

Flora of Mizoram

Volume - I

BOTANICAL SURVEY OF INDIA
Ministry of Environment and Forest

FLORA OF MIZORAM

VOLUME I

Ranunculaceae-Asteraceae

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BOTANICAL SURVEY OF INDIA

BOTANICAL SURVEY OF INDIA

Ministry of Environment and Forests

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Date of Publication : March 12, 2002

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Price :

Photo credit : Dr. K.P. Singh and Dr. D.K. Singh

Cover Photo: *Mussaenda roxburghii* Hook. f.

Published by the Director, Botanical Survey of India, P-8, Brabourne Road, Kolkata-700 001 and printed at Shiva Offset Press, 14, Old Connaught Place, Dehra Dun 248 001.



CHIEF MINISTER
MIZORAM

AIZAWL-796001

MESSAGE

The forests have been playing an important role in the socio-economic development of the people of the North-eastern region in general and Mizoram in particular. In fact, in Mizoram our lives are inseparable from the forests, as the people still depend largely on the forest resources for their various daily needs. The lush evergreen forests in Mizoram are bestowed with enormous plant wealth which is important not only for the economic well being of the people in the state, but also for the environmental security in the region. However, a sound scientific knowledge about proper identity of the plants, their habitat, distribution and utility for the local communities is essential in order to ensure the availability of these resources on long term basis to meet the needs and aspirations of present as well as future generations. I am glad to know that Botanical Survey of India, the premier research organisation mandated for survey and documentation of plant diversity of the country, through its Eastern Circle at Shillong, has done a commendable job in carrying out this onerous task in a professional manner.

The Flora of Mizoram, Vol. I, is first of the series, documenting various facets of the floristic diversity in the state. I am sure, the information contained in the book will be of immense use for various stakeholders of biodiversity in the state the people, the scientists and the managers alike.

The editors and contributors deserve all praise for bringing out this exhaustive volume at a time when the environmental issues have become a major concern for the people and the Governments across the world.

(ZORAMTHANGA)

Dated Aizawl,
14th June, 2001

PREFACE

The last decade has witnessed the emergence of great awareness about the desirability of sustainable use of biodiversity and its conservation. But this is possible only through the availability of proper information on the identity of the elements of biodiversity, places of occurrence, distribution, habitat, ecology and utility for the local communities. In this context the importance of floristic studies need not be overemphasised. The Botanical Survey of India, whose one of the primary objectives is to document the plant resources of the country in the form of National, Regional, State and District floras, is actively engaged in this task since its reorganisation in 1954. The *Flora of Mizoram* is another important milestone in this direction at a time when the entire world is celebrating "International Mountain Year"

Mizoram, one of the seven sister states of the North-eastern India, lies in the southern most part of the region. The varied physiographic and eco-climatic conditions, met within the state, have adequately expressed itself by supporting a rich vegetation both in luxuriance and diversity. Located between Cachar district of Assam, Kuki hills of Manipur, Chin and Arakan hills of Myanmar and Chittagong hills of Bangladesh, the state displays a close floristic affinity with not only these regions but with other neighbouring and distant part of the world as well. Though the state has been botanically explored since 1899, no comprehensive floristic account on its plant resources is available till date. Besides, the changing concepts in the taxonomy of various families and genera over the last century have made most of the informations available in the Check-lists published by C.E.C. Fischer (1938) and Deb and Dutta (1987) obsolete.

To bridge the gap in our knowledge about its floristic diversity in the light of recent taxonomic studies, to update the existing information in conformity with the International Code of Botanical Nomenclature currently in vogue and as one of the basic mandate of the department, the present study was taken up in late nineteen hundred and eighties. It is largely based on the intensive and extensive collections made by two of the contributors (KPS & DKS) between 1988-1995, as well as those made by other scientists of the department and Dr. M. Sawmliana of the State Forest Department, Mizoram, and housed in the herbarium of Eastern Circle, BSI, Shillong (ASSAM). The

historical collections made by A.T. Gage, J.E. Leslie, Father Godfrey, Mrs. N. Parry, Rev. W.G.L. Wenger, Rev. R.A. Lorrain, Lorrain Foxall, etc., housed in the Central National Herbarium, BSI, Howrah (CAL), and all relevant literature dealing with the plant resources of the state, were also consulted.

The *Flora of Mizoram* is proposed to be published in three volumes. The present volume, dealing with general chapters, like introduction, physiography, climate, geology and soil, forests and forest types, botanical studies, forestry, economic plants, floristic diversity, references, key to the families, etc. includes taxonomic account of 884 taxa belonging to 403 genera and 90 families from Ranunculaceae to Asteraceae. Of these 172 species and one variety have been recorded for the first time from the state. As southern and South-western part of the state still remain to be thoroughly explored, many more species are expected to be added in future.

It is hoped that the Flora will be useful to the forest managers, botanists, researchers and all those concerned with the study, conservation and sustainable utilisation of the plant resources in the state of Mizoram.

The contributors express their grateful thanks to the Principle Chief Conservator of Forests, Government of Mizoram and his staff for the facilities rendered during the exploration work. We also express our deep sense of gratitude and thanks to Dr. M. Sanjappa, Director and Dr. N.P. Singh, Dr. P.K. Hajra, Dr. B.D. Sharma and Dr. M.P. Nayar, ex-Directors, Botanical Survey of India for their constant encouragement during the course of the present work. Thanks are also due to Shri B.M. Wadhwa, ex-Deputy Director and Dr. V.J. Nair, formerly Scientist-in-charge, Eastern Circle, BSI, Shillong for the facilities and keen interest evinced by them. We also sincerely thank Dr.U.K. Mishra, Senior Geologist, Geological Survey of India, Shillong for providing useful information on the geology of the state, and Dr. T.M. Hynniewta, Deputy Director, Dr. G.P. Sinha, Scientist, Eastern Circle, BSI, Shillong, Shri B.P. Uniyal, Botanist, Northern Circle, BSI, Dehradun and Dr. J.H. Lalramghinglova, Forest Department, Mizoram for their help in various ways.

The contributors express their thanks to all their present and retired colleagues and staff members of the Eastern Circle, Botanical

Survey of India, Shillong who have sincerely helped and cooperated during the progress and finalisation of this work, and to Shri K. Chandra Sekar, Shri Amit Chauhan and Shri Prashant K. Pusalkar, Junior Research Fellows, Northern Circle, Botanical Survey of India, Dehradun for their help in preparing Indices for the present volume.

We also express our sincere thanks to the staff of the Publication Unit, Botanical Survey of India, Kolkata, for their help and assistance in arranging the publication of this volume, and to M/s Shiva Offset Press, Dehradun for its quick printing in the present form.

K.P. Singh
D.K. Singh

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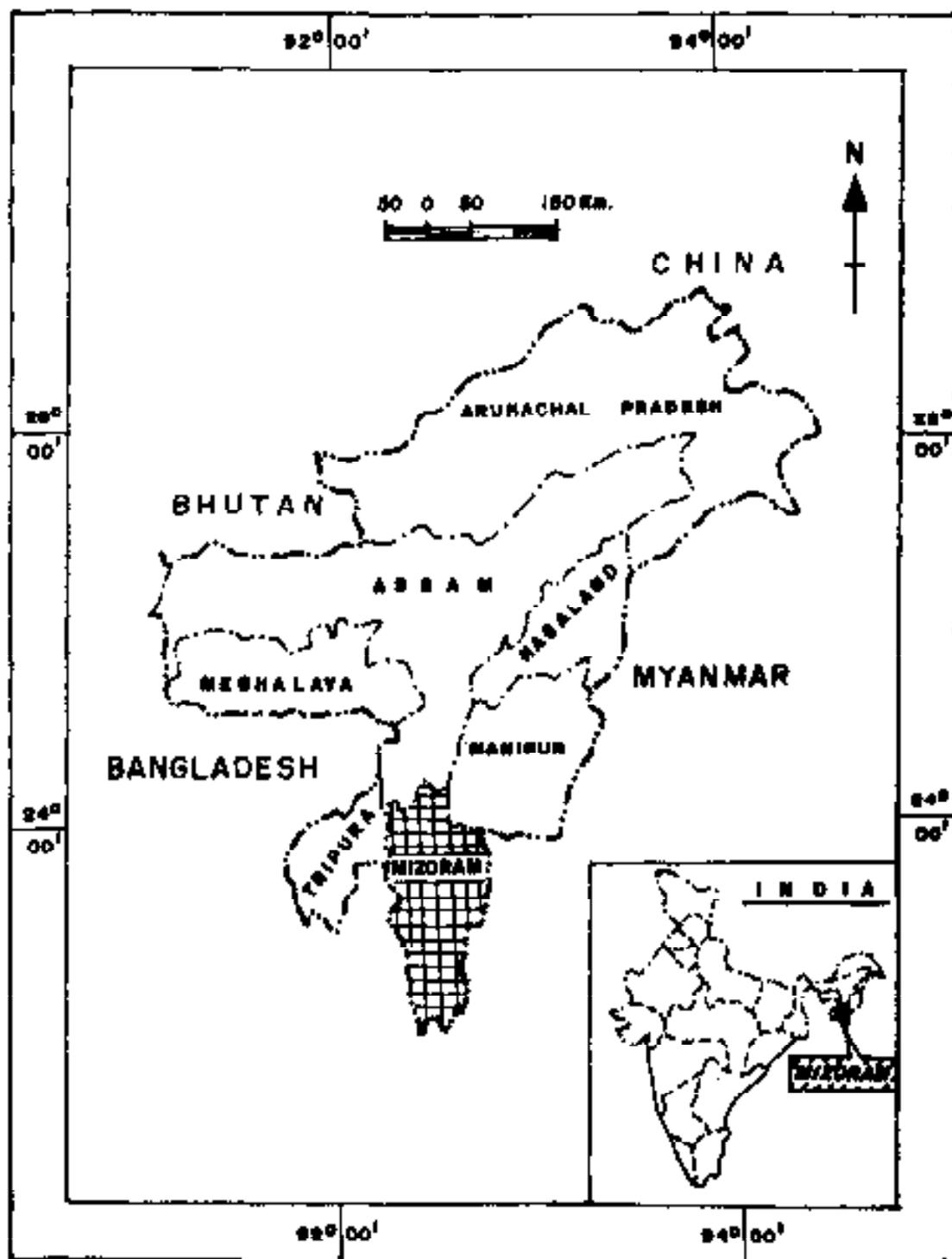
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INTRODUCTION

The present state of Mizoram or Lushai hills, as it was known formerly, forms tongue shaped rugged mountainous region in the extreme southern fringe of North east India. It was called Lushai hills district during the British period and formed part of undivided Assam. It was renamed as Mizo hills district by the act of Indian Parliament in 1954, and continued to remain the part of undivided Assam till 1971. In 1972 (Anon., 1971), the Mizo district was accorded the status of Union Territory named Mizoram and finally attained full fledged statehood on February 20th, 1987 (Anon. 1986).

Geographically, the state is located between $21^{\circ}57' - 24^{\circ}30'$ N latitude and $92^{\circ}15' - 93^{\circ}29'$ E longitude, covering 21,081 sq. km of land area. The length of the state from North to South is about 277 km, while East - West width extends over 121 km. It has a long inter- state boundary with Assam (123 km), Tripura (66 km), and Manipur (95 km). Besides, Mizoram shares international borders on three sides, with Myanmar in the East and South (ca 404 km) and Bangladesh in the West (ca 306 km). It is surrounded in the North by the Cachar district of Assam, in the East by the state of Manipur, in the East-south and South-west by the Chin and Arakan hills of Myanmar and the western side by the state of Tripura and Chittagong hill tracts of Bangladesh.

The tropic of Cancer passes through the middle of the state (just South of the Aizawl town). Initially there were three districts in Mizoram. Aizawl in the North has an area of 12,588 sq. km, while central district Lunglei occupies 4,536 sq. km and southern most district of Chintuipui extends over an area of 3,957 sq. km. Recently for administrative convenience, the Aizawl district has been divided into five districts, viz. Aizawl (with district headquarter at Aizawl), Aizawl North (with district headquarter at Kolasib), Aizawl East (with district headquarter at Champhai), Aizawl West (with district headquarter at Mamit) and Aizawl South (with district headquarter at Sherchip). Lunglei remained undivided, while Chintuipui has again been divided into two districts Chintuipui East (with district headquarter Saiha) and Chintuipui West (with district headquarter Lawngtalai). Thus, today there are total 8 districts in the state. The state has about 681 villages and three autonomous district councils, viz. Lai, Mara and Chakma in Chintuipui district.



Map of North East India showing Mizoram



A view of tropical evergreen forest in West Mizoram



A view of Dampa Wildlife Sanctuary



A degraded landscape



A view of tropical evergreen forest in Dampa Wildlife Sanctuary



Patches of sub tropical forests alternating with Jhum fallows



A view of tropical vegetation near Variengte



A view of bamboo forest near Tamdil



A view of Tung [*Vernicia fordii* (Hemsl.) Airy Shaw] plantation near Tamdil



A view of Tamdil Lake



Coffee (*Coffee arabica* L.) plantation near Kolasib



***Michelia champaca* L.**



***Cleome speciosa* Raf.**



Mahonia pycnophylla (Fedde) Takeda.



Mesua ferrea L.



Saurauia nepaulensis DC.



Abelmoschus manihot (L.) Medikus var. pungens (Roxb.) Hochr.



Bombax ceiba L.



Semecarpus anacardium L. f.



***Cordia dichotoma* Forst.- a common medicinal plant**



***Crotalaria anagyroides* Kunth**



***Derris robusta* (Roxb. ex DC.) Benth.**



***Aganope thyrsoflora* (Benth.) Polhill**



***Butea monosperma* (Lam.) Taub.**



***Erythrina arborescens* Roxb.**



***Bauhinia glauca* (Wallich ex Benth.) Benth.**



***Saraca asoca* (Roxb.) de Wilde**



***Acacia pennata* (L.) Willd.**



***Acacia eburnea* (L.f.) Willd.**



***Mimosa pudica* L.**



Rubus rosifolius Smith



Rubus alceifolius Poir.



***Combretum flagrocarpum* C.B. Clarke**



Passiflora foetida L.



Coffea arabica L.



Alangium chinense (Lour.) Harms



***Mussaenda roxburghii* Hook.f.**



***Spilanthes calva* DC.**



***Tithonia rotundifolia* (Miller) S.F. Blake**



***Vernonia volkammeriaefolia* DC.**

Physiography

Geomorphology

The geographical milieu of Mizoram has been discussed earlier in detail by S. Singh (1994). The state is a mountainous region and consists of seven, long, North-South traversing parallel ranges with intervening valleys. Infact, these are broken into innumerable small hills, locally called "Tlang" with sharp and pointed hill tops. These look like hundreds of pyramids grouped together. The slopes are steep on all sides but much steeper in the West than the East and the average height is about 900 m above the mean sea level.

The terrain is immature and young and subject to continuous denudation in response to recent tectonism and other various exogenic processes. The landform in the state is the result of erosion in which the running water had played a major role from the very beginning (Anon., 1979). The major geomorphic elements observed in the area are both structural and topographic 'high' and 'depressions' 'flats' and 'slopes' sculptured on the topographic surface of Mizoram in a linear fashion. In Mizoram the 'depressions' are in all cases in accordance with the normal first order structural elements, but the topographic 'highs' are recorded both in the structural 'high' and 'depressions'. The physiographic expression of the state is imparted by approximately N-S trending steep, mostly anticlinal, longitudinal (linear fashion), parallel to sub-parallel hill ranges and synclinal narrow valleys with series of parallel hummocks or topographic highs (in an aerial fashion). The ridges are highly dissected with the formation of deep gorges, spurs, keels and kcoks, which developed due to intensive erosion during the isostatic adjustment (Anon., 1974). In general, the western limbs of the anticlines are steeper than the eastern limbs. Faulting in many cases, produced steep faults scarps, especially along the steep dipping fault planes. The difference of elevation between valleys, floors and hill tops greatly varies from West to East, the range being 200 m to 600 m. The steep hill ranges are more towards East to West.

The major drainage pattern having different bifurcation ratios follow the N-S trending depressions and gorges in the low level topography, separated by high land topography in between them. The depressions and gorges, in most cases, are the physiographic expressions of the faults or other structural patterns. The tributaries and streamlets form 'angular'

'sub-parallel' to 'parallel' and 'dendritic' drainage pattern and run both parallel and across the topographic depressions and highs. The slope of the streams are moderate. In some cases the main rivers are restricted within the comparatively soft shale horizons. The main drainage system in the area falls within the piedmont and straight reaches. The water holding capacity of the soil is low because of its clayey nature.

Geology

The general geology of the Mizoram state shows repetitive succession of Neogene (40-20 million years), arenaceous (sandy) and argillaceous (clayey) sediments, subsequently folded into a series of North-South trending, longitudinal plunging, anticlines and synclines. The Mizo hills are part of the folded belt of Tripura -Cachar-Mizoram and adjoining areas which inturn constitute a part of major Assam-Arakan basin. The generalized succession (from older to younger) of lithostratigraphic units in the state is as follows:

Barail Group : Mainly argillaceous, the Barail Group has monotonous sequence of shales within interband of siltstone and localised Micaceous sandstone. Oligocene in age, the rocks have low (3° - 15°) rolling dipsand, which have been folded into a broad anticline with the axis trending approximately East - West.

Surma Group : This group, Mio Pliocene in age, is represented by the Bhuban and the Boka Bill Formations. The Bhuban formations, which are predominantly arenaceous, have been further sub-divided, based on lithology and order of superposition, into three units, viz. the lower, middle and the upper Bhubans. The Boka bill Formation remained undivided.

Lower Bhuban : It is predominantly arenaceous and includes fine to very fine grained, compact, bluish ash, greyish coloured massive to well bedded lethic greywacke sandstones, full of turbidite features. Besides, well laminated siltstone, silty shale/shale (olive green) interlaminations are found to occur within this. The Bhuban is found to occur in the anticlinal cores of the high ranges and in most cases crop out along the faulted contacts.

Middle Bhuban : It shows dominance of shales and mud stone with interbands of sandstone.

Upper Bhuban : This unit overlies the Middle Bhuban conformably and their contact is gradational to transitional to the underlying rocks. It is predominantly arenaceous and comprises mostly hard, compact, massive to well-laminated, bluish grey to grey coloured sandy greywacke with siltstone/shale interlamination. The shales are olive green in colour. At places, silty shales are dominant. Sometimes sandstone bands have calcareous matrix and often contain narrow bands of calcareous pebbly conglomeratic sandstones with lamellibranch fossils. Besides, sandstone bands contain large calcareous boulders of various shapes and sizes. They exhibit typical turbidite structures with much ridge structures and ripple-drift-cross laminations.

Bokabil Formation : The rocks belonging to this formation occur conformably over the Upper Bhuban and their contact with the lower units are transitional. It is represented by soft, grey coloured, friable loosely packed medium to fine grained feldspathic sandy greywacke sandy shale with interlaminated silt/shale alternations. Occasionally, brownish yellow ferruginous sandstones are also present. The rocks of this formation exhibit typical turbidite features, with multiple grading, and ripple-drift-cross laminations etc. At places, rough cross-beddings and large current bedding are also present.

Structure

The major structural trend in the area coincides with the regional tectonic lineaments. The general strike of the bed is N-S to N5° E/ N5° W-S5° W/ S5° E, with dips varying from 40° to 50° either towards West or East. Structurally, the rocks of the state lie on highly compressed asymmetrical anticlinal ridges and narrow valleys, with parallel to sub-parallel sub-vertical axial planes. The axes of the folds show convergence pattern in the directions of plunge, except in few cases where they run parallel. The limbs of the major folds are folded into small anticlines and synclines mostly in chevron style. Mesoscopic folds are observed mainly in the incompetent Middle Bhubans which are bounded by the competent Lower and Upper Bhubans. The overall geometry maintains similarity throughout the state. The intensity of fold movements is greater in the East than in the West.

Primary sedimentary structures recorded in the area are of deep sea flysch type structures, viz. graded bedding, the flute casts, load casts,

ridge structures, chevron marks, parting lineations, groove marks, ripple-drift-cross laminations of several types, flame structures, ripple-trough convolutions and the complete sequence of Bouma's (1962) turbidite structures, etc. The palaeocurrent directions shown by all primary features, reveal a mean southerly transport direction indicating a southerly basinal plunge.

Economic geology

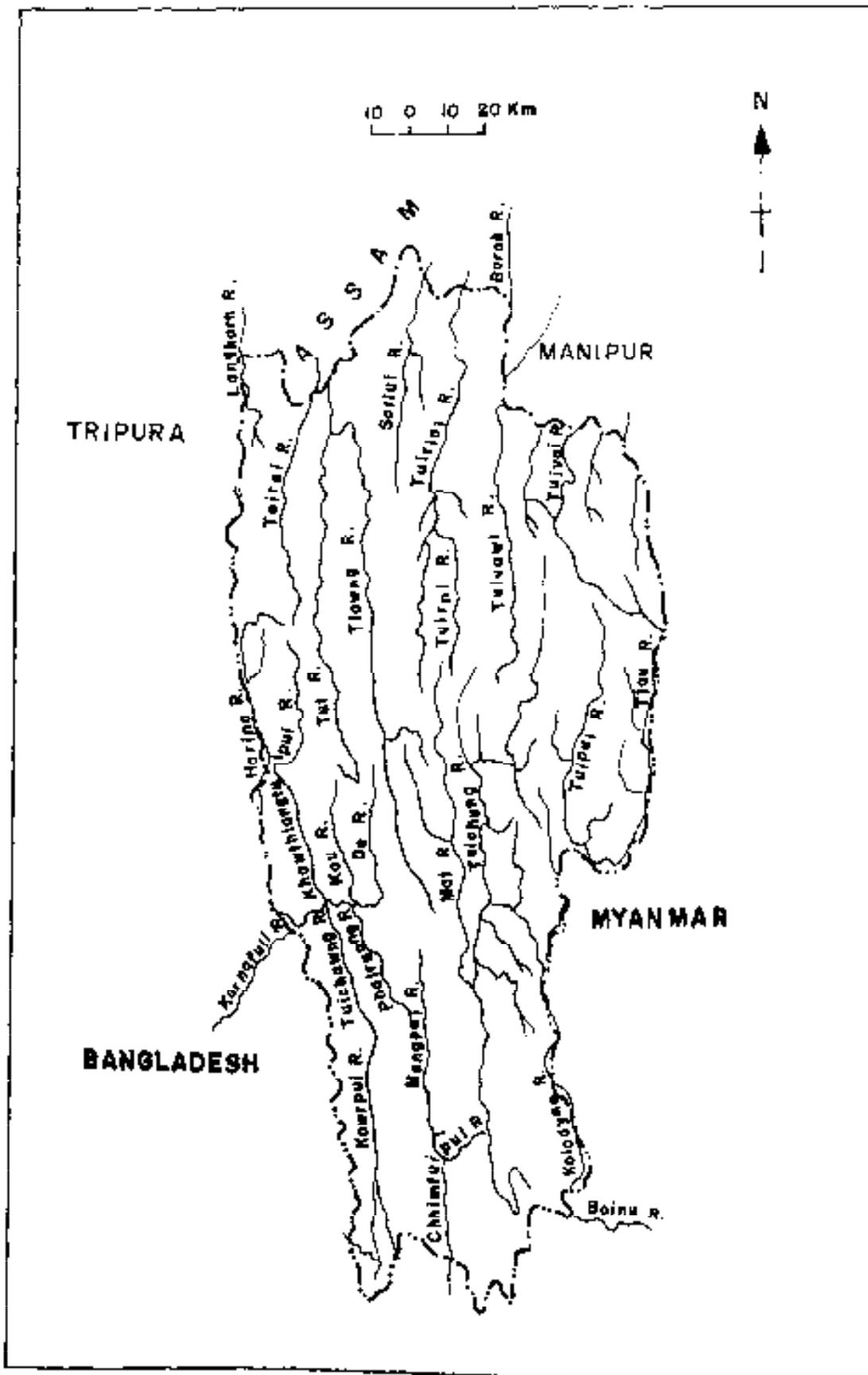
The state lacks in mineral deposits of economic importance. The Bhuban sandstone is being used as road metal and same can be used as building material also. Many surface and subsurface manifestations of natural gas have been recorded in the state during the explorations. This indicate the possibility of storage of petroleum on the anticlines of Variengte ridge and in the vicinity of Chhattachura range.

Drainage

The humid conditions created by the drainage system are important as far as growth of vegetation of an area is concerned. It is observed that most of the vegetation in the Mizoram occurs along the river courses and adjoining areas. The drainage pattern of Mizoram is virtually shaped by its physiography and the geological structures. The drainage follows the synclinal valleys between the parallel ranges. The rivers, tributaries and streamlets run through the depressions and gorges, forming angular dendritic drainage pattern across the topographic depressions and heights. The slopes of the streams are moderate. In some cases the main rivers are restricted in their comparatively soft shale horizons. Most of the rivers either flow northwards or southwards and a watershed is formed in the middle of the state. The water holding capacity of the soil is low because of its clayey nature. The rainfall which is the only source of water supply to the rivers of Mizoram, is well spread throughout the year except November, December and January. However, all the rivers are not perennial.

There are number of rivers in Mizoram. The largest river is Tlawng (Dhaleshwari) which is 185.15 km in length. It is followed by Tiak (159.39 km in length), Chimtuipui or Kolodyne (130.46 km), Khawthlangtuipui or Karnaphuli (128.08 km), Tuichang (120.75 km), Tuirial or Sonai (117.53 km), Tuichawng (107.87 km), Mat (90.16 km), Tuipui or Khawchhak (86.94 km), Tuiyawl (72.45 km), Teirei (70.84 km), Tuirini (59.57 km),

FLORA OF MIZORAM



Drainage Map of Mizoram

Serlui (56.35 km) etc. The important rivers in the northern parts of the state are Tlawng (Dhaleswari), the Tuiral (Sonai) and the Tuivawl. The river Tlawng (Dhaleswari) passes from South to North in the western parts of Mizoram and then it enters into Cachar plain and ultimately joins Barak river. Originating from Zowbawk village (8 km East of Lunglei town) and engulfing the tributaries, viz. Gudur (Tut) and Pakwa (Teirai) in the western flank, and medium Lui and Bhairabi Cherra from the eastern side it flows majestically in North. Tut and Teirai run parallel to Tlawng for about 60 km and then join the Tlawng. Similarly, other North flowing rivers, like Sailut Lui and Langkaih (Longai) and Thingtlang (Singla) are important. The river Longai forms the border between Tripura and Mizoram in the West.

The Tuiral (Sonai) river flowing northward passes through Chaiffil range in the East and Mualkhangtlang, Ungarchhungtlang and Person Chhiptlang in the West.

The river Tuivawl and its tributary Tuival forms an important drainage system in the North-east part of Mizoram. These rivers form the borderline between Mizoram and Manipur and finally join Barak river of Tipaimukh.

In the southern part of Mizoram, the Chintuipui drainage system is important where river Chintuipui (Kolodyne) has four tributaries - the Mat, the Tuichang, the Tyao and the Tuipui. It forms boundary line between India and Myanmar in the South eastern part of Mizoram. It originates from the mountains in Myanmar, flows first westward and then southwards in Mizoram and then reenters the Myanmar.

The Khawtlanguipui (Karnafuli), with its tributaries - the Tuichawng, the Phaireng, the Kuo, the Deh and the Tuiliangpui (Sazailui) form the western drainage system. This river originates from central hills of Mizoram and flows Westwards into Bangladesh at Demagiri and finally joins Bay of Bengal. The drainage system is of rectangular or parallel pattern. The river Tuichang and its tributaries Muthului, Jamilalui and Tlangpuilui joins from the South - west and Dantelui, Rangtalui, Roilui from the East. Similarly, the Tuivawl, the Tuichang and Tuilianpui have parallel courses for quite a length, but run in opposite directions. The Tuichawng and the Phaireng flow Northward and join the Deh. After this the Deh turns to the West and meets the Karnaphuli which flows South-west.

Climate

Mizoram enjoys moderate climate. In the lower altitude at foot hills and the valleys, typical tropical climate is obtained while in the mid region with large expanse, the subtropical moist climate is experienced. A special feature of the climate here is the occurrence of North-westerly thunderstorms, sweeping over the hills in entire state with heavy down-pour during April and May being very common.

Temperature varies from about 11° C in winter to 30° C in summer or spring. Winter or cold season starts from November to February with temperature ranging between 8° C and 20° C. The season is pleasant, dry and refreshing during morning and evening hours usually with no rain or very little rain. Winter is followed by warm or spring season, starting from March and continuing upto May with temperatures ranging between 19° C and 30° C. Occasional rainfall occurs and sky is not clear. The rainy or summer season lasts for a longer period and heavy rainfall comes during June to August which covers 89 per cent of the total annual rainfall. September and October are the autumn months when rains cease and temperature is usually between 19° C and 25° C.

During winter, the remote, high altitude places of Champhai region, like Zote and Ngur in the East, and Bualpui and Phowngpui or Phawngpuitlang (Blue mountain) in the South, experience low temperature, while maximum temperature during summer season is experienced at Kanmun, Lakicherra and Bhairabi in the North-western part of Mizoram, Demagiri and Chawngte in the western side and Tuipang area in the southern region.

The state receives annual rainfall between 2000 - 3600 mm from both North-east and South-west monsoons. The North-western part of the state (Longai, Tut and Dhaleshwari region) gets maximum rainfall of over 3500 mm annually. The southern part of Mizoram, including Lunglei area also gets higher rainfall of over 2500 mm. The high rainfall with moist climate is conducive for the vigorous growth of varied types of vegetation,

Soil

The soils of Mizoram have developed from shale, sandstones and mudstone. The lateritic soil with high percentage of acidity is the common

characteristic of the soil of Mizoram. The pH value varies from 4.1 to 5.8. Due to heavy rainfall the soil is weathered and leached and as a result is poor in potash, phosphorus and organic carbon contents. Being low in humus contents its colour is yellow, reddish and extremely porous and is unsuited for agricultural purposes.

Plains

The plains or low lying areas in the state are rare except in small patches here and there and in between the mountain ranges. These plains are believed to be possibly the silted beds of lakes which existed at the hill tops. The plains have thick layers of rich alluvial soil. The largest of these plains, the Champhai plain, is situated near Myanmar border about 150 km East of Aizawl town. It covers an area of about 11 sq. km and is suitable for wet rice cultivation.

Another such plain area is at North Vanlaiphai which is situated 90 km South-east of Aizawl. The plain is 10 km long and about half to one kilometer wide. It is also suitable for wet rice cultivation. In the Mat river basin near Thenzawl (*ca* 40 km from Sherchip) is another such area which is situated 90 km away from the Aizawl. In the North-west Mizoram, between the rivers Longkhaih and Tlawng, there is a small area below 600 m, near Lokicherra and Bhairabi. Similarly, near Demagiri, the river Karnaphuli and its tributaries form a small low lying area.

Peaks

Mountain peaks in Mizoram usually occur in the eastern and southern side. The ranges in the West are steep and precipitous, whereas those on eastern sides are somewhat gentler. The sides of the hills are covered with forests. The highest peak in Mizoram is Phawngpuitlang (Blue Mountain) which has a height of *ca* 2,157 m and is situated in East Chintuipui district in South-east Mizoram. Some other peaks in Mizoram are Lengtenglang (2,141 m), Surtlang (1,967 m), Lurthlang (1,935 m), Tantlang (1,929 m), Vapartlang (1,860 m), Chalfithlang (1,866 m), Hrantuzzotlang (1,854 m), Zopuitlang (1850 m), Tawitlang (1837 m), Mawmraunglang (1812 m), etc.

Lakes

There are a number of beautiful lakes in the state that provide habitat for growth of aquatic vegetation and tropical and subtropical vegetation surrounding them. Some important lakes are as follows:

Palak lake : This oval shaped lake, 200 m long and 150 m wide with an area of 30 ha, is situated about 130 km South-west of Saiha and 5 km from Pahu village, in the East Chimuipui district. The local people, the Lakhers generally shun the lake area as they believe that the lake is the abode of demons and evil spirits, who are displeased when people enter this area and make them fall sick. The lake is surrounded by tropical evergreen and moist deciduous forests comprising species, like *Dipterocarpus retusus*, *Michelia champaca*, *Schima wallichii*, *Mesua ferrea*, *Chukrasia tabularis*, *Toona ciliata*, *Bischofia javanica*, *Artocarpus chama*, bamboos and canes, etc. The lake is abode of aquatic birds with different species of wild duck.

Tamdil : This lake is situated ca 110 km South-east of Aizawl town and 7 km from Siatul village in Aizawl district. 'Tam' is a shortened form of the Mizo word 'antam' which means mustard plant and 'dil' means lake. Tamdil means lake of mustard plant. People believe that there was a big mustard plant in place where the lake is situated. Whenever this plant was cut, water came out incessantly thereby creating a lake. This is also surrounded by the tropical evergreen and moist deciduous forests.

Rungdil : The lake, having an area of ca 2.5 ha, is situated ca 14 km from Suangpuilawn village in Aizawl district. Rungdil means lake of partridge and was one time the habitat of a large number of a partridges. It is also surrounded by tropical evergreen and deciduous forests.

People and Population

The inhabitants of Mizoram are now known by the generic name of Mizo which means people (Mi) of the hills (Zo). The original stock of the state population was Mongoloid or of Tibeto-Burman origin (Chatterjee, 1951), who migrated to the present location from the southern and western parts of China through upper Myanmar. Over 80 per cent population of the state belongs to Christians. Buddhists, Hindus, Muslims, Sikhs, etc. are also found, but in minority.

One of the well known tribes of the Kuki-Chin group invaded this territory in early 19th century. Historically there has been considerable admixture of different tribes in this area, ultimately leading to three main sub groups - Lushais, Pawis and Lakhers. These apart, there is a substantial representation of non Mizo tribes, such as the Chakma and Riangs in the southern and South-western part of the state.

Mizos or Lusei (wrongly spelt Lushai)

The Mizos included the following tribes - Ralte, Paite, Duliens, Poi, Sakte, Pankhup, Jahao, Fanai (Molienpui), Molbem, Taute, Lakher, Dalang, Mar, Khuangli, Falam (Tashous) Leillul and Tangur. The Lusei sub group consists of ten commoners (Pachuaui, Chhangte, Chawngte, Hauhmar, Chuaunga, Chuahang, Hrahse, Tohhawng, Vanchlawng and Chhakhchhuak) and six chief clans (Zadeng, Pallian, Thangluah, Rivung, Rokhum and Sailo).

Although several languages are spoken in the Mizoram today, but the main language is Lusei. Other languages of the Kuki-Chin groups spoken by different tribes are Zahoo, Lakher, Hmar, Paite, Lai and Ralte. Some of the clans were not yet absorbed by the Luseis. These tribes were the Fanai, the Ralte, the Paite and the Rangte.

Fanai came from Myanmar to Mizoram and established a village near Champhai. They moved further South-west and occupied successively various sites to the West and North-west of Lunglei along the western bank of the Tyao and Kolodyne river between the Baite in the North and the Sangau in the South.

Ralte were found scattered in the Lushai villages to the North of Aizawl, including some close to Aizawl. They had distinct social customs and had noticeable differences in dialects. Among the Duliens or Lushais, the Ralte language is understood and the Sailo chiefs habitually use Ralte language.

Paite belonged to old Kuki group (Paite means goers). In Mizoram, they are confined to an area between two rivers Tiau and Run, in the North - eastern Mizoram. Most of them live in Manipur (Churachandpur) and have preserved their traditional traits. Like Paites, the Rangtes were living mostly in South - western Manipur, adjoining Mizoram.

Pawis and Lakhers

In south Lushai hills one found the Fanais (earlier known as Mohienpui) inhabiting the land between the rivers Tuichawng and the Kolodyne on the West and Tao and the Kolodyne on the East.

Further south the Pawi tribes inhabited the territory on both the Indian and the Myanmar sides. The term Pawi was not strictly speaking the name of a clan but it was the term used by the Lushais for all the people living near Kolodyne. Further South were the people belonging to the Lakher tribe. The Lakhers inhabited South-eastern corner in Chimtuipui district of the state and South of Haka sub division of Chin district of Myanmar. Geographically the tribe was located West of Kolodyne river and South of Blue Mountain. Lakhers belong to the branch of 'Lai' tribes. These tribes along with sub-tribes were known as Shendus. The Lushais used the name Pawi for the Lai tribes. Pawis are settled in Lunglei subdivision. The Lakhers lived in the villages immediately in the South of the Pawi villages. Pawis as well as Lakhers collectively were called Shendus by the tribes in the western hills and the plains. The Lakhers call themselves Mara, but the Lushai call them Lakhers. Lakhers are mostly concentrated in Tuipang block and few villages near Sangau block. The Pawi district council has its headquarter at Lawngtalai, while that of Lakher district councils at Saiha.

Chakmas

Chakmas are a distinct tribe localised in the South-western part of Mizoram, predominantly in Chawgate Block. This tribe belong to eastern group of the Indo-Aryan family whose dialect is Chakma. It is a corrupt form of Bengali language written in corrupt Burmese script.

Among other tribes whose reference has been made earlier are Hmar, Paite, and Riang. Riang are mostly in the North-west part of Mizoram along the Tripura border, while Hmar and the Paite are in the North-east corner of Mizoram.

Thus, different tribes and subtribes came down to the present Mizoram, in successive waves and settled down in different parts of Mizoram. However, the settled life was disturbed by perpetual fear of raid and inter-tribe feuds. The advent of British rule and the missionaries activities implanted a sense of love, value, sacrifice in their minds.

Apart from these, there has been considerable number of non Mizos who came from Assam, Tripura and Bihar states for working as skilled or unskilled labourers and shop keepers. The Mizo society has maintained its ethno-cultural values and is highly disciplined. According to 1991 census, the population of Mizoram was 6,89,756 showing a rise of 39.70 per cent over the previous decade. Literacy in Mizoram is also very high at 87.49 per cent. Female literacy in Mizoram is one of the highest in the country. Agriculture is the main occupation and traditional jhum cultivation is practiced by a large number of people. About two third of the population depend on jhumming for their livelihood. Major wood based industries are lacking and poultry and piggery are reared on homesteads.

The present land use pattern in the state, as presented by the Savant and Patnaik (1998), is as follows:

Table 1: Land use pattern in Mizoram

Type	Area in sq. km.
1. State owned forests	9410
2. District council forests	297
3. Agricultural land	580
4. Water bodies	16
5. Area under sericulture crop	17
6. Cash crop plantations	1
7. Jhum lands	6000
8. Town/villages/ Miscellaneous and other areas	4766
* Total	* 21,087

* As per forest Survey of India report in government records, the total geographical area of Mizoram is 21,081 sq. km.

Forests

The forests are one of the important resources for the socio-economic development of Mizo people. From early days the entire land has been

under the ownership of the village community. Everyone in the village has the right to utilise the land and the forest produce thereon according to his needs. The total forest area according to various Government statistics is about 15,935 sq. km (Bathew, 1991), of which about 7, 127 sq. km is owned by the government while remaining forests are under the control of village councils (*ca* 7022 sq. km) and District councils (*ca* 1783 sq. km). The actual forest cover of the state at present is 18, 338 sq. km which constitute 86.99 per cent of the geographical area and is the second highest among the states of the country (Anon., 1999). Out of the 18,338 sq. km forests, 3786 sq. km are dense forests and 14,552 sq. km open forests. According to the State Forest Report 1999, by Forest Survey of India, Dehradun, an increase of 437 sq. km of forest cover has been recorded in 1999 assessment as compared to the increase of 199 sq. km of forest in the previous assessment made during 1997. Dense forests registered a decrease of 562 sq. km, while open forests increased by 125 sq. km. The shifting cultivation remains the single largest factor for the loss of forest cover in the state.

Forest types

The diverse vegetation cover of North-east India as a whole has been discussed by many eminent botanists and forest officers such as Hooker (1854, 1872-97, 1904), Griffith (1848), Clarke (1889), Kanjilal *et al.* (1934 - 40), Bor (1938, 1942), Puri (1960), Champion and Seth (1968), Rao and Panigrahi (1961), Murti and Joseph (1984), Sahni (1986), Mehra *et al.* (1983), Rao and Hajra (1986), etc. However, studies pertaining to forest types of Mizoram (Deb & Dutta, 1987; Singh, 1997; Lalramnghinglova & Jha, 1997) are scanty. Based on these fragmentary studies as well as from the observations and collections made in the field by the authors (K.P. Singh & D.K. Singh), an attempt is made to present the forest types of Mizoram. In general, the forests of Mizoram can broadly be divided into following types, based mainly on the altitude, rainfall and dominant species composition.

1. *Tropical wet evergreen and semievergreen forests :*

These forests are usually met below an altitude of 900 m and form one of the major forest types in Mizoram with rich species diversity. Patches of these forests can be seen usually on the steep slopes, rocky and steady river banks and areas not suitable for shifting cultivation. The

exact distinction between the evergreen and semievergreen forests is difficult as they occur in the areas of similar characteristics where rainfall averages between 2000–2500 mm annually and temperature varies between 20° C and 22° C. Tropical wet evergreen forests are met usually in southern and western part of Mizoram, while semi-evergreen forests occur in northern, North-western, western and central part of the Mizoram.

The tropical wet evergreen forests exhibit clear zonation or canopies consisting of an admixture of numerous species with a dense and impenetrable herbaceous undergrowth. Most of the species of the top canopy are evergreen trees with tall boles. Cauliflory is rather common. The middle and lower canopies are dense, evergreen and diverse. Epiphytes and parasites are few. Tree ferns, aroides, palms, ferns, orchids, bryophytes and lichens are fairly common. Lianas are frequent and conspicuous. Sedges and grasses are common in humid places or along the banks of rivers and rivulets. Species of *Musa* are also common along the streams on hilly slopes. The top canopy is composed of mighty trees, like *Dipterocarpus turbinatus*, *D. retusus*, *Michelia champaca*, *Artocarpus chama*, *Aphanamixis wallichii*, *Mesua ferrea*, *Toona ciliata*, *Duabanga grandiflora*, *Bischofia javanica*, *Schima wallichii*, *Haldina cordifolia*, *Firmiana colorata*, *Syzygium cumini*, *Actinodaphne angustifolia*, *A. obovata*, *Sapium baccatum*, *Phoebe attenuata*, *Chukrasia tabularis*, *Anogeissus latifolia*, *Calophyllum polyanthum*, *Cryptocarya amygdalina*, *Cinnamomum bejolghota*, *C. pauciflorum*, *Lindera pulcherrima*, *Persea villosa*, *Castanopsis indica*, *Beilschmiedia assamica*, *Pterospermum acerifolium*, *Elaeocarpus aristatus*, *E. floribundus*, etc. Buttressed trunks are characteristic of the majority of the trees of this storey.

In exposed and drier areas, where there is only a thin layer of soil, deciduous elements along with some evergreen trees are found. Sometimes these are grouped as a distinct type, referred as tropical moist deciduous forests (Lalraminglova & Jha, 1997). The distinction between the tropical evergreen forests and tropical moist deciduous forests is difficult as they are found in the same hill ranges. Some common deciduous trees are *Bombax ceiba*, *Juglans regia*, *Emblica officinalis*, *Erythrina arborens*, *Albizia lebbek*, *A. procera*, *Lagerstroemia speciosa*, *Firmiana colorata*, *Sterculia villosa*, *Bischofia javanica*, *Podocarpus nerifolia*, *Gmelina arborea*, *Bursera serrata*, *Garuga pinnata*, *Macaranga denticulata*, etc.

The second canopy is composed of trees, like *Garcinia cowa*, *G. xanthochymus*, *G. lanceaefolia*, *Dysoxylum binecteriferum*, *Aphanamixis chittagonga*, *Litsea glutinosa*, *L. laeta*, *L. lancifolia*, *Pterospermum semisagittatum*, *P. lancifolium*, *Syzygium cerasoides*, *Symplocos javanica*, *S. lucida*, *Knema angustifolia*, *Oxyceros longiflora*, *Stereospermum colais*, *Elaeocarpus lanceaefolius*, *Ardisia colorata*, *A. paniculata*, *Turpinia pomifera*, *Hydnocarpus kurzii*, *Heritiera papilio*, *Mangifera sylvatica* etc. Many of these trees are tall but thin boled, Smaller trees of top canopy are also found in second storey.

The third storey or canopy consists of smaller trees and shrubs with maximum floristic diversity. The common species of this storey are *Ficus subincisa*, *Leea indica*, *Meliosma simplicifolia*, *Litsea meissneri*, *Saurauia napaulensis*, *Garcinia sopsopia*, *Eurya cerasifolia*, *Maesa paniculata*, *Clausena heterophylla*, *Mycetia longifolia*, *Pandanus foetidus*, *Tournefortia monhana*, *Symplocos lucida*, *Diospyros lanceaefolia*, *Cyathea gigantea*, *Euonymus attenuatus*, *Phlogacanthus thyriformis*, *Eranthemum purpurascens*, *Daedalacanthus tubiflorus*, etc.

Ground layer has humus and leaf litter and rich in herbaceous flora. Ground cover comprises species, like *Curculigo latifolia*, *Phrynium capitatum*, *Globba clarkei*, *G. multiflora*, *Costus speciosus*, *Begonia annulata*, *B. hatacoa*, *B. lushaiensis*, *Impatiens chinensis*, *I. balsamina*, *Viola betonicifolia*, *Euphorbia spp*, *Sonerila maculata*, etc. *Aeginetia indica*, a saprophyte is also found in moist places.

Climbers and liana, like *Pericampylus glaucus*, *Pycnarrhena pleniflora*, *Stephania glandulifera*, *Tinospora cordifolia*, *Entada rheedei*, *Dioscorea pentaphylla*, *Passiflora foetida*, *Hoya parasitica*, *Trichosanthes tricuspidata*, *Rhaphidophora eximia*, *Pothos scandens*, *Mucuna pruriens*, *Sarcostemma secamone*, *Thladiantha calcarata*, *Thunbergia grandiflora*, *Piper nigrum*, *P. clarkii*, *Combretum squamosum*, *Smilax lanceaefolia*, *Gnetum gnemon*, etc. are common. These climbers intertwining with each other and entangling over other trees give a wiring look to the interior of the forest at many places. Many epiphytic ferns also grow over these giant liana.

The evergreen forests are also rich in both epiphytic as well as terrestrial orchids. They grow on main trunks of lofty trees and in different

ecological niches of the steep ravines. Species, like *Coelogyne nitida*, *C. flaccida*, *Cymbidium aloifolium*, *C. longifolium*, *Bulbophyllum viridiflorum*, *B. reptans*, *Dendrobium aphyllum*, *D. chrysanthum*, *D. densiflorum*, *D. falconeri*, *D. fimbriatum*, *Eria pannea*, *Paphiopedilum villosum*, *Renanthera imschootiana*, *Phaius flavus*, *Pholidota imbricata*, *Pleione praecox*, etc. are of common occurrence in Lunglei, Champhai, Sairep areas. Among the parasites *Scurrula pulverulenta*, *Helixanthera parasitica*, *Cuscuta reflexa*, *Viscum monoicum*, *Balanophora dioica* (root parasite), *Loranthus spp.*, etc are seen.

In exposed places or abandoned jhumland, the canopies are not distinct. In these places the species, like *Aporosa oblonga*, *Mallotus philippensis*, *Maesa ramentacea*, *Cordia fragrantissima*, *Bridelia squamosa*, *Macaranga denticulata*, *Antidesma bunius*, *Dysoxylum binectariferum*, *Sterculia villosa*, *Callicarpa arborea*, *Meliosma simplicifolia*, *Dalbergia stipulacea*, *Duabanga grandiflora*, *Gmelina arborea*, *Bauhinia variegata*, *Syzygium fruticosum*, etc. are common. Similarly climbers like *Dalhousiea bracteata*, *Butea parviflora*, *Combretum roxburghii*, *Mucuna nigricans*, *Thunbergia grandiflora*, members of Cucurbitaceae, Dioscoreaceae, etc. are also abundant.

The ground flora of these forests consists of herbs and undershrubs, like *Clerodendrum viscosum*, *Melastoma malabathricum*, *Triumfetta rhomboidea*, *Desmodium heterocarpon*, *D. caudatum*, *Uraria clarkei*, *Atylosia goensis*, *Ageratum conyzoides*, *Blumea fistulosa*, *Crotalaria ferruginea*, *Urena lobata*, *Hedychium coronarium*, *Ipomoea hederifolia*, *Peperomia pellucida*, *Galinsoga parviflora*, *Vernonia albicans*, *Solanum nigrum*, *Polygonum chinense*, *Torenia diffusa*, members of Scrophulariaceae, Acanthaceae, Lamiaceae, etc. The three species of 'Dancing girl' viz. *Mantisia saltatoria*, *M. spathulata*, and *M. wengeri*, the later being endemic to the state are also found in shade on rocks in Lungleh and Blue Mountain areas. Other than these the common species of grasses, viz. *Imperata cylindrica*, *Chimonobambusa callosa*, *Panicum incomtum*, *Cynodon dactylon*, *Digitaria ciliaris*, *Pogonatherum crinitum*, *Saccharum arundinaceum*, *S. longisetosum*, *Thysanolaena maxima*, etc., are also abundant.

Several species of canes are found in Mizoram. These are *Calamus latifolius*, *C. erectus*, *C. tenuis*, *C. leptospadix*, *C. acanthospathus*, etc.

Swamp flora as reported by Deb and Dutta (1987) consists of many herbaceous species, some shrubs and few trees. The common tree species are *Barringtonia acutangula*, *Lagerstroemia parviflora*, *Ficus spp.*, *Bischofia javanica*, etc. The dominant herbaceous species are *Phragmites karka*, *Alpinia nigra*, *Saccharum arundinaceum*, *S. spontaneum*, *Polygonum microcephalum*, *P. donii*, *P. glabrum*, *Schoenoplectus lateriflorus*, *Cyperus laxus*, *C. difformis*, *Fimbristylis dichotoma*, *Utricularia aurea*, *U. exoleta*, *Eichhornia crassipes*, etc. In marshy places along the river courses especially in Demagiri area. *Alpinia nigra*, *A. bracteata*, *A. galanga*, *Imperata cylindrica*, *Phragmites karka*, *Saccharum arundinaceum* and *S. spontaneum*, etc. are found. They form socias and grow in various proportions. They usually form *Phragmites-Alpinia* socias and *Alpinia-Phragmites-Saccharum* socias.

Rooted in the mud at edges are found *Osbeckia chinensis*, *Ludwigia octovalvis*, *L. prostrata*, etc. Aquatic species either floating or submerged are few in Mizoram. Some such species are *Trapa natans* var. *bispinosa*, *Pistia stratiotes*, *Spirodela polyrrhiza*, *Hydrilla verticillata*, *Limnophila repens*, *Rotala indica*, *Leersia hexandra*, *Polygonum spp.*, etc.

2. *Montane subtropical forests :*

These forests are usually found on high hills between 900 and 1500 m altitude in the eastern fringes bordering Chin hills of Myanmar, and places which are cooler and have less precipitation. Subtropical vegetation shows mixed pine forests. The common species of these forests are *Pinus kesiya*, *Quercus leucotrichophora*, *Q. acutissima*, *Q. semiserrata*, *Castanopsis purpurella*, *Podocarpus neriifolia*, *Schima wallichii*, *Prunus cerasoides*, *Myristica spp.*, *Phoebe goalparensis*, *Duabanga grandiflora*, etc. In Ngur-Zote, close to Myanmar border, there is a small patch of *Pinus kesiya*, associated with *Schima wallichii*, *Myrica esculenta* and *Quercus spp.* The plantations of pine trees have also been taken up by the side of Silchar-Aizawl national highway beyond Kolasib and Pharpak in Blue Mountain area. The other species of subtropical forests belong to the genera *Acacia*, *Albizia*, *Bridelia*, *Castanopsis*, *Cinnamomum*, *Engelhardtia*, *Erythrina*, *Ficus*, *Garcinia*, *Michelia*, *Terminalia*, etc. In some places palms such as *Calamus erectus*, *Caryota urens*, *Didymosperma nana*, *Licuala peltata*, *Phoenix humilis*, etc. are also found and form part of subtropical forests. The species of *Lyonia*, *Gaultheria*, *Rhus*, etc., are some of the common shrubs in the forests,

whereas the herbaceous elements are represented by *Potentilla fulgens*, *Ranunculus sceleratus*, *Artemisia* spp., *Elsholtzia fruticosa*, etc.

