic resin which cozes from the bark is said to possess medicinal properties. (W1).

Dry leaves of this plant is smoked by local people for relief from asthma. Leaves are eaten by cattle during famine. It increases milk in cattle. Leaves and unripe fruits are used as poultice on wounds. Fruits are used for preparing pickles. Bark is used as a dyeing material. The wood is used as fuel and for furniture. Ash is used as a washing powder. It is also used as a lotion to wash blotches. This plant cures leprosy also. (Indraji 577. 1910).

VERBENACEAE

Inflorescence of racemose type :

Flowers arranged in spikes :

Spikes elongate at the time of anthesis

Stachytarpheta

Spikes compressed and capitate at the time of anthesis :

Straggling shrubs

Lantana

Procumbent or semi-erect herbs

Phyla

Flowers arranged in racemes :

Calyx coloured

Petrea

Calyx green :

Herbs

Priva

Trees or shrubs	<i>Duranta</i>
Inflorescence of cymose type :	
Stamens as many as the lobes of the corolla	<i>Tectona</i>
Stamens 4 :	
Corolla subregular	<i>Clerodendrum</i>
Corolla bilabiate :	
Leaves compound	<i>Vitex</i>
Leaves simple :	
Corolla white	<i>Premna</i>
Corolla yellow	<i>Gmelina</i>

CLERODENDRUM Linn.

Inflorescence in axillary simple cymes	<i>inerme</i>
Inflorescence in axillary or panicle, sometimes truly terminal	<i>multiflorum</i>

Clerodendrum inerme (Linn. f.) Gaertn. Fruct. 1 : 271. t. 75. 1788; FBI 4 : 589 ; Cooke 2 : 511 ; Santapau, Pl. Saur. 649. 1953 ; Balamani 70. 1961 ; Santapau & Jan. 40. 1967. *Volkameria inermis* Linn. f. Sp. Pl. 637. 1753.

A straggling much branched shrub with sarmentose branches 7-2.5 m high ; bark greenish brown, lenticillate ; branches greenish brown or purplish softly pubescent, slightly flattened for younger parts, terete in older. Leaves 2.5-7 × 1.5-2 cm, elliptic or obovate, acute, entire, glabrous dark green, somewhat thick, decurrent into petiole at base ; petioles 3-7 mm long, ventrally grooved, glabrous ; slender. Flowers 2-3 cm, long, white in axillary cymes of three ; peduncles 1.8-3.5 cm long, glabrous ; bracts 1 mm long, linear. Calyx 4-8 mm long, cupular, persistent, minutely 5-toothed, somewhat leathery. Corolla 2-2.5 cm long, glabrous or slightly pubescent ; tube 2 cm long, slender, lobes 5-10 mm long, oblong, obtuse with slightly crenate margins. Filaments 4, much longer and exerted, hairy at the base, violet or purple. Ovary and style glabrous, stigmas bifid. Drupes 1-1.2 cm long, glabrous, pyriform, black on drying, spongy encircled by the persistent calyx at the base, separating into 4, 1-seeded pyrenes.

Local name : Darial arani, Vanjai.

Flowers : Almost round the year.

Occurrence : It is a common in Saurashtra, Junagadh, at foot of Girnar ; Willingdon Dam etc.

Uses : Fresh and dry leaves possess alterative and febrifugal properties. A poultice of the leaves is used to resolve bubose. A liniment useful in rheumatism is obtained by boiling the root in oil. (WI).

Clerodendrum multiflorum (Burm. f.) O. Ktze. Rev. Gen. Plt. 2 : 506. 1891 ; Balamani, 87. 1961 ; Santapau & Jan. 40. 1967. *Volkameria multiflora* Burm. f. Pl. Ind. 137, t. 45. 1768. *Clerodendrum phlomidis* Linn. f., Suppl. 292. 1781 ; Bor & Raizada, Beau. Clim. & Shrs. 154, f. 98. 1954 ; Cooke 2 : 511. *C. phlomoides* Willd in Linn. Sp. Pl. 3 : 386. 1800 ; FBI 4 : 590.

A large shrub, 3-9 m high, with hoary pubescence on the shoot. Leaves 4-8 × 3-4 cm, opposite, ovate-deltoid or sub-rhomboid, obtuse or acute, usually sinuate or crenate, sometimes entire ; base truncate or sub-cordate, puberulous beneath ; petioles 1-2.5 cm long, pubescent. Peduncles 2-3 cm, axillary or panicle, sometimes truly terminal ; cymes 12-fid. lax, pubescent. Flowers pinkish white, fragrant, bracts 15-20 mm long, obovate-lanceolate leafy, acute, bracts absent in the middle flowers ; pedicels 4-8 mm long. Calyx 8-12 mm long, divided about half-way down, glabrous, enlarged and rigid in fruit ; segments triangular-ovate, acuminate, 1-nerved. Corolla 8-10 mm long, slightly pubescent outside ; lobes elliptic, obtuse ; tube 18-26 mm long, filiform, yellowish white. Filaments white, shining, smooth and slightly pubescent below. Ovary yellowish green, small, rounded, glabrous ; styles glabrous, white downwards and purplish and 2-fid upwards. Drupes 8-12 mm long, dry-obovoid, 4-lobed, one pyrene in each lobe. Seeds 3-5 × 2-3 mm, compressed, acuminate at one end, smooth. White in beginning and brown afterwards.

Local name : Arani, Karni.

Flowers : May to October.

Occurrence : Recorded from Khatia, Jamnagar - Jail, Ranjit Sagar near Jamnagar, Sasan high hill north of village ; Mangrol ; Veraval Junagadh ; Ghumli-abhapara top, Jamnagar.

Uses : The root is aromatic and astringent and a decoction of it is used as a demulcent in gonorrhoea. It is also used as a bitter tonic. The juice of the leaves is useful as an alterative. (WI).

DURANTA Linn.

Duranta repens Linn. Sp. Pl. 637. 1753 ; Santapau, Pl. Saur. 651. 1953 ; Balamani, 101. 1961 ; Santapau & Jan. 40. 1967. *Duranta plumieri*

Jacq. Select. Strip. Amer. Hist. 186, t. 176, f. 76. 1763 ; FBI 4 : 560 ;
Cooke 2 : 518.

A scandent, erect, bushy, deciduous shrub 1.5 - 2.5 m high, usually armed with axillary thorns ; branches many, drooping ; bark fissured, lenticellate, greyish brown. Leaves 2 - 7 × 1.5 - 3 cm, bright green, elliptic or somewhat oblong, cuneate at base, acute to acuminate at apex, serrate - dentate in the upper half, entire in lower, glabrous, petiole 5 - 12 mm long, glabrous, ventrally grooved. Flowers 6 - 10 mm long, bright blue or bluish - purple, in axillary or terminal pendulous spikes. Berries 4 - 7 mm long, orange coloured, ellipsoid or sub - glabrous, smooth, slightly apiculate. Seeds 4, glabrous, shining, brown.

Local name : Damayanti.

Flowers : July to December.

Occurrence : Recorded from Junagadh.

Uses : Commonly cultivated in the gardens and used as a border or hedge plant. The juice can be used as a larvicide in ponds and swamps. The wood is easily worked and is suitable for turnery. (WI).

GMELINA Linn.

Gmelina arborea Roxb. Hort. Beng. 46. 1814 (nom. nud.) & Pl. Cor. 3 : 42, t. 246. 1819 ; FBI 4 : 581 ; Cooke 2 : 505 ; Indrajit 571. 1910 ; Santapau, Pl. Saur. 652. 1953 ; Balamani, 104. 1961 ; Santapau & Raizada 285 ; Santapau & Jan. 40. 1967.

A middle-sized unarmed tree up to 20 m tall, trunk straight, cylindrical, branched from above ; bark smooth whitish grey or greyish, exfoliating in irregular flanks, young branches clothed with white hairs. Leaves 8 - 20 × 6.5 - 14 cm, broadly ovate, entire, rarely lobed, glabrous above, tomentose beneath, more or less acuminate at apex cordate, rounded or tapering at base sometimes densely pubescent with 2 glands one on either side at the tip towards the upper surface of the leaf. Flowers 2 - 4 cm long, brownish-yellow, in cymose panicles, 4.5 - 1.5 cm long densely silky-tomentose, terminate at the ends of the leafless or leaf branches, bracts, bracts 8 mm long, linear-lanceolate. Calyx 4 - 5 mm long, teeth very small, triangular, acute. Corolla 2 - 3.5 cm long, brownish yellow, 2-lipped ; upper lip shortly bifid and longer than the lower, lower lip 3-lobed ; pubescent outside ; glabrous or thinly hairy within, tube stout. Drupes 1.8 - 2.5 cm long, ovoid, or pyriform, orange-coloured when ripe.

Local name : Shivan, Shavan, Savan.

Flowers : February to April.

Occurrence : This is commonly found in the forests of Godhana, Hadia and Adityana near Porbandar. (Indraji).

Uses : An infusion of the root increase the flow of milk in woman. Roots are given with other drugs in gout, leprosy and eczema. Juice of the leaves is given to diabetics. It was given as fodder during scarcity. (Indraji 572. 1910).

LANTANA Linn.

Branchlets pubescent ; inflorescence axillary, elongating with age ; leaves ovate-lanceolate

salvifolia

Branchlets hirsute and prickly ; inflorescence terminal, not elongating with age

camara var.
aculeata

Lantana camara Linn. var. *aculeata* (Linn.) Moldenke in *Torreyia* 34 : 9, 1934 ; Santapau, Pl. Saur. 653, 1953 ; Balamani, 122, 1961 ; Santapau & Jan. 41, 1967. *Lantana aculeata* Linn., Sp. Pl. 627, 1753. *Lantana camara* auct. (non Linn. 1753) FBI 4 : 562 ; Cooke 2 : 498.

A much branched straggling or climbing shrub, 2 - 3 m high, having a very strong odour. Stems armed with numerous recurved small prickles. Leaves 5-7 × 3-5 cm, ovate, acute at the apex, rounded cordate at the base ; crenate along the margins, scabrous on both sides. Flowers orange coloured, strongly scented in pedunculate subumbellate spikes which are short and generally appear in the axils of the upper pairs of leaves and hence appear terminal. Bracts of the spikes lanceolate, 3-5 ribbed, acute, 10-15 mm long, hairy. Bracteoles absent. Calyx 15-20 mm long, truncate, very hairy, obovate, obtuse. Corolla 1-1.5 cm long, 2-lipped ; segments ovate, slightly obtuse, tube slender, scabrous pubescent. Filaments glabrous ovary and style glabrous. Drupes 4 mm long, glabrous, black when ripe.

Local name : Indradhanu.

Flowers : Throughout the year.

Occurrence : Recorded from Rajkot Rajkumar College compound and from near the station and Jail.

Uses : The leaf oil is used in the treatment of itches of skin and may also be useful as an antiseptic for wounds. The fruits are edible. Stems are used as tooth brush leaves for polishing wood. A decoction of the plant is given in tetanus rheumatism, malaria and atoxy of abdominal viscera. Pounded leaves are applied to cuts ulcers and swellings ; a decoction of leaves and fruits is used as a lotion for wounds. An infusion of leaves is taken internally for bilious fever and catarrhal affections ; externally it is used in the form of lotion or fomentation against eczema eruptions and rheumatism. An infusion of flowers is given as pectoral for children. (WI).

Lantana salvifolia Jacq. Hort. Schoen. 3 : 18, t. 285. 1803 ; Blatter in RBSI. No. 3, 8(3) : 363. 1921 ; Santapau & Jan. 41. 1967. *L. indica* Roxb. (Hort. Beng. 46. 1814. nom.) Fl. Ind. 3 : 89. 1832 ; FBI 4 : 562 ; Cooke 2 : 498 ; Santapau, Pl. Saur. 654. 1953 ; Balamani, 119. 1961.

An erect shrub, reaching 1-2.5 m high ; branches long, quadrangular, yellowish-brown, rambling, appressedly scabrid-pubescent or towards the tips patently densely fulvous-hairy. Leaves 3-8 × 2.5-4 cm, opposite, sometimes ternate, ovate, acute, rounded and then cuneate at the base, rugose crenate and softly hairy above, densely white-pubescent or white-wooly beneath ; petiole 6-10 mm long. Flowers aromatic white sessile in axillary pedunculate ovoid heads 1-2 cm long, sometimes in fruit 5-7 cm long, cylindric, peduncles many, axillary, 3-7 cm long, usually opposite, 4-sided, hairy, slender, somewhat thickened upwards ; bracts 6-8 mm long, upper smaller, ovate, acuminate, softly loosely hairy. Calyx 1-1.5 mm long, membranous, densely pubescent. Corolla pink or purplish, 8 mm long, hairy : tube yellowish, mostly cylindric, mouth 6 mm in diam., lobes 4, rounded, spreading. Filaments slender, short. Ovary glabrous, styles short. Drupes 3-7 mm in diam purple.

Local name : Dhanidariya,

Flowers : September to January.

Occurrence : Collected from Junagadh. Willingdon Dam ; Chotial plains ; Ghumli abhapara top, Jamnagar ; Rozi near Jamnagar ; Balachari ; Modpar vidi Halar district.

Uses : Same as *L. camara* var. *aculeata* (L.) Mold. (WI).

PETREA Linn.

Petrea volubilis Linn. Sp. Pl. 626. 1753 ; Cooke 2 : 518 ; Fletcher in Kew. Bull. 1938 : 410. Bailey, Man. Cult. Pl. (ed. 2) 843. 1949 ; Bor & Rai. Beau. Climb. & Shars. 141. 1954 ; Balamani, 126. 1961 ; Santapau & Jan. 41. 1967.

A large climber with ovate or lanceolate scabrous leaves, 7.5-10 cm long. The flowers are inodorous, in copious racemes, remarkable for the large persistent purplish blue calyx which remains long after the violet corolla have fallen off.

Local name : Nilambha.

Flowers : January to March.

Occurrence : Recorded from Gondal garden.

Uses : Cultivated as an ornamental climber.

PHYLA Lour.

Phyla nodiflora (Linn.) Greene in Pittonia 4 : 46. 1899; Santapau, Pl. Saur. 655. 1953 ; Gir 286 ; Balamani, 129. 1969 ; Santapau, Fl. Khandala 211. 1967 ; Santapau & Jan. 41. 1967. *Verbena nodiflora* Linn., Sp. Pl. 20. 1753. *Eippia nodiflora* A. Rich in Michx. Fl. Bor. Amer. 2 : 15. 1803 ; FBI 4 : 563 ; Cooke 2 : 499 ; Indrajai 568. 1910.

A prostrate, minutely strigose, widely creeping herb, 15-200 cm long. Stems much branched, rooting from the nodes, clothed with appressed, medifixed white hairs. Leaves subsessile, 10-30 × 8-12 mm, cuneate-spathulate, serrate towards the apex ; base attenuate entire, much hairy on both sides ; upper surface deep green or red and lower one pale green ; petioles very short, flattened. Flowers sessile, peduncles 2-7 cm long, 5-6 mm broad, axillary rarely opposite, single. Spikes dense, globose at first, afterwards elongating and becoming spicate and oblong in fruit 10-15 × 5-6 mm. Bracts 2-3 mm long, broadly obovate, shortly acuminate, outermost not much longer than the others, green at the base and purplish-green at the top and margins. Calyx 2 mm long, 2-fid, membranous, purplish-blue in the middle and hairy, closing covering the fruit. Corolla 1.5-2.5 mm long, white to pinkish-purple, 2-lipped ; upper lip narrow, erect, bifid, lower lip broader and longer than upper one, 3-fid ; middle lobe the largest, tube slender. Fruit 1-1.5 mm long, dry, glabrous-oblong, narrow at the base, broader at the top, acute, splitting into two 1-seeded pyrenes. Seeds minute, white.

Local name : Ratvelio.

Flowers : Throughout the year.

Occurrence : Recorded from Junagadh to Sasan, Veraval in dense patch in moist land at Mithapur, Rajkot, Jilla garden ; Dwarka ; Cooke reports it for Porbandar.

Uses : The plant is said to possess cooling, diuretic and febrifuge properties, it is used in ischury, stoppage of bowels and pain in knee-joints. A paste or poultice prepared from the fresh plant is applied as suppurant for boils, swollen cervical glands, erysipels and chronic indolent ulcers. (W1).

PREMNA Linn.

Shrubs; leaves ovate or elliptic ; corymbose ; calyx bilabiate *obtusifolia*

Herbs :

Leaves, sessile, obovate, obtuse, coarsely crenate or serrate *herbacea*

Leaves, opposite, ovate, acuminate, entire *resinosa*

Premna herbacea Roxb. Hort. Beng. 46. 1814 ; & Fl.³ Ind. 3 : 80. 1832 ; FBI 4 : 581 ; Indrajii 570. 1910 ; Santapau, Pl. Saur. 657. 1953 ; Santapau & Jan. 41. 1967.

A small herb from a woody stock, up to 1 m tall ; branches ascending, white pubescent, pale-white or blue outside ; green inside. Leaves 8 12 × 5 6 cm, sessile, obovate, obtuse, coarsely crenate or serrate in the upper half, pubescent on the nerves ; main nerve 5 pairs. Flowers small about 5 6 mm long, white, in small corymbose about 4 cm in diam., pubescent, somewhat dense ; peduncles 1 3 cm long, green, white-pubescent. Calyx 2 3 mm long, closely pubescent, subequally 5-toothed, obscurely 2-lipped ; the upper lip 2-lobed ; lower one 3-lobed ; segments ovate, obtuse with green or yellow spots. Corolla 4 mm long, white or greenish-white, hairy in the throat, 4-lobed, obscurely 2-lipped. Anthers 2-lobed, purplish-blue. Ovary rounded, green ; styles deep-green and higher than stamens. Drupes 5 6 mm in diam., globose with a minute hole at the top, 1 4-celled, 1 - 4-seeded. Seeds orbicular, apiculate. at one end, smooth.

Local name : Gheeteli.

Flowers : July to November.

Occurrence : Collected from Porbandar, near Barda Hills.

Uses : Fresh rootstocks and roots along with ginger are given in asthma, rheumatism and dropsy. The rootstocks are used to cure toothache. The leaves are prescribed in fevers, cough and rheumatism and their poultices are applied to boils. The ripe fruit is reported to be eaten. (WI).

Premna obtusifolia : R. Br. Prodr. 512. 1810 ; Fosberg in Taxon 2 : 89. 1953 ; Santapau & Jan. 41. 1967. *Premna integrifolia* Linn., Mant. Pl. 2 : 252. 1771 ; FBI 4 : 574 ; Cooke 2 : 500. *Premna corymbosa* (Burm. f.) Rottl. & Wild. ex Merr. Int. Herb. Amboin. 450-451. 1917 ; non Rottl. 1803. Santapau, Pl. Saur. 658. 1953. Balamani, 134. 1961. *Cornutia corymbosa* Burm, f., Fl. Ind. 132. 1768.

Sarmentose shrubs, slender, simple or branched, 120-200 m tall; younger stems tetra-gonous, grooved, pubescent occasionally densely so; older ones terete, deeply striate; glabrous, with pale to dark reddish-brown, lenticellate bark. Leaves 6-10 × 2-6 cm, ovate, slightly acuminate, truncate or subcordate at base; 4-nerved, nearly glabrous; margins entire or shallowly crenate towards the apex only; petioles 8-20 mm long, thinly or densely pubescent, at length glabrous. Flowers very small, greenish-yellow, sweet smelling, in terminal umbellate, 4-6 cm across cymes; peduncles pubescent; bracts narrowly lanceolate, minute 2-lipped. Corolla tubular; limb subequally 4-lobed, tube 3 mm long. Cylindrical, hairy inside; segments oblong, rounded. Stamens slightly exerted, filaments hairy at the base. Ovary and style glabrous, stigmas with a divaricate lobes. Drupes 5 mm long, obovoid, dark-brown or black when dry, long, 4-celled, 4-seeded.

Local name : Arani.

Flowers : June to September.

Occurrence : Collected from Dwarka and Okha.

Uses : The roots form a constituent of the wellknown Ayurvedic medicine, Dasamula, used as a cure for obstinate fevers. They are prescribed as a laxative, stomachic and tonic. The leaves have an unpleasant odour but are eaten cooked; they are also used as a cattle feed. They are said to possess carminative and galactagogue properties, and are used in the preparation of a soup given as a stomachic. A decoction of the leaves is reported to be used in the treatment of colic and flatulence, and that of the tender plants for rheumatism and neuralgia. (WI)

Note : Fosberg in *Taxon* 2 : 89. 1953 : States that "this case provides opportunity to emphasize' two nomenclatural points that have not always been given serious enough attention. One is that nomenclature must be based on specimens and documentary evidence, not on assumption—i.e. it was not correct to assume that Rottler was making a transfer of Burmann's *Cornutia corymbosa* Burm. f. to *Premna* simply because he used the epithet *corymbosa*. A great deal of confusion was caused by this assumption. The other point is the full implication of Article 73 of the new code. *Premna integrifolia* L. and *P. serratifolia* L. familiar Linnean names are illegitimate because they were superfluous when published".

Premna resinosa Schau. in DC. Prodr. 11 : 637. 1847 ; Deshpande in *Curr. Sci.* 30 : 21-22, f. 1-3, 1961 ; Santapau & Jan. 41. 1967.

A small herb, 1-2 m high. Leaves opposite, sub-alternate, ovate, subrhomboid-elliptic, obtuse, acuminate, entire, membranous, glabrous, upperside shining, pale beneath. Panicle in terminal, small corymbose. Calyx equal.

Flowers : October onwards.

Occurrence : Collected from Dwarka ; Okha ; Ghumli ; Abhaparatorp.

PRIVA Adans.

Priva cordifolia (Linn. f.) Druce in *Rep. Bot. Exch. Cl. Brit. Isles*, 4 : 641. 1917 ; Santapau, *Pl. Saur.* 658. 1953 ; Balamani, 138. 1961 ; Santapau & Jan. 41. 1967. *Buchnera cordifolia* Linn. f. *Suppl.* 287. 1781 *Priva leptostachya* Juss. in *Ann. Mus. Paris* 7 : 70. 1806 ; *FBI* 4 : 565 ; *Cooke* 2 : 502.

An erect branched herb. Stems 20-80 cm., hairy at the nodes with small hooked hairs, internodes long. Leaves 2.5-7 × 1-2 cm, ovate, obtuse, crenate-serrate, thin, somewhat softly hairy and covered stiff fine hooked hairs ; base sub-cordate or truncate ; petioles 8-30 mm long. Flowers white in very long interrupted spicate racemes 15-30 cm long, rachis pubescent with small hooked hairs, pedicels 1 mm ; lower flowers distant ; bracts 2 mm long, lanceolate, hairy. Calyx 4-6 × 2 mm and cylindric in flower ; as broad as long and globose in fruit, hispid with 1-celled white hooked hairs ; segments acute, small corolla 8 mm long, white, 2-lipped, tube 8 mm long. Pyrenes obovate, mucronate with 2 rows of hooked small spines on the apex, each presenting a large cavity towards the axis, deeply excarinate on the faces.

Flowers : August to January.

Occurrence : Collected from Okha and Dwarka near the station.

STACHYTARPHETA Vahl.

Stachytarpheta urticaefolia (Salisb.) Sims. in Curt. Bot. Mag. 43 : t. 1848. 1816 ; Balamani, 140. 1961 ; Santapau & Jan. 41. 1967. *Cymburus urticaefolias* Salisb., Parad. Lond. 53. 1805-1807. *Stachytarpheta indica* auct. (non Vahl. 1804) FBI 4 : 584 ; Cooke 2 : 501 (Omne proparte) ; Bor & Rai. Bean. Climb. & Shars. 138. 1954.

An erect annual tall herb, 45-60 cm, high, simple or dichotomously branched, stems and branches dark-green, glabrous or sparsely pubescent ; young branches nearly quadrangular ; internodes 6-10 cm, long. Leaves 4-10 × 2.5-5 cm, ovate or elliptic, membranous darkgreen, glabrous or sparsely hairy, deeply impressed between the nerves ; apex obtuse ; base decurrent into petiole ; margins sharply serrate ; petiole 7-12 mm long. Flowers deep-blue, sessile, in terminal spikes 10-30 cm long, glabrous, slender, nearly continuous, rachis dark-green ; bracts 5 mm long, lanceolate, acuminate with a long acumen and scarious margins. Calyx 5-6 mm long, membranous, tubular, glabrous lobes 4, oblique, short, acute. Corolla deep-blue, 8-12 mm long, glabrous, tube 10 mm long, curved, hairy inside, limb as long as tube, 5-lobed. Filaments slender, hairy below. Ovary styles glabrous. Capsules 4-5 mm long, oblong or pear-shaped, ribbed, glabrous, dark purple, shining, smooth spiculate, splitting into 2 pyrenes.

Flowers : August to November.

Occurrence : Recorded from Junagadh, Motibaug-Botanical garden.

Uses : Commonly cultivated in the gardens.

TECTONA Linn. f.

Tectona grandis Linn. f. Suppl. 151. 1781 ; FBI 4 : 570 ; Cooke 2 : 503 ; Indraj 569. 1910 ; Santapau, Pl. Saur. 659. 1953 ; Balamani, 144. 1961 ; Gir 287 ; Santapau & Jan. 41. 1967.

A deciduous tree 15-20 m high, young branches quadrangular, stellately tomentose, channeled. Leaves 15-60 × 10-30 cm, opposite, elliptic or obovate, acute or shortly acuminate at the apex, usually cuneate

at the base, entire along the margins, punctate above, covered with dense stellate grey tomentum beneath; main nerves 8-10 pairs with 2-3 large branches near the edge of the leaf; petioles 2-3 cm long. Flowers white; numerous, in dichotomous cymes in large terminal panicles 30-100 cm long, only few flowers fertile. Bracts 10-12×2 mm, deciduous, with also usually some reduced leaves at the forks, linear-lanceolate. Calyx in flower 3-4 mm long, lobed, less than half-way down, stellately white-tomentose, calyx in fruit elongated to 25 mm or more, enclosing the fruit, ovoid, reticulately veined, nearly glabrous, mouth very small. Corolla scarcely 6 mm long, white, glabrous in the throat; tube 2 mm long, 5-6 lobed. Drupes 15 mm., in diam., globose; covered with dense felted stellate hairs, brownish, cells 4 with a central cavity

Local name : Sag.

Flowers : June to October.

Occurrence : Collected from Sagadi vidi and Junagadh Gir forest.

Uses : Excellent timber tree. The plaster of the powdered wood is recommended in headache and inflammatory swellings; taken internally it is said to be beneficial in dyspepsia, it acts also as a vermifuge. The ashes of wood are applied to swollen eyelids and are said to strengthen eye-sight. Bark is an astringent. But oil-promotes the growth of hair and removes itchiness of skin. Flowers and seeds are diuretic. This timber tree is comparatively poorly developed in Saurashtra [Gaz. A(1): 209, 1953].

VITEX Linn.

Vitex negundo Linn. Sp. Pl. 638. 1753; FBI 4: 583; Cooke 2: 508; Indrajit 572. 1910; Santapau, Pl. Saur. 660. 1953; Balamani, 160. 1961; Santapau & Jan. 41. 1967.

An evergreen large shrub or small tree up to 4 m high, with straight or crooked trunk and brownish-black or yellowish, fissured bark; young stems and branches quadrangular, greyish-tomentose. Leaves 3-5 foliate, alternate; petioles 3.5-6.5 cm long, whitish-tomentose; leaflets 3.5-0×1.2-3 cm, the terminal leaflet being the largest, lanceolate or ovate-lanceolate, acuminate at the apex, rounded at the base, glabrous or nearly so above, white tomentose beneath, entire or sometimes toothed along the margins, lateral leaflets often sessile. Flowers 7-11 mm long, blue or bluish-purple, in lax, cymose-panicles with occasional additional

branches in the upper leaf axile, panicles 7-20 cm long, whitish tomentose; bracts 1.5-3 mm long, lanceolate. Calyx 3 mm long, white-tomentose, teeth triangular. Corolla 6-8 mm long, 2-lipped. Filaments hairy at the base. Ovary and styles glabrous. Drupes 5 mm in diam., black; globose.

Local name : Nagod.

Flowers : Almost throughout the year.

Occurrence : It was found very common on Barda Hills. Indrajit has recorded from the forest of Barda Hills.

Uses : Root is tonic, febrifuge, expectorant and diuretic, root-bark tincture is given in cases of irritable bladder and of rheumatism; powdered roots are used as demulcent for piles and dysentery. Leaves are aromatic, tonic and vermifuge; a decoction is given in catarrhal fever; juice removes foetid discharges and worms from ulcers; oil prepared from leaf juice is applied to sinuses and scrofulous sores. Dried leaves are smoked for relief of head-ache. Flowers are used as cool astringent in cholera, diarrhoea, fever, liver diseases and as cardiac tonic. [Gaz. A(1): 227. 1953]

LABIATAE

Perfect stamens, 4, declinate; lower lip of corolla 1-lobed, stamens usually exerted; basal scar of nutlets not oblique:

Lower lip of corolla flat or nearly so:

Calyx deflexed in front upper lobe recurved, margin decurrent on the tube:

Corolla-tube not exceeding the calyx, stigma 2-fid

Ocimum

Corolla-tube exceeding the calyx, stigma entire

Orthostemon

Calyx sub-erect or declinate in fruit, upper lobe not recurved, margins not decurrent

Acrocephalus

Lower lip of corolla conspicuously concave or boat-shaped:

Corolla distinctly 2-lipped, lower-lip longer than the upper:

Upper lip of calyx rounded, deflexed; or the calyx sub-equally 5-toothed

Coleus

- Upper lip of calyx beaked or truncate, curved downwards to close the mouth or the calyx 1-lipped, the upper lip absent *Anisochilus*
- Corolla 5-lobed, the lowest lobe shorter or equalling the other lobes *Hyptis*
- Perfect stamens 4, erect or spreading or ascending :
- Lower lip of corolla 3-lobed ; stamens included ; basal scar of nutlets oblique *Lavandula*
- Corolla 2-lipped ; stamens didynamous :
- Lower pair of stamens the longer :
- Upper lip of corolla short, nearly flat ; stamens exserted, the anther-cells of upper dimidiate, of the lower pair transverse *Anisomelis*
- Upper lip of corolla hooded, densely woolly *Leucas*
- Upper pair of stamens the longer ; calyx tubular, 5-toothed ; stamens included *Nepeta*
- Perfect stamens 2, ascending or erect *Salvia*

ACROCEPHALUS Benth.