3. Temperate forests :

These forests usually occur above the elevation of 1600 m in the areas, like Lengteng, Naunuarzo, Pharpak, Thaltlang, Phawngpui reserve forests and display impenetrable virgin primary forests. These forests are not typical temperate forests as found elsewhere in eastern Himalaya. In appearance they look like somewhat subtropical type. Here subtropical elements are mixed with some temperate elements. In several congenial localities, particularly on the valley slopes of different tributaries the vegetation presents an admixture of tropical and subtropical elements. The predominant arboreal elements in the forests are *Pinus kesiya*, *Actinodaphne microptera*, *Betula alnoides*, *Eubucklandia populnea*, *Elaeocarpus serratus*, *Dillenia pentagyna*, *Kadsura heteroclita*, *Michelia doltsopa*, *M. champaca*, *Garcinia anomala*, *Schisandra neglecta*, *Photinia integrifolia*, *Litsea salicifolia*, *Quercus floribunda*, *Lithocarpus dealbata*, *Rhododendron arboreum*, *R. vetchianum*, *R. watti*, *R. johnstoneanum*, etc. The prominent shrubs occurring in these forests are *Pittosporum podocarpum*, *Xylosma controversum*, *Camellia caudata*, *Mahonia pycnophylla*, *Rubus ellipticus*, *R. himanicus*, *Clerodendrum viscosum*, *Rosa brunonii*, *Baliospermum* spp., *Helicia nilagirica*, *Viburnum* spp., *Osbeckia* spp., *Mussaenda* spp., etc. The common herbaceous species of these forests are *Hypericum elodeoides*, *H. monanthemum*, *Plantago major*, *Potentilla fulgens*, *Impatiens* spp., *Centella asiatica*, *Cyanotis cristata*, *Chirita* spp., members of Asteraceae, Commelinaceae and grasses, like *Arundinaria callosa*, *Coix lacryma jobi*, *Cynodon dactylon*, *Saccharum longisetosum*, *Eragrostis unioides*, *E. nigra*, etc. Besides, the common climbers in these forests are *Brachystemma calycinum*, *Illigera khasiana*, *Millettia pachycarpa*, *M. pulchra*, *Rosa brunonii*, *Smilax* spp., *Vitis* spp., etc. Pteridophytes are also abundant in these forests and are represented by *Selaginella chrysocaulos*, *Cyclosorus perakensis*, *Dryopteris elongata*, *Lycopodium hamiltonii*, *L. setaceum*, *Tectaria macrodonta*, *Davallodes membranulosum*, *Arthromeris wallichiana*, *Pyrrosia stenophylla*, *Polypodium* spp., *Dryopteris* spp., etc. The epiphytic components are dominated mostly by Lichens, Bryophytes, Pteridophytes, various species of orchids, *Aeschynanthus* spp., *Agapetes* spp., *Hoya* spp., *Vaccinium* spp., *Viscum* spp., etc.

4. *Bamboo forests :*

Bamboos usually grow as an understorey to the tree species in tropical evergreen and subtropical mixed-deciduous forests, whereas *Melocanna baccifera* forms dense or pure forests in certain areas in the state. Large tracts of bamboos are seen throughout Mizoram but their distribution is somewhat restricted to about 1600 m and below. They occur mostly between 40 m and 1520 m in tropical and subtropical areas. However, few species, like *Chimonobambusa callosa*, *Drepanostachyum jainianum*, *Melocalamus mastersii* occur in temperate areas in Blue Mountain and Mount Chalfih. It appears that bamboos have resulted from jhumming system of cultivation (Deb & Dutta, 1987). For practicing jhum cultivation the forests are burnt and tree species are destroyed but the bamboo rhizomes throw out new culms as soon as favourable temperature and seasonal monsoon arrive. Therefore, in abandoned jhumland they are the first coloniser and grow rapidly. These colonised bamboo forests are repeatedly cut and burnt for jhumming till the land become unsuitable for cultivation in areas other than the raverine reserve forests. Bamboos are more concentrated along the Tripura border. They are abundant in the western and eastern fringes than in the eastern region. In the eastern region bamboos are usually confined along the river banks up to a kilometer or so.

The common species of bamboos found in Mizoram are *Melocanna baccifera*, *Bambusa tulda*, *Dendrocalamus hamiltonii*, *Schizostachyum polymorphum*, and species of *Melocanna* and *Schizostachyum*, which grow single stemmed without forming clumps. The species, like *Bambusa tulda*, *B. vulgaris*, *Dendrocalamus longispathus* prefer steep and rocky areas with sandy gravelly soil, whereas the sporadic occurrence of *Dendrocalamus hamiltonii* and *D. giganteus* favours flat topped gentle slope with sandy loam or loamy - clay soils.

Some important associates found growing along with bamboos are *Emblica officinalis*, *Litsea monopetala*, *Pterospermum acerifolium*, *Terminalia myriocarpa*, *Dipterocarpus turbinatus*, *Caryota mitis*, *Artocarpus chama*, *Duabanga grandiflora*, *Albizia procera*, *Haldina cordifolia*, *Gmelina arborea*, *Syzygium spp.*, etc.

5. *Quercus forests :*

Quercus forests are mostly found intermingled in subtropical and

temperate areas. Pure patches or predominant *Quercus* species are present near Champhai Baite hill ranges and its distribution is restricted to other small areas in the eastern part of Mizoram. *Lithocarpus dealbata* is other main species.

6. *Jhumland* :

Jhumland are very common in Mizoram. They are classified variously as current jhumland, old jhumland and abandoned jhumland. Jhumlands are more prevalent in eastern Mizoram where extensive and intensive jhumming is practiced. Similarly, the areas in western side in Lunglei district towards Bangladesh have also jhumlands. Chhimaipui district is most effected district as far as jhum cultivation is concerned. The vegetation of these jhumlands have also been described above. The bamboos, grasses, members of Asteraceae, Melastomaceae are most abundant in Jhumlands.

Botanical Studies

The literature indicates that the botany of the state is not adequately studied as compared to other states of North-east India. The initial botanical studies are mainly based on the collections made by army officials, administrators, some missionaries out of their personal interest.

Sir J.D. Hooker's '*Flora of British India*' (1872 -1897) was the first comprehensive flora to deal with plant species from the then called Lushai hills, presently known as Mizoram. These collections were made by J.D. Hooker and T. Thomson for their flora of British India. However, a significant contribution for the first time on the botany of Mizoram was made by Col. A.T. Gage (1901), who recorded 317 species, including 26 species of Cryptogams, based on his own collections made from a small area in Lungleh district for about 5 weeks on a march from Chittagong to Lungleh and back in the months of March and April 1899. J.E. Leslie also made some valuable collections in December 1902 and deposited them in Calcutta, which were subsequently indentified and preseved properly. Mrs N.E. Parry also made some collections between 1924 and 1929 from Lungleh district, when her husband was in administrative charge of the area. Most of her collections, along with some propagules, were sent to Royal Botanic Gardens, Kew and a smaller portion to the Royal Botanic Garden, Kolkata (now Indian Botanic Garden). Rev. W. G. L. Wenger of the Baptist Mission at Lungleh, from 1926 - 1932, Rev. R.A. Lorrain

of the Pioneer Mission to the Lakhers at Sherkor and his daughter Lorraine Foxall also made some collections from Lungleh and Sherkor, and sent most of them to Kew and some to Kolkata. Based on all these sources Fischer (1938) published '*The Flora of Lushai Hills*' enumerating therein 1360 species, including 6 species of Gymnosperms and 155 species of Cryptogams. Forest officers, like U.N. Kanjilal, P.C. Kanjilal and his colleagues A.Das, C. Purkayastha and R.N. De also made efforts to collect the material from different places for the undivided Flora of Assam. This finally resulted in the publication of '*Flora of Assam*' (Kanjilal *et al.*, 1934-40) and included some species from the state of Mizoram. But these studies were not exhaustive. Bor (1940) while contributing an account on grasses of Assam for Kanjilal's (*l.c.*) *Flora of Assam*, also mentioned few species from the Lushai hills.

After the publication of *Flora of Assam* (Kanjilal *et al.* 1934-40), there was a complete silence in the floristic activity until the re-organisation of Botanical Survey of India and establishment of Eastern Circle, at Shillong in 1956. Scientists from this circle have contributed immensely to the understanding of the rich flora of the region.

D.B. Deb and R.M. Dutta explored the state during January and July-August 1963. Identifications of these collections resulted in the publication of 585 species under 380 genera of Pteridophytes and Angiosperms, which were not reported earlier from the state and some of those reported without mentioning the locality of occurrence (Deb & Dutta, 1987). Some species of sedges (Rao & Verma, 1982) and grasses (Shukla, 1995) have also been worked out for the state, while they were revising the families at regional level. Shukla *et al.* (1978) has made observations on some economic plants and mentioned uses of 59 species from Mizoram. Kataki *et al.* (1984) enumerated 159 species of orchids from Mizoram along with their range of distribution in North-east India and adjacent South-east Asian countries.

In recent past K.P. Singh and D.K. Singh explored different districts of the state during 1988-1995 and collected about 2200 field numbers. These have been identified and will be dealt in different volumes of '*Flora of Mizoram*' to be published by the Botanical Survey of India. A conspectus of orchids dealing with 244 species under 74 genera from Mizoram has already been published (Singh *et al.*, 1990).

In recent years ethnobotanical and medicinal uses of higher plants have also been recorded by various workers (Mahanti, 1994; Lalraminghlova, 1996; Lalraminghlova & Jha, 1997) leading to the information on more than 500 species which are being used in the state.

Lalraminghlova (1997) has also gave an account of bamboos and their uses in Mizoram. Prominent agroforestry system and important multipurpose trees in farming system of Mizoram were presented by Lalraminghlova and Jha (1996). A discussion on forestry management in Mizoram was published by Garbyal (1986) and Savant and Patnaik (1998). Floristic diversity of the state is discussed by K.P. Singh (1997). More recently Flora of India series (Sharma *et al.*, 1993a, 1993b, 1993c, Hajra *et al.*, 1995a,b, 1997; Singh *et al.*, 2000) also includes many species under different families from the state. Thus, there was considerable improvement in the knowledge of Botany of Mizoram during the last one decade. However, more information need to be collected as some areas are still either underexplored or unexplored floristically.

Forestry

In begining the forests of Mizoram were well protected and managed by village chieftains. A useful discussion on the foresrty of Mizoram has already been made (Garbyal, 1996; Savant & Patnaik, 1998). In villages, forest produce was utilised for domestic purpose in appropriate way by the permission of village head. During the British regime, commercial exploitation of forests started in accessible areas, depleting the rich tropical forests. Mizoram forest act 1955, framed for Lushai hill has also provided provisions for issuing permits, which also resulted in selective removal of valuable trees leaving behind only the trees of inferior quality.

As far as scientific way of management of forests in Mizoram is concerned, a good begining was made with the establishment of a state forest department in 1972. In initial stages attempts were made to raise plantations of economic tree species on abandoned jhumland and degraded forest land and this was continued in VIII and IX five years plans. The main schemes in operation as mentioned by Savant and Patnaik (1998) are (a) Area oriented fuel wood and fodder plantations scheme (FFP), (b) Integrated afforestation and ecodevelopment projects (IAEP), (c) Non timber forest produce scheme (NTEP), and (d) Compensatory afforestation (CA). Till now an area of *ca* 1,75,000 ha has been covered under plantations of *Tectona grandis*, *Gmelina arborea*, *Michelia champaca*

and *Pinus kesiya*. Cane and medicinal plants are raised under NTFP Scheme. Fuel wood, fodder and fruit trees are planted under FFP scheme which is funded by Government of India on 50-50 sharing basis, while other afforestation schemes are entirely funded by the Government of India.

Farm forestry and private tree planting have also been encouraged by the state government. Private planters have gone for plantation of teak, *Gmelina arborea* and *Eucalyptus* species in recent years and as a result about 8000 ha land is utilised in private sector. To promote forestry research, the state forest department has set up a separate 'Forest Research wing' under the control of Conservator of Forests. Silviculture and research division is looking after the various research programmes. Nursery and field trials of various forest species, like *Dipterocarpus*, *Mesua ferrea* and other species have given favourable results. Further, a forest training school was also established in 1974 to impart training to foresters for proper forestry management practices. A full time Botanist and Orchidologist are working in the state forest department to promote studies on taxonomy, orchids and other ethnobotanical studies.

Young Mizo Association (YMA), a prominent voluntary organisation, is also playing significant role towards protection of forests, ecology and environment. This group has immensely contributed towards the cause of tree plantation, wildlife protection and creating awareness among the local public. As a result arms and amunitions have been laid down by local tribes during preceding years.

In addition to this, the staff of Botany department, Pachunga University College at Aizawl have contributed many articles for promotion and preservation of plant diversity. In recent years Government of India has made Joint Forest Management (JFM) component mandatory in all afforestation schemes to be implemented in Mizoram. This programme is receiving good response from the people.

Agroforestry

Production of agricultural crops is one of the main source of livelihood of Mizo people. Over the years, farmers in many areas in Mizoram have been practicing various form of agroforestry or taungya system (Lalraminghlova & Jha, 1996). They use various combinations of

multipurpose trees and shrubs along with their food crops in their fields. This gives them additional benefits on sustained basis. However, in recent years maximum cash crops are grown to fetch more money and tree species are being neglected. The most common agricultural crops grown along with tree species are *Phaseolus mungo*, *P. vulgaris*, *Dolichos lablab*, *Brassica oleracea* var. *capitata*, *B. oleracea* var. *botrytis*, *Colocasia esculenta*, *Capsicum* sp., *Sechium edule*, *Gossypium arboreum*, *Vigna sinensis*, *Cucumis sativus*, *Zingiber officinale*, *Arachis hypogea*, etc.

The most common and successful practice is intercropping of *Oryza sativa* (paddy) with *Tectona grandis* (teak). Paddy is harvested in November, leaving teak plants free to flourish. Similarly multipurpose trees and shrubs grown under different agroforestry system are appended below in Table 2.

Economic Plants

From time immemorial plants have been utilized by man for various purposes such as food, fodder shelter, clothing, medicine, fibre, gum, etc. They are more closely associated with the life of tribal communities. Mizoram has rich wealth of plants having economic potential as ornamentals, horticultural, timber, medicinal and ethnobotanical significance.

(i) *Timber plants* : There are about 125 good timber yielding species which are used in making plywood, pulp, constructional work, poles, agricultural implements, furniture, etc. Some of the timber species along with their local names are *Haldina cordifolia* (Lungkhup), *Neolamarckia cadamba* (Banphur), *Aphanamixis wallichii* (Sahatah), *Aglaia edulis* (Thingri), *Albizia lebbek* (Thingri), *A. odoratissima* (Kangtek), *Alseodaphne* sp. (Bulfek), *Artocarpus chama* (Lamkhuang), *Bombax ceiba* (Phungchawng), *Cassia fistula* (Makpazang Kang), *Cinnamomum bejolghota* (Sentezel), *Chukrasia tabularis* (Zawngtei), *Cynometra polyandra* (Kawrhreihha), *Cordia fragrantissima* (Muk), *Dillenia indica* (Kawrthingdong), *Dipterocarpus retusus* (Thingsen), *D. turbinatus* (Thingsen), *Duabanga grandiflora* (Zuang), *Gmelina arborea* (Thanvawng), *Mangifera indica* (Theihai), *Morus laevigata* (Lungli), *Mesua ferrea* (Hershe), *Michelia champaca* (Zobul), *Parkia roxburghii* (Zawngteh), *Pinus kesiya* (Fir), *Pterospermum acerifolium* (Siksil), *Phoebe goalparensis* (Lawngthintha), *P. attenuata* (Saperbul), *Schima wallichii* (Khiang), *Shorea robusta* (Lawngthing), *Sterculia villosa*

Table 2: Multipurpose trees and shrubs

Botanical name	Mizo name	Family	Habit	Main uses
<i>Acrocarpus fraxinifolius</i>	Naganbawn	Caesalpiniaceae	T	Fodder, fuelwood
<i>Albizia lebbekii</i>	Thingri	Mimosaceae	T	Timber, fuelwood
<i>Areca catechu</i>	Kuva	Araceae	T	Masticatory nut
<i>Artocarpus dadah</i>	Theitar	Moraceae	T	Fodder, fruit, fuelwood, medicinal purposes
<i>Artocarpus heterophyllus</i>	Lamkhuang	Moraceae	T	Fruits and seeds as food; leaves as fodder; wood as timber
<i>Bauhinia variegata</i>	Vau-fayang	Caesalpiniaceae	T	Fodder, fuelwood, fruit
<i>Hischia javanica</i>	Khungthji	Euphorbiaceae	T	Fodder, fuelwood, medicinal purposes
<i>Bombax ceiba</i>	Phunchawng	Bombacaceae	T	Fuelwood, timber, spices
<i>Callicarpa arborea</i>	Hnahkiah	Verbenaceae	T	Fodder, fuelwood, bark medicinal
<i>Cinnamomum glaucescens</i>	Khiangzo	Lauraceae	S	Timber, fuelwood, medicinal purposes
<i>Cinnamomum zeylanicum</i>	Thakthing	Lauraceae	T	Spice, fuelwood

Botanical name	Mizo name	Family	Habit	Main uses
<i>Clerodendrum colebrookianum</i>	Phuihnam	Verbenaceae	T	Leaves used as vegetable, and medicine; plant, control soil erosion
<i>Dendrocalamus strictus</i>	Yarsing	Poaceae	B	Fodder, fuelwood, construction purposes
<i>Diploknema butyracea</i>	Basia	Sapotaceae	T	Seed-oil, timber, medicinal purposes
<i>Dysoxylum gobarum</i>	Thiangthapui	Meliaceae	T	Timber, fuelwood, leaves vegetable
<i>Erythrina stricta</i>	Phartuah	Fabaceae	T	Fodder, fuelwood, fencing, support for vines, etc., nitrogen fixation in soil
<i>Ficus benghalensis</i>	Hinawng	Moraceae	T	Fodder, ornamental, control of soil erosion
<i>Ficus religiosa</i>	Hinawngnahzum	Moraceae	T	Fodder, shade, control of soil erosion
<i>Ficus semicordata</i>	Theipui	Moraceae	T	Fodder, fruit
<i>Gmelina arborea</i>	Thlanvawng	Verbenaceae	T	Fodder, fuel, timber, medicinal purposes

Botanical name	Mizo name	Family	Habit	Main uses
<i>Grevillea robusta</i>	Oakthing	Proteaceae	T	Timber, windbreak
<i>Grewia serrulata</i>	Oakthing	Tiliaceae	T	Fodder, fuelwood
<i>Hydnocarpus kurzii</i>	Saithei	Flacourtiaceae	T	Seed-oil, nut juice and ink and varnish, medicine for leprosy
<i>Justicia adhatoda</i>	Kawldai	Acanthaceae	S	Live-fence, erosion control, medicinal purposes
<i>Leucaena lativilqua</i>	Japan zawngtahte	Mimosaceae	S	Fruit, fodder, medicinal, vegetable
<i>Manifera indica</i>	Yehihai	Anacardiaceae	T	Fruit, fuelwood
<i>Mesua ferrea</i>	Hethse	Clusiaceae	T	Timber, shade, medicinal, windbreak
<i>Michelia champaca</i>	Ngiau	Magnoliaceae	T	Timber, fuelwood, plywood, windbreak
<i>Morus alba</i>	Thingtheihtu	Moraceae	T	Timber, fodder, fuelwood, fruit
<i>Parkia timoriana</i>	Zawngtah	Mimosaceae	T	Fruit, control of soil erosion
<i>Prunus cerasoides</i>	Thuzawng	Rosaceae	T	Fodder, fuel, timber
<i>Psidium guajava</i>	Kawlthei	Myrtaceae	T	Fruit, fuel, medicinal purposes

Botanical name	Mizo name	Family	Habit	Main uses
<i>Frerospermum marsupium</i>	Siksi	Sterculiaceae	T	Timber, fodder, fuelwood
<i>Punica granatum</i>	Theibuhfai	Punicaceae	S,T	Fodder, fuelwood, fruit, medicinal purposes
<i>Rhus chinensis</i>	Khawmhma	Anacardiaceae	T	Fodder, fuelwood, fruit
<i>Rhus succedanea</i>	Chhinhruk	Anacardiaceae	T	Fodder, fuelwood
<i>Schima wallichii</i>	Khiang	Theaceae	T	Fodder, fuelwood, timber, medicinal purposes
<i>Syzygium claviflorum</i>	Lenhmui	Myrtaceae	T	Fodder, fuelwood, medicinal purposes
<i>Tecoma grandis</i>	Teak, llawt	Verbenaceae	T	Timber, fuelwood
<i>Trevesia palmata</i>	Kawhtebel	Araliaceae	S,T	Fruits-vegetable, hedge
<i>Vernicia fordii</i>	Tung	Euphorbiaceae	T	Oil-seed, fuelwood
<i>Zanthoxylum chetsa</i>	Chingit	Rutaceae	T	Leaves-vegetable, fuelwood
<i>Ziziphus jujuba</i>	Borai, kawlsunhlu	Rhamnaceae	S,T	Fruit, fodder

B = Bamboo; S = Shrub; T = Tree.

(Khaupui), *Syzygium cumini* (Hmuipui), *Terminalia myriocarpa* (Char), *Toona ciliata* (Teipui), *Tectona grandis* (Ilawr), etc.

(ii) **Ornamental plants** : Mizoram flora has numerous ornamental species of great commercial potential. Orchids represented by ca 251 species are one of the most valued ornamental plants. Some of the most ornamental orchid taxa found in the state are *Coelogyne barbata*, *C. punctulata*, *Cymbidium elegans*, *C. hookerianum*, *C. tridioides*, *C. mastersii*, *Dendrobium chrysanthum*, *D. chrysotoxum*, *D. densiflorum*, *D. devonianum*, *D. falconeri*, *D. fimbriatum*, *Eria paniculata*, *Paphiopedilum villosum*, *P. hirsutissimum*, *Phaius flavus*, *P. tankervilleae*, *Thunia alba*, *Vanda coerulea*, *Renanthera imschootiana*, *Rhynchostylis retusa*, etc.

The other ornamental species found in the area are *Begonia thomsonii*, *B. annulata*, *B. wattii*, *Hedychium coccineum*, *H. coronarium*, *H. gardnerianum*, *H. ellipticum*, *H. spicatum*, *Ixora acuminata*, *I. roxburghii*, *I. undulata*, *Impatiens chinensis*, *I. trilobata*, *Hibiscus rosa-sinensis*, *Malastoma malabathricum*, *Murraya paniculata*, *Osbeckia capitata*, *Oxyspora paniculata*, *Rosa multiflora*, *Sonerila maculata* and members of *Gentianaceae*, *Gesneriaceae*, *Asteraceae*, *Acanthaceae*, etc.

(iii) **Wild relatives of cultivated crop plants** : Mizoram flora is also characterized by having large number of wild relatives of cultivated crop plants that would help a breeder to evolve new varieties with desirable characters. Some species belonging to this category are *Artocarpus chama*, *Citrus indica*, *C. medica*, *Camellia caudata* and species of *Musa*, *Colocasia*, *Prunus*, *Alpinia*, *Ammomum*, *Cajanus*, *Cinnamomum*, *Cissus*, *Curcuma*, *Garcinia*, *Piper*, *Ipomoea*, *Saccharum*, *Zingiber*, etc.

(iv) **Fibre yielding plants** : The plant belonging to this category are species of *Abelmoschus*, *Abutilon*, *Acacia*, *Bauhinia*, *Hibiscus*, *Kydia*, *Sterculia*, *Grewia*, *Helicteres*, *Agave*, *Calotropis gigantea*, *Triumfetta*, *Typha*, *Crotalaria*, etc.

(v) **Bamboos** : Bamboos, a group of tall arborescent grasses are closely associated with the life of Mizos. Lalramnghinglova (1997) already provided an account of Bamboos from the state. Of the 63 species of Bamboos

known from N.E. India (Biswas, 1988), 19 species occur in Mizoram. Bamboos in Mizoram form one of the important forest resource and are used in many ways by the Mizo community. The young, white and tender shoots of both runner and clump forming bamboos, like *Bambusa tulda*, *Melocanna baccifera*, *Dendrocalamus longispathus*, *D. hamiltonii*, *D. giganteus* are eaten in the form of cooked vegetable. During the last Mautam famine in 1959, bamboo shoots were the main food and eaten along with *Dioscorea* tubers. The shoots are also used for preparation of curry or chutney usually in combination with potatoes or tomatoes, etc. The leaves of *Bambusa arundinacea*, *Schizostachyum capitatum*, *Dendrocalamus sikkimensis*, *D. strictus* and *Melocanna baccifera* are used as fodder for animals. The fruits of *Melocanna baccifera* are readily devoured by cattle, deer, pigs, and goats, etc. Bamboos are also used extensively as building material and also as a raw material for cottage industry by the rural people. The species extensively employed in construction work are *Bambusa tulda*, *Schizostachyum capitatum*, *Dendrocalamus giganteus*, *D. hamiltonii*, *D. longispathus* and *Melocanna baccifera*. For ceiling and partition purposes, the culms of *Schizostachyum polymorphum* are used. Similarly baskets, hats, etc. are made from the species, like *Bambusa vulgaris* and *Dendrocalamus* spp. In interior areas the long stems of *Dendrocalamus giganteus* are used as water vessels for storing water and also for making frames. Species, like *Melocanna baccifera*, *Schizostachyum dullooa* and *S. polymorphum* are used for making umbrella handles. Toys and mats are also prepared from bamboo species. *Bambusa arundinacea*, *B. tulda*, *B. vulgaris* and other thick walled species are used for making furniture. Horizontally tied bamboos of *Dendrocalamus longispathus*, *Melocanna baccifera* are used for transportation of timber logs in major rivers in Mizoram. The cut culms of *Melocanna baccifera* are used as tumbler or cups for drinking water, soup and tea by the farmers or jhumias and long culms also as fencing material to protect road side plantations in agricultural crops. Dried bamboos in villages are used as fuelwood. The outer green skin of bamboos is used to stop bleeding in fresh cuts and wounds by the local people. Thus bamboos are used in all walks of life. There is an urgent need to establish bamboo based industry in the state to manage bamboo resources sustainably to improve economic conditions of the local people.

(vi) **Medicinal and ethnobotanical plants** : Mizoram forests are rich in medicinal as well as plants of ethnobotanical importance. It is interesting to note that almost every plant is assigned the local name here, indicating their close relationship with the people. Shukla *et al.* (1978) recorded 59

economic plants from Mizoram. So far, about 500 species under 383 genera have been recorded from the state, possessing medicinal and ethnobotanical uses (Mahanti, 1994; Lalramnghinglova & Jha 1996; Singh, 1997). These are enumerated alphabetically along with family and local names in Table 3.

Floristic diversity

The floristic knowledge of the state is incomplete as studies are still continued. In a recent review of the status of floristic diversity in the state, Singh (1997) recorded 2358 species of plants from Mizoram out of which 2141 species in 905 genera and 176 families belonged to Angiosperms, 6 (in six genera and four families) to Gymnosperms and 211 (in 66 genera and 35 families) to Pteridophytes. Of the 2141 species of Angiosperms, 1641 species were those of dicots, while the rest belonged to the monocots. These figures, however, are likely to change once the explorations and floristic studies in the state are complete. The present volume deals with 884 taxa under 403 genera belonging to 90 families of Angiosperms.

Major threats and conservation

The major portion of the forests of Mizoram fall under tropical and subtropical categories, that exhibit maximum species diversity. These forests are greatly effected due to various biotic activities and thus, causing threat to species diversity. The 1999, State of Forest Report by the Forest Survey of India, indicates a decrease in forest cover in Mizoram, as compared to gain of previous years. It is also observed when forest cover is increased due to regeneration in abandoned jhumland and other areas, the secondary vegetation will be entirely of different type from those found before jhumming in virgin forests. It takes long period to reach climax vegetation. The causes responsible for degradation of virgin forests are expansion of agriculture, construction of houses for human settlements, illegal encroachments in forest land, construction of new roads, urbanisation, jhumming, etc. Of all these, jhumming is the main cause of destruction of virgin forests. Jhumming is a lifestyle and celebrated with great festivities in Mizoram. More than 70 per cent workforce depend upon jhum cultivation which is usually carried out in the unclassed forests falling under jurisdiction of village councils. With decrease in jhum cycle period (2-4 years) due to demographic pressure, the land hardly gets sufficient time to recover its original fertility and climax vegetation. As a result many virgin forests have been replaced by bamboo forests and grasses which are common in the areas where jhumming is vigorous.

Table 3: Medicinal and Ethnobotanical Plants of Mizoram.

Name	Local name	Family	Uses
<i>Abelmoschus esculentus</i> (L.) Moench.	Bawhsaiabe	Malvaceae	Decoction of young capsules as an emollient, demulcent, diuretic in catarrhal affections, dysuria and gonorrhoea.
<i>Abelmoschus manihot</i> (L.) Medikus	Uichhune	Malvaceae	Leaf and root paste as a poultice for sprain and inflammations.
<i>Acacia pennata</i> (L.) Willd.	Khanghu	Mimosaceae	Leaf juice with milk given to infants in indigestion; leaves with sugars chewed in bleeding of gums; bark juice antidote for snake poison; fruits and stems as fish poison.
<i>Acampe papillosa</i> (Lindl.) Lindl.	-	Orchidaceae	Roots in rheumatism and as tonic.
<i>Acer laevigatum</i> Wallich	Thingkhim	Aceraceae	Leaf paste used externally for sprains.
<i>Achyranthes bidentata</i> Blume	Vangvattur	Amaranthaceae	Plant paste as astringent and diuretic.
<i>Adiantum capillus-veneris</i> L.	Cha-kawk-te	Adiantaceae	Fronde as expectorant, diuretic, emmenagogue, tonic, demulcent and febrifuge.
<i>Adiantum caudatum</i> L.	Cha-kawk-ria	Adiantaceae	Fronde in diabetes, skin diseases, cough, cold and fever.
<i>Adiantum flabellulatum</i> L.	-	Adiantaceae	Fronde in cough.
<i>Adiantum philippense</i> L.	Cha-kawk-te	Adiantaceae	Plants for dysentery and fever.

Name	Local name	Family	Uses
<i>Aeginetia indica</i> L.	Sanghar vaibel	Orobanchaceae	Juice of roots, tubers and rhizome used externally in mumps.
<i>Aegle marmelos</i> (L.) Correa	Bef-ubei	Rutaceae	Decoction of root and stem bark for diarrhoea; fruit pulp as scorbatic.
<i>Aerides multiflora</i> Roxb.	Lawhlangpar	Orchidaceae	Juice of stem and leaves applied externally to remove worm.
<i>Aeschynanthus sikkimensis</i> (C.B. Clarke) Stapf	Bawltchluntai	Gesneriaceae	Decoction of root for fever; flowers in throat pain.
<i>Aganope thyrsoflora</i> (Benth.) Polhill	Iluliu	Fabaceae	Decoction of fruits for dysentery and stomach-ache.
<i>Agave cantala</i> Roxb.	Saidai	Agavaceae	Root as diuretic, diaphoretic and antisyphilitic; leaf juice as laxative, diuretic, emmenagogue and in scurvy; whole plant as fish poison.
<i>Ageratum conyzoides</i> L.	Vailehlo	Asteraceae	Juice of roots as antihitic; crushed leaves for blood coagulation, externally on cuts and wounds.
<i>Albizia chinensis</i> (Osbeck) Merr.	Vang	Mimosaceae	Infusion of bark in cuts, wounds, skin diseases and scabies; plant as fish poison.
<i>Albizia lebbeck</i> (L.) Benth	Thingri	Mimosaceae	Wood timber and fuelwood.

Name	Local name	Family	Uses
<i>Albizia odoratissima</i> (L.f.) Benth.	Kargtek	Mimosaceae	Bark paste externally in leprosy and ulcers; leaves fried in ghee in cough and cold.
<i>Albizia procera</i> (Roxb.) Benth.	Kangtek-pa	Mimosaceae	Bark in fish poisoning; leaves as poultice to ulcers and insecticide.
<i>Allium cepa</i> L.	Purun-sen	Liliaceae	Bulb as diuretic, expectorant, aphrodisiac and stimulant; freshly cut bulbs used externally in centipede bite.
<i>Allium sativum</i> L.	Purun-var	Liliaceae	Bulb as aphrodisiac, expectorant, stimulant, in cough and cold, fever, febrifuge; bulb juice as ear drops, tonic, in dyspepsia, skin diseases, etc.
<i>Alnus nepalensis</i> D. Don	Alnas	Betulaceae	Root bark for diarrhoea and stem bark as antispasmodic.
<i>Alocasia fornicata</i> (Roxb.) Schott	Baibing	Araceae	Juice of the plant on snake bite.
<i>Alpinia bracteata</i> Roxb.	Aichal	Zingiberaceae	Paste of rhizome mixed with water to treat dysentery.
<i>Alpinia galanga</i> (L.) Swartz	Aichal	Zingiberaceae	Rhizome paste in rheumatism, fever, bronchial problems, carminative and flavouring agents.
<i>Alpinia malaccensis</i> (Burm. f.) Rosc.	—	Zingiberaceae	Fruit with salt used as emetic.

Name	Local name	Family	Uses
<i>Astonia scholaris</i> (L.) R. Br.	Thumriat	Apoecynaceae	Bark as tonic and febrifuge, in diarrhoea, dysentery, snake bite, malaria and externally in sores and ulcers; milky juice to ulcers.
<i>Amaranthus caudatus</i> L.	Zo-eng	Amaranthaceae	Root boiled with leaves of <i>Pratia nemularia</i> and used for urethritis.
<i>Amaranthus viridis</i> L.	Zamzo	Amaranthaceae	Leaves for whole plant in snake bite and scorpion sting.
<i>Amantia baccifera</i> L.	-	Lythraceae	Leaves in blisters, rheumatism, fever and skin diseases.
<i>Amomum maximum</i> Roxb.	-	Zingiberaceae	Root sucker or flower buds are taken raw or boiled to reduce blood pressure.
<i>Ananas comosus</i> (L.) Merrill.	Lakhuithbei	Bromeliaceae	Juice of leaves as anthelmintic; fruit juice as antiscorbutic and unripe fruit as abortifacient; fruit and leaves used in typhoid.
<i>Andrographis laxiflora</i> (Blume) Lindau	Hlochang vawm	Acanthaceae	Leaves for tonsillitis.
<i>Andrographis paniculata</i> (Burm. f.) Wallich ex Nees	Huakhapoi	Acanthaceae	Plants as febrifuge, tonic, anthelmintic, in dysentery and dyspepsia; plant decoction in fever; roots and leaves as febrifuge, stomachic, tonic and anthelmintic.

Name	Local name	Family	Uses
<i>Angiopteris erecta</i> (Forst.) Hoffm.	Arthladadnpu	Angiopteridaceae	Paste of the plants as an ingredient of poultice to cure bone fracture.
<i>Anodendron paniculatum</i> A. DC.	'Thei-kelki	Apocynaceae	Root bark for placental problems; fruits edible.
<i>Anogeissus acuminatus</i> (Roxb. ex DC.) Guillemin & Perrottet	Zairum	Combretaceae	Decoction of bark is given in diarrhoea and externally applied in burns and in sprains.
<i>Antidesma bunius</i> (L.) Spreng.	—	Euphorbiaceae	Leaves antidote to snake poison and in syphilis.
<i>Aporosa octandra</i> (Buch.-Ham. ex D.Don) Vickery	Chhawntual	Euphorbiaceae	Decoction of bark is given in stomach trouble and also in low blood pressure.
<i>Aquilaria malaccensis</i> Lam.	Thing-rai	Thymelaeaceae	Wood as stimulant, tonic, aphrodisiac, carminative, astringent, also in diarrhoea, constipation, vomiting and in snake bite.
<i>Arachis hypogea</i> L.	Badam	Fabaceae	Unripe fruits as lactagogue; fruits and oil as astringent; oil as substitute for olive-oil and also as emollient.
<i>Archidendron monadelphum</i> (Roxb.) Nielson	Ardahte	Mimosaceae	Plants in fish poison; Seeds in diabetes; decoction of leaves for growth of hair and for toothache.
<i>Ardisia colorata</i> Roxb.	—	Myrsinaceae	Roots as febrifuge in diarrhoea and in rheumatism.

Name	Local name	Family	Uses
<i>Andisia paniculata</i> Roxb.	Nauruar	Myrsinaceae	Root demulcent for rheumatism and against pain in venereal diseases; juice of crushed roots boiled with <i>Sesilax ovalifolia</i> and <i>Bridelia nomentana</i> used to cure jaundice.
<i>Andisia polycapitata</i> Wallich ex A. DC.	Sailuni	Myrsinaceae	Root paste with cold water for excess bleeding; and with hot water for normal bleeding after childbirth.
<i>Andisia volucrena</i> Roxb.	-	Myrsinaceae	Roots used as febrifuge, in diarrhoea and rheumatism.
<i>Areca catechu</i> L.	Kuvurhing	Arecaceae	Nuts as aphrodisiac, astringent, tonic, scintillating; also in urinary disorder and as veterinary medicine.
<i>Areca triandra</i> Roxb.	Usai	Arecaceae	As a substitute for catechu.
<i>Arenga pinnata</i> (O. Kuntze) Merr	Thanglung	Arecaceae	Roots used in stomachic and in bronchitis; outer fleshy layer of fruit used as fish poison; young shoots eaten raw.
<i>Aristolochia magna</i> Champ.	-	Aristolochiaceae	Plants used in bowel disorder.
<i>Artemisia vulgaris</i> Willd.	--	Asteraceae	Decoction of leaves for fever.

Name	Local name	Family	Uses
<i>Artemisia nilagirica</i> (C.B. Clarke) Pamp.	Sai	Asteraceae	Plants as antispasmodic, anthelmintic and in stomach problem; root as tonic and antispasmodic; leaves and flowering twig in asthma, diseases of brain, etc.; decoction of leaves in malaria and intestinal worms.
<i>Artocarpus chama</i> Buch.-Ham.	Tatkawng	Moraceae	Decoction of bark in diarrhoea.
<i>Artocarpus dadah</i> Miq.	Theitai	Moraceae	Seed dust as purgative; bark powder on sores; paste on pimples and cracked skin; leaves as fodder.
<i>Artocarpus heterophyllus</i> Lam.	Lamkhuang	Moraceae	Roots in diarrhoea; leaves in skin diseases and antidote to snake bite; unripe fruits used as astringent; decoction of plants in swellings; ripe fruits as laxative.
<i>Asparagus racemosus</i> Willd.	Arkebawk.	Asparagaceae	Roots as refrigerant, demulcent, diuretic, antispasmodic, galactagogue, in dysentery, diarrhoea and in veterinary medicine.
<i>Averrhoa carambola</i> L.	Theiher-awt.	Averrhoaceae	Dried fruits in fever, jaundice; ripe fruits in piles and in relieving thirst and febrile excitement.
<i>Azadirachta indica</i> A. Juss.	Nimthing Nim. Hnahkha	Meliaceae	Roots, bark, flowers, leaves, fruits anti-poisonous; leaf paste used in skin diseases, ulcer; fruits used in leprosy; seeds used in rheumatism.

Name	Local name	Family	Uses
<i>Baccaurea ramiflora</i> Lour.	Pangkai	Euphorbiaceae	Bark dust as purgative.
<i>Bambusa tulda</i> Roxb.	Rawthing	Poaceae	Young shoots as vegetable; frayed outer skin is applied to stop bleeding.
<i>Barleria cristata</i> L.	-	Acanthaceae	Plant paste in snake bite and cough; roots and leaves to relieve swellings.
<i>Barleria strigosa</i> Willd.	-	Acanthaceae	Roots in spasmodic swellings.
<i>Barringtonia acutangula</i> (L.) Gaertn.	-	Lecythidaceae	Decoction of root as cooling reagent; leaves and roots as tonic; juice of leaves in diarrhoea; seed powder as expectorant; bark, root and seeds as fish poison.
<i>Bauhinia purpurea</i> L.	Vaufawang	Caesalpinaceae	Root carminative; bark as astringent, in diarrhoea and skin diseases; flowers as laxative; plant yields gum and bark yields tannin.
<i>Bauhinia variegata</i> L.	Vaufawang, Vaube	Caesalpinaceae	Root as antidote to snake bite, decoction in dyspepsia; bark as astringent, tonic, in skin diseases, ulcers and scrofula; dried buds in diarrhoea, dysentery, and in piles; leaves as fodder.

Name	Local name	Family	Uses
<i>Begonia inflata</i> C.B. Clarke	Sekhupthur	Begoniaceae	Plant decoction in dysentery.
<i>Begonia picta</i> Smith	Lalruangadar- awhna	Begoniaceae	Plant juice is given to cure leeches.
<i>Bergenia ciliata</i> (Haw.) Sternb. f.	Pandamdawi	Saxifragaceae	Plant paste externally on boil and orally for dissolving stones in the kidney; roots as tonic, in fever, pulmonary trouble, and in diarrhoea.
<i>Betula alnoides</i> Buch.-Ham. ex D. Don	Hriang	Betulaceae	Decoction of plant in snake bite; and bark in fever.
<i>Bidens pilosa</i> L.	Vawkpuihat	Asteraceae	Leaf juice externally on swollen glands.
<i>Bischofia javanica</i> Blume	Khuangthili	Euphorbiaceae	Juice of leaves for sores and throat problems; leaves as fodder.
<i>Bixa orellana</i> L.	Rawngsen	Bixaceae	Root as purgative and astringent; seed powder for gonorr, anti periodic and as astringent.
<i>Blumea balsamifera</i> (L.) DC.	Buarthau	Asteraceae	Plants as fish-poison and decoction as expectorant; leaves with <i>Cemella asianica</i> in fever and with <i>Plantago major</i> for diabetes.
<i>Blumea densiflora</i> DC.		Asteraceae	Leaves as sudorific and insect repellent.
<i>Blumea lacera</i> (Burm.f.) DC.	-	Asteraceae	Root paste in cholera; juice of leaves as febrifuge, stimulant and diuretic; plant yields essential oil containing camphor.

Name	Local name	Family	Uses
<i>Blumea laciniata</i> (Roxb.) DC	Khuanglawi	Asteraceae	Roots along with those of <i>Butea superba</i> , <i>Vitis bifurcata</i> and <i>Cissus repanda</i> used in snake bite; root paste mixed with water and drunk for snake bite.
<i>Blumea lanceolaria</i> (Roxb.) Druce	Buarzo	Asteraceae	Juice of leaves applied to cure wounds and chronic ulcers and also on animal sores to kill worms; leaf infusion for dysentery, suspension of boiled leaves to cure bronchitis, asthma, cancer and liver ailments.
<i>Blumea riparia</i> (Blume) DC.	—	Asteraceae	Leaves as antispasmodic.
<i>Hoerhavia diffusa</i> L.	—	Nyctaginaceae	Plants for dropsy, urogenital problems and in jaundice.
<i>Bombax ceiba</i> L.	Phunchawng	Boribacaceae	Decoction of roots is used as tonic; root and bark is emetic; flowers and fruits is used in snake bite.
<i>Borassus flabellifer</i> L.	Siat lu	Arecaceae	Root as cooling reagent; juice of plant as diuretic and also in dropsy; fruit pulp is nutritious and demulcent; leaves for thatching.
<i>Botrychium lanuginosum</i> Wallich ex Hook et Grev.	—	Ophioglossaceae	Fronde in dysentery, cuts and wounds.

Name	Local name	Family	Uses
<i>Bougainvillea spectabilis</i> Willd.	Sarawn	Nyctaginaceae	Paste of spines applied externally on ulcers.
<i>Brassica napus</i> L.	Antam	Brassicaceae	Roots and seeds used as antiscorbutic; seeds yield oil of colza; leaves as vegetable.
<i>Brassica rapa</i> L.	An-tam	Brassicaceae	Leaves as vegetable; seeds as antiscorbutic.
<i>Buddleja asiatica</i> Lour.	Siabrial, Serial	Buddlejaceae	Plants used as abortifacient.
<i>Butea monosperma</i> (Lam.) Taub.	-	Fabaceae	Bark and seeds in snake bite; seeds as anthelmintic; leaves as tonic and astringent; flowers as astringent, depurative and diuretic.
<i>Callicarpa arborea</i> Roxb.	Hrahkiah	Verbenaceae	Bark paste in skin disease, as tonic, carminative etc., used also as fodder; leaves dust in stomachache also.
<i>Callicarpa nudiflora</i> Hook.f. & Arn	-	Verbenaceae	Paste of bark externally in headache; hot leaves in rheumatic pain; oil of root in stomachache.
<i>Calycopteris floribunda</i> (Roxb.) Poirac	-	Combretaceae	Root paste in snake bite; leaves as astringent, laxative, also applied externally for ulcer.
<i>Camellia kissi</i> Wallich	Lalai	Theaceae	Oil cake used to stupefy fish.
<i>Camellia sinensis</i> (L.) O. Kuntze	Thingpui	Theaceae	Leaves as diuretic, stimulant and astringent.

Name	Local name	Family	Uses
<i>Canarium strictum</i> Roxb.	Berawthing	Butseraceae	Resin for fixing handle with knife/dags, etc.; smoke of stem repels mosquitoes; fruits for urinary problems.
<i>Canavalia cathartica</i> Thou.	-	Fabaceae	Fruits in hernia, colic, bilious; and as vegetables.
<i>Canscora diffusa</i> (Vahl) R. Br.	-	Gentianaceae	Plant paste as alternative nervine tonic and laxative.
<i>Capsicum annuum</i> L.	Hmarchate	Solanaceae	Root juice for urethritis.
<i>Capsicum frutescens</i> L.	Hmarchate	Solanaceae	Fruits as stimulant, in dyspepsia and as vegetable.
<i>Carallia brachiata</i> (Lour.) Merr.	Tbeiria	Rhizophoraceae	Bark in itch; fruits in ulcers.
<i>Careya arborea</i> Roxb.	-	Lecythidaceae	Bark as antipruritic, antipyretic, small pox and snake bite; bark and leaves as fish poison; bark and fruits as astringent and demulcent; flowers, juice of fresh fruits with honey in cough and cold.
<i>Carica papaya</i> L.	Thingfanghna	Caricaceae	Milky latex of unripe fruits in skin treatment and as anthelmintic; ripe fruits as diuretic, carminative and in constipation; seeds as

Name	Local name	Family	Uses
<i>Caryota urens</i> L.	Meihle, Tum	Arecaceae	vermifuge and for expelling intestinal worms; leaves in tooth decay. Nuts applied externally on head in case of hemiparalysis.
<i>Cassia alata</i> L.	Tuibho	Caesalpinaceae	Bruised leaves applied on ringworms.
<i>Cassia fistula</i> L.	Ngaingaw	Caesalpinaceae	Decoction of bark for hepatomegaly.
<i>Castanopsis echinocarpa</i> Miq.	Thingsia	Fagaceae	Extract from stem in mouth and tongue ulcer; endocarp edible.
<i>Catharanthus roseus</i> (L.) G. Don	Kumtluang	Apocynaceae	Plants in diabetes; infusion of leaves orally for treating menorrhagia; flowers are considered anti cancerous.
<i>Caulokaempferia linearis</i> (Wallich) K. Larsen	Lungaitching	Zingiberaceae	Crushed leaves are used by the Chakmas on the head in vertigo.
<i>Caulleya gracilis</i> (Sw.) Dandy	Pale	Zingiberaceae	Infusion of rhizomes to cure flatulence, colic and hepatomegaly.
<i>Ceiba pentandra</i> (L.) Gaertn.	Japanpang	Bombacaceae	Roots in scorpion sting and as diuretic; gum as tonic, astringent and in bowel problems; young leaves used as emollient; fruits in diabetes; unripe fruits as astringent and demulcent.

Name	Local name	Family	Uses
<i>Celastrus paniculatus</i> Willd.	-	Celastraceae	Bark as abortifacient; seeds as laxative, emetic, stimulant in gout, leprosy, fever and rheumatism; oil of seeds in heri-heri and as powerful stimulant.
<i>Celosia argentea</i> L.		Amaranthaceae	Flower paste in menstrual problems, diarrhoea and as astringent; seeds in cough and dysentery.
<i>Centella asiatica</i> (L.) Urban	Hnabbial, Lambak	Apiaceae	Infusion of plant for gastro-enteritis; seven leaves with petiole taken for seven days keep high blood pressure under control.
<i>Cheilotheca humilis</i> (D. Don) Keng	-	Monotropaceae	Roots as sedative, tonic and nervine.
<i>Chloranthus elatior</i> Link.	-	Chloranthaceae	Decoction of plants as astringent.
<i>Chukrasia tabularis</i> A. Juss.	Zawugtei	Meliaceae	Bark as astringent; juice of fruits in dysentery, diarrhoea, inflatulant and indigestion.
<i>Cinnamomum bejolghota</i> (Buch.-Ham.) Sweet	Thukthingsuak	Lauraceae	Decoction of bark in dyspepsia and liver problems.
<i>Cinnamomum glanduliferum</i> Meisn.	-	Lauraceae	Wood is substitute for sassafras; contains camphor.

Name	Local name	Family	Uses
<i>Cinnamomum glaucescens</i> (Nees) Hand.-Mazz.	Khiangzo	Lauraceae	Infusion of roots or leaves for cough and cold, bronchitis and pneumonia.
<i>Cinnamomum tamala</i> (Buch.-Ham.) Nees & Fiberm.	Tezpatu	Lauraceae	Aromatic bark in gonor; leaves stimulant, carminative used in rheumatism, diarrhoea and scorpion bite.
<i>Cinnamomum verum</i> Presl.	Thakthing	Lauraceae	Bark for vomiting and as spices.
<i>Cinnamomum zeylanicum</i> Breyer	Thakthing	Lauraceae	Bark as astringent, carminative, prevent vomiting and nausea; leaves as spice.
<i>Cirsium shansiense</i> Petrak	Lenbling	Asteraceae	Roots applied externally for ulcers, cuts, wounds and taken orally in flatulence; stems and leaves used as antiperiodic.
<i>Cissampelos pareira</i> L. var. <i>hirsuta</i> (Buch.-Ham. & DC.) Forman	—	Menispermaceae	Roots used as antiperiodic, diuretic, purgative, in snake-bite, cough, urinary troubles, dropsy, diarrhoea, dyspepsia etc. Leaves paste externally on itch.
<i>Citrus aurantium</i> L.	Siso	Rutaceae	Fruit juice is given as refrigerant, antiscorbutic and in stomachic.
<i>Citrus limetta</i> Risso.	Sertawk.	Rutaceae	Roots as anthelmintic, in constipation, vomiting and in urinary problem; flowers used as astringent and stimulant; ripe fruits juice taken as tonic and astringent.

Name	Local name	Family	Uses
<i>Citrus sinensis</i> (L.) Osbeck	Serthlum	Rutaceae	Decoction of leaves used for bathing in malarial fever.
<i>Claoxylon khasiana</i> Hook. f.	Nugabang	Euphorbiaceae	Roots as an ingredient for treatment of abdominal tumour in combination with <i>Ardisia paniculata</i> , <i>Clerodendrum wallichii</i> , <i>Mussaenda macrophylla</i> and <i>Trevesia palmata</i> ; paste of roots applied gently on abdominal cancer once daily for a week.
<i>Clerodendrum cotebrookianum</i> Walp.	Phuihnam	Verbenaceae	Decoction of leaves for high blood pressure, diabetes and distended breast milk.
<i>Clerodendrum serratum</i> (L.) Moon	Phuihnamtsuak	Verbenaceae	Roots in malarial fever; leaves in fever, snake bite; boiled leaves with oil in ophthalmia; decoction of leaves is given in high blood pressure and in jaundice.
<i>Clerodendrum viscosum</i> Vent.	Phuihnam	Verbenaceae	Root paste in scabies; roots and leaves in skin disease; leaves as tonic, vermifuge, febrifuge and in malaria; sprouts in snake bite; decoction of leaves in dandruff.
<i>Coffea arabica</i> L.	Kawfi	Rubiaceae	Seed powder as diuretic.
<i>Coix lacryma-jobi</i> L.	Pingpith	Poaceae	Seeds as tonic, diuretic; roots in menstrual disorder and also as a diuretic and blood purifier.