Acrocephalus indicus (Burm. f.) O. Ktze. Rev. Gen. Pl. 511. 1891 ; Mukerjee, RBSI 14(1) ; 29. 1940 ; Santapau & Jan. 41. 1967. *Prunella indica* Burm. f. Fl. Ind. 130. 1768. *Acrocephalus capitatus* Benth. in Bot. Reg. tt. 1282. 1300 & in Wall. Pl. As. Rar. 2 : 1831 ; FBI 4 : 611 ; Cooke 2 : 525.

An elegant slender annual with simple or branched stem ; often branched from the base, 15-30 cm high ; stems obtusely quadrangular, glabrous or nearly so, branches ascending or descending. Leaves 2-4 × 0.6-1.2 cm, ovate or lanceolate, acute or subacute, coarsely serrate, glabrous, few nerved. Heads 1-2 cm in diam, terminal, globose, rarely cylindrical, often with two spreading leaves at the base. Flowers pale purple, 4-5 mm long, suberect, imbricating. Calyx 2.5 mm long, nearly double in fruit, pubescent outside. Corolla 3 mm long, pale purple, suberect. Nutlets nearly 1 mm long, oblong-ellipsoid, smooth, compressed, brownish-black.

Flowers : October.

Occurrence : Collected from Junagadh, Girnar.

ANISOCHILUS Wall.

Anisochilus carnosus Wall., Pl. As. Rar. 2 : 18. 1831 ; FBI 4 : 627 ; Cooke 2 : 532 ; Indrajī 583. 1910 ; Mukerjee, RBSI 14(1) : 58. 1940 ; Santapau, Pl. Saur. 661. 1953 ; Santapau & Jan. 41. 1967.

An erect annual herb, 30–60 cm high ; stems quadrangular, stout, glabrous or tomentose. Leaves petioled, 5–7 × 1–4 cm, broadly ovate, obtuse, cordate or rounded at base, fleshy, glabrous or villous above, puberulous beneath ; petioles 1–4 cm long. Flowers 8 mm long, sessile, in dense cylindric spikes 1–4 cm long, enlarged in fruit ; peduncles long ; bracts ovate ; acuminate, caducous, pubescent, glandular and ciliate. Calyx 5 mm long in flower, enlarged in fruit, pubescent outside, 2 lipped. Corolla pale purple, 8–10 mm long, pubescent outside ; tube narrow below, whitish ; upper lip short, broad, lower lip longer, concave. Filaments purplish, shining, smooth. Nutlets 1 mm long, orbicular, compressed, smooth, shining, brown.

Local name : Ubhoratvelio.

Flowers : August to October.

Occurrence : Collected from Girnar Forest along road ; lower slopes of Barda Hill ; South of Ghumli, Jamnagar.

ANISOMELES R. Br.

Stem and branches acutely quadrangular *indica*

Stem and branches obtusely quadrangular *malabarica*

Anisomeles indica (Linn.) O. Ktze. in Rev. Gen. Pl. 2 : 512. 1891 ; Mukerjee, RBSI 14(1) : 152. 1940 ; Santapau, Pl. Saur. 662. 1953 ; Gir. 288 ; Santapau & Jan. 41. 1967. *Nepeta indica* Linn. Sp. Pl. 571. 1753. *Anisomeles ovata* R. Br. in Ait. Hort. Kew ed. 2, 3 : 364. 1811 ; FBI 4 : 672 ; Cooke 2 : 543 ; Indrajī 588. 1910.

Suffruticose, herb reaching 2 metres in height, sparingly hairy or densely pubescent, sometimes almost woolly ; branches tomentose, acutely quadrangular. Leaves 3.5–10 × 2.5–9 cm ovate, truncate or cordate at base, acute at apex, crenate serrate, thick softly pubescent on both sides ; petioles up to 8 cm long, pubescent. Flowers purple in dense spicate whorls, axillary and interrupted below ; bracts 4–5 mm long, linear, pubescent. Calyx about 6 mm hirsute ; lobes about as long as the tube, hairy, acuminate. Corolla 2 cm long ; reddish purple ; 2 lipped. Filaments bearded, Nutlets 4, 2–2.5 mm long, ovoid, smooth, shining, black when ripe.

Local name : Gopati, Chodhari.

Flowers : May to October.

Occurrence : Recorded from Junagadh, foot of Girnar, Khatia 4 m. SE. Khambhalia, it was found near water ; Jamnagar ; Dhunvao, 6 m. E. Jamnagar.

Uses : It is useful as an astringent and carminative (WI)

Anisomeles malabarica (Linn.) R. Br. ex Sims in Bot Mag. 46 : t. 2071. 1819 ; FBI 4 : 673 ; Cooke 2 : 544 ; Indrajii 588. 1910 ; Mukerjee, RBSI 14(1) : 153. 1940 ; Santapau, Pl Saur. 663. 1953 ; Santapau & Jan. 41. 1967. *Nepeta malabarica* Linn. Mant. Alt. 566. 1771.

Tall erect shrub, 150 - 200 cm high, densely woolly with white adpressed hairs, stems and branches stout, terete, obtuse 4 angled, white tomentose. Leaves 8 - 13 × 2 - 4.5 cm, very thick, petioled, lanceolate or oblong lanceolate, acute or acuminate or obtuse, rounded at base, entire or crenate serrate along margins, pale above, white below, hairy, petiole 1 - 2 cm long, hairy. Flowers pale-purple in dense whorls, 4 cm in diam., forming an interrupted spike, densely woolly ; bracts 1 - 1.5 cm long, filiform, linear. Calyx 10 mm long, densely villous, segments narrow, lanceolate. Corolla pale purple, 19 - 23 mm long, slightly pubescent outside, 2 lipped. Filaments hairy. Nutlets 3 - 4 mm long, pale brown, ellipsoid, compressed, smooth shining.

Local name : Dholochodhard.

Flowers : October to November.

Occurrence : This is given on the authority of Indrajii.

Uses : An infusion of the leaves has been found to be beneficial in dyspepsia and fever, accompanying teething in children. A decoction of the plant, or the oil distilled from it said to be useful in rheumatism. (WI).

COLEUS Lour.

Spikes uninterrupted

caninus

Spikes much interrupted

forskohlii

Coleus caninus (Roth) Vatke, *Linnaea* 37 : 318, 1971-1873 ; Rai zada, *Indian Forester* 92 : 306, 1966 ; Santapau & Jan. 41, 1967 ; *Plectan - thrus caninus* Roth, *Nov. Pl. Sp.* 279, 1821. *Coleus spicatus* Benth. in *Wall. Pl. As. Rar.* 2 : 15, 1831 ; *FBI* 4 : 624 ; *Cooke* 2 : 530.

A perennial herb 15-30 cm high ; stems ascending, simple or branched, quadrangular, clothed with long, soft hairs. Leaves sessile or shortly petiolate 2.5-5 × 1.2-2.5 cm, obovate, fleshy, entire or crenate, pubescent on both sides, narrowed at the base. Flowers in long dense spicate woolly racemes, the whorls closely approximate at flowering time, separating a little in fruit. Calyx throat hairy ; upper lip obtuse or minutely acute, equaling or longer than lower lip. Corolla pale lilac (?) Nutlets sub-globose, smooth, shining, black when ripe.

Flowers : November onwards.

Occurrence : Collected from Junagadh.

Coleus forskohlii (Poir) Briq. in *Engl. & Prantl. Pfan.* 4(3A) : 359, 1897 ; Mukerjee, *Rec. Bot. Surv. Ind.* 14(1) : 53, 1940 ; Santapau, *Pl. Saur.* 664, 1953 ; Stewart, *Fl. W. Pakistan*, 610, 1972. *Germanea forskohlii* Poir in *Lamk. Encyl.* 2 : 764, 1786. *Coleus barbatus* Benth. in *Wall. Pl. As. Rar.* 2 : 15, 1829 ; *FBI* 4 : 625 ; *Cooke* 2 : 530 ; Santapau & Jan. 41, 1967.

Perennial fleshy herb, 30-60 cm high ; stems stout, slightly branched, ascending, woody at the base, very softly generally white hairy, arising from thick and fleshy root-stocks. Leaves 5-10 × 0.6-4 cm, petioled, ovate or elliptic-oblong, obtuse at the apex, tapering at the base, densely pubescent on both sides, villous, not fleshy, crenate ; lower surface faintly gland-dotted. Flowers 1.5-2.5 cm long, bluish, distinctly whorled in terminal, stout, spiciform, densely hairy and glandular racemes 15-30 cm long ; whorls close at first, afterwards about 2 cm apart. Nutlets small, globose, smooth, brownish-black.

Local name : Garmar.

Flowering : May to September.

Occurrence : Collected from Junagadh.

Uses : Cultivated for the roots which are pickled and eaten. (W1).

HYPTIS Jacq.

Hyptis suaveolens (Linn.) Poit. in Ann. Mus. Par. 7 : 472, t. 29, f. 2. 1806 ; FBI 4 : 630 ; Cooke 2 : 560 ; Mukerjee, RBSI 14(1) : 63. 1940 ; Santapau, Pl. Saur. 665. 1953 ; Santapau & Jan. 41. 1967. *Balleta suaveolens* Linn. Syst. (ed. 10) 1100. 1759.

Annual, erect, profusely branched, sweet smelling herb, 17-150 cm high ; stems and branches quadrangular, densely softly hairy, grooved sometimes purplish ; internodes 3-7 cm long. Leaves 4.5-9 × 3-5 cm, petioled, broadly ovate, acute, at apex, cordate or rounded at base, irregularly serrate margins, glabrous thinly minutely hairy above, pubescent, villous or tomentose beneath. Flowers 1.4-1.8 cm, blue or bluish-purple, rarely solitary, in axillary and terminal, sometimes 8-15 cm long, lax panicles. Nutlets 2, 3-4 mm long, oblong or ovoid, flat, glabrous, blackish-brown, emarginate at apex with a white mark on either side of the pointed base.

Local name : Vilayati-tulsi.

Flowers : September to April.

Occurrence : Recorded from Pradumna Park, Rajkot ; Lalpari talao, Rajkot.

Uses : This plant is considered to be stimulant, carminative, endorific and lactagogue. An infusion of the plant is used in catarrhal conditions, affections of the uterus and parasitical used in catarrhal conditions, affections of the uterus and parasitical cutaneous diseases. The leaf juice is taken in cases of colic and stomachaches. A decoction of the roots is valued as an appetiser. The root is chewed with betel nuts as a stomachic. (WI)

LAVANDULA Linn.

Lavandula bipinnata (Roth) O. Ktze. Rev. Gen. Pl. 521. 1891 ; Mukherjee, RBSI 14(1) : 65. 1940 ; Santapau, Pl. Saur. 666. 1953 ; Santapau & Jan. 41. 1967. *Bisteropogon bipinnatus* Roth. Nov. Sp. 255. 1821. *Lavandula burmanni* Benth., Lab. Gen. & Sp. 151. 1833 and in DC. Prodr. 12 : 147 ; FBI 4 : 631 ; Cooke 2 : 534.

An erect, stout or slender herb, 60-100 cm high ; stems simple or branched, quadrangular, white pubescent. Leaves sessile or subsessile, 5-10 × 4-8 cm, pinnatisect ; lobes 2.5-4 mm broad, simple or cut or

toothed, linear, obtuse, pubescent on both sides, deep green upper and pale beneath. Flowers pale white or blue, in spikes which are solitary or few or subumbellate, white pubescent. Nutlets 2 mm long, ellipsoid, smooth, black with a large oblong areole on dorsal side; mucilaginous. Stamens, corolla, and styles fall off at fruiting.

Local name : Asamanigalgoti.

Flowers : August to November.

Occurrence : Recorded from Ghumli abhapara top.

Uses : The tops of the plant are eaten by cattle; paste of the roots is used as an external application for stings and bites of poisonous animals (WI).

LEUCAS R. Br.

Calyx-tube bent, mouth oblique :

Calyx-mouth produced on the lower side *urticaefolia*

Calyx-mouth produced on the upper side :

Calyx mouth glabrous within or minutely pubescent :

Bracts equalling the calyx, with long marginal bristles ;

calyx distinctly ribbed *aspera*

Bracts smaller than the calyx, without bristles *lavandulaefolia*

Calyx-mouth hairy, within *cephalotes*

Calyx-tube straight, mouth never oblique :

Leaf-margin entire :

Slender herbs *longifolia*

Erect herbs :

Calyx-teeth 2.5 mm long, the upper tooth much longer *stricta*

Calyx-teeth 1 mm long, almost subequal *zeylanica*

Leaf-margin crenate or serrate *stelligera*

***Leucas aspera* (Willd.) Spreng. Syst. Veg. 2 : 743. 1825 ; FBI 4 : 690 ; Cooke 2 : 548 ; Mukerjee, RBSI 14(1) : 166. 1940 ; Santapau, Pl. Saur. 667. 1953 ; Gir. 290 ; Santapau & Jan. 41. 1967. *Phlomis aspera* Willd. Link. Enum. Berol. 2 : 113. 1809.**

Annual herbs, 15-35 cm high, much branched, erect or diffuse, somewhat woody at the base; stems and branches 4-angled, hispidly hairy, greyish; internodes 3-8 cm long, deeply grooved. Leaves 2.5-8 × 0.5-2 cm, shortly petioled or sessile, linear-oblong, elliptic or oblong-lanceolate, appressedly hairy; obtuse or subacute, tapering at the base, entire or serrate margins. Flowers 0.8-1.2 cm long, white in axillary and terminal whorls, very dense and many flowered, often at the ends of the branches. Nutlets 2.5 mm long, oblong, smooth, brown; inner face sharply angular, the dorsal face rounded.

Local name : Tamba (Bombay).

Flowers : July to October.

Occurrence : Recorded from Junagadh, foot of Girnar and Gondal Road, Rajkot.

Uses : The plant is fragrant and used as a pot herb. It is eaten in times of scarcity. It is commonly used as an antipyretic. The juice of the leaves is used as an external application for psoriasis, chronic skin eruptions and painful swellings. (WT).

Leucas cephalotes (Roth) Spreng. Syst. 2 : 743. 1825; FBI 4 : 689; Dalz. & Gibs. 211. 1861; Cooke 2 : 549; Indrajit 590. 1910; Mukerjee, RBSI 14(1) : 168. 1940; Santapau, Pl. Saur. 668. 1953; Gir. 291; Santapau & Jan. 41. 1967. *Phlomis cephalotes* Roth, Nov. 262. 1821.

Erect, stout, coarse herbs, 30-100 cm high; stems and branches obtusely quadrangular, hairs spreading. Leaves 3.5-8 × 1-2.5 cm, shortly petioled, ovate or ovate-lanceolate, obtuse or subacute, cuneate at base, crenate, serrate along margins, membranous, more or less pubescent. Flowers white, sessile, in very large globose dense terminal conspicuous heads about 2-5 cm in diam. Nutlets 3 mm long, smooth, obovoid-oblong, rounded at the apex, brown, 4-seeded. Seeds 2 mm long, rounded at apex, tapering at base, brownish-black.

Local name : Khetaraukubo, Doshi no kubo

Flowers : August to November.

Occurrence : Recorded from Rajkot Pradumna Park. Dalzell and Gibson also recorded it from the coast area of Saurashtra.

Uses : The plant is pungent to taste. It is used as pot herb. The seeds yield an oil used for illumination purpose, they are used as an auxiliary in the extraction of dye from *Rubia sikkimensis* Kurz. The plant is reported to possess rennet-like properties. It is considered

stimulant, diaphoretic, laxative, anthelmintic, antiseptic and insecticidal. A syrup of the flowers is used as a domestic remedy for coughs and colds. (WI).

Leucas lavandulaefolia Rees, Cycl. 20(2). 1819 ; Mukerjee, RBSI 14 (1) : 167. 1940 ; Santapau, Pl. Saur. 659. 1953 ; Santapau & Jan. 41. 1967. *Leucas linifolia* Spreng., Syst. 2 : 743. 1825 ; FBI 4 : 690 ; Cooke 2 : 548 ; Indrajī 592. 1910.

Erect, slender annual herbs 30-70 cm. high, smooth or scaberulous; stems quadrangular, smooth or scaberulous; branched above. Leaves 5-10 by 0.8-1.4 cm, linear or narrowly linear-lanceolate, obtuse or subacute at apex, tapering at base, entire or subserrate along margins, pale-green, pubescent; petiole 0-1 cm long. Flowers shortly pedicellate or sessile, white in few axillary and terminal whorls towards the ends of the branches, 1.3-2 cm in diam. Nutlets 2-3 mm long, oblong, rounded at the apex, pale-brown, dull.

Local name : Zina-Pan-no-Kubo.

Flowers : August to November.

Occurrence : This is given on the authority of Indrajī.

Uses : Leaves are eaten as pot-herb. The plant is eaten by cattle when fodder's scarce. Flowers are offered in temples. A decoction of leaves or crushed leaves is used as a sedative in nervous disorders; it is used also as vermifuge and stomachic. A poultice of fresh leaves is applied to old sores and wounds. Crushed leaves are used externally for dermatosis. Roots, stems and leaves are cyanogenetic. (WI)

Leucas longifolia Benth. Lab. Gen. & Sp. 744. 1835 ; FBI 4 : 684 ; Cooke 2 : 551. Indrajī 590. 1910 ; Mukerjee, RBSI 14(1) ; 170. 1940 ; Santapau, Pl. Saur. 670. 1953 ; Santapau & Jan. 41. 1967.

Erect, rigid, annual, 25-45 cm high, branching on the upper part of stem, scaberulous or hispid above with erect or spreading hairs. Leaves 3.5-6 by 0.3-0.8 cm, sessile, narrowly linear, obtuse or subacute, entire, narrowed to the base, more or less pubescent on both sides; midrib strong beneath. Flowers in few flowered axillary whorls approximated near the top. Nutlets 2-3 mm long, obovoid, trigonous, rounded at the top.

Local name : Lamba-Pan-no-kubo.

Flowers : July to August.

Occurrence : This plant is given on the authority of Indrajī.

Uses : An infusion of the plant is administered on fevers with black-pepper. The plant after soaking in hot water is wrapped in cloth and tied on the abdomen part to relieve urine. The ash mixed with oil is smeared on boils. (Indrajī 590. 1910)

Leucas stelligera Wall. ex Benth. in Wall. Pl. As. Rar. 1 : 61. 1829 ; FBI 4 : 686 ; Cooke 2 : 553 ; Indrajī 590. 1910 ; Mukerjee, RBSI 14(1) : 177. 1940. Santapau, Pl. Saur. 671. 1953 ; Santapau & Jan. 41. 1967.

Erect, branching softly pubescent or villous aromatic herbs 60-95 cm high ; stems and branches obtusely quadrangular with long erect spreading hairs. Leaves 5-11 × 0.9-2.5 cm, shortly petioled, linear-oblong subacute at apex, tapering at base, serrate along the margins, densely pubescent above, tomentose beneath, petioles 0.5-1.0 cm long. Flowers white, sessile, in dense terminal and axillary whorls, 2-4 cm in diam., large crowded, many-flowered. Nutlets 2-3 mm long, obovoid, rounded at the apex, smooth, shining and brown.

Local name : Dungarau Kubo.

Flowers : November to February.

Occurrence : On Barda Hills.

Uses : The plant is considered stimulant, carminative and emmenagogue. (WI).

Leucas stricta Benth. in Wall. Pl. As. Rar. 1 : 61. 1829 ; FBI 4 : 688 ; Cooke 2 : 551 ; Mukerjee, RBSI 14(1) : 170. 1940.

Erect, slender annual herbs, 15-20 cm high, hispidly hairy ; branches acutely 4-gonous, diffuse. Leaves 2.5-4.5 × 1-2 cm, shortly petioled or sessile, linear or oblong-lanceolate, obtuse, usually entire, tapering at base, hispid, glandular beneath, petiole 0-2 mm long. Flowers white in small globose about 10-12 flowered, solitary and terminal whorls on the branches or sometimes another is present below the terminal one. Nutlets 3-4 mm long, smooth, shining, rounded at the tip, brownish.

Flowers : May to October.

Occurrence : Collected from Rajkot Public Park and Rozi near Jamnagar.

Leucas urticifolia (Vahl.) J. Donn. Regn. Veg. 36 : 25. 1964 ; Santapau & Jan. 42. 1967. *Phlomis urticaefolia* Vahl, Symb. Bot. 3 : 76. 1794.

Erect, soft, hairy, branched, finely tomentose herb, 15-45 cm high; stems and branches obtusely quadrangular from a stout woody root stock, much hispid, pale-green. Leaves 3-7.2 × 1.5-3 cm, thin, petioled, linear or ovate, obtuse at apex, rounded or slightly cuneate at base, entire or coarsely crenate margins, more or less pubescent with stiff hairs on both sides, dark-green below; petiole 1.5-2.5 cm long. Flowers white, in many-flowered, dense, globose, small, remote, axillary and terminal whorls, 1.5-2.5 cm in diam. Nutlets 4, 2 mm long, obovoid-oblong, trigonous with truncate top, glandular, smooth, shining, green at first and brownish-black when ripe.

Local name : Kubo.

Flowers : August to October.

Occurrence : Collected from Dwarka near station, it was found abundant in salty waste; Junagadh Forest College; Rajkot along river bed, Ghumli, Okha, Vijarkhi lake 8 m SE. Jamnagar, Rozi near Jamnagar and Modpar-vidi in Halar district.

Uses : The same as *L. longifolia*. The plant is used as fodder for camels and goats.

Leucas zeylanica (Linn.) R. Br. Prodr. 504. 1810; FBI 4 : 689; Cooke 2 : 549; Mukerjee, RBSI 14(1) : 171. 1940; Santapau, Pl. Saur. 673. 1953. *Phlomis zeylanica* Linn. Sp. Pl. 820. 1753.

Large, erect, pubescent or hispid annual herbs, 15-45 cm high; stems and branches quadrangular, grooved; hairs spreading deflexed or appressed. Leaves 3-7 × 0.5-1.4 cm long, shortly petioled or sessile, linear or lanceolate, obtuse or subacute, cordate or tapering at base, entire or obscurely serrate margins, membranous, dark-green above, paler beneath, ciliate with bulbous-based hairs curved towards leaf-apex; petiole 2.5 mm long, hispid. Flowers white, sessile, in terminal, rarely axillary, 6-10 fid, whorls 12-20 mm in diam. Nutlets 3 mm long, obovoid-oblong, subtruncate at apex; inner face angular, outer rounded; smooth shining, blackish-brown.

Flowers : September to October.

Occurrence : Recorded from Sasan, Iran river up stream.

Uses : A decoction of leaves is used as a lotion for ulcers of the nose. (W1)

NEPETA Linn.

Nepeta bombaiensis Dalz. in Dalz. & Gibs. Bombay Fl. 209. 1861 ; FBI 4 : 661 ; Cooke 2 : 556 ; Mukerjee, RBSI 14(1) : 133. 1940 ; Santapau, Pl. Saur. 674. 1953 ; Santapau & Jan. 42. 1967.

An erect herb up to 35 cm tall ; stems branched, tomentose or laxly villous with soft white hairs. Leaves long, petioled, 3.5 × 2.5-4 cm, rounded-ovate, cordate at base, crenate along the margins, sparsely hairy ; petiole 2-3 cm long. Flowers long-pedicelled, as long as petiole ; corolla pale-blue with purple spots, very small. Nutlets 1.5 mm long, ellipsoid, nearly smooth, dark-brown, dotted with white dots.

Flowers : July to August.

Occurrence : Recorded from Junagadh, Girnar along pilgrims steps.

OCIMUM Linn.

Calyx hairy within :

Fruiting calyx 3 mm long ; corolla 6 mm *americanum*

Fruiting calyx 6 mm long ; corolla 10-12 mm *basilicum*

Calyx glabrous within :

Pedicel as long as calyx *sanctum*

Pedicel minute :

Leaves strongly serrate, almost glabrous *gratisimum*

Leaves entire *adscendens*

Leaves deeply serrate, pubescent on both sides *killmandscharicum*

Ocimum adscendens Willd. Sp. Pl. 3 : 166. 1800 ; FBI 4 : 609 ; Cooke 2 : 522 ; Mukerjee, RBSI 14(1) : 21. 1940.

Annual herbs, 15-35 cm high, erect or prostrate with ascending and spreading branches. Leaves 1.5-2.5 × 0.6-1.6 cm, shortly petioled, oblong or ovate, obtuse, cuneate or tapering at base, glabrous, much gland-dotted ; petioles 3-10 mm long. Flowers pale rose in short lax racemes ; whorls distinct 15-25 mm in diam. Nutlets 1.5 mm in diam., compressed, orbicular, smooth, yellowish-brown mucilaginous when wetted.

Flowers : May to August.

Occurrence : Collected from Gondal Road Rajkot, Junagadh and Modpur-vidi in Halar district.

Ocimum americanum Linn. in Juslenius, cent. pl. 1 : 15. 1755; Santapau, Pl. Saur. 675. 1953 ; Saldanha, Fl. Hassan distr. 505. 1976. Bhandari, Fl. Indian Desert 314. 1978. *O. canum* Sims. in Bot. Mag. 51, t. 2452. 1823 ; FBI 4 : 607 ; Cooke 2 : 521 ; Mukerjee, RBSI 14(1) : 17. 1940 ; Santapau & Jan. 42. 1967.

An erect, much branched perennial, aromatic herb, 20-55 cm high; stems and branches subquadrangular, grooved; internodes 3.5-6 cm long. Leaves 2.5-4 × 1-1.5 cm., petiolate, elliptic-lanceolate, acute at both ends, almost glabrous, entire or slightly serrate along margins, gland-dotted; petioles 1-2 cm long, slender hairy. Flowers 4 mm long, white, pink or purplish, subsessile, in close whorls in a spiciform racemes 8-20 cm long. Nutlets 1 mm long, pitted, narrowly ellipsoid, punctate, black, mucilaginous, when wet.

Local name : Ramtulasi.

Flowers : July to December.

Occurrence : Recorded from Beyt, Jamnagar, Girnar forest, along road; Rajkot, waste sandy land; Rajkot riverbed; Pradumna Park Rajkot; Gondal Irrigation Lake, Chotila Hill; Dwarka Syke's point, 6 m NE. Girnar Hill, Junagadh.

Uses : The plant possesses aromatic, carminative, diaphoretic and stimulant properties. A decoction of the plant is taken for coughs, that of leaves for dysentery; it is also used as mouth wash for relieving toothache, the juice of leaves is given to children for cold, catarrh and bronchitis. A paste of leaves is used as an external application for parasitical skin affections. Fresh leaves are official in homoeopathy. (WI).

Ocimum basilicum Linn. Sp. Pl. 597. 1753 ; FBI 4 : 608 ; Cooke 2 : 523 ; Indrajai 579 & 583. 1910, Mukerjee, RBSI 14(1) : 18. 1940 ; Santapau & Jan. 42. 1967.

A large, quite smooth, perennial herb, 60-300 cm high with green stem. Leaves 4-8 × 2-4 cm, petiolate, ovate or lanceolate, acute or subacuminate, entire or dentate along margins, cuneate or tapering at base, almost glabrous on both sides; petioles 1.2-1.9 cm long, hairy. Flowers white, in elongate racemes, simple or branched; whorls close. Nutlets large, pitted, very mucilaginous when wetted.

Local name : Takmaria.

Flowers : July to October.

Occurrence : Recorded from Rajkot, Pradumna Park, Ranjit Sagar, Jamnagar ; Girnar Hill Junagadh, not common ; Okha seashore, in waste lands, abundant locally.

Uses : The plant is considered stomachic, anthelmintic, alexipharmic, antipyretic, diaphoretic, expectorant, carminative, stimulant and pectoral. An infusion of the plant is given for cephalalgia and gouty joints, and used as a gargle for foul breath. The juice of the leaves has a slightly narcotic effect and allays irritation in the throat. It is used as a nasal douche and as a nostrum for earache and also for ringworm. Seeds possess demulcent, stimulant, diuretic, diaphoretic and cooling properties; they are given internally in cases of habitual constipation and piles. They are used in poultices for sores and sinuses. (WI)

Ocimum basilicum var. *thyrsiflora* Benth. Lab. Gen. et sp. 5. 1832 ; Cooke 2 : 523.

Stem purple. Leaves very highly scented, inflorescence vinaceous purple, white.

Local name : Kamakasturi (Marathi).

Flowers : October onwards.

Occurrence : Collected from Sasangir Forest and Sasan village ; it was found cultivated in the cemetery at Okha, abundant.

Ocimum gratissimum Linn. Sp. Pl. 1197. 1753 ; FBI 4 : 608 ; Cooke 2 : 522 ; Indrajit 581. 1910. Mukerjee, RBSI 14(1) : 20. 1940 ; Santapau, Pl. Saur. 677. 1953 ; Santapau & Jan. 42. 1967.

Tall, perennial shrub reaching 1.5 metres high, slender, much branched, woody below ; stems and branches quadrangular, pubescent in younger parts, glabrous in older. Leaves 5-12 × 2.5-5 cm, petiolate, elliptic-lanceolate, acute or slightly acuminate at apex, tapering at base, distinctly serrate along margins, pubescent, at length almost glabrous, except hairiness on nerves, punctate below ; petioles 1.5-5.5 cm long, slender, slightly pubescent. Flowers greenish-yellow, in simple or branched rather short racemes, 8-16 cm long of compact whorls ; floral axis quadrangular, densely hairy. Style bifid, upper calyx purple, rest of the corolla and stamens white, anthers yellow. Nutlets 1.5 cm long, subglobose, rugose, brown, smooth with a glandular depression, not mucilaginous when wetted.

Local name : Ramtulsi.

Flowers : July to October.

Occurrence : Collected from Ghumli, Junagadh Forest Road ; Girnar Hill ; Barda Hill ; Khatia, near Jamnagar.

Uses : The plant is considered digestive, tonic, stimulant, demulcent, diuretic, antiemetic, antiseptic and styptic. It is used in cough mixtures in combination with other expectorant. The leaf juice is given in stomachache. The seeds of the plant are sometimes eaten. They are given in headache, neuralgia and dysentery. An infusion of the seeds is used in urinary disorders. (W1)

Ocimum kilimandscharicum Guerke in Engl. Pflanzenw. Ost. Afr. C. 349. 1895 ; Index Kewensis Suppl. 296. 1906 ; Santapau, Pl. Saur. 678. 1953 ; Santapau & Jan. 42. 1967.

An undershrub with pubescent branchlets. Leaves ovate or oblong, acute, narrow at base, deeply serrated, pubescent on both surfaces. Flowers in 4-6-flowered whorls on long villose racemes. Nutlets ovoid to ovoid-oblong, black to brown.

Flowers : September.

Occurrence : Junagadh, foot of Girnar, and in garden.

Uses : Oil which has been partially decamphorized possesses insecticidal properties and may be used as mosquito repellent, it is one-third as effective as pyrethrum extract. (W1)

Ocimum sanctum Linn. Mant. 1 : 85. 1767 ; FBI 4 : 609 ; Cooke 2 ; 521, Indrajit 582. 1910 ; Mukerjee, RBSI 14(1) : 19. 1940. Santapau, Pl. Saur. 679. 1953 ; Santapau & Jan. 42. 1967.

An erect, much branched, pungent odoured perennial herb, 30-75 cm high ; stems and branches subquadrangular, often tinged with purple, somewhat woody at the base, softly, densely hairy. Leaves 1.4-4 × 0.5-2 cm, petiolate, aromatic, ovate or elliptic-oblong, obtuse or subacute at apex, annulate or narrowed at base, shallowly and distant by serrate along margins, closely gland-dotted with long hairs on both sides. Petioles 0.7-2.0 cm long, pubescent. Flowers about 4 mm long, in axillary and terminal racemes 6-12 cm long, of compact whorls, floral axis as long as calyx, slender, simple. Sometimes branched, at times entire, inflorescence purple. Nutlets 4, about 1 mm long ellipsoid, smooth, brown mottled with minute yellow and black spots, covered with short fringe of hygroscopic mucilaginous hairs.

Local name : Tulsi (Holy basil).

Flowers : September to March.

Occurrence : Collected from Jamnagar Jail. Commonly cultivated in most Hindu homes and temples.

Uses : The juice of leaves possesses diaphoretic, antiperiodic, stimulating and expectorant properties, it is used in catarrh and bronchitis, applied to the skin, in ringworm and other cutaneous diseases and dropped into the ear to relieve earache. An infusion of the leaves is used as a stomachic in gastric disorders of children. A decoction of the root is given as a diaphoretic in malarial fevers. The seeds are mucilaginous and demulcent, and are given in disorders of genito-urinary system. (WI)

ORTHOSIPHON Benth.

Orthosiphon pallidus Benth. Lab. Gen. et Sp. 708. 1836 ; FBI 4 : 613 ; Cooke 2 : 523 ; Mukerjee, Rec. Bot. Surv. India 14 (1) : 23. 1940 ; Santapau & Jan. 42. 1967.

A low diffusely branched herb from a woody root stock up to 30 cm high : branched many, glabrous or finely pubescent, quadrangular. Leaves petioled, 1 4×1 2 cm, ovate, obtuse or subacute, gland-dotted, glabrous, crenate or serrate above, entire and cuneate below ; petioles 1 cm long. Flowers 6 mm long, in short, stout or slender racemes ; whorls 6-fid, distant. Corolla white or pale lilac. Nutlets 1.5 mm long, subglobose ; compressed, pale, nearly smooth.

Flowers : June to October.

Occurrence : Collected from Jamnagar.

SALVIA Linn.

Salvia santolinaefolia Boiss. Diagn. Ser. 1 : 13. 1842 & Fl. Orient 4 : 632. 1879 ; FBI 4 : 656 ; Mukerjee, RBSI 14 (1) : 108. 1940 ; Santapau, Pl. Saur. 680. 1953 ; Santapau & Jan. 42. 1967. *S. aegyptiaca* Linn. Sp. Pl. 23. 1753 ; FBI 4 : 656. 1885 in part, Cooke 2 : 558 ; Indrajit 586. 1910. *S. aegyptiaca* var. *pumila* Hook. f. in FBI 4 : 656. 1885 (Pro Parte):

Herb, up to 22.5 to 30 cm high ; stems much branched, hoary occupying up to 30 sq. cm ground surface. Leaves shortly-petioled, 1 2× 0.5 - 0.7 cm, linear, obtuse or subacute, decurrent into petiole, rigid, rugose, pectinately lobed ; lobes rounded ; margins revolute ; veins clear

on lower surface. Flowers minute, in axillary very slender spikes ; whorls 2 3 fid, distant. Corolla pale blue. Nutlets brown ; smooth, with 2 lobes, quite near.

Local name : Lavingiobaut.

Flowers : August to December.

Occurrence : Collected it from Rajkot Public-Park, Pradumna Park and Gondal Road, Rajkot, Ranjit Sagar, Jamnagar ; Dhunvao-vidi. Cooke also reports it for Rajkot.

Uses : Seeds are used as demulcent in diarrhoea and haemorrhoids. They are said to be useful in removing foreign bodies from the eye. (W1)

NYCTAGINACEAE

Herbs :

Flowers pink or purple, paniculate, umbellate or subcapitate

Boerhaavia

Flowers white, yellow or crimson in terminal cymes

Mirabilis

Climbing shrubs

Bougainvillea

Tree

Pisonia

BOERHAAVIA Linn.

Fruit glandular, along the ribs not at the crown :

Flowers pink or purple, in small, umbels ; opposite pairs of leaves very unequal, obtuse

diffusa

Flowers pink, in umbels, opposite pairs of leaves nearly equal, acute

chinensis

Fruits with large glands at the crown ; flowers in whorls, white ; leaves obtuse

verticillata

Boerhaavia chinensis (Linn.) Aschers. & Schweinf, Beitr. Fl. Aeth. 1 : 167. 1867 ; Stemmerik in Fl. Malesiana Ser. 1,6(3) : 455. 1964 ; Santapau & Jan. 42. 1967 (non Asch. & Schw.). *Valeriana chinensis* Linn. Sp. Pl. 33. 1753. *Boerhaavia repanda* Willd. Sp. Pl. 1 : 22. 1797 ; FBI 4 : 709 ; Cooke 2 : 564 : Indraj 595. 1910 ; Santapau, Pl. Saur. 682. 1953.

Diffuse, subscaudent herbs; branches 1-2 m long, glabrous or pubescent, cylindrical; internodes long. Leaves 4-7 × 2-4 cm, triangular ovate or cordate, acute or acuminate at apex, rounded or cordate or truncate at base, glabrous above, pubescent beneath, repand-sinuate; opposite pairs of leaves nearly equal; petioles 1-3 cm long, slender. Flowers in axillary or terminal, 3-8-fid umbels at the ends of peduncles; Fruits 6 mm long, linear-oblong, obscurely-ribbed, covered with numerous glands along the 5 ridges.

Local name : Satodi, Vasedo.

Flowers : Almost all the year.

Occurrence : Rajkot, Jubilee Garden; Dhunvao, Jamnagar; Sasau and Okha.

Uses : Root is effective on rheumatism and all sorts of swellings. An infusion of the root is given in asthma and bronchitis. (Indraji, 594. 1910)

Boerhaavia diffusa Linn. Sp. Pl. 3. 1753; Cooke 2 : 563; Santapau, Pl. Saur. 681. 1953; Santapau & Jan. 42. 1967. *B. repens* Linn. Sp. Pl. 3. 1753; FBI 4 : 709; Indraji 595. 1910.

Perennial herbs, much-branched, diffuse, procumbent or subscaudent, 20-60 cm long, with stout, fusiform roots; stems and branches slender, glandular-pubescent or at times almost glabrous, greenish-brown or purple; internodes 3-11 cm long. Leaves petioled, opposite, unequal, in pairs or fascicles 1-4 × 0.5-2.5 cm, oblong or suborbicular, acute, obtuse or rounded at apex, cordate; rounded or truncate at base, slightly tapering from the centre, entire or wavy along the margins, sub-fleshy, glabrous or sparingly hairy above, whitish-tomentose beneath; petioles 0.7-3.0 cm long, greenish or reddish-purple, deeply grooved, slender, glabrous. Flowers 4 mm, in diam., pale-pink minute, in axillary, extra-axillary or terminal paniculate umbels of 4-10 flowers; peduncles 1-2.5 cm long. Fruits 2-4 mm long, clavate or obovate, broadly 5-ribbed, pubescent, glandular-viscid outside. Seeds minute; embryo hooked.

Local name : Nano-vasedo, Zinko-vasedo, Vasedi, Punarnava, Rato-vasedo.

Flowers : Almost all the year.

Occurrence : Junagadh; Mangrol; Okha; Rajkot, Veroval, on sands.

Uses : The root of the plant consider laxative and diuretic. It has also expectorant properties and is used in asthma. In large doses, it acts as an emetic, found it to be a fairly good diuretic, especially when combined with iron, in dropsy associated with Chronic Bright's disease. (WI)

Boerhaavia verticillata Poir. Encyl. Method. 5 : 56. 1804 ; FBI 4 : 710 ; Woodrow in JBNHS 12 : 363. 1899 ; Cooke 2 : 564 ; Indrajai 593. 1910 ; Santapau, Pl. Saur. 683. 1953 ; Santapau & Jan. 42. 1967. *Boerhaavia stellata* Wight, Icon. t. 857. 1844-45 ; Dalz. & Gibs. 213. 1861.

A diffuse or climbing herb ; branches long, pale, terete, shining, glabrous, green or pale-blue. Leaves petioled, thick, 3.6 × 3.6 cm, unequal, broadly ovate or rounded, rarely oblong, obtuse, sinuate, glabrous, cordate at base ; young leaves white-pubescent ; petioles stout, 1.2 cm long. Flowers in oblong pedunculate-racemes, axillary and paniced arising from the axils of smaller leaves, rarely from bigger leaves, 9-15 cm long, few-fid, often superposed ; white. Fruits 3.4 × 1.2 mm club-shaped, green, with fine glands crown at the top, 1-seeded. Seeds white, glabrous, shining.

Local name : Orlo-gorlo, Ular-gular, Vakh-khapro, Moto-vasedo, Punarnava.

Flowers_g : June to December.

Occurrence : Veraval ; Junagadh ; Ranjit Sagar, Jamnagar ; Mangrol ; Porbander near Rest House ; Beyt, Jamnagar, Okha ; Dwarka near station ; Chotila ; Panelividi, Morvi, Woodrow, Dalzel and Gibson also reported it from Kathiawar.

Uses : Root is effective on rheumatism and all sorts of swellings. An infusion of the root is given in asthma and bronchitis. (Indrajai 594. 1910)

BOUGAINVILLEA comm. ex Juss. Mut. Choisy.

Bougainvillea spectabilis Willd. Sp. Pl. 2 : 348. 1799 ; Cooke 2 : 567 ; Indrajai 593. 1910 ; Santapau, Pl. Saur. 684. 1953 ; Bor & Raizada, Beaut. Ind. Clim. & Shrs. 269. 1954 ; Gir 296 ; Santapau & Jan. 42. 1967.

A large thorny climbing shrub up to 4 m tall ; bark pale and corky ; branches pubescent ; spines axillary, 2-4 cm long, curved.

Leaves petioled, 3 6.5 × 2.7 6 cm, ovate or orbicular, acute or narrowed base, entire and undulate along the margins, glabrous; petioles upto 2 cm long. Flowers yellowish or creamish, enclosed and adnate to pink to purplish large bracts in cymose panicles, either axillary or terminal. Fruits 5-ribbed, more or less glabrous, club-shaped.

Local name : Bouganvelia-ni-vel ; Rati-vel.

Flowers : December to June.

Occurrence : Found commonly cultivated all over Saurashtra.

Uses : Cultivated as an ornamental plant.

MIRABILIS Linn.

Mirabilis jalapa Linn. Sp. Pl. 177. 1753 ; Cooke 2 : 567 ; Santapau, Pl. Saur. 685. 1953 ; Santapau & Jan. 42. 1967. *M. dichotoma* Gater. Pl. Mantaub. 46 ; Indrajai 593. 1910.

Erect herbs or undershrubs 30 100 cm high ; stems much-branched, more or less terete, minutely pubescent or glabrous, greenish-yellow. Leaves 2.5 7.5 × 1.5 4.0 cm, broadly ovate or ovate-elliptic, more or less glabrous above, appressedly hairy beneath, acuminate at apex, rounded, truncate or acute at base, entire along the margins ; petioles upto 2.2 cm long. Flowers white, yellow or crimson or striped, 2.5 4.5 cm long, 2.5 cm in diam., in terminal cymose clusters ; involucre containing only one flower. Fruits about 4 mm in diam., subglobose, black.

Local name : Gulbas.

Flowers : August to December.

Occurrence : Found cultivated in the garden all over Saurashtra.

Uses : The leaves and stems of the plant are reported to be cooked with Pork and used as tonic in China. Seeds are used as an adulterant of black pepper. Bruised leaves are employed for poulticing abscesses and boils. Juice expressed from leaves is used as an external application to wounds and bruises and for alleying itching in urticaria. (W1)

PISONIA Linn.

Pisonia mitis Linn. Sp. Pl. 1026. 1753 ; Burm. f. Fl. Ind. 224. 1768 (excl. cit. Rheede) Shah et al. in JBNHS 79(3) : 567. 1977. *Pisonia grandis* R. Br. Prodr. 422. 1810. *Pisonia morindifolia* R. Br. in Wall. Cat. No. 7130. 1828 (nomen) ; Cooke 2 : 566 ; Indrajit 593. 1910 ; Santapau, Pl. Saur. 686. 1953 ; Santapau & Jan. 42. 1967. *Pisonia alba* Span. in Linnaea 25 : 342. 1841 ; FBI 4 : 711.

An arboreous, unarmed branched tree, 8-12 m tall, branches stout. Leaves petioled, 15-30 cm long, oblong-ovate or oblong, acute or acuminate at apex, slightly narrowed at base, entire along the margins, glabrous on both sides ; petioles 1-4 cm long. Male flowers 6 mm long, tubular campanulate, pedicelled, 5-toothed. Stamens 8. Female flowers 3 mm long ; stigma spenicellate. Fruits 1-2 cm long, long pedicelled, club-shaped, 5-angled ; angles with one row of prickles.

Local name : Velati salet.

Flowers : January onwards.

Occurrence : This is here given on the authority of H. Santapau & Janardhanan.

Uses : Cultivated as an ornamental plant.

Notes : Stemmeric [Fl. Males 6(4) : 464, ff. 11, 13. 1964] considered *Pisonia alba* Span. (1841), *Pisonia morindifolia* R. Br. (1828) and *Pisonia grandis* R. Br. (1810) conspecific, accepting the last name as valid on the basis of priority. However, Hooker in Fl. Brit. Ind. (4 : 711. 1885) cites *Pisonia mitis* Linn. (1753) as an unambiguous synonym of *Pisonia alba* Span. Therefore *Pisonia mitis* Linn. has priority.

AMARANTHACEAE

Leaves alternate :

Ovary 2-many-ovulate

Celosia

Ovary 1-ovulate :

Flowers 2-sexual

Digera

Flowers 1-sexual

Amaranthus

Leaves alternate or fascicled or with opposite and alternate mixed

Aerva

Leaves all opposite, not fascicled :

Anthers 2-celled :	
Flowers all perfect, spicate :	
Staminodes 0 :	
Stamens 5 :	
Seeds reddish-brown, long with narrow flattened appendage on one side	<i>Gomphrena</i>
Seeds brown, minute, globose smooth	<i>Psilostachys</i>
Stamens 2	<i>Nothosaerva</i>
Stamens with interposed staminodes	<i>Achyranthes</i>
Flowers clustered 1-3 perfect surrounded by deformed ones	<i>Pupalia</i>
Anthers 1-celled	<i>Alternanthera</i>

ACHYRANTHES Linn.

Achyranthes aspera Linn. Sp. Pl. 204, 1753 ; FBI 4 : 730 ; Cooke 2 : 580 ; Indraj 605. 1910 ; Santapau, Pl. Saur. 687. 1953 ; Gir 297 ; Santapau & Jan. 42. 1967.

An erect herb, 50-100 cm high, profusely branched from near the base with opposite branches ; stems and branches thickened at the nodes ; younger parts obscurely tetragonous, hairy ; older terete, almost glabrous ; internodes 5-11 cm long. Leaves bluish purple to glaucous 3-9.5 cm, broadly ovate or obovate, acute, acuminate or rounded at apex, acute, obtuse or cuneate at base, entire along the margins, pubescent tomentose or velvety, at length glabrescent ; petioles 1-5 cm long, hairy, terete. Flowers, red, 3-5 mm in diam., in erect, dense axillary and terminal spikes which are upto 25 cm long ; inflorescence purplish, stamens with interposed staminode. Utricles 3-5 mm long, cylindric-oblong, glabrous, straw coloured, enclosed in persistent perianth parts. Seeds 2 mm long, oblong black.

Local name : Aghedo.

Flowers : September to April.

Occurrence : Dwarka near station ; Shirva in Gir Forest ; Bileshwar on Barda Hill ; Barda S. of Ghumli, Jamnagar.

Uses : The flowering spikes or seeds, ground into a paste, are used as an external application for poisonous insect bites. A decoction of the

entire plant is reputed to possess diuretic properties and occasionally it has proved useful in renal dropsies. (WI)

Achyranthes aspera var. *argentea* Hook. f. in Fl. Brit. India 4 : 730. 1885. *A. argentea* Thwaites Enum. 249. 1869.

It differs from the typical variety only in having the leaves silvery silky beneath.

Flowers : September to October.

Occurrence : Rajkot Catholic Church, Jubilee Gardens, Rajkot and from near the Jail, Dwarka along railway line.

Achyranthes aspera var. *porphyristachya* Hook. f. in Fl. Brit. India 4 : 730. 1885 ; Boerlage in Ned. Kruid. Arch (2) 5 : 425 ; Santapau, Pl. Saur. 688. 1953 ; Santapau & Jan. 42. 1967 ; Santapau Fl. Khandala 224. 1967.

This is a distinct variety and differs from the typical variety in the following characters.

Much longer upto 2 m tall. Leaves 7-25 cm long, broadly elliptic, elliptic-lanceolate or lanceolate, acuminate, glabrous or pubescent, membranous. The flowers and perianths are slightly larger in size. Spikes much longer with a more slender hairs.

Flowers : September to October.

Occurrence : Ghumli and Bileshwar on Barda Hills.

AERVA Forsk. (nom. cons.)

Herbs ;

Flowers small, white or with a pinkish or golden tinge, in lax terminal racemes

sanguinolenta

Flowers small, whitish or greenish-white, in axillary spikes

lanata

Undershrubs ; flowers pale-white, in densely white-wooly elongate spikes

persica

Aerva lanata (Linn.) Juss. in Ann. Mus. Paris 2 : 131. 1803 ; FBI 4 ; 728 ; Cooke 2 : 578 ; Indrajī 604. 1910 ; Sauntapau, Pl. Saur. 690. 1953 ; Santapau & Jan. 42. 1967. *Achyranthes lanata* Linn. Sp. Pl. 204. 1753 ; (non *Celosia lanata* Linn. *Ibid.* 205. 1753).

Annual, diffuse, erect or ascending herbs, 15-50 cm tall, somewhat thickened and woody at base ; stems simple or branched glandular, hairy, striate. Leaves 1-6 × 1-4 cm, broadly ovate, elliptic or obovate, acute or subacute at apex, tapering at base appressedly hairy on both surfaces, entire along the margins ; petioles 0.3-1.6 cm long, pubescent. Flowers small, whitish or greenish white, in axillary spikes on 2-4, 0.5-3.0 cm long culminating into interrupted panicles at the end of the branches due to suppression of upper leaves. Staminodes 5 ; filaments pale yellow. Stigmas 2. Utricles minute, broadly ovoid, subacute, smooth, shining, 1 seeded. Seeds black, shining, smooth, acute at one end, with margins outside.

Local name : Gorakh ganjo, Bhoyanjadi.

Flowers : September to January.

Occurrence : Junagadh, Fort of Girnar and from cattle farm ; Junagadh to Sasan ; Veraval, Somnath on sandy soil erect or prostrate ; Porbander near the Rest House ; Dwarká near the station ; Shirvao, Gir Forest and Mangrol.

Uses : The plant is said to possess diuretic and demulcent properties. (WI)

Locally dry leaves and flowers are used for the treatment of bronchitis, asthma, and Jaundice (Indrajī, 604. 1910).

Aerva persica (Burm. f.) Merrill. in Phil. Journ. Sci. 10 : 348. 1928. *Iresine persica* Burm. f., Fl. Ind. 212. 1768. *Celosia lanata*. Linn. Sp. Pl. 298. 1753. *Iresine javanica* Burm. f. Fl. Ind. 212. 1768. *Aerva javanica* (Burm. f.) Juss. ex Schult., Ann. Mus. Par. 11 : 13. 1808. *A. tomentosa* Forsk. Fl. Aegypt.-Arab. 122. 1775 ; Santapau & Jan. 42. 1967 (of Juss.).

An erect, hoary tomentose conspicuous undershrub, 60-120 cm tall ; stems terete, branched, clothed with thick pale - white hairs. Leaves sessile or subsessile, 2.5-8 × 0.4-1.2 cm, linear, oblong or spatulate, acute or obtuse at apex, sharply narrowed at base, recurved along the margin, densely tomentose pale white, in densely white - woolly elongate spikes, 3-16 cm long, sessile. linear or oblong ; often forming leafless

terminal panicles ; male flowers seem to be very rare, utricles minute ovoid, 1 lobed and 1 seeded. Seeds minute, ovoid, black or brownish black, shining.

Local name : Boor.

Flowers : August to November.

Occurrence : Dwarka along the railway line.

Aerva sanguinolenta (Linn.) Blume, Bijdr. 547. 1825 ; Santapau, Pl. Saur. 691. 1953 ; Gir 299 ; Santapau & Jan. 42. 1967. *Achyranthes sanguinolenta* Linn. Sp. Pl. 294. 1762. *Aerva scandens* Wall. Cat. 1911. 1823 ; FBI 4 : 727 ; Cooke 2 : 577 ; Indrajai 605. 1910.

An erect, perennial, often climbing, annual herb, 30-150 cm high, arising from the woody base ; branches terete, densely appressedly tomentose in younger parts. Leaves sessile, 1.7 × 0.5-3.0 cm alternate or fasciated or with opposite and alternate mixed ; ovate-elliptic or elliptic-lanceolate or oblong, acute or mucronate at the apex, cuneate, subacute or tapering at base, entire along the margin, densely clothed with appressed white hairs on both sides ; petioles 3-8 cm long. Flowers small, white or with a pinkish or golden tinge, in spikes which are 0.5-3.0 cm long, globose or cylindrical, white-woolly, shining and which may be solitary or fasciated in the axils of leaves or gathered into lax terminal racemes ; often forming paniculate inflorescence due to suppression of upper leaves. Utricles 1 mm in diam., reniform, broadly ovate, acute, thin. Seeds 1 mm in diam., reniform, brownish-black, shining, smooth.

Local name : Velaro gorakhganjo.

Flowers : September to January.

Occurrence : Kankeshwari in Gir Forest, Sasan Iran river up stream.

Uses : Dry leaves and flowers are used for the treatment of bronchitis, asthma and jaundice. (Indrajai 605. 1910).

ALTERNANTHERA Forsk.

Leaves, lanceolate, somewhat oblong-lanceolate, acute

amoena

Leaves, elliptic-oblong, obovate-oblong

sessilis

Alternanthera amoena (Reg.) Voss in Vilm. Blumeng. ed. 3 Sieb. & Voss 1 : 869. 1895 ; Santapau & Jan. 42. 1967. *Telanthera amoena* Regel, Gartfl. 101. 1869 ; L.H. Bailey, Stand. Cyclo. Horti. 6 : 3319. 1917.

A dwarf ornamental plant. Leaves long-lanceolate, somewhat oblong-lanceolate, sometime elliptic, acuminate, very short-petioled, the under colour mostly green but veined and blotched with red and orange. Flowers head sessile, single in pairs or 3's and terminal.

Flowers : Flowering season not known.

Occurrence : It was found cultivated in the garden at Rajkot.

Uses : An ornamental plant cultivated for edging in gardens.

Alternanthera sessilis (Linn.) DC. Cat. Hort. Monsp. 77. 1813 ; R. Br. ex Sweet, Hort. Sub. Lond. 48. 1818 ; FBI 4 : 731 ; Indraj 607. 1910 ; Santapau, Pl. Saur. 692. 1953 ; Santapau, Bull. Bot. Surv. Ind. 3 : 11. 1961 ; Santapau & Jan. 42. 1967. *Gomphrena sessilis* Linn. Sp. Pl. 225. 1753. *A. triandra* Lamk. Encycl. 1 : 95. 1783 ; Cooke 2 : 584.

An erect perennial or prostrate herb, 10-30 cm tall, rooting at the lower nodes ; stems simple or branched, yellowish green, deep green or reddish purple, shining, quadrangular at first, terete when old, with longitudinal row of hairs on two opposite sides and also with transverse lines of hairs at nodes ; internodes 4-7 cm long. Leaves sessile or subsessile, opposite, 1.5 × 0.7-1.5 cm, elliptic-oblong, obovate-oblong or oblanceolate, rounded, obtuse or sub-acute at apex, tapering or acute at base, entire along the margins, glabrous or thinly hairy. Flowers small, about 1.5-2 mm long, whitish or with a pinkish tinge, in axillary globose condensed spikes ; anthers 1-celled. Utricles 2 mm long, obcordate, deeply emarginate, brownish or straw coloured, glabrous, falling off with the perianth. Seeds 1-1.5 mm in diam., glabrous, ovoid.

Local name : Jal-jambvo, Pani-ni-bhaji.

Flowers : Almost throughout the year.

Occurrence : It grows near the water. It was found near water at Satvirbanes, Pransia talao near Hadia dungar and elsewhere in Porbander area.

Uses : This is used as a vegetable by poors. It is used to increase the flow of milk in woman after delivery. Leaves are applied on erpsipelas and blotches. (Indraj 607. 1910)

Note : Our floras generally credit the combination to R. Brown in Prodr. 417, 1810 ; Robert Brown did not make the combination in the sense of Art. 32 of the Code. The nomenclature of this plant is as cited above.

AMARANTHUS Linn.

Stamens 5, sepals 5 ; leaf-axils with spines	<i>spinosus</i>
Stems 3 ; sepals 3 :	
Fruit circumscissile	<i>tricolor</i>
Fruit indehiscent :	
A low much-branched herb	<i>viridis</i>
A tall succulent herb	<i>lividus</i>

Amaranthus lividus Linn. Sp. Pl. 1753 ; Thellung in Aschers. & Graebn. Synops. 5(1) : 319. 1914 ; Backer, Fl. Males. 1, 4(2) : 77. 1949 ; Santapau & Jan. 42. 1967. *A. blitum* and var. *oleracea* Hook. f. in FBI 4 : 721. 1885 (non *A. oleraceus* Linn.).

A tall erect succulent herb ; procumbent ; 15 - 40 cm high. Branches pale green in colour and smooth. Leaves alternate, small, narrow, sepals oblong, apiculate, clusters small all axillary. Fruit indehiscent.

Local name : Adbau tandaljo, Ukadi Bhaji, Varsad ni bhaji.

Flowers : During monsoon season.

Occurrence : Dwarka near station ; Chotila.

Uses : It is used as a pot herb. Leaves are used to make poultice. (Indraji 501. 1910).

Amaranthus spinosus Linn. Sp. Pl. 991. 1753 ; FBI 4 : 718 ; Cooke 2 : 573 ; Indraji 599. 1910 ; Santapau, Pl. Saur. 695. 1910 ; Santapau & Jan. 42. 1967.