Name	Local name	Family	Uses
<i>Colebrookea oppositifolia</i> Smith	--	Lamiaceae	Roots in epilepsy; leaves paste on wounds.
<i>Colocasia esculenta</i> (L.) Schott	Bal, Dawl	Araceae	Juice of petiole in bee sting.
<i>Colysis hemlonitidea</i> (Wallich ex Mett.) Presl.	Kawktebet	Polypodiaceae	Rhizome as an ingredient of poultice to treat bone fracture.
<i>Combretum flagrocarpum</i> C.B. Clarke	Leihraisen	Combretaceae	Leaf juice on cuts and wounds to stop bleeding.
<i>Congea tomentosa</i> Roxb.	Sahasihroi	Verbenaceae	The plant is considered as the best animal medicine for expelling sore worms.
<i>Conyza bonariensis</i> (L.) Cronq.	Buar-zen	Asteraceae	Roots for dropsy; plants in piles, to promote perspiration; flower juice in conjunctivitis; seeds anthelmintic.
<i>Cordia dichotoma</i> Forst.	Muk	Boraginaceae	Infusion of bark with leaves for expelling retained placenta in females on child birth.
<i>Cordia wallichii</i> G. Don	Muk	Boraginaceae	Infusion of leaves and barks for expelling retained placenta in females (on child birth).
<i>Corylus jacquemontii</i> Decne.	--	Betulaceae	Nuts as tonic.
<i>Costus speciosus</i> (Koenig) J.E. Sm.	--	Zingiberaceae	Roots as astringent, purgative, depurative, stimulant, tonic, anthelmintic and in snake bite.

Name	Local name	Family	Uses
<i>Cratogeomys murvata</i> Buch.-Ham.	-	Capparaceae	Bark as tonic, antipyretic, demulcent, laxative and in urinary problems.
<i>Cratogeomys sumatranum</i> (Jack.) Blume subsp. <i>neriifolium</i> (Kurz) Gagn.	Thingait	Hypericaceae	Infusion of leaves as digestant.
<i>Crotalaria juncea</i> L.	Tumthang	Fabaceae	Seeds used to purify blood, in psoriasis, anaemia; poisonous to livestock.
<i>Crotalaria spectabilis</i> Roth	-	Fabaceae	Plants in scabies.
<i>Croton roxburghii</i> Balak.	-	Euphorbiaceae	Bark in liver problems and sprains; bark, roots, fruits and seeds in snake bite and as purgative.
<i>Cucumis sativus</i> L.	Faanguna	Cucurbitaceae	Juice of stem and leaves in high blood pressure.
<i>Cucurbita maxima</i> Duch. ex Lamk.	Mai	Cucurbitaceae	Seeds in ringworm and also as anthelmintic and tonic; fruit pulp used as poultice to burns, boils and inflammation.
<i>Curculigo crassifolia</i> Hook. f.	Phaiphek	Amaryllidaceae	Juice of tuber in stomachache.
<i>Curcuma longa</i> L.	Aieng	Zingiberaceae	Rhizomes as tonic, curminative, blood purifier, antiperiodic, in dysentery, diarrhoea, cholera, in sprains and wounds; decoction of rhizome; in conjunctivitis; fresh juice in skin disease and as antiparalysis and for skin infection.

Name	Local name	Family	Uses
<i>Cynodon dactylon</i> (L.) Pers.	Phaitualnim	Poaceae	Decoction of roots in piles to stop bleeding; decoction of plant as astringent, in cuts and wounds.
<i>Dalbergia pinnata</i> (Lour.) Prain	Hruirengera	Fabaceae	Roots as anthelmintic.
<i>Dalbergia volubilis</i> Roxb.	—	Fabaceae	Roots juice in gonorr; juice of leaves in throat problems.
<i>Datura metel</i> L.	—	Solanaceae	Roots, leaves and seeds in fever, diarrhoea, skin diseases, cerebral and catarrhal problems.
<i>Deeringia amaranthoides</i> (Lam.) Merr.	—	Amaranthaceae	Roots as sternutatory; leaves applied externally to sores.
<i>Dendrobium denudans</i> D. Don	Naubantiosen	Orchidaceae	Drops of water extracts are taken orally as a strong narcotic.
<i>Dendrocalamus hamiltonii</i> Nees & Arn. ex Munro	Phulrua	Poaceae	Young shoots as vegetables; fruits eaten in time of famine and also for low blood pressure.
<i>Dendrocalamus strictus</i> (Roxb.) Nees.	Tursing	Poaceae	Silicious matter as tonic and astringent; leaves echolics to animals.
<i>Dendrocnide sinuata</i> (Blume) Chew	Thakpui	Urticaceae	Boiled root water for jaundice; plant used as poison.

Name	Local name	Family	Uses
<i>Desmodium gangeticum</i> (L.) DC.	-	Fabaceae	Roots as astringent, tonic, diuretic, in cough, cold, fever, vomiting, asthma, snake bite and scorpion sting; roots and seeds as febrifuge and anticalarthalic.
<i>Desmodium motorium</i> (Houtt.) Merr.	-	Fabaceae	Leaf paste externally for lumbago.
<i>Desmos chinensis</i> Lour.	-	Apocynaceae	Decoction of roots in dysentery and vertigo.
<i>Desmos longiflorus</i> (Roxb.) Safford	Chiuipi	Annonaceae	Roots act as an ingredient to cure chronic ulcer.
<i>Dichroa febrifuga</i> Lour.	Khawsik damelawi	Saxifragaceae	Roots and young shoots are emetic and febrifuge; roots and leaves are given to cure malaria.
<i>Dichrocephala integrifolia</i> (L.f.) O. Kuntze	Vawkek- atumtjal	Asteraceae	Young shoots in diarrhoea.
<i>Dictyoneura lepteuroides</i> Nees	-	Acanthaceae	Decoction of plants as a tonic.
<i>Dillenia indica</i> L.	Kawrhindeng	Dilleniaceae	Bark and leaves as astringent; fruits as tonic, laxative and in abdominal pain; juice of fruits with sugar in cough and fever; juice of bark, leaves and fruits in cancer and diarrhoea.
<i>Dimocarpus longan</i> Lour.	Theifeihmung	Sapindaceae	Aril as tonic and refrigerant in fever; fruits in stomachic and anthelmintic.

Name	Local name	Family	Uses
<i>Dioscorea alata</i> L.	Bachin	Dioscoreaceae	Decoction of tubers in leprosy, piles and gonorrhoea.
<i>Dioscorea bulbifera</i> L.	Rumbahra	Dioscoreaceae	Tubers in dysentery, piles, syphilis and applied externally to ulcers.
<i>Dioscorea pentaphylla</i> L.	-	Dioscoreaceae	Tubers as tonic and applied externally on swellings.
<i>Diospyros toposia</i> Ham.	-	Ebenaceae	Fresh gum from stems for toothache.
<i>Diplazium maximum</i> (D.Don) C. Chatt.	Chakawkeichi	Athyriaceae	Crushed rootstock with those of <i>Angiopteris evecta</i> , <i>Cotysis hemionitides</i> and stems of <i>Rhaphidophora decursiva</i> and <i>R. hookeri</i> to treat fracture; fried young leaves as vegetable.
<i>Dipterocarpus turbinatus</i> Gaertn.	Lawngthing	Dipterocarpaceae	Extracted resin in ringworms, ulcers, skin problems and in gonoc.
<i>Dryasena spicata</i> Roxb.	Phunbrin	Liliaceae	Root juice for stomachache.
<i>Drosera peltata</i> Sm.	-	Droseraceae	Plants used in the preparation of gold 'Basma' which is used as antisyphillitis and alternative.
<i>Drymaria diandra</i> Blume	Paripanchhi	Caryophyllaceae	Juice of plant as laxative and antifebrile.

Name	Local name	Family	Uses
<i>Dysoxylum gobarum</i> (Buch.-Ham.) Merr.	Thingthupui	Meliaceae	Decoction of leaves and buds in diarrhoea and dysentery.
<i>Elaeagnus caudata</i> Schlecht. ex Morriy.	Sazukpui	Elaeagnaceae	Flowers in cardiac problems and as astringent; fruits as astringent; roots in rheumatism.
<i>Eleusine indica</i> (L.) Gaertn.	-	Poaceae	Plants in liver problems.
<i>Embelia ribes</i> Burm. f.	-	Myrsinaceae	Roots for cough and diarrhoea; decoction of dried fruits for fever, heart problems and in skin diseases.
<i>Embelia subcoriacea</i> (C.B. Clarke) Mez.	Tling	Myrsinaceae	Decoction of leaves for bathing in treatment of small pox; root is taken to retain placenta.
<i>Embelia tejeriana-cottam</i> (Rocm. & Schult.) DC.	-	Myrsinaceae	Dry skin of fruits in toothache; fruits antispasmodic, carminative and anthelmintic.
<i>Engelhardtia spicata</i> Lechen ex Blume	Hnum	Juglandaceae	Bark as fish poison; resin in medicine.
<i>Eracte glauca</i> Roxb.	Sainsu	Musaceae	Cut stem sap for dysentery and also as cooling agent; stem juice on insect bite.
<i>Entada rhoadesii</i> Spreng. subsp. <i>rhoadesii</i>	Kawi	Mimosaceae	Stem, bark and seeds poisonous; seeds as fish poison, tonic, antiperiodic, emetic; stem used as emetic; wood bark in ulcers.
<i>Eria pauciflora</i> Lindl.	-	Orchidaceae	Plants in medicinal baths for high fever.

Name	Local name	Family	Uses
<i>Erycibe paniculata</i> Roxb.	-	Convolvulaceae	Bark in cholera.
<i>Eryngium foetidum</i> L.	Bakhawr	Apiaceae	Roots in stomachach disorder; leaf juice in fever, pinworms; plants substitute for coriander and cattle fodder.
<i>Erythrina variegata</i> L.	Partuah	Fabaceae	Bark as astringent, febrifuge, in liver trouble, antidote to snake bite; leaves as laxative, diuretic and anthelmintic; juice of leaves is vermifuge and cathartic
<i>Eucalyptus maculata</i> Hook.	Nawh-ah-thing	Myrtaceae	Leaf oil as antiseptic in problem of respiration, skin diseases, rheumatism, used in ointments for burns, mosquito repellent, as a expectorant; decoction of leaves as insect repellent; roots as purgative.
<i>Eulophia nuda</i> Lindl.	Nauban	Orchidaceae	Tubers in tumors and bronchitis.
<i>Eupatorium nudiflorum</i> Wallich ex DC.	Vajhlenho-sang	Asteraceae	Plants as purgative.
<i>Eupatorium odoratum</i> L.	Tlamsam	Asteraceae	Plants used as fish poison; juice of leaves is applied on cuts and wounds as haemostatic.
<i>Euphorbia hirta</i> L.	.	Euphorbiaceae	Plant used in worms, stomach problems and in cough; juice of plant in asthma; latex used for warts.

Name	Local name	Family	Uses
<i>Euphorbia ligularia</i> Roxb.	Chawng	Euphorbiaceae	Latex applied on pimples.
<i>Eurya acuminata</i> DC.	Sihneh (Ziksen)	Theaceae	Decoction of leaves for colic and stomachache.
<i>Excoecum tetragonum</i> Roxb.		Gentianaceae	Plants used as tonic, for fever and stomach problems.
<i>Fagerlindia fasciculata</i> (Roxb.) Tirveng.	Chhawntan	Rubiaceae	Leaves applied externally on sores.
<i>Ficus benghalensis</i> L.	Hmawng	Moraceae	Root fibres in gonorrhoea, bark used as tonic, astringent, in dysentery, diarrhoea and diabetes; milky juice applied externally in rheumatism and lumbago; leaves as fodder and poultice to abscesses; seeds as tonic and cooling agent.
<i>Ficus fistulosa</i> Reinw.		Moraceae	Decoction of roots after child birth.
<i>Ficus hispida</i> L.	-	Moraceae	Fruit, seed and bark as purgative and emetic.
<i>Ficus microcarpa</i> L.	-	Moraceae	Roots, bark and leaves, boiled in oil, are applied externally on wounds and bruises; powdered leaves and bark in rheumatism and headache; juice of bark in liver disease.
<i>Ficus racemosa</i> L.	-	Moraceae	Roots in dysentery; rap root in diabetes; bark as astringent; milky juice in piles and diarrhoea; fruits as astringent and stomach problems.

Name	Local name	Family	Uses
<i>Ficus religiosa</i> L.	–	Moraceae	Leaves used as fodder.
<i>Ficus semicordata</i> Buch.-Ham. ex Sm.	Theipui	Moraceae	Decoction of leaves for jaundice and hepatitis.
<i>Ficus tinctoria</i> Forst. f.	–	Moraceae	Roots and bark in stomachic; juice of roots in urinary and in visceral complaints.
<i>Firmiana colorata</i> (Roxb.) R.Br.	Khaukhim	Sterculiaceae	Plants for cholera.
<i>Galium elegans</i> Wallich ex Roxb.	–	Rubiaceae	Plants in sore throat and chest complaints.
<i>Garcinia cowa</i> Roxb. ex DC.	Chengkek	Clusiaceae	Decoction of leaves in dysentery and diarrhoea.
<i>Garcinia lanceaefolia</i> (G. Don) Roxb.	Pelte	Clusiaceae	Leaf infusion as stomachic and diuretic.
<i>Garcinia pedunculata</i> G. Don		Clusiaceae	Leaves in round worms.
<i>Garcinia sopsapia</i> (Buch.-Ham) Mabberley	Vaunva	Clusiaceae	Bark and twig is powdered and applied on snake bite and also used as snake repellent.
<i>Garcinia xanthochymus</i> Hook.f. ex T. Anderson	Thehnusaw	Clusiaceae	Fruits used as cooling, cholagogue, emollient, antiscorbutic and demulcent.
<i>Gardenia campanulata</i> Roxb.	–	Rubiaceae	Fruits as fish poison, larvicide, cathartic and anthelmintic.
<i>Garuga pinnata</i> Roxb.	Bunghu-tuairam	Burseraceae	Fruits as stomachic; juice of stems in eye problems; juice of leaves with honey in asthma.

Name	Local name	Family	Uses
<i>Gelsemium elegans</i> Benth.	Hnamur	Loganiaceae	Small amount of root is taken in stomach piers; juice of roots is given in ringworm.
<i>Geniosporum tenuiflorum</i> (L.) Merr.	–	Lamiaceae	Roots given in malarial fever; plants in snake bite and scorpion sting, mosquitoes bites; leaves in ear problems, bronchitis, used as diaphoretic, expectorant and antiperiodic; seeds in urine problems.
<i>Geranium nepalense</i> Sweet	–	Geraniaceae	Plants used in renal diseases and as astringent.
<i>Girardinia diversifolia</i> (Link.) Fries	Kangthai	Urticaceae	Root paste against food allergy.
<i>Glycosmis pentaphylla</i> (Retz.) DC.	..	Rutaceae	Root paste with sugar in low fever; wood in snake bite.
<i>Gmelina arborea</i> Roxb.	Thlanvawng	Verbenaceae	Juice of leaves as demulcent, in gonorrhoea, cough and cold and to remove foetid discharges and worms from ulcers; roasted fruit dust externally in itches.
<i>Gnaphalium luteo-album</i> L.	–	Asteraceae	Leaves as astringent, vulnerary, diuretic and febrifuge.
<i>Gossypium arboreum</i> L.	La	Malvaceae	Roots in fever; seeds in gonorrhoea, cystitis and eye problems.

Name	Local name	Family	Uses
<i>Gynocardia odorata</i> R.Br.	Sai-thei	Flacourtiaceae	Oil from seeds in leprosy and other skin diseases.
<i>Gynura</i> spp.	Buarzo	Asteraceae	Decoction of leaves in tuberculosis, cancer, dysentery, stomach ulcer; leaf paste externally in ulcer, scabies, wounds, skin diseases and dandruff.
<i>Haldina cordifolia</i> (Roxb.) Ridsdale	Lungkhop	Rubiaceae	Bark dust as antiseptic and febrifuge; bark juice in sores; dysentery and diarrhoea, also as vegetable.
<i>Hedera nepalensis</i> K.Koch	--	Araliaceae	Leaves and berries as stimulant, diaphoretic catarrhal; berries as purgative.
<i>Hedychium coccineum</i> J.E. Sm.	Aichhia	Zingiberaceae	Rhizome paste for bee sting and also applied to anus against pinworms.
<i>Hedychium spicatum</i> Sm. var. <i>spicatum</i>	Aithur	Zingiberaceae	Juice of rhizome for liver problems and body pain.
<i>Hedychium spicatum</i> var. <i>acuminatum</i> Wallich	Aithur	Zingiberaceae	Rootstocks used as tonic, stimulant, expectorant, in liver problem, vomiting, stomachic, diarrhoea, inflammatory and pains, also used in snake bite.
<i>Hedychium tenuiflorum</i> K. Schum.	Thingsawthing	Zingiberaceae	Juice of rhizomes to cure asthma, cough and colic.

Name	Local name	Family	Uses
<i>Hedyotis costata</i> (Roxb.) Kurz	—	Rubiaceae	Decoction of roots as lotion for rheumatism.
<i>Hedyotis scandens</i> Roxb.	—	Rubiaceae	Root paste in sprain; plant juice in eye problems.
<i>Helianthus annuus</i> L.	Nihawipar	Asteraceae	Seeds used as diuretic, expectorant, febrifuge, in bronchitis, stomache and also in pulmonary and laryngeal affections.
<i>Helicia excelsa</i> (Roxb.) Blume	Siadma	Proteaceae	Decoction of bark taken internally for stomachache, colic, ect.
<i>Helicia robusta</i> (Roxb.) R.Br. ex Blume	Pasal-takara, sial-hma	Proteaceae	The plant is used for poulticing; bruised leaves for healing sores; decoction of bark for stomachic.
<i>Heliotropium indicum</i> L.	—	Boraginaceae	Leaves applied to ulcers, wounds, insect stings and on boils.
<i>Hemistepta lyrata</i> Bunge ex C.E.C. Fischer	Phawngdamdawi	Asteraceae	Roots in gynaecological diseases.
<i>Hibiscus aculeatus</i> Roxb.	—	Malvaceae	Infusion of roots for hot weather.
<i>Hibiscus rosa-sinensis</i> L.	Chimpang-par.	Malvaceae	Leaf as laxative; flowers as aphrodisiac.
<i>Hibiscus sabdariffa</i> L.	Lekher-anthur	Malvaceae	Fruits and calyx, cooked with water, taken as vegetable, also used in colic

Name	Local name	Family	Uses
<i>Hibiscus surattensis</i> L.	Schnap	Malvaceae	Stems and leaves used in venereal diseases.
<i>Hibiscus sylvicus</i> L.	Saron-rosepar	Malvaceae	Bark and roots in dysentery; leaves given in stomachic; flowers used as diuretic and in skin diseases.
<i>Hodgsonia macrocarpa</i> (Blume) Cogn.	Khaum	Cucurbitaceae	Decoction of seeds is given in female diseases.
<i>Holarrhena pubescens</i> (Buch.-Ham.) Wallich ex G. Don	Thlengpa	Apocynaceae	Bark in dysentery, intestinal worms and dropsy; seeds as astringent, febrifuge, in fever, dysentery, diarrhoea and intestinal worms.
<i>Homonota riparia</i> Lour.	-	Euphorbiaceae	Decoction of roots in piles, bladder stones and venereal diseases, roots as laxative, diuretic and in urinary problems.
<i>Houttuynia cordata</i> Thunb.	Vaithiothang	Saururaceae	Roots as diuretic; leaves for measles and dysentery.
<i>Hydnocarpus kuzi</i> (King) Wagh	Khawitut	Flacourtiaceae	Fruits as fish poison; seed oil in skin diseases and in leptosy.
<i>Hydrocotyle javanica</i> Thunb.	Hlovaldawt, Durbengbur	Apiaceae	Leaves as tonic, blood purifier, in indigestion, nervousness, dysentery and eyesore.
<i>Hypericum japonicum</i> Thunb. ex Murray	-	Hypericaceae	Plants in asthma, alternative, dysentery and as astringent.

Name	Local name	Family	Uses
<i>Hypoxis aurea</i> Lour.	–	Hypoxidaceae	Roots in jaundice.
<i>Ilex umbellulata</i> (Wallich) Loes.	Thinguisahni	Aquifoliaceae	Bark paste with pig food for diseases in pigs.
<i>Impatiens chinensis</i> L. var. <i>chinensis</i>	Hawjlo	Balsaminaceae	Plants used externally for burns and wounds and taken orally in gonorrhoea.
<i>Imperata cylindrica</i> (L.) Raeusch.	IX	Poaceae	Roots for intestinal worms.
<i>Ipomoea alba</i> L.		Convolvulaceae	Plant paste is given in snake bite.
<i>Ipomoea batatas</i> (L.) Lam.	Kawlbahra	Convolvulaceae	Plants as laxative and used in poultice; paste of roots or leaves in scorpion stings.
<i>Ipomoea nil</i> (L.) Roth	–	Convolvulaceae	Seed paste as purgative.
<i>Jasminum grandiflorum</i> L.	–	Oleaceae	Plants as antihelminthic and diuretic; leaves chewed in mouth ulcers; fresh juice in corn and ear problems; flowers in skin diseases, headache, eye problems and in skin diseases.
<i>Jasminum nervosum</i> Lour.	Iruikha	Oleaceae	Leaf infusion taken internally to cure stomachache and diarrhoea.
<i>Jasminum scandens</i> Vahl	–	Oleaceae	Roots in ringworm.
<i>Jatropha curcas</i> L.	Kangdamdawi	Euphorbiaceae	Juice of stems in burns.

Name	Local name	Family	Uses
<i>Justicia adhatoda</i> (L.) Nees.	Kawldai	Acanthaceae	Leaves in rheumatism, also as insecticidal; leaves and roots in cough, cold, bronchitis, asthma and pulmonary tuberculosis; flowers, leaves and roots as antiseptic and antispasmodic.
<i>Justicia simplex</i> D. Don	-	Acanthaceae	Plants used in cough, asthma, rheumatism, back pain, as laxative and diuretic; leaves in ophthalmia and in bone diseases.
<i>Kaempferia rotunda</i> L.	Tuktin-par	Zingiberaceae	Plants used in healing of wounds; tuber for mumps; roots in stomachic.
<i>Kalanchoe integra</i> (Medik.) O. Kuntze	-	Crassulaceae	Leaves used externally on cuts, wounds, burns and taken orally in cholera; plants poisonous to goat.
<i>Kyllinga nemoralis</i> (J.R. & G. Forst.) Nutch. & Dalz.	-	Cyperaceae	Antidote to poison, refrigerant and in fever.
<i>Lagerstroemia speciosa</i> (L.) Pers.	Thlado	Lythraceae	Roots as purgative and febrifuge; bark and leaves as purgative; decoction of leaves in jaundice; fruits used in mouth ulcer; seeds as narcotic.
<i>Laggera crispata</i> (Vahl) Hepper	Ramvaihlo	Asteraceae	Leaf juice applied externally on chronic ulcer or sores.

Name	Local name	Family	Uses
<i>Lannea coromandelica</i> (Houtt.) Merr.	Tawitawsuuk	Anacardiaceae	Bark and leaf juice applied externally on ulcers, swellings and wounds.
<i>Lantana camara</i> L. var. <i>aculeata</i> (L.) Moidenke	Hlingpang-par	Verbenaceae	Crushed leaves applied to cuts, ulcers and swellings.
<i>Leea indica</i> (Burm.f.) Merr.	—	Leeaceae	Roots in diarrhoea and dysentery; decoction of roots in severe thirst; roasted leaves applied externally on the head in vertigo.
<i>Lepidagathis incurva</i> Buch.-Ham. ex D. Don		Acanthaceae	Leaves chewed to relieve cough.
<i>Lepidagathis rigida</i> Dalz.	Vangvattur	Acanthaceae	Leaf juice as ear drops and to treat tooth worms.
<i>Lepionurus sylvestris</i> Blume	Anpangthuam	Opiliaceae	Decoction of leaves for throat pain.
<i>Lilium wallichianum</i> Schultes f.	Badai	Liliaceae	Dried bulb scales in pectoral problems.
<i>Lindernia ruelliioides</i> (Colson.) Pennell	—	Scrophulariaceae	Plant paste is given externally in skin worms.
<i>Linostoma decandrum</i> Wallich	—	Thymelaeaceae	Stems and fruits in fish poison.
<i>Lithocarpus pachyphylla</i> (Kurz) Rehder	Thil	Fagaceae	Bark as astringent.
<i>Litsea cubeba</i> (Lour.) Pers.	Semam	Lauraceae	Fruits edible.
<i>Litsea monopetala</i> (Roxb.) Pers.	Nauthak	Lauraceae	Bark as astringent, in diarrhoea and loss of micturary.

Name	Local name	Family	Uses
<i>Lobelia angulata</i> Forst.	-	Campanulaceae	Leaves in dysentery, diarrhoea, ulcers and in night blindness.
<i>Lonicera macrantha</i> (D. Don) Spreng.	Leihuisen	Caprifoliaceae	Leaf juice in dysentery; dry flowers as diuretic.
<i>Lygodium japonicum</i> (Thunb.) Sw.	-	Schizaeaceae	Decoction of young shoots is used as diuretic and cathartic.
<i>Lyonia ovalifolia</i> (Wallich) Drude	Tlangham	Ericaceae	Young twigs poisonous to goats, insects. infusion in skin diseases.
<i>Maesa indica</i> (Roxb.) Wallich	-	Myrsinaceae	Roots in syphilis; leaves as fish poison; berries as anthelmintic.
<i>Maesa montana</i> DC.	Arangeng	Myrsinaceae	Young shoots in dysentery and stomachic.
<i>Maesa ramentacea</i> Wallich	-	Myrsinaceae	Leaves juice for itches and other skin diseases.
<i>Muhonia borealis</i> Takeda	Pualeng	Berberidaceae	Roots contain alkaloids.
<i>Mahonia pycnophylla</i> (Fedde) Takeda	Pualeng	Berberidaceae	Berries as diuretic and in dysentery.
<i>Mallotus leucocarpus</i> (Kurz) Airy-Shaw	Sikiah	Euphorbiaceae	Root decoction for stomach problems.
<i>Mallotus philippensis</i> (Lam.) Muell.-Arg.	Thingkhei	Euphorbiaceae	Trichomes and glands of fruits applied on scabies and herpes.

Name	Local name	Family	Uses
<i>Mallotus roxburghianus</i> Muell.-Arg.	Zadngtenawhlung	Euphorbiaceae	Decoction of leaves is taken to cure diabetics.
<i>Mangifera indica</i> L.	Theihai	Anacardiaceae	Decoction of young leaves in diarrhoea; fruits edible.
<i>Manihot esculenta</i> Crantz	Panghal	Euphorbiaceae	Leaf juice applied on headache, skin diseases and on ringworms.
<i>Marsilea minuta</i> L.	Siakthur	Marsileaceae	Juice of leaves applied externally on eye problems.
<i>Meizotropis buteiformis</i> Voigt	Tiualthu	Fabaceae	Seeds as purgative and antihelminthic.
<i>Melastoma malabathricum</i> L.	Builukham	Melastomataceae	Leaves in dysentery, diarrhoea and on cuts; leaves and flowers in leucorrhoea.
<i>Melocalamus mastersii</i> (Munro) R. Majumdar	Sairil	Poaceae	Juice of stems in influenza.
<i>Melodinus monogynus</i> Roxb.	—	Apocynaceae	Roots, wood and leaves as anti malarial drug; plants as fish poison.
<i>Melothria heterophylla</i> (Lour.) Cogn.	Zawngawn-pawng	Cucurbitaceae	Juice of roots with milk, sugar and cumin for spermatorrhoea.
<i>Mentha arvensis</i> L.	Pudina	Lamiaceae	Dried plants as antispasmodic, carminative, refrigerant and diuretic; leaves in asthma.

Name	Local name	Family	Uses
<i>Merremia umbellata</i> (L.) Hallier f.	Vavkhesentil	Convolvulaceae	Plants in fistula and tumors; seeds used in skin diseases; climber tied round the waist to relieve pain; leaves for poulticing.
<i>Merremia vitifolia</i> (Burm. f.) Hallier	—	Convolvulaceae	Root eaten raw in stomachic.
<i>Mesua ferrea</i> L.	Hershe	Clusiaceae	Bark as astringent; leaves and flowers in snake bite and scorpion sting; flower buds in dysentery; flower as astringent; unripe fruits as aromatic and sudorific; seed oil in scabies.
<i>Michelia champaca</i> L.	Ngiau	Magnoliaceae	Roots as purgative; bark as astringent, expectorant, febrifuge and stimulant; leaves with honey given in colic; flowers oil for ophthalmia and gout; flowers and fruits as antispasmodic, tonic, stomachic, carminative, in renal diseases, nausea, fever, etc; seeds and fruits applied externally for healing cracks in feet.
<i>Micromelum minutum</i> (Forst. f.) Wight & Arn.	Nauteninnam	Rutaceae	Stem bark for dysentery.
<i>Mikania micrantha</i> Kunth	Japau-hlo	Asteraceae	Leaf juice on cuts; leaves boiled with <i>Vitex peduncularis</i> are taken against malarial fever, diarrhoea and dysentery.

Name	Local name	Family	Uses
<i>Millettia pachycarpa</i> Benth.	Rulei	Fabaceae	Roots in scabies and skin diseases.
<i>Millettia piscidia</i> Wight	Ruteng	Fabaceae	Bark and flowers as fish poison.
<i>Mimosa invisa</i> C. Martius ex Cola	Dihjo	Mimosaceae	Infusion of roots to dissolve kidney and gall bladder stones.
<i>Mimosa pudica</i> L.	Hlowar	Mimosaceae	Leaves and roots in piles and fistula; leaves and stems in scorpion sting; leaves paste in hydroceal.
<i>Mirabilis jalapa</i> L.	Aratukkhuan	Nyctaginaceae	Roots, boiled with water, taken for diabetes.
<i>Mitragyna rotundifolia</i> (Roxb.) O. Kuntze.	Thinglung, Lingkhup	Rubiaceae	Leaves and bark in paralysis and sympathetic nerve endings.
<i>Molineria capitulata</i> (Lour.) Herb.	Phaiphek	Hypoxidaceae	Paste of tuber for stomachache and on cuts and wounds.
<i>Mollugo pentaphylla</i> L.	-	Molluginaceae	Plants in stomachic.
<i>Momordica charantia</i> L.	Changkha	Cucurbitaceae	Decoction of fruits and leaves in high blood pressure.
<i>Monochoria hastata</i> (L.) Solms.	-	Pontederiaceae	Plants in insanity, and as a tonic; leaves in boils.

Name	Local name	Family	Uses
<i>Morinda angustifolia</i> Roxb.	Lum	Rubiaceae	Leaves paste on cracks in the feet.
<i>Moringa oleifera</i> Lam.	-	Moringaceae	Leaves and flowers as vegetable medicine.
<i>Morus alba</i> L.	Thingtheihmu	Moraceae	Bark as purgative; fruits edible and as refrigerant in fever and throat problems.
<i>Morus australis</i> Poir.	Lungli	Moraceae	Roots as astringent; bark as purgative; stem juice in sores; leaves boiled with water used in throat problems; fruits as laxative.
<i>Morus macroura</i> Miq.	Hmubelbing	Moraceae	Milky latex externally for sores.
<i>Mucuna nigricans</i> (Lour.) Steudel	Khuangtum	Fabaceae	Stem juice in cough and cold.
<i>Mucuna pruriens</i> (L.) DC.	Ujema	Fabaceae	Roots as purgative, diuretic, febrifuge in kidney problems and in dropsy; leaves given in ulcers; bristles of fruits as vermifuge, liver problems, gall bladder and parkinson disease.
<i>Murdannia nudiflora</i> (L.) Brenan	Dawng	Commelinaceae	Bruised plant applied externally on burns and itches; leaves for poulticing sores.
<i>Murraya koenigii</i> (L.) Spreng.	Arpatil	Rutaceae	Plants as tonic; roots, bark, and leaves as carminative and antidiabetic; leaves as febrifuge, in dysentery, kidney pain and eruptions.

Name	Local name	Family	Uses
<i>Murraya paniculata</i> (L.) Jack.	Mungthi, Mungthing	Rutaceae	Bark of roots is given for body pain; bark and stem given for diarrhoea; leaves given on cuts, used as stimulant, astringent also given in diarrhoea and dysentery.
<i>Musa balbisiana</i> Colla	Buhla	Musaceae	Roots used as anthelmintic; stems in hysteria, cholera, dysentery and diarrhoea; leaves in burns; flowers and fruits with curd in dysentery.
<i>Mussaenda glabra</i> Vahl	Vakep	Rubiaceae	Roots and leaves in cough; flowers in asthma, fevers and dropsy.
<i>Myrica esculenta</i> Ham.	Keifang	Myricaceae	Bark as astringent, carminative and antiseptic; also used in asthma, cough, cold and headache.
<i>Neolamarkia cadamba</i> (Roxb.) Bosser	Baaphur	Rubiaceae	Bark as tonic, febrifuge, astringent and in snake bite; decoction of leaves in stomachic; the ripe fruit eaten raw or cooked.
<i>Nervelia plicata</i> (Andr.) Schltr.	Hnahkhat	Lamiaceae	Root and leaf paste in stomachache, chest pain, burns, diarrhoea and dysentery.
<i>Nicotiana tubacum</i> L.	Vahlo	Solanaceae	Leaves in skin diseases, scorpion sting, rheumatism and fish poison; also as sedative, narcotic, emetic and antispasmodic.
<i>Nymphoides indicum</i> (L.) O. Kuntze	—	Limnanthaceae	Dried plants in fever and jaundice; also used as substitute for Chiretta.

Name	Local name	Family	Uses
<i>Ocimum americanum</i> L.	-	Lamiaceae	Leaves in skin diseases.
<i>Ophloglossum gramineum</i> Willd.	-	Ophloglossaceae	Plant paste in wounds.
<i>Oroxylum indicum</i> (L.) Kurz	Archangkawu	Bignoniaceae	Roots bark as astringent, tonic, in dysentery; stems in scorpion sting; fruits as carminative; seeds as purgative.
<i>Orthosiphon aristatus</i> (Blume) Miq.	Zunthlunkung	Lamiaceae	Dried leaves for kidney problems; leaf juice for diabetes and as diuretic.
<i>Oryza collina</i> (Tri.) Sharma & Shastri	Buh	Poaceae	Decoction of straw in urinary problems and in kidney stone.
<i>Orybeckia stellata</i> Ker-Gawl.	Builukham	Melastomataceae	Decoction of leaves in toothache.
<i>Oxalis corniculata</i> L.	Sialthur	Oxalidaceae	Leaves as antiscorbutic, refrigerant and in stomachic.
<i>Oxyropa paniculata</i> (D. Don) DC.	Khampar, Builukhampa	Melastomataceae	Root paste in heart, stomach, kidney problems and in bleeding of nose.
<i>Paederia scandens</i> (Lour.) Merr.	Vawih-uil-lui	Rubiaceae	Plants for rheumatism; leaves as astringent, toothache, gum-boil and in diarrhoea.
<i>Pajanelia longifolia</i> (Willd.) K. Schum	Ramsarchangkadam	Bignoniaceae	Paste of leaves and young foliage twig applied to cure bone fracture.

Name	Local name	Family	Uses
<i>Panicum incompum</i> Trin.	—	Poaceae	Roots in throat problems.
<i>Parubarium hookeri</i> Pierre	Thikekibawr	Apocyanaceae	Latex applied on cuts and wounds.
<i>Parkia timoriana</i> (DC.) Merr.	Zawngtah	Mimosaceae	The skin of young pods scrapped off and made into paste and applied on scabies; green pods used as vegetable.
<i>Passiflora edulis</i> Sims.	Sapthei	Passifloraceae	Fruits in jaundice.
<i>Passiflora nepulensis</i> Wallich	Navawimu	Passifloraceae	Root juice in fever.
<i>Pavetta indica</i> L. var. <i>tomentosa</i> (Roxb. ex Smith) Hook. f.	Thainurual	Rubiaceae	Roots with ginger and rice water in dropsy.
<i>Pericampylus glaucus</i> (Lam.) Merr.	Nambiel	Menispermaceae	Roots antidote to snake poison.
<i>Phyllanthus acidus</i> (L.) Skeels	Kawlsunhlu	Euphorbiaceae	Fruits edible, and also as astringent; roots in snake bite.
<i>Phyllanthus emblica</i> L.	Sinhlul	Euphorbiaceae	Roots and barks as astringent; fruits in diarrhoea, dysentery, anaemia, jaundice, dyspepsia, haemorrhage, cough and cold; exudation from incision on the fruit as external application in inflammation of the eyes.
<i>Phyllanthus fraternus</i> Wcbs.	Mithi-sunhlu	Euphorbiaceae	Decoction of plants for diabetes and jaundice; leaves chewed to check hiccup.

Name	Local name	Family	Uses
<i>Physalis minima</i> L.	Kela-sairawphit	Solanaceae	Leaf juice with mustard oil and water for carache; fruits as tonic.
<i>Picrosma javanica</i> Blume	Thingdamdawi	Simaroubaceae	Bark in fever.
<i>Piloselloides hirsuta</i> (Forsk.) C. Jeffrey	-	Asteraceae	Infusion of root with milk in chest complaints.
<i>Pimpinella diversifolia</i> DC.	-	Apiaceae	Plants as carminative.
<i>Piper betle</i> L.	Pandawng	Piperaceae	Roots as contraceptive; leaves in snake bite and eye problems.
<i>Piper nigrum</i> L.	-	Piperaceae	Fruits in piles, skin-diseases, fever, weakness, vertigo, coma, dyspepsia, etc.
<i>Piper peepuloides</i> Roxb.	-	Piperaceae	Roots in leprosy.
<i>Pittosporum napaulense</i> (DC.) Rehder & Wilson	-	Pittosporaceae	Bark in bronchitis, snake bite, as febrifuge and narcotic; oil as tonic, in rheumatism and leprosy.
<i>Plantago major</i> L.	-	Plantaginaceae	Leaves in medicine; seeds in inflammation of alimentary canal and in haematuria.
<i>Plumeria rubra</i> L. var. <i>acutifolia</i> (Poir.) Woodson	Vaingai	Apocynaceae	Root bark in herpes and venereal sores.

Name	Local name	Family	Uses
<i>Podocarpus nerifolius</i> D. Don	Thlangfar	Podocarpaceae	Bark juice applied externally on centipede bite.
<i>Pogonatherum crinitum</i> (Thunb.) Kunth	-	Poaceae	Plant ash for skin diseases.
<i>Pogostemon auricularius</i> (L.) Hassk.	-	Lamiaceae	Decoction of plants applied externally for rheumatism.
<i>Pogostemon pubescens</i> Benth.	-	Lamiaceae	Roots in snake bite, scorpion sting and haemorrhage; fruits and leaves in wounds.
<i>Poikilospermum suaveolens</i> (Blume) Merr.	-	Moraceae	Watery sap of stem in eye problem; roots for poulticing itches.
<i>Polyalthia longifolia</i> Benth. & Hook. f.	-	Annonaceae	Bark used as febrifuge.
<i>Polyalthia simiarum</i> (Hook. f. & Thomson) Hook. f. & Thomson	Zathu, Heiruwt	Annonaceae	Bark for scorpion sting.
<i>Polygala arillata</i> Buch.-Ham. ex D. Don	-	Polygalaceae	Roots for headache, as purgative and febrifuge.
<i>Polygonum barbatum</i> L.	Anbawng	Polygonaceae	Seeds for colic.
<i>Polygonum chinense</i> L.	Tahan	Polygonaceae	Plants juice as tonic.
<i>Polygonum glabrum</i> Willd.	-	Polygonaceae	Plant as febrifuge; leaves in colic pains.
<i>Polygonum nepalense</i> Meissa.	-	Polygonaceae	Leaves applied externally on swellings.
<i>Potentilla lineata</i> Trevit. ex Reich.	-	Rosaceae	Roots for gum and teeth, also in diarrhoea.

Name	Local name	Family	Uses
<i>Potentilla sondaica</i> (Blume) O. Kuntze	—	Rosaceae	Plants as astringent; roots and stem as tonic in snake and centipede bite.
<i>Pothos scandens</i> L.	—	Araceae	Stems in snake bite and small pox; also good for asthma.
<i>Prunus cerasoides</i> D. Don	Thuzawng	Rosaceae	Bark in fever and malaria.
<i>Psidium guajava</i> L.	Kawlthei, Kawiam	Myrtaceae	Bark of roots as astringent and in diarrhoea; leaves as astringent, arresting vomiting and diarrhoea; fruit in ulcers, also edible.
<i>Pteridium aquilinum</i> (L.) Kuhn.	Katchat	Polypodiaceae	Rhizome and fruits in chronic visceral and spleen problems.
<i>Pteris ensiformis</i> Burm. f.	—	Polypodiaceae	Rhizomes in neck problems; fronds as astringent and in dysentery.
<i>Pterospermum acerifolium</i> (L.) Willd.	Siksilthing	Sterculiaceae	Bark, flowers applied externally with orange for small pox; flowers as tonic, blood purifier, in ulcers, tumors, leprosy, inflammation, etc.
<i>Pueraria lobata</i> (Willd.) Ohwi	Bepui	Fabaceae	Roots poisonous; seeds as febrifuge, antispasmodic and in stomachache.
<i>Punica granatum</i> L.	Theibuhfai	Punicaceae	Root bark and stems as astringent, in tape worms; fruits and rind of fruits used in diarrhoea

Name	Local name	Family	Uses
<i>Quercus leucotrichophora</i> A. Camus	Tien, Phen	Fagaceae	and dysentery; fruits edible, juice as refrigerant; seeds as stomachic; pulp useful in cardiac problems and in stomachic. Acorns in gonorr, diarrhoea, asthma, indigestion and as diuretic.
<i>Ranunculus cantoniensis</i> DC.	Hnat	Ranunculaceae	Plants used to rise blisters.
<i>Raphanus sativus</i> L.	Buluhi	Brassicaceae	Roots in piles, urinary complaints; leaves as diuretic and laxative; seeds as expectorant, diuretic and carminative.
<i>Rauwolfia serpentina</i> (L.) Benth. ex Kurz.	.	Apocynaceae	Roots given in insanity, epilepsy, blood pressure, schizophrenia, psychoses, etc.
<i>Rhaphidophora hookeri</i> Schott	Thiatlawu	Araceae	Mixture of crushed stem juice and fatty oil of <i>Buceros bicornis</i> given to pregnant woman for smooth delivery.
<i>Rhus chinensis</i> Miller	Khawmhong	Anacardiaceae	Fruits edible, also used in colic and dysentery; leaves as fodder.
<i>Rhus succedanea</i> L.	Chiantouk	Anacardiaceae	Leaves used as fodder, also given in blister; fruits in treatment of phthisis.
<i>Ricinus communis</i> L.	Mutih	Euphorbiaceae	Leaves applied externally for headache and boils; seed oil as purgative.

Name	Local name	Family	Uses
<i>Rorippa dubia</i> (Pers.) Hara	-	Brassicaceae	Plants as diuretic, stimulant and antiscorbutic; seeds as laxative and in asthma.
<i>Rubus alceaeifolius</i> Poir.	-	Rosaceae	Leaves as astringent; fruits for nocturnal micturition (urination) of children.
<i>Rubus ellipticus</i> Sm.	Hmutau	Rosaceae	Roots in dysentery and diarrhoea.
<i>Rungia pectinata</i> (L.) Nees.	-	Acanthaceae	Roots as febrifuge; leaves in swellings; leaf juice given in small pox.
<i>Saccharum officinarum</i> L.	Fu	Poaceae	Stem juice in jaundice.
<i>Salix tetrasperma</i> Roxb.	Tuipuisuthlah	Salicaceae	Bark as febrifuge.
<i>Salomonina cantoniensis</i> Lour.	-	Polygalaceae	Plants in mouth ulcer.
<i>Sapindus mukorossi</i> Gaertn.	Hlingsi	Sapindaceae	Fruits as expetorant, fish poison; also as substitute for soap.
<i>Sapium insigne</i> (Royle) Benth. ex Hook. f.	Thinvawkpui	Euphorbiaceae	Milky latex in acidity, as vesicant.
<i>Saraca asoca</i> (Roxb.) De Wilde	Mualhawih	Caesalpinaceae	Bark as astringent, in uterine infection, gonorr and scorpion sting.
<i>Sarcoocca soligna</i> (D. Don.) Muel.-Arg.	-	Bixaceae	Plant as febrifuge and in rheumatism.
<i>Saurauia napaulensis</i> DC.	-	Actinidiaceae	Bark as anaesthesia and antiseptic.

Name	Local name	Family	Uses
<i>Schefflera venulosa</i> (Wight & Arn.) Harms	Kelbuh	Araliaceae	Fruit juice is applied on sprains.
<i>Schinus molle</i> (DC.) Korthals	Khiang	Theaceae	Bark irritates skin and as anthelmintic and rubefacient.
<i>Schizostachyum capitatum</i> (Munro) R. Majumdar	Rawngal	Poaceae	Leaves in stomachic.
<i>Securinega virusa</i> (Roxb. ex Willd.) Baill.	Saisiak	Euphorbiaceae	Leaves boiled with water and used for bathing children suffering from scabies and measles; leaf juice with tobacco leaves used as vermifuge.
<i>Sesamum orientale</i> L.	Chhawn-chhi	Pedaliaceae	Seed oil applied externally on scabies.
<i>Smilax glabra</i> Roxb.	Tluangngil	Smilacaceae	Decoction of rhizome is taken for gynaecological problems.
<i>Smilax lanceaefolia</i> Roxb.	Kaiha	Smilacaceae	Roots for rheumatism.
<i>Smilax ovalifolia</i> Roxb.	Kaihapui	Smilacaceae	Root decoction for jaundice; roots ground with those of <i>Bridelia tomentosa</i> and paste applied for rheumatic pain and gonorrhoea.
<i>Smilax perfoliata</i> Lour.	-	Smilacaceae	Roots with milk or old molasses in blood dysentery.
<i>Smilax zeylanica</i> L.	-	Smilacaceae	Roots in dysentery and venereal diseases.

Name	Local name	Family	Uses
<i>Solanum anguivi</i> Lamk.	Santawk	Solanaceae	Roots in toothache and in fever; leaves vomiting; fruits with sugar applied externally for itches.
<i>Solanum melongena</i> L.	Bawkbawn	Solanaceae	Leaves as narcotic; seeds as stimulant.
<i>Solanum myriacanthum</i> Dun.	Rujpuk	Solanaceae	The burning smoke of berries in tooth problems.
<i>Solanum torvum</i> Swartz	Tawkpui	Solanaceae	Fruits in spleen problem.
<i>Solanum tuberosum</i> L.	Alu	Solanaceae	Paste of tuber in burns.
<i>Solanum viarum</i> Dunál	Athlo	Solanaceae	Smoke of burnt fruits and seeds sucked through pipe to expel tooth worms.
<i>Sonchus wightianus</i> DC.	—	Asteraceae	Roots given in jaundice.
<i>Spilanthes calva</i> DC.	—	Asteraceae	Inflorescence in ulcers of tongue.
<i>Spinacia oleracea</i> L.	Tamnem	Chenopodiaceae	Young shoots given in urinary problem; leaves given in inflammation of lungs and bowels.
<i>Spondias pinnata</i> (L.f.) Kurz	Tawitaw	Anacardiaceae	Bark in dysentery and rheumatism; leaves in earic; fruits in dyspepsia.
<i>Sterculia urens</i> Roxb.	Pangkhu	Sterculiaceae	Gum in throat problems.

Name	Local name	Family	Uses
<i>Sterculia villosa</i> Roxb.	Khaupti	Sterculiaceae	Barks in dysentery and diarrhoea.
<i>Stereospermum chelonoides</i> (L.f.) DC.	Zinghal	Bignoniaceae	Decoction of leaves is used as febrifuge and applied on itches.
<i>Stereospermum fimbriatum</i> (Wallich) DC.	Zihaw.	Bignoniaceae	Decoction of young shoots for stomachic.
<i>Stereospermum neuranthum</i> Kurz	Zihad	Bignoniaceae	Wood vinegar in chronic ulcer, sores and skin diseases.
<i>Stereospermum colais</i> (Dillw.) Mabberley	–	Bignoniaceae	Leaves and flowers as febrifuge; fruits for scorpion sting.
<i>Strobilanthes auriculatus</i> Nees	Ramting	Acanthaceae	Pounded leaves rubbed on the body during temperature fall of intermittent fever.
<i>Styrax serrulatum</i> Roxb.	–	Styracaceae	Resin used externally as antiseptic.
<i>Swertia angustifolia</i> Buch.-Ham. ex D. Don var. <i>pulchella</i> Burkill	–	Gentianaceae	Plants as tonic and antiperiodic.
<i>Swertia paniculata</i> Wallich	–	Gentianaceae	Plant as tonic and laxative.
<i>Symplocos paniculata</i> (Thunb.) Miq.	–	Symplocaceae	Bark used in ophthalmia.
<i>Symplocos racemosa</i> Roxb.	–	Symplocaceae	Bark in gum problems and in eye diseases.

Name	Local name	Family	Uses
<i>Synotis cappa</i> (Buch.-Ham. ex D. Don) Jeffery & Y.L. Chen	—	Asteraceae	Leaves applied to boils as emollient and maturant.
<i>Syzygium cumini</i> (L.) Skeels	Hmaipui	Myrtaceae	Fruit pulp in stomachic and as diuretic.
<i>Tabernaemontana divaricata</i> (L.) R. Br.	Pararsi	Apocynaceae	Roots chewed for toothache; milky latex for eye trouble.
<i>Tagetes erecta</i> L.	Dehtkan	Asteraceae	Leaves given in caric, boils and carbuncles; flowers used in eye problem, bleeding of piles and as blood purifiers.
<i>Tamarindus indicus</i> L.	Teng-te-re	Caesalpinaceae	Fruits digestive, laxative, refrigerant and carminative; cotyledons applied externally in snake bite.
<i>Taranna odorata</i> (Roxb.) Robins	Khalagorsong	Rubiaceae	Root paste consumed with water for snake bite.
<i>Taxus wallichiana</i> (L.) Zucc.	—	Taxaceae	Plants used as fish poison; leaves in asthma, bronchitis, indigestion and epilepsy; leaves and fruits sedative and anti spasmotic.
<i>Tectona grandis</i> L. f.	Teak, Tiawr	Verbenaceae	Bark as astringent; wood paste applied externally for swelling; taken orally in dyspepsia; flowers as diuretic; oil from nuts promotes hair growth.

Name	Local name	Family	Uses
<i>Terminalia arjuna</i> (Koxb.) Wight & Arn.	Char-buang	Combretaceae	Decoction of bark for dressing ulcers; leaf juice is in earic.
<i>Terminalia bellirica</i> (Gaertn.) Roxb.	—	Combretaceae	Fruits as astringent, laxative, tonic, in diarrhoea, dyspepsia, leprosy and headache.
<i>Terminalia catappa</i> L.	Vainkhal	Combretaceae	Bark as diuretic; leaves for skin diseases and in leprosy.
<i>Terminalia chebula</i> Retz.	Reraw	Combretaceae	Bark as cardiotoxic and diuretic; fruits in diarrhoea and dysentery, as laxative, alternative and tonic.
<i>Terminalia citrina</i> (Gaertn.) Flem.	Reraw	Combretaceae	Fruits used as laxative.
<i>Terminalia myriocarpa</i> Houtck et Muell.-Arg.	Chur	Combretaceae	Bark as cardiac stimulant and diuretic.
<i>Tetrastigma leucostaphylum</i> (Dennsl.) Alston ex Mabblerley		Vitaceae	Leaves applied externally to boils.
<i>Thespesia lampas</i> (Cav.) Daly & Gibs.	—	Malvaceae	Roots and fruits in gonorrhoea and syphilis; poulticed leaves applied externally in boils.
<i>Thunbergia grandiflora</i> (Roxb. ex Rottl.) Roxb.	Zawngifun, Vako.	Acanthaceae	Leaf juice taken orally for stomach problems; leaves applied externally on boils.