Erect or procumbent, perennial herbs, 50 - 125 cm tall ; stems and branches thickened at the nodes, occasionally rooting from basal nodes, simple or branched, terete and grooved, yellowish-green to reddish, glabrous, with axillary divaricate pale - brown spines which are 1.5 - 2.5 cm long. Leaves long petioled, 1.5 - 6.5 × 0.5 - 3.5 cm, alternate, broadly ovate, ovate - rhomboid, oblong or elliptic, obtuse, subacute or

emarginate at apex, narrowed or decurrent at base, entire or minutely serrulate along the margins, undulate, glabrous, petioles 1-5 cm long. Flowers small, about 1 mm greenish or greenish white, in dense globose, axillary clusters upto 2 cm across or in dense, elongate, lax, terminal spikes up to 15 cm long, branched or unbranched, forming a panicle, 1 sexual, females usually clustered in axils, bracts linear, setaceous, bristle-tipped. Perianths of male acuminate; of females oblong, obtuse, apiculate. Stamens 5, styles 2, pubescent; stigmas 2. Utricles 1.5-2 mm long, membranous ovoid or oblong, 2-3 lobed and thickened at apex. Seeds about 0.5 mm in diam., black or brownish red, with thin margin outside.

Local name : Kantalo dhimdo, Kantalo dambho.

Flowers : July to May.

Occurrence : Rajkot along river bed and Rozi near Jamnagar.

Uses : It is used by the poor as a pot-herb. Boiled with pulses, it is also fed to cattle to increase the yield of milk. (WI)

The root is used for the treatment of bronchitis, asthma and skin diseases and for poisonous stings. Leaves are used as poultice. (Indraji 600. 1910)

Amaranthus tricolor Linn. Sp. Pl. 989. 1753; Merrill, Enum. 2: 128; Santapau, Pl. Saur. 696. 1953; Gir 303; Santapau & Jan. 43. 1967. *A. gangeticus* Linn. Syst. Nat. (ed. 10) 1268. 1758; FBI 4: 719; Cooke 2: 574; Indraji 600. 1910. *A. oleraceus* Burm. f. Pl. Ind. 198. 1768; Willd. Sp. Pl. 4: 386. 1805 (non Linn. 1753).

An erect annual herb, 30-90 cm high; stems simple or branched, succulent, greenish to reddish purple; branches more or less glabrous, deeply striate or grooved, terete and angular. Leaves petioled, 1-6.5 cm alternate, broadly ovate or ovate-rhomboid, glabrous, entire, rounded and shortly mucronate at apex, narrowed into petiole at base; petioles 0.5-5 cm long, slender glabrous, pale-green to reddish. Flowers greenish, in dense axillary clusters and in terminal spikes which are 2-6 cm long; male and female mixed; stamens 3. Utricles 2-3 mm long, flask shaped, wrinkled, outside, smooth, dehiscing, lid contracted above, conical with obtuse apex. Seeds 1 mm in diam., lenticular, ovoid or circular, pitch black or reddish-brown and shining.

Local name : Adbau dambho.

Flowers : August to October.

Occurrence : Sasan, westwards to river, Shirvao, Gir Forest, abundant.

Uses : Used in the treatment of skin diseases and as pot herb. (Indraji 600. 1910)

Amaranthus viridis Linn. Sp. Pl. ed. 2 : 1405. 1763 ; FBI 4 : 720 ; Cooke 2 : 575 ; Indraji 600. 1910 ; Saldanha, Fl. Hassan Distr. 107. 1976 ; Bhandari, Fl. Indian Desert 324. 1978. *A. gracilis* Desf. Tabl. Ec. Bot. 43. 1804 ; Santapau, Pl. Saur. 693. 1953 ; Gir 300 ; Santapau & Jan. 42. 1967.

Erect or diffuse annual unarmed herbs, simple or branched, 20-80 cm high ; stems and branches grooved, glabrous, subfleshy, pale purple. Leaves long petioled, alternate, 1.2-6 × 1.5-4.5 cm, broadly ovate rhomboid, subacute or emarginate at apex, rounded, cuneate or tapering at base, entire, glabrous, petioles 0.8-5 cm long, glabrous, grooved. Flowers very small, 1 mm long, green or purplish brown, 1 sexual, lower ones in axillary clusters of about 4 cm long ; upper ones in dense terminal spikes or panicles of about 12 cm long. Stamens 3. Utricles 1-2 mm long, indehiscent, acute, rugose, ovoid, with sub-conical scarcely exerted beak, wrinkled outside 1-sided. Seeds less than 1 mm in diam., black or brown, shining, smooth, with narrow margin on one side.

Local name : Dhimdo.

Flowers : Almost throughout the year.

Occurrence : Shapoor ; Chotila ; Ranjit Sagar, Jamnagar, in cultivated field.

Uses : It is used against urine - troubles and skin diseases. It is used as a vegetable by the poor. It is also given to the cattle during scarcity. (Indraji 601. 1910)

CELOSIA Linn.

Celosia argentea Linn. Sp. Pl. 205. 1753 ; FBI 4 : 714 ; Cooke 2 : 570 ; Indraji 596. 1910 ; Santapau, Pl. Saur. 697. 1953 ; Gir 304 ; Santapau & Jan. 43. 1967.

An erect annual glabrous herb, 30-150 cm high; stems green, pale yellowish or purplish red, usually simple, often much branched, grooved, striate, internodes 8-15 cm long. Leaves alternate, upper ones subsessile or shortly petiolate, the lower petiolate, 1.5-10 × 0.6-4 cm, ovate lanceolate or lanceolate-oblong, acute or obtuse at apex, narrowed at base, entire with purplish red margins, glabrous, petioles 1-3 cm long, glabrous, ventrally grooved. Flowers 6-7 mm long, pink or white, in subsessile or stalked, erect, dense terminal spikes 1.5-20 by 0.5-2.5 cm, usually solitary, often paired, broadly cylindrical towards base, conical at apex, upper part of spike purple, the colour gradually decreasing downwards, ovary 2-many-ovulate. Utricles 3-4 mm, long-obovoid, green, later changing to brown, circumscise at middle, included by perianth, 4-seeded, at times 2-8-seeded. Seeds 1-1.5 mm in diam., lenticular, black, smooth, shining.

Local name : Lampdi.

Flowers : July to February.

Occurrence : Sasan, Junwania Nes, Kankai, Shirwan, Jamwala in Gir Forest, Junagadh, Willingdon dam, Rajkot, Lakes, Public Park.

Uses : The plant is used as pot-herb in times of scarcity. It is eaten by cattle. The seeds are considered efficacious in diarrhoea. They are useful in blood diseases and mouth sores, for clearing the vision and for the diseases of the eye. (WI)

DIGERA Forsk.

Digera muricata (Linn.) Mart. Beitr. Amer. No. 2, 77. 1825; Santapau, Pl. Saur. 698. 1953; Gir 305; Santapau & Jan. 43. 1967. *Achyranthes muricata* Linn. Sp. Pl. (ed. 2) 295. 1762. *D. arvensis* Forsk. Fl. Aeg. Arab. 65. 1775. FBI 4 : 717; Cooke 2 : 572; Indrajit 597. 1910.

An annual erect slender herb, upto 30-50 cm tall; stems striate, simple or branched from the base, dark-green, greenish purple at the nodes, glabrous. Leaves alternate, petioled, 2.5-7 × 1.8-4 cm, it shows variation in the size; membranous, elliptic, ovate or ovate-rhomboid, acute at apex, rounded or cordate at base, entire along the margins, glabrous, petioles 1-4.5 cm long, slender, glabrous or nearly so, grooved on upper surface. Flowers 2 sexual, small, about 2 mm long, red in colour, in axillary pedunculate spikes 3-10 cm long, spreading, slender. Fruits 2-3 × 1-2 mm, yellowish-green, subacute and notched at the apex, margined, pale green, turning dark brown later, wrinkled, shining. Seeds 1 mm in diam. brown or black.

Local name : Kanejaro.

Flowers : June to October.

Occurrence : Dwarka ; Rajkumar College Compound, Rajkot, from near the Lakes, Gondal Road, Rajkot, Pradumna Park, Residency Park and Jilla garden, Rajkot.

Uses : It is sweetish and laxative in large doses ; flowers and seeds are reported to be given for urinary discharges. (WI)

GOMPHRENA Linn.

A diffuse, procumbent or suberect herbs, leaves elliptic, oblong, entire and hairy along the margins, glabrous or nearly so above, pubescent beneath

celosioides

An annual erect herb ; leaves oblong or oblong-obovate, entire along the margins, thinly hairy on both surfaces

globosa

Gomphrena celosioides : Mart. Beitr. Amar. 93. 1825 & in Nov. Act. Nat. Cur. 13 : 301. 1826 ; Sandwith in Kew. Bull. 29. 1946 ; Raizada in JBNHS 48 : 675. 1952 ; Santapau & Jan. 43. 1967. *G. decumbens* auct. *G. procumbens* auct. *G. dispersa* auct.

A diffuse, procumbent or suberect herbs at times trailing, 10 - 40 cm long ; main stems prostrate, woody at the base, sometimes rooting along nodes ; branches radially spreading or ascending, obscurely quadrangular, grooved, villous, internodes 3 - 10 cm long. Leaves 1.5 - 4.5 × 0.5 - 1.6 cm, opposite, elliptic, oblong, obovate-oblong or spatulate, subacute or obtuse at apex, tapering at base, entire and hairy along the margins, glabrous or nearly so above, pubescent beneath, petioles 0.3 - 0.8 cm long. Flowers small, about 4 mm long, white or greenish-white in terminal heads, usually falling off from below upwards leaving persistent. Utricles upto 3 mm long, ovate or ovoid, compressed, truncate at apex. Seeds 1.5 - 2 mm long, reddish-brown, with narrow flattened appendage on one side.

Flowers : July to March.

Occurrence : Collected from Okhamandai.

Gomphrena globosa Linn. Sp. Pl. 326. 1753 ; FBI 4 : 732 ; Cooke 2 : 584 ; Aschers & Graeb. Synops. 5 : 367. 1914 ; Santapau, Pl. Saur. 699. 1910 ; Santapau & Jan. 43. 1967 ; Santapau, Fl. Khandala 226. 1967.

An annual erect herb, 20-60 cm high, much-branched, stems and branches thickened, stout, obscurely 4-gonous at nodes, young parts grooved, geniculate, pubescent and often tinged with red; older parts terete and glabrous, greenish-red or yellowish-brown; internodes 3-7 cm long. Leaves shortly-petioled, 2.5-7 × 1-2 cm opposite, oblong or oblong-obovate, acute, subacute or obtuse at apex, subcordate, rounded or tapering at base, entire along the margins, thinly hairy on both surfaces; petioles 4-8 mm long. Flowers small, about 5-6 mm long; yellowish-white or purplish, in solitary or terminal or fascicled spicate heads 1-2.5 cm in diam., globose, large peduncled. Utricles up to 3 mm long, ovoid, seeds swollen, reniform.

Flowers : September to March.

Occurrence : It was found cultivated in the garden at Rajkot Jilla garden, Jubilee garden, Residency Park; Bhavnagar lane, Okha.

Uses : Cultivated in gardens as a pot or border plant. The roots are used in the treatment of coughs. (WI)

NOTHOSAERVA Wight

Nothosaerva brachiata (Linn.) Wight, Icon. 6 : 1. 1853; FBI 4 : 726; Cooke 2 : 580; Santapau, Pl. Saur. 700. 1953; Gir 306; Santapau & Jan. 43. 1967. *Illecebrum brachiatum* Linn. Mant. 1 : 23. 1767.

Annual, erect, slender herbs, 20-60 cm high, much-branched from the base, deciduous, branches striate, spreading, glabrous or puberulous often with purplish-tinge or reddish. Leaves 1-5.5 × 0.7-2.2 cm, ovate, or elliptic, acute or sub-acute at apex, tapering at base, entire along the margins, membranous, green, glabrous, petioled 0.9-1.8 cm long. Flowers small, creamy-white or pinkish, in solitary or axillary fascicled spikes 0.5-1.5 cm long, sessile, cylindrical, dense, 2 stamens. Utricles 0.3 mm long, falling off, obovoid or oblong compressed, smooth, pointed at base, rounded at apex, circumscise at middle. Seeds minute, reddish-black, shining, lenticular.

Flowers : August to February.

Occurrence : Junagadh, Girnar Hill; Sasan in Gir Forest, Jamnagar.

Uses : The plant is used as pot-herb.

PSILOSTACHYS Hochst.

Psilostachys sericea (Koen.) Hook. f. in Benth. & Hook. Gen. Pl. 3 : 32. 1880 ; FBI 4 : 726 ; Cooke 2 : 579 ; Santapau, Pl. Saur. 701. 1953 ; Santapau & Jan 43. 1967. *Achyranthes sericea* Koen. in Roxb. Fl. Ind. 3. 675. 1832. *Psilotrichum serriceum* Dalz. in & Gibs. Bomb. Fl. 216. 1861.

A slender erect silky herb, arising from woody root-stock ; stems stout, hard, terete, villous with long, silky, patent hairs, 6-8 mm long. Leaves 15-25 × 10-20 mm, broadly ovate or orbicular-ovate, acute at apex, rounded or cordate at base, thick, villous above, silky beneath ; petioles up to 5 mm long. Flowers 2-3 mm long, in trichotomous slender spikes, 6-14 mm long, sessile, 4-8 'fid' at the ends of the filiform branches of a lax panicle ; peduncles 4-7 cm long, axillary, filiform ; stamens 5. Utricles subglobose or ovoid, indehiscent, membranous. Seeds minute, globose, smooth, shining, brown.

Flowers : January.

Occurrence : Recorded by Dalzell ; as growing along the coast, Veraval, Somnath. (T.A. Rao 566)

PUPALIA Adans. mut. Juss.

Pupalia lappacea (Linn.) Juss. in Ann. Mus. Par. 2 : 132. 1803 & Moq. in DC. Prodr. 13 (2) : 331. 1849 ; FBI 4 : 724 ; Dalz. & Gibs. 219. 1861 ; Cooke 2 : 583 ; Indrajit 602. 1910 ; Santapau, Pl. Saur. 702. 1953 ; Gir 307 ; Santapau & Jan. 43. 1967. *Achyranthes lappacea* Linn. Sp. Pl. (ed. 1). 1 : 204. 1753.

A large straggling, perennial undershrub, 90-150 cm high ; branches many from the woody stock, divaricate, terete, brown-tomentose, slightly swollen at the nodes, green to reddish-pink. Leaves short petioled, 4-10 × 1.8-5 cm, elliptic, ovate or ovate-lanceolate, acute or apiculate at apex, narrowed or cordate at base, brown tomentose on both surfaces, petiole 1 cm long, perfect. Flowers 6-8 mm in diam., yellowish-green, in clusters forming terminal spikes, 10-40 cm long, sessile, tomentose with ovate, aristate or acuminate bracts which are persistent after the fall of clusters ; imperfect flowers reduced to 4-7 glabrous, stalked, stellate, hooked yellow spines in a whorl, on a tough pedicel in the axil of bract which is lanceolate, acute, 3-nerved. Utricles upto 1.3 cm in diam., membranous, oblong or ovate, slightly tapering at base and suddenly and shortly tapering at apex, green at first, turns

brown later, covered with brownish-white hairs and hooked, sharp, acuminate spines. Seeds 1.6-2 mm long, ellipsoid, compressed, black, smooth, shining, notched at one end.

Local name : Gadar-zipto, Dholo-zipto, Vad-zipto.

Flowers : July to November.

Occurrence : Jamnagar Jail ; Dhunvao, 6 M.E. Jamnagar ; Beyt. Rajkot Lakes, Pradumna Park ; Junagadh, foot of Girnar ; Gondal Irrigation Lakes, Girnar Forest along road, Girnar Hill Junagadh ; Dalzell & Gibson reported from Kathiawar.

Uses : It is given in the form of soup for cough and fever. The ash of the burnt plant is mixed with water and taken for flatulence, and applied to leprosy sores after making them bleed. It is used as an ingredient in rat poison. (WI)

Leaves are used in skin-diseases. Ash of dry plant is given with honey for the treatment of cough and bronchitis. (Indraji 603, 1910)

CHENOPODIACEAE

Stem not twining :

Embryo annular or horseshoe-shaped :

Stems leafy, not jointed :

Flowers all similar, hermophordite, leaves flat

Chenopodium

Flowers dimorphic

Atriplex

Stems jointed, fleshy ; leaves 0 :

Flowers in the scale of cone-like spikes

Arthrocnemum

Flowers sunk in cavities in successive joints

Salicornia

Embryo spiral :

Sepals not winged

Suaeda

Sepals transversely winged

Salsola

Stems twining to the right

Basella

ARTHROCNEMUM Moq.

Arthrocnemum indicum (Willd.) Moq. Chen. Enum. 113. 1840 ; FBI 5 : 12 ; Cooke 2 : 589 ; Indraj 611. 1910 ; Santapau, Pl. Saur. 703. 1953 ; Santapau & Jan. 43. 1967. *Salicornia indica* Willd. in Ges. Naturf. Fr. Nene Schr. 2 : 111, t. 4, f. 2. 1799.

Perennial succulent erect herbs, 10-30 cm high ; stems leafless, profusely branched, jointed, terete, slightly woody at base, glabrous, glaucous green, sometimes purplish ; branches opposite, ascending, at times the lower ones diffuse or prostrate, rooting at the basal nodes. Flowers minute, pink, bisexual. 2-3 together in the axil of scaly bracts, forming cone-like spikes at the nodes of branches which are upto 2.5 cm long. Fruiting perianth 3 together, shorter than the cup-shaped jointed, laterally compressed, closely appressed, spongy, truncate, with a minute hole for the protrusion of the stigmas. Stamens 1. Fruits small, ovoid, enclosed in the swollen perianth. Seeds free, erect, trigonous, orbicular, much compressed, yellow.

Local name : Bholdo.

Flowers : December to may.

Occurrence : Porbander near station ; Dwarka ; Rozi near Jamnagar.

Uses : It is said to be used to treat scorpion stings. (WI)

ATRIPLEX Linn.

Stems stout erect, often tinged with red or purple *hortensis*

Stems prostrate or suberect, pale-green or white *stocksii*

Atriplex hortensis Linn. Sp. Pl. 1053. 1753 ; FBI 5 : 6 ; Cooke 2 : 588 ; Santapau & Jan. 43. 1967.

A stout erect polygamous succulent annual often tinged with red or purple. Leaves not mealy, the lower is deltoid, the upper usually ovate-lanceolate. Fruiting bracteoles thin, nearly free elliptic or orbicular ; reticulately veined, obtuse, sometimes mucronate.

Local name : Palakh-ni-bhaji ; Juri.

Flowers : October to December.

Occurrence : It was found cultivated everywhere in Saurashtra, collected from Shapur.

Uses : The flour of the seeds is reported to be valuable in Vitamin A deficiency, and is used as pot herb.

Atriplex stocksii Boiss. Diagn. Ser. 2, 4 : 73. 1849 ; FBI 5 : 7 ; Woodrow in JBNHS 12 : 364. 1899 ; Cooke 2 : 587 ; Indrajī 610. 1910 ; Santapau, Pl. Saur. 704. 1953 ; Santapau & Jan. 43. 1967.

A perennial herb, 20-50 cm high, much branched ; stems prostrate or suberect, upto 80 cm long. Stems and branches woody, terete, pale-green or white, glabrous. Leaves shortly petioled, 10-25 × 6-20 mm oblong, elliptic or suborbicular, obtuse at apex, tapering or acute at base, entire and wavy along the margins, fleshy, glabrous ; petioles 3-4 mm long. Male flowers in axillary or short leafy spikes ; fruiting bracteoles cuneate at base, orbicular or broadly ovate, suddenly contracted into a short pedicel, swollen and thickened above the utricle. Seeds suborbicular, compressed, pale-brown, smooth.

Local name : Adbau palakh, Adbau tanko.

Flowers : October to January.

Occurrence : Syke's Point, 6 m NE. Salaya, Jamnagar ; Dwarka ; Okha and Veraval (Woodrow).

Uses : It is eaten by animals during scarcity of fodder. (Indrajī 610. 1910)

BASELLA Linn.

Basella alba Linn. Sp. Pl. 272. 1753 ; Steenis, Fl. Males. I, 5 : 300, f. 1. 1057 ; Santapau & Jan. 43. 1967. **B. rubra** Linn. Sp. Pl. 272. 1753 ; FBI 5 : 20 ; Cooke 2 : 594 ; Indrajī 611. 1910 ; Santapau, Pl. Saur. 705. 1953.

Annual twining herbs ; stems much-branched, slender, succulent, glabrous, bright to dark green, at times purple, with plenty of mucilage. Leaves petioled, 4-14 × 3-11 cm pale to dark green or bright purple, broadly ovate, subfleshy, subacute or acute at apex, tapering at base, entire and slightly undulate along the margins, glabrous above, minutely hairy beneath, sometimes impressed between nerves ; petioles 1-3 cm long, glabrous. Flowers whitish or pinkish or reddish, 4-8 mm in diam., in axillary spikes, upto 4 cm long, or condensed only in the upper parts of 3-10 cm long peduncles ; bracts small, apiculate. Perianth divide half

way down ; lobes elliptic, obtuse. Fruits 3-4 mm in diam., subglobose, glabrous, dark purple to reddish.

Local name : Pothi-ni-vel ; Pothi ; Poi.

Flowers : June to December.

Occurrence : Barda Hills, commonly found everywhere in Saurashtra.

Uses : Leaves edible. The pulped or bruised leaves, on account of the presence of mucilage are used as poultice. The juice of leaves is prescribed in cases of constipation, particularly in children and pregnant women. (Indraji 611. 1910)

The tender shoots and leaves are used as vegetables. The leaves are diuretic, demulcent and useful in gonorrhoea. By its dense foliage, it also provides a good shade. (W1)

BETA Linn.

Beta vulgaris Linn. Sp. Pl. 222. 1753 ; FBI 5 : 5 ; Cooke 2 : 595 ; Santapau & Jan. 43. 1967.

A biennial herb; glabrous, root leaves ovate or oblong, obtuse, base cuneate or cordate, cauline, rhombic ovate, oblong obovate. Spikes slender paniced, flowers sessile solitary.

Local name : Beet.

Flowers : December to March.

Occurrence : It was found under cultivation at Junagadh, Gondal, Chotila etc. Gokuldas Bambhdai reported it from Saurashtra.

Uses : The beets are eaten boiled or as salad. They are also pickled. The tender leaves and young beets, the so called beet greens, are used as pot herb. (W1)

CHENOPODIUM Linn.

A tall, erect or ascending, scentless herb

album

A subglabrous, strongly scented herb

murale

Chenopodium album Linn. Sp. Pl. 219. 1753 ; FBI 5 : 3 ; Cooke 2 : 586 ; Indraj 608. 1910 ; Santapau & Jan. 43. 1967.

A tall, erect or ascending, scentless herb, 0.3 - 2 m tall, stems grey or green, with glandular mealiness, angled, sometimes striped green or purple ; branches glabrous ; shining. Leaves long petioled, variable, 2 - 6 cm long, rhomboid, deltoid or lanceolate, acute or obtuse at apex, rounded or tapering at base, entire or lobed along the margins ; the upper leaves smaller, narrower and more entire than lower ones, pale - green on both the surfaces ; petioles upto 6 mm long, slender. Flowers minute, 0.5 - 1.0 mm in diam., in axillary and terminal clusters forming complex or lax paniculate mealy spikes. Utricles 0.5 - 1.0 mm in diam., green, turning brown later, nothead at apex. 1 - seeded. Seeds orbicular, compressed, black, smooth, shining, with an obscure horizontal keel.

Local name : Chil, Chil-ni-bhaji.

Flowers : November to March.

Occurrence : Barda Hills, Okhamandal.

Uses : The plant is laxative and anthelmintic, often cultivated as a pot herb. (Indraj 608. 1910)

Chenopodium murale Linn. Sp. Pl. 219. 1753 ; FBI 5 : 4, Cooke 2 : 586 ; Santapau, Pl. Saur. 706. 1953 ; Santapau & Jan. 43. 1967.

A subglabrous rather foetid herb, 15 - 40 cm high ; stems branched, green or with slight glandular mealiness, stout or slender, erect or ascending. Leaves petioled, bright-green, shining, 3 - 10 × 2 - 7 cm, rhomboid or deltoid - ovate, acute or obtuse at apex, cuneate at base, irregularly lobed and more or less sharply toothed along the margins ; petioles 2 - 7 cm long. Flowers clustered, in lax or dense divaricate spreading cymes arranged in axillary slender racemes or panicles. Perianth 1.5 mm long, enclosing the utricles, minutely obtusely keeled ; lobes oblong, subacute. Stigmas 2. Seeds 1.5 mm long, enclosing the utricles, minutely obtusely keeled, lobes oblong, subacute, orbicular, smooth, dull, sharply keeled, horizontal, dotted, blackish, rugose.

Local name : Barolo.

Flowers : May to September.

Occurrence : Okha ; Rajkot, Junagadh ; Dwarka, Chotila Jamnagar, Amarjund ; Chotila ; Mangrol ; Gondal to Jetalsar ; mostly found under cultivation.

Uses : Used as a pot herb.

SALICORNIA Linn.

Salicornia brachiata Roxb. Fl. Ind. ed. Carey & Wall. 1 : 82. 1820 ; FBI 5 : 12 ; Woodrow in JBNHS 12 ; 365. 1899 ; Cooke 2 : 590 ; Santapau, Pl. Saur. 707. 1953 ; Santapau & Jan. 43. 1967.

An erect perennial undershrub with many, diffuse, opposite slender branches ; stems woody at the base, 30 - 50 cm, long ; branches 4 - 6 mm in diam., joints 0.6 - 1.3 cm long, stout, clavate, dilated and bifid at the top ; lobes of joints rounded with membranous margins. Flowers minute, in cylindric, very slender spikes which are 2.5 - 8 cm long, fleshy linear spindle shaped at the top of the joints, with 3 nate flowers on each side of all the nodes. Perianth calycine. Stamens 1 to each flower ; anthers oblong, exserted. Stigmas 2, subulate. Utricles ovoid, membranous, subacute, enclosed in the spongy perianth. Seeds compressed, pale-brown, hispid with white hairs.

Local name : Machul.

Flowers : November to December.

Occurrence : Dwarka ; (Porbander - Woodrow) ; (Dwarka, Bhiva) ; Okhamandal and Rozi near Jamnagar.

Uses : The ashes are used in mange and itch, and are also considered to be emmenagogue and abortifacient. It is also used as pot-herb. (W1)

SALSOLA Linn.

Salsola baryosma (Roem. & Schult.) Dandy in Andrews, Fl. Pl. Angl.-Egypt. Sudan 1 : 111. 1950 ; Santapau & Jan. 43. 1967. *Chenopodium baryosma* Roem. & Schult. Syst. Veg. 6 : 269. 1820. *S. foetida* Del. Fl. Aegypt. III. 310. 1812 ; (nomen nudum), FBI 5 : 18 ; Cooke 2 : 593 ; Santapau, Pl. Saur. 708. 1953.

A large, much branched, pale - hoary, stout herb, upto 1.25 m high ; stems stout ; branches filiform, densely crowded, slender (The branches often bear globose villous galls 6 - 20 mm in diam., beset with linear leaves and caused by insect - puncture). Leaves minute, fleshy, subglobose. Flowers minute, in very short cylindric spikes, formed by floral leaves which are long and imbricate ; bracteoles 1 mm long, broadly ovate or obovate, fleshy. Fruiting perianth as long as the bracteoles, silvery - white, oblong, rounded or obtuse at apex ; wings symmetrical,

rounded, membranous, horizontal; margins often overlapping. Stigmas 2, recurved.

Flowers : November to December.

Occurrence : Jodiya Port, Jamnagar.

Uses : The plant is used as camel fodder, and manna is obtained from its leaves. It has been used to obtain Sajji, a crude form of carbonate of soda. The plant is used as a vermifuge. Its ashes are applied to itch. (WI)

SUAEDA Forsk. ex Scop.

Perennial ; seed usually erect :

Usually erect ; flowers axillary *fruticosa*

Diffusely branched ; flowers in dense many-flowered clusters *nudiflora*

An annual erect herb, seed usually horizontal *maritima*

Suaeda fruticosa (Linn.) Forsk. Fl. Aegypt.-Arab. 70. 1775 ; FBI 5 : 13; Cooke 2 : 590 ; Woodrow in JBNHS 12 : 365 ; 1899 ; Santapau & Jan. 43. 1967. Bhandari, Fl. Indian Desert. 331. 1978. *Salsola fruticosa* Linn. Sp. Pl. ed. 2 : 324. 1792.

Erect or diffuse, perennial herbs, subfruticose, much-branched ; branches 15-40 cm long, spreading. Stems somewhat woody at the base, herbaceous in upper parts, glabrous glaucous-green, in younger parts terete, pale, brown and faintly striate in older. Leaves sessile 0.6-1.5 cm long, linear-oblong, obovate or elliptic-oblong, obtuse or acute at apex, tapering at base, subterete, fleshy, glabrous, glaucous-green. Flowers minute, deep-green, in dense axillary globose clusters or forming spikes at the ends of leafless branches ; bracts very small, ovate, subacute, membranous. Fruiting perianth 2.5 mm long, subglobose ; lobes oblong, obtuse, incurved, thick. Stamens 5, styles 3, short. Utricles minute, ovoid, at first bright or deep green, at length black, smooth. Seeds obovoid, slightly beaked and compressed, smooth, shining.

Local name : Moras.

Flowers : June to November.

Occurrence : Dwarka, near station and along the railway line, rare. (Bhavnagar and Dwarka Woodrow in Cooke).

Uses : The tender shoots and succulent leaves are at times eaten by local people as vegetables, the leaves are sour in taste. It is also eaten by camels and crude soda is prepared from it.

Suaeda maritima (Linn.) Dumort., Fl. Belg. 22. 1827 ; FBI 5 : 14 ; Cooke 2 : 591 ; Indrajai 611. 1910 ; Santapau, Pl. Saur. 710. 1953 ; Santapau & Jan. 43. 1967. *Chenopodium maritimum* Linn. Sp. Pl. 221. 1753.

An annual, diffuse, at times suberect, 40-70 cm high ; glaucous-green, branched usually from the base ; stems woody at the base with many, very slender branches, glabrous. Leaves 10-25 × 0.05-1.5 mm, narrowly linear or filiform, subacute at apex, fleshy, subterete. Flowers minute, in small few-fid, globose clusters, in lax elongate spikes ; bracts small, ovate, membranous, entire. Fruiting perianth very small, less than 1 mm long, depressed ; lobes rounded, covering the utricles. Stamens 5, styles 2, long, slender. Seeds 1 mm long, usually horizontal, ovoid or suborbicular, smooth, shining, black.

Local name : Lanno ; Lunno.

Flowers : May.

Occurrence : It grows near the creeks in Porbander ; Okhamandal.

Uses : The leaves are eaten as vegetable. It is also eaten by camels as fodder. (Indrajai 611. 1910)

Suaeda audiflora Moq. in Ann. Sci. Nat. (ser. 1) 23 : 316. 1831 ; FBI 5 : 14 ; Cooke 2 : 591 ; Indrajai 611. 1910 ; Santapau, Pl. Saur. 711. 1953 ; Santapau & Jan. 43. 1967.

A woody, perennial herb, 25-35 cm high ; stems diffusely branched ; branches spreading close to the ground. Leaves 0.6-1.2 × 0.2-0.3 cm, oblong, ellipsoid or linear-obovate, obtuse at apex, narrowed at base, rigid, subterete, glaucous-green. Flowers in axillary dense globose many-fid clusters forming long spikes, leafless above ; bract ovate, acute, membranous, hyaline, toothed, often forming persistent sellate tufts, with pectinate margin, Perianth 2-3 mm long, obovoid, lobes short, oblong, obtuse. Stamens 5, styles 3. Utricles ovoid, seeds small, about 1 mm in diam., usually erect, smooth, shining, black.

Local name : Moras.

Flowers : July to November.

Occurrence : Syke's point, 6 m. NE. Salaya, Jamnagar.

Uses : The green leaves are eaten by local people. (Indraji 611. 1910)

POLYGONACEAE

Stem erect or prostrate :

Perianth 3-5 cleft *Polygonum*

Perianth 6-cleft *Rumex*

Stem climbing *Antigonon*

ANTIGONON Endl.

Antigonon leptopus Hook. & Arn. Bot. Beech. Voy. 308, t. 69. 1841 ;
Cooke 3 : 10 ; Bailey, Mon. Cul. Pl. 351 ; Santapau, Pl. Saur. 712. 1953 ;
Bor & Raizada in Beaut. Ind. Climber & Shrubs 265 & t. opp. P. 65 ;
1954 ; Santapau & Jan. 43. 1967.

A large, handsome, perennial, much-branched herbaceous climbers with tuberous roots ; branches pale to bright-green angled and grooved, glabrous or minutely hairy, somewhat woody and pale-brown near the base. Leaves 4.5 14 × 2.8 10.8 cm, ovate-triangular, ovate-cordate or deltoid, acuminate and ending in a short spine at apex, cordate or sagittate at base, entire or undulating along the margins, bright to dark-green, glabrous, minutely, impressed between the flat nerves above, prominently veined beneath ; petioles 1.5 4.0 cm long, clasping, the stem. Flowers 0.8 1.8 cm across, dark to pale-pink or at times white, solitary or several, in axillary or terminal panicles, 10 20 cm long, branching at the nodes, forming tendrils, upper leaves on the flowering shoots reduced to small bracts.

Flowers : Throughout the year.

Occurrence : Cultivated in the garden at Junagadh Botanical garden, Rajkot ; Gondal ; Bhavnagar.

Uses : It is cultivated as an ornamental for its flowers.

POLYGONUM Linn.

Polygonum plebeium R. Br. Prodr. 420. 1810 ; FBI 5 : 27 ; Cooke 3 : 4 ; Indrajī 628 : 1910 ; Santapau, Pl. Saur. 713. 1953 ; Santapau & Jan. 43. 1977.

Annual small erect plant mostly unbranched often with a woody root-stock ; leaves 0.5 - 1.7 × 0.2 - 0.4 cm, linear, linear-oblong, obovate or spatulate, subacute or obtuse at apex, cuneate or tapering at base, entire and sometimes with thickened margins, glabrous, blackish when dry ; stipules slightly brown at base, shiny white upper, hyaline, lacinate ; petioles very short or 0. Flowers less than 3 - 4 mm long, bright-red or pinkish-purple, solitary, axillary or in clusters of 2 - 5 ; perianth 3 - 5 cleft, pedicel upto 3 mm long, slender. Nuts small, 1 - 1.5 mm in diam. ; trigonous, smooth, shining, black.

Local name : Zinko-okhrad.

Flowers : October to March.

Occurrence : Chotila ; Bhavnagar ; Jamnagar, local Talao ; Dwarka ; Rajkot, Pradumna Park. Locally abundant.

Uses : The herb is used as a vegetable. It is reported to be used in bowel complaints. The powdered herb is given for pneumonia. (WI)

Dried plant is used for the skin diseases. Roots are used for intestinal troubles. (Indrajī 628. 1910)

RUMEX Linn.

Rumex vesicarius Linn. Sp. Pl. 336. 1753 ; FBI 5 : 61 ; Cooke 3 : 10 ; Santapau & Jan. 43. 1967.

Annual, erect, glabrous, 15 - 30 cm high, branched from the root. Leaves 2.5 - 7.5 cm long, elliptic, ovate or oblong, 3 - 5-nerved, base cuneate, cordate or hastate. Flowers monoecious, inner perianth-segments membranous and reticulate in fruit, orbicular, 6-cleft.

Local name : Chaka-ni-bhaji, Chuko.

Flowers : May onwards.

Occurrence : Rajkot, river bed ; Junagadh. Gokuldas Bambhdai reported is from Saurashtra ; cultivated as a pot-herb.

Uses : Cultivated for its leaves used as bhaji. It is very sour, laxative, useful in heart troubles.

ARISTOLOCHIACEAE

ARISTOLOCHIA Linn.

Stem prostrate ; leaves covered with a whitish bloom on the under surface ; bracts large and round

bracteolata

Stems twining ; leaves greenish beneath ; bracts small, ovate

indica

Aristolochia bracteolata Lamk. Encyl. 1 : 258. 1783 ; Santapau & Jan. 43. 1967 ; Bhandari, Fl. Indian Desert. 334. 1978. *A. bracteata* Retz. Obs. Bot. fasc. 5 : 29. 1789 ; FBI 5 : 75 ; Cooke 3 : 16 ; Indrajai 613. 1910 ; Santapau, Pl. Saur. 714. 1967.

A perennial slender much-branched prostrate herb, 15-45 cm long ; branches angled, striate, glabrous, shining. Leaves 3.5-7.5 × 3-7 cm, glaucous, reniform or broadly ovate, subacute or obtuse at apex, obtusely cordate at base wide sinus, flat or waved along the margins, glabrous above, glaucous beneath, finely reticulate-veined, usually 5-nerved from the petiole, nerves prominent beneath ; petioles 2.5-4 cm long, grooved, minutely pubescent. Flowers 3-4.5 cm long, grooved, minutely pubescent. Flowers 3-4.5 cm long, solitary, bright to dark-purple, peduncles short bracts large and round. Capsules 1.4-2 by 0.7-1.0 cm, oblong-ellipsoid, 12-ribbed, glabrous, 35-50 seeded. Seeds 5-6 by 2-3 mm, triangular, cordate at base, acute at apex, flattened, one side completely covered with round glands.

Local name : Kidamari.

Flowers : August to November.

Occurrence : Junagadh to Sasan ; Rojkot, river bed ; Veraval ; Okha in open fields, rare ; Dwarka ; neighbourhood of station ; Beyt ; Ranjit Sagar, Jamnagar.

Uses : The plant is exceedingly bitter and is reputed to possess cathartic and anthelmintic properties. The expressed juice of the leaves is said to destroy maggots when applied to foul and neglected ulcers. (WI)

Aristolochia indica Linn. Sp. Pl. 960. 1753 ; FBI 5 : 75 ; Cooke 3 : 16 ; Indrajai 613. 1910 ; Santapau, Pl. Saur. 715. 1953 ; Santapau & Jan. 44. 1967.

Woody perennial shrubby climbers, glabrous ; stems and branches grooved, green in younger parts, pale to dark-purple in older, swollen at

the nodes, glabrous; internodes 3.4-9 cm long. Leaves 3-11 × 1.5-5.00 cm, elliptic, oblong, obovate-oblong or subpanduliform, obtusely acuminate or emarginate at apex, cuneate, truncate or subacute at base, entire with somewhat undulate along the margins, glabrous, 5-nerved; petioles 0.8-1.6 cm long, slender. Flowers 2-3.5 cm long, greenish-yellow with brownish mouth, in few flowered short axillary fascicles; bracts small ovate. Capsules 3-5 cm long, oblong, 6-valved, opening from below upwards, the pedicels splitting into 6 filaments. Seeds 6-9 mm long, deltoid-ovate, acute, flat, winged, glands only in the middle.

Local name : Norvel, Sapsan.

Flowers : August to November.

Occurrence : Recorded from Barda Hills, found on the road sides waste lands near the streams and on sea shore; Okhamandal.

Uses : Roots are effective for fever. This plant is said to be an antidote to snake-bite. (Indraji 614. 1910)

LAURACEAE

CASSYTHA Linn.

Cassytha filiformis Linn. Sp. Pl. 35. 1753; FBI 5 : 188; Cook 3 : 35; Santapau, Pl. Saur. 716. 1953; Santapau & Jan. 44, 1967.

Leafless herbaceous parasitic twiners; stems very long, slender, branched, twined and matted together, glabrous or nearly so, dark-green. Flowers small, upto 2 mm long, sessile, creamy-white, in lax, lateral, divaricate spikes, 1.2-5 cm long; bracteoles rounded, ciliate. Perianth twice as long as the bracteoles; lobes in 2 rows; the three outer ones short, orbicular; the inner ones longer, oblong or ovate, acute, glabrous. Stamens 3-seriate; outermost series petaloid, with 2 cells adnate to linear face; middle series smaller; similar, dilated below; innermost series hastate, with 2 glands on the very short filament; staminodes 3, fleshy. Ovary tapering to a minute-capitellate stigma. Drupes globose, about 4-6 mm in diam., white smooth, enclosed by persistent, fleshy, enlarged perianth.

Local name : Akash-vel, Amarvel.

Flowers : Almost throughout the year.

Occurrence : Junagadh, foot of Girnar.

Uses : The plant is used in bilious affections, urethritis, chronic dysentery and skin diseases. Preparation of the stems are used as eye-wash and for cleaning inveterate ulcers. Powdered and mixed with sesamum oil, the stems are used as a hair tonic. The plant is reported to be used as an insecticide. (WI)

LORANTHACEAE

Flowers hermaphrodite	<i>Dendrophthoe</i>
Flowers 1-sexual	<i>Viscum</i>

DENDROPHTHOE Mart.

Fruit, oblong, glabrous	<i>falcata</i>
Fruit ovoid, hard, rugose	<i>falcata</i> var. <i>coccinia</i>

Dendrophthoe falcata (Linn. f.) Etting in Denkschr. Akad. Wissen. Math.-Naturw. Cl. 32 : 52, 53, 58, t. 13, f. 14. 1872 ; Santapau, Pl. Saur. 717. 1953 ; Santapau & Jan. 44. 1967. *Loranthus falcatus* Linn. f. Suppl. 211. 1781. *L. longiflorus* Desr. in Lamk. Encycl. 3 : 598. 1789 ; FBI 5 : 214 ; Cooke 3 : 42 ; Indraj 615. 1910.

A glabrous shrub. Leaves sub-sessile, 8-11 cm long, elliptic-ovate to oblanceolate, mostly opposite, obtuse sometimes acute, entire ; coriaceous ; base attenuate. Flower buds cylindrical, acute, flowers in axillary racemes, 3.5-4 cm long ; bract orbiculate ; persistent. Calyculus 4 mm long, persistent, glabrous, splitting into 4-5 truncate lobes. Perianth tube 3-2.4 cm long, scarlet, 5-lobed ; lobes c. 1 cm long, linear-oblong, greenish, stamens 5, filaments 5 mm long, glabrous ; anthers 5 mm long. Style 3-3.3 cm long ; stigma capitate, 1 mm long. Fruit 8-12 mm long, oblong, glabrous ; seeds 8-9 mm long, oblong.

Local name : Vando.

Flowers : February to March.

Occurrence : Sasan along main road, found parasitic on *Wrightia tinctoria* R. Br. only in bud. Rare.

Uses : The bark is astringent and narcotic, and is used for wounds and menstrual troubles and also as a remedy for consumption, asthma and mania. It is reported to be used as a substitute for betel nut. (WI)

Dendrophthoe falcata Etting var, *coccinia* (Talb.) Santapau in Pl. Saur. 718. Pg. 34. 1953 ; Santapau & Jan. 44. 1967 ; Santapau, Fl. Khandala 234. 1967. *Loranthus longiflorus* Desr. var. *coccinea* Talb. Trees. ed. 1, 172. 1894 ; Cooke 3 : 43.

Branches stout, lenticellate, Leaves broadly ovate, shortly petiolate. Calyx very rugose outside ; limb often 5-notched corolla-tube 5-4 cm long, bright scarlet ; lobes short, light-scarlet or greenish. Filaments scarlet. Fruit ovoid, crowned by the calyx-limb, hard, rugose. The teeth of the albumen are longer and more slender than in *D. falcata* proper ; embryo white, slender, gradually thickened at the radicle end which is apiculate.

Local name : Vando.

Flowers : February onwards,

Occurrence : Junagadh, at the foot of Girnar.

VISNUM Linn.

Young branches 4-angled, not swollen nor contracted at the nodes *angulatum*

Stem and branches flattened, contracted at the nodes *nepalense*

Viscum angulatum Heyne ex DC. Prodr. 4 : 283. 1830 ; FBI 5 : 225 ; Cooke 3 : 47 ; Indrajī 615. 1910 ; Santapau, RBSI 16 : 267 ; Santapau, Pl. Saur. 719. 1953 ; Santapau & Jan. 44. 1967.

Leafless, pendulous, 60-90 cm long, main stem terete or nearly so ; young branches numerous, 4-angled, jointed, the nodes not swollen nor contracted. Flowers minute, 1-sexual, sessile, solitary or whorled at the nodes. Perianth-lobes deciduous. Berry globose.

Local name : Bodovando.

Flowers : During most of the year.

Occurrence : Barda Hills ; parasitic on *Dalbergia* tree.

Uses : It is given in bile and constipation. (Indrajī 616. 1910)

Viscum nepalense Spreng. Syst. Cur. Post. 47. 1827 ; Santapau, Pl. Saur. 720. 1953 ; Santapau & Jan. 44. 1967 ; Santapau, Fl. Khandala 238. 1967. *V. articulatum* (non Burm. 1768) Hook. f. in FBI 5 ; 226 ; Cooke 3 : 47. pro-parte ; Fischer. in RBSI 11 : 161, Seq. (Omnes incl. var. *dichotoma*).

A leafless pendulous much dichotomously branched shrub ; branches jointed, the internodes 2.5 - 3 × 0.2 - 0.8 cm linear, flattened, slightly narrowed at each end, readily disarticulating, pale-green (turning yellowish-brown when dry and then longitudinally furrowed). Flowers minute, 1-sexual, 3 - 4 merous, very shortly pedicellate, 1 - 6 together in fascicles at the nodes, each with a large cup-shaped bract at the base. Perianth-lobes small, triangular, deciduous. Berry 0.4 cm in diam., globose, smooth, greenish-yellow.

Local name : Vando, Bodo-vando.

Flowers : June to August.

Occurrence : Jamnagar, Kileshwar, Kathiadijar on *Grewia tiliaefolia* ; on one single tree, but very abundant.

Uses : The herb is bitter, acrid, cooling, sweetish ; alexipharmic, aphrodisiac, alterative ; useful in coughs, diseases of the blood, ulcers, epilepsy, biliousness. (Kirtikar & Basu 3 : 2184)

SANTALACEAE

SANTALUM Linn.

Santalum album Linn. Sp. Pl. 497. 1753 ; FBI 5 : 231 ; Cooke 3 : 49 ; Santapau, Pl. Saur. 721. 1953 ; Santapau & Jan. 44. 1967.

A small overgreen glabrous tree with slender drooping branches, the sap-wood white and odourless, the heart-wood yellowish brown, strongly scented. Leaves 3.6 - 6.2 × 1.5 - 3 cm elliptic-lanceolate, subacute glabrous, entire thin, base acute ; petioles 0.9 - 1.2 cm long, slender. Flowers brownish-purple, inodorous, in terminal and axillary paniculate cymes shorter than the leaves perianth campanulate ; limb of 4 velvet triangular-segments, stamens 4, exserted, alternating with 4 rounded obtuse scales. Drupe globose, 1.2 cm in diam., purple-black, endocarp hard ribbed.

Local name : Shvet-chandan, Sukhad.

Flowers : March to August.

Occurrence : Junagadh, Willingdon Dam, several middle sized trees, all along the right hand side of lake. In flower fruits first red, then purple, then black.

Uses : Wood ground up with water into a paste, is applied to local inflammations, to temples in fever, in skin diseases, to allay heat and pruritus ; acts as diaphoretic. In cases of morbid thirst wood-powder is taken in coconut water. A bolus of ground sandal cheeks-hoemoptysis in mild form. Essential oil from wood is used in perfumery and is a remedy as demulcent, diuretic and mild stimulant in gonorrhoea and chronic cystitis. Oil from the seeds is used in skin diseases. [Gaz. A(1) : 187. 1953].

EUPHORBIACEAE

Cells of the ovary 2-ovuled except in *Euphorbia* :

Inflorescence of many pedicelled bracteolate, stamens as ♂ flowers surrounding a single pedicelled ♀, the whole contained in a 4-5-lobed involucre :

Involucre regular or nearly so *Euphorbia*

Involucre obliquely zygomorphous *Pedilanthus*

Flowers distinct, not contained in an involucre :

Petals present, small *Bridelia*

Petals wanting ; calyx-lobes imbricate in bud :

Disk present, usually conspicuous and of glands :

Fruit a dry capsule of 3-2-valved cocci *Phyllanthus*

Fruit a berry :

Fruit a small, fleshy, with 6-12 crustaceous seeds ; ovules superposed ; calyx-lobes 5 *Kirganelia*

Fruit large, of 3-6 hard cocci in a fleshy epicarp :

Calyx-lobes 5-6 ; stamens 3, the filaments connate *Emblica*

Calyx-lobes 4 ; stamens 4, the filaments free *Cicca*

Fruit dry or fleshy with 6 cocci, stamens 5, the filaments free, alternating with the disk-glands and surrounding the pistillode *Securinea*

Disc combined with the calyx-lobes, the 3 stamens in a column	<i>Breynia</i>
Disc wanting ; stamens 2-3 central	<i>Drypetes</i>
Cells of the ovary 1-ovuled :	
Calyx in ♂ valvate :	
Petals present in ♂ flowers	<i>Chrozophora</i>
Petals in ♂ flowers 0 :	
Partial inflorescence not involucrate :	
Filaments not branched :	
Styles free or only slightly connate :	
Anthers not vermiculiform or linear :	
Anther-cells pendulous or adnate	<i>Mallotus</i>
Anther-cells discrete, ascending, divaricate	<i>Micrococca</i>
Anthers vermiculiform or linear	<i>Acalypha</i>
Styles connate ; calyx of ♀ accrescent ; stinging climbers	<i>Tragia</i>
Filaments much branched ; staminal bundles indefinite	<i>Ricinus</i>
Partial inflorescence involucrate ; climbers	<i>Dalechampia</i>
Calyx in ♂ imbricate :	
Petals present in ♂ flowers :	
Petals free ; stamens numerous	<i>Jatropha</i>
Petals in ♂ flowers 0	<i>Baliospermum</i>

ACALYPHA Linn.

Bracts concealing the capsules :	
Bracts shortly dentate, truncate	<i>indica</i>
Bracts fimbriate	<i>ciliata</i>
Bracts not concealing the capsules	<i>malabarica</i>

Acalypha ciliata Forsk. Fl. Aeg.-Arab. 162. 1775 ; FBI 5 : 417 ; Cooke 3 : 109 ; Indrajit 638. 1910 ; Santapau, Pl. Saur. 722. 1953 ; Gir 309 ; Santapau & Jan. 44. 1967.

Erect annual herbs, 30 - 100 cm high, simple or sparingly branched ; stems deeply striate, white-pubescent. Leaves 3.5 - 9.0 × 1.6 - 5.0 cm, membranous, ovate, acute at apex, rounded or slightly tapering at base, sharply crenate-serrate along the margins, pubescent on both sides, 3-nerved from the base ; petioles 1.5 - 7.0 cm long, pubescent. Spikes very short, about 1.2 - 2.5 cm long or at times almost in axillary fascicles ; male flowers at the ends of the spikes. Capsules 1 - 2 mm in diam., green at first, pale-straw on drying, glabrous, 3-lobed, 3-seeded. Seeds brown, oblong or ovoid, smooth, shining.

Local name : Runchhalo-dadro ; Dadra.

Flowers : June to October.

Occurrence : Amar Jund, Jamnagar, Ghumli ; Junagadh, foot of Girnar, not common below, more so above, and Forest Road ; Sasan Iran river up stream, in hedges rare.

Uses : Roots are laxative and a vermifuge ; the juice of leaves is smeared on poisonous stings and is used on various skin-diseases. (Indraji 637. 1910).

Acalypha indica Linn. Sp. Pl. 1003. 1753 ; FBI 5 : 416 ; Cooke 3 : 108 ; Indraji 636. 1910 ; Santapau, Pl. Saur. 723. 1953 ; Gir 310 ; Santapau & Jan 44. 1967.

Annual herbs, erect, at times diffuse, 30 - 120 cm high ; stems simple or branched, deep-green, hirsute, angular, hairy and deeply grooved in younger parts, more or less terete, glabrous and faintly striate in older. Leaves 2.4 - 7.5 × 1 - 4 cm, ovate, rhomboid-ovate, sometimes obovate, subacute or obtuse at apex, cuneate or tapering at base, serrate only in the upper part along the margins, dark-green above, pale-green below, glabrous or thinly hairy ; petioles 3 - 8 cm long, hairy. Spikes 2.5 - 6 cm long, axillary white-pubescent, male-flowers minute, pale-greenish-yellow, condensed in the upper part, followed by a tuft of sterile flowers ; females lax, in the lower half. Capsules 1 - 2 mm in diam., green, pubescent, 3 seeded, dehiscent, concealed in the bract. Seeds about 1 mm in diam., brown, glabrous, along ovoid.

Local name : Dadro ; Vinchhikanto.

Flowers : June to December.

Occurrence : Rajkot, Jubilee Garden, Jilla garden, Presidency Garden, Mangrol, Junagadh, burning ghat and Girnar Hills Sasan Gir, Gir Forest.

Uses : Locally the leaves are said to be used externally in scabies and other skin-diseases. It is also useful in bronchitis Pneumonia and asthma. The roots are cathartic. (Indraji 636. 1910).

Acalypha malabarica Muell.-Arg. in *Linnaea*. 34 : 42. 1865 & in DC *Prodr.* 15 (2) : 871. 1886 ; FBI 5 : 416. Cooke 3 : 109 ; Santapau, Pl. Saur. 724. 1953 ; Gir 311 ; Santapau & Jan. 44. 1967.

An erect annual herb, 15-60 cm high, branched or unbranched ; branches flaccid, pubescent, stout, flattened and more so when young terete. Leaves 1.5-4.5 × 1-2.5 cm, elliptic ovate or lanceolate, subacute or rounded at apex, acute or cuneate and 3-5 nerved at base, crenate-serrate along the margins, hispid on both sides ; petioles 1.5-5.0 cm long, slender, flattened and appressedly hairy. Flowers monoecious, small, in axillary androgynous spikes which are up to 3 cm long ; females sessile, many, confined to basal portion of spikes ; bracts of females 5-6 mm long, 3-5 alternate, 2-5 fid, shortly many-toothed and bordered with gland-tipped yellowish hairs. Capsules 2 mm in diam., consisting of 3, 2-valved cocci, covered with long appressed hairs. Seeds redish-brown, ovoid and minutely tubercled.

Flowers : July to October.

Occurrence : Cattle Farm, Junagadh ; Rajkot Residency Park, Pradumna Park ; Gondal Irrigation lake ; Sasangir, Gir Forest.

BALIOSPERMUM Blume

Baliospermum montanum (Willd.) Muell.-Arg. in DC. *Prodr.* 15(2) : 1125. 1866 ; Santapau & Jan. 44. 1967. *Jatropha montanum* Willd Sp. Pl. 4 : 563. 1805. *Baliospermum axillare* Blume, *Bijdr.* 604. 1825 ; FBI 5 : 461 ; Cooke 3 : 106.

An erect undershrub, 1-2 m high ; stems stout with erect or suberect branches, glabrous except when young. Leaves firmly coriaceous very variable in size and shape ; the upper 5-8 cm long, lanceolate, sinuate-toothed, penninerved, the lower 12-30 cm long, ovate or often 2-5 nerved, rounded or cuneate at base, 2-glandular, long-petioled, stipules of 2 glands. Flowers usually monoecious, arranged in many axillary racemes or contracted panicles, all male or with a few females at base ; bracts small. Calyx of males orbicular, concave, disk of 6 glands which are soft, lobulate ; calyx of females ovate, acute, toothed, disk cupular, crenate.

Capsules 0.7-1.2 cm long, obovoid of 3, 2-valved cocci, hairy. Seeds 0.6-0.8 cm long, smooth, mottled.

Local name : Danti.

Flowers : October to March.

Uses : The oil from the seeds resembles croton oil and is a powerful hydrogogue cathartic. It is also useful in external application in rheumatism. The root is also cathartic, but its action is milder. (WI).

BREYNIA J.R. & G. Forst. (non. cons.)

Breynia retusa (Dennst.) Alston. Ann. Roy. Bot. Gard. (Peradeniya) 11 : 204. 1929 ; Santapau & Jan. 44. 1967 ; Saldanha & Nicolson, Fl. Hassan Distr. Karnataka 333. 1976. *Phyllanthus retusus* Dennst. Schluess Hort. Malab. 24. 1818. *Melanthesa retusa* (Dennst.) Kostel., Aug. Med.-Pharm. Flora 5 : 1771. 1835 ; Santapau, Fl. Khandala, 245. 1967. *Breynia patens* (Roxb.) Rolfe, J. Bot. 11 : 359. 1882 ; FBI 5 : 329 ; Cooke 3 : 79 ; Indrajai 633. 1910.

A small tree with spreading branches 90-180 cm high. Leaves 1.5 × 1 cm, orbicular, rounded, glabrous, glaucous beneath. Flowers axillary on filiform pedicels. The males in the lower, the females in the upper axils. Male flower pale yellow. Female flowers greenish. Pedicels shorter than in the male. Flowers appearing with the young leaves.

Local name : Kali-Kamboi, Kamboi, Kheda-Kamboi, Keda-Kamboi.

Flowers : June onwards.

Occurrence : Junagadh, at the foot of Girnar ; on Barda Hills.

Uses : Pounded leaves, flowers and fruits are applied on blotches as a poultice. Juice of the ripe fruits is applied on various skin-diseases. (Indrajai, 634. 1910).

BRIDELIA Willd.

Trees :

Flowers creamy-white or pink, in terminal spicate

retusa

Flowers, small, pinkish-purple, in axillary clusters

squamosa

Climbing shrub, flowers in axillary or terminal spikes,
yellowish-green

stipularis

Bridelia retusa (Linn.) Spreng. Syst. Veg. 3 : 48. 1826 ; FBI 5 : 268 Pro parte ; Cooke 3 : 68 Pro parte, Indraj 627. 1910 ; Santapau in JBNHS 50 : 308, t. 1, f-1, 1951 ; Santapau, Pl. Saur. 725. 1953 ; Gir 312 ; Santapau & Jan. 44. 1967. *Cluytia retusa* Linn. Sp. Pl. 1042. 1753.

Deciduous trees with straight trunk, 4-8 m high, stems 15-20 cm in diam., greyish ; branches drooping, glabrous or minutely hairy in younger parts, densely armed with straight, hard, cone-shaped thorns ; bark grey, smooth. Leaves 4.5-18 × 2.5-8 cm, elliptic, elliptic-oblong or elliptic-lanceolate, acute or shortly acuminate apex, subacute or rounded at base, entire along the margins, coriaceous, dull to dark-green, glabrous and shining above, paler and finely tomentose below, petioles 0.6-1.3 cm long, terete, pubescent. Flowers creamy-white or pinkish, in terminal spicate panicles which are 6-16 cm long, clothed with grey hairs ; male flowers more than the females ; bracts minute, obtuse, hairy. Calyx 4 mm in diam., glabrous or slightly pubescent, persistent ; segments ovate, acute. Drupes 5-10 mm in diam., ovoid, grooved, 2-lobed, 2-seeded, often 4-seeded, shining, smooth, dark-purple at first, almost black later, seeds very small, greyish-green, wrinkled.