Name	Local name	Family	Uses
<i>Tinospora cordifolia</i> (Wallich) Miers ex Hook. f. & Thomson	Theisawaltung	Menispermaceae	Juice of fresh plants in gonorrhoea and as diuretic.
<i>Toddalia asiatica</i> (L.) Lam.	—	Rutaceae	Plants as febrifuge and bark as tonic.
<i>Toona ciliata</i> M. Roem.	Tai	Meliaceae	Bark as astringent, tonic, antiperiodic, dysentery and applied externally on ulcers.
<i>Trema orientalis</i> (L.) Blume	Belpuar	Ulmaceae	Plant juice in epilepsy.
<i>Trevesia palmata</i> (Roxb.) Vis.	Kuwhte-bel	Araliaceae	Juice of leaf stalks taken for colic, high blood pressure and stomachache.
<i>Trichosanthes anguina</i> L.	Berul	Cucurbitaceae	Fruits as purgative, emetic and anthelmintic.
<i>Uncaria sessilifructus</i> Roxb.	Ralsamkuai	Rubiaceae	Boiled leaves and young shoots for throat problems.
<i>Uraria crinita</i> (L.) Desv. ex DC.	—	Fabaceae	Plants antidote to snake bite; fruit juice as mouth wash for children.
<i>Urena lobata</i> L.	Leithu	Malvaceae	Roots applied externally for rheumatism, also as diuretic.
<i>Verbena officinalis</i> L.	..	Verbenaceae	Roots in snake bites; plants used in nervous problems; leaves used as tonic and febrifuge.
<i>Vernonia squarrosa</i> (D. Don) Less.	—	Asteraceae	Plants in wounds, ulcers, for dysmenorrhoea and dropsy.

Name	Local name	Family	Uses
<i>Viola pilosa</i> Blume	—	Violaceae	Plants antipyretic, diaphoretic and febrifuge; flowers in lung problems.
<i>Viscum articulatum</i> Burm. f.	Lengpat	Loranthaceae	Plants for fever
<i>Vitex peduncularis</i> Wallich ex Schauer	Thinghawitu	Verbanaceae	Stem bark boiled in water and used for patients suffering from malarial fever and black fever.
<i>Wrightia arborea</i> (Donnast.) Mabbasley		Apocynaceae	Bark in menstrual and renal complaints.
<i>Xylia xylocarpa</i> (Roxb.) Taub.	Thing-uk.	Mimosaceae	Bark in leprosy, gonorrhoea, worms, diarrhoea and vomiting; oil seeds in piles and leprosy.
<i>Zanthoxylum armatum</i> DC.	Alikikrah	Rutaceae	Thorns, young stems and fruits as fish poison, in stomacheic and tooth problems; seeds and bark in fever, cholera and dyspepsia.
<i>Zanthoxylum rhetsa</i> (Roxb.) DC.	Chingit	Rutaceae	Leaves as vegetable; berries as fish poison.
<i>Zea mays</i> L.	Yammi	Poaceae	Grain nutritive and used as astringent.
<i>Zingiber officinale</i> Roscoe	Sawthing	Zingiberaceae	Rhizomes as stimulant, carminative, dyspepsia and also as a flavouring agent.
<i>Zingiber purpureum</i> Roscoe	Ranthing	Zingiberaceae	Rhizomes as stimulant, tonic, in dyspepsia and also is flavouring agent.
<i>Lizaphus mauritiana</i> Lam.	Kawrsinhto	Khamnaceae	Decoction of roots for fever and powdered roots applied on ulcers.

The other major cause responsible for forest degradation was the large scale encroachment on the forest land by the local people on account of not having proper demarcation on the ground. In the absence of proper records and boundary demarcations, land settlement permits are issued by the revenue department even in reserve forest areas, causing great difficulty and confusion for the effective management of forests by the forest authorities. According to a notification way back in 1956, the land within 0.8 km on either side of 16 major rivers and on Silchar - Aizawl national highway continued to remain as reserve forest on record. Whereas, the situation on ground is different. All along Silchar - Aizawl road, people have constructed permanent settlements and encroached large areas for their personal use. During insurgency period many villages were relocated along the roads and valleys within the reserve forests and people have settled permanently.

Conservation of plant diversity is one of the prime objective of today's needs as the forests are disappearing. In this direction the governmental and non-governmental organisations are continuously contributing their efforts. Although in terms of geographical area, the Mizoram has second highest forest cover in the country, but virgin forests are depleted and replaced by secondary and bamboo forests. As a result, many orchids, ornamentals and medicinal species have become threatened in nature and need protection. Mizoram has enacted many acts to safeguard, the forests, their produce and the land which harbour them. There are village safety reserves, village supply reserves and protected reserves in Mizoram. The Pawi Autonomous District Council (Forest) Act, 1976; Lakher Autonomous District Council (Forest) Act, 1981, and Mizoram District Council (Forest) Act, 1955, have ample powers to regulate the cutting of forests or any kind of activity in the forest areas in their jurisdiction. As the name indicates, the Village Safety Reserves have been constituted near villages for the protection of forests, for sustaining healthy environment, abundant water supply and protection against fire. The village supply reserves have been constituted to cater to the needs of village community. Under protected reserves the valuable forests are not allowed to be cut for the interest of village communities. For further protection of forests, the entire land within 0.8 km on either side of the sixteen major rivers (Tlawng or Dhaleswari, Tut or Gudur, Teirei or Pakna, Langkai, Chemlue, Serlui, Tuivai, Tuivawl, Tuirini, Tuirial or Sonai, Tuiruang or Barak, Khawthlang tuipui, Tuichawng, Kau, De and Phairuang) of the state and on Silchar-Aizawl road via Sairang has been constituted as Reserve forests

in 1956 as per provisions of Mizo District (Forest) Act, 1955. The riverine reserve forests cover an area of *ca* 4455 sq. km and road side reserves cover *ca* 418 sq. km.

In situ conservation is the best and most effective means to conserve species diversity in its natural habitats. The Government of Mizoram has already put in place protected area network, comprising two National Parks and four Wildlife Sanctuaries. Murlain National park with an area of *ca* 200 sq. km and Blue Mountain National park with an area of *ca* 50 sq. km were created in 1991 and 1997 respectively. Dampa Wildlife Sanctuary, now a Tiger reserve, covers an area of 500 sq. km and was constituted in 1985. Similarly Ngengpui Wildlife Sanctuary with an area of 170 sq. km, Khawnglung Wildlife Sanctuary with 41 sq. km and Lengteng with 120 sq. km area are also serving the cause of conservation. The management of these parks and sanctuaries needs to be strengthened for proper and effective conservation of both flora and fauna.

Orchid sanctuaries at Sairep, near Lungleh, and Ngopa, near Champhai have been set up by the state forest department to save orchids. Similarly more sanctuaries in the orchid rich habitats in different ecoclimatic zones, like Blue mountain, Mamit, North Vanlaiphai, Saithah would be desirable for preserving orchids. A gene sanctuary for rare and endemic plant *Mantisia wengeri* ('dancing girl') can also be set up near Darzo or Blue Mountain area.

Rare and threatened taxa can also be cultivated and multiplied in Botanic Gardens. Some such Botanic gardens need to be established in Aizawl, Lungleh and Sangau areas. *Ex situ* conservation can also be carried out by using tissue culture techniques. Infrastructural facilities for this can be created in research wing of state forest department. Thus, *in vitro* raised seedlings could, in future, be made available both for rehabilitation in the wild and for commercial purposes to check the depletion of wild populations. Jhum cultivation need to be tackled effectively and cleverly since jhuming is an integral part of the culture of Mizos. Public awareness is required to be created. Agroforestry system with new technologies should be introduced as an alternative means of jhuming system. All departments concerned with the development have to evolve policies which are beneficial and suitable in local conditions. All forest areas need to be demarcated on ground and boundary disputes settled amicably to check further encroachment on forest land by the local

inhabitants. Proper bamboo felling rules and extraction of other non wood forest produce regulations require to be introduced. Bamboo based industries can be established to improve the living standards of the local people. Plantations of cash crops, like banana, pineapple, oranges, papaya etc., need to be encouraged among jhumias. Finally, proper planning and judicious use of plant resources will naturally ensure the conservation of flora for future generations.

Materials and presentation of flora

The present floristic study is based mainly on the collections made by two of us (K.P.S & D.K.S) from different localities in the state during 1988-95, as also the collections made by earlier collectors and the species mentioned in literature.

All the specimens, collected by different scientists of the Regional circle of the Botanical Survey of India, Shillong are lodged in the Kanjilal Herbarium, of the Circle (ASSAM) and a duplicate set at Central National Herbarium of the Botanical Survey of India, Howrah (CAL). Collections of A.T. Gage, J.E. Leslie, Mrs. N.E. Parry and father Godfrey, deposited at CAL, have also been studied.

It is proposed to bring out flora of the state in three volumes dealing with flowering plants. Volume 1 includes Introductory chapter, like introduction, physiography, geology, drainage, forest types, economic plants, botanical studies, references; key to families; enumeration of 884 taxa under 403 genera distributed in 90 families of Angiosperms from Ranunculaceae to Asteraceae. The families are arranged according to the Bentham and Hooker's system of classification (1862-83) with little modifications as proposed by Hutchinson (1959) regarding splitting of the families. Within each family, genera and within the genus species are arranged alphabetically. The name of the species is followed by up to date nomenclature, in accordance with the International Code of Botanical Nomenclature (ICBN):

Dichotomous keys for identification of indigenous taxa from the rank of family to infraspecific level are given. The flora generally includes correct botanical name, basionym, if any and a very few selected synonyms, with original references and references to the Flora of British India by Sir J.D. Hooker (1872 - 1897), Flora of Assam by Kanjilal *et al.*

(1934 - 39), and Flora of Lushai hills by C.E.C. Fischer (1938). Wherever the species is not included in these floras, other recent literature have been cited. Local names, wherever available, have been provided in italicized form after citations, followed by language code within the bracket.

Brief descriptions of the species or the infraspecific taxa based on observations made on Mizoram specimens are provided. Whenever specimens are not available but reported from the area by earlier workers, the descriptions have been borrowed from the literature. Phenological data have been recorded from the field observations made by the authors as well as from the herbarium sheets examined during the study. At places ecological data, like relative abundance, habitat, etc., are also provided after phenological data. The specimens examined have also been cited. Unless otherwise mentioned, all the specimens examined are deposited in the Herbarium of Botanical Survey of India, Eastern Circle, Shillong (ASSAM). Specimens cited by earlier workers, but not seen by the authors are also cited quoting the source in bracket against specimen number. Few species are also reported just by their names in the literature. Their identity could not be ascertained. These species are just enumerated at the end of family wherever applicable for future reference. A general index to the botanical and local names has also been provided at the end.

REFERENCES

- Anonymous 1971. *North-Eastern Area (Reorganisation) Act, 1971* (27th amendment).
- Anonymous 1974. *Geological Survey of India (1974) Geology and Mineral Resources of states of India*, Part IV. Misc. Publication, pp. 93 - 98.
- Anonymous 1979. *Satellite Remote Sensing Survey of National Resources of Mizoram*. Remote Sensing Agency 1979, report Vol 1: 20.
- Anonymous 1986. *North-Eastern Area (Reorganisation) Act 1986* (53rd amendment).
- Anonymous 1999. *State of Forest Report 1999*. Forest Survey of India, Dehra Dun.
- Bathew, W.B. 1991. *Ten years perspective plan for Mizoram*, Forest department, Govt. of Mizoram.
- Bentham, G. & J.D. Hooker 1862-83. *Genera Plantarum*. 3 vols. London.
- Bor, N.L. 1938. A sketch of the vegetation of Aka hills, Assam-Synecological study. *Indian For. Rec. (NS) Bot.* 1(4): 103 - 221.
- Bor, N.L. 1940. Gramineae. In: Kanjilal *et al.*, *Flora of Assam* 5. Calcutta.
- Bor, N.L. 1942. Some remarks on Geology and the flora of Naga and Khasi hills, 150th anniversary volume. *Roy. Bot. Gard. Calcutta* 129 -135.
- Champion, H.G. & S.K. Seth 1968. *A Revised Survey of Forest Types of India*. Delhi.
- Chatterjee, S.K. 1951. Kirat janaskriti The Indo-Mongoloid. Their contribution to history and culture of India. *Royal Soc. Bengal, Calcutta* p. 77.

- Clarke, C.B. 1889. On the plants of Kohima and Muneypore. *J. Linn Soc. London* 25: 1 - 207.
- Deb, D.B & R.M. Dutta 1987. A contribution to the flora of Mizoram. *J. Econ. Tax. Bot.* 10(1): 21 -61.
- Fischer C.E.C. 1938. The flora of Lushai hills. *Rec. Bot. Surv. India* 12(2): 75 - 161.
- Gage, A.T. 1901. A botanical tour in the South Lushai hills. *Rec. Bot. Surv. India* 1: 361 - 369.
- Garbyal, S.S. 1996. Forestry management practices in Mizoram. *Indian For.* 22 (8): 687 - 695.
- Griffith. W. 1848. *Itinerary Notes of plants collected in Khasyah and Bhutan Mountains 1837-1838, in Afghanistan and neighbouring countries 1839 -41.* Calcutta.
- Hajra P.K., R.R. Rao, D.K. Singh & B.P. Uniyal (eds.) 1995. *Flora of India.* Vol. 12. *Asteraceae (Anthemideae-Heliantheae).* B.S.I., New Delhi.
- Hajra P.K., R.R. Rao, D.K. Singh & B.P. Uniyal (eds.) 1995. *Flora of India.* Vol. 13. *Asteraceae (Inuleae-Vernonieae).* B.S.I., New Delhi.
- Hajra P.K., V.J. Nair & P. Daniel (eds.) 1997. *Flora of India.* Vol. 4. *Malpighiaceae-Dichapetalaceae.* B.S.I., New Delhi.
- Hooker, J.D. 1854. *Himalayan Journal.* 2 Vols. London.
- Hooker, J.D. 1872 - 1897. *The Flora of the British India.* Vols. 1-7. London.
- Hooker, J.D. 1904. *A sketch of the flora of British India.* London.
- Hutchinson, J. 1959. *The Families of Flowering Plants* eds. 2, vol. 1 & 2. Oxford.
- Jain, S.K. 1983. *Flora and vegetation of India, an outline.* pp. 1-24. P.I.D., C.S.I.R. New Delhi.

- Kanjilal U.N., P.C. Kanjilal, A.Das, R.N.De & N.L. Bor 1934-1940. *Flora of Assam*. Vols. 1-5. Govt. Press, Shillong
- Kataki, S.K., S.K. Jain & A.R.K. Sastry 1984. Distribution of Orchids of Sikkim and North-Eastern India. *Plant. Conserv. Bull.* 5: 1-38.
- Lalramnghinglova, J.H. 1996. Ethnobotany of Mizoram- A preliminary Survey. *J. Econ. Tax. Bot.* (Add. Series) 12: 439-459.
- Lalramnghinglova, J.H. 1997. Bamboo. In: L.K. Jha, *Natural Resource Management. 1. Mizoram*. pp. 257-269. A.P.H. Publishing Corporation, New Delhi.
- Lalramnghinglova, J.H. & L.K. Jha 1996. Prominent Agroforestry Systems and important multipurpose trees in farming system of Mizoram. *Indian For.* 122(7): 604 - 609.
- Lalramnghinglova, J.H. & L.K. Jha 1997. Forest Resources- an overview. In: L.K. Jha, *Natural Resource Management. 1. Mizoram*. pp. 203-253. A.P.H. Publishing Corporation, New Delhi.
- Mahanti, N. 1994. *Tribal Ethnobotany of Mizoram*. Tribal studies of India, Series T 171. pp. 1-177. Inter - India Pub., New Delhi.
- Mehra P.N., K.S. Bawa, P.K. Khosla & A.S. Hans 1983. Floristic account of some forest types of the eastern Himalayas. *Bull. Bot. Sur. India*. 25: 1-18.
- Murti S.K. & J. Joseph 1984. Plant Resources of North Eastern India. *Res. Potential North-East India* 2: 28-39
- Puri, G.S. 1960. *Indian Forest Ecology*. Vols. I & II. New Delhi.
- Rao A.S. & D.M. Verma 1982. *Cyperaceae of North-East India*. B.S.I., Howrah.
- Rao, R.R. & P.K. Hajra 1986. Floristic diversity of the Eastern Himalaya in a Conservation perspective. *Proc. Indian Acad. Sci. Suppl.*: 103-125.

- Rao, R.S. & G. Panigrahi 1961. Distribution of vegetational types and their dominant species in Eastern Himalaya. *J. Indian Bot. Soc.* 40: 274-285.
- Sahni K.C. 1981. Botanical panorama of the Eastern Himalaya. In: Lal, J.S.(ed.) *The Himalayan Aspects of Change*. pp. 32-49. New Delhi.
- Savant P.V. & S.S. Patnaik 1998. Forests and Forestry in Mizoram. *Indian For.* 124(6): 433 - 439.
- Sharma B.D., M. Sanjappa (eds.) 1993. *Flora of India*. Vol. 3. *Portulacaceae-Ixonanthaceae*. B.S.I., New Delhi.
- Sharma B.D. & N.P. Balakrishnan (eds.) 1993. *Flora of India* Vol. 2 *Papaveraceae-Caryophyllaceae*. B.S.I., New Delhi.
- Sharma B.D., N.P. Balakrishnan, R.R. Rao & P.K. Hajra (eds.) 1993. *Flora of India* Vol. 1. *Ranunculaceae-Barclayaceae* B.S.I., New Delhi.
- Shukla, U. 1995. *Grasses of North East India*. Scientific Publishers, Jodhpur.
- Shukla, U., A.K. Baisya & S. Ali 1978. Observations on some economic plants of Mizoram. *Bull. Bot. Surv. India*. 20(1-4): 48-52.
- Singh, D.K., B.M. Wadhwa & K.P. Singh 1990. A conspectus of orchids of Mizoram: Their status and conservation. *J. orchid. Soc. India* 4(1-2): 51 - 64.
- Singh, K.P. 1997. Mizoram. In: V. Mudgal & P.K. Hajra (eds.) *Floristic Diversity and Conservation Strategies in India*. III. pp. 1217-1256. B.S.I., Dehra Dun.
- Singh, N.P., J.N. Vohra, P.K. Hajra & D.K. Singh (eds.) 2000. *Flora of India*. Vol. 5 *Oleaceae-Connaraceae*. B.S.I., New Delhi.
- Singh, S.N. 1994. *Mizoram Historical, Geographical, Social, Economic, Political and Administration*. Mittal Publications, New Delhi.

KEY TO THE FAMILIES

(K.P. Singh)

- 1a. Vascular bundles open in stem, arranged in concentric rings; leaves usually reticulately veined; flowers 4 or 5-merous; seeds with 2 cotyledons:
- 2a. Plants insectivorous:
- 3a. Leaves flat, sticky with gland tipped hairs at margins; petals free, not spurred ... DROSERACEAE
- 3b. Leaves modified into sub ovoid bladders with sensitive trap doors; petals united and spurred at base ... LENTIBULARIACEAE
- 2b. Plants not insectivorous:
- 4a. Plants parasitic or saprophytic
- 5a. Plants without leaves:
- 6a. Climbers, parasitic on aerial parts of host plants ... CUSCUTACEAE
- 6b. Herbs, parasitic on roots of the host plants:
- 7a. Flowers unisexual, in spadices; ovules 1 - 13; fruit a nut ... BALANOPHORACEAE
- 7b. Flowers bisexual, solitary or in racemes; ovules many; fruit a capsule:
- 8a. Flowers irregular; ovary 1-celled ... OROBANCHACEAE
- 8b. Flowers regular; ovary 1-6-celled ... MONOTROPACEAE
- 5b. Plants with leaves:
- 9a. Flowers often brightly coloured; petals present ... LORANTHACEAE
- 9b. Flowers often greenish; petals absent ... SANTALACEAE
- 4b. Plants neither parasitic nor saprophytic :
- 10a. Fruit a legume:
- 11a. Corolla actinomorphic; sepals and petals valvate; stamens 4- many ... MIMOSACEAE

- 11b. Corolla zygomorphic; sepals and petals imbricate;
stamens mostly 10:
- 12a. Calyx united; corolla papilionaceous,
posterior petal outermost; stamens
mono or diadelphous ... FABACEAE
- 12b. Calyx mostly free; corolla caesalpinaceous,
posterior petal innermost; stamens free ... CAESALPINIACEAE
- 10b. Fruit otherwise, not a legume:
- 13a. Perianth present, biseriate or multiseriate:
- 14a. Corolla polypetalous or at least
some of the petals free:
- 15a. Stamens many or more than
twice as many as petals:
- 16a. Ovary superior or half superior
- 17a. Pistils free, usually more than one:
- 18a. Stamens perigynous arising
from hypanthium ... ROSACEAE
- 18b. Stamens hypogynous arising
from receptacle:
- 19a. Perianth 3- more seriate,
3-4-merous:
- 20a. Sepals and petals
valvate; fruits fleshy ... ANNONACEAE
- 20b. Sepals and petals
imbricate; fruit dry:
- 21a. Erect trees or
shrubs; stipules
caducous ... MAGNOLIACEAE
- 21b. Woody climbing
shrubs; stipules
absent ... SCHISANDRACEAE
- 19b. Perianth 2-seriate, 5-merous:
- 22a. Trees; leaves with
prominent lateral nerves;
sepals persistent ... DILLENACEAE

- 22b. Herbs, undershrubs or shrubs;
leaves without prominent lateral nerves;
sepals usually deciduous :
- 23a. Leaves radical and alternate;
petals with nectariferous gland ... RANUNCULACEAE
- 23b. Leaves alternate or opposite;
petals without nectariferous gland ... HYDRANGEACEAE
- 17b. Pistil one, united
- 24a. Stamens perigynous, arising from hypanthium:
- 25a. Leaves alternate, stipulate;
fruit usually a drupe ... ROSACEAE
- 25b. Leaves opposite, exstipulate;
fruit a capsule:
- 26a. Carpels 4 - 20 ... SONNERATIACEAE
- 26b. Carpels 2 - 3 ... LYTHRACEAE
- 24b. Stamens hypogynous:
- 27a. Stamens monadelphous or polyadelphous:
- 28a. Leaves opposite, pellucid ... HYPERICACEAE
- 28b. Leaves alternate, not pellucid:
- 29a. Anthers 2 - celled ... STERCULIACEAE
- 29b. Anthers 1 - celled:
- 30a. Trees; leaves digitately compound;
carpels 2 - 5 ... BOMBACACEAE
- 30b. Plants not as above; carpels many ... MALVACEAE
- 27b. Stamens free:
- 31a. Ovary long stipitate on a gynophore ... CAPPARACEAE
- 31b. Ovary sessile, not stipitate:
- 32a. Flowers unisexual:
- 33a. Ovary 3-carpelled;
ovules 1-2 in each cell ... EUPHORBIACEAE
- 33b. Ovary not 3-carpelled;
ovules 1-many in each cell:

- 34a. Plants usually with resinous juice;
leaves opposite ... CLUSIACEAE
- 34b. Plants without resinous juice;
leaves alternate ... THEACEAE
- 32b. Flowers bisexual:
- 35a. Fruits long beaked ... GERANIACEAE
- 35b. Fruits not long beaked:
- 36a. Leaves opposite:
- 37a. Herbs; leaves gland dotted;
flowers 5-merous; seeds not arillate ... HYPERICACEAE
- 37b. Trees; leaves not gland dotted;
flowers 4-merous; seeds arillate ... CLUSIACEAE
- 36b. Leaves alternate:
- 38a. Venation palmate:
- 39a. Flowers axillary; placentation axile ... TILIACEAE
- 39b. Flowers terminal; placentation parietal ... BIXACEAE
- 38b. Venation pinnate:
- 40a. Anthers dehiscence poricidal ... ELAEOCARPACEAE
- 40b. Anthers dehiscence otherwise:
- 41a. Plants succulent;
placentation free central ... PORTULACACEAE
- 41b. Plants not succulent;
placentation otherwise:
- 42a. Sepals 2 ... PAPAVERACEAE
- 42b. Sepals 4 - 6 (usually 5):
- 43a. Leaves with pellucid
aromatic glands ... RUTACEAE
- 43b. Leaves without glands:
- 44a. Sepals not accrescent ... BERBERIDACEAE
- 44b. Sepals accrescent:

- 45a. Leaves stipulate; ovules few, parietal ... DIPTEROCARPACEAE
- 45b. Leaves exstipulate; ovules many, axile:
- 46a. Bracteoles often paired below the calyx;
anthers usually opening lengthwise ... THEACEAE
- 46b. Bracteoles if present not as above;
anthers usually opening by apical pore ... ACTINIDIACEAE
- 15b. Stamens fewer, at the most twice
as many as the petals:
- 47a. Leaves simple:
- 48a. Ovary 1-celled:
- 49a. Climbers or scandent shrubs:
- 50a. Ovules many ... PASSIFLORACEAE
- 50b. Ovules single :
- 51a. Flowers unisexual,
fruits not winged ... MENISPERMACEAE
- 51b. Flowers bisexual,
fruits broadly winged ... CARDIOPTERIDACEAE
- 49b. Plants otherwise:
- 52a. Placentation free-central:
- 53a. Sepals 2;
capsules circumscissile ... PORTULACACEAE
- 53b. Sepals and capsules otherwise:
- 54a. Stamens alternate to petals ... CARYOPHYLLACEAE
- 54b. Stamens opposite to petals:
- 55a. Herbs; leaves mostly basal ... PRIMULACEAE
- 55b. Shrubs or trees;
leaves alternate ... MYRSINACEAE
- 52b. Placentation otherwise:
- 56a. Ovary stipitate on gynophore ... CAPPARACEAE
- 56b. Ovary sessile or subsessile :

- 57a. Anther connectives with an appendage at apex ... VIOLACEAE
- 57b. Anther connectives without appendages at apex:
- 58a. Ovules 1 - 2, in each cell of ovary, pendulous:
- 59a. Calyx superior; fruits not drupaceous ... HERNANDIACEAE
- 59b. Calyx inferior; fruits drupaceous ... ICACINACEAE
- 58b. Ovules many, in each cell of ovary:
- 60a. Stamens 5, free; staminodes absent;
seeds embedded in resinous pulp ... PITTOSPORACEAE
- 60b. Stamens more than 5; filaments often connate
into separate bundles; staminodes present;
seeds not embedded in resinous pulp ... FLACOURTIACEAE
- 48b. Ovary 1 - many celled:
- 61a. Leaves aromatic gland dotted ... RUTACEAE
- 61b. Leaves not gland dotted:
- 62a. Corolla cruciform; stamens tetradynamous ... BRASSICACEAE
- 62b. Corolla and stamens not as above:
- 63a. Flowers zygomorphic:
- 64a. Sepals 3 ... BALSAMINACEAE
- 64b. Sepals 5:
- 65a. Inner 2 sepals petaloid;
stamens 8, monadelphous;
ovary 2-celled ... POLYGALACEAE
- 65b. Sepals not petaloid;
stamens 10, free;
ovary 3-celled ... MALPIGHACEAE
- 63b. Flowers actinomorphic:
- 66a. Leaves opposite:
- 67a. Fruits long beaked ... GERANIACEAE
- 67b. Fruits otherwise:
- 68a. Herbs ... LYTHRACEAE
- 68b. Trees, shrubs or
climbing shrubs:

- 69a. Stamens 2 ... OLEACEAE
- 69b. Stamens 10 ... MALPIGHIACEAE
- 66b. Leaves alternate:
- 71a. Flowers unisexual:
- 71b. Flowers bisexual or polygamous:
- 72a. Flowers in umbels or umbelules,
ovules 2-many per cell ... AQUIFOLIACEAE
- 72b. Flowers not in umbel or umbelules,
ovules 1-2 per cell :
- 73a. Plant twining herbs or shrubs, carpels 3 ... MENISPERMACEAE
- 73b. Plants herbs, shrubs or trees, carpel 1 ... EUPHORBIACEAE
- 74a. Plants climbing or creeping with tendrils ... VITACEAE
- 74b. Plants of other habits, without tendrils:
- 75a. Fertile stamens 2 or 3:
- 76a. Fertile stamens 2; petals 4 -5 ... SABIACEAE
- 76b. Fertile stamens 3; petals 3 ... OLACACEAE
- 75b. Fertile stamens more than 3:
- 77a. Fruits long beaked ... GERANIACEAE
- 77b. Fruits not long beaked:
- 78a. Stamens opposite to petals:
- 79a. Sepals valvate, much
reduced or open in bud;
anthers versatile;
ovary 3-celled ... RHAMNACEAE
- 79b. Sepals imbricate,
well developed;
anthers introrse;
ovary 3-6-celled ... IFFACEAE
- 78b. Stamens alternate to petals:
- 80a. Venation usually pinnate;
sepals mostly imbricate:

- 81a. Ovary 1-3-celled; ovules many;
placentation axile or parietal:
- 82a. Petals often clawed; stamens 5 - 10;
placentation usually axil ... SAXIFRAGACEAE
- 82b. Petals not clawed; stamens 5;
placentation usually parietal ... ITEACEAE
- 81b. Ovary 1-5-celled; ovules 2-10;
placentation otherwise:
- 83a. Stamens 4-5; ovules mostly 2 ... CELASTRACEAE
- 83b. Stamens 3; ovules 2-10 ... HIPPOCRATEACEAE
- 80b. Venation palmate; sepals valvate:
- 84a. Stamens united ... STERCULIACEAE
- 84b. Stamens free or slightly connate at base ... TILIACEAE
- 47b. Leaves compound:
- 85a. Carpels free or deeply lobed:
- 86a. Ovules pendulous,
solitary in each cell; styles 2 - 5 ... SIMAROUBACEAE
- 86b. Ovules ascending, 2 in each cell; style 1 ... CONNARACEAE
- 85b. Carpels united:
- 87a. Ovary 1-celled:
- 88a. Ovules 2 or more in each cell ... MORINGACEAE
- 88b. Ovule solitary in each cell:
- 89a. Stamens 10, in 2 whorls ... ANACARDIACEAE
- 89b. Stamens 3-5, in one whorl ... HERNANDIACEAE
- 87b. Ovary 2 or more-celled:
- 90a. Leaves aromatic gland dotted ... RUTACEAE
- 90b. Leaves not aromatic gland dotted:
- 91a. Herbs or climbers:
- 92a. Leaves stipulate ... GERANIACEAE
- 92b. Leaves exstipulate:

- 93a. Leaves divided or dissected; sepal 2 ...FUMARIACEAE
- 93b. Leaves not divided as above; sepals 4-5:
- 94a. Leaves biternately compound ... SAPINDACEAE
- 94b. Leaves ternately or pinnately compound ... OXALIDACEAE
- 91b. Trees or shrubs (sometimes scandent):
- 95a. Scandent shrubs with tendrils ... VITACEAE
- 95b. Trees, shrubs or undershrubs without tendrils:
- 96a. Stamens opposite to petals,
 equal to or fewer than the petals:
- 97a. Fertile stamens 4 or 5;
 placentation basal ... LEEACEAE
- 97b. Fertile stamens 2 or 3;
 placentation axil or apical:
- 98a. Petals valvate; fertile stamens 3;
 ovules 1 - 5 in each cell ... OLACACEAE
- 98b. Petals imbricate; fertile stamens 2;
 ovules 1 - 2 in each cell ... SABIACEAE
- 96b. Stamens at least one whorl alternating with petals,
 equal to or upto twice as many as petals:
- 99a. Leaves gland dotted ... RUTACEAE
- 99b. Leaves not gland dotted:
- 100a. Flowers regular, at least some unisexual;
 stamens with scales at base ... SIMAROUBACEAE
- 100b. Flowers and stamens otherwise:
- 101a. Flowers zygomorphic;
 disc extra-staminal:
- 102a. Leaves opposite;
 digitate; ovules 2 ...HIPPOCASTANACEAE
- 102b. Leaves alternate;
 pinnate; ovules 1-2 ... SAPINDACEAE
- 101b. Flowers actinomorphic;
 disc intra-staminal:

- 103a. Leaves stipulate; ovary 2-3-celled; fruit capsule ... STAPHYLEACEAE
- 103b. Leaves exstipulate; ovary 2-5-celled;
fruit berry or capsule:
- 104a. Stamens twice as many as petals;
 filaments free or connate at base ... BURSERACEAE
- 104b. Stamens either less than twice as many as
 petals or filaments united into a base ... MELIACEAE
- 106b. Ovary inferior:
- 105a. Stamens numerous, usually more than
 twice as many as petals:
- 106a. Flowers unisexual ... BEGONIACEAE
- 106b. Flowers bisexual:
- 107a. Leaves opposite or fasciculate:
- 108a. Leaves gland dotted ... MYRTACEAE
- 108b. Leaves not gland dotted ... PUNICACEAE
- 107b. Leaves alternate:
- 109a. Leaves stipulate ... ROSACEAE
- 109b. Leaves exstipulate:
- 110a. Disc present; stamens
 epipetalous ... LECYTHIDACEAE
- 110b. Disc absent; stamens
 not epipetalous ... SYMPLOCACEAE
- 105b. Stamens twice as many as petals or fewer:
- 111a. Plants aquatic; leaves floating; fruits 2-spined ... TRAPACEAE
- 111b. Plants otherwise:
- 112a. Inflorescence umbellate:
- 113a. Shrubs or trees; leaves stipulate;
 fruits baccate or drupaceous ... ARALIACEAE
- 113b. Herbs; leaves exstipulate;
 fruit a schizocarp ... APIACEAE
- 112b. Inflorescence otherwise:

- 114a. Fruits 4-winged ... COMBRETACEAE
- 114b. Fruits not winged:
- 115a. Leaves stipulate:
- 116a. Leaves alternate; stamens indefinite ... ROSACEAE
- 116b. Leaves opposite;
stamens twice as many as petals ... RHIZOPHORACEAE
- 115b. Leaves exstipulate:
- 117a. Ovules pendulous:
- 118a. Ovary 2-5-celled; ovules 2 - 4 ... SYMPLOCACEAE
- 118b. Ovary usually 1-2-celled;
ovules solitary:
- 119a. Petals imbricate ... NYSSACEAE
- 119b. Petals mostly valvate or absent:
- 120a. Flowers cymose;
style simple ... ALANGIACEAE
- 120b. Flowers cymose to
capitate; style simple
or lobed ... CORNACEAE
- 117b. Ovules on axile, parietal or central placentas :
- 121a. Leaves basal or opposite,
palmately nerved;
anthers opening by pores ... MELASTOMATACEAE
- 121b. Leaves cauline, alternate,
pinnately nerved;
anthers opening by slits ... ONAGRACEAE
- 14b. Corolla gamopetalous variously,
usually forming a long or short tube:
- 122a. Ovary fully or semi inferior:
- 123a. Plants climbing with tendrils;
stems with bicollateral bundles ... CUCURBITACEAE
- 123b. Plants of various habits, without tendrils;
stems with collateral vascular bundles:
- 124a. Ovary 1 - celled:

- 125a. Flowers in heads:
- 126a. Calyx limb cup shaped,
4-lobed; stamens 4, free ... DIPSACACEAE
 - 126b. Calyx absent or reduced to pappus;
stamens 5; anthers syngeneicous ... ASTERACEAE
- 125b. Flowers not in heads, various:
- 127a. Leaves pinnately compound ... CAPRIFOLIACEAE
 - 127b. Leaves simple:
 - 128a. Ovules solitary, pendulous ... CAPRIFOLIACEAE
 - 128b. Ovules 5, or more,
not pendulous ... MYRSINACEAE
- 124b. Ovary 2-many-celled:
- 129a. Leaves opposite; stipules inter or intra-petiolar ... RUBIACEAE
 - 129b. Leaves otherwise, if opposite then stipules not
interpetiolar or absent:
 - 130a. Stamens more than twice the
number of corolla lobes, epipetalous;
ovules pendulous ... SYMPLOCACEAE
 - 130b. Stamens as many as corolla lobes;
ovules axile:
 - 131a. Stamens 10:
 - 132a. Ovary falsely 5-10 -celled;
fruit a berry ... VACCINIACEAE
 - 132b. Ovary 3-celled;
fruit a drupe ... STYRACACEAE
 - 131b. Stamens 5:
 - 133a. Flowers actinomorphic ... CAMPANULACEAE
 - 133b. Flowers zygomorphic ... LOBELIACEAE
- 122b. Ovary superior:
- 134a. Plant succulent ... CRASSULACEAE
 - 134b. Plants not succulent
 - 135a. Stamens more than corolla lobes:

- 136a. Leaves palmately lobed; petioles long, fistular ... CARICACEAE
- 136b. Leaves not lobed; petioles neither long nor fistular :
- 137a. Petals connate at base ... THEACEAE
- 137b. Petals united most of their length:
- 138a. Flowers unisexual; calyx gamosepalous ... EBENACEAE
- 138b. Flowers bisexual; calyx polysepalous:
- 139a. Plants with yellowish milky juice;
ovules solitary in each cell;
fruit a berry ... SAPOTACEA
- 139b. Plants without juice;
ovules many in each cell;
fruit a capsule ... ERICACEAE
- 135b. Stamens as many as corolla lobes or fewer:
- 140a. Stamens opposite to corolla lobes:
- 141a. Ovary 1-celled; placentation free central:
- 142a. Shrubs; leaves alternate;
perianth gland dotted ... MYRSINACEAE
- 142b. Herbs; leaves basal;
perianth not gland dotted ... PRIMULACEAE
- 141b. Ovary 2-celled; placentation axile:
- 143a. Leaves compound; stamens united
by filaments ... LEEACEAE
- 143b. Leaves simple; stamens free:
- 144a. Flowers bisexual; stamens
epipetalous ... SAPOTACEAE
- 144b. Flowers unisexual;
stamens not epipetalous ... EBENACEAE
- 140b. Stamens alternate to corolla lobes:
- 145a. Flowers zygomorphic; stamens 2 or 4:
- 146a. Inflorescence distinctly bracteate:
- 147a. Leaves often with cystoliths;
seeds supported on retinacula ... ACANTHACEAE

- 147b. Leaves without cystoliths; seeds not supported or retinacula ...THUNBERGIACEAE
- 146b. Inflorescence otherwise:
- 148a. Ovules and seeds few:
- 149a. Ovary 4 lobed; style gynobasic ...LAMIACEAE
- 149b. Ovary not lobed; style terminal:
- 150a. Stems and branches terete; flowers with extrafloral glands at the base of pedicels ...PEDALIACEAE
- 150b. Stems and branches 4-angled; flowers without extrafloral glands ... EBENACEAE
- 148b. Ovules and seeds numerous:
- 151a. Leaves compound; seeds winged ... BIGNONIACEAE
- 151b. Leaves simple or dissected; seeds not winged:
- 152a. Placentation axile ... SCROPHULARIACEAE
- 152b. Placentation parietal:
- 153a. Perianth 4-5-merous; corolla contorted ... GENTIANACEAE
- 153b. Perianth 5-merous; corolla imbricate or valvate ... GESNERIACEAE
- 145b. Flowers actinomorphic; stamens 5:
- 154a. Leaves alternate:
- 155a. Aquatic floating plants with floating cordate leaves; seeds prominently tubercled ... LEMNANTHACEAE
- 155b. Plants not as above:
- 156a. Flowers in scorpioid cymes:
- 157a. Fruits of 4 nutlets; seeds without endosperm ... BORAGINACEAE
- 157b. Fruits 1 - 4-seeded; seeds usually with endosperm ... HELIOTROPIACEAE

- 156b. Flowers not in scorpioid cymes:
- 158a. Calyx with appendaged sinuses ... HYDROPHYLLACEAE
- 158b. Calyx without appendages:
- 159a. Corolla scarious ... PLANTAGINACEAE
- 159b. Corolla not scarious:
- 160a. Ovules many in each cell ... SOLANACEAE
- 160b. Ovules 1 - 2 in each cell:
- 161a. Sepals free; corolla lobes contorted and infolded ... CONVULVULACEAE
- 161b. Sepals connate; corolla lobes imbricate; fruits dry, with 4 nutlets ... BORAGINACEAE
- 154b. Leaves opposite, verticillate or radical:
- 162a. Plants scapigerous with petiole sheathing at base ... PLANTAGINACEAE
- 162b. Plants not as above :
- 163a. Ovary 1-celled ... ICACINACEAE
- 163b. Ovary 2 or more-celled:
- 164a. Anthers and stigma united to form a gynostegium; pollen in pollinia ...ASCLEPIADACEAE
- 164b. Anthers and stigma not as above; pollen not in pollinia:
- 165a. Plants with milky sap; corolla lobes contorted; fruit of 2 follicles ... APOCYNACEAE
- 165b. Plants with watery sap; corolla lobes contorted or not; fruit not follicular:
- 166a. Hirsute herbs; fruit of 4 nutlets ... BORAGINACEAE
- 166b. Plants otherwise:
- 167a. Ovules 1 - 2 in each cell:

- 168a. Ovule 1 in each cell ... VERBENACEAE
- 168b. Ovules 2 in each cell:
- 169a. Stamens 2 ... OLEACEAE
- 169b. Stamens 3 - 5 ... CELASTRACEAE
- 167b. Ovules many in each cell :
- 170a. Plants covered with glandular, stellate or
 lepidote indumentum ... BUDDLEJACEAE
- 170b. Plants not as above:
- 171a. Stigma trifid; ovary 3-celled ... POLEMONIACEAE
- 171b. Stigma bifid or simple;
 ovary 1 - 3 - celled:
- 172a. Placentation axile; fruit a berry ... LOGANIACEAE
- 172b. Placentation parietal; fruit a
 septicidal capsule ... GENTIANACEAE
- 13b. Perianth absent, if present then uniseriate and
not differentiated into calyx and corolla:
- 173a. Perianth absent:
- 174a. Inflorescence a cyathium; placentation axile ... EUPHORBIACEAE
- 174b. Inflorescence catkin like or a spike;
 placentation basal or parietal:
- 175a. Leaves opposite; stamens 1 - 3,
 connate; ovules pendulous ... CHLORANTHACEAE
- 175b. Leaves alternate; stamens usually
 5 - 10; ovules not pendulous:
- 176a. Flowers unisexual; fruit a
 capsule or drupe:
- 177a. Ovules many on parietal
 placenta; fruit a capsule ... SALICACEAE
- 177b. Ovule solitary on basal
 placenta; fruit a drupe ... MYRICACEAE
- 176b. Flowers bisexual; fruit a berry
 or nutlet:

- 178a. Ovule 1; ovary superior; bracts not petaloid ... PIPERACEAE
- 178b. Ovules 2 or more; ovary superior or inferior; bracts petaloid ... SAURURACEAE
- 173b. Perianth present:
- 179a. Ovary inferior or semiinferior:
- 180a. Erect herbs or creepers:
- 181a. Leaves alternate; flowers unisexual ... BEGONIACEAE
- 181b. Leaves opposite; flowers bisexual:
- 182a. Perianth calycine ... LYTHRACEAE
- 182b. Perianth corolline ... NYCTAGINACEAE
- 180b. Plants woody, usually trees or shrubs:
- 183a. Perianth 2-3-lobed; ovary 6-celled; ovules many ... ARISTOLOCHIACEAE
- 183b. Perianth 4-5-lobed; ovary 1-celled; ovules 1-3:
- 184a. Stamens 4 - 5, as many as calyx lobes ... SANTALACEAE
- 184b. Stamens 8 - 10, twice as many as calyx lobes ... COMBRETACEAE
- 179b. Ovary superior:
- 185a. Anthers dehiscing by valves ... LAURACEAE
- 185b. Anthers dehiscing otherwise:
- 186a. Bracts much larger than the fruits and adnate to them as wing:
- 187a. Leaves compound ... JUGLANDACEAE
- 187b. Leaves simple ... CORYLACEAE
- 186b. Bracts if present otherwise:
- 188a. Perianth variously segmented and recurved backwards with free tips ... PROTEACEAE
- 188b. Perianth otherwise:

189a. Pistil 2 or more, free:

190a. Trees ... STERCULIACEAE

190b. Herbs or climbers ...RANUNCULACEAE

189b. Pistil 1 :

191a. Ovary 1-celled:

192a. Stipules ochreate ... POLYGONACEAE

192b. Stipules if present not ochreate:

193a. Annual or perennial herbs:

194a. Flowers unisexual:

195a. Leaves exstipulate;
ovules 2 ... MENISPERMACEAE

195b. Leaves usually stipulate;
ovule solitary:

196a. Leaves palmately
3-11-partite;
placentation
apical ... CANNABINACEAE

196b. Leaves simple;
placentation basal ... URTICACEAE

194b. Flowers bisexual:

197a. Perianth and bracts
scarious; stamens
connate below ... AMARANTHACEAE

197b. Perianth and bracts
if present green and
herbaceous; stamens free ...CHENOPODIACEAE

193b. Shrubs or trees:

198a. Stipules absent:

199a. Leaves without pellucid
dots or lepidots:

200a. Perianth lobes valvate
or imbricate; calyx
minute or absent;
fruit drupaceous ...OPILIACEAE

- 200b. Perianth lobes imbricate; calyx conspicuous; fruits capsular, indehiscent ...THYMELAEACEAE
- 199b. Leaves often with pellucid dots or lepidots :
- 201a. Stamens connate into a column; seeds arillate ... MYRISTICACEAE
- 201b. Stamens free; seeds not arillate ... ELAEAGNACEAE
- 198b. Stipules present:
- 202a. Style branched:
- 203a. Anthers inflexed and reversed in bud; ovule 1, apical ... MORACEAE
- 203b. Anthers erect in bud; ovules 1 - 2, apical or basal:
- 204a. Ovule 1, apical ... ULMACEAE
- 204b. Ovules 2, basal ... EUPHORBIACEAE
- 202b. Style unbranched:
- 205a. Leaves pinnate ... CAESALPINIACEAE
- 205b. Leaves simple:
- 206a. Placentation parietal ... FLACOURTIACEAE
- 206b. Placentation otherwise:
- 207a. Ovule apical ... MORACEAE
- 207b. Ovule basal ... URTICACEAE
- 191b Ovary 2-more-celled:
- 208a. Ovules many in each cell:
- 209a. Herbs; leaves alternate or falsely whorled; ovary 3-5-celled ... MOLLUGINACEAE
- 209b. Trees; leaves opposite, bifarious; ovary 2-celled ...LYTHRACEAE
- 208b. Ovules 1 - 3 in each cell:
- 210a. Plants armed with stipular spines ...RHAMNACEAE

- 210b. Plants unarmed:
- 211a. Inflorescence a spike or catkin:
- 212a. Plants with milky latex ... EUPHORBACEAE
- 212b. Plants without milky latex:
- 213a. Styles and locules 3; fruits subtended by a cupular involucre; ovules 2 in each cell ... FAGACEAE
- 213b. Styles and locules 1-2; fruits not subtended by involucre (usually cone like); ovule 1 in each cell ... BETULACEAE
- 211b. Inflorescence other than spikes or catkin:
- 214a. Inflorescence a capitate head ... HAMAMELIDACEAE
- 214b. Inflorescence otherwise:
- 215a. Leaves opposite; fruit a double samara with 1-seeded; mericarps winged ... ACERACEAE
- 215b. Leaves spirally arranged, alternate, sometimes in whorl; fruits not as above:
- 216a. Leaves pinnately compound, if simple then not 3 nerved ... SAPINDACEAE
- 216b. Leaves otherwise, alternate, distichous, 3 nerved ... BUXACEAE
- 1b. Vascular bundles scattered in stem; leaves usually parallel veined; flowers mostly 3-merous; seeds with one cotyledon:
- 217a. Plant body thalloid, not differentiated into root, stem and leaves ... LEMNACEAE
- 217b. Plant body differentiated into root, stem and leaves:
- 218a. Inflorescence a fleshy spadix or dense glomerule with inconspicuous flowers and a large spathe ... ARACEAE
- 218b. Inflorescence not as above:
- 219a. Ovary inferior or semiinferior:
- 220a. Aquatic herbs ... HYDROCHARITACEAE
- 220b. Terrestrial or epiphytic herbs:

221a. Ovary 1-celled:

222a. Fertile stamens 1 or 2; pollen in pollinia ... ORCHIDACEAE

222b. Fertile stamens 2; pollen not in pollinia ... BURMANNIACEAE

221b. Ovary 2 or more-celled:

223a. Fertile stamen 1:

224a. Sepals free or at most connivent;
anther 1-celled:

225a. Ovules solitary in each cell ... MARANTACEAE

225b. Ovules numerous in each cell ... CANNACEAE

224b. Sepals united into spatheous tube:

226a. Leaves spiral; sheaths closed ... COSTACEAE

226b. Leaves distichous; sheaths open ... ZINGIBERACEAE

223b. Fertile stamens 2 or more:

227a. Flowers unisexual:

228a. Plants climbers, dioecious;
leaves alternate or opposite;
bracts simple or absent;
capsules winged ... DIOSCOREACEAE228b. Plants tree like erect;
monoecious; lamina at the tip;
bracts spatheous; fruits fleshy
not winged ... MUSACEAE

227b. Flowers bisexual:

229a. Leaves fibrous, spine tipped :

230a. Anthers versatile, dehiscing
by vertical slits ... BROMELIACEAE230b. Anthers dorsifixed, dehiscing
by longitudinal slits ... AGAVACEAE

229b. Leaves not as above:

231a. Perianth persistent in fruit,
tubular, covered with hairs ... HAEMODORACEAE

231b. Perianth not as above:

- 232a. Fertile stamens 3 ... BURMANNIACEAE
- 232b. Fertile stamens 6:
- 233a. Placentation parietal ... TACCACEAE
- 233b. Placentation axile:
- 234a. Plants scapose with tunicated
bulbous rootstock ... AMARYLLIDACEAE
- 234b. Plants not scapose, with
tuberous rhizome or corm ... HYPOXIDACEAE
- 219b. Ovary superior:
- 235a. Perianth absent or rudimentary or
reduced to scales or bristles:
- 236a. Plant arborescent:
- 237a. Leaves broadly plicate or pinnatisect ... ARECACEAE
- 237b. Leaves not as above:
- 238a. Plants often with stilt roots;
leaves spiral; inflorescence
a spadix; fruit a syncarp ... PANDANACEAE
- 238b. Plants without stilt roots;
leaves distichous; inflorescence
not a spadix; fruit a caryopsis ... POACEAE
- 236b. Plants herbaceous:
- 239a. Flowers in globose or hemispheric
heads, unisexual, terminal on scape;
ovary 2-3-celled ... ERIOCAULACEAE
- 239b. Flowers in spikelets with imbricating
glumes, bisexual; ovary 1-celled:
- 240a. Stems terete, cylindrical or flattened,
noded; leafsheaths usually open;
flowers enclosed by 2 glumes;
anthers dorsifixed or versatile ... POACEAE
- 240b. Stems solid, triangular, not noded;
leafsheaths entire or closed;
flowers enclosed by single glume;
anthers basifixed ... CYPERACEAE

235b. Perianth distinct, petaloid at least in part:

241a. Perianth segment distinguishable into two heteromorphic series with outer whorl sepaloid and inner petaloid ... COMMELINACEAE

241b. Perianth segments not distinguishable, both perianth segments usually of the same colour, often petaloid or united into a tube below:

242a. Plants aquatic; inflorescence subtended by spathe like leaf sheaths ... PONTEDERIACEAE

242b. Plants terrestrial; inflorescence not subtended by spathe as above:

243a. Perianths densely hairy and persistent in fruit ... HAEMODORACEAE

243b. Perianth not as above:

244a. Leaves modified into phyllode, without lamina ... ASPARAGACEAE

244b. Leaves not modified, with distinct lamina:

245a. Flowers mostly dioecious; anthers 1-celled ... SMILACACEAE

245b. Flowers mostly bisexual; anthers 2-celled:

246a. Plants climbers; stamens usually 4; placentation basal apical ... STEMONACEAE

246b. Plants usually erect; stamens usually 6; placentation axile ... LILIACEAE

RANUNCULACEAE

(K.P. Singh)

- 1a. Erect herbs; leaves alternate :
- 2a. Sepals 3-5, herbaceous; petals present, 5 ... 3. *Ranunculus*
- 2b. Sepals 4-8, petaloid; petals absent: ... 4. *Thalictrum*
- 1b. Climbing shrubs; leaves opposite:
- 3a. Leaves with terminal tendrils; climbing by means of tendrils; petals present ... 2. *Naravelia*
- 3b. Leaves lacking tendrils; climbing by means of twining petioles; petals absent ... 1. *Clematis*

1. CLEMATIS L.

- 1a. Flowers 1-3, in axillary fascicles ... 2. *C. acutangula*
- 1b. Flowers many, in axillary or terminal racemes or panicles:
- 2a. Leaves simple ... 6. *C. smilacifolia*
- 2b. Leaves compound, ternate or biternate :
- 3a. Plants usually glabrous or glabrescent :
- 4a. Leaves ternate, distantly serrate; sepals erect; filaments hairy ... 1. *C. acuminata*
- 4b. Leaves 5-7 foliolate, usually entire, sepals spreading; filaments glabrous ... 4. *C. gouriana*
- 3b. Plants coarsely hairy or densely tomentose-villous :
- 5a. Plants coarsely hairy; leaves ternate, rarely pinnate; sepals ribbed ... 3. *C. buchananiana*
- 5b. Plants densely tomentose-villous; leaves pinnate or biternate :
- 6a. Leaves densely villous below and glabrescent above; sepals spreading from the base ... 7. *C. wightiana*
- 6b. Leaves densely brown velvety, tomentose on both sides; sepals erect with recurved tips ... 5. *C. grewiflora*

1. *Clematis acuminata* DC., Syst. Nat. 1 : 148, 1817 & Prodr. 1 : 6, 1824; Hook.f. & Thomson in Fl. Brit. India 1 : 5, 1872; Kanjilal *et al.*, Fl. Assam 1 : 4, 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2) : 77, 1938; Rau in Sharma *et al.*, Fl. India 1 : 54, 1993. *Hruipawno* (Lushai).