Local name : Asan ; Akalkanto.

Flowers : July to September.

Occurrence : Kankai in Gir Forest ; Jasadhar.

Uses : Wood is very hard and hence used to make implements for farming. The bark is used for tanning. The ripe fruit is edible. The leaves are used as cattle-fodder. The roots and bark are astringent. The bark is used as a liniment with gingelly oil in rheumatism. (Indraj 627. 1910).

Bridelia squamosa (Lamk.) Gehrm. in Engl. Bot. Jahrb. 41 ; Beibl. 95 : 30. 1908 ; Santapau in JBNHS 50 : 308. t. 2. 1951 ; Santapau & Jan. 44, 1967. *Cluytia squamosa* Lamk. Encyl, 5 (2) : 54. 1790.

Large trees, 4-7 m high; bark dark-brown, smooth. Leaves 6.5-20 by 3-9 cm ovate-elliptic, elliptic-oblong, obovate-oblong or elliptic-lanceolate or rarely triangular, acute, subacute, obtuse or broadly emarginate at apex, subacute, rounded or subcordate at base, entire along the margins,

at times slightly repend, glabrous above, puberulous beneath, petioles 0.6-1.5 cm long, pubescent. Flowers small, pinkish-purple, in axillary clusters. Drupes about 5 mm in diam. subglobose, at first green, then yellowish and finally dark-purple, shining.

Flowers : January to October.

Occurrence : Jamnagar.

Bridelia stipularis (Linn.) Blume, Bijdr. 2 : 597. 1825 ; FBI 5 : 270. (Pro parte) ; Cook 3 : 68 ; Indraji 628. 1910 ; Santapau in JBNHS 50 : 308. 1951 ; & Pl. Saur. 726. 1953 ; Santapau & Jan. 44. 1967. *Cluytia stipularis* Linn. Mant. 127. 1767.

A large scandent evergreen climbing shrub ; bark dark-grey or brownish ; stems 5-20 cm in diam. ; branches fulvous-tomentose, often with long deflexed thorns. Leaves 5-15 × 2-7 cm broadly elliptic-ovate, elliptic-oblong or obovate, obtuse or subacute at apex, cordate or rounded at base, entire along the margins, at times undulate or repand, glabrous or puberulous above, fulvous-tomentose beneath ; main nerves 8-12 pairs, slender, parallel, joining the marginal one ; petioles 6-10 mm long, stout, tomentose. Flowers monoecious, in axillary or terminal spikes, yellowish green, densely hairy outside ; male flowers sessile ; female pedicelled ; bracts 3 mm long, obliquely ovate-lanceolate, acute, tomentose, stipular. Calyx about 4 mm long, distinctly enlarged in fruits ; lobes lanceolate, acuminate. Corolla 2-3 mm long, suborbicular ; disk of male pulvinate, of female with a ring of bristles at the base within. Drupes 1.2 cm long, oblong, black smooth.

Local name : Asan-vel.

Flowers : May to December.

Occurrence : Parda Hills, near the water and bushes on hill side.

Uses : The fruit is edible.

CHROZOPHORA A. Jussieu (nom. cons.)

Prostrate or procumbent herb ; leaves rounded or subcordate at base, entire along the margins

prostrata

Erect herb ; leaves obliquely truncate or cordate at base, slightly 3-lobed along the margins

rotleri

Chrozophora prostrata Dalz. in Dalz. & Gibs. Bomb. Fl. 233. 1861 ; FBI 5 : 410 ; Cooke 3 : 105 ; Indrajai 636. 1910 ; Santapau, Pl. Saur. 727. 1953 ; Santapau & Jan. 44. 1967.

Annual herbs, prostrate or procumbent ; branches 5-40 cm long, many, radially spreading, warty tomentose. Leaves 0.8-3.3 × 0.6-2.5 cm, broadly ovate, oblong, elliptic or suborbicular, subacute or obtuse at apex, rounded or subcordate at base, entire along the margins, deeply bullate and stellately hairy above, densely woolly beneath ; petioles 1-3.5 cm long, greyish-tomentose, terete. Flowers yellowish, monoecious, pedicellate, in terminal and axillary few-flid racemes, males 8-12 in a raceme, about 7 mm in diam., females 2-4 in a raceme, minute, about 3-4 mm in diam. Calyx of male as long as bract, petals elliptic or lanceolate ; calyx of female smaller, petals linear and narrower. Anthers about 1.5-2 mm long. Stigmas orange-coloured. Capsules 5-6 mm in diam., densely woolly-tomentose, 3-lobed, cells marked distinctly. Seeds 2 mm in diam., light-black, dark-brown.

Local name : Betho-okhrad.

Flowers : December to April.

Occurrence : Dwarka, growing in dried up ponds.

Uses : The ash of the roots are given to children for cough. The seeds are purgative. (Indrajai 636. 1910).

Chrozophora rottleri (Geis.) Juss. ex Spreng. Syst. 3 : 850. 1826 ; Prain in Kew Bull. 1918 : 95 ; Santapau, Pl. Saur. 728. 1953 ; Santapau & Jan. 44. 1967. *Croton rottleri* Geis. Croton. Monogr. 57. 1807. *Chrozophora plicata* Voigt. Hort. Sub. Calc. 156. 1846 ; Indrajai 634. 1910 ; Cooke 3 : 104 (non A. Juss.) *C. plicata* Hook. f. in FBI 5 : 409. 1887.

Annual erect herbs, 15-80 cm high ; stems simple or dichotomously branched above, stellately hairy, greenish-grey, often pinkish. Leaves 1.5-7.8 by 1-5.5 cm, very variable, ovate, elliptic, ovate-lanceolate, rhomboid or suborbicular, acute subacuminate or obtuse at apex, obliquely truncate or cordate at base, entire, wavy, distinctly crenate or slightly 3-lobed along the margins, thick, wrinkled, stellately hairy on both sides, 3-nerved from below upwards ; petioles 0.7-5.0 cm long, terete, stout, hairy. Flowers about 3-4 mm long, greenish-yellow, in terminal racemes 4-9 cm long ; males short-peduncled, closely arranged, females long-peduncled, scattered. Calyx of male flower about 3 mm long, stellately hairy, petals 2-2.5 mm long ovate-lanceolate, white-tomentose. Calyx of females shorter, acute, stellately hairy, petals shorter and

narrower. Stamens 15; anthers about 3 mm long. Stigmas red. Capsules 4-7 mm in diam., subglobose, densely stellately hairy, 3-seeded, reddish-blue when mottled. Seeds about 2 mm in diam.; ovoid, black.

Local name : Kalo-okhrad, Alchhiyo.

Flowers : December to April.

Occurrence : Rajkot, river bed.

Uses : Leaves are used in the treatment of skin-diseases on horse-neck. The plant is emetic, drastic and corrosive. The seeds are used as a cathartic. (Indraji 634. 1910).

Cicca Linn.

Cicca acida (Linn.) Merrill, Interp. Herb. Amb. 314. 1917; Santapau, Pl. Saur. 729. 1953; Santapau & Jan. 44. 1967. *Averrhoa acida* Linn., Sp. Pl. 428. 1753. *Cicca disticha* Linn. Mant. 1:124. 1767. *Phyllanthus distichus* Muell. Arg. in DC. Prodr. 15(2): 413, 1866; FBI 5: 304; Cooke 3: 85; Indraji 632. 1910.

Deciduous trees, 5-8 m high, monoecious, closely marked with thick scare of deciduous branchlets; branches spreading wrinkled, 30-60 cm long, glabrous. Leaves 2.5-7 × 1.6-4 cm, glabrous, pinnately distichous, ovate or ovate-lanceolate, crowded to the ends or branches; upper leaves pale-green; lower ones pale-red; stipules minute, subulate; petioles minute. Flowers reddish, clustered on pendulous branches on old wood; pedicels short, about 6-10 mm long, capillary. Fruits edible, globose, fleshy, yellow, 1-2.5 cm in diam., 3, 4 or 8 lobed. Seeds 2.5-4 mm long red or pale brown.

Local name : Harpadrevadi; Khati amlī.

Flowers : April.

Occurrence : This tree is found very common in Saurashtra.

Uses : The roots and seeds are cathartic. The juice of the root bark is used as a poison; it produces headache, sleepiness and death accompanied by severe abdominal pain. (WI).

DALECHAMPIA Linn.

Dalechampia scandens var. *cordofana* (Hochst.) Muell. Arg. in DC. Prodr. 15, 2 : 1245. 1866 ; Blatter. Fl. Arabica RBSI no. 4, 8(5) : 442. 1923 ; Chavan, Sabnis & Redi in JBNHS 59 : 324-325. 1962 & in Curr. Sci. 31 : 115, ff. 1-6. 1962 ; Santapau & Jan. 44. 1967. *D. cordofana* Hochst. ex Rich. Fl. Abyss. 2 : 244. 1851. *D. indica* sensu Indrajii 639. 1910.

Climbing herb, 150-300 cm high. Leaves simple, deeply 3-lobed, sometimes upto the middle only, pale to bright green, serrate along the margins. Flowers axillary peduncled cymes, female flowers with 2 large bracts, sepals pinnatifid.

Local name : Khajoti, Khajavani-ni-vel.

Flowers : July to October.

Occurrence : Recorded from Dwarka, neighbourhood of station, climbing on *Euphorbia*, abundant locally ; Bileshwar on Barda Hill ; Mangrol ; Jonpur Mangalpur ; Rozi and Khatia near Jamnagar.

Note : Chavan, Sabnis and Redi loc. cit. wrote on the identity of this plant. After much study and the examination of the specimens collected from Saurashtra and Dalziel's specimens from Kathiawar (Saurashtra) at Kew, they have come to the conclusion that the species of *Dalechampia* occur in Saurashtra are not *Dalechampia indica* Wight, but *D. scandens* Linn. var. *cordofana* (Hochst.) Muell. - Arg. They have given the key based on obvious external morphological characters to differentiate the two species :

Leaves 3-foliate, leaflets shortly petiolate	<i>indica</i>
Leaves simple, deeply 3-lobed, sometimes up to the middle only	<i>scandens</i> var. <i>cordofana</i>

DRYPETES Vahl

Drypetes roxburghii (Wall) Hurus. in Journ. Fac. Sci. Univ. Tokyo. Sect. 3. Bot. 6 : 335. 1954 ; Index Kewensis 12 : 49. 1959 ; Santapau & Jan. 45. 1967. *Putranjiva roxburghii* Wall., Tent. Fl. Nep. 61. 1826 ; FBI 5 : 336 ; Cooke 3 : 86 ; Santapau, Pl. Saur. 758. 1953.

A moderate-sized evergreen tree, 8-12 m high ; branches drooping, glabrous except the young shoots ; bark pale to dark-grey, whitish

when young, with horizontal lenticels; wood grey, moderately hard. Leaves 5-10 × 2-4 cm, elliptic-oblong, or ovate-lanceolate, acute or subacuminate at apex, obtuse or rounded at base, wavy or serrulate along the margins, coriaceous; petioles 6 mm long, pubescent; stipules smaller than blade, triangular, acute, deciduous. Male flowers yellow, clustered or contracted, often on leafless axillary shoots or on old wood; females green, solitary on young shoots or in few-flowered racemes on old shoots. Sepals of male 3-5, oblong; of female 5-6, broadly elliptic. Drupes 1.3-1.8 cm long, ellipsoid, hoary.

Local name : Putranjiva ; Jiyaputa.

Flowers : March to May.

Occurrence : Recorded on the authority of H. Santapau & Janardhanan.

Uses : The timber is occasionally used. The leaves are used as cattle fodder. A decoction of the leaves, fruits and seeds useful in colds and coughs. The nuts are strong in necklaces and rosaries. Seeds yield an oil which is used for burning.

EMBLICA Gaertn.

Emblia officinalis Gaertn., *Fruct.* 2 : 122. 1791 ; Santapau, *Pl. Saur.* 731. 1953 ; Gir 313 ; Santapau & Jan. 45. 1967. *Phyllanthus emblica* Linn. *Sp.* Pl. 982. 1753 ; *FBI* 5. 289 ; *Cooke* 3 : 82 ; *Indraji* 646. 1910.

Deciduous trees 5-7 m high ; bark peeling off in flakes, greyish ; branches spreading, glabrescent or slightly hairy at the ends, bark grey ; wood red, hard and close grained. Leaves 0.6-2 × 0.2-0.4 cm, linear, obtuse and apiculate at apex, acute or rounded at base, entire along the margins, glabrous on both sides ; petioles very short ; stipules minute, ovate, acute. Flowers small, greenish yellow, in axillary fascicles on leaf-bearing branchlets often below on the naked portion ; the males many on slender pedicels ; the females few, subsessile or sessile, usually arising from the lower axils. Fruits 1.3-2.3 cm. in diam., globose, fleshy, with 6 obscure vertical furrow, pale yellow, smooth, shining. Seeds 6.

Local name : Amlan ; Ray amlan.

Flowers : March to May.

Occurrence : Sasan ; Tulshishyam ; Jasadhar, Junwania.

Uses : The leaves and fruits are medicinally used. The fruits are edible and taken as jam with sugar, or pickled. Roots, branches and leaves have religious used. Seeds are used in bronchitis and vomiting. Wood is used for poles, furniture etc. (Indraji, 646. 1910).

EUPHORBIA Linn.

Herbs, prostrate or ascending ; leaves opposite ; glands of involucre 4-5, usually with a petaloid limb :

Erect and dichotomously branching ; limb of gland more or less conspicuous, petaloid :

Floral leaves distichous, imbricate, enclosing the involucre which are solitary or 2-3 only :

Limb of gland scarcely 0.12 cm long ; plants nearly or quite glabrous ; leaves elliptic-oblong, obtuse

pycnostegia

Limb of gland 0.25 cm long, pink, plant with soft spreading hairs, leaves elliptic or orbicular, obtuse ; the floral much imbricate

elegans

Floral leaves not distichous and imbricate

linearifolia

Erect slender inland herbs ; not fleshy, seeds with shallow furrows :

Cymes not capitate ; plant nearly glabrous, leaves thin, glaucous, elliptic oblong or obovate, obtuse, serrulate ; limb of gland small, retuse white or pink

parviflora

Cymes capitate, often in pairs ; plants with hispid often yellowish hairs ; leaves obliquely elliptic or lanceolate, acute, serrulate ; limb of stalked gland minute or 0

hirta

Prostrate herbs with very small leaves ; involucre solitary or in small axillary cymes ; limb of gland minute or 0 :

Stems hispidly hairy, capsules pubescent or hirsute, leaves arcuate-reticulate :

Cocci rounded or only slightly obtusely keeled, covered with appressed stiff hairs ; leaves oblong or ovate, crenulate at tip, obliquely subcordate at base

thymiflora

Cocci prominently keeled, with stiff spreading hairs on the keels ; leaves elliptic or obovate, crenulate, oblique at base

prostrata

- Stems and capsules glabrous, the latter obtusely keeled ; leaves elliptic or obovate, rounded or emarginate :
- Leaves nearly as broad as long ; seeds smooth *heyneana*
- Leaves much longer than broad ; seeds obscurely transversely rugose *clarkeana*
- Shrubs or trees or plants with thickened underground stem, the branches often angular and with stipular spines ; glands of involucre without a petaloid limbs :
- Branches spreading, unarmed, cylindrical ; leaves 0 or small and linear-oblong *tirucalli*
- Branches thick, fleshy, armed with stipular spines :
- Main stems practically none but many branches from the base *caducifolia*
- Main stems present, thick and tree-like :
- Branches cylindrical with pairs of straight spines inserted on flat corky bases, arranged in vertical lines ; leaves obtuse *nivulia*
- Branches more or less angular with small pairs of spines on small corky bases ; arranged in spiral lines ; leaves shortly acute *nerifolia*
- Shrubs or herbs, neither very fleshy nor umbellately branched ; leaves alternate or upper opposite ; involucre with a single large gland :
- Garden shrub ; inflorescence with brilliant scarlet bracts *pulcherima*
- Garden herb or undershrub, bracts of inflorescence partly-coloured ; *heterophylla*
- Introduced herb ; bracts mostly green or pale at base *geniculata*

Euphorbia caducifolia Hains. in Ind. For. 40 : 154. 1914 ; Fischer in Kew Bull. 1925 : 341 ; Santapau in Bull. Bot. Soc. Beng. 8 : 6. 1954.

A fleshy much branched, thorny shrub, 1.2-2 m. high, spinous on the upper part, unarmed below; bark smooth, green; branches terete, smooth, green; spines in pairs from large conical tubercles, 5-11 mm long, divaricate, glabrous, sharp, red when young, at length black. Leaves 8-12 mm long, suborbicular, acute at apex, undulate along the margins, thick, fleshy, glabrous, crowded at the ends of branchlets; early leaves deciduous; stipules minute, aculeiform. Involucres solitary or 2-3 nate, 4-5 mm in diam., red or yellowish green, in axils of fallen leaves towards the apex of the branches; lateral ones pedunculate. Capsules 8 mm in diam., red, acutely trigonous, with compressed, glabrous cocci. Seeds 3 mm in diam., spherical, glabrous, brownish.

Flowers : May.

Occurrence : Chotila.

Euphorbia clarkeana Hook. f. Fl. Brit. Ind. 5 : 253. 1887; Cooke 3. 65. Santapau, Pl. Saur. 732. 1953; Santapau & Jan. 45. 1967.

A glabrous annual herb; stems many, 8-20 cm long, filiform, prostrate and spreading from roots, rarely erect; branches leafy, pale at times clothed with a few scattered hairs towards the tip. Leaves 4-8 × 1-3 mm coriaceous, glabrous, distichously spreading, at times crowded towards the ends of branchlets; obliquely linear-oblong, entire or minutely toothed at the rounded apex; base almost auricled on one side; petioles very short; stipules setaceous. Involucres less than 1 mm long, campanulate, axillary, chiefly towards the ends of lateral branchlets, glabrous; lobes lanceolate; toothed; glands without a limb. Styles very short. Capsules 1.5 mm in diam., glabrous with keeled cocci. Seeds minute, about 1 mm in diam., acutely 4-angled, obscurely transversely rugose, pale brown.

Flowers : August.

Occurrence : Rajkot, beyond station, Pradumna Park, and along river bed; Chotila; Gondal Irrigation Lake, Dwarka along railway line and neighbourhood of station.

Euphorbia elegans Spreng, Syst. 3 : 794. 1826; FBI 5 : 246. Cooke 3 : 61; Indrajit 620. 1910; Santapau, Pl. Saur. 733. 1953 & Bull. Bot. Soc. Beng 8 : 13. 1954; Santapau & Jan. 45. 1967.

An erect annual dichotomously branched undershrub, up to 1 m high; branches many, slender, greenish white or reddish, with long soft spreading hairs. Leaves sub sessile, 0.7-2.5 × 0.6-1.2 cm, elliptic-oblong or orbicular, obtuse at apex, cordate at base, serrulate towards

the tips ; floral leaves upto 15×11 mm, broadly elliptic or obovate, reticulate, much imbricating forming spikes at the ends of branches, stipules minute, setaceous. Involucres about 5-6 mm long ; turbinate, hairy on both sides ; limbs of gland very conspicuous, lobes of the limb obovate, pinkish. Styles elongate, 2-fid. Cocci globose or rounded, hairy, greyish, 3-lobed, 3-seeded. Seeds 4-angled, parallelly grooved, glabrous black.

Local name : Unarvan.

Flowers : March to May and October.

Occurrence : Recorded from Kadachh, Gorej Bhad and Madhavpur near Porbandar.

Uses : It is used in skin diseases of animals. (Indraji 620. 1910)

Euphorbia geniculata Ort. Nov. Rar. Pl. Hort. Matrit. Decad. 18. 1797 ; FBI 5 : 239 ; Cooke 3 : 66 ; Santapau, Pl. Saur. 734. 1953 ; Santapau in Bull. Bot. Soc. Beng. 8 : 5. 1954 ; Gir. 314 ; Santapau & Jan. 45. 1967.

Herbs, 15-60 cm high ; stems simple or branched, geniculate, striate, glabrous, bluish green, lower portion leafless. Leaves $5.5-12 \times 3.4-5.5$ cm, broadly elliptic, oblong or obovate elliptic, acute at apex, decurrent at base, glabrous or nearly so, entire or distantly and sharply serrate, petioles 1-3 cm, long, slightly flattened, glabrous. In florescence 4-7 mm long, pinkish. In the axils of floral leaves arranged towards the ends ; pedicels very short. Capsules 4-8 mm in diam., subglobose, 3-lobed, glabrous, green. Seeds 2-3 mm in diam., more angular and on outer face carinate, black when mature with a membranous coating.

Flowers : May to June.

Occurrence : Cattle farm, Junagadh ; Rajkot Pradumna Park, Jilla Park ; Sasan gir Forest ; Sasan Iran river up stream, abundant locally in river bed.

Euphorbia heterophylla Linn. Sp. Pl. 453. 1753 ; Cooke 3 : 66 ; Santapau & Jan. 45. 1967.

An annual herb, glabrous, 80 cm high. Leaves alternate, floral leaves opposite, green towards the apex, rose coloured towards the base, very variable, from ovate to linear, entire or sinuate-toothed. Flower in terminal cymes.

Flowers : September to March.

Occurrence : Recorded on the authority of H Santapau & Janardhanan.

Uses : Cultivated as an ornamental plant.

Euphorbia heyneana Sprengel, Syst. Veg. 3 : 791. 1826 ; Panigrahi, Kew Bull. 29 : 695. 1974. *E. microphylla* Heyne ex Roth, Nov. Pl. Sp. 229. 1821 ; Non Lam. 1788 ; FBI 5 : 252 ; Cooke 3 : 65 ; Indrajit 620. 1910 ; Santapau, Pl. Saur. 738. 1953. *E. bombaiensis* Santapau in Bull. Bot. Soc. Beng. 8 : 17. 1954 (1955) ; Santapau & Jan. 45. 1967.

Prostrate herbs ; stems 5-20 cm long, dichotomously branched and radially spreading ; stems and branches glabrous, greenish white, at times purplish. Leaves 0.4-1.0 × 0.2-0.6 cm, green the edges bronze red obliquely oblong, obovate, or orbicular, obtuse at apex, obliquely rounded or tapering at base, entire along the margins, glabrous, pale to dark green, closely set along the branches ; petioles short, filiform ; stipules minute, triangular, 2-partite or laciniately toothed ; inflorescence small, about 1 mm. long, axillary, solitary or 2-3 together, glabrous ; pedicels very short. Capsules minute subglobose, glabrous, straw coloured, obtusely keeled, 3-lobed ; 3-seeded. Seeds 0.5-1.5 mm long, obtusely 4-angled or oblong, blackish, smooth.

Local name : Dudhli.

Flowers : October to March.

Occurrence : Ghumli ; Bhavnagar ; Dwarka ; Junagadh to Sasan and Veraval, Rare.

Uses : This is a very poisonous plant. The plant is used as a galactagogue. (Indrajit 620. 1910).

Note : Santapau (in Bull. Bot. Soc. Beng. 8 : 17. 1955) considered *E. microphylla* Roth (1821) to be a later homonym of *E. microphylla* Lam. (1788) and proposed a new name *E. bombaiensis*. While doing so, he observed that "*E. heyneana* Spreng. Syst. 3 : 791 is doubtfully synonymous with our plant . . ." Panigrahi loc. cit. states that "But this name was also a replacement for the illegitimate *E. microphylla* Roth. and the type of all three names is the same. *E. heyneana* Spreng. is therefore, the correct name for this plant".

Euphorbia hirta Linn. Sp. Pl. 454. 1753 ; Santapau, Pl. Saur. 735. 1953 ; Gir. 315 ; Santapau in Bull. Bot. Soc. Beng. 8 : 15. 1954 ; Santapau & Jan.

45. 1967. *E. pilulifera* Hook. f. Fl Brit. Ind. 5 : 250. 1887 ; Cooke 3 : 64 ; Indrajī 618. 1910.

Suberect or procumbent herbs, 15-50 cm long, simple or branched ; stems and branches yellowish or reddish, pilose, more or less flexuose, faintly striate, somewhat woody at the base, slightly thickened at the nodes ; internodes 2-5.2 cm long. Leaves 1-4.3 × 0.6-2 cm, elliptic, ovate, oblong-lanceolate or rhomboid-oblong, acute or subacute at apex, obliquely rounded at base, minutely toothed along the margins, green, at times purplish on lower surface and with black spots on upper surface, appressedly hairy ; stipules green or purplish, minutely toothed ; petioles 2-4 mm long, terete, hairy. Inflorescence 0.5-1.2 cm across, greenish-yellow or at times pinkish-purple, axillary, solitary ; peduncles 0.5-1.2 cm long, hairy ; glands 4-6, reddish, minute, with or without a minute petaloid limb, erect. Capsules small, about 1-3 mm in diam., keeled at angles of cocci, glabrous-trigonous, hispidly hairy. Seeds 1 mm long, reddish-brown, ovoid-trigonous, transversely rugose.

Local name : Rati-dudheli ; Nagala-dudheli ; Moti-dudheli.

Flowers : Almost round the year.

Occurrence : Junagadh, Girnar Forest, along road ; Sasan Gir Forest ; Rajkot Pradumna Park and Jubilee Garden.

Uses : The leaves are said to be used in asthma and ring-worm. The plant is used in diseases of children worms, bowel-complaints and coughs. (Indrajī 618. 1910)

Euphorbia linearifolia Roth, Nov. Pl. Sp. 224. 1821 ; FBI 5 : 249 ; Cooke 3 : 63 ; Santapau, Pl. Saur. 737. 1953 ; Santapau in Bull. Bot. Soc. Beng. 8 : 18. 1954 ; Santapau & Jan. 45. 1967.

A glabrous, glaucous, dichotomously branched herb, with thick root-stock and branches ; stems filiform, terete, sub-woody, glabrous, procumbent in the lower part, branched, dark-purple ; about 30 cm long, swollen at the nodes ; branches alternate, adscendent, simply, densely foliose. Leaves shortly petioled, 1-2 × 0.2-0.5 cm, linear-oblong, acute or subacute at apex, unequally cordate at base, entire along the margins, coriaceous, glabrous, lower leaves shorter, ovate or ovate-oblong. Involucres solitary or in subglobose terminal cymes, about 4 mm long ; lobes triangular-ovate, hairy, pedicels 1.5 mm long, glabrous ; limb of the gland 2-3 mm long, broadly rounded cuneate and crenulate at apex, white, at times pinkish. Cocci glabrous keeled. Seeds glabrous.

Flowers : October.

Occurrence : Beyt, Jamnagar.

Euphorbia neriifolia Linn. Sp. Pl. 451. 1753 ; FBI 5 : 255 ; Santapau, Pl. Saur. 739. 1953 ; Gir 317; Santapau in Bull. Bot. Soc. Beng. 8 : 7. 1954 ; Santapau & Jan. 45. 1967. *E. ligularis* Roxb. Hort. Beng. 36. 1814 (nom. nud.) & Fl. Ind. 2 : 465. 1832 ; Cooke 3 : 58.

Large, erect, deciduous shrubs and small trees, 1-4 m high, copiously branched with plenty of thick latex ; stems with ascending branches, succulent, pale to dark-green, glabrous and strongly 5-angous. in younger parts, woody, more or less cylindrical and terete in older ones. Leaves 4.5-15.5 × 3-9 cm, obovate, obovate-oblong or spatulate-oblong, shortly acute or obtuse and mucronate at apex, cuneate, decurrent or tapering at base, entire along the margins, subfleshy, glaucous-green glabrous, stipular thorns 8-13 mm long, black, stout, spirally arranged petioles very short or 0. Inflorescence few-fid cymes, pale-green or yellow at first, becoming deep-red, in the axils of stipular thorns towards the ends of the branches ; peduncles short. Capsules 0.8-1.2 cm in diam., 3-lobed glabrous, reddish or pale-brown. Seeds 2 mm in diam., brown glabrous.

Local name : Kantalo-thor ; Bhungla-thor.

Flowers : February to June.

Occurrence : Junagadh, foot of Girnar ; Gir Forest, along the way from Junagadh to Sasan.

Uses : Commonly planted as a hedge plant 'around the cultivated fields. The juice is purgative, diuretic and useful in earache. It is also used as a fish-poison.

Euphorbia nivulia Buch.-Ham. in Trans. Linn. Soc. London 14 : 286. 1825 ; FBI 5 : 255 ; Indrajit 622. 1910 ; Santapau, Pl. Saur. 740. 1953; Gir 318 ; Santapau in Bull. Bot. Soc. Beng. 8 : 8. 1954 ; Santapau & Jan. 45. 1967.

A tree or large shrub, 4-10 m high, with milky juice ; wood white, soft ; trunk straight, more or less terete with whorled branches ; stems and branches rounded with stipular thorns arising from low, distant tubercles, vertically arranged. Leaves 15-30 cm long, oblanceolate, linear or obovate-oblong, obtuse and apiculate at the apex, cuneate at base, purplish-white along the margins, fleshy, glabrous at the ends of the branches ; midrib stout beneath ; petioles very short or 0. Involucres 3-nate forming small, yellowish-green, glabrous, short-peduncled cymes which are twice-forked on the leaf-scars towards the ends of the branchlets. Flowers 3 mm in diam., yellow or at times reddish ; central flower

sessile, male, lateral ones peduncled bisexual. Capsules 6-12 mm in diam., sharply 3-lobed, 3-seeded; stalks 1.7-2.5 cm long, pinkish-red, smooth. Seeds about 3 mm in diam., oblong or ovoid, smooth, blackish-brown with white straps, strongly 1-nerved to the middle.

Local name : Thor-Kantalo.

Flowers : February to May, rarely from September to October.

Occurrence : Jasadhar near village; Mangrol; Junagadh; Chotila, Satadhar.

Uses : The juice of the plant is purgative, diuretic, cure for earache. It is also used for plastering handles of sickles. (Indraji 622. 1910)

Euphorbia parviflora Linn. Syst. (ed. 10) 2 : 1047. 1759. Santapau in Bull. Bot. Soc. Beng. 8 : 13. 1954; Santapau & Jan. 45. 1967. *E. hypericifolia* Linn. Sp. Pl. 454. 1753. Pro parte; FBI 5 : 249. Pro parte; Indraji 617. 1910. *E. hypericifolia* var. *parviflora* Prain, Beng. Pl. 2 : 924. 1903; Cooke 3 : 63.

Annual, erect or prostrate herbs; stems slender, 15-30 cm. long, simple or dichotomously branched, somewhat woody at the base; stems and branches glabrous, reddish-pink; internodes 2.5-5.5 cm long. Leaves 0.7-3.8 × 0.4-1.8 cm, slightly pinkish, elliptic, obovate or elliptic-oblong, obtuse or subacute at apex, obliquely rounded or subcordate at base, minutely crenate-serrate along the margins, glabrous above, minutely hairy beneath; petioles short. Inflorescence of many flowered corymbose cymes, axillary and terminal, whitish or rosy; peduncles 0.5-1.2 cm long, hairy; involucreal limbs petaloid, obtuse. Capsules small, about 2 mm in diam., sub-globose, yellowish-brown or straw-coloured, glabrous or nearly so. Seeds obscurely tetragonous, yellowish or brown, smooth.

Local name : Dudheli.

Flowers : June to December.

Occurrence : Rajkot, Lalpari Talao common, not abundant, Jilla Park and from beyond the station; Junagadh Forest, Gondal Irrigation Lake; Beyt, Jamnagar; Dwarka along railway line; Chotila Hill, Sasan Gir to Junwania; Sasan Iran river up stream.

Uses : This is given with sugar in diabetes, and diarrhoea, but excess is poisonous. (Indraji 618. 1910)

Euphorbia prostrata Ait. in Kew (ed. 1) 2 : 139. 1789 ; FBI 5 : 266 ; Santapau, Pl. Saur. 741. 1953 ; Santapau in Bull. Bot. Soc. Beng. 8 : 16. 1954 ; Gir 319 ; Santapau & Jan. 45. 1967.

Annual prostrate herbs ; 18-30 cm high ; hispidly hairy ; stems slenderly filiform, alternately branched, puberulous with minute curved hairs on upper side at least along medium line, glabrous beneath, stems deep red. Leaves 2-7 mm long, purplish ; elliptic, oblong or obovate, obtuse or rounded at apex, oblique at base, distinctly or obsoletely denticulate or crenulate and at times ciliate along the margins, glabrous on both sides, 3-nerved ; the nerves all prominent ; stipules on upper side of stem usually distinct, linear and pilose, those on lower side of stem usually distinct, linear and pilose, those on lower side united into one deltoid or deltoid-ovate, apically lacinate-toothed ; petioles 1 mm long, glabrous. Involucres in short axillary, leafy racemose clusters. Cocci 1-1.5 mm long ; sub-ovate, orbicular, prominently keeled with stiff spreading hairs on the keels. Seeds very small, ovoid, obtuse, truncate at base, 4-angled, transversely deeply furrowed.

Flowers : October.

Occurrence : Shirvau, Gir Forest ; Rajkot Residency Garden, Jilla Park, Rajkumar College Compound, and on waste lands ; Gondal Road, Rajkot, Gondal Irrigation Lake ; Beyt, Jamnagar ; Sasan Iran river up stream, abundant in cultivated fields and in nursery.

Euphorbia pulcherrima : Willd. ex Klotzsch in Otto & Dietr. Allg. Gartenz. 2 : 27. 1834 ; FBI 5 : 239 ; Cooke 3 : 66 ; Santapau, Pl. Saur. 742. 1953 ; & in Bull. Bot. Soc. Beng. 8 : 4. 1954 ; Santapau & Jan. 45. 1967. *Poinsettia pulcherrima* R. Graham in Edinb. New Phyll. Journ. 20 : 412. 1836 ; Bor & Raizada in JBNHS 46 : 320, Col. t. 16 & tt. opp. P. 320. 1944.

Deciduous trees, 1.5-2.2 m high, with brown bark and milky latex ; stems much branched, green, glabrous. Leaves 5-14 × 2.5-7 cm, elliptic or oblong, acuminate at apex, cuneate at base, entire or irregularly lobed along the margins, glabrous above ; minutely hairy beneath ; the entire surface of upper leaves coloured. Petioles 1.5-3.7 cm long. Inflorescence 1-1.6 cm long, orange-coloured ; solitary in the axil of floral leaves arranged towards the ends of branches ; floral leaves 5-10 by 1.4-3.0 cm, elliptic, obovate-elliptic, elliptic-lanceolate, bright red, pink or scarlet ; glands yellow, large, unilateral, ellipsoid, compressed.

Flowers : October to February.

Occurrence : Jamnagar, Dhuwao.

Uses : Cultivated in the gardens as ornamentals.

Euphorbia pycnostegia : Boiss. Cent. Euph. 9. 1860 ; FBI 5 : 246 ; Cooke 3 : 60 ; Santapau, Pl. Saur. 743. 1953 & in Bull. Bot. Soc. Beng. 8 : 11. 1954 ; Santapau & Jan. 45. 1967.

An erect or suberect dichotomously branched annual herb, 30 - 70 cm high ; stems glabrous, slender, often tinged with swollen nodes, internodes long, glabrous. Leaves 2.5 - 4 × 0.8 - 1.4 cm, oblong, elliptic-oblong, obtuse at apex, subcordate and oblique at base, entire and serrulate along the margins, glabrous on both sides except near the axils ; secondary nerves obscure ; petioles 0 ; floral leaves smaller, ovate-cordate or suborbicular, distichously imbricating, concealing the cyathia ; stipules minute, fimbriate. Involucres 6 - 7 mm long, solitary in the axils of the uppermost leaves ; petaloid limb conspicuous, white, obovate, obtuse ; lobes fimbriate, toothed ; glands 1 mm long, transversely oblong. Capsules 3 - 4 mm long, glabrous or nearly so, cocci obtusely keeled. Seeds 2 mm long, obtusely 4-angled, greenish, with flattened tubercles.

Flowers : September to December.

Occurrence : Visavadar near Junagadh, Rajkot.

Euphorbia thymifolia : Linn. Sp. Pl. 454. 1753 ; FBI 5 : 252 ; Cooke 3 : 64 ; Indrajit 619. 1910 ; Santapau, Pl. Saur. 744. 1953 ; Gir 320 ; Santapau in Bull. Bot. Soc. Beng. 8 : 16. 1954 ; Santapau & Jan. 45. 1967.

Prostrate or decumbent herbs ; stems dichotomously branched, pale green or reddish, more or less hairy ; branches 10 - 40 cm long, radially spreading. Leaves 0.4 - 1.0 × 0.2 - 0.5 cm, sessile, obliquely oblong or oblong-elliptic, obtuse at apex, subcordate and obliquely rounded at base, crenulate along the margins, glabrous above, sparsely pubescent beneath ; petioles 1 mm long, hairy ; stipules fimbriate, elongate. Inflorescence small, less than 1 mm long, pubescent, greenish-yellow, in axillary condensed cymes without a peduncle ; glands minute, stipulate, ovate-rounded with 2 - 3 lobular appendage ; pedicels hirsute-capsules small, about 1.2 mm in diam., ovoid, pale-brown or straw-coloured obtusely 3-lobed, pubescent. Seeds less than 1 mm long, reddish-brown, oblong, 4-angled with faint transverse rows.

Local name : Nani-dudheli.

Flowers : July to April.

Occurrence : Rajkot, Pradumna Park ; Tulshishyam in Gir Forest.

Uses : The seeds and dried leaves are astringent, laxative, stimulant and given to children in bowel-complaints. (Indraji 619. 1910)

Euphorbia tirucalli Linn. Sp. Pl. 452. 1753 ; FBI 5 : 254 ; Cooke 3 : 66 ; Indraji 620. 1910 ; Santapau, Pl. Saur. 745. 1953 ; Gir 321 ; Santapau in Bull. Bot. Soc. Beng. 8 : 5. 1954 ; Santapau & Jan. 45. 1967.

Deciduous shrubs or small trees, 2-6 m high, dichotomously branched ; bark greenish-brown ; wood white or grey ; branches 15-30 mm in diam., pale to dark green, cylindrical, smooth, spreading with plenty of latex, younger parts flexuose ; internodes 5-17 cm long, striate when dry. Leaves small, about 6-16 × 1-1.5 mm linear to spatulate, subacute or obtuse at apex, tapering at base, entire along the margins, pale to dark green, minutely pubescent when young, glabrous when old, slightly grooved on upper side, appearing in monsoon but soon falling away ; petioles 0. Flowers not seen.

Local name : Kharsani-thor ; Kharsani ; Dandaliyo-thor.

Flowers : Not seen.

Occurrence : Veraval ; Rajkot ; Junagadh ; Chorvad.

Uses : This plant makes a good hedge or wind breaks ; due to its poisonous properties, though the plant is unarmed, it is respected by cattles. Latex is used with Bajri in stomach-troubles ; the wood is also used for making toys. (Indraji 620. 1910)

JATROPHA Linn.

Flowers small, about 8 mm in diam., greenish-yellow,
axillary and terminal paniculate cymes

curcas

Flowers about 5 mm in diam., crimson or purplish, in terminal
glandular dichotomous cymes

gossypifolia

Jatropha curcas Linn. Sp. Pl. 1006. 1753 ; FBI 5 : 383 ; Cooke 3 : 95 ; Santapau, Pl. Saur. 747. 1953 ; Santapau & Jan. 45. 1967.

A monoecious deciduous shrub, 1.5-3.2 m high ; stems and branches cylindric, straight, greyish with prominent leaf-scars, bark

greenish white, smooth, peeling off in thin flakes ; wood soft. Leaves 4 14.2 × 4 15 cm, broadly ovate or suborbicular, coriaceous, palmately-lobed, rarely entire ; lobes 3 5, ovate, acute or obtuse at apex, cordate at base, bright-green, turning yellow later, glabrous ; petiole 5 15 cm long, striate, glabrous, at times with a gall like smelling in the middle. Flowers small, about 8 mm in diam., greenish-yellow, axillary and terminal paniculate cymes which are 5 11 cm in diam., the central flower usually female ; pedicels short. Corolla-tube of male flowers villous within. Drupes 1.5 2.3 cm in diam., subglobose, pendulous, smooth, green at first, turning orange and finally almost black, dehiscing into 3, 2-valved cocci. Seeds 12 20 × 7 12 mm, black when mature, oblong.

Local name : Mogli-erandi.

Flowers : Almost throughout the year.

Occurrence : Jamnagar, Rajkot.

Uses : The plant makes a good living fence, the seeds are purgative ; the oil extracted from them is sometimes used for burning.

Jatropha gossypifolia Linn. Sp. Pl. 1006. 1753 ; FBI 5 : 383 ; Cooke 3 : 94 ; Indrajī 651. 1910 ; Santapau, Pl. Saur. 748. 1953 ; Santapau & Jan. 45. 1967.

An erect evergreen, monoecious shrub, 1 2 m high ; bark shining, rough ; stems much-branched, soft-wooded, glabrous, brownish-green to reddish-brown, succulent ; branches glabrous, succulent. Leaves 6 15 × 7.5 12 cm, palmately 3 5 lobed ; lobes elliptic-oblong, obovate-oblong or subpanduliform, acute or acuminate at apex, glandular-hairy along the margins, deep purplish-red at first become green, more or less glabrous, petioles 2.5 11 cm long, deep-red, grooved, glandular hairy ; stipules short, capillary, multified, glandular. Flowers about 5 mm in diam., crimson or purplish, in terminal glandular dichotomous cymes. Capsules 1 1.5 cm long, slightly apiculate, minutely pubescent, smooth, 3-lobed, 3-seeded, green at length brownish, rugose. Seeds 0.6 0.8 cm long, oblong, glabrous, shining, greyish-brown with yellowish strophioles.

Local name : Velati ; Erandi.

Flowers : July to March, at times throughout the year.

Occurrence : Amar Jund, Jamnagar, Rajkot.

Uses : It is used for skin-diseases. The leaves are applied to boils and itches. The leaves and seeds are purgative but dangerous. (Indrajī 651. 1910)

KIRGANELIA A. Jussieu.

Kirganelia reticulata (Poi.) Baill., Etud. Gen. Euph. 614. 1874 ; Santapau, Pl. Saur. 749. 1953 ; Gir 322 ; Santapau & Jan. 45. 1967. *Phyllanthus reticulatus* Poir. in Lamk. Encyl. 5 : 298. 1804 ; FBI 5 : 288 ; Cooke 3 : 81.

Monoecious, glabrous shrubs, 1-2.3 m high ; bark brownish, smooth ; wood reddish inside ; stems sarmentose, much-branched, purplish. Leaves 0.8-3 × 0.5-1.5 cm, oblong, elliptic or obovate, acute or obtuse at apex, rounded or tapering at base, entire along the margins glabrous or nearly so, dark-green, at length yellow ; petioles 2 mm long, terete, hairy ; stipules 1.5-2 mm long, ovate, subacuminate, entire. Flowers small, up to 2 mm in diam, green, axillary ; male flowers 2-6 in fascicles ; females solitary ; pedicels about 5 mm long slender. Berries 3-6 mm in diam., globose, glabrous, green at first, at length dark-purple supported by persistent calyx of 5-6 sepals which are orbicular or oblong, obtuse, with hairy margins, alternating with glands of the disk. Seeds 9-15, about 2 mm long, irregularly trigonous, brown finely granulate.

Local name : Shinvi.

Flowers : May to November.

Occurrence : Sasan ; Bileshwar.

Uses : The bark is alterative ; leaves are diuretic and cooling.

MALLOTUS Lour.

Mallotus philippensis (Lamk.) Muell-Arg. in Linnaea 34 : 196. 1865 ; FBI 5 : 442 ; Cooke 3 : 113 ; Santapau, Pl. Saur. 750. 1953 ; Santapau & Jan. 45. 1967. *Croton philippensis* Lamk. Encyl. 2 : 206. 1786.

Evergreen, dioecious trees, 3-6 m high, with an irregular trunk and grey bark ; branches many, rusty-pubescent. Leaves 4.7-17 × 3-9 cm, ovate, ovate-elliptic, ovate-lanceolate or elliptic-lanceolate, acute or acuminate at apex, rarely notched, rounded or truncate at base, entire or serrate along the margins, glabrescent above, pubescent with minute red glands beneath, pale-green, subcoriaceous ; petioles 2-6 cm long, terete, rusty pubescent, curved at the top. Flowers small, greenish-yellow ; male sessile or pedicelled, in erect, axillary or terminal, simple or

branched spikes or racemes which are 8-15 cm long; females sessile in axillary or terminal simple spikes which are 5-7.5 cm long, rarely solitary. Capsules 0.7-1.2 cm in diam., subglobose, 3-lobed, glandular-hairy, deep-red. Seeds 3-4 mm in diam., black, smooth, subglobose.

Local name : Kapila.

Flowers : October to November.

Occurrence : Rare. Recorded from Palitana Road (AHL 762).

MICROCOCCA Benth.

Micrococca mercurialis (Linn.) Benth. in Hook. Niger. Fl. 503. 1849; Santapau, Pl. Saur. 752. 1953; Santapau & Jan. 45. 1967. *Tragia mercurialis* Linn. Sp. Pl. 980. 1753. *Claoxylon mercurialis* Thwaites, Enum. 271. 1861; FBI 5 : 412; Woodrow in JBNHS 1512 : 372. 1899; Cooke 3 : 107; Indraj 636. 1910.

An annual erect herb, 15-55 cm high; stems simple or branched, glabrous or minutely pubescent. Leaves 3-5.5 × 1.8-2.6 cm, ovate or ovate-lanceolate, acute or subacute at apex, usually rounded at base, crenate-serrate along the margins, glabrous or nearly so on both sides; petioles 1-2 cm, long, slender. Racemes upto 7 cm long, erect, slender, androgynous, filiform. Flowers short or long-pedicelled; the females usually solitary with several males. Capsules 4 mm in diam., globose, glabrous or sparsely hairy, 3-lobed. Seeds pale-brown, globose, deeply foveolate.

Local name : Ardio-okharad.

Flowers : July to December.

Occurrence : Porbander (Woodrow) on Barda Hills, scattered.

Uses : Ash of plant with oil is good medicine in skin diseases. (Indraj 636. 1910).

The oil extracted from seeds is valuable on account of its drying properties. The red powdery covering of fruits is employed as an anthelmintic. The dye from the fruit is used to colour silks. It may be employed as an anti-oxidant for ghee, vegetable oils and shortenings. The powder possesses purgative properties and in full doses occasionally causes nausea. (WI)

PEDILANTHUS Neck. ex Poit.

Pedilanthus tithymaloides (Linn.) Poir. in Ann. Mus. Hist. Nat. Paris 19 : 390, t. 19. 1812 ; FBl 5 : 239 ; Cooke 3 : 124; Indrajai 617. 1910 ; Santapau, Pl. Saur. 753. 1953 ; Gir 323 ; Santapau & Jan. 45. 1967. *Euphorbia tithymaloides* Linn. Sp. Pl. 453. 1753.

Perennial deciduous undershrubs, 75-120 cm high ; stems simple or slightly branched, succulent with plenty of latex ; stamens and branches dark-green, terete, flexuose, glabrous, shining ; internodes 3-5 cm long. Leaves 2.5-7 × 1.7-5.5 cm., broadly ovate, acute at apex, subcordate or rounded at base, obscurely crenate along the margins, at times undulating dark-green, often green and white, fleshy, glabrous ; petioles short. Inflorescence a solitary cyathium at the ends of the stems and branches. Flowers 1.5-2 cm long, pinkish or reddish, slipper-shaped, generally dropping off soon ; bracts caduous.

Local name : Vilayati-Khursandi.

Flowers : January to June.

Occurrence : Jasadhar Rest House.

Uses : Planted in gardens as hedge plant.

PHYLLANTHUS Linnaeus emend. Gaertner

Flowers greenish-white :

Filaments free ; male and female cymules intermixed *virgatus*

Filaments fused into a column ; male and female cymules not intermixed :

Leaves hispidulous beneath ; pistillate flowers sessile, ovary bullate-papillate *urinaris*

Leaves glabrous ; pistillate flowers distinctly pedicelled, ovary smooth *fraternus*

Flowers yellow *maderaspatensis*

Phyllanthus fraternus Webster, Contr. Grey. Herb. 176 : 53. 1955 et in Journ. Arnold Arb. 38 : 309. 1957 ; Bhandari, Fl. Ind. Desret. 346. 1978. *Phyllanthus asperulatus* Hutchins. in Kew Bull. 1920 : 27-28. 1920 ;

Santapau & Jan. 45. 1967. *P. niruri* auct (non Linn.) FBI 5 : 298. 1887 ; Cooke 3 : 84 ; Indraj. 632. 1910; Santapau, Pl. Saur. 755. 1953 ; Gir 324 ; Santapau, RBSI 16(1) : 218. 1960.

Erect annual herbs, 30-60 cm high ; stems simple or branched, pale green, slender, glabrous, faintly striate. Leaves 4-12 × 2-5 mm, closely distichous, linear or elliptic-oblong, subacute or obtuse at apex, rounded at base, entire along the margins, glabrous on both sides, pale green ; petioles very short, glabrous ; stipules pale green, linear-lanceolate or subulate. Flowers small, greenish white, axillary, mostly on the lower side of the branchlets hidden by leaves ; the males 1-3 fascicled, subsessile ; females solitary, pedicelled, larger than the males. Sepals of male orbicular or rounded ; of females narrowly obovate-oblong or oblong with broad white margins ; disk of male of minute glands ; of females saucer-shaped, annular with erect lobes. Capsules 1.5-3 mm in diam, depressed-globose, smooth, pale brown, faintly reticulately veined, 3-lobed, 6-seeded. Seeds 1 mm long, trigonous, brown, with longitudinal regular parallel ribs on the back.

Local name : Bhoyn-ambali.

Flowers : May to October.

Occurrence : Rajkot, Jilla-Garden, Rajkumar College compound and Gondal Road, Rajkot.

Uses : The leaves are said to be applied on swellings and skin diseases. (Indraj. 623, 1910)

Phyllanthus maderaspatensis Linn. Sp. Pl. 982. 1753 ; FBI 5 : 292 ; Cooke 3 : 82 ; Indraj. 630. 1910 ; Santapau, Pl. Saur. 754. 1953 ; Santapau & Jan. 45. 1967.

Annual erect herbs, somewhat woody, 40-80 cm high ; stems simple or branched, suberect or diffuse ; stems and branches glabrous, shining, terete ; younger parts herbaceous, green ; older ones woody, dark brown or reddish. Leaves 1-3 × 0.4-1.2 cm, elliptic-oblong, obovate-oblong, linear-oblong or lanceolate, obtuse and minutely apiculate at apex, cuneate or tapering at base, glabrous on both sides, dark green and shining on upper surface, paler beneath ; younger leaves smaller, broader, pale green with pinkish margins ; older leaves longer and narrower ; petioles very short or 0, stipules lanceolate, acuminate, cuneate or rounded, persistent, membranous, scarious, pinkish white. Flowers minute, yellow, axillary ; males 2-5 in fascicles, 1.5 mm in diam., sessile or subsessile ; females solitary, 2.5-3 mm in diam., on long, filiform, at

times red, shining, glabrous. Pedicellate. Capsules 2-3 mm in diam., smooth, shining, 3 grooved, 3 nerved, 3 lobed, 6 seeded, green at first, at length brown. Seeds 1-1.5 mm in diam., trigonous, rounded on the dorsal side, ridged on ventral, reddish brown, minutely muciculate in lines.

Local name : Kanocha ; Bakrato.

Flowers : August to October.

Occurrence : Dwarka ; Gondal Irrigation Lake ; Rajkot river bed in open ground, Residency Garden ; Jamnagar Jail ; Okha Rozi Port of Jamnagar ; Dhunvaon-vidi ; Ranjit Sagar, Jamnagar.

Uses : Seeds are medicinally used in kidney troubles. Roots are used in swellings. An infusion of the leaves is given for headache. (Indraji 630. 1910)

Phyllanthus urinaria Linn. Sp. Pl. 982. 1753 ; FBI 5 : 293 ; Cooke 3 : 83 ; Indraji 631. 1910 ; Santapau, Pl. Saur. 757. 1953 ; Webster in Journ. Arn. Arb. 38 : 194, t. 9. 1957 ; Santapau & Jan. 45. 1967.

Annual herbs, 10-40 cm tall ; stem erect, much branched, glabrous, purplish ; ultimate branches 3-8 cm long, flattened or slightly winged. Leaves 5-20 × 3-8 cm, broadly oblong, linear-oblong, elliptic-oblong, obovate-oblong, obovate, obtuse and apiculate at apex, obliquely rounded or cuneate at base, entire and ciliate along the margins, often dark red, membranous, glabrous ; petioles very short or 0, flattened, glabrous. Flowers greenish white, monoecious, arising from lower side of branchlets, hidden by leaves ; males short pedicelled, 1.25 mm or less in diam., usually crowded in upper axils, females solitary, slightly larger than the males, sessile or very shortly pedicelled, arising from lowermost axils. Capsules about 3 mm in diam, pale brown or yellowish-brown, globose, echinate, densely verrucose. Seeds 1 mm long, pale-brown or straw-coloured, prominently transversely ridged and with faint cross bars.

Local name : Khorsat bhoyan ambali.

Flowers : July to October.

Occurrence : On Barda Hills, near the streams and in fields

Uses : The plant is diuretic, useful in gonorrhoea and genitourinary troubles. It is also used as a fish-poison. (Indraji 631. 1910)

Phyllanthus virgatus Forst. f. Fl. Ins. Austr. Prodr. 65. 1786 ; Backer & Bakh. f. Fl. Java 1 : 469. 1963 ; C. Saldanha & D. Nicolson, Fl. Hassan Dist. 347. 1976. *P. simplex* Retz. Obs. Bot. 5 : 29. 1789 ; FBI 5 : 295 ; Cooke 3 : 83 ; Indrajai 631. 1910 ; Santapau, Pl. Saur. 756. 1953 ; Santapau & Jan. 45. 1967.

Perennial herbs, 15 - 60 cm high, with along taproot ; stems simple or branched from the base, glabrous, often purplish ; branches flattened, curving upwards, minutely winged when young. Leaves 6 - 25 × 2 - 7 cm, linear or linear-oblong, obtuse and apiculate at apex, rounded or tapering at base, entire and thickened along the margins, dark green, glabrous ; petioles very short, about 1 mm long, articulated to stem ; stipules peltate, subsagittate, scarious. Flowers small, greenish yellow, axillary, solitary ; males few, sessile, minute ; females many long pedicelled, larger. Capsules about 3 mm in diam., globose, greyish brown, glabrous, obscurely 3-lobed, 6-seeded. Seeds about 1.5 mm long, reddish-black.

Local name : Moti bhoyan ambali.

Flowers : July to November.

Occurrence : On Barda Hills, in the field with other crops and near water.

Uses : The fresh leaves with milk are used as wash for itch in children. The fresh leaves, flowers and fruits are useful in gonorrhoea. (Indrajai 613. 1910)

RICINUS Linn.

Ricinus communis Linn. Sp. Pl. 1007. 1753 ; FBI 5 : 457 ; Cooke 3 : 125 ; Indrajai 617. 1910 ; Santapau & Jan. 46. 1967.

A shrub, 1.2 - 4.5 m tall, with straight stem ; bark pale brown ; wood white ; stems and branches glaucous green or with a purple tinge, terete, glabrous, with scars of fallen leaves. Leaves peltate 15 - 24 cm in diam., 5 - 9 lobed ; lobes palmate-partite, acuminate or acute at apex ; cordate or subcordate at base, serrate along the margins dark-green above, pale green and prominently nerved beneath, membranous, glabrous, terete. Flowers small, yellow, in terminal racemes of 6 - 20 cm long ; males above ; females below. Fruits 1.5 - 2.5 cm in diam., 3-lobed, oblong, softly spinous, deep bluish-green, dehiscing into 3, 2-valved cocci. Seeds 7 - 10 mm long, smooth, oblong, greyish-brown, mottled with white or creamy, with white caruncles.

Local name : Erado ; Divejo.

Flowers : Almost all the year.

Occurrence : Gir Forest ; on Barda Hills. Beyt, Dwarka ; Ranjit Sagar, Syke's point near Jamnagar, Junagadh ; Chotila etc.

Uses : It is cultivated in fields. It is an important non-irritant purgative, the oil extracted from seeds is used for burning and lubricant. The leaves are used in headache and heat stroke. The seed oil has a very large number of industrial uses. It is an important export item from India. (Indraji 617. 1910) ; (WI)

SECURINEGA Comm. ex Juss. (nom. cons.)

Spinous, flowers pale-green or white

leucopyrus

Unarmed ; flowers greenish-yellow

virosa

Securinega leucopyrus (Willd.) Muell. Arg. in DC. Prodr. 15(2) ; 451. 1866 ; Santapau, Pl. Saur. 760. 1953 ; Gir 326 ; Santapau & Jan. 46. 1967. *Flueggea* (*Fluggea*) *leucopyrus* Willd. Sp. Pl. 4 : 757. 1805 ; FBI 5 : 328 ; Cooke 3 : 77 ; Indraji 633. 1910.

Straggling shrubs, 1-2.5 m tall ; bark smooth, ash coloured in younger parts, blackish brown in older ; wood hard and close grained ; stems erect, slender, much branched ; branches spreading, leafy, terminating into sharp spines. Leaves 1-3.5 × 1-2.5 cm, obovate, elliptic obovate or obovate oblong, obtuse or emarginate at apex, at time apiculate, cuneate or tapering at base, glabrous on both sides ; petioles short ; stipules small, acuminate. Flowers pale green or white, many, shortly pedicelled, in axillary fascicles, at the ends of branches. Ripe berries 4-8 mm in diam., white, smooth, spherical or subglobose, 3-lobed, 6-seeded ; stalks thin, 6-8 mm long. Seeds about 4 mm long, dark yellowish brown, trigonous, smooth.

Local name : Shinvi ; Thumri.

Flowers : June to October.

Occurrence : Sagdi vidi, Junagadh ; Tulshishyam, Junvania, Sasan, frequent.

Uses : Fruits are locally eaten. The leaves made into a paste and mixed with tobacco are used to destroy worms in the sores. The plant is a fish poison. (Indraji 633. 1910)

Securinega virosa (Willd.) Baillon, *Adansonia* 6 : 334. 1865 66 ; Pax & Hoffm. in Engl. & Prantl. *Pflanzenfam.* ed. 2, 19C : 60. 1931 ; Santapau, *Pl. Saur.* 761. 1953 ; Santapau & Jan. 46. 1967. *Phyllanthus virosus* Roxb. ex Willd. *Sp. Pl.* 4 : 578. 1805. *Flueggea microcarpa* Blume, *Bijdr.* 580. 1825 ; *FBI* 5 : 328 ; *Cooke* 3 : 77.