Woody climbers; branches sulcate, glabrous or scarcely puberulus with scattered hairs. Leaves opposite, pinnately 3-foliolate; common petioles 8-12 cm long, ribbed; leaflets ovate or lanceolate, 3-9 x 2-4.5 cm, terminal leaflet longer and broader than the side ones, base rounded or subcordate, subcoriaceous, caudate-acuminate at apex, quite entire to distantly serrate along margins, glabrous or sparsely puberulus, palmately 5-nerved; petiolules 1-2 cm long. Inflorescence in axillary compound panicles, 3-5-flowered; flowers pale yellow, 2-3 cm across; sepals ovate or oblong-lanceolate, yellowish, subglabrous or \pm pubescent outside with tomentose borders, pubescent inside, 10-14 x 4-5 mm; filaments hairy, upto 1 cm long. Achenes ovate, compressed, dark brownish, hairy; style feathery, 1-2 cm long.

Fl. & Fr.: October-April.

Siata, alt. ca 1200 m, Parry 534 (*vide* C.E.C. Fischer, *l.c.*).

2. *Clematis acutangula* Hook.f. & Thomson in Fl. Brit. India 1 : 3, 1872; Kanjilal *et al.*, Fl. Assam 1 : 2, 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2) : 77, 1938; Rau in Sharma *et al.*, Fl. India 1 : 56, 1993.

Herbaceous or slightly woody climbers; stems deeply furrowed, shining; branches slender. Leaves opposite, bipinnate, ternate or biternate, 10-15 cm long; leaflets ovate-lanceolate, 2-4 x 1-2 cm, base cuneate or acute to acuminate at apex, margins coarsely serrate or lobed, often 3-lobed, pubescent on both surfaces with straight hairs; petiolules 1-3 cm long. Inflorescence axillary, 1-3-flowered; flowers brownish-yellow, ca 3 cm across; sepals oblong-elliptic, 8-12 x 4-5 mm, purplish, pubescent at margins with long hairs; filaments pilose, upto 1 cm long. Achenes ovate, \pm compressed, margined, pubescent, 3-4 x 1-2 mm; style feathery, 2-2.5 cm long.

Fl. & Fr.: September-January.

North Vanlaiphai, ca 1500 m, Parry 377 (*vide* C.E.C. Fischer, *l.c.*); Phongphui, ca 1800 m, Parry 561 (*vide* C.E.C. Fischer, *l.c.*).

3. *Clematis buchananiana* DC., Syst. Nat. 1: 140. 1817 & Prodr. 1: 4. 1824 (as *buchaniana*); Hook. f. & Thomson in Fl. Brit. India 1: 6. 1872; Kanjilal *et al.*, Fl. Assam 1: 5. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 77. 1938; Rau in Sharma *et al.*, Fl. India 1: 60. 1993. *C. tortuosa* (Wallich ex Hook. f. & Thomson) C.E.C. Fischer, Kew Bull. 1929: 4. 1929 & in Rec. Bot. Surv. India 12(2): 77. 1938. *C. buchananiana* var. *tortuosa* Wallich ex Hook. f. & Thomson, *l.c.* *Hruipanruang* (Lushai). Fig. 1.

Woody climbers or stragglers; branches sulcate, densely pubescent. Leaves ternate or rarely pinnate, 3-7-foliolate; petioles flattened at base, 4-7 cm long; leaflets 5-10 x 3-9 cm, broadly ovate or sub-orbicular, sometimes 2-3-lobed, base rounded or cordate, acute to acuminate at apex, coarsely dentate-serrate along margins, glabrescent to sparsely pubescent above, denser beneath specially along the nerves, 5-7-nerved from base; petiolules ribbed, 1-2 mm long, hairy. Inflorescence axillary with leafy panicles, 3 to many-flowered; bracts foliaceous; flowers creamy-white, 3-5 cm across; sepals ovate-oblong, greenish yellow, white tomentose inside, fleshy, densely silky, pubescent outside, 15-20 x 5-7 mm; filaments flat, hairy, ca 1 cm long. Achenes ovate-elliptic, compressed, 3-5 x 2 mm, reddish-brown, densely hairy; style feathery, 3-4 cm long.

Fl & Fr.: June-March.

Common and a variable species. Vombuk, 1500 m, Parry 500 (CAL), as *Clematis tortuosa*; Champhai, Leslie 267 (CAL); Mizo hills, Deb 30821; Hmuifang, ca 1500 m, Deka s.num.

4. *Clematis gouriana* Roxb. [Hort. Beng.43, 1814, *nom nud.*] ex DC., Syst. Nat. 1: 138. 1817 & Prodr. 1: 3. 1824; Hook. f. & Thomson in Fl. Brit. India 1: 4. 1872; Kanjilal *et al.*, Fl. Assam 1: 4. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 77. 1938; Rau in Sharma *et al.*, Fl. India 1: 64. 1993.

Large woody climbers; branches grooved, purple, pubescent when young. Leaves pinnate, 5-7-folioate, ca 14 x 10 cm; leaflets variable, ovate or elliptic; 5.0-8.5 x 2.0-3.5 cm, distant, base rounded or cordate, acuminate at apex, usually entire along margins, thin, glabrous or sparsely pubescent along nerves, 3-5-nerved from base; petiolules ca 1 cm long. Panicles cymose, axillary or terminal, many-flowered, up to 12 cm long; bracts

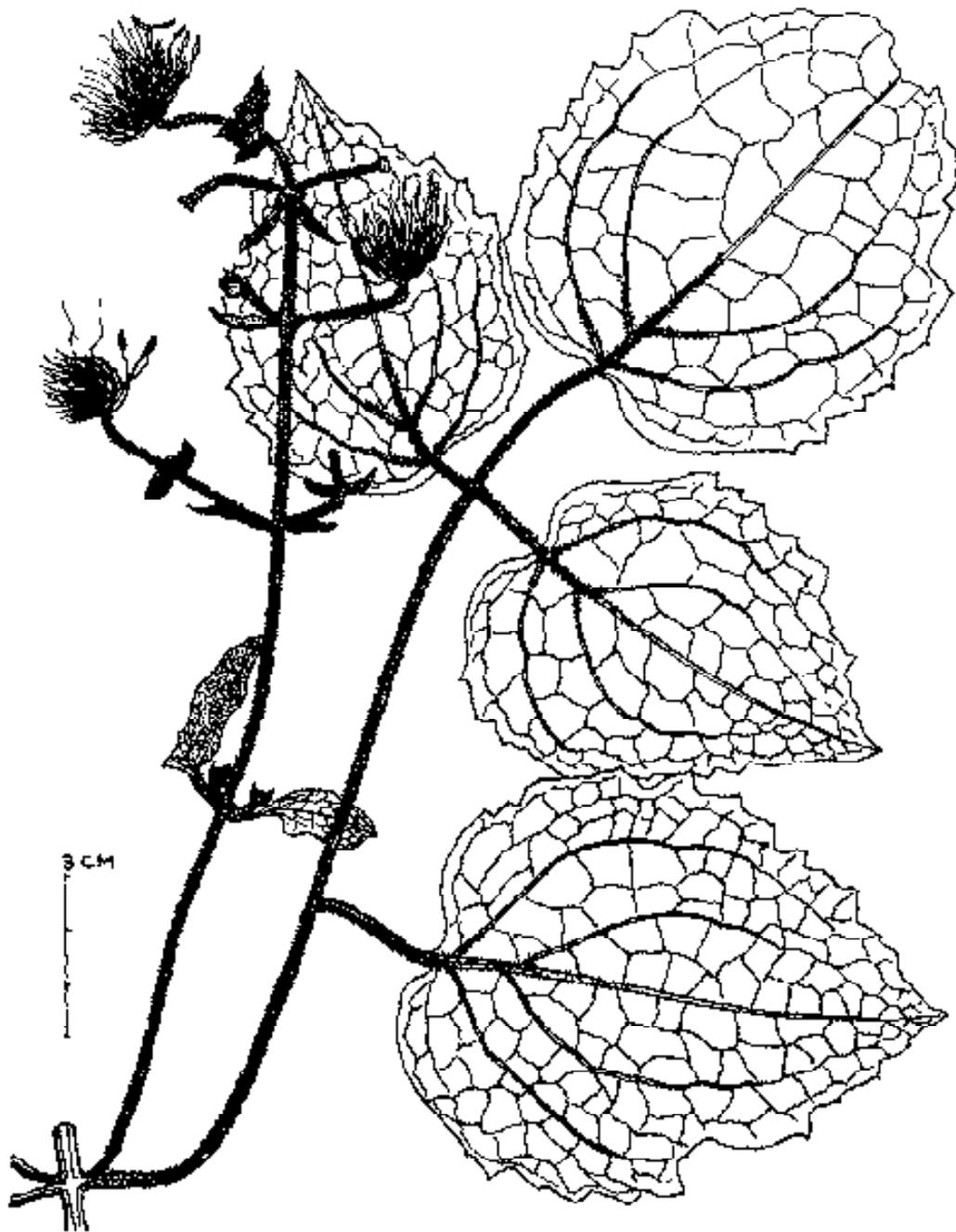


Fig. 1: *Clematis buchananiana* DC.

foliaceous, usually rotund-ovate, rarely lanceolate; flowers white-creamy, 2-3 cm across, scented; sepals oblong-elliptic, pubescent outside, 4-8 x 1-2.5 mm; filaments flat, glabrous, 2-6 mm long. Achenes ovate to elliptic, \pm compressed, 4-6 x 1-1.5 mm; style silky, hairy, up to 4 cm long.

Fl. & Fr.: August-May.

Common in tropical evergreen forests. North Vanlaiphai, 1500 m, *Parry* 372 (*vide* C.E.C. Fischer, *l.c.*); Hauruang, *Deb* 31373.

5. *Clematis grewiiflora* DC., *Syst. Nat.* 1: 140. 1818 & *Prodr.* 1: 4. 1824 (as *grewiaeflora*) Hook.f. & Thomson in *Fl. Brit. India* 1: 6. 1872; Kanjilal *et al.*, *Fl. Assam* 1: 4. 1934; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 77. 1938; Rau in Sharma *et al.*, *Fl. India* 1: 66. 1993.

Large woody climbers; branches sulcate, densely tomentose. Leaves ternate to 3-5-folioate, 10-15 cm long; petioles 2-3 cm long; leaflets broadly ovate, 3.5-8.5 x 2-6 cm, base cuneate or rounded, acute to acuminate at apex, dentate-serrate at margins, often lobed, densely brown velvety tomentose on either sides, 5-nerved from the base; petiolules 1-2.5 cm long. Panicles brown, tomentose, axillary, many-flowered, up to 18 cm long; bracts foliaceous, ovate-lanceolate; flowers greenish or whitish, \pm 2.5 cm across; sepals ovate-oblong, tomentose outside, puberulous inside, 15-20 x 8-10 mm; filaments densely hairy, 2-2.5 cm long. Achenes ovate, flat, velvety hairy, 3-5 x 1.5 mm; style densely white-silky, 2.5 cm long.

Fl & Fr.: August-March.

North Vanlaiphai, 1500 m, *Parry* 382 (CAL); near Lungleh fort, 900 m, *Gage* 29 (CAL).

6. *Clematis smilacifolia* Wallich in *Pl. Asiat. Res.* 13: 402. 1820; Hook.f. & Thomson in *Fl. Brit. India* 1: 3. 1872; Kanjilal *et al.*, *Fl. Assam* 1: 3. 1934; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 77. 1938. Rau in Sharma *et al.*, *Fl. India* 1: 75. 1993.

Tall woody climbers; branches furrowed, glabrous, green or purple. Leaves simple or sometimes ternate, broadly ovate, 6-15.5 x 5-10 cm, base cordate or rounded, acute to mucronate at apex, entire at margins, subcoriaceous, usually glabrous on both sides or sometimes few scattered

hairs below, often purplish beneath, 5 or 7-veined from the base; petioles 4-8 cm long, often twining above, glabrous. Panicles 12-25 cm long, axillary or terminal, 3 or more flowered; bracts foliaceous, elliptic-lanceolate; flowers purplish brown, 3-3.5 cm across, sweet-scented; sepals oblong or oblong-lanceolate, mucronate, ribbed, greenish brown, tomentose outside, 12-18 x 2-5 mm; filaments linear, glabrous, inner stamens shorter with longer anthers, 4-12 mm long. Achenes elliptic-ovate, 8-10 x 2-4 mm, elongate, compressed, pubescent; styles *ca* 4.5 cm long, feathery.

Fl. & Fr.: August-March.

Reported by C.E.C. Fischer (*l.c.*).

7. ***Clematis wightiana*** Wallich [Cat. no. 4674. 1828, *nom. nud.*] ex Wight & Arn., Prodr. 2. 1834; Hook. f. & Thomson in Fl. Brit. India 1: 5. 1872; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 28. 1987; Rau in Sharma *et al.*, Fl. India 1: 80. 1993.

Large woody climbers, densely covered all over with shining brownish hairs; branches furrowed, villous. Leaves pinnate, 3-5-foliolate; leaflets ovate-lanceolate or orbicular, 5-7 x 3-4.5 cm, entire or 3-5-lobed, base ovate-cordate, acute or mucronate at apex, \pm dentate along margins, chartaceous, densely villous and velvety on both sides, nerves prominent beneath; petioles 8-10 cm long. Inflorescence axillary or terminal, paniculate; bracts ovate-linear; flowers pale yellow or golden yellow, *ca* 5 cm across; sepals ovate or oblong-elliptic, ribbed, brown, tomentose outside, glabrous inside, 20-30 x 5-10 mm; filaments linear, glabrous at the base and tips, hairy in between. Achenes ovate, hairy, compressed, 4-5 x 2-2.5 mm; style white feathery, 3-3.5 cm long.

Fl. & Fr.: November-May.

Sialsuk to Aizawl, Deb 30844.

2. **NARAVELIA** Adans.

Naravella zeylanica (L.) DC., Syst. Nat. 1: 167. 1817; Hook. f. & Thomson. in Fl. Brit. India 1: 6. 1872; Kanjilal *et al.*, Fl. Assam 1(1): 6. 1934; Rau in Sharma *et al.*, Fl. India 1: 106. 1993. *Artagene zeylanica* L., Sp. Pl. 542. 1753. *Hruipawuro* (Lushai). Fig. 2.

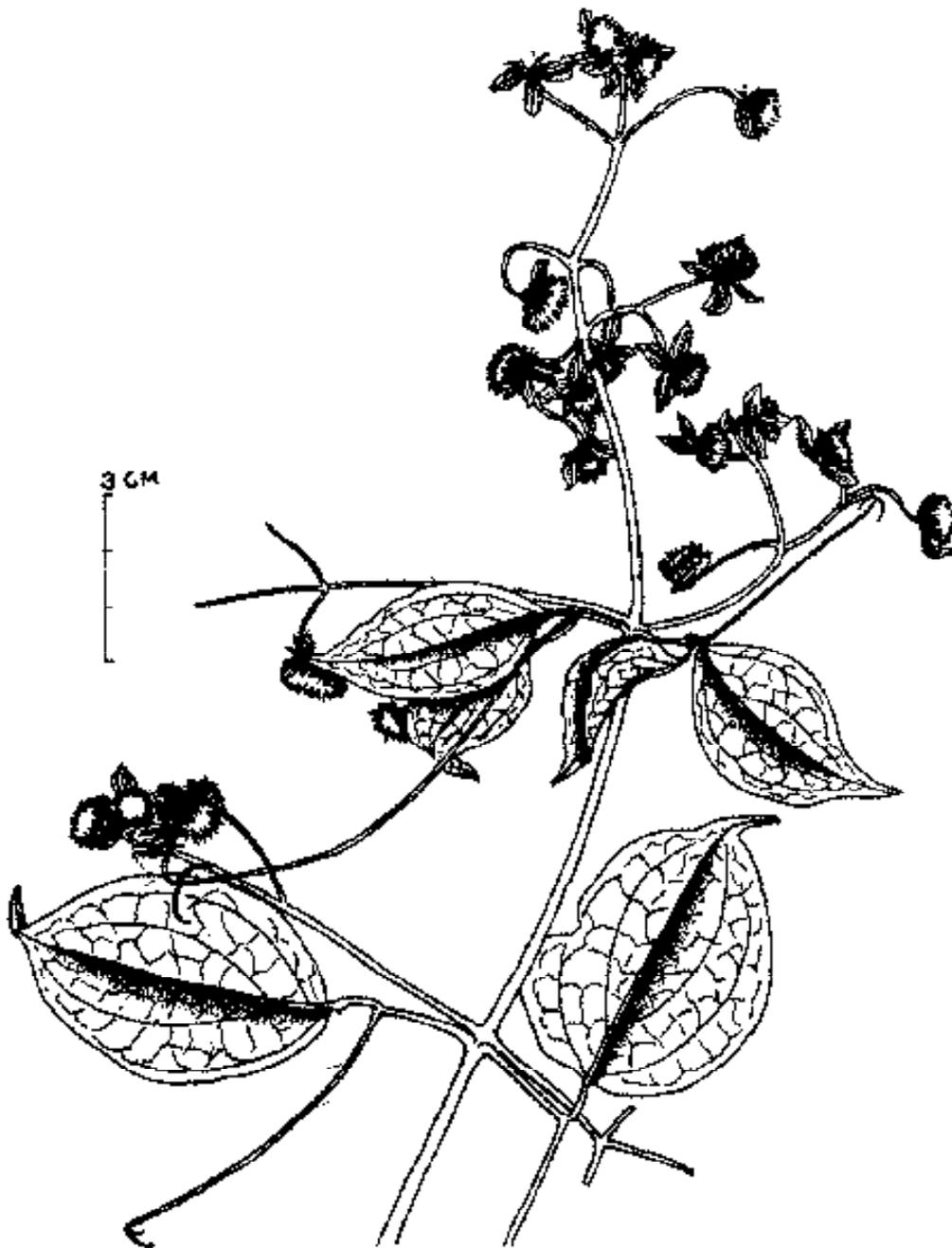


Fig. 2: *Naravelia zeylanica* (L.) DC.

Large woody climbing shrubs, up to 12 m long; branches sulcate, pubescent. Leaves trifoliolate, *ca* 14 cm long; petioles 3-4 cm long; lateral leaflet modified into 3-fid hooked tendril; lateral leaflets usually of unequal in size, ovate-rotundate, 5-11.5 x 4-7 cm, base rounded-truncate or cuneate, acuminate at apex, entire along margins, subcoriaceous, tomentose beneath, sparsely hairy or glabrous above, more densely hairy on nerves, beneath 5-7-nerved; petiolules 1.5-2 cm long, densely hairy, twisted. Panicles divaricately branched, tomentose, terminal and axillary, up to 12 cm long, flowers greenish-white, 1.5-1.8 cm across; sepals 4-5, elliptic to obovate, *ca* 6 x 3 cm, caducous; petals 6-12, narrow, oblong, *ca* 6 x 1 mm; stamens yellowish, many. Fruit a head of tailed achenes, pointed at both ends, twisted, brown, 5-6 x 1 mm; tail 3-6 cm long, finely hairy, slender, persistent.

Fl. & Fr.: October-March.

Spreading on bushes in dense forests, Sairang, *Deb* 30605 (CAL); Tithlang, *K.P. Singh* 94055.

3. RANUNCULUS L.

- 1a. Small herbs; leaves lobed; achenes turgid, not margined ... 2. *R. hirtellus*
 1b. Large herbs; leaves deeply divided;
 achenes flattened with an intramarginal rib ... 1. *R. cantoniensis*

1. *Ranunculus cantoniensis* DC., Prodr. 1: 43. 1824. *R. pensylvanicus auct. non L.f.*; Hook.f. & Thomson in Fl. Brit. India 1: 19. 1872 *p.p.*; Kanjilal *et al.*, Fl. Assam 1: 9. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 77. 1938; Rau in Sharma *et al.*, Fl. India 1: 117. 1993. Fig. 3.

Erect or prostrate hairy herbs, upto 1 m long; stems 15-50 cm long. Radial leaves ternately divided into 3 leaflets; petioles 5-15 cm long or sometimes more long, sheathing at base; leaflets 3-8 x *ca* 4 cm, deeply cut into narrow segments; cauline leaves with smaller petioles, the upper ones sessile; leaflets tripartite, 3-8 x 5-10 cm, deeply cut into linear or oblanceolate lobes, appressed pubescent; petiolules 1-4 cm long. Flowers 1.2-1.5 cm across; solitary, yellow; sepals 5, elliptic-oblong, 3-4 x 2 mm, reflexed, hirsute; petals 5, oblong, 5-6 x 3-4 mm, yellow to creamy white. Achenes in globose heads, broadly elliptic, compressed, surrounded by a narrow marginal rim, *ca* 2 mm across, \pm beaked.

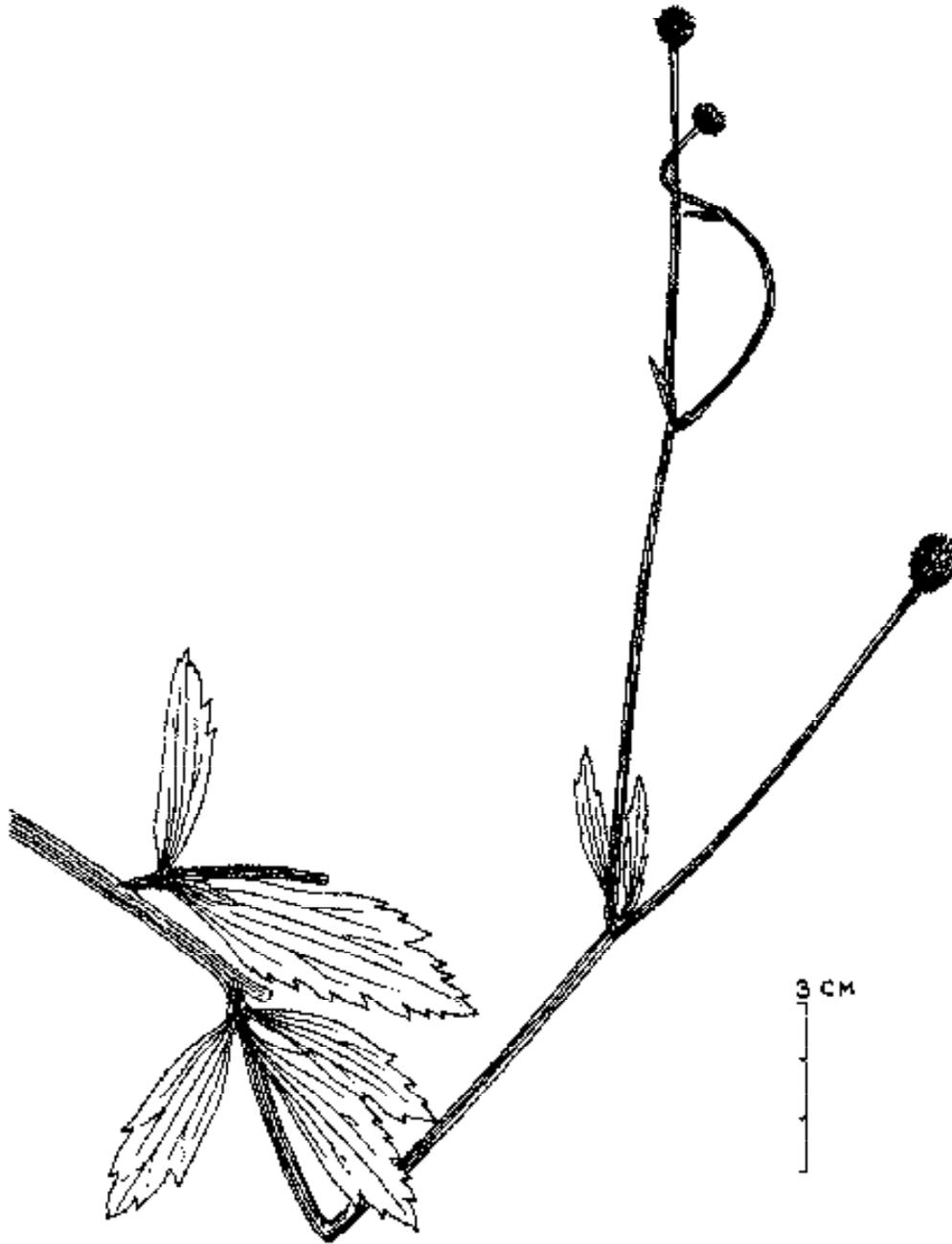


Fig. 3: *Ranunculus cantoniensis* DC.

Fl. & Fr.: May-December.

Mizo hills, *Dutta* 34008, 95902.

2. *Ranunculus hirtellus* Royle *Illus. Bot. Himal.* 53. 1834; Hook. *f. & Thomson in Fl. Brit. India* 1: 18. 1872; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 77. 1938; Rau in *Sharma et al., Fl. India* 1: 121. 1993.

Suberect, perennial, hairy herbs; stems many, ascending, branched, 5-15 cm long. Basal leaves 3-many; lamina deeply 3-partite, reniform, 8-16 x 5-20 mm, hairy, middle lobes large, entire or tricuspidate, lateral segments deeply 2-lobed; leaf bases cordate to truncate; petioles 2-6 cm long; cauline leaves palmately 3-5 partite with amplexicaul base and narrow lobes. Flowers 1-1.5 cm across, yellow; sepals oblong, 3-5 x 1.5-2 mm, hairy; petals 5, obovate, clawed, 3-6 x 3-4 mm; nectaries cupshaped. Achenes oblong or suborbicular, on pilose or glabrous receptacle, hairy when young, 1-1.5 mm long.

Fl. & Fr.: May-October.

Grierson and Long (1984) reported that the records of *R. hirtellus* from eastern Himalaya probably refer to *R. adoxifolius* Handel-Mazzetti.

North Vanlaiphai, 1500 m, *Parry* 243 (*vide* C.E.C. Fischer, *l.c.*).

4. THALICTRUM L.

1a. Leaves simple; panicles few-flowered ...2. *T. rotundifolium*

1b. Leaves biternate; panicles many-flowered ...1. *T. punduanum*

1. *Thalictrum punduanum* Wallich, *Pl. Asiat. Rar.* 2: 26. 1831; Hook. *f. & Thomson in Fl. Brit. India* 1: 13. 1872; Kanjilal *et al., Fl. Assam* 1: 7. 1934; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 77. 1938; Rau in *Sharma et al., Fl. India.* 1: 139. 1993. *Hrat* (Lushai).

Erect perennial herbs, ca 50 cm high. Leaves ternate or biternate with sheathing base; leaflets up to 9, ovate or orbicular, 2-5 cm across, base cordate, shallowly 5-lobed, toothed along margins, glaucous or pubescent beneath, sheath auricled; petioles 2-5 cm long. Panicles branched, corymbose; flowers white or purplish; sepals elliptic, ca 4 x 3 mm;

filaments filiform; anthers acute at apex. Achenes ellipsoid, *ca* 2 mm across, sessile, strongly ribbed and glandular pubescent; beak *ca* 1 mm long.

Fl. & Fr.: July-September.

Lushai hills, *Parry* 24 (CAL).

2. *Thalictrum rotundifolium* DC., *Syst. Nat.* 1: 185. 1817; *Hook. f. & Thomson in Fl. Brit. India* 1: 13. 1872; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 77. 1938.

Erect herbs; stems *ca* 25 cm long. Leaves simple, orbicular, 5-7 cm in diam.; lobes toothed, membranous, reticulate, scabrous on both sides; stipules free, oblong. Panicles few-flowered; filaments filiform. Achenes oblong with a straight beak at the tip.

Fl. & Fr.: July-August.

On moist, stony cliffs. Sialsuk, 1500 m, *Parry* 17 (*vide* C.E.C. Fischer, *l.c.*).

Note : This species has not been included in the Flora of India (Sharma *et al.*, 1993), although it was reported earlier from the area by C.E.C. Fischer (*l.c.*).

DILLENIACEAE

(K.P. Singh)

- 1a. Trees; flowers solitary or in clusters ... 1. *Dillenia*
 1b. Shrubs or lianas; flowers in terminal panicles ... 2. *Tetracera*

1. DILLENIA L.

- 1a. Flowers ebracteate, fascicled, yellow; carpels 5 ... 2. *D. pentagyna*
 1b. Flowers bracteate, solitary, white; carpels 15-25 ... 1. *D. indica*

1. *Dillenia indica* L., *Sp. Pl.* 1: 535. 1753; *Hook. f. & Thomson in Fl. Brit. India* 1: 36. 1872, *p.p. excl. syn. D. elliptica* Thunb. (1791); Kanjilal *et al.*, *Fl. Assam* 1: 10. 1934; C.E.C. Fischer in *Rec. Bot. Surv. India*

12(2): 77, 1938; N.C. Majumdar in Sharma *et al.*, Fl. India 1: 155, 1993. *Aithlong, Kawrthingdeng* (Lushai). **Fig. 4.**

Evergreen trees, up to 30 m tall. Leaves oblong to elliptic, 12-30 x 5-12 cm, base rounded or attenuate, acute to acuminate at apex, serrate at margins, glabrous above, hirsute along veins beneath; lateral nerves 30-50 pairs; petioles winged, 3-7 cm long. Flowers solitary, terminal, white, bracteate, pendant, 15-20 cm across; sepals 5, obovate, fleshy, 4-5 x 3-4 cm; petals obovate, rounded at apex, caducous, 6-8 x 4-6 cm; stamens many, anthers opening by apical pores; carpels 15-25, flattened. Pseudocarps 8-10 cm in diam., yellowish green, indehiscent, subglobose, enclosed by persistent sepals; fruiting carpels each with 5 seeds embedded in the pulp; seeds reniform, compressed, reddish, hirsute along outer margin, ca 6 x 4 mm.

Fl. & Fr.: June-February.

Common in tropical and subtropical forests. Kolasib, I.B. Camp, Dutta 33377.

2. *Dillenia pentagyna* Roxb., Pl. Corom. 1: 21, t. 20, 1795; Hook. f. & Thomson in Fl. Brit. India 1: 38, 1872; Kanjilal *et al.*, Fl. Assam 1: 11, 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 77, 1938; N.C. Majumdar in Sharma *et al.*, Fl. India 1: 156, 1993. *Kaizawl* (Lushai).

Deciduous trees, 15-25 m tall. Leaves obovate, 20-60 x 10-20 cm, base cuneate, obtuse or subacute at apex, serrate along margins, glabrous above, pubescent on veins beneath; lateral nerves 25-50 pairs; petioles 2-5 cm long. Flowers 3-8 fascicled, 3-4.5 cm across, greenish to bright yellow, fragrant, ebracteate; sepals 5, ovate reddish, 8-10 mm long; petals 5, obovate, bright yellow, 15-20 mm long; stamens in 2 series; outer numerous, shorter; inner few, longer, outwardly reflexed; anthers opening by longitudinal slits; carpels 5, oblong, unilocular. Pseudocarps ca 1.5 x 1.3 cm in diam., subglobose, drooping, yellow to orange-red, indehiscent, fleshy, 1(-2)-seeded; seeds ovoid, black, glabrous, ca 5 x 3 mm.

Fl. & Fr.: June-November.

Common in tropical and subtropical area. Kawthlir, 1200 m, Parry 231 (*vide* C.E.C. Fischer, *l.c.*); Mawmanglang 1500 m, Parry 513 (*vide* C.E.C. Fischer, *l.c.*).

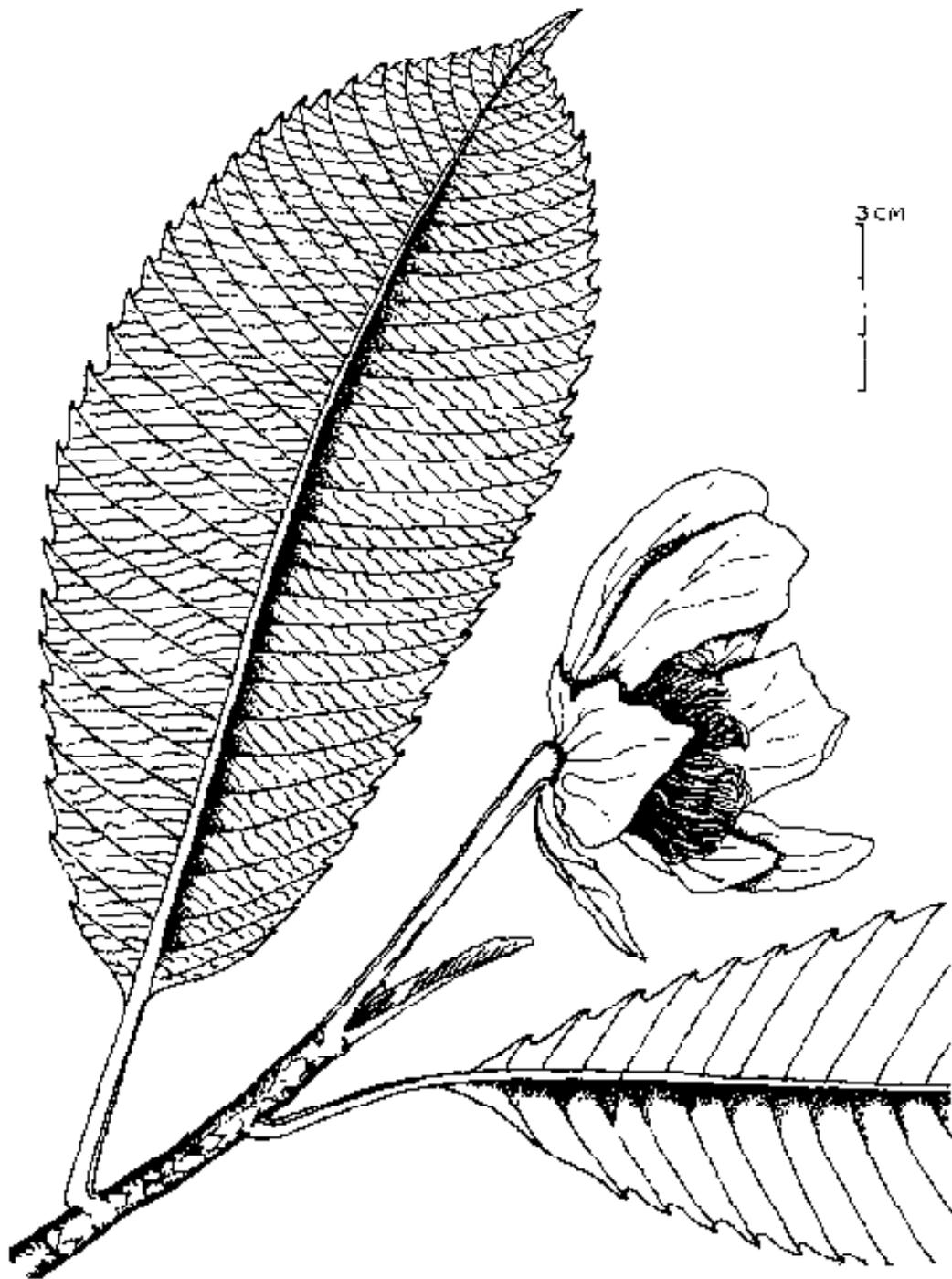


Fig. 4: *Dillenia indica* L.

2. TETRACERA L.

Tetracera sarmentosa (L.) Vahl subsp. **andamanica** (Hoogl.) Hoogl. in *Blumea* 9: 588. 1959; N.C. Majumdar in Sharma *et al.*, *Fl. India* 1: 159. 1993; *T. asiatica* (Lour.) Hoogl. subsp. **andamanica** Hoogl. in *Fl. Males.* 1, 4: 144. 1951, cum descr. angl. *Delima sarmentosa* L. var. *glabra* Hook. f. & Thomson in *Fl. Brit. India* 1: 31. 1872. *Hruithindeng* (Lushai).

Erect shrubs, upto 3 m tall, or scandent, up to 6 m, branched; young branches scabrid, sparsely hirsute. Leaves elliptic or obovate, 5-10 x 3-5.5 cm, cuneate at base, shortly acute to obtuse at apex, subentire to shallowly serrate in upper part along the margins, scabrid-papillose hairy on both surfaces; lateral nerves 10-14 pairs; petioles upto 2 cm long. Flowers whitish, in terminal panicles, 8-10 mm across; sepals elliptic, 3-4 mm long, ciliate; petals obovate, same size as sepals; stamens numerous. Follicles 5-10 x 5 mm, ovoid, beaked, glossy, purplish; seeds ovoid, ca 4 x 3 mm, black.

Fl. & Fr.: May-December.

Scarce. *s. loc.* Lalramnghinglova 08019.

MAGNOLIACEAE

(K.P.Singh)

- | | |
|---------------------------------------------------------------------------------------------|-----------------------|
| 1a. Flowers axillary; gynoecium stipitate; carpels free, dehiscing along dorsal suture | ...2. <i>Michelia</i> |
| 1b. Flowers terminal, gynoecium sessile, carpels united, dehiscing transversely around base | ...1. <i>Magnolia</i> |

1. MAGNOLIA L.

- | | |
|------------------------------------------------------------------------|----------------------------|
| 1a. Small trees; flowers sweet scented; sepals and petals not reflexed | ... 1. <i>M. hodgsonii</i> |
| 1b. Tall trees; flowers not scented; sepals and petals reflexed | ... 2. <i>M. rabaniana</i> |

1. **Magnolia hodgsonii** (Hook. f. & Thomson) Keng in *Gard. Bull. Singapore* 31(2): 129. 1978; Raju in Sharma *et al.*, *Fl. India* 1: 168. 1993. *Talauma hodgsonii* Hook. f. & Thomson in *Fl. Brit. India* 1:40. 1872;

Kanjilal *et al.*, Fl. Assam 1: 17. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78. 1938. *Thingtumbu* (Lushai).

Small evergreen trees, 8-25 m tall. Leaves oblanceolate, 16-45 x 7-11.5 cm, base attenuate or cuneate, acuminate or apiculate at apex, entire, glabrous; lateral nerves prominent beneath, 15-25 pairs; petioles 2-4 cm long, thickened at base with stipular scar along the entire length. Flowers large, terminal, white or pink, fragrant, 6-10 cm across; sepals 3, white, pinkish tinged, oblong, fleshy; petals 6-9, not reflexed; stamens sessile, yellowish; carpels sessile, glabrous. Fruiting receptacles ellipsoid, 8-10 x 4-6 cm; ripe carpels sharply beaked, ovoid; seeds 3-4 in each carpel, oblong, 8-9 x 6-7 mm, plano-convex, red.

Fl. & Fr.: April-October.

Kawthlir, 600 m, Parry 361 (*vide* C.E.C. Fischer, *l.c.*); Dutta 34098, 33598.

Magnolia rabaniana (Hook. f. & Thomson) Raju & Nayar in Indian J. Bot. 3: 171. 1890; Raju in Sharma *et al.*, Fl. India 1: 173. 1993. *Talauma rabaniana* Hook. f. & Thomson, Fl. Ind. 74. 1855 & in Fl. Brit. India 1: 40. 1872; Kanjilal *et al.*, Fl. Assam 1: 18. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78. 1938. *Thingtumbu* (Lushai).

Tall trees, 20-25 m with conical crown; young parts tomentose. Leaves elliptic or oblanceolate, 18-32 x 5-9 cm, base attenuate, shortly acuminate at apex, entire along margins, coriaceous, glabrous, shiny above; lateral nerves 10-20 pairs; petioles upto 2.5 cm long. Flowers solitary, terminal, 5-8 cm long, not fragrant, white; bracts tomentose; sepals 3, suborbicular, caducous; petals, 9 in 3 whorls, elliptic or obovate, outer whorl reflexed; stamens many. Fruiting receptacles woody, 7-15 x ca 4 cm; ripe carpels 20, dehiscent by ventral suture; pits rhomboidal.

Fl. & Fr.: April-October.

Reported by C.E.C. Fischer (*l.c.*).

CULTIVATED SPECIES

Magnolia grandiflora L. Syst. Nat. ed. 10, 2: 1082. 1759; Mathew in Rec. Bot. Surv. India 20: 37. 1969.

Evergreen trees with hoary tomentose young braches. Leaves elliptic-oblong, ovate to obovate, rusty tomentose beneath; buds concealed in stipular sheaths. Flowers white, solitary, fragrant, 10-25 cm across; perianth 9-15; stamens many; carpels 1-2-ovuled, rusty brown tomentose in fruits. Seeds bright red.

Fl. & Fr.: April-May.

A native of southern United States, widely cultivated in the gardens as an ornamental.

2. MICHELIA L.

- 1a. Perianth parts more than 4 cm long ... 3. *M. doltsopa*
- 1b. Perianth parts less than 4 cm long :
- 2a. All parts glabrous ... 4. *M. oblonga*
- 2b. Young parts hairy :
- 3a. Young parts rusty tomentose; stipular scars indistinct; flowers white; carpels bi-ovulate ... 1. *M. baillonii*
- 3b. Young parts yellowish or greyish pubescent; stipular scar 1-2 cm long; flowers yellow; carpels with 3 or more ovules ... 2. *M. champaca*

1. *Michelia baillonii* (Pierre) Finet & Gagnepain in Mem. Soc. Bot. France 1(4): 46. 1905; Raju in Sharma *et al.*, Fl. India 1: 174. 1993. *Magnolia baillonii* Pierre, Fl. For. Cochinch. 1: t. 2. 1879. *Talauma phellocarpa* King in Ann. R. Bot. Gard. Calc. 3: 205, t. 47. 1891; Kanjilal *et al.*, Fl. Assam 1: 18. 1934. *Paramichelia baillonii* (Pierre) Hu in Sunyatsenia 4: 144. 1940. *Ngiau-hnah-sin* (Lushai). **Fig. 5.**

Large ever-green trees, up to 30 m tall; crown conical and narrow; branches grey to rusty tomentose. Leaves elliptic-lanceolate or oblong-lanceolate, 8-15 x 4-6.5 cm, base acute or cuneate, acute to acuminate at apex, entire along margins, thinly coriaceous, glabrous above, minutely pubescent on midrib beneath, glabrescent when mature; lateral nerves 12-14 pairs; petioles up to 2 cm long, swollen at base, pubescent; stipular scars inconspicuous; bracts deltoid, ca 2.5 cm long. Flower buds ovoid-ellipsoid, enclosed in silky scales; flowers solitary, axillary, erect, 2.5-3 cm across, pale-white; perianth parts 12-18, ca 2 x 0.5-0.6 cm, lanceolate or

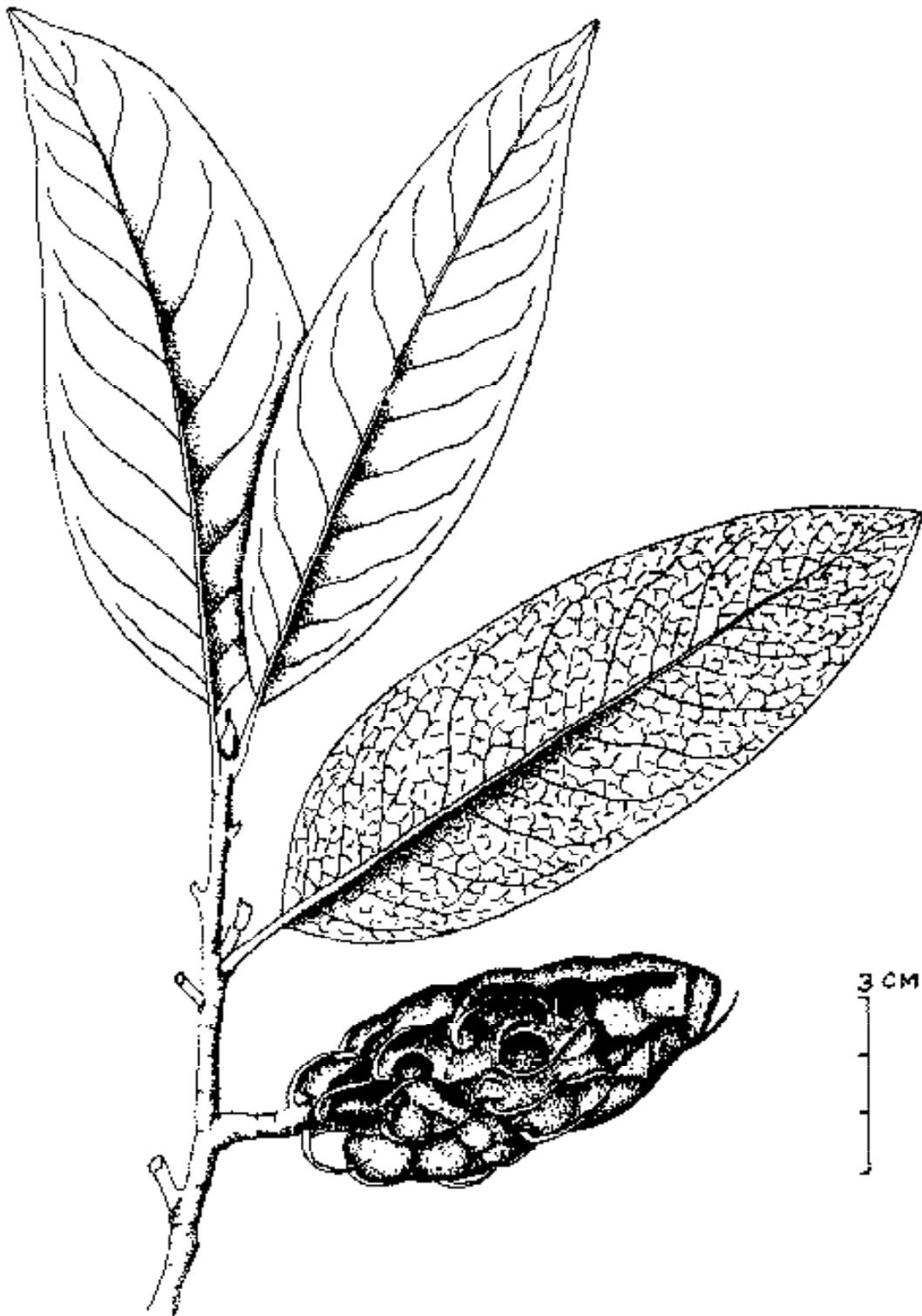


Fig. 5: *Michelia baillonii* (Pierre) Finet & Gagnepain

strap shaped. Fruiting receptacle subcylindrical, 6-8 x 2-4 cm; ripe carpels many, woody, obliquely ovoid, biovulate, whitish-grey speckled on their surface, ca 1-1.5 cm long; seeds bright red, \pm ellipsoid, 5-7 x ca 5 mm.

Fl. & Fr.: July-September.

Scarce in the area. Tuivawl, *M. Sawmliana* 99247; Ratu, alt 800 m, *M. Sawmliana* 101753.

2. *Michelia champaca* L., Sp. Pl. 536. 1753; Hook. f. & Thomson in Fl. Brit. India 1: 42. 1872; Kanjilal *et al.*, Fl. Assam 1: 22. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78. 1938; Raju in Sharma *et al.*, Fl. India 1: 175. 1993. *Zobul, Ngiau* (Lushai). **Fig. 6.**

Evergreen trees, 15-25 m tall. Leaves ovate-elliptic, 8-18 x 5-7.5 cm, base cuneate, long acuminate at apex, entire, glabrous and shining above, glabrescent beneath; lateral nerves 12-18 pairs; petioles 2.5-3.5 cm long; stipular scar 1-2 cm long; bracts spathoid. Flowers solitary, axillary, 4-5 cm across, light yellow, fragrant; perianth parts 12-15, 2-3 x 0.7-1 cm, petaloid, oblanceolate, fleshy. Fruiting receptacles cone like, 8-11 cm long, drooping; ripe carpels woody, ovoid-ellipsoid, white speckled, 1-2 cm long; seeds many.

Fl. & Fr.: April-June.

In dense shady forests. A very valuable timber species, sometimes cultivated. Aizawl, *Leslie* 20 (CAL); Kalchau, on way from Saiha to Sangau, *K.P. Singh* 96898; Kawnpui, *K.P. Singh* 97024.

3. *Michelia doltsopa* Buch.-Ham. ex DC., Syst. Nat. 1: 448. 1817; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78. 1938; Raju in Sharma *et al.*, Fl. India 1: 176. 1993. *M. excelsa* (Wallich) Blume, Fl. Jav. 1: 9. 1828; Hook. f. & Thomson in Fl. Brit. India 1: 43. 1872; Kanjilal *et al.*, Fl. Assam 1: 21. 1934. *Magnolia excelsa* Wallich, Tent. Fl. Nepal. 5. t. 2. 1824. *Zongiau* (Lushai).

Trees, 10-25 m tall, deciduous; young parts ferruginous-tomentose. Leaves elliptic or oblanceolate, 8-20 x 4-7 cm, base cuneate, acute or acuminate at apex, entire, glabrous above, densely pubescent beneath at first; lateral nerves 7-10 pairs; petioles 2-4 cm long, glabrous, smoothens

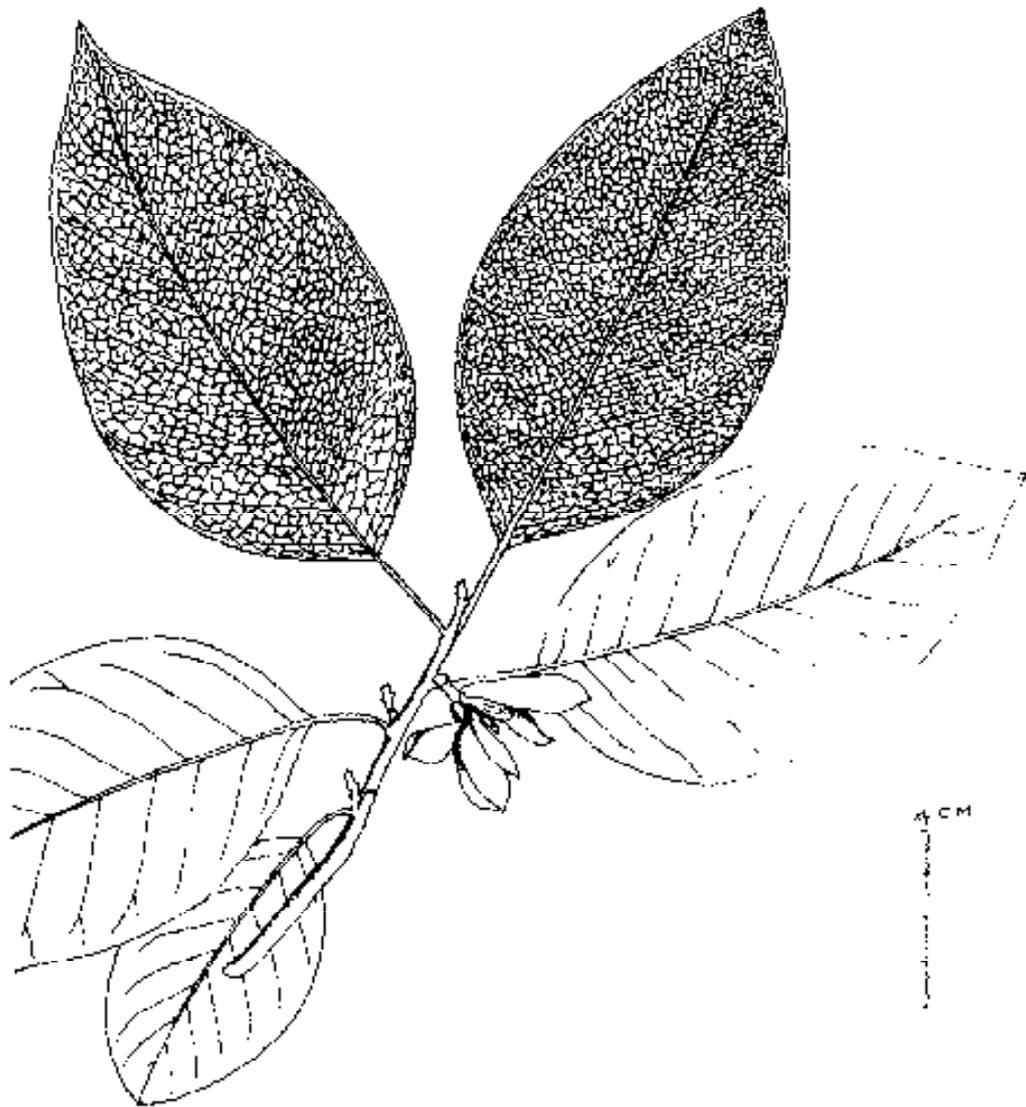


Fig. 6: *Michelia champaca* L.

at base; stipular scar 5-8 mm long. Buds brown, sericeous; flowers, axillary or pseudoterminal, 8-14 cm across, creamy white, sweet scented; perianth parts 9-12, oblanceolate, 4-5.5 x 1-2.5 cm, petaloid; stamens yellowish. Fruiting receptacles 8-13 x 4-6 cm; ripe carpels obliquely ovoid, ca 1.5 x 0.8-1 cm, beaked, woody; seeds 1-2, red, oily, compressed.

Fl. & Fr.: February-September.

Often cultivated, a very valuable timber tree, used for building and furniture making. Phongphui, 1800 m, Parry 144 (*vide* C.E.C. Fischer, *l.c.*).

4. *Michelia oblonga* Wallich ex Hook. f. & Thomson, Fl. Ind. 81. 1855 & in Fl. Brit. India 1: 43. 1872; Kanjilal *et al.*, Fl. Assam 1(1): 23. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78. 1938; Raju in Sharma *et al.*, Fl. India 1: 179. 1993. *Ngiau* (Lakher).

Trees, up to 40 m tall. Leaves oblanceolate, ovate-elliptic or oblong, 10-18 x 5-6 cm, base acute or cuneate, abruptly acuminate at apex, entire, glabrous on either side; lateral nerves visible on both surfaces, 10-12 pairs; petioles 1.5-2.5 cm long, swollen at base; stipular scar 7-9 mm. Flowers axillary, solitary, 2-3 cm across, white; perianth parts white, 12, oblanceolate, petaloid, 2.5-3 x 0.8-1 cm. Fruiting receptacles 10-16 cm long; ripe carpels 1-2 cm long, sessile, subglobular, beaked, speckled.

Fl. & Fr.: February-November.

South Mizoram, *Wenger s.num.*

SCHISANDRACEAE

(K.P. Singh)

- | | |
|-------------------------------------------------------------------------------|-------------------------|
| 1a. Leaves entire, fruitlets borne on elongated axis | ...2. <i>Schisandra</i> |
| 1b. Leaves denticulate, fruitlets crowded in a subglobose to globose clusters | ...1. <i>Kadsura</i> |

1. KADSURA A. Juss.

Kadsura heteroclita (Roxb.) Craib, Fl. Siam. Enum. 1: 28. 1925; R.R. Rao & Hajra in Sharma *et al.*, Fl. India 1: 189. 1993. *Uvaria heteroclita* Roxb., Fl. Ind. 2: 663. 1832. *Kadsura roxburghiana* Arn. in

Mag. Zool. Bot. 2: 546. 1838; Hook.f. & Thomson in Fl. Brit. India 1: 45. 1872; Kanjilal *et al.*, Fl. Assam 1: 29. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 77. 1938. *Thearbawn* (Lushai), *Theiawbeupu* (Lakher).

Evergreen, climbing shrubs, glabrous. Leaves elliptic to ovate-lanceolate, 8-14 x 3-5.3 cm, base rounded or cuneate, acute at apex, distantly denticulate to entire at margins, glabrous; lateral nerves 10-15 pairs; petioles 1-2 cm long. Flowers axillary, solitary, 0.6-1.3 cm across; perianth parts 11-15, in 3-4 whorls, whitish, turning pale-creamy. *Male flowers*: stamens 12-15 or rarely more, outer filaments free, inner filaments connate. *Female flowers*: carpels angular, many with sessile stigma, 2-2.5 mm long; densely packed into a subglobose head; head 0.8-1 cm diam.; ovules 2-4 in each carpel. Fruiting head globose or subglobose, 3-4.5 cm across; fruitlets globose, 1-1.5 x 1.5 cm, fleshy, scarlet-red; seeds orbicular, compressed, ca 8 mm in diam.

Fl. & Fr.: August-December.

In subtropical evergreen forests. Sialsuk, 1500 m, Parry 426, (*vide* C.E.C. Fischer, *l.c.*).

2. SCHISANDRA Michx.

- 1a. Deciduous climbers; stamens monadelphous below;
anthers free ...1. *S. neglecta*
- 1b. Evergreen climbers; stamens in one globose mass;
anthers sessile ...2. *S. propinqua*

1. *Schisandra neglecta* A. C. Smith, in Sargentia 7: 127. 1947; R.R. Rao & Hajra in Sharma *et al.*, Fl. India 1: 193. 1993. *S. elongata sensu* Hook.f. & Thomson in Fl. Brit. India 1: 44. 1872 (excl. basionym); Kanjilal *et al.*, Fl. Assam 1: 27. 1934; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 28. 1987.

Deciduous woody climbers. Leaves lanceolate, elliptic or oblanceolate, 5-10 x 2-7 cm, base rounded or cuneate, acute or shortly acuminate at apex, denticulate at margins, membranous, glabrous above, glaucous beneath; lateral nerves 4-6 pairs; petioles 1-3 cm long, channelled above. Panicles 1-5 cm long; flowers 1-3 cm across, fascicled or solitary, yellowish; perianth parts 7-8, orbicular, 5-10 x 5-8 mm, yellowish inside. *Male flowers*: Stamens spirally arranged, monadelphous below, free and

tubular above; *Female flowers*: Carpels 10-24, on 1.5-1.8 mm long column; ellipsoid, 3-5 x 2 mm; fruitlets 10-30, sessile, oblong-ellipsoid, indehiscent, not beaked, red when ripe, 4-7 mm long; seeds 1-2, globose.

Fl. & Fr.: May-September.

In subtropical forests. Thalthlang, *Dutta* 33987.

2. *Schisandra propinqua* (Wallich) Baill. ex A.C. Smith in *Sargentia* 7: 149. 1947; Kanjilal *et al.*, *Fl. Assam* 1: 28. 1934; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 78. 1938; R.R. Rao & Hajra in *Sharma et al.*, *Fl. India* 1: 194. 1993. *Kadsura propinqua* Wallich, *Tent. Fl. Nep.* 11, t. 15. 1824. *S. axillaris* Hook. f. & Thomson in *Fl. Brit. India* 1: 45. 1872.

Woody climbers; branchlets angular, succulent. Leaves ovate-lanceolate, 6-10 x 2-5 cm, base cuneate, acuminate at apex, serrate-toothed at margins, glabrous and shining above, pale and minutely gland dotted beneath; lateral nerves 6-8 pairs; petioles 1-2.5 cm long. Flowers axillary, solitary, 1-2 cm across, scarlet, slightly scented; pedicels 2-3 cm long; perianth parts 6-10 in male flowers and 8-16 in female flowers, 5-6 x 5 mm, ovate to obovate. Stamens 10-12, connate into a globose, brick-red fleshy mass, anthers sessile, embedded in the mass of filament. Fruiting axis 4-6 cm long (excluding pedicel part) with 20-30 fruits; ripe carpels fleshy, 4-7 x 4-5 mm, 1-2-seeded.

Fl. & Fr.: August-November.

Hmuifang, ca 1500 m, *Parry* 296 (*vide* C.E.C. Fischer, *l.c.*).

ANNONACEAE

(K.P. Singh)

1a. Climbing or scrambling shrubs:

2a. Ripe carpels moniliform; inner petals
not thick and fleshy ... 2. *Dioscorea*

2b. Ripe carpels not moniliform; inner petals
thick and triquetrous above ... 3. *Fissistigma*

1b. Erect shrubs or trees:

- 3a. Petals all equal, spreading :
- 4a. Flowers solitary; ripe carpels moniliform,
more than one-seeded ...2. *Desmus*
- 4b. Flowers fasciated; ripe carpels ovoid or ellipsoid,
1-seeded ...6. *Polyalthea*
- 3b. Petals unequal or subequal:
- 5a. Flowers red, outer petals smaller than inner ones,
sepaloid; inner petal sometimes pouched
and coherent at base ...5. *Mitisa*
- 5b. Flowers yellowish, outer petals longer
than inner ones :
- 6a. Ripe carpels solitary, many-seeded ...1. *Cyathocalyx*
- 6b. Ripe carpels many, one-seeded ... 4. *Goniothalamus*

1. CYATHOCALYX Cham. ex Hook. f. & Thomson

Cyathocalyx martabanicus Hook. f. & Thomson in Fl. Brit. India 1: 53. 1872; Kanjilal *et al.*, Fl. Assam 1: 40. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78. 1938; D. Mitra in Sharma *et al.*, Fl India 1: 255. 1993. *Hreirawt* (Lushai).

Evergreen trees, up to 10-12 (48) m tall. Leaves ovate or elliptic-oblong, 8-15 x 3-6 cm, base cuneate, abruptly acuminate at apex, entire, coriaceous, glabrous, shining on both surfaces; lateral nerves 8-12 pairs; petioles 1-1.5 cm long. Flowers solitary, sometimes 2-3 together, 1.5-2 cm across, extra axillary, densely pubescent; sepals *ca* 1 cm long, oblong, reflexed above, deeply 3-lobed to the middle; petals in 2 whorls of 3 each, 2-3 cm long, clawed, yellowish, thick; stamens many, truncate at top, *ca* 2 mm long; anthers extrose, solitary or paired, oval-oblong, greenish-white; carpels 3-4 mm long. Ripe carpels berried, turning into cherry colour, blunt at top, *ca* 10 cm long, 5-6 cm across; pericarp fleshy; seeds many, brown, oblong, flat with blunt ridge around, 3-3.5 x 1.5-2 cm.

Fl. & Fr.: April-December.

In moist shady places. Dampa, *D.K. Singh* 98986.

Timber is soft and very elastic. The sweetish aromatic pulp of the ripe fruit is eaten.

2. DESMOS Lour.

- 1a. Petals 2-3, connate; inner whorl absent; flowers horn shaped, reddish-brown or orange outside ...3. *D. longiflorus*
- 1b. Petals 6, free, in two whorls:
- 2a. Erect, sarmentose shrubs; leaves glabrous above; flowers 5-7 cm across, pale-yellow ...1. *D. chinensis*
- 2b. Climbing shrubs; leaves glabrescent above; flowers 10-20 cm across, yellowish-green ...2. *D. dumosus*

1. *Desmos chinensis* Lour., Fl. Cochinch. 1: 352. 1790; D. Mitra in Sharma *et al.*, Fl. India 1: 257. 1993. *Unona discolor* Vahl, Symb. Bot. 2: 63, t. 36. 1791; Hook. f. & Thomson in Fl. Brit. India 1: 59. 1872; Kanjilal *et al.*, Fl. Assam 1: 35. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78. 1938.

Evergreen, erect or sarmentose shrubs, up to 5 m high. Leaves bifarious, oblong-elliptic or oblong-lanceolate, 5-9(15) x 3-4.5 cm, base rounded or subcuneate, bluntly acuminate or acute at apex, entire, glabrous above, greyish and minutely pubescent below; petioles 3-6 mm long. Flowers extra-axillary, 5-7 cm long, leaf opposed, pale yellow, solitary; sepals 3, ovate, acuminate, nearly glabrous, 5-7 x 4-3 cm; petals 6(3+3), elliptic-lanceolate, clawed at base, outer petals 5-5.5 x 1.8-2 cm; inner petals 3.8-4 x 0.8-1 cm, glabrous or minutely pubescent; stamens many, sessile, with spreading top; carpels numerous, sessile, oblong, 1-2 mm long. Ripe carpels many, moniliform, 2-6, jointed, 2-4 cm long, 4-5 mm thick; segments ovoid; seeds 2-3, brownish, shiny.

Fl. & Fr.: April-November.

Lushai hills, Parry 24 (CAL); Theiriat, Deb 31315.

2. *Desmos dumosus* (Roxb.) Safford in Bull. Torrey Bot. Club 39: 506. 1912; D. Mitra in Sharma *et al.*, Fl. India 1: 260. 1993. *Unona dumosa* Roxb., Fl. Ind. 2: 670. 1832; Hook. f. & Thomson in Fl. Brit. India 1: 59. 1872; Kanjilal *et al.*, Fl. Assam 1: 35. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78. 1938. *Chhawag-Chat* (Lushai). Fig. 7.

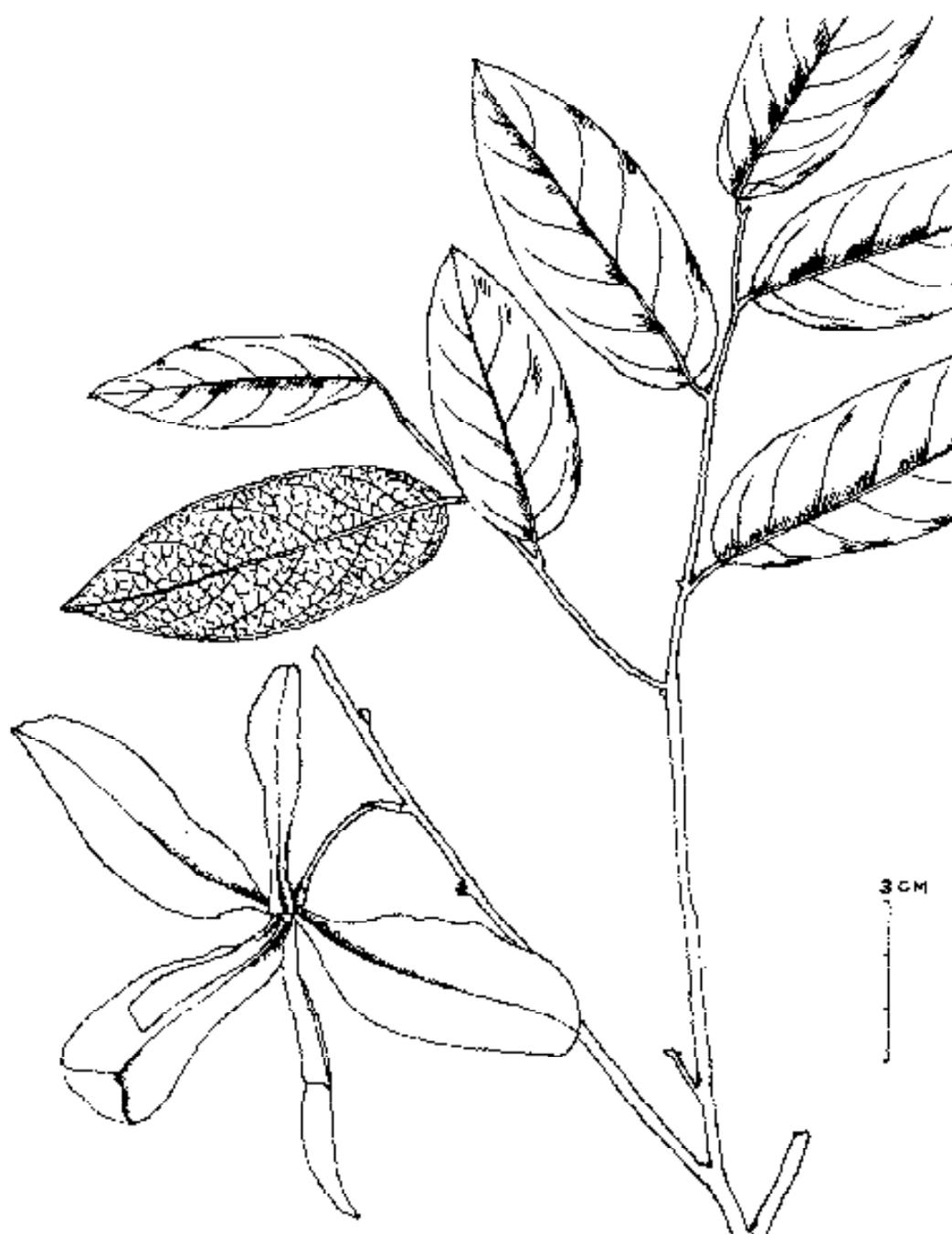


Fig. 7: *Desmos dumosus* (Roxb.) Safford

Scandent shrubs with thickened loops and coils. Leaves ovate, elliptic-oblongate, 6-12 x 3-5 cm, base rounded or subcordate, acuminate at apex, entire at margins, glabrous or glabrescent above, pubescent on midrib, brownish pubescent beneath; lateral nerves 8-12 pairs; petioles 2-6 cm long, hairy. Flowers extra axillary or terminal, solitary, pendulous, yellowish-green, 10-12 cm across; sepals 3, 8-10 x 5-7 mm, ovate, pubescent; petals 6(3+3), outer petals 5-5.5 x 2-2.3 cm, oblongate, fine pubescent; inner petals 4.5-5 x 0.5-1 cm, narrow; stamens many, flat-topped; carpels many, ca 2 mm long. Ripe carpels dark red, many, moniliform, up to 3 cm long, pubescent, constricted, 1-4-seeded, 2-3-jointed.

Fl. & Fr.: May-December.

In open forests. South Lushai hills, 990 m, *Wenger* 217 (*vide* C.E.C. Fischer, *l.c.*); *Theiriak*, *Deb* 31331; *Aizwal Zoo*, Near panther cave, *Lalramnghinglova* 197.

3. *Desmos longiflorus* (Roxb.) Safford in Bull. Torrey Bot. Club 39: 507, 1912; D. Mitra in *Sharma et al.*, Fl. India 1: 261, 1993. *Unona longiflora* Roxb., Fl. Ind. 2: 668, 1832; Hook. f. & Thomson in Fl. Brit. India 1: 61, 1872; *Kanjilal et al.*, Fl. Assam 1: 34, 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78, 1938; *Deb & Dutta* in J. Econ. Tax. Bot. 10(1): 28, 1987. Fig. 8.

Erect glabrous shrubs to small trees, 5-8 m tall. Leaves oblong-lanceolate, 15-30 x 5-8 cm, base rounded or cuneate, acuminate at apex, entire at margins, shining and glabrous above, glaucous beneath; lateral nerves 10-16 pairs; petioles 1.5-2 cm long. Flowers solitary, axillary, drooping, 4-10 cm long, horn shaped, reddish brown or orange outside, yellow inside; sepals 3, broadly triangular, 2-3 x 2-3 mm, minutely pubescent; petals 3, spatulate, red, fleshy, puberulous when young, clawed at base, 8-15 x 1-1.5 cm; inner whorl absent; stamens many, closely packed; carpels many, ovoid, 2-4 mm long. Ripe carpels 15-20, borne on 3-4 cm long fruiting stalks, 4-7.5 cm long, moniliform, jointed, each with 1-4-seeded segments; segments 1.8-2.2 x 0.7-0.8 cm, terminal apiculate.

Fl. & Fr.: April-December.

In moist shady places. Selegkawn, 600 m, *Parry* 177 (*vide* C.E.C. Fischer, *l.c.*); *Kawthlir*, *Parry* 396 (*vide* C.E.C. Fischer, *l.c.*); *Aizawl*, 900

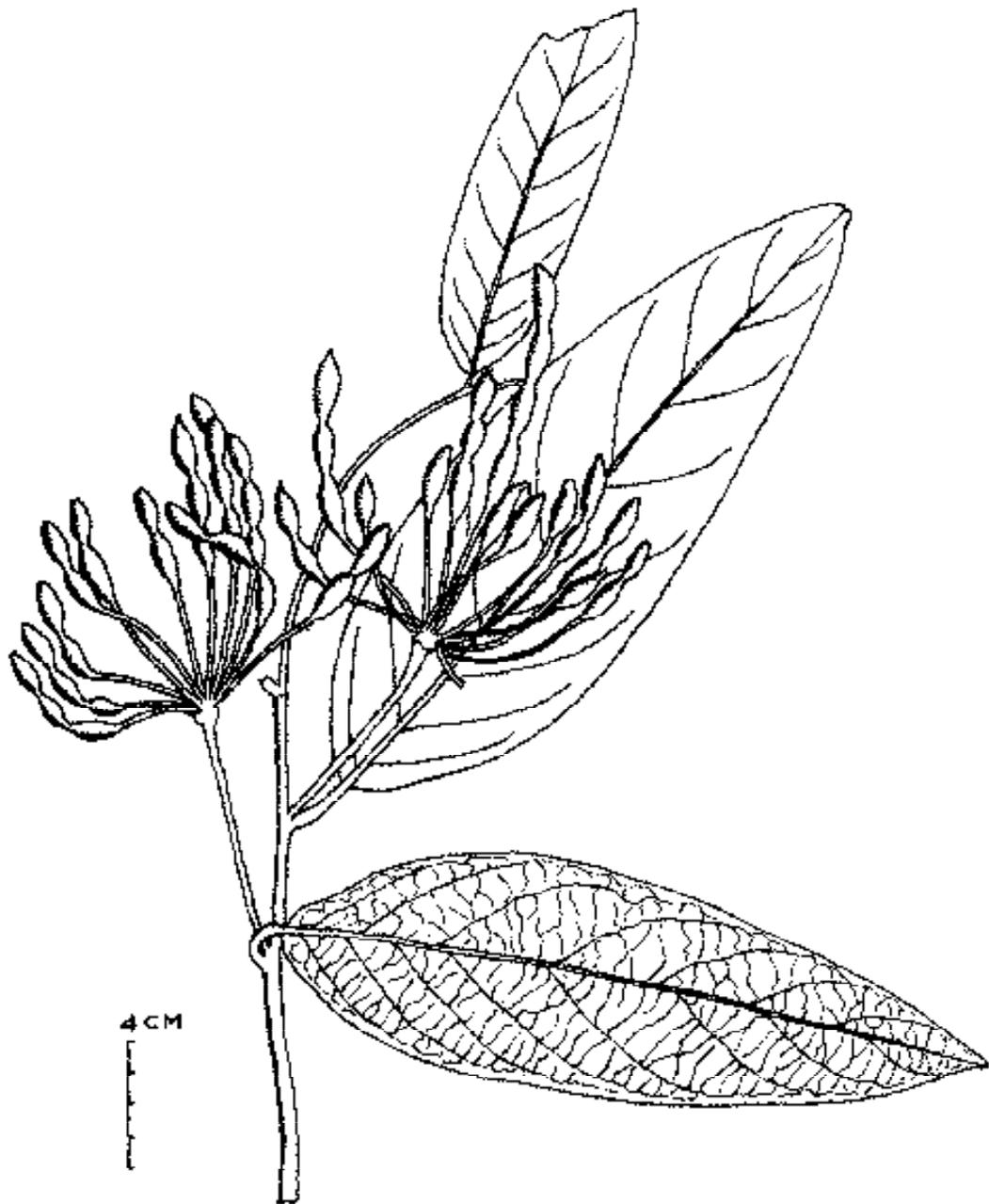


Fig. 8: *Desmos longiflorus* (Roxb.) Safford

m, *Parry 657a* (fide C.E.C. Fischer, l.c.); Sialsuk, *Deb 30853*; Haurung, 660 m, *Deb 31385*; Rieng, *D.K. Singh 92966*.

3. FISSISTIGMA Griffith

Fissistigma polyanthum (Hook. f. & Thomson) Merr. in Philipp. J. Sci. (Bot.) 15: 135. 1919; D.Mitra in Sharma *et al.*, Fl. India 1: 299. 1993. *Melodorum polyanthum* Hook. f. & Thomson, Fl. Ind. 121. 1855 & in Fl. Brit. India 1: 81. 1872; Kanjilal *et al.*, Fl. Assam 1: 49. 1934; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 28. 1987.

Woody climbers; branches brown, glabrous. Leaves oblong-elliptic, 6-14 x 3-5 cm, base rounded or cuneate, acute at apex, ± coriaceous, glabrescent above and pubescent beneath, glabrous with age; lateral nerves 15-20 pairs; petioles 0.8-1 cm long. Flowers 3-6 together, in sub-umbellate cymes, leaf opposed, bracteate and bracteolate, ca 6 mm across, pale orange-red, fragrant; sepals 3, ovate, greyish, tomentose, 0.3-0.4 x 0.2 cm; petals 6(3+3), red; outer ovate, tomentose outside, 5-6 mm long, inner thicker, glabrous except near apex; stamens numerous; carpels also numerous; styles hairy. Ripe carpels many, globose; berries, 1-2 cm across, apiculate; seeds many in 2 rows, brown.

Fl. & Fr.: December-June.

Theiriat, *Deb 31330*.

4. GONIOTHALAMUS (Blume) Hook. f. & Thomson

Goniothalamus sesquipetalis (Wallich) Hook. f. & Thomson, Fl. Ind. 108. 1855 & in Fl. Brit. India 1: 73. 1872; Kanjilal *et al.*, Fl. Assam 1: 37. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78. 1938; D. Mitra in Sharma *et al.*, Fl. India 1: 237. 1993. *Gutteria sesquipetalis* Wallich, Pl. Asiat. Rar. 3: t. 266. 1832.

Springly branched, erect undershrubs, up to 3 m tall. Leaves oblong, 20-30 x 5-10 cm, base rounded or cuneate, acuminate at apex, entire and recurved at margins, glabrous, coriaceous; lateral nerves 15-20 pairs; petioles 1-1.5 cm long. Flowers 1.5-2 cm long, axillary, solitary and fascicled, greenish-yellow, bracteate at base; sepals 3, 5-6 x 5 mm, ovate, acute; petals 6(3+3), ovate lanceolate, shortly clawed and free in lower

region, outer ones *ca* 2 x 0.5 cm, inner ones *ca* 1.2 x 0.4 cm; stamens many, *ca* 1 mm long; carpels hairy. Ripe carpels *ca* 2 x 1 cm, subsessile, ovoid to ellipsoid, orange-red when mature; seeds solitary, transversely grooved.

Fl. & Fr.: May-December.

Lungleh, 1110 m, *Gage* 95 (CAL); *Deb* 31091.

5. MILIUSA Leschen. ex A. DC.

Miliusa globosa (DC.) Panigr. & S.C. Misra in *Taxon* 33: 713. 1984; D. Mitra in Sharma *et al.*, *Fl. India* 1: 215. 1993. *Guatteria globosa* DC. period. edit.: (?) 218, before 21 Nov. 1832. *Hyalostemma roxburghiana* Wallich, Cat. no. 6434. 31 Oct. 1832, *nom. illeg.* *Miliusa roxburghiana* (Wallich) Hook. f. & Thomson in *Fl. Ind.*: 150. 1855 & in *Fl. Brit. India* 1: 87. 1872; Kanjilal *et al.*, *Fl. Assam* 1: 42. 1934; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 78. 1938.

Small trees, 3-10 m tall. Leaves bifarious, ovate-lanceolate or oblong-elliptic, 3-15 x 2-4.5 cm, base rounded, abruptly acuminate at apex, oblique, glabrous above, midrib pubescent above, glabrescent beneath, glabrous with age; lateral nerves *ca* 10 pairs; petioles 2-3 mm long. Flowers bisexual or unisexual, 1-1.5 cm across, axillary or extra axillary or leaf opposed, solitary or fascicled, red, drooping; sepals 3, linear-lanceolate, 2-5 x 1 mm, narrow; petals 6(3+3), crimson red, fleshy; outer ones 3-5 x 1.5-2 mm, hairy, spreading; inner ones *ca* 1 x 0.8 cm, erect, ovate; stamens many, *ca* 1 mm long; carpels ovate. Ripe carpels 0.8-1 cm long, obovoid or subglobose, on 1-2 cm long stalks, glabrous-verrucose, usually 1-seeded; seeds 4-5 x *ca* 3 mm.

Fl. & Fr.: April-December.

Saithah, *D.K. Singh* 92922.

6. POLYALTHIA Blume

Polyalthia simiarum (Hook. f. & Thomson) Hook. f. & Thomson in *Fl. Brit. India* 1: 63. 1872 *p.p.*; Kanjilal *et al.*, *Fl. Assam* 1: 31. 1934; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 78. 1938; D. Mitra in

Sharma *et al.*, Fl. India 1: 276. 1993. *Guatteria simiarum* Hook. f. & Thomson in Fl. Ind. 142. 1855. *Hreirawt* (Lushai); *Themeumaw* (Lakher).

Trees, 15-30 m tall. Leaves bifarious, elliptic-oblong to ovate-oblong, 8-25 x 3-10 cm, base rounded or subcuneate, acute to acuminate at apex, entire at margins, subcoriaceous, dark green and shining above, glabrous; lateral nerves 12-16 pairs; petioles 0.8-1.2 cm long. Flowers 3-3.5 cm across, 2-3 fascicled on small woody leafless branches, or on tubercles on older branches, greenish-yellow; pedicels 2-3.5 cm long; sepals 3, *ca* 3.5 x 3 mm, broadly ovate to triangular, pubescent outside; petals 6(3+3), strap shaped, puberulous outside; outer ones 1.5-2 x 0.3-0.4 cm; inner ones 2-2.5 x 0.3-0.4 cm; stamens many. Ripe carpels *ca* 40, 2-3.5 cm long, glabrous, obovoid, orange-red to black, borne on 2-3 cm long stalks; seeds ovoid, grooved and transversely ribbed, 2-3 cm long.

Fl. & Fr.: June-September.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

CULTIVATED TAXA

Polyalthia longifolia (Sonner.) Thawaites, *Erum. Pl. Zeyl.* 398. 1864; Hook. f. & Thomson, *Fl. Brit. India* 1: 62, 1872; D. Mitra in Sharma *et al.*, *Fl. India* 1: 274. 1993. *Uvaria longifolia* Sonner., *Voy. aux Indes* 2: 233, t. 131. 1782.

Cultivated as an avenue tree.

MENISPERMACEAE

(K.P. Singh)

- 1a. Leaves elliptic or oblanceolate:
 - 2a. Leaves membranous, base sagittate;
lateral nerves 3-5 pairs ... 3. *Parabaena*
 - 2b. Leaves coriaceous, base acute or cuneate;
lateral nerves 7-9 pairs ... 5. *Pycnarrhena*
- 1b. Leaves ovate or orbicular:
 - 3a. Leaves peltate:

- 4a. Inflorescence umbellate or subcapitate;
carpels solitary; style 3-6-partite ...6. *Stephania*
- 4b. Inflorescence paniculate cymose or racemiform :
- 5a. Sepals free; male flowers in dense corymbose
cymes; female flowers aggregated in the axils
of foliaceous suborbicular bracts ...1. *Cissampelos*
- 5b. Sepals connate; male and female flowers paniculate
or racemiform, borne on old wood; bracts not
foliaceous, if present linear or very small ...2. *Cyclea*
- 3b. Leaves apeltate :
- 6a. Leaves hastate or sagittate, basal lobes acute ...3. *Parabaena*
- 6b. Leaves otherwise, basal lobes rounded :
- 7a. Inflorescence axillary, cymose ...4. *Pericampylus*
- 7b. Inflorescence racemose or paniculate-racemose ...7. *Tinospora*

1. CISSAMPELOS L.

Cissampelos pareira L. var. *hirsuta* (Buch.-Ham. ex DC.) Forman in Kew Bull. 22. 356. 1968. *C. hirsuta* Buch.-Ham. ex DC., Syst. Nat. 1: 535. 1817, Gangopadhyay in Sharma *et al.*, Fl. India 1:317.1993. *C. pareira* L. Sp. Pl. 1031. 1753, *p.p. quoad* B; Hook. f. & Thomson in Fl. Brit. India 1: 103. 1872; Kanjilal *et al.*, Fl. Assam 1: 52. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78. 1938. *Hnahbial* (Lushai).

Fig. 9.

Twining shrubs with young parts usually tomentose or pubescent. Leaves broadly ovate, or orbicular, peltate, 3-8 x 4-8 cm, base cordate, rounded or truncate, mucronate at apex, entire at margins, pubescent above, glaucous beneath, palmately 5-7-nerved; petioles 3-8 cm long, inserted at base of lamina, puberulous. Inflorescences pendulous; male flowers greenish-yellow in subcorymbose cymes; peduncles 2-5 cm long, tomentose; sepals 4-6, ca 1 mm long, pilose; petals 4, ca 1 mm long, connate into a cup; stamens connate into a column with 4 anthers at tip; female flowers 1-1.5 mm across, greenish, crowded in the axils of tomentose, foliaceous bracts; bracts 5-10 mm long, ovate; sepals and petals obovate; carpel 1; style 3-fid, glabrous. Drupes 4-6 x 3-4 mm diam., reddish, compressed, obovoid-globose, hirsute, ridged.

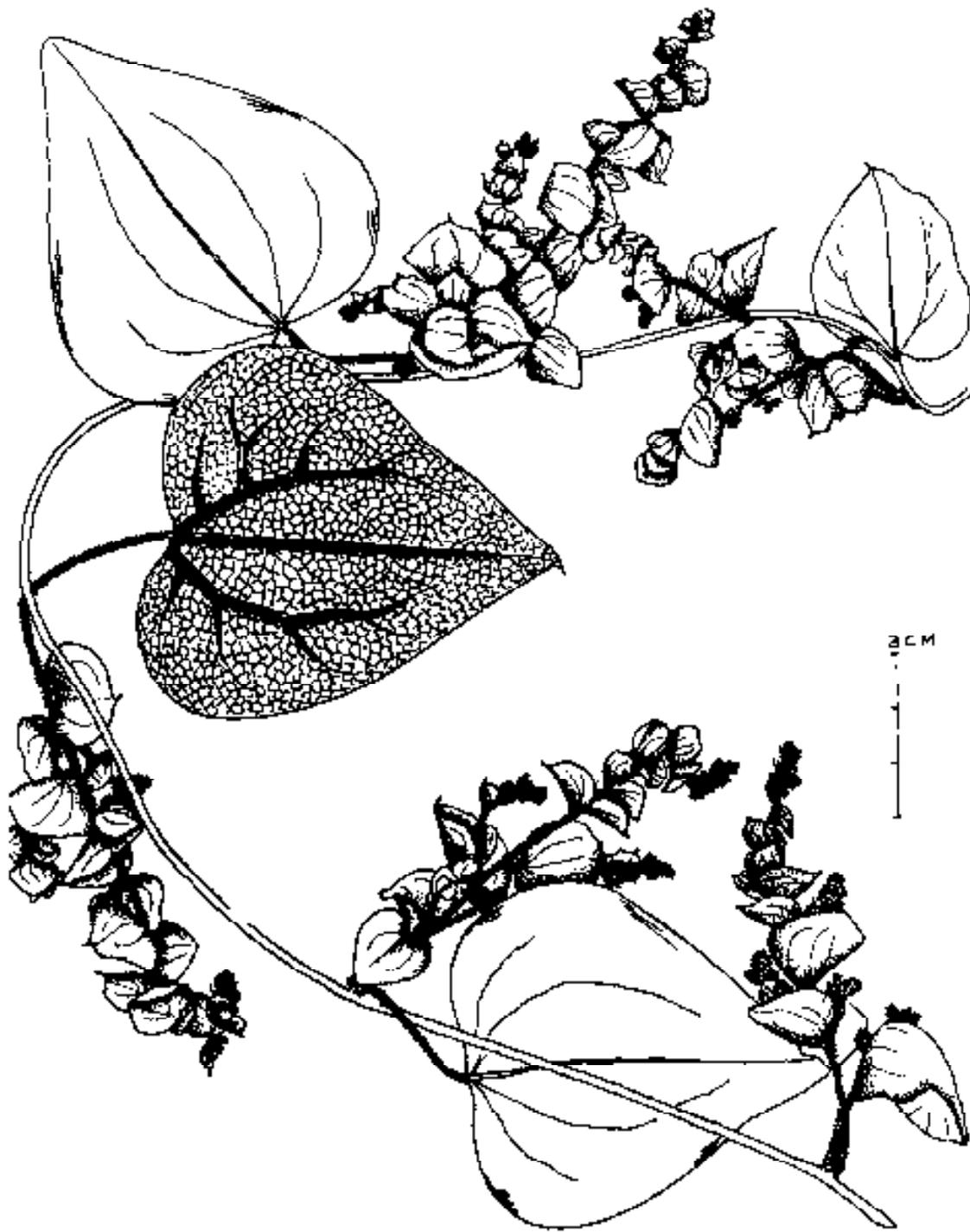


Fig. 9: *Cissampelos pareira* L. var. *hirsuta*
(Buch.- Ham. ex DC.) Forman

Fl. & Fr.: August-January.

Common in tropical forests. Sairang, 660 m, *Deb* 30596; Lungleh-Hauruang, 660 m, *Deb* 31386; Mizo hills, *Dutta* 33223; Lawngtalai-Ngengpui road, *K.P. Singh* 92891; Kheitum, *K.P. Singh* 93986; Khawaikhul-Tuichang road, *K.P. Singh* 94432; Hnathial, *K.P. Singh* 96643.

2. CYCLEA Arn. ex Wight

- 1a. Flowers ebracteate and ebractenolate ... 1. *C. meeboldii*
 1b. Flowers bracteate and bracteolate ... 2. *C. bicristata*

1. **Cyclea bicristata** (Griffith) Diels in Engler, *Pflanzenr.* 46: 317. f. 93 A-E. 1910; Gangopadhyay in Sharma *et al.*, *Fl. India* 1: 322. 1993. *Lophophyllum bicristatum* Griffith, *Notul.* 4: 313. 1854; Hook. *f.* & Thomson in *Fl. Brit. India* 1: 105. 1872; Kanjilal *et al.*, *Fl. Assam* 1: 53. 1934.

Tall twining shrubs; branches striated. Leaves broadly ovate, or oblong-deltoid, subpeltate, 7-12 x 6-9.5 cm, base truncate or subcordate, long acuminate at apex, glabrous above, pubescent beneath; petioles 4-6 cm long, pilose. Flowers yellowish, in fascicles on 5-10 cm long panicles, axillary or on old leafless stems; bracts linear-lanceolate. *Male flowers*: sepals 4-8, campanulate, connate into a cup, fleshy, *ca* 1 mm long; petals absent. *Female flowers*: sepals 2, *ca* 1 mm long, in an opposite pair pouched below; petals absent. Drupes 4-5 mm diam., orbicular, compressed, red, pilose; endocarp with a double row of peg like projections around the edge on either side; seeds horse-shoe shaped, curved.

Fl. & Fr.: August May.

In evergreen forests. Lungleh, 900 m, *Gage* 43 (CAL); Theiriat, *Deb* 31275, 31334 (CAL).

2. **Cyclea meeboldii** Diels in Engler, *Pflanzenr.* 46: 315. 1910; Gangopadhyay in Sharma *et al.*, *Fl. India* 1: 325. 1993. **Fig. 10.**

Tall climbing shrubs, *ca* 3 m high; branches striate, pilose. Leaves broadly cordate, 9-13 x 8-10 cm, acuminate at apex, entire at margins, membranous, glabrous above, hispid beneath; nerves palmate, distinct

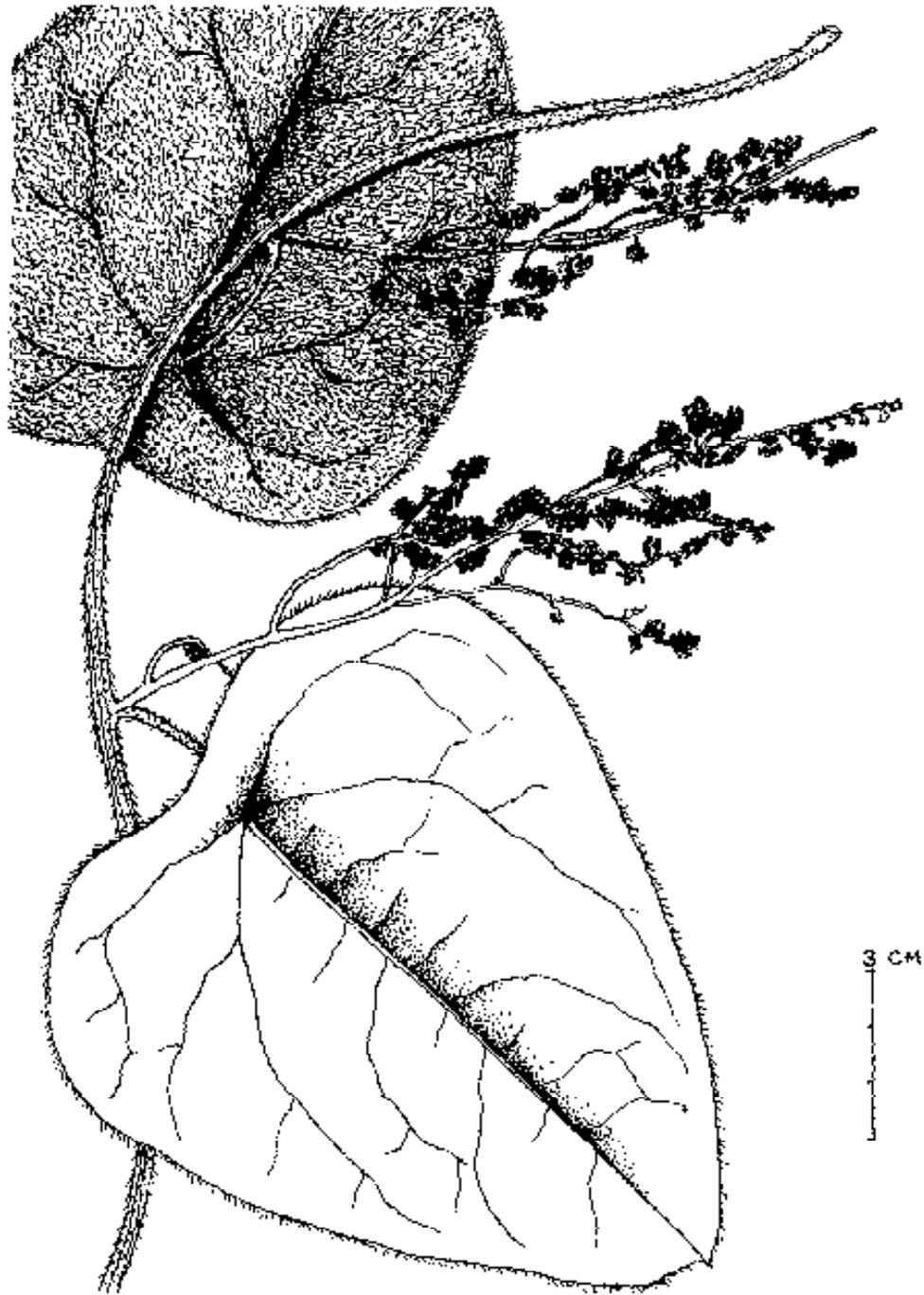


Fig. 10: *Cyclea meeboldii* Diels

below; petioles 4-6 cm long, hispid. Male inflorescence paniculate. 8-12 cm long, hispid, branched; cymes capitate with ebracteate, congested flowers; sepals 4, 1-2 mm long, hairy; petals 4, free, ovate, ca 1 mm long, glabrous. Infructescences subsessile, ca 4 cm long, hispid. Drupes hispid, ca 4 x 4 mm; endocarp tuberculate.

Fl. & Fr.: October-March.

Shady places in evergreen subtropical forests. Khawalkhul-Tuichang. K.P. Singh 94430.

3. PARABAENA Miers

Parabaena sagittata Miers [in Arn., Mag. Nat. Hist. Ser. 2, 7: 39. (1851), *nom nud.*] ex Hook. f. & Thomson, Fl. Ind. 181. 1855 & in Fl. Brit. India 1: 96. 1872; Kanjilal *et al.*, Fl. Assam 1: 58. 1934; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 28. 1987; Pramanik in Sharma *et al.*, Fl. India 1: 346. 1993. Fig. 11.

Climbers with milky juice. Leaves ovate-cordate or sagittate, 7-16 x 5-7 cm, base \pm deeply cordate with acute basal lobes, acuminate at apex, margins shallowly toothed, glabrous above, weakly hirsute beneath; petioles 4-9 cm long, pubescent. Flowers axillary, solitary or few to many in 3-8 cm long, hirsute, dichotomous cymes, occasionally thyrsoid. *Male flowers*: sepals 6, yellow, 1-2 cm long, pubescent; petals cuneate, ca 1 mm long; anthers 6, free. *Female flowers*: sepals and petals same as in male flowers; staminodes 6; carpels 3, style scar subterminal. Drupes globose, 3-5 x ca 4 mm, sharp tubercled on the back, orange; endocarp with 2 rows of spines.

Fl. & Fr.: May-November.

In subtropical, evergreen forests. Aizawl, Godfrey 500 (CAL); Chumliang-Meibui, Dutta 33340; Lawngtalai, Dutta 33742; Teirei, D.K. Singh 99111.

4. PERICAMPYLUS Miers

Pericampylus glaucus (Lam.) Merr., Interpr. Rumph. Herb. Amboin. 219. 1917; Pramanik in Sharma *et al.*, Fl. India 1: 330. 1993. *Menispermum glaucum* Lam., Encycl. Meth. 4: 100. 1797. *Pericampylus*

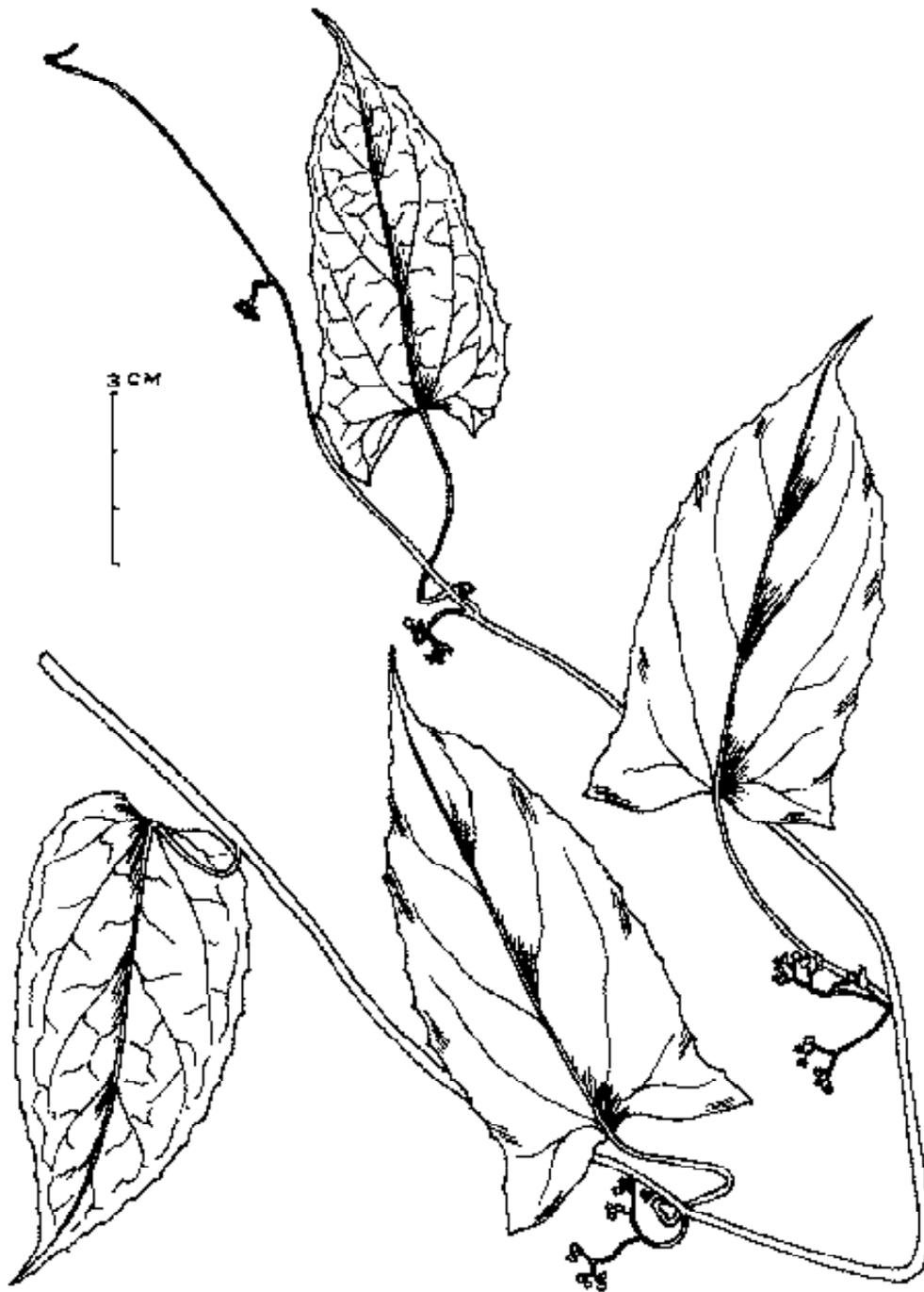


Fig. 11: *Parabaena sagittata* Miers ex Hook. f. & Thomson

incanus (Colebr.) Miers in Ann. Nat. Hist. ser. 7, 2: 40. 1851; Hook. f. & Thomson in Fl. Brit. India 1: 102. 1872; Kanjilal *et al.*, Fl. Assam 1: 52. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78. 1938. *Nambiel* (Lushai).