Unarmed shrubs, 1-3 m high ; bark pale brown, smooth, wood hard, close grained, stems much branched, subtetragonous, greyish ; branches slender, grooved. Leaves 2-6.5 × 1-5 cm, elliptic-oblong, obovate, orbicular, obtuse, truncate or emarginate at apex, cuneate or tapering at base, entire along the margins, glabrous on both sides ; petioles very short, slender. Flowers small, greenish-yellow axillary, in fascicles, pedicels upto 6 mm long, greenish-yellow axillary, in fascicles, pedicels upto 6 mm long, capillary. Fruits 4-5 mm in diam, subglobose or spherical, white, with a fleshy pericarp. Seeds rounded at the back, minutely punctate.

Local name : Shinvi.

Flowers : June to October.

Occurrence : Rajkot, Residency Garden ; Junagadh ; Forest Road.

Uses : Fruit is edible. Wood is useful for agricultural tools.

TRAGIA Linn.

Tragia cannabina Linn. f. *Suppl.* 415. 1781 ; *Cooke* 3 : 120 ; Santapau, *Pl. Saur.* 762. 1953 ; Santapau & Jan. 46. 1967. *T. involucrata* var. *cannabina* Hook. f. in *Fl. Brit. Ind.* 5 : 465. 1867.

A climbing shrub or a herb, 60-90 cm high ; more or less hispid with stinging hairs ; stems stout, slender, terete, woody. Leaves 5-8 cm long, palmately 3-partiate ; the lobes hispid grey, toothed or pinnatifid. Flowers yellow and green frequent ; usually leaf-opposed sub-spicate racemes which are up to 5 cm long, hairy and sometimes terminal or on short, axillary branches ; male flowers in the upper part, many ; females few in the lower part of racemes, capsules 8-10 mm in diam., 3-lobed, hirsute. Seeds 4 mm in diam., globose, smooth.

Local name : Moti - Khajavani ni vel.

Flowers : August to March.

Occurrence : Gondal Road, Rajkot ; Rajkot river bed, found on *Euphorbia* clumps, rare ; Motwa matli, Ranjit Sagar and Jamnagar Jail, Jamnagar.

Uses : The roots are useful in guinea-worms, skin diseases. The leaves with water rubbed over the head are said to be useful to prevent baldness.

MORACEAE

Anthers in bud reversed ; stamens inflexed ; ovules pendulous, anatropous shrubs or trees

Morus

Anthers in bud erect :

Flowers on the inner wall of a closed receptacle

Ficus

Flowers all exposed

Artocarpus

ARTOCARPUS Forst. (nom. cons.)

Artocarpus heterophyllus Lamk. Encycl. 3 : 210. 1789 ; Jarrett in Journ. Arn. Arb. 40 : 334. 1959 ; Santapau in JBNHS 57 : 447. t. 1. 1960 and in Bull. Bot. Surv. Ind. 3 : 12. 1961 ; Santapau & Jan. 46. 1967. *A. integer* auct. non Merrill 1917 ; Santapau in RBSI 16(1) : 232. 1960. (*integra*). *A. integrifolia* auct. non Linn. f. 1781 ; FBI 5 : 541. Cooke 3 : 158.

An evergreen tree, 6-8 m high, bark brown, warted. Leaves coriaceous, obovate, 16 × 8 cm, short petioled ; stipules 2, imbricate, deciduous. Male inflorescence is 4-8 cm long, spike subglobose to elongate ; peduncle with an annular bract at the apex. Male florets 2-3 mm long, borne on the surface of the fleshy receptacle ; perianth somewhat green, tubular, broader above, anther globose, exerted, filament white. Female spikes like the male elongate, fleshy, green granulate with protruding styles. Florets linear, 1 cm long, perianth fleshy, closely enclosing the pistil, ovary sessile ; style long, somewhat white, slightly exerted. Fruit globose to elongate, 30-60 cm long, green spiny. Seeds obovoid, 2.5-3 cm long, attached to the margin below the middle.

Local name : Fanas.

Flowers : January to February.

Occurrence : Junagadh, in the gardens ; Veraval ; Chorvad in the gardens cultivated.

Uses : Cultivated in the gardens for its edible fruits, it is used as a vegetable or made into pickles. The wood is suitable for brush backs, inlay work and turnery. It is also a favourite wood for musical instruments. (WI)

Note : The identity of the common Phanas was a problem for our Indian floras, this tree has often been listed in our popular floras under the names of *A. integrifolia* or *A. integra*. Dr. Miss F.M. Jarrett who has monographed the genus *Artocarpus* l.c., has now established the identity. Our plant is not *A. integra* Merr ; nor *A. communis* Forst., but is actually *A. heterophyllus* Lamk.

FICUS Linn.

Unisexual or a sexual ; male flowers without any rudimentary pistil; male, gall and female flowers in the same receptacle :

Leaves coriaceous or subcoriaceous, petioles short or moderately long, stout, never jointed to the blade :

Leaves more or less tomentose

benghalensis

Leaves glabrous

microcarpa

Leaves subcoriaceous or membranous on long slender petioles which are sometimes jointed to the blade :

Apices of leaves more or less caudate-acuminate :

Bases of leaves not narrowed to the petiole, rounded or truncate, 5-7-nerved ; receptacle depressed at the apex

religiosa

Bases of leaves cordate ; apex shortly caudate-acuminate

arnottiana

Apices of leaves not caudate-acuminate :

Primary nerves of leaves indistinct ; male perianth of 3 sepals

amplicarpa

Primary nerves of leaves distinct, male perianth of 4 or 5 sepals

virens

Unisexual ; male and gall flowers in one set of receptacles ; fertile female flowers in another :

Male flowers with 2 stamens

racemosa

Male flowers with 3-stamens

carica

Ficus amplissima Smith in Rees, Cycl. 14, No. 1. 1810 ; Corner in Gard. Bull. 21 : 11. 1965 ; Santapau & Jan. 46. 1967. *Ficus tsiela* Roxb. Fl. Ind. 3 : 549. 1832 ; FBI 5 : 515 ; Cooke 3 : 150 ; Indrajī 646. 1910 ; Santapau, Pl. Saur. 771. 1953.

A large, glabrous tree ; serial roots 0. Leaves alternate, ovate, apiculate acuminate, coriaceous, 8-16 × 4.5-7.5 cm, upper surface dotted with minute raised spots ; base narrowed, 3 nerved ; petiole 2-6 cm long, with a gland at the apex on the underside. Hypanthodia globose, 1.2 cm across, sessile, axillary, pubescent, androgynous ; basal bracts 3, broadly ovate. Perianth of 3, ovate tepals. Staminate florets sessile, monandrous, filament clavate, larger than the anther. Pistillate florets ; stigma cylindrical. Achenes ovoid reniform.

Local name : Pipar, Pipali.

Flowers : November - January.

Occurrence : Balachari, H. H. Bunglow. Roadside all over Saurashtra.

Uses : Is used to make pickles ; strong fibres are obtained from the bark and is used for making ropes. Wood is very hard and is used by the farmers to make tools. (Indrajī 647. 1910)

Ficus arnottiana Miq. in Ann. Mus. Lugd. Bot. 3 : 287. 1867 ; FBI 5 : 513 ; Cooke 3 : 149 ; Indrajī 646. 1910 ; Santapau, Pl. Saur. 764. 1953 ; Santapau & Jan. 46. 1967. *Urostigma arnottiana* Miq. London J. Bot. 6 : 564. 1847.

A small tree or shrub. Leaves subcoriaceous, 7.5-20 × 5-15 cm, broadly ovate, narrowed upwards, margins entire, base cordate, 7 nerved ; lateral main nerves 5-7 pairs ; petioles 5-15 cm long ; stipules ovate lanceolate, 1.2-2.5 cm long, caducous. Receptacles mostly from the axils of fallen leaves, sessile or shortly pedunculate, depressed globose, smooth, basal bracts 3, brown, membranous. Male flowers few, near the mouth of the receptacles, sessile. Sepals 3, loose, inflated, broadly

acuminate, larger than the small sessile, solitary anther. Gail and fertile flowers undistinguishable except by the contents of the ovary, sessile or pedicellate, the perianth gamophyllous, lax, toothed at the apex, completely investing the ovary. Style elongate, stigma flat.

Local name : Ashtaparas, Pipali.

Flowers : November to January.

Occurrence : Laloi Ghodajhar.

Uses : The leaves and bark are used in skin diseases. (Kirti. & Basu 3 : 2331)

Ficus benghalensis Linn. Sp. Pl. 1059. 1753 ; King in ARBGC 1 : 18. 19. 1887 ; Corner in Gardn. Bull. 17 : 381. 1960 ; FBI 5 : 499 ; Cooke 3 : 145 ; Indraj 641. 1910 ; Santapau, Pl. Saur. 765. 1953 ; Santapau & Jan. 46. 1967.

An evergreen tree with abundant, white latex. Leaves ovate, obtuse, about 15 × 10 cm, pubescent (densely so beneath), nerves distinct ; petiole subterete, pubescent, 5 cm long, stipules 2, free lateral, ovate acuminate, 2 cm long, pubescent, imbricate. Receptacles depressed globose, pubescent, 2 cm across, sessile, androgynous, in axillary pairs, ripening red to pomegranate purple ; basal bracts 3, imbricating 3 × 8 mm Staminate florets stipitate, 3-4 mm long ; perianth 1 mm long, 2-3 lobed ; filaments 1 mm long ; anthers dorsifixed, slits medium. Pistillate florets sessile ; the perianth of 3 or 4 tepals, 1.5 mm long. Achenes globose, 1-1.5 mm across.

Local name : Vad, Vadalo.

Flowers : November January.

Occurrence : Junagadh, foot of Girnar and Barda Hill S. of Ghumli ; very common tree found everywhere in Saurashtra.

Uses : The milky juice is externally applied for pains and bruises and as an anodyne in rheumatism and lumbago. It is also used as a remedy for toothache, The leaves are heated and applied as poultice to abscesses. The bark is astringent and is used in dysentery, diarrhoea and diabètes. An infusion of the young buds is useful in diarrhoea and dysentery. The seeds are considered cooling and tonic. The young tips of hanging roots are given for obstinate vomiting. (W1)

Ficus carica Linn. Sp. Pl. 1059. 1753 ; Cooke 3 : 155 ; Santapau, Pl. Saur. 766. 1953 ; Santapau & Jan. 46. 1967.

A middle sized, deciduous tree. Leaves cordate, dentate, or more or less deeply lobed, 3-5 nerved. Male hypanthodia elongate, staminate florets mixed with gail florets, stamens usually 3.

Local name : Anjir.

Flowers : November - January.

Occurrence : It was under cultivation in some parts of Saurashtra ; Okha, cultivated in gardens.

Uses : Fig latex is used as an anthelmintic. It is toxic when administered parenterally to animals but has no toxic effect when administered orally. The fig is emollient, demulcent, laxative, nutritive. The fresh and dried fruits are used in constipation. (Kirti. & Basu 3 : 2329)

Ficus microcarpa Linn. f. Suppl. 442. 1781 ; Corner in Gard. Bull. 17 : 397. 1960 ; Santapau & Jan. 46. 1967. *Ficus retusa* auct. non. Linn. FBI 5 : 511 ; Cooke 3 : 146 ; Santapau in RBSI 16(1) : 228. 1960.

A large, evergreen tree ; aerial roots few. Leaves alternate, 'mostly elliptic - orbicular, 6-12.5 × 4.5-8.5 cm ; obtuse often apiculate ; petiole 1.5-2 cm long. Hypanthodia sessile, globose, 8 mm across, retuse, narrowed below, in pairs, axillary, white-purplish to creamy, androgynous ; basal bracts 3, deltoid, 2 × 4 mm. Perianth 1.2 mm long, 2 or 3 sect. Staminate florets monandrous, anther 0.6 mm long, filament shorter than the anther. Ovary obovoid, 1.1 mm long ; style 1 mm long, lateral.

Local name : Nandruk vad.

Flowers : November - January.

Occurrence : Recorded on the authority of H. Santapau (Checklist 46. 1967).

Uses : All parts are pungent, bitter ; tonic, aphrodisiac, useful in burning sensation, leucoderma, ulcers, leprosy, itching, biliousness, diseases of the blood. The bark of the root itself, and the leaves boiled in oil form good application for wounds and bruises. In rheumatic headache, the leaves and bark pounded are applied as a poultice. (Kirti. & Basu 3 : 2315)

Ficus racemosa Linn. Sp. Pl. 1060. 1753 ; Corner in Dansk. Bot. Arkiv. 23 : 28. 1963 ; Santapau & Jan. 46. 1967. *Ficus glomerata* Roxb. Pl. Cor. 2 : 13, t. 123. 1798 ; FBI 5 : 535 ; Cooke 3 : 154. Indrajai 647. 1910 ; Santapau, Pl. Saur. 767. 1953 ; Santapau in RBSI 16(1) : 230. 1960.

A large tree, 9 - 11 m high, with smooth, grey bark, aerial roots 0 or few. Leaves ovate elliptic to oblong elliptic, entire, glabrous, 1.3 × 5.5 cm; stipules 2, imbricate, pubescent, linear deltoid, deciduous. Hypanthodia globose to pyriform, pubescent, 2.5 - 4 cm across, peduncled, androgynous solitary or binate, borne on the short, leafless scally branchlets, from the trunk or larger branches; basal bracts 3, borne at the apex of the peduncle. Staminate florets sessile, few, diandrous, 3 mm long, situated near the mouth of the receptacles. Call florets long stalked. Pistillate florets numerous, subsessile, smaller than the staminate florets. Synconus orange red to red, fleshy.

Local name : Umbaro.

Flowers : November to January.

Occurrence : Recorded from Adityana village near Barda mountains, on road side and near water very common.

Uses : All parts are cooling, sweet, acrid, vulnerary, anti-dysenteric; useful in cough, biliousness, diseases of the vagina. The root is useful in hydrophobia. The bark is cooling, acrid, galactagogue; good for the gravid uterus. The unripe fruit is acid, astringent to bowels; tonic, styptic; allays thirst, useful in coughs, biliousness, leucorrhoea, and blood diseases. (Kirit. & Basu 3 : 2327)

Ficus religiosa Linn. Sp. Pl. 1059. 1753; FBI 5 : 513; Cooke 3 : 149; Indrajit 644. 1910; Santapan, Pl. Saur. 769. 1953; Santapau & Jan. 46. 1967?

A tall tree, 10-15 m high, often epiphytic, aerial roots rare. Leaves alternate, cordate or broadly ovate-obcuneate, acuminate to a long beak, glabrous, 8 - 17 × 8 - 14 cm, margins undulate; petioles 9 cm long; stipules 3.7 cm long, intrapetiolar. Hypanthodia globose to turbinate, 1 cm across androgynous sessile in axillary pairs, the apex truncate or subacute, with few brown spots; basal bracts 3, unequal, up to 5 mm long; slightly imbricate. Florets few, obracteolate, gall florets many. Tepale 2 or 3, valvate, 0.8 mm long, staminate florets monandrous. Ovary sessile, 0.6 mm long; style 1 mm long. Synconus somewhat dry.

Local name : Pipalo.

Flowers : November to January.

Occurrence : On Barda Hills. It was found near lake and streams. Very common tree in Saurashtra.

Uses : The bark contains 4% tannin and is astringent. An infusion of it is used for ulcers and skin diseases. An aqueous extract of the bark shows anti bacterial activity. Leaves and tender shoots are used as purgative and in skin diseases. The fruit is laxative and the seeds are considered to be cooling, alterative and laxative. (WI)

Ficus virens Ait. Hort. Kew. 3 : 451. 1789 ; Corner in Gard. Bull. 17 : 376. 1960 ; Santapau & Jan. 46. 1967. *Ficus infectoria* Roxb. Fl. Ind. 3 : 551. 1832 ; FBI 5 : 515 ; Cooke 3 : 151.

A large tree. Leaves ovate to ovate-oblong, thin, glabrous, abruptly acuminate, 9 15 × 5 6.5 cm, margins, subundulate ; base usually rounded to cordate, often narrowed, 3 nerved ; petiole 3 6 cm long, glandular at the apex on the underside, stipules ovate, acute, pubescent 1.2 cm long. Hypanthodia globose, 6 mm across, sessile, in axillary pairs, androgynous ; basal bracts 3, ovate rotund. Perianth of 4 or 5 tepals. Staminate florets sessile, monandrous ; anther broadly ovate, filament short.

Local name : Pepri.

Flowers : November to January.

Occurrence : Recorded on the authority of H. Santapau.

Uses : The bark yields a fibre. Young shoots are eaten in curries ; the fruits are edible. A decoction of the bark is used as a gargle and as a wash for ulcers. (WI)

MORUS Linn.

Morus alba Linn. Sp. Pl. 986. 1753 ; FBI 5 : 492 ; Cooke 3 : 159 ; Santapau, Pl. Saur. 775. 1953 ; Santapau & Jan. 46. 1967. *Morus indica* Linn. Sp. Pl. 986. 1753 ; FBI 5 : 492 ; Cooke 3 : 159.

A middle sized, deciduous tree ; young shoots, petioles, and underside of leaves slightly pubescent. Leaves ovate, dentate serrate, frequently lobed, base often cordate, blade 5 7.5 cm long ; petiole 1 2.5 cm. long ; basal nerves 3 5 ; stipules linear triangular, free lateral, deciduous. Inflorescence of axillary, cylindrical, short catkins, the sexes often on separate branches, rarely deciduous, green ; peduncle shorter than the spike. Flowers ebracteolate, often bisexual flowers are seen. Tepals 4, imbricate in bud. Staminate flowers ; tepals ovate, concave, green, 2 mm long ; stamens 4, inflexed in bud ; filaments 4 mm long, anthers globose, yellow, pistillode green. Pistillate flowers ; tepals unequal, opposite, decussate, green, accrescent and succulent in fruits, pistil sessile, ovary

ovoid ; styles 2, basally connate. Fruit a sorosis of nuts, juicy, oblong, up to 4 cm long, ripening red or black, sweet.

Local name : Shetur.

Flowers : February March.

Occurrence : Junagadh, Motibugh, Chorvad, Veraval, in the gardens.

Uses : Nulberry leaves are considered diaphoretic and considered diaphoretic and emollient. A decoction of leaves is used as a gargle in inflammations of the throat. The fruit is cooling and laxative, it is used for sore throat, dyspepsia and melancholia. The root is reported to possess anthelmintic and astringent properties. The bark is used as a purgative and vermifuge. (WI)

URTICACEAE

Leaves and stems with stinging hairs :

Ovary oblique, annual herb

Laportea

Ovary straight ; a perennial herb

Girardinia

Leaves and stems without stinging hairs

Pouzolzia

GIRARDINIA Gaudich.

Girardinia zeylanica Decne. in Jacq. Voy. 152. 1844 ; Cooke 3 : 132 ; Santapau, Pl. Saur. 773. 1953 ; Santapau & Jan. 46. 1967. *C. heterophylla* var. *zeylanica* Hook. in Fl. Brit. Ind. 5 : 551. 1888.

An erect, robust, perennial herb; 0.5 - 1.5 m tall, closely armed with slender stinging hairs. Leaves 5 - 15 cm long and often as broad as long, 3 - 7 lobed, acuminate at apex, truncate or cordate at base, 3 ribbed, coarsely serrate along the margins, appressedly hairy with slender stinging hairs on ribs and nerves ; petioles about as long as or slightly longer than leaves ; stipules 8 - 15 mm long, broadly cordate, bifid. Flowers monoecious, in pedunculate racemose cymes which are more than 2 cm in diam. ; the males in simple spikes in the lower axils, the female usually aggregated in heads in the upper axils. Filaments long, persistent. Achenes 3 - 4 mm long, obliquely ovate, much compressed with deflexed persistent styles.

Local name : Vinchhudo.

Flowers : October to December.

Occurrence : Common in Saurashtra, Junagadh, Girnar, Sardar baugh.

Uses : The bark yield a very strong fibre, the extraction is however difficult because of the stinging hairs. The leaves are said to be used in headache and swollen joints. (WI)

LAPORTEA Gaudich. (nom cons.)

Laportea interrupta (Linn.) Chew, Gard. Bull. Straits Settlement. 21 : 200. 1965 ; Saldanha, Fl. Hassan Distrs. 89. 1976. *Urtica interrupta* Linn. Sp. Pl. 985. 1753. *Fleurya interrupta* (Linn.) Gaud. in Freyc. Voy. Bot. 497, t. 8. 1826, FBI 5 : 548 ; Cooke 3 : 131 ; Santapau, Pl. Sau r. 772. 1953 ; Santapau & Jan. 46. 1967.

Monoecious annual herbs, 30-90 cm. high ; stems erect or diffuse, branched, grooved, clothed with watery juice and stinging hairs ; stems and branches often deep purple, deeply striate, densely hairy and flexuous in younger parts. Leaves 2.5-12.2 × 1.5-7 cm, broadly ovate or ovate lanceolate, acute or acuminate at apex, rounded, truncate or shortly cuneate at base, serrate along the margins, 3-nerved from base, hispid on both sides ; petioles 3.2-9.5 cm long, hairy, often purple, slender, terete ; stipules 2-fid, about 1 mm in diam. Flowers small, greenish yellow, in cymose clusters, distantly arranged on the flowering axis, upto 1.2 cm in diam., 8-30 cm long, purple, rigid ; male flowers few, soon falling. Perianth of female cupular, stipulate, keeled on one side. Achenes small, about 2 mm long, oblique, membranous, exserted, yellowish-brown, glabrous, ovoid, acute, compressed, with thickened keeled margins.

Local name : Dhadri.

Flowers : July to October.

Occurrence : Junagadh, Forest Road, Girnar.

POUZOLZIA Gaudich.

Pouzolzia zeylanica (Linn.) Bonn. Pl. Jav. Rar. 67. 1838 ; Gir 334 ; Santapau & Jan. 46. 1967. *Parietaria zeylanica* Linn. Sp. Pl. 1052. 1953.

Parietaria indica Linn. Mant. 1 : 128. 1767. *Pouzolzia indica* Gaud. Bot. Freyc. Voy. 503. 1826 ; FBI 5 : 581 ; Cooke 3 : 137.

Erect annual herbs, 10–50 cm high ; stems simple or branched, slender, deeply striate, somewhat angular, appressedly hairy ; branches at times diffuse or ascending, especially near the base. Leaves 0.9–3.8 × 0.5–1.6 cm ovate or ovate lanceolate, acute or subacuminate at apex, occasionally obtuse, rounded or attenuated at base, entire along the margins ; appressedly hairy, mostly crowded at the ends of branches ; petioles 8–17 mm long hairy ; stipules ovate, acuminate. Flowers greenish white, minute, in axillary androgynous clusters, strigose with simple or hooked hairs ; male flowers shortly pedicellate ; females sessile. Sepals of male convex, oblong, acuminate, stigmas about 4 mm long, feathery. Achenes small, about 2 × 1 mm, acute reddish black or black, convex on both sides, enclosed in the perianth. Seeds brownish, smooth and shining, with rounded cotyledons.

Flowers : July to October.

Occurrence : Sasan Gir to Junvania, it was found in shady spot near water. Rare.

Uses : The roots are edible. Leaves are occasionally eaten as a vegetable ; it is believed that the use of this vegetable lead to the expulsion of worms. The leaves are also used as a vulnerary and as a cicatrizant for gangrenous ulcers. Juice of the leaves or their decoction is given as a galactagogue. A poultice of the herb is applied to sores and boils, and to relieve stomachache. (WI)

ULMACEAE

Fruit dry, winged, leaves deciduous

Holoptelea

Fruit a drupe, leaves persistent

Trema

HOLOPTELEA Planch.

Holoptelea integrifolia (Roxb.) Planch. in Ann. Sci. Nat. (Ser. 3) 10 : 269. 1848 ; FBI 5 : 481. Cooke 3 : 127 ; Indrajit 640. 1910 ; Santapau, Pl. Saur. 774. 1953 ; Gir 333 ; Santapau & Ján. 46. 1967. *Ulmus integrifolia* Roxb. Pl. Cor. 1 : 56, t. 78. 1795.

A deciduous tree, 7-11 m high; base grey, smooth, thick, corky pusteoles; branches spreading, younger ones grouping and minutely pubescent. Leaves 6-4 × 2.7-7 cm elliptic, ovate-elliptic or obovate-oblong, acuminate at apex, rounded or subcordate at base, entire along the margins, at times minutely serrate or oblique near the base, glabrous or nearly so; Petioles 0.5-1.1 cm long, minutely pubescent; stipules linear, scarcely having a scar. Flowers small greenish yellow, male and hermaphrodite mixed in axillary or terminal racemes or fascicles on leafless branches. Sepals 4, reddish, white tomentose. Stamens 9; anthers hairy; filaments glabrous. Samaras 1.8-3.6 × 1.6-3.2 cm orbicular, thin, flat, yellowish. Seed 1, 6-12 × 4-8 mm flat ovate or obovate oblong, smooth, shining.

Local name : Kunazo, Vavali, Charal.

Flowers : May to December.

Occurrence : Sasan Iran river up stream and Bifeshwar on Barda Hill.

Uses : Wood yields a very good timber. Seeds are eaten and used in ring worm locally; bark yields a very good fibre. The bark is used as fish poison. The juice of the bark is applied in rheumatic swellings. (Indraji 640. 1910).

TREMA Lour.

Trema orientalis (Linn.) Blume, Mus. Bot. 2 : 61. 1856; FBI 5 : 484; Cooke 3 : 128; Indraji 658. 1910; Santapau & Jan. 46. 1967. *Celtis orientalis* Linn. Sp. Pl. 1004. 1753.

A dioecious, ever green tree, 4-7 m high; branches spreading pubescent; bark grey, soft rough, lenticellate, leaves 5.2-14.5 × 2-6 cm, ovate-lanceolate, acuminate at apex, rounded or obliquely cordate at base, crenate-serrate along the margins, hispid above, white tomentose beneath; petioles 5-12 mm long, pubescent, terete ventrally grooved stipules 6-10 mm long, deciduous. Flowers small greenish-white in axillary, pubescent fascicled cymes, sometimes dichotomously branched cymes and longer than petioles; male cymes more compact than females and usually on different trees. Sepals 2-3 mm long, elliptic-lanceolate. Stamens 5, stigmas villous, reflexed in fruits. Drupes 3-7 mm in diam., ovoid or sub-globose smooth, purplish-black when ripe, crowned with reflexed styles. Seeds minute with membranous testa.

Local name : Popti.

Flowers : August to January.

Occurrence : Junagadh, Girnar Hill.

Uses : In old days the timber was used for making gun powder charcoal and as fuel. The plant is used in epilepsy. (Indraji 658. 1910)

CANNABINACEAE

CANNABIS Linn.

Cannabis sativa Linn. Sp. Pl. 1027. 1753 ; FBI 5 : 487 ; Cooke 3 : 160 ; Santapau & Jan. 46. 1967.

Annual, 75 cm 1.5 cm tall, slender ; stem and branches slightly angular with appressed hair (dense on younger shoots). Leaves palmately 3 9 foliolate, petiole 2 10 cm, pubescent hairs white, appressed lobes sessile, narrowly lanceolate, narrowed at base, palmtinerved serrate, acuminate cordate, 2 11 cm long \times 3 15 mm upper surface scabrid with stiff hairs lower surface more or less densely pubescent stipules 4 6 mm long. Male flowers 4 6 mm across, greenish, pedicel 1 1.5 mm long, filiform. Tepals elliptic or oblong finally pubescent 3 4 mm \times 1.5 2 mm entire, acute. Stamens 4 - 4 mm flowers as large as the perigonium bracts, foliaceous 4 13 mm long, covered with small glandular hairs, bracteoles linear, 1.5 2.5 mm long. Ovary sessile, sub globose, 0.5 mm long, styles 2 3 mm long, brown, caducous pubescent. Achene 3 4 mm, in diam. ; shining, yellowish brown, minutely pilose to glabrous, ovate ; seed only with fleshy unilateral endosperm.

Local name : Ganjo, Bhang, Charas.

Flowers : October onwards.

Occurrence : Kankai in Gir forest.

Uses : Well-known narcotic. Surreptiously cultivated for Ganja, which is used for smoking, charas, hashish and bhang. All those are intoxicating in different degrees.

CASUARINACEAE

CASUARINA. Forst.

Casuarina equisetifolia Forst. Char. Gen. 104, t. 52. 1776 ; FBI 5 : 598 ; Cooke 3 : 161 ; Indraji 649. 1910 ; Santapau, Pl. Saur. 776. 1953 ; Santapau & Jan. 46. 1967.

A fast growing erect tall tree. Bark brown rough, fibrous, peeling in vertical stripes ; wood yellowish pink to reddish brown, very hard. Scales in whorls of 6-8, usually 7 ; teeth acute or setaceous ; internodes rarely exceeding 0.6 cm, rather prominently ribbed. Valves of the cone pubescent outside.

Local name : Saru.

Flowers : August - November.

Occurrence : Gondal, usually found on coastal area, recorded from Chorvad sea-shore ; Veraval ; Mangrol.

Uses : Wood is used for house posts, rafters, electric poles, mine props and masts of country craft. The bark is astringent and is useful in diarrhoea and dysentery. A lotion of it is reported to be efficacious in beri beri. A decoction of the leaves is used in colic and powdered seeds are applied as plaster in headache. (WI)