Climbing, woody shrubs, young parts tomentose. Leaves broadly triangular-ovate, 4-10 x 2-8 cm, base truncate or cordate, acute to mucronate at apex, entire to undulate along margins, pilose above, pubescent beneath; basal nerves 5; petioles 2-5 cm long, tomentose. Flowers small, yellowish-greenish, in 2-6 cm long, axillary, paniculate cymes. *Male flowers*: sepals 9 in 3 whorls, greenish-yellow, pubescent; outer ones minute, inner most larger, *ca* 1 mm long; petals 6, smaller than the inner most sepals, *ca* 0.5 mm long, oblanceolate. *Female flowers*: sepals and petals like male flowers, staminodes 6, linear; carpels 3, ovoid. Drupes subglobose, 4-5 mm diam., purple or red, \pm compressed, echinate; surface concave with double row of projections around the edge.

Fl. & Fr.: April-September.

In evergreen, primary and secondary forests. Lungleh, 99 m, Gage 58 (CAL); Aizawl protected forest, 1050 m, Deb 33224; Kolasib, K.P. Singh 93153; near Sherchip, K.P. Singh 96619; Jowbak, K.P. Singh 96739; Aizawl, M. Sawmliana 95587.

5. **PYCNARRHENA** Miers *ex* Hook. f. & Thomson.

Pycnarrhena pleniflora Hook. f. & Thomson, Fl. Ind. 206. 1855 (as '*planiflora*') & in Fl. Brit. India 1: 106. 1872; Kanjilal *et al.*, Fl. Assam 1: 58. 1934; Gangopadhyay in Sharma *et al.*, Fl. India 1: 342. 1993.

Climbing shrubs. Leaves elliptic or oblong-lanceolate, 13-20 x 7-9 cm, base rounded or cuneate, obtusely acuminate at apex, entire along margins, coriaceous, glabrous; petioles 1-2 cm long, puberulous, top clavate. Flowers axillary, fascicled. *Male flowers*: sepals in whorls, *ca* 2 mm long, outer ciliate, inner obovate, glabrous; petals 4-5, small lobed, *ca* 1 mm long; stamens 6-10, sessile. *Female flowers* unknown or much smaller; staminodes 6. Drupes up to 10 mm long, wrinkled, glabrous; seeds ellipsoid.

Fl. & Fr.: February-June.

Changae, Prazer 1890, *s.num.* (CAL).

6. STEPHANIA Lour.

- 1a. Leaves broadly ovate or suborbicular,
lobed or obscurely toothed along margins :
- 2a. Leaf margin \pm lobed; sepals glandular-
papillose; petals eglandular ...3. *S. glandulifera*
- 2b. Leaf margin obscurely toothed;
sepals not glandular; petals glandular in middle ...2. *S. glabra*
- 1b. Leaves deltoid, entire along margins:
- 3a. Leaves elongate, deltoid; umbels 3-4-rayed,
long peduncled ... 1. *S. elegans*
- 3b. Leaves ovate-deltoid; umbels 6-7-rayed, capitate ...4. *S. japonica*

1. *Stephania elegans* Hook. f. & Thomson, Fl. Ind. 195. 1855 & in Fl. Brit. India 1: 103. 1872; Kanjilal *et al.*, Fl. Assam 1: 51. 1934; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 28. 1987; Gangopadhyay in Sharma *et al.*, Fl. India 1: 333. 1993.

Small twiners. Leaves narrowly deltoid, 5-10 x 3-5 cm, base truncate, acute at apex, entire along margins, glabrous, pale beneath, coriaceous; petioles 3-4 cm long. Flowers in cymose umbels, purple or greenish; peduncles 4-5 cm long, axillary. *Male flowers*: sepals obovate, ca 2 mm long; petals obovate, fleshy, glabrous. *Female flowers* same as male. Drupes 6-8 x 4-5 mm, red, obovoid, glabrous; endocarp tubercled on periphery, transversely ribbed.

Fl. & Fr. : September-April.

Chimmtupui, Saiha-Bualpui, Dutta 33854 (CAL).

2. *Stephania glabra* (Roxb.) Miers, Contrib. Bot. 3: 217. 1817; Gangopadhyay in Sharma *et al.*, Fl. India 1: 334. 1993. *Cissampelos glabra* Roxb., Fl. Ind. 3: 840. 1832. *Stephania rotunda auct. non* Lour.; Hook. f. & Thomson in Fl. Brit. India 1: 103. 1872, *p.p.* *Hnahbial* (Lushai).

Twiners. Leaves broadly ovate, 5-12 x 4-11 cm, base rounded, acute or usually mucronate at apex, usually entire along margins, glabrous; petioles 10-15 cm long. Flowers in axillary umbels, peduncles 5-6 cm long.

Male flowers : sepals 6, whorled, ca 2 mm long; outer ones narrow-oblong; inner ones obovate-oblong; petals 3, 1.5-2 mm long, cuneate, glandular. *Female flowers*: sepals and petals same as that of male flowers; carpels ovoid. Drupes ovoid, 5-7 x ca 5 mm, reddish; endocarp surface with 2 rows of peg like projections around the edge.

Fl. & Fr.: May-October.

Hnathial, K.P. Singh 94140; Ruallung, M. Sawmliana 95536.

3. *Stephania glandulifera* Miers, Contrib. Bot. 3: 220. 1871; Kanjilal *et al.*, Fl. Assam 1: 52. 1934. Gangopadhyay in Sharma *et al.*, Fl. India 1: 334. 1993. *S. rotunda auct. non.* Lour.; Hook. f. & Thomson in Fl. Brit. India 1: 103. 1872, p.p.; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78. 1938.

Climbers with fleshy branches. Leaves orbicular or broadly ovate, peltate, 8-12 cm across, base rounded, obtuse or mucronate at apex, lobed along margins, glabrous; petioles 8-10 cm long. Flowers yellowish, ca 5 mm across, borne in umbels on leafless branches; peduncles 3-4 cm long, axillary. *Male flowers*: sepals puberulus, glandular-papillose near apex; petals orbicular, shorter, eglandular. *Female flowers*: ovary ovoid. Drupes suborbicular, 5-8 x 5-6 mm, compressed, reddish when ripe; endocarp horse shoe shaped with two rows of peg like processes around the edge.

Fl. & Fr.: November-May.

Near Fort Lungleh, Gage 217 (CAL); Mizo hills, Dutta 33546, 33563.

4. *Stephania japonica* (Thunb.) Miers, Contrib. Bot. 3: 213. 1871, p.p. excl. Cuming 1160; Gangopadhyay in Sharma *et al.*, Fl. India 1: 335. 1993. *Menispermum japonicum* Thunb., Fl. Jap. 193. 1784. *Stephania hernandifolia* (Willd.) Walp., Rep. Bot. Syst. 1: 96. 1842; Hook. f. & Thomson in Fl. Brit. India 1: 103. 1872. var. *discolor* (Blume) Forman in Kew Bull. 11: 56. 1956. *Clypea discolor* Blume, Bijdr. 26. 1825.

Large twiners; branchlets glabrous. Leaves deltoid, broadly ovate, 7-9 x 4-7 cm, base rounded, acuminate at apex, entire along margins, membranous; glabrous above; sometimes sparsely pubescent beneath particularly on nerves; petioles 3-5 cm long, puberulous. Flowers in axillary, capitate umbels, whitish or greenish-yellow; peduncles 4-5 cm long. Male

flowers ± sessile in capitate clusters, yellow or white; sepals 6-8, ca 1.5 x 0.5 mm, obovate; petals 3-5, ca 1 mm long, fleshy; stamens 6 or 8. Female flowers similar to males; carpels solitary, ovoid. Drupes ± globose, 4-7 x 4-6 mm, red when ripe, glabrous; surface with 2 rows of peg like projections.

Fl. & Fr.: April-December.

Kawnpui-Hartawki road, *K.P. Singh* 93277. Gangopadhyay (*l.c.*) reported two varieties under the species. The above plant belongs to var. *discolor* (Blume) Forman.

7. TINOSPORA Miers

- 1a. Leaves glabrous; fruit surface tubercled ... 1. *T. cordifolia*
 1b. Leaves pubescent; fruit surface rough and warted ... 2. *T. sinensis*

1. *Tinospora cordifolia* (Willd.) Miers ex Hook. f. & Thomson, Fl. Ind.: 184, 1855 & in Fl. Brit. India. 1: 97, 1872; Kanjilal *et al.*, Fl. Assam 1: 54, 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 78, 1938; Pramanik in Sharma *et al.*, Fl. India 1: 347, 1993. *Menispermum cordifolium* Willd., Sp. Pl. 4: 826, 1806. *Theisawntlung* (Lushai).

An extensive climber with succulent stems, up to 10 m high. Leaves broadly ovate-cordate, 7-10 x 5-9 cm, base sinuate, shortly acuminate at apex, glabrous; petioles 3-6 cm long, pulvinate. Flowers axillary or on leafless branches, 8-15 cm long, greenish-yellow, glabrous. Male flowers in few-flowered clusters, sepals in two whorls of 3 each, outer sepals ca 1 mm long, inner elliptic, 3-4 mm long; petals 6, 3 mm long, obovate; stamens 6, free, club shaped; anthers oblong. Female flowers solitary along axis, bracteate; bracts boat shaped; staminodes 6; carpels 3, ellipsoid. Drupes globose-ellipsoid, 5-6 mm long, red, rounded at both ends, papillose on surface.

Fl. & Fr.: February-April.

Jawbak, *K.P. Singh* 94238.

2. *Tinospora sinensis* (Lour.) Merr. in Sunyatsenia 1: 193, 1934; Pramanik in Sharma *et al.*, Fl. India 1: 349, 1993. *Campylus sinensis* Lour., Fl. Cochinch. 113, 1790. *Tinospora malabarica* (Lam.) Hook. f.

& Thomson in Fl. Brit. India 1: 96. 1872; Kanjilal *et al.*, Fl. Assam 1: 55. 1934; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 28. 1987.

A large, fleshy climber. Leaves broadly ovate, 8-11 x 7-10 cm, base cordate but abruptly truncate, shortly acute at apex, entire along margins, membranous, pubescent above and whitish tomentose below; petioles 4-6 cm long. Flowers green on racemes; racemes 5-10 cm long. *Male flowers*: sepals in 2 whorls of 3 each; inner ones *ca* 1.5 mm long; outer ones 2-4 x 2-4 mm, elliptic; petals 6, rhomboid, 2-4 x 1-3 mm; stamens *ca* 2 mm long. *Female flowers*: carpels *ca* 2 mm long. Drupes 1-3, 8-10 mm across, globose, bright red, ± keeled at apex, pointed at base, rough and warted.

Fl. & Fr.: February-April.

New Aizawl, *Deb* 3428.

BERBERIDACEAE

(K.P. Singh)

MAHONIA Nutt.

- 1a. Racemes 12-20 cm long; bracts longer than pedicels ...1. *M. borealis* var. *parryii*
 1b. Racemes 10-12 cm long; bracts shorter than pedicels or equal ...2. *M. pycnophylla*

1. *Mahonia borealis* Takeda in Notes R. Bot. Gard. Edinb. 6: 221. t. 8. 33, f. 30-46. 1917; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 79. 1938. var. *parryii* Ahrendt in J. Linn. Soc. Lond. (Bot.) 57: 308. 1961; Guha Bakshi in Sharma *et al.*, Fl. India 1: 408. 1993. *Pualeng*, *Puallan* (Lushai).

Shrubs. Leaves oblong-ob lanceolate; leaflets 5-9 pairs, usually separate, lower most pair very small, 5-10 x 1.5-2 cm, base obliquely truncate or rounded-cuneate; spinose-dentate along margins, smooth above, dull beneath, basal nerves 5. Flowers fascicled in dense racemes; racemes 12-20 cm long; pedicels 3-4 mm long; bracts 3-5 mm long; outer sepals 5-6 mm long, ovate; inner sepals *ca* 8 mm long, oblong-obovate; petals 5-6 mm long, oblong; stamens apiculate. Berries 5-8 mm long, globose, blue-black, hairy.

Fl. & Fr.: February-April.

North Vanlaiphai 1500 m, *Parry* 149 (*fide* C.E.C. Fischer, *l.c.*);
Phongpui 1800 m, *Parry* 149a (*fide* C.E.C. Fischer, *l.c.*). Endemic.

Endemic.

Notes: A yellow dye is made from the sap.

2. ***Mahonia pycnophylla*** (Fedde) Takeda in Notes R. Bot. Gard. Edinb. 6: 21. 1917; Guha Bakshi in Sharma *et al.*, Fl. India 1: 411. 1993. *Berberis nepalensis* (DC.) Spreng. var. *pycnophylla* Fedde in Engler, Bot. Jahrb. 31: 124. 1901. *B. nepalensis* (*non* Spreng.) Hook. f. & Thomson in Fl. Brit. India 1: 109. 1872. *Mahonia nepalensis* (*non* DC.); Kanjilal *et al.*, Fl. Assam 1: 61. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 79. 1938. *Pualeng* (Lushai). **Fig. 12.**

Erect shrubs or small trees, up to 2m tall. Leaves 25-40 cm long, sheathed at base; leaflets 5-6 pairs, mostly contiguous, 3-13 x 3-4.5 cm, ovate, ovate-oblong, base obliquely truncate or rounded, acuminate or acute at apex, coarsely spinose-dentate with 3-5 large spinous teeth on either side along the margins, sessile, glabrous; basal nerves 3-5. Flowers fascicled in dense racemes, 0.5-0.7 cm diam., yellow; racemes 7-12 cm long; bracts 1-2 mm long; pedicels 5-7 mm long, sepals 5-6 mm long, ovate; petals *ca* 5 mm long, elliptic-lanceolate, 2-lobed at apex; stigma capitate. Berries 6-7 mm long, elliptic or globose, purplish when ripe; ovules 2.

Fl. & Fr.: October-January.

North Vanlaiphai, *Leslie* 343, 354 (CAL); *Deb* 31106.

PAPAVERACEAE

(K.P. Singh)

ARGEMONE L.

Argemone mexicana L., Sp. Pl. 508. 1753; Hook. f. & Thomson in Fl. Brit. India 1: 117. 1872; Kanjilal *et al.*, Fl. Assam 1: 66. 1934; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 28. 1987; Debnath & Nayar in Sharma *et al.* Fl. India 2: 2 1993. **Fig. 13.**

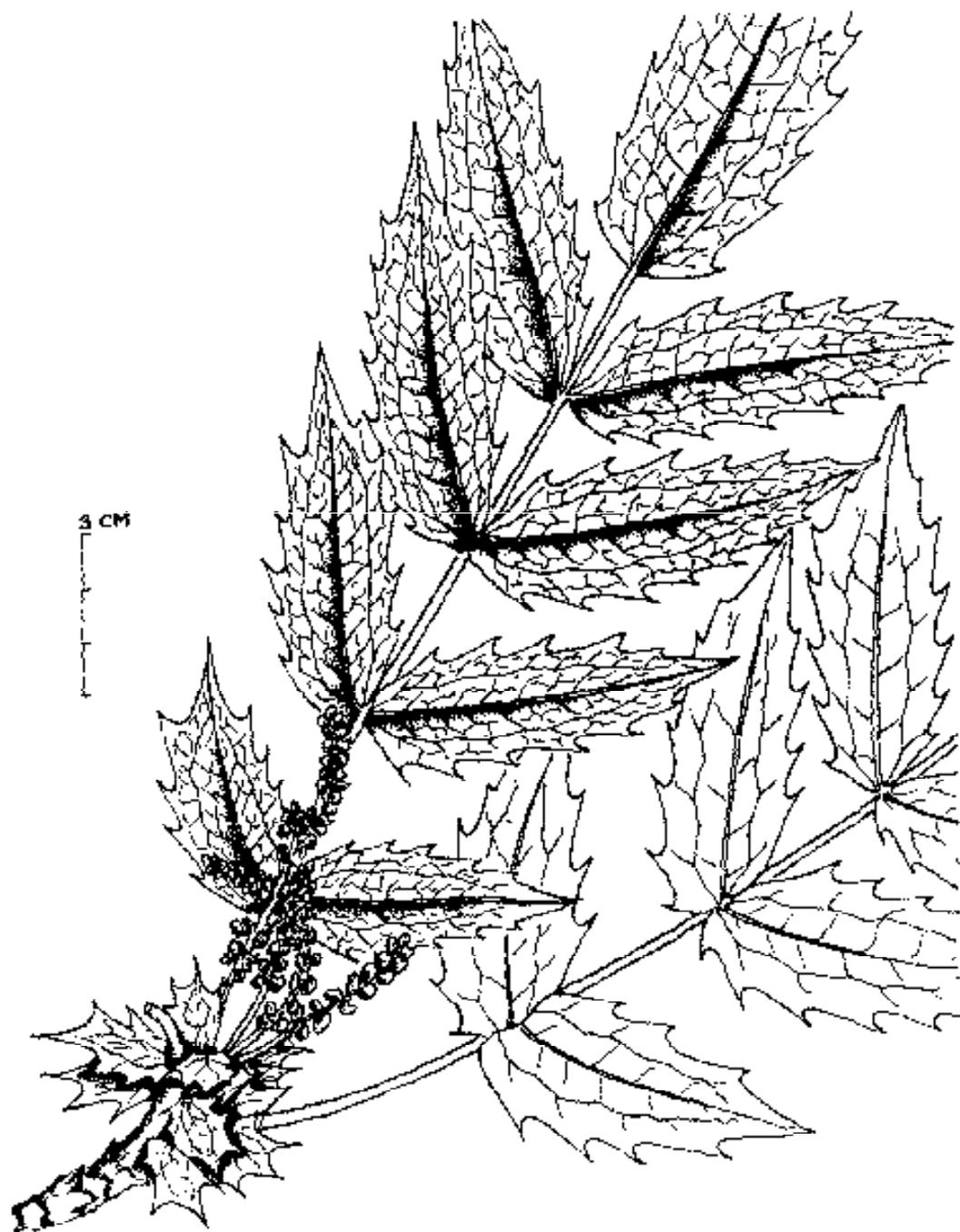


Fig. 12: Mahonia pycnophylla (Fedde) Takeda

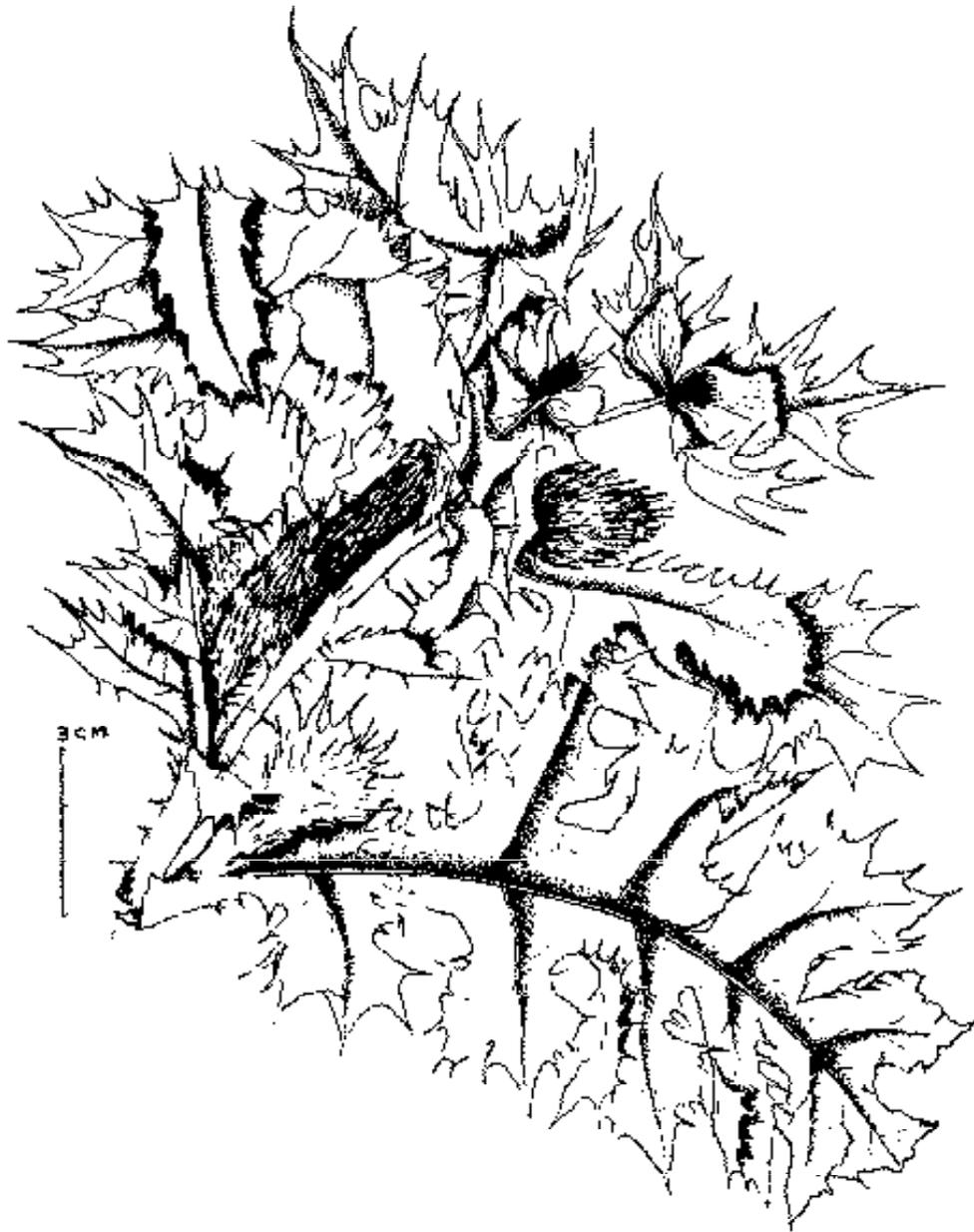


Fig. 13: *Argemone mexicana* L.

Erect, prickly, annual herbs, up to 1 m high, divaricately branched with bluish leaves and yellowish juice. Leaves elliptic-oblong, 3-20 x 2-8 cm, base cordate, sessile or semi-amplexicaul, alternate, pinnatifid, sinuate-lobate, acute, toothed with spines along the margins, prickly beneath, glabrous above or sometimes both surfaces glabrous. Flowers 4-6 cm in diam., terminal, solitary, golden-yellow; sepals 2 or 3, ca 1.5 cm long, elliptic, prickly outside; petals 4 or 6, imbricate, obovate, 2-3 x 1.5-2.5 cm; Stamens many, ca 10 mm long, caducous. Capsules 1-3.5 x 0.5-1.5 cm, oblong, 4-6-ribbed, usually prickly, dehiscent along sutures by short valves opposite each stigmatic lobe; seeds many, 1.5-2 mm long, deeply reticulate, blackish-brown.

Fl. & Fr.: January-June.

Common on waste land throughout the state specially on banks of the river in association with *Xanthium* species. Sairang, 660 m, *Deb* 30628.

Uses: The yellow juice is used medicinally. Seeds possess laxative properties and as adulterants for mustard seeds.

FUMARIACEAE

(K.P. Singh)

CORYDALIS DC.

Corydalis pseudolongipes Liden in Bull. Brit. Mus. (Nat. Hist.) Botany 18: 532, ff. 22D & 23D, 1989; Ellis & Balak., in Sharma *et al.*, Fl. India 2: 70, 1993. *C. longipes* auct. non DC.; *C. sibirica* auct. non (L. f.) Persoon; Hook. f. & Thomson in Fl. Brit. India 1: 125, 1872. *p.p.*; Kanjilal *et al.*, Fl. Assam 1: 67, 1934.

A much branched, prostrate herb, 20-30 cm high. Leaves cauline, 1-3 x 1-3 cm, deeply and equally lobed with ultimate segment obovate or oblanceolate; lobules 2-3 mm broad, glabrous; petioles 2-5 cm long. Racemes 3-10-flowered, terminal 5-8 cm long; bracts small, deeply toothed; Flowers yellow, 5-10 mm long; pedicels 5-7 mm long; sepals 2, broadly ovate, ca 1 mm long; petals yellow, tinged with purple, upper petal with broad, often crenately toothed dorsal crest, decurrent along spur; spur 8-10 mm long; lower petal with rounded swelling near base; ovary 1-celled.

Capsules 4-5 x 2-3 mm, obovoid with two rows of seeds, minutely papillose on surface; seeds *ca* 10, *ca* 1 mm across.

Fl. & Fr.: April-October.

Mizo hills, *Wenger* 21516.

BRASSICACEAE

(K.P. Singh)

- 1a. Seeds in 1-row
 - 2a. Flowers white; pods unbeaked or with conical style, linear, flat ... 2. *Cardamine*
 - 2b. Flowers yellow; pods with slender beak, turgid ... 1. *Brassica*
- 1b. Seeds in 2-rows: ... 3. *Rorippa*

1. BRASSICA L.

- 1a. Upper leaves amplexicaulate at base, auricled; usually entire along the margins ... 2. *B. rapa* subsp. *campestris*
- 1b. Upper leaves not amplexicaulate at base, narrowed to the petiole, usually toothed along the margins ... 1. *B. juncea*

1. *Brassica juncea* (L.) Czern., Consp. Fl. Chark. 8. 1859; Hook. f. & T. Anderson in Fl. Brit. India 1: 157. 1872; Kanjilal *et al.*, Fl. Assam 1: 69. 1934; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 28. 1987; Hajra *et al.* in Sharma *et al.*, Fl. India 2: 134. 1993. *Sinapis juncea* L., Sp. Pl. 668. 1753.

Annual herbs, 1-2 m high; stems erect, branched. Basal leaves oblong-lanceolate, 10-15 x 2-5 cm, lyrate, sinuate; upper leaves oblong-lanceolate or linear, narrowed and not amplexicaul at base, usually toothed along the margins. Flowers in corymbs, *ca* 6 mm across; sepals *ca* 5 mm long, oblong; petals 8-10 x *ca* 4 mm, obovate, bright yellow with pale green narrow claw. Pods (siliquas) torulose, 2.5-5 x 0.2-0.3 cm, bivalved with a narrow conical beak; seeds *ca* 10-20 in each locule, arranged in one row, 1-1.5 mm diam., globose-spherical, brown, reticulate.

Fl. & Fr.: September-January.

Sialsuk, *Deb* 30865 (CAL); South Vanlaiphai-Darzo, *Dutta* 34047 (CAL).

Uses: Seeds are used as source of oil.

2. ***Brassica rapa* L. subsp. *campestris* (L.) Clapham** in Fl. Brit. Isles, ed. 2: 124. 1962; Hajra *et al.* in Sharma *et al.*, Fl. India 2: 138. 1993. *B. campestris* L., Sp. Pl. 666. 1753; Hook. f. & T. Anderson in Fl. Brit. India 1: 156. 1872; Kanjilal *et al.*, Fl. Assam 1: 69. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 79. 1938. *Antam* (Lushai).

Herbs with slender roots, 0.3-1 m high. Leaves rosette, green. Basal leaves 10-20 cm long, lyrate-pinnatifid, hispid with a large terminal lobe and 1 or more pairs of lateral lobes; upper leaves oblong, base cordate, obtuse or acute at apex, entire along margins, glaucous, glabrous, amplexicaul. Flowers corymbose, yellow; petals 4, 7-8 x 4-5 mm, obovate. Pods 3-10 x 0.3-0.6 cm, beak 1-1.5 cm long; seeds in one row, globose, 1.5 mm across.

Fl. & Fr.: April-June.

Reported on the basis of C.E.C. Fischer (*l.c.*).

2.1 var. ***trilocularis* (Roxb.) Kitam.** in Acta Phyt. Geobot. 16: 62. 1955; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 28. 1987. *B. campestris* var. *sarson* Prain in Agr. Ledger 5:24, t. 5-7. 1898. *p.p.*; Kanjilal *et al.*, Fl. Assam 1: 69. 1934.

Pods broader, 7-8 mm wide, 3-4-valved.

Sairang, 680 m, *Deb* 30603 (CAL); Sialsuk, *Deb* 30864 (CAL).

2. CARDAMINE L.

- | | |
|----------------------------------------------------------------------------------------------------|---------------------------|
| 1a. Stems erect, usually not branched from below;
leaflets 5-11 pairs, hairy on upper surface | ... 2. <i>C. hirsuta</i> |
| 1b. Stems flexuose with many branches from below;
leaflets 2-4 pairs, glabrous on upper surface | ... 1. <i>C. flexuosa</i> |

1. **Cardamine flexuosa** Withering, Bot. Arr. Brit. Pl. ed. 3, 3: 578. 1976; Hajra & Chowdhery in Sharma *et al.*, Fl. India 2: 110. 1993. *C. hirsuta* var. *sylvatica* auct. non Link; Hook. f. & T. Anderson in Fl. Brit. India 1: 138. 1872. p.p.; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 79. 1938.

Annuals or biennials, 10-30 cm high, simple, flexuose. Leaves pinnate or deeply pinnatisect; basal leaves 7-12, orbicular; stem leaves 4-10, ovate to lanceolate, 3-4.5 cm long; lateral leaflets 2-4 pairs, 2.5-7 x 2-5 mm, ovate-elliptic, obtuse or subacute at apex, entire or sinuate along margins, glabrous; terminal leaflet 0.8-1 x 0.7-1 cm, obovate, sometimes 3-4-lobed. Flowers *ca* 3 mm across, few to many, in 2-12 cm long racemes; sepals oblong-elliptic; petals 2-3 mm long, white; stamens 4 or 6 with 2 outer staminodes. Pods 10-18 x 0.5-1 mm, elliptic-oblong, obtuse; seeds ovoid, yellow.

Fl. & Fr.: January-July.

Scarce on rocks, Theiriat, Deb 31340.

2. **Cardamine hirsuta** L., Sp. Pl. 655. 1753; Hajra & Chowdhery in Sharma *et al.*, Fl. India 2: 112. 1993; *C. hirsuta* L. var. *sylvatica* (Link) Hook. f. & T. Anderson in Fl. Brit. India 1: 138. 1872. p.p.; Kanjilal *et al.*, Fl. Assam 1: 70. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 79. 1938. *Phaiantam* (Lushai). **Fig. 14.**

Annual herbs, ± straight, glabrous, 15-40 cm high; stems simple. Leaves pinnate or pinnatisect, variable, 5-8 cm long; leaflets 5-11, variable in size and shape, 8-14 x 3-11 mm, orbicular to ovate or elliptic, entire or lobulate along margins; basal leaves forming a rosette, hairy on upper surface; stem leaves 2-4, smaller than basal leaves; petioles 1-2.5 cm long. Flowers 1.2-2 cm across, white, in terminal racemes; sepals *ca* 2 mm long, elliptic, small; petals 3-5 mm long, clawed, obovate-cuneate, sometimes absent; stamens usually 4. Pods linear, 10-20 x *ca* 1 mm, flat, not beaked; seeds 8-16 per valve, ± 1mm diam., ellipsoid, smooth.

Fl. & Fr.: January-October.

Darzo, Parry 586 (*fide* C.E.C. Fischer, *l.c.*).



Fig. 14: *Cardamine hirsuta* L.

3. RORIPPA Scop.

Rorippa benghalensis (DC.) Hara in J. Jap. Bot. 49: 132. 1974; Hajra & Chowdhery in Sharma *et al.*, Fl. India 2: 128. 1993. *Nasturtium benghalensis* DC., Syst. Nat. 2: 198. 1821; *N. indicum* (L.) DC. var. *benghalensis* (DC.) Hook. f. & T. Anderson in Fl. Brit. India 1: 134. 1872; Kanjilal *et al.*, Fl. Assam 1: 70. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 79. 1938.

An annual weed, 20-30 cm high, hairy; stem simple or branching from below. Leaves variously lobed, 3-8 x 1-2.5 cm, base auriculate-amplexicaul, margin acutely toothed; lateral segments oblong-elliptic; terminal segments ovate, obtuse. Racemes bracteate with yellow, bracteate flowers; bracts leaf like, 5-20 mm long, entire or minutely toothed; pedicels 3-7 mm long. Pods narrowly oblong; 5-15 x 1-1.5 mm, seeds many, small, in 2 rows.

Fl. & Fr.: February-May.

Between Ridge camp and Lungsin, 750 m, Gage 215 (CAL).

CULTIVATED TAXA

1. **Brassica napus** L., Sp. Pl. 666. 1753; Hajra *et al.*, in Sharma *et al.*, Fl. India 2: 135. 1993. *B. campestris* (L.) Hook. f. & T. Anderson, Fl. Brit. India 1: 156. 1872.

2. **Brassica oleracea** L. var. *botrys* L., Sp. Pl. 667. 1753; Hajra *et al.*, in Sharma *et al.*, Fl. India 2: 137. 1993.

3. **Brassica oleracea** L. var. *capitata* L., Sp. Pl. 667. 1753; Hajra *et al.*, in Sharma *et al.*, Fl. India 2: 137. 1993.

4. **Brassica rapa** L., Sp. Pl. 666. 1753; Hajra *et al.* in Sharma *et al.*, Fl. India 2: 138. 1993. *B. campestris* subsp. *rapa* Hook. f. & T. Anderson, Fl. Brit. India 1: 156. 1872.

5. **Raphanus sativus** L., Sp. Pl. 669. 1753; Hook. f. & T. Anderson, Fl. Brit. India 1: 166. 1872; Hajra *et al.* in Sharma *et al.*, Fl. India 2: 145. 1993.

6. **Rorippa dubia** (Pers.) Hajra in J. Jap. Bot. 30: 196. 1955; Hajra & Chowdhery in Sharma *et al.*, Fl. India 2: 129. 1993.

CAPPARACEAE

(K.P. Singh)

- 1a. Herbs with elongated non-baccate fruits ...2. *Cleome*
- 1b. Shrubs or scandent shrubs or trees with baccate fruits :
- 2a. Trees with palmately trifoliate leaves;
stamens 4-6; fruits many seeded berry ...3. *Crateva*
- 2b. Shrubs or scandent shrubs with simple leaves;
stamens many; fruits berry or a drupe :
- 3a. Sepals and petals 4; gynophore elongated;
fruits many-seeded berry ...1. *Capparis*
- 3b. Sepals 6; petals absent; gynophore very short;
fruits 1-seeded drupe ...4. *Stixis*

1. CAPPARIS L.

- 1a. Flowers in paniced corymbs,
never in supra-axillary vertical series ... 2. *C. cantoniensis*
- 1b. Flowers in supra-axillary vertical series of 2-10 :
- 2a. Flowers numerous, arranged in many rows
of 7-10 flowers on leafless shoots ... 3. *C. multiflora*
- 2b. Flowers 1-few, arranged in axillary rows of
2-4 flowers on leafy shoots :
- 3a. Shoots unarmed :
- 4a. Shoots glabrous; lateral nerves
more than 7 pairs; fruits 2-seeded ...1.1. *C. acutifolia*
ssp. *sabiaefolia*
- 4b. Shoots tomentose; lateral nerves less
than 7 pairs; fruits many-seeded ...1.2. *C. acutifolia* ssp. *viminea*
- 3b. Shoots usually armed :
- 5a. Branchlets glabrous; leaves membranous,
cataphylls absent; fruits not beaked ...5. *C. tenera*
- 5b. Branchlets pubescent; leaves coriaceous,
cataphylls present at least at base; fruits beaked ...4. *C. olacifolia*

1.1. *Capparis acutifolia* Sweet subsp. *sabiaefolia* (Hook. f. & Thomson) Jacobs in *Blumea* 12: 432-33, f. 22 d-f. 1965; Raghavan in Sharma *et al.*, *Fl. India* 2: 256. 1993. *C. sabiaefolia* Hook. f. & Thomson, *Fl. Brit. India* 1: 179. 1872; Kanjilal *et al.*, *Fl. Assam* 1: 78. 1934.

Shrubs or sometimes climbers, up to 10 m tall, glabrous; stipular thorns usually minute or absent, *ca* 1 mm long. Leaves elliptic to oblong-lanceolate, 6.5-8 x 3.5-4 cm, base rounded or tapering, long acuminate at apex, glabrous; lateral nerves 7-8 pairs; petioles 4-5 mm long, channelled. Flowers axillary, 1-1.5 cm across, fragrant, solitary or 2-4 in vertical supra-axillary rows, white; sepals obovate, glabrous except along the margins, greenish-white; petals tomentose inside, glabrous outside; stamens 20-25; gynophore up to 4 cm in fruit, filiform. Fruits *ca* 1.5 cm diam., globose or pear shaped; seeds 2, *ca* 5 x 3.5 mm.

Fl. & Fr.: April-October.

In open thickets. North Lushai hills, Kulikawn, *Godfrey* 462 (CAL).

1.2. *Capparis acutifolia* Sweet subsp. *viminea* Jacobs in *Blumea* 12(3): 429-437, f. 22 j-i, 1965; Raghvan in Sharma *et al.*, *Fl. India* 2: 257. 1993. *C. viminea auct. non* Oliver, 1869; Hook. f. & Thomson in *Fl. Brit. India* 1: 179. 1872; Kanjilal *et al.*, *Fl. Assam* 1: 78. 1934; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 79. 1938.

Shrubs, sometimes scandent, 3-5 m high; innovations (shoots) minutely light brown, tomentose, but later glabrescent, unarmed. Leaves ovate or elliptic, 5.5-10.5 x 3.5-4 cm, base cuneate or rounded, abruptly acuminate or acute at apex, subcoriaceous, widest at or below the middle, glabrous, but main nerves tomentose for a long period; lateral nerves 5-7 pairs; petioles 6-7 mm long. Flowers 2-6 in vertical rows at or above leaf-axils, 1.2-1.5 cm across, white with green striations and purple spots, fragrant; sepals broadly elliptic, 5-6 mm long, outside tomentose; margins ciliate; petals densely tomentose, 6-10 x 2-3 mm, obovate; stamens 28-30; gynophore filiform, 2-3 cm long. Fruits 1-1.5 cm diam., subglobose, dark-coloured, pulp yellow, many seeded; seeds *ca* 7 x 6 mm.

Fl. & Fr.: April-September.

In thickets, on dry and moist, sandy or loamy soil. Chiappui, 1500 m, *Parry* 211 (*vide* C.E.C. Fischer, *l.c.*).

2. *Capparis cantoniensis* Lour., Fl. Cochinch. 331. 1790; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 28. 1987; Raghvan in Sharma *et al.*, Fl. India 2: 260. 1993. *C. pumila* Champ. ex Benth. in Hook., J. Bot. Kew Gard. Misc. 3: 260. 1851; Hook. f. & Thomson in Fl. Brit. India 1: 177. 1872; Kanjilal *et al.*, Fl. Assam 1: 76. 1934. Fig. 15.

Scandent armed shrubs, 3-18 m high; young shoots puberulous, terete and glabrescent when older; stipular thorns small, recurved, 2-5 mm long in older branchlets. Leaves elliptic or oblong-lanceolate, 6-10 x 2.5-3.5 cm, base rounded or cuneate, acuminate at apex, subcoriaceous, glabrous above, puberulous beneath but soon glabrescent; lateral nerves inconspicuous, 6-9 pairs; petioles 5-6(8) mm long, puberulous, channelled. Corymbs axillary to uppermost leaves, forming terminal panicles; panicles 15-18 cm long; bracts subulate, 1-2 mm long, caducous. Flowers fragrant, white, 1.2-1.5 cm across; sepals suborbicular, puberulous, 4-7 mm long; petals 5-6 x 2-4 mm, oblong, pubescent; stamens 18-32; gynophore 4-12 mm long, glabrous. Fruits 0.8-1.5 x ca 0.8 cm in diam., subglobose, oblong or ellipsoid, pointed at both ends, glabrous, reddish, 1-seeded or few; seeds brown, 8-10 mm long, globular.

Fl. & Fr.: February-November.

Aizawl, Godfrey 526 (CAL); Kheitung, Deb 31207.

3. *Capparis multiflora* Hook. f. & Thomson in Fl. Brit. India 1: 178. 1872; Kanjilal *et al.*, Fl. Assam 1: 76. 1934; Raghvan in Sharma *et al.*, Fl. India 2: 279. 1993.

Erect shrubs or trees, 2-5 m tall; branchlets glabrous; stipular thorns short, ca 1 mm long, straight, sometimes absent. Leaves elliptic-oblong, or oblanceolate, 10-26 x 4-8 cm, base cuneate, abruptly acuminate at apex, membranous, glabrous; lateral nerves 6-10 pairs, petioles 8-10 mm long. Flowers 4-6 mm across, arranged in supra axillary vertical rows of 6-10 flowers, white, sweet-scented; sepals ovate, 3-5 mm long, glabrous; petals 5-6 x 3-4 mm, broadly elliptic, glabrous; stamens 10-12; gynophore 5-10 mm long. Fruits globose, 8-10 mm across, 1-3 in a row, glabrous, reddish-purple, turning black; seeds 1-3, 6 x ca 4 mm.

Fl. & Fr.: February-December.

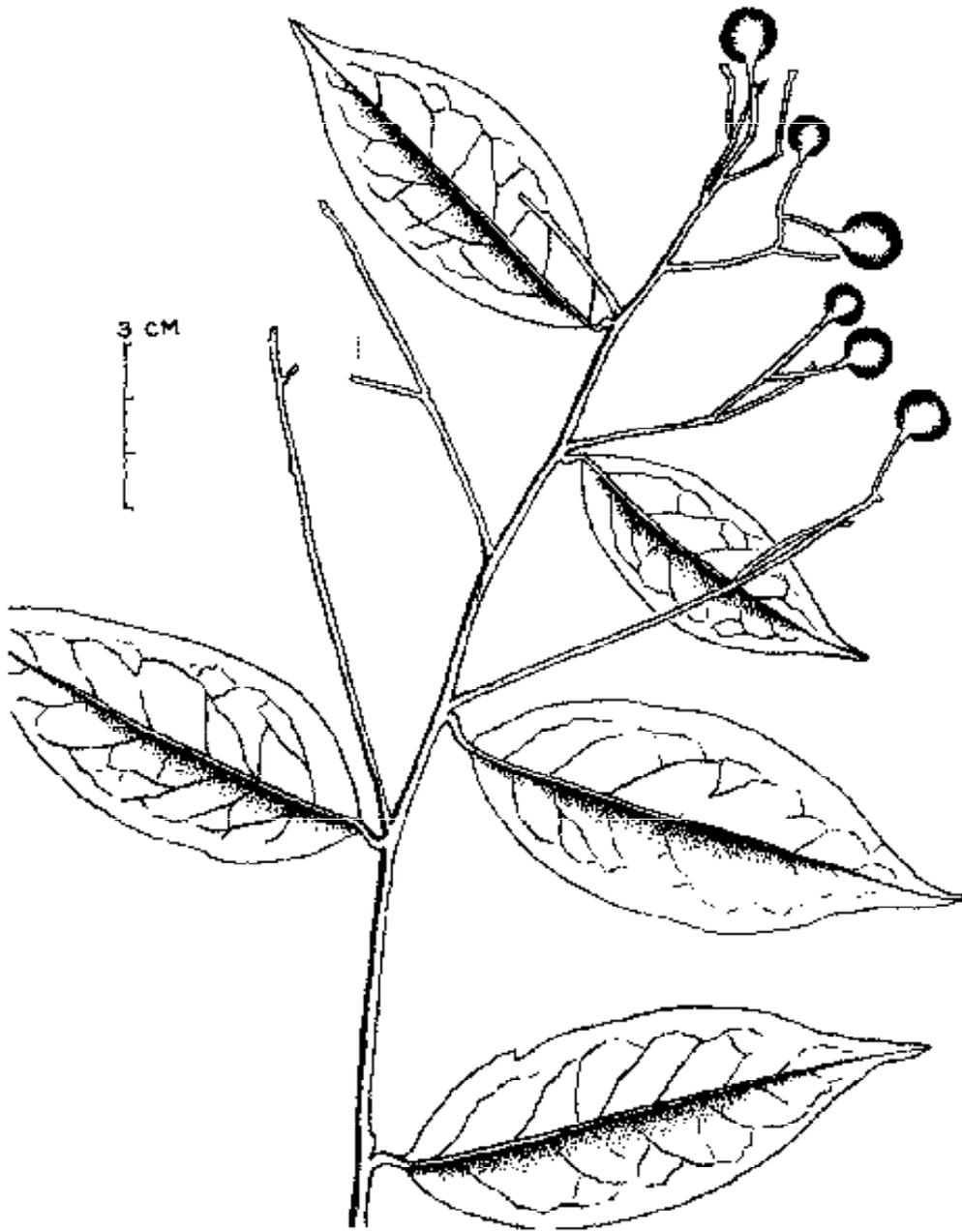


Fig. 15: *Capparis cantoniensis* Lour.

In moist subtropical forests. Recorded on the basis of Raghavan (*l.c.*).

4. *Capparis olacifolia* Hook. f. & Thomson in Fl. Brit. India 1: 178. 1872; Kanjilal *et al.*, Fl. Assam 1: 77. 1934; Raghvan in Sharma *et al.*, Fl. India 2: 283. 1993.

Erect shrubs or small trees, up to 5 m tall; young branches tomentose; stipular thorns 5-6 mm long, straight, pointing upwards. Leaves ovate-lanceolate, 5-15 x 3-6 cm, globose, base rounded or subacute, acute to acuminate at apex, chartaceous, glabrous; lateral nerves 5-8 pairs; petioles 5-6 mm long. Flowers 3-4 cm across, in axillary or extra axillary rows of 2-3 flowers, white; sepals 6-9 mm long, densely tomentose, ciliate; petals 1.4-2 cm long, obovate-oblong or oblanceolate, pubescent, inner pair with purple or yellow blotch; stamens 32-38; gynophore 2.5-3.5 cm long. Fruits 0.8-1.5 cm across, globose, red, apically beaked, glabrous; seeds 1, globose, 4-5 mm diam., brown.

Fl. & Fr.: March-February.

In grassy places in subtropical areas. Recorded on the basis of Raghavan (*l.c.*).

5. *Capparis tenera* Dalz. in Hook., J. Bot. Kew Gard. Misc. 2: 41. 1850; Hook. f. & Thomson, in Fl. Brit. India 1: 179. 1872; Kanjilal *et al.*, Fl. Assam 1: 78. 1934; C.E.C. Fischer, in Rec. Bot. Surv. India 12(2): 79. 1938; Raghvan in Sharma *et al.*, Fl. India 2: 297. 1993.

Straggling shrubs, up to 3 m high; shoots glabrous; stipular thorns pointed, strongly recurved, 3-4 mm long, in pairs at the base of each leaf, whitish. Leaves ovate-elliptic, 4-8 x 2-4 cm, base rounded, caudate-acuminate at apex, glabrous; lateral nerves 4-5 pairs; petioles 4-6 mm long. Flowers 5-10 mm across, white, fragrant, 1-5 in supra-axillary vertical rows; sepals broadly elliptic, 4-6 x ca 3 mm, tomentose along edges; petals oblong, tomentose; stamens 8-18; gynophore 15-20 mm long, glabrous; ovary red, glabrous, pear shaped. Fruits 0.8-1 cm diam., pisciform or subglobular, deep orange or red when ripe; seeds 3-4, ca 5 x 4 mm.

Fl. & Fr.: March-June.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

2. CLEOME L.

- 1a. Plants pubescent with gland-tipped hairs, foetid;
petals white or yellow; androphore 15-25 mm long ... 1. *C. gynandra*
- 1b. Plants ± glabrous, eglandular, not foetid; petals pinkish or
reddish violet; androphore 5-9 mm long ... 2. *C. speciosa*

1. **Cleome gynandra** L., Sp. Pl. 671. 1753; Deb & Dutta in J. Econ. Tax. Bot. 10: 29. 1987; Raghavan in Sharma *et al.*, Fl. India 2: 309. 1993. *Gynandropsis pentaphylla* (L.) DC., Prodr. 1: 238. 1824; Hook. f. & Thomson in Fl. Brit. India 1: 171. 1872; Kanjilal *et al.*, Fl. Assam 1: 73. 1934.

Annual, erect herbs, up to 1 m high, strongly smelling, glandular-pubescent. Leaves 4-6 cm long, 3-5-foliolate; leaflets unequal, middle pair largest, 2-6 x 1.5-2.5 cm; laterals 1-3 x 0.5-1.5 cm, obovate-elliptic, oblanceolate or rhombate, base cuneate, acute at apex, entire to denticulate along margins, chartaceous, glandular-pubescent beneath; petioles 2-12 cm long; petiolules up to 3 mm long, webbed. Racemes lax, many-flowered, corymbose, terminal, 10-25 cm long; flowers 1-2.5 cm across, white or creamy-yellow; sepals ovate, 2-5 mm long, caducous; petals obovate, 4-16 x 2-6 mm long, narrowly clawed at base; androphore 15-25 mm long; stamens 6, purple; gynophore up to 1.5 cm long, later elongating to 3.5 cm in fruits. Capsules 2- 8 x 0.5-0.6 cm, erecto-patent or compressed, terete, striate; seeds 15-40, reniform, brown or black.

Fl. & Fr.: Throughout the year, chiefly August-September.

Common weed in abandoned Jhum land and other waste places. Aizawl, Deb 50559; Lungleh-Sairep, Dutta 33494, 33495 (CAL).

2. **Cleome speciosa** Raf., Fl. Ludovic. 86. 1817; Raghavan in Sharma *et al.*, Fl. India 2: 316. 1993. *Gynandropsis speciosa* (Raf.) DC., Prodr. 1: 238. 1824. *Nghasihpar* (Lushai). **Fig. 16.**

Erect herbs, up to 1.5 m high, whitish, glabrous. Leaves 3-7-foliolate; petioles 4-12 cm long; leaflets ovate-lanceolate, elliptic-lanceolate, 8-13 x 1.5-4 cm, base narrowed, acuminate at apex, chartaceous, glabrous; lateral nerves 7-20 pairs; flowers 2.5 cm across, on racemes, subtended by sessile leafy bracts; sepals subulate, 3-5 mm long, puberulous; petals



Fig. 16: *Cleome speciosa* Raf.

lanceolate, 2-4 cm long, pinkish or rosy-purple; androphore 5-9 mm long; stamens 6; gynophore 4-6 cm long, later elongating to 9 cm in fruits. Capsules linear, pendent, 6-10 x ca 0.3 cm, striate; seeds many, horse-shoe shaped, brown, 2-3.5 mm across.

Fl. & Fr.: April-October

Usually cultivated in Kitchen gardens for its showy flowers. Sairang, *Godfrey* 429 (CAL); Hnathial, *K.P. Singh* 94133.

3. CRATEVA L.

Crateva religiosa Forster *f.*, *Pl. Escul. Ins. Occ. Austral* 45. 1786; *Hook. f. & Thomson in Fl. Brit. India* 1: 172. 1872; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 79. 1938; Raghavan in *Sharma et al., Fl. India* 2: 325. 1993. *C. nurvala non Buch.-Ham.*; Kanjilal *et al., Fl. Assam* 1: 74. 1934.

Trees, 3-15 m tall, young shoots brown, branchlets mostly hollow. Leaves thinly membranous, 3-foliolate; petioles 4-10 cm long; leaflets lanceolate or elliptic, 5.5-12 x 3.5-6.5 cm, base cuneate, abruptly acuminate at apex, middle leaflets largest, lateral leaflets oblique, glabrous; lateral nerves 8-12 pairs; petiolules 4-5 mm long. Flowers 3-4 cm across, in terminal corymbose up to 25-flowered racemes; sepals 6-8 mm long, narrowly lanceolate; petals ovate-elliptic, white turning creamy, sometimes orange, clawed; claw 6-18 mm long; stamens 16-24, on androphore, dark red or purplish, 3-7 cm long; gynophore 4-5 cm long and later enlarging to 12 cm long in fruiting; ovary subglobose. Fruits obovoid-subglobose, 4.0-5.5 cm in diam., fleshy, many-seeded; seeds ellipsoid, 14-15 x 10-12 mm, compressed, tuberculate.

Fl. & Fr.: April-December

Scarce, in subtropical evergreen forests, South Lushai Hills, *Wenger* C 1, (CAL); Mizo hills, *Dutta* 33565 (CAL).

4. STIXIS Lour.

Stixis suaveolens (Roxb.) Pierre in *Bull. Soc. Linn. Paris* 1: 654. 1887; Raghvan in *Sharma et al., Fl. India* 2: 333. 1993. *Roydsia*

suaveolens Roxb., Pl. Corom. 3: 87. t. 289. 1819; Hook. f. & Thomson in Fl. Brit. India 1: 180. 1872; Kanjilal *et al.*, Fl. Assam 1: 79. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 79. 1938. **Fig. 17.**

Large, woody climbers, 2-15 m high with dotted white branchlets. Leaves simple, oblong or oblong-lanceolate, 12-24 x 4-11 cm, base cuneate, abruptly acuminate at apex, glabrous, shining above, pale beneath, minutely punctate with raised white dots on both surfaces; lateral nerves 6-9 pairs, prominent; petioles 1-1.5 cm long, pubescent. Inflorescence axillary or supra-axillary, racemes or terminal panicles, 10-20 cm long; bracts linear to ovate-acute, caducous; flowers white, ca 1.5 cm across; sepals ovate-elliptic, 4-5 x ca 2 mm, olive green, pubescent; petals absent; androgynophore ca 2 mm long, glabrous; stamens 38-52; gynophore puberulous, 2-6 mm long, enlarging in fruit. Drupes ellipsoid or obovoid, 2-5 x 1.5-3 cm, fleshy, brown-orange when ripe, 1-seeded; surface covered with flat whitish warts, 3-valved; seeds ovoid, 1.5-2 x ca 1 cm.

Fl. & Fr.: April-November.

Common in mixed tropical and subtropical evergreen forests. Near Lungleh fort, 900 m, Gage 41, 77 (CAL); Lawngtalai, Dutta 33764 (CAL); Phairuang K.P. Singh 94199; Chalfilth, K.P. Singh 96998; Kawnpui, K.P. Singh 97017, 97040; Ratu, K.P. Singh 97105.

Note : As per the state forest department records, *Crateva magna* (Lour.) DC. also occurs in the state.

VIOLACEAE

(K.P. Singh)

VIOLA L.

1a. Plants without subterranean stems or stolons; stipules adnate to petioles; leaves triangular-ovate or linear-lanceolate

...1. *V. betonicifolia*
ssp. *betonicifolia*

1b. Plants with ascending or decumbent stolons; stipules free from petioles:

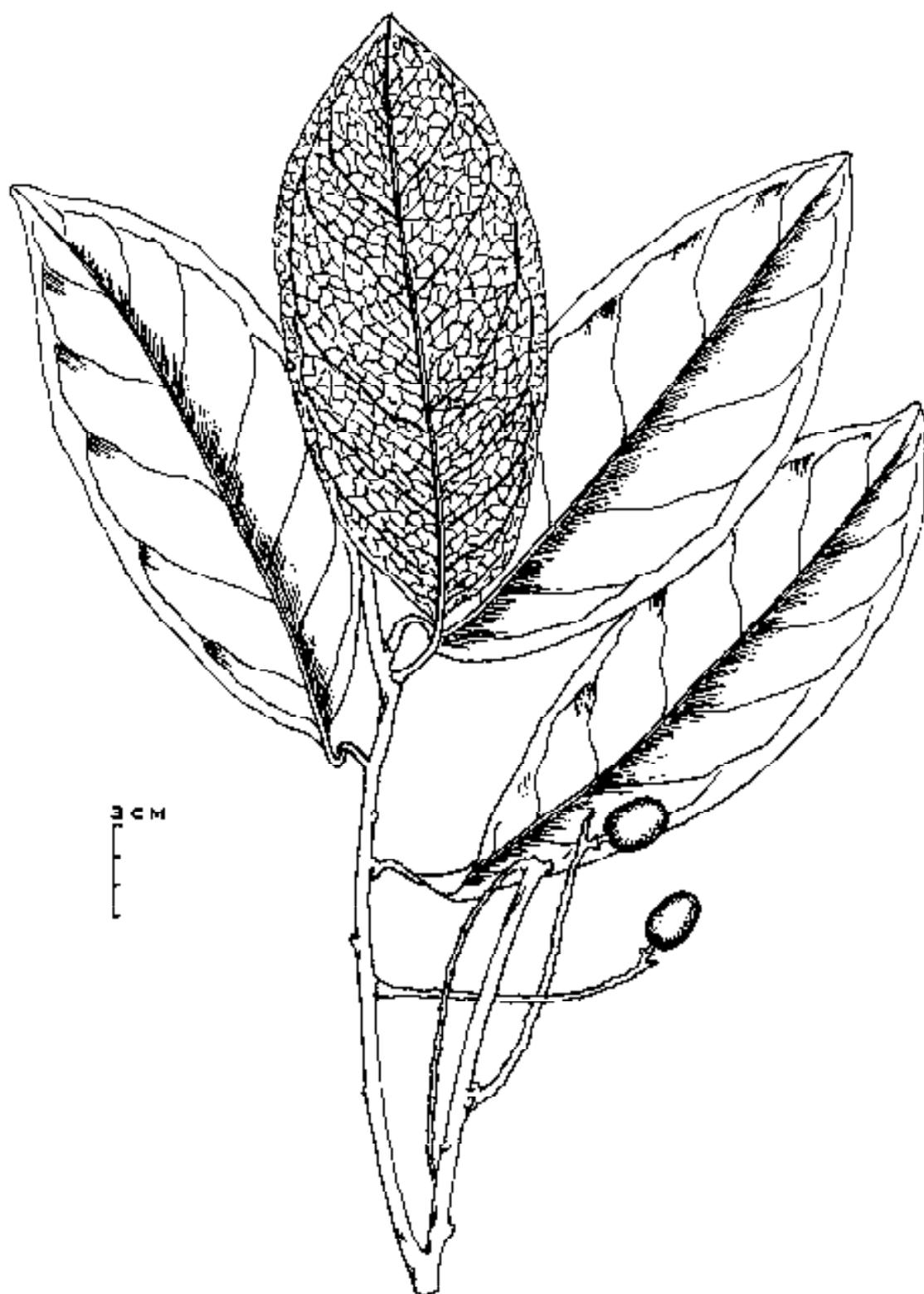


Fig. 17: *Stixis suaveolens* (Roxb.) Pierre

- 2a. Stipules entire; styles with two lateral patent lobes on the top ... 3. *V. hamiltoniana*
- 2b. Stipules fimbriate; styles without lateral patent lobes:
- 3a. Peduncles bi-bracteolate above the middle ... 4. *V. thomsonii*
- 3b. Peduncles bi-bracteolate below the middle:
- 4a. Leaves broadly canescent, obtuse; flower pale-violet ... 2. *V. canescens*
- 4b. Leaves pilose, deltoid, acuminate; flowers white to bluish ... 5. *V. pilosa*

1. *Viola betonicifolia* J. Smith in Rees, Cyclop. 37(1): Viola No. 7. 1817 subsp. ***betonicifolia*** non DC., Banerjee & Pramanik in Sharma *et al.*, Fl. India 2: 355. 1993. *V. patrinii* non DC., 1824; Hook. f. & Thomson, Fl. Brit. India 1: 183. 1872. *p.p.* *V. betonicifolia* subsp. *nepalensis* (Ging.) W. Becker in Engler, Bot. Jahrb. 54 (Beibl. 120): 166. 1917; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 79. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 29. 1987.

Herbs with perennial rootstock; stems absent. Leaves linear-lanceolate, sometimes triangular-ovate, 2-6 x 0.5-3 cm, base truncate or shallowly cordate, obtuse to subacuminate at apex, crenate or serrate along margins, glabrous to ± pubescent; petioles 3-8 cm long, winged above; stipules ovate-lanceolate, 5-8 mm long, sparsely short-fimbriate. Flowers 4-7 mm across, lilac, on 5-15 cm long peduncles; peduncles bi-bracteolate at middle, glabrous; petals up to 1 cm long; spur 2-5 mm long. Capsules ca 8 mm in diam., oblong, glabrous.

Fl. & Fr.: February-June, often throughout the year.

Phonphui, 1800 m, Parry 224, (*fide* C.E.C. Fischer, *l.c.*); Lushai hills, Parry 6 (CAL); Champhai, 170 m, Deb 30970; Theiriat, Deb 31279; Taitaw, 600-914 m, Dutta 33219; Thalthlang, Dutta 33945; Sairep, K.P. Singh 94126.

2. *Viola canescens* Wallich in Roxb., Fl. Ind. 2: 450. 1824; Banerjee & Pramanik in Sharma *et al.*, Fl. India 2: 359. 1993. *V. serpens* Wallich var. *canescens* (Wallich) Hook. f. & Thomson in Fl. Brit. India 1: 184. 1872; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 79. 1938.

Herbs, prostrate; stems often with runners. Leaves ovate-cordate to subreniform, 1-4 x 1.5-4 cm, obtuse, serrate-crenate along margins, 5-nerved beneath; petioles 5-8 cm long, pubescent; stipules up to 1 cm long, fimbriate, lanceolate. Flowers *ca* 1.5 cm across, pale-violet; bi-bracteolate; peduncles 7-10 cm long; sepals trinerved, pubescent; petals up to 1.5 cm long, obovate-oblong, lower most spurred; style with truncate stigma. Capsules 3-4 mm in diam., pubescent, subglobose, many-seeded.

Fl. & Fr.: March-October.

S. loc., Lorrain s.num (*fide* C.E.C. Fischer, *l.c.*).

3. *Viola hamiltoniana* D. Don, Prodr. Fl. Nep. 206. 1825; Banerjee & Pramanik in Sharma *et al.*, Fl. India 2: 363. 1993. *V. arcuata* Blume, Bijdr. 58, June-Dec. 1825; Kanjilal *et al.*, Fl. Assam 1: 81. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 79. 1938. *V. distans* Wallich in Trans. Med. Phys. Soc. Calc. 7: 227. 1835; Hook. f. & Thomson in Fl. Brit. India 1: 183. 1872, p.p. *V. distans* var. *acaulis* Hook. f. & Thomson in Fl. Brit. India 1: 184. 1872.

Perennial herbs; stems slender, ascending or trailing, up to 25 cm long. Leaves 1-3.5 x 1.5-3.5 cm, ovate to reniform-cordate or deltoid; basal sinus broad, obtuse to acute at apex, crenate-serrate along margins, glabrous to hirsute; petioles 3-5 cm long, glabrous; stipules *ca* 1 cm long, subentire. Flowers solitary, *ca* 1 cm across, white to light violet; peduncles 1-6 cm long, bi-bracteolate above middle; sepals 4-5 mm long, lanceolate, acute; petals obovate, supur saccate; style straight. Capsules ellipsoid-oblong, *ca* 1 cm long, glabrous, many seeded.

Fl. & Fr.: April-June, often throughout the year.

Phongphui, 1800 m, Parry 4, (*fide* C.E.C. Fischer, *l.c.*); Blue Mountain, 1650-2100 m, Wenger 434, (*fide* C.E.C. Fischer, *l.c.*).

4. *Viola pilosa* Blume, Cat. Gew. Buitenz. 57. 1823; Banerjee & Pramanik in Sharma *et al.*, Fl. India 2: 371. 1993. *V. serpens* Wallich ex Ging in DC., Prodr. 1: 296. 1824; Hook. f. & Thomson in Fl. Brit. India 1: 184. 1872; Kanjilal *et al.*, Fl. Assam 1: 81. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 79. 1938. *V. serpens* var. *glabra* Hook. f. & Thomson in Fl. Brit. India 1: 184. 1872. Fig. 18.

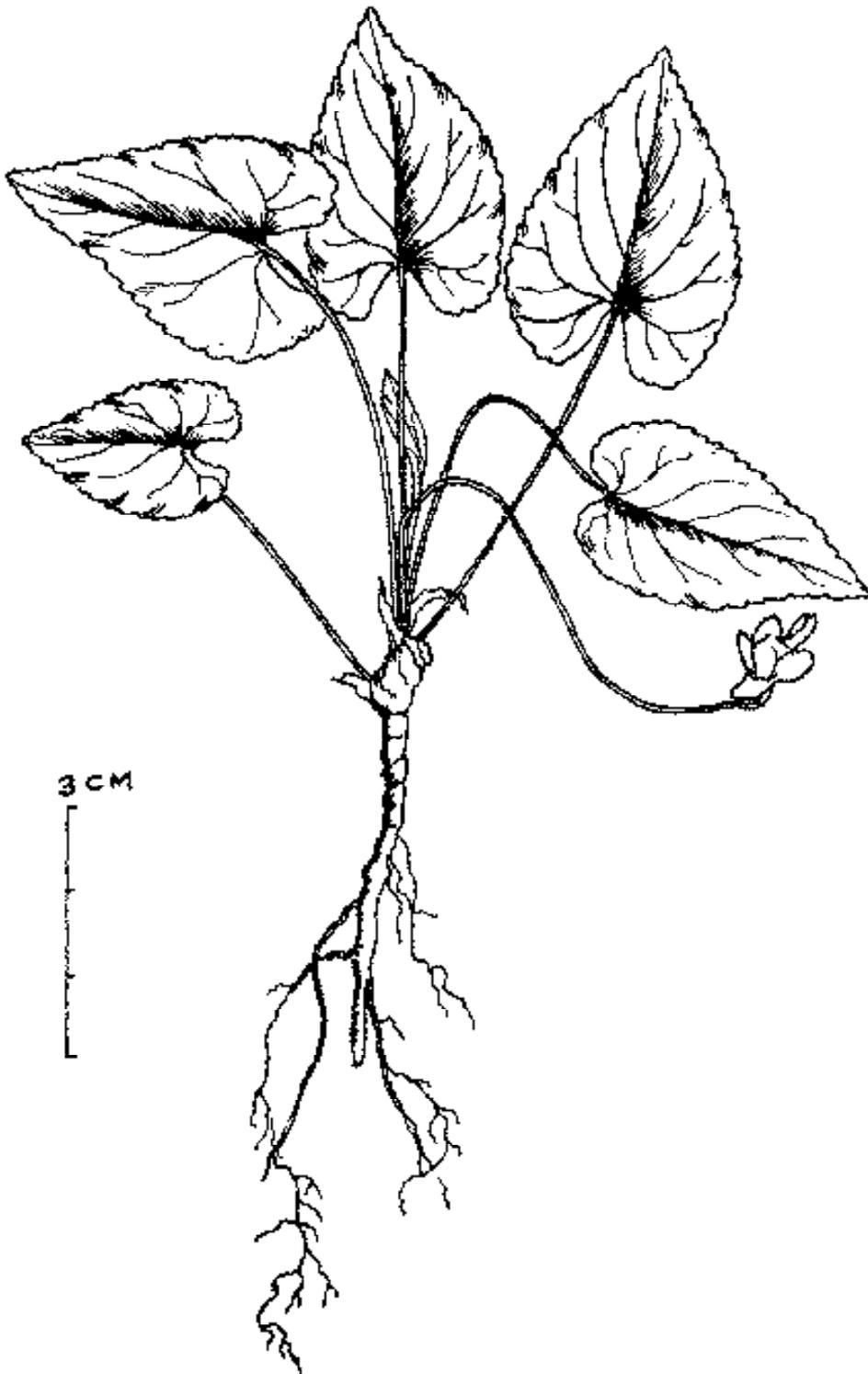


Fig. 18: *Viola pilosa* Blume

Herbs with usually long, ± prostrate stolons. Leaves ovate to deltoid, 2.5-6 x 1-3.2 cm, base shallowly cordate, serrate along margins, hirsute or pilose to glabrous; petioles 5-6 cm long, pubescent; stipules ovate, acuminate, toothed or fimbriate. Flowers white to bluish; on 3-7 cm long, pilose peduncles; sepals linear-lanceolate, canescent, 3-6 mm long; petals 1-2 cm long, obovate; spur saccate; style trumpet shaped; stigma crooked. Capsules 4-5 mm in diam., ellipsoid-globose, glabrous, few-seeded.

Fl. & Fr.: February-July, often throughout the year.

Vanjoh kupleyas, Zolse, *Leslie* 291 (CAL).

5. *Viola thomsonii* Oudem. in Miq., Ann. Mus. Bot. Lugd.-Bat. 3: 74. 1867; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 29. 1987; Banerjee & Pramanik in Sharma *et al.*, Fl. India 2: 377. 1993.

Herbs; stolons up to 20 cm long. Leaves ovate-cordate, 1.5-5 x 1.5-3.5 cm, acute at apex, serrate-crenate along margins, ± glabrous; petioles 8-10 cm long; stipules lanceolate, deeply fimbriate. Flowers ca 1.5 cm long, pale violet; on 8-12 cm long peduncles; bracteoles linear, acuminate with few teeth along the margins; sepals lanceolate, ca 5 mm long, acute; petals ovate-oblong, ca 12 mm long; lower petal spurred; style shortly beaked, geniculate at base. Capsules ± 8 mm long, oblong, apiculate.

Fl. & Fr.: March-September, often throughout the year.

Saiha-Bualpui, *Dutta* 33851.

BIXACEAE

(K.P. Singh)

BIXA L.

Bixa orellana L., Sp. Pl. 512. 1753; Hook. f. & Thomson in Fl. Brit. India 1: 190. 1872; Balakrishnan in Sharma *et al.*, Fl. India 2: 381. 1993. Kanjilal *et al.*, Fl. Assam 1: 83. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 80. 1938. *Rangsen* (Lushai).

Shrubs or small trees, 5-8 m tall. Leaves ovate, 7-18 x 4-10 cm, base cordate to truncate, acuminate at apex, glossy glabrous above, densely

red dotted beneath; lateral nerves 4-5 pairs; petioles 4-8 cm long; stipules 5-6 mm long, acute. Flowers in terminal corymbose panicles, 3.5-5 cm across, white or pinkish; sepals broadly ovate, purple, scaly; petals 5-7, unequal, 2-3 cm long, pink to white. Capsules ovoid, 2-3.5 x 2.5-3.5 cm, densely covered with greenish brown bristles, loculicidally bivalved, green when young, brownish with age; seeds ca 5 mm long, many, obovoid, angular, orange-red.

Fl. & Fr.: July-January.

Cultivated as an ornamental. Saitul, 900 m. *Parry 317, (fide C.E.C. Fischer, l.c.)*.

Uses: Seeds give a dye used to colour butter, other food items, silk and hands. Fibre is used for making ropes. Bark is used for medicinal properties.

FLACOURTIACEAE

(K.P. Singh)

- 1a. Petals absent :
- 2a. Anthers dorsifixed; ovary imperfectly
(2) 3-5-locular; styles 3 or more ...1. *Flacourtia*
 - 2b. Anthers basifixed; ovary 1-locular;
style simple ...5. *Xylocarpus*
- 1b. Petals present :
- 3a. Flowers bisexual, in racemes, spikes or panicles;
petals without a scale at base inside;
stamens as many as petals; fruit a dry psule ...3. *Homalium*
 - 3b. Flowers unisexual, in fascicles or cymes;
petals with a scale at base inside;
stamens many; fruit a berry with hard rind :
 - 4a. Petioles geniculate at upper end;
sepals free; fruits borne usually on branches ...4. *Hydnocarpus*
 - 4b. Petioles not geniculate; sepals connate,
fruits borne on the short trunk ...2. *Gynocardia*

1. FLACOURTIA L.

Flacourtia jangomas (Lour.) Raeusch., Nom. Bot. ed 3: 290. 1797; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 29. 1987; Mitra in Sharma *et al.*, Fl. India 2: 403. 1993. *Stigmarotia jangomas* Lour. Fl. Cochinch. 2: 634. 1790. *Flacourtia cataphracta* Roxb. ex Willd., Sp. Pl. 4: 830. 1806; Hook. f. & Thomson in Fl. Brit. India 1: 193. 1872; Kanjilal *et al.*, Fl. Assam 1: 89. 1934.

Middle sized trees, up to 15 m tall. Leaves pinkish or light cinnamon brown when young, ovate-lanceolate, 4-9.5 x 2.5-4.5 cm, base cuneate, obtusely acuminate at apex, serrulate-crenate along margins, glabrous above, minutely puberulous along midrib beneath; petioles 4-5 mm long. Flowers in axillary, subcorymbose racemes, 5-6 mm across, greenish yellow or white, fragrant; sepals 4(5), broadly ovate, ca 2 mm long. *Male flowers*: stamens many. *Female flowers*: ovary subglobose; styles 4-6. Berries 1-2.5 cm in diam., globose, dark purple when ripe, crowned by the persistent column of styles with 4-6 minute stigma points; seeds many.

Fl. & Fr.: March-October.

Lawngtalai, Dutta 33786 (CAL).

Uses: Fruits are edible.

2. GYNOCARDIA R. Br.

Gynocardia odorata R. Br. in Roxb., Pl. Corom. 3: 95, t. 299. 1820; Hook. f. & Thomson in Fl. Brit. India 1: 195. 1872; Kanjilal *et al.*, Fl. Assam 1: 87. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 80. 1938; Mitra in Sharma *et al.*, Fl. India 2: 407. 1993. *Saithei* (Lushai).

Evergreen large trees, 10-30 m tall with drooping branchlets. Leaves bifarious, oblong or oblong-lanceolate, 7.5-19.5 x 4-7.5 cm, base rounded or truncate, short acuminate at apex, entire but uneven along margins; glabrous; lateral nerves 5-8 pairs; petioles 1-2 cm long. *Male flowers*: 2-3.5 cm across, in few-flowered axillary fascicles or corymbose clusters on tubercles on stem and old branches or cauline; yellow, fragrant; calyx lobes 5, connate into a cupular calyx; petals 5, oblong, ca 15 mm long; stamens ca 100, silky. *Female flowers*: few on tubercles on stem and

older branches; sepals and petals larger in size than males. Berries 8-10 cm in diam., with 5 mm thick hard rind, depressed, globose, glabrous, rugose, greyish, borne on the trunk; seeds numerous, obovoid or oblong, 2-2.5 x 1-2 cm, immersed in pulp, compressed.

Fl. & Fr.: March-January.

Near Fort Lungleh, 900-1200 m, *Gage* 70, 178 (CAL).

Uses: Wood is used for posts and planking. Fruit pulp is used for poisoning fish.

3. HOMALIUM Jacq.

Homalium ceylanicum (Gardner) Benth. subsp. **minutiflorum** (Kurz) Mitra in Sharma *et al.*, Fl. India 2: 411. 1993. *H. minutiflorum* Kurz, For. Fl. Brit. Burma 1: 532. 1877; C.B. Clarke in Hook. f., Fl. Brit. India 2: 596, 1879. *H. bhamoense* var. *debbarmani* Kanjilal *et al.*, Fl. Assam 1: 85. 1934, incl. forma *glabra*.

Evergreen, tall trees, 8-28 m tall, young shoots glabrescent to grey hirsute. Leaves variable, elliptic-oblong or elliptic, base cuneate, 8-18 x 4-10 cm, bluntly acuminate at apex, coarsely to repando-crenate or subentire along margins, glabrous above, minutely hirsute along the nerves beneath; petioles 6-10 mm long. Racemes up to 35 cm long, axillary, pendulous; flowers in dense clusters, 2-5 mm across; hypanthium 1-2 mm long, faintly ribbed; sepals *ca* 2 mm long, petals *ca* 3 mm long, moderately to sparsely hirtellous outside; stamens one opposite each petal; ovary sparsely pubescent.

Fl. & Fr.: March-December.

Chawanpui, Aizawl, *Lalramnghinglova* 00220.

4. HYDNOCARPUS Gaertn.

Hydnocarpus Kurzii (King) Warb. in Engler & Prantl, Pflanzenfam. 3, 60: 21. f. M-N (fig. erroneo sub *Gynocardia odorata*) 1893; Kanjilal *et al.*, Fl. Assam 1: 87. 1934; Mitra in Sharma *et al.*, Fl. India 2: 421.

1993. *Taraktogenos kurzii* King in J. As. Soc. Bengal 59(2): 123. 1890; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 80. 1938. *Khawitur* (Lushai).

Evergreen trees, 10-20 m tall, with narrow crown and hanging branches. Leaves bifarious, variable, 10-20 x 4-6.5 cm, oblong or oblong-lanceolate, elliptic-oblong, base cuneate, obtusely short or abruptly acuminate at apex, entire along margins, glabrous; lateral nerves 7-9 pairs, oblique; petioles 2-4 cm long, swollen and slightly geniculate at upper end. Inflorescence in axillary cymes. Male flowers 8-12 mm across, pale yellow; sepals ovate-orbicular, ca 5 x 4 mm, fulvous, tomentose; petals ovate-orbicular, ca 4 mm long, white, pilose at apex; stamens 20-30. Female flowers 2-5 in a compact fascicles, sepals and petals less in number; staminodes 10-16; ovary villous. Berries globose, 5-8 cm across, stout beaked, velvety; pericarp reddish brown; seeds 12-18, 2-3 cm long, angular-ovoid.

Fl. & Fr.: July-February, probably throughout the year.

In evergreen forests. Aizawl, 900 m, *Parry 677*, (*vide* C.E.C. Fischer, *l.c.*); Aizawl, 900 m. *G.K. Deka s.num.*

Uses: Chalmugra oil from the seeds used for cutaneous complaints

5. XYLOSMA G. Forst.

Xylosma controversum Clos in Ann. Sci. Nat. Hist. ser. 4, 8: 231. 1857; Hook. f. & Thomson in Fl. Brit. India 1: 194. 1872; Kanjilal *et al.*, Fl. Assam 1: 91. 1934; Mitra in Sharma *et al.*, Fl. India 2: 434. 1993.

Fig. 19.

Large shrubs or small trees, 5-10 m tall; stem with simple, short axillary thorns near base. Leaves elliptic-ovate or obovate-lanceolate, 8-16 x 3-6 cm, base attenuate, acuminate at apex, shallowly glandular-serrate along margins, thinly coriaceous, glabrous; lateral nerves 6-8 pairs, very oblique; petioles 5-10 mm long. Racemes axillary, paniculate, few-flowered, 2.5-4 cm long; flowers ca 4 mm across, dull white; sepals unequal ca 2 mm long, ± suborbicular, ciliate, silky inside. *Male flowers*: stamens 25-40. *Female flowers*: ovary sessile on disc. Berries globose-ellipsoid, 4-10 mm across, red when ripe with a persistent style, 2-8-seeded; seeds smooth, shiny.

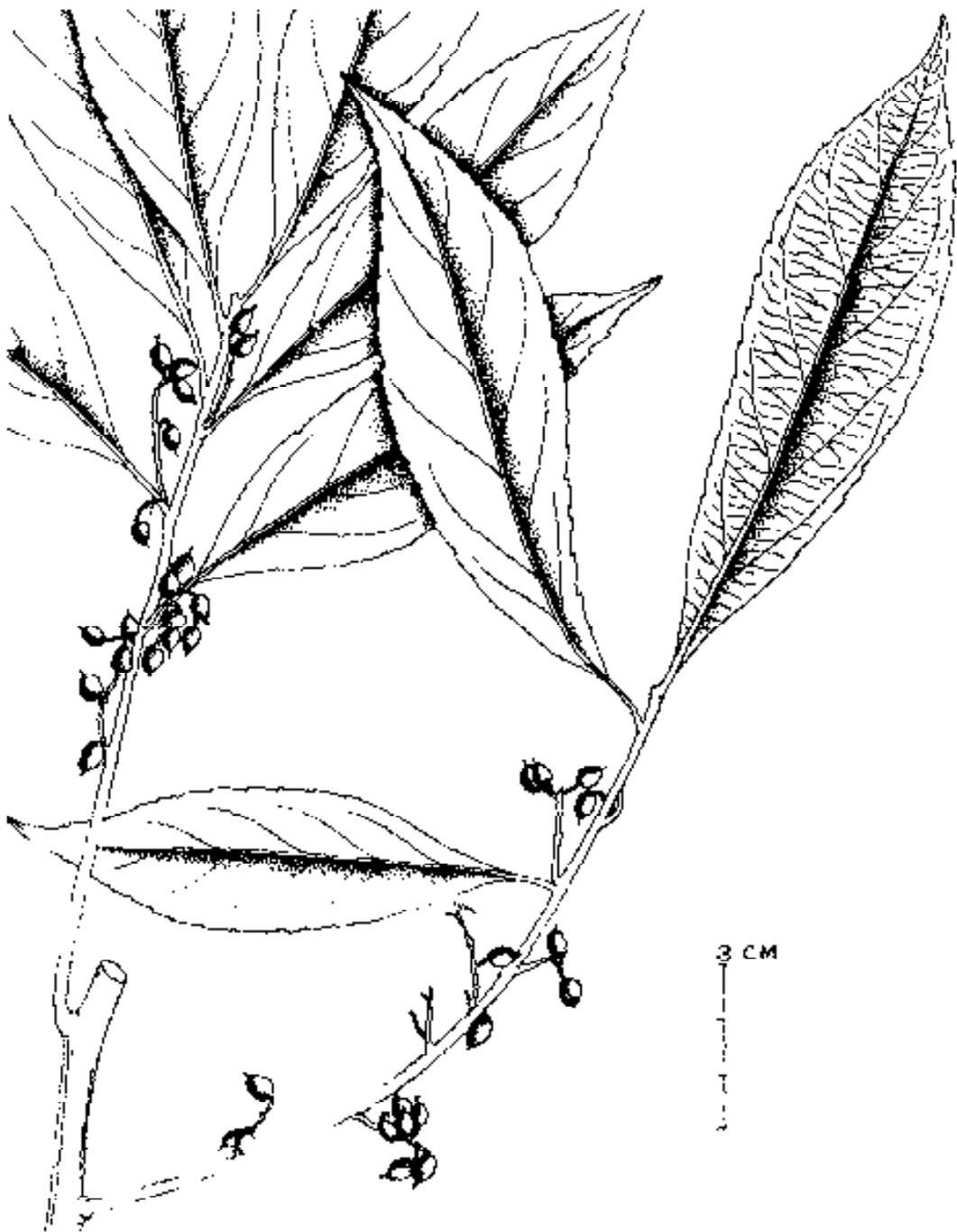


Fig. 19: *Xylosma controversum* Clos

Fl. & Fr.: November-April.

In moist subtropical forests. Phongphui, *K.P. Singh* 96825.

PITTOSPORACEAE

(K.P. Singh)

PITTOSPORUM Banks ex Gaertn.

- 1a. Shrubs; flowers borne in simple racemes or corymbs;
capsules obovoid or ellipsoid, 3-valved ...2. *P. podocarpum*
- 1b. Trees; flowers borne in panicles or umbels;
capsules globose, 2-valved ...1. *P. napaulense*

1. *Pittosporum napaulense* (DC.) Rehder & Wilson in Pl. Wilson. 3: 326. 1916; Nayar & Giri in Sharma *et al.*, Fl. India 2: 445. 1993. *Senacia napaulensis* DC., Prodr. 1: 347. 1824. *Pittosporum floribundum* Wight & Arn., Prodr. Fl. Pen. Ind. Or. 1: 154. 1834, *non* Royle, 1834; Hook. f. & Thomson in Fl. Brit. India 1: 199. 1872 *p.p.*; Kanjilal *et al.*, Fl. Assam 1: 95. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 80. 1938. Fig. 20.

Shrubs or small trees, up to 10 m tall. Leaves crowded at the end of branches, oblong-lanceolate, oblanceolate, elliptic or obovate, 7-15 x 2.5-4 cm, base cuneate, acuminate at apex, undulate or entire along margins, glabrous; lateral nerves 7-10 pairs. Petioles 1-2 cm long. Flowers 6-8 mm long, in terminal or subterminal panicles of corymbs or umbels, yellow, sweet scented; sepals ca 2 mm long, ovate-oblong; petals 6-7 mm long, oblong; ovary hairy; style glabrous. Capsules globose, 5-7 mm diam., orange-yellow, crowned by the persistent style, 2-valved; valves horizontally striate inside; aril scarlet; seeds 4-8 per capsule, 3-4 mm long.

Fl. & Fr.: February-January.

Lungleh, Helio hill, 1010 m, *Gage* 103 (CAL); Sairang, 1310 m, *Deb* 30742.

2. *Pittosporum podocarpum* Gagnepain in Notul. Syst. 8: 211. 1939; Nayar & Giri in Sharma *et al.*, Fl. India 2: 446. 1993. *P. glabratum* (*auct. non* Lindley, 1846) Hook. f. & Thomson in Fl. Brit. India 1: 198. 1872;

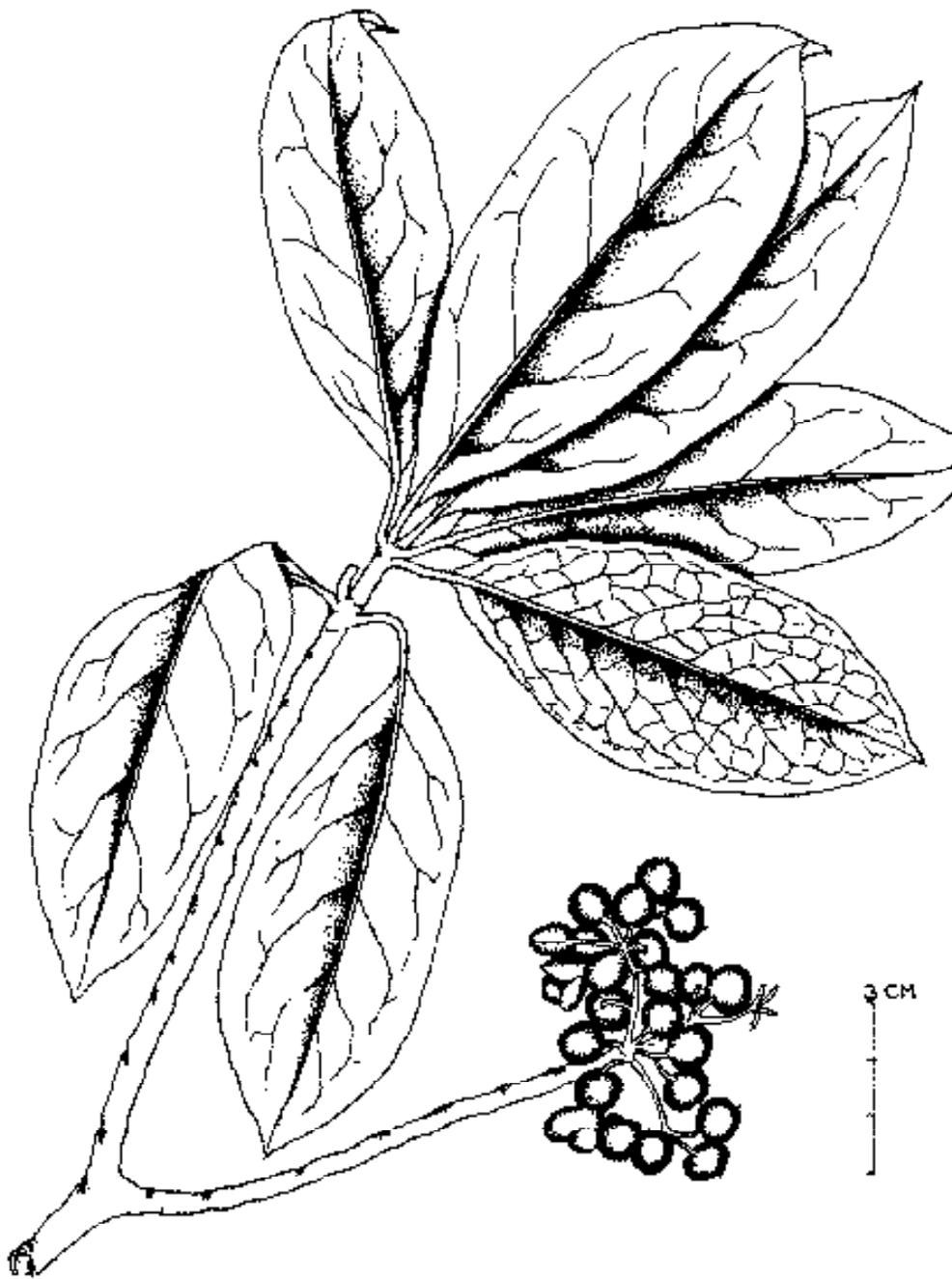


Fig. 20: Pittosporum napaulese (DC.) Rehder & Wilson

Kanjilal *et al.*, Fl. Assam 1: 95. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 80. 1938.

Erect shrubs, up to 3 m high with whorled branches. Leaves very variable in size and shape, oblong-lanceolate, linear-lanceolate, oblanceolate or falcate, obovate or elliptic, 0.3-18 x 2-3 cm, base cuneate, acute or acuminate at apex, revolute along margins, glabrous, coriaceous; petioles 2-10 mm long, channeled; lateral nerves faint. Flowers in subterminal short racemes or corymbs, 1-1.5 cm long, pale yellow; sepals glandular hairy, 2-3 mm long, ovate; petals clawed at base, 10-12 mm long, recurved; ovary globose, tomentose. Capsules obovoid or oblong-ellipsoid, 2-2.5 x ca 1.5 cm, 3-valved, striate inside with horizontal lines; aril orange-red; seeds compressed, reddish, ca 8 x 5 mm.

Fl. & Fr.: March-January.

Phongphui, 1800 m, Parry 145, (*vide* C.E.C. Fischer, *l.c.*).

POLYGALACEAE

(K.P. Singh)

11. Tall herbs or climbing shrubs; flowers pedicellate; sepals unequal in shape; two inner sepals much larger than the outer ones; stamens 4-8; seeds arillate ... 2. *Polygala*
- 1b. Low herbs; flowers sessile; sepals equal or subequal in shape and size; stamens 4-5; seeds exarillate :
- 2a. Saprophytic plants; leaves scaly, non green; fruits enclosed by calyx ... 1. *Epirixanthes*
- 2b. Autotrophic plants; leaves distinct, green; fruits not enclosed by calyx ... 3. *Salomonina*

1. EPIRIXANTHES Blume

Epirixanthes elongata Blume, Cat. Gew. Buitenz. 25. 1823; Banerjee in Sharma *et al.*, 2: 451. 1993. *Salomonina aphylla* Griffith in Trans. Linn. Soc. 19: 342. 1845; Bennett in Hook. *f.*, Fl. Brit. India 1: 207. 1872; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 80. 1938.

Saprophytic, yellow-brown, annual herbs, 8-10 cm high. Leaves reduced to a few brown scales, 1.5-2 x ca 1 mm, sessile, ovate-lanceolate,

acuminate at apex. Spikes 2-5 cm long, many, terminal with mature fruits below and flowers above, conical; flowers densely arranged, *ca* 1 mm long, cream-yellow; sepals nearly equal, *ca* 0.5 mm long, ovate. petals 3, 1.5-2 mm long, yellowish, narrow; stamens 4-5; ovary sessile. Capsules 2-celled, *ca* 1 mm or less wide, broader than long, without cilia, membranous, \pm compressed; seeds \pm rounded, small, black with a appendiculate strophiole, glabrous.

Fl. & Fr.: December.

A very rare plant in moist places. Dampatlang, *D.K. Singh* 99156.

2. POLYGALA L.

1a. Herbs, less than 1 m high:

- 2a. Leaves linear-elliptic to lanceolate, acute at apex; inflorescence 4-8 cm long, lax flowered; alae symmetric, obovate, obtuse at apex, petaloid; seeds without appendages ... 3. *P. persicariifolia*
- 2b. Leaves ovate-lanceolate; obtuse-mucronate at apex; inflorescence 0.5-1 cm long, dense flowered; alae asymmetric, acute or mucronate at apex, not petaloid; seeds with 3 appendages ... 2. *P. chinensis*

1b. Shrubs, 2 m or more high:

- 3a. Scandent or climbing shrubs; stems with projecting cicatrices of fallen leaves; racemes terminal, paniculate; flowers pink; anthers conical ... 4. *P. tricholopha*
- 3b. Erect shrubs or small trees; stems smooth; racemes axillary or sub axillary; flowers yellow; anthers oblong ... 1. *P. arillata*

1. *Polygala arillata* Buch.-Ham. *ex* D. Don, *Prodr. Fl. Nep.* 199. 1825; Bennett in Hook. *f.*, *Fl. Brit. India* 1: 200. 1872, *p.p.*; Kanjilal *et al.*, *Fl. Assam* 1: 97. 1934; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 80. 1938; Banerjee in Sharma *et al.*, *Fl. India* 2: 457. 1993. **Fig. 21.**

Shrubs or small trees, up to 3 m high. Leaves elliptic or oblong-lanceolate, 7-14 x 3-5 cm, base rounded to narrowed, acuminate-mucronate at apex, glabrous, usually hairy along nerves; lateral nerves 6-10 pairs; petioles 5-10 mm long. Racemes 5-10 cm long, axillary, terminal



Fig. 21: *Polygala arillata* Buch.-Ham. ex D. Don

or supra axillary, drooping; flowers 1-1.5 cm long, yellow to deep orange; bracts minute, deciduous; sepals unequal, hairy outside, outer 3 ovate-elliptic, 3-6 mm long; inner 2 winged, obovate, 10-12 x 5-6 mm; petals 3-lobed, 10-15 mm long, hairy inside; stamens 8. Capsules 8-13 x 12-14 mm, bicelled, broadly reniform, compressed, notched apically, fleshy, rugose, dull red, loculicidal; seeds 2, 4-8 mm in diam., brown-black, globose, bilobed, glabrous, strophiolate.

Fl. & Fr.: March-September

Phongphui, *Parry* 576. (*vide* C.E.C. Fischer, *l.c.*); Saiha-Bualpui, *Dutta* 33950; Blue Mountain, 1950 m, *Mao* 107109.

2. *Polygala chinensis* L., *Sp. Pl.* 2: 704. 1753; Bennett in Hook. *f.*, *Fl. Brit. India* 1: 204. 1872; Banerjee in Sharma *et al.*, *Fl. India* 2: 464. 1993. *P. glomerata* Lour., *Fl. Cochinch.* 426. 1790; Bennett in Hook. *f.*, *Fl. Brit. India* 1: 206. 1872; Kanjilal *et al.*, *Fl. Assam* 1: 98. 1934; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 29. 1987. Fig. 22.

Much branched, erect or ascending, perennial herbs or undershrubs, 10-75 cm high with woody rootstock; branches with curled hairs. Leaves variable, ovate to elliptic-lanceolate, linear-lanceolate, 2.5-7 x 0.8-2.5 cm, base acute, obtuse-mucronate at apex, glabrous or sparsely hairy; petioles ca 2 mm long. Racemes 2-8-flowered, short, axillary or supra axillary; flowers 5-7 mm long, greenish-white with pink violet blotches; sepals persistent; outer sepals 2-3 mm long, unequal, ovate-lanceolate, ciliate along margins; lateral sepals winged, 6-7 mm long, oblong to elliptic, acute or mucronate at apex, subfalcate, herbaceous, broader near the base; petals 3-lobed; middle lobe 5-7 mm long, white with purple apex. Capsules 4-6 mm across, broader than long, suborbicular, notched at apex, margined, ciliate; seeds ellipsoid, black, white silky with 2 oblong membranous appendages and a short tooth.

Fl. & Fr.: April-November.

Very common in moist places. Aizawl, *Deb* 30650; Chumliang, *Dutta* 33339; South Vanlaiphai, *Dutta* 34050; Bualpui village, *K.P. Singh* 93830; Kheitum, *K.P. Singh* 93980; Hnathial, *K.P. Singh* 96911; Tuipui road, *K.P. Singh* 94030, 96937.



Fig. 22: *Polygala chinensis* L.

3. ***Polygala persicariifolia*** DC., Prodr. 1: 326. 1824, Bennett in Hook. f., Fl. Brit. India 1: 202. 1872 (as "*persicariaefolia*"); Banerjee in Sharma *et al.*, Fl. India 2: 480. 1993. **Fig. 23.**

Erect or decumbent, branched, slightly pubescent herbs, 15-65 cm high. Leaves alternate, ovate-oblong or linear-elliptic to lanceolate, 2-5 x 0.4-2 cm, base subacute or cuneate, acuminate or acute-mucronate at apex, glabrous, slightly pubescent or strigose on nerves beneath; basal leaves smaller; petioles short, ca 1 mm long. Racemes 4-8 cm long, lax flowered, terminal or extra axillary; flowers 3-5 mm long, light-purple with pink streaks; bracts subulate, ca 2 mm long, acute; sepals persistent, membranous; outer ones small, 2-3 mm long, puberulous on margins, subequal; lateral ones winged, 5-7 x 5 mm, petaloid, broad obovate or elliptic, obtuse; petals hairy inside; middle lobe ca 5 mm long, keeled; lateral lobes smaller, obliquely oblong. Capsules bicelled, elliptic, oblong-obovate, compressed, membranous, ca 5 x 4 mm, notched at apex, marginally winged, ciliate along margins; seeds ca 3 x 1.5 mm long, oblong-ellipsoid, reddish black, villous without appendages.

Fl. & Fr.: July-November.

Common in grasslands and forest edges. Kawkhul to Hliapui, K.P. Singh 94379.

4. ***Polygala tricholopha*** Chodat in Mem. Soc. Phys. Geneva 31(2): 98, t. 17, f. 20. 1898; Banerjee in Sharma *et al.*, 2: 485. 1993. *P. arillata sensu* Bennett in Hook. f., Fl. Brit. India 1: 200. 1872, *p.p.* **Fig. 24.**

Climbing shrubs, up to 2 m high; stems with projecting cicatrices of fallen leaves. Leaves oblong-lanceolate or oblong-elliptic, 4.5-x 8.5 x 1.5-2.5 cm, base rounded, abruptly acuminate at apex, entire along margins, coriaceous, glabrous; petioles 4-6 mm long. Inflorescence in terminal, paniculate racemes or sometimes leaf opposed; racemes 5-7 cm long; flowers pink to pinkish purple, 1-1.5 cm long; sepals ciliolate; outer paired ones suborbicular, ca 4 mm long; outer solitary one gibbous 5-7 mm long; winged sepals elliptic, ca 6 mm long; petals 3, keeled and crested, ca 1 cm long; stamens united to a sheath; anthers conical; ovary bicelled, compressed. Capsules ovoid or elliptic, winged, 4-6 x 6-7 mm, glabrous, beaked, reddish-purple; seeds black, arillate, subglobose.

Fl. & Fr.: August-October.

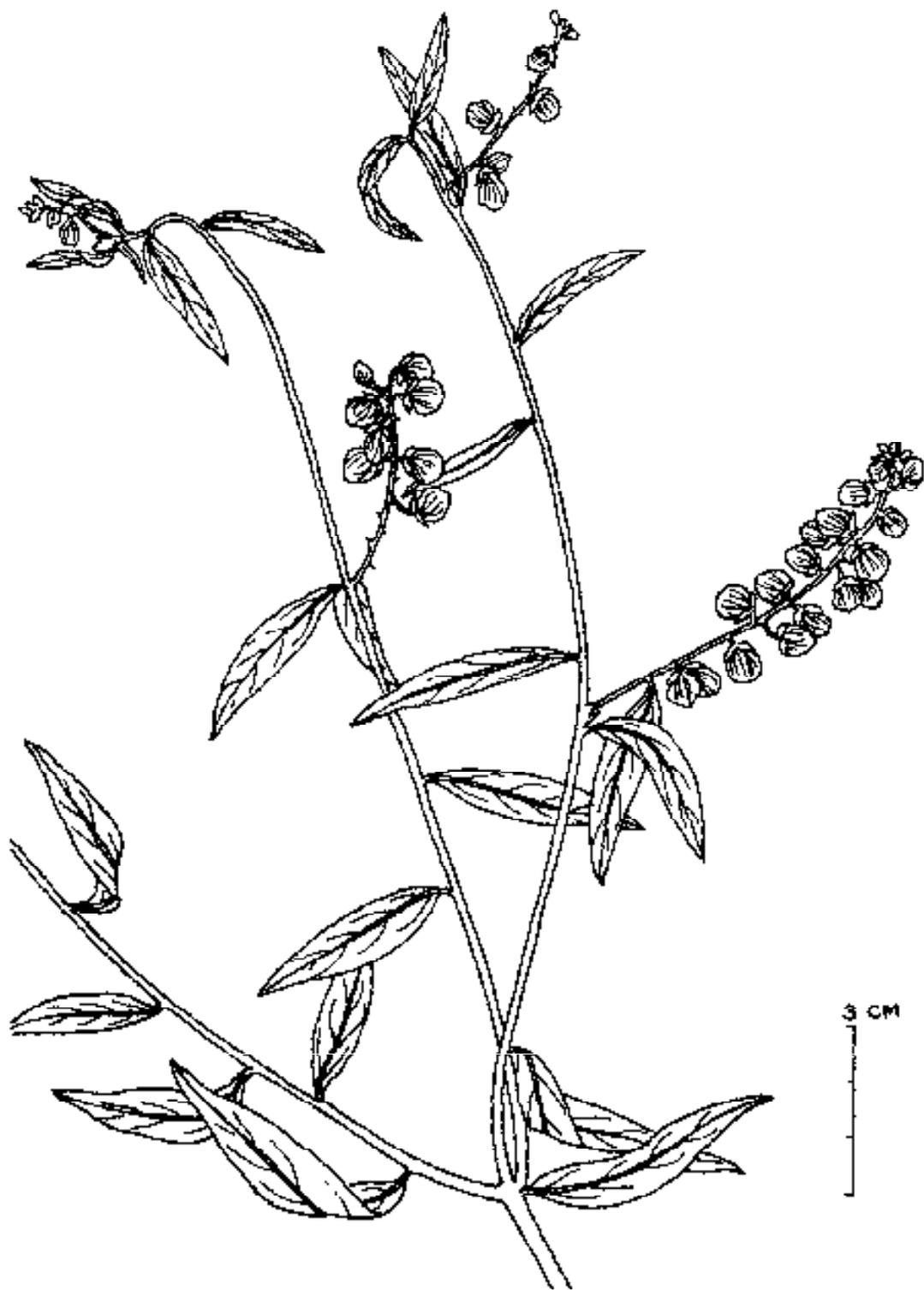


Fig. 23: *Polygala persicariifolia* DC.



Fig. 24: *Polygala tricholopha* Chodat

Scarce in the area. Tuivawl, *M. Sawmliana* 99269.

3. SALOMONIA Lour.

Salomonium cantoniensis Lour., Fl. Cochinch 1: 17. 1790; Bennett in Hook. f., Fl. Brit. India 1: 207. 1872; C.E.C. Fischer in Rec. Bot. Surv. India 12: 80(2). 1938; Banerjee in Sharma *et al.*, Fl. India 2: 489. 1993. *Nvaiphawn* (Lushai). Fig. 25.

Erect or ascending, much branched, slender, annual herbs, 10-20 cm high, glabrous. Leaves ovate-lanceolate, 0.6-2 x 0.5-1.5 cm, broadly rounded, base cuneate or truncate, obtuse or subacute at apex, glabrous, 3-5-nerved at base; petioles short, ca 2 mm long, winged; spikes 2-8 cm long, terminal, many, dense flowered; flowers 0.15-2 mm long, pinkish-white; sepals 5, scaly, subulate, subequal, ca 1 mm long, linear; petals 3, connate at base into a cleft tube, equal or subequal, 1.5-2 mm long; stamens 4, monadelphous. Capsules ca 2 mm wide and 1 mm high, sessile, compressed, obcordate, toothed along the margins; seeds ca 1 mm in diam., shiny red or black-brown, estrophiolate.

Fl. & Fr.: August-November.

Common in sunny spots on grassy slopes. Aizawl, *Godfrey* 494 (CAL); Darzo, *Dutta* 34062; Near Buangpui village, *K.P. Singh* 93824; Kawikhul-Hliapui, *K.P. Singh* 94364; Puilo Basti forest, *K.P. Singh* 94464.

CARYOPHYLLACEAE

(K.P. Singh)

- 1a. Prostrate or suberect, spreading herbs; stipules present;
petals notched or bifid to below middle; capsules 3-valved ...2. *Drymaria*
- 1b. Climbing herbs; stipules absent; petals entire,
shorter than sepals; capsules 4-valved ...1. *Brachystemma*

1. BRACHYSTEMMA D. Don

Brachystemma calycinum D. Don, Prodr. Fl. Nep. 216. 1825; Edgeworth & Hook. f. in Fl. Brit. India 1: 235. 1874; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 80. 1938; N.C. Majumdar in Sharma *et al.*, Fl. India 2: 519. 1993. Fig. 26.



Fig. 25: *Salomonina cantoniensis* Lour.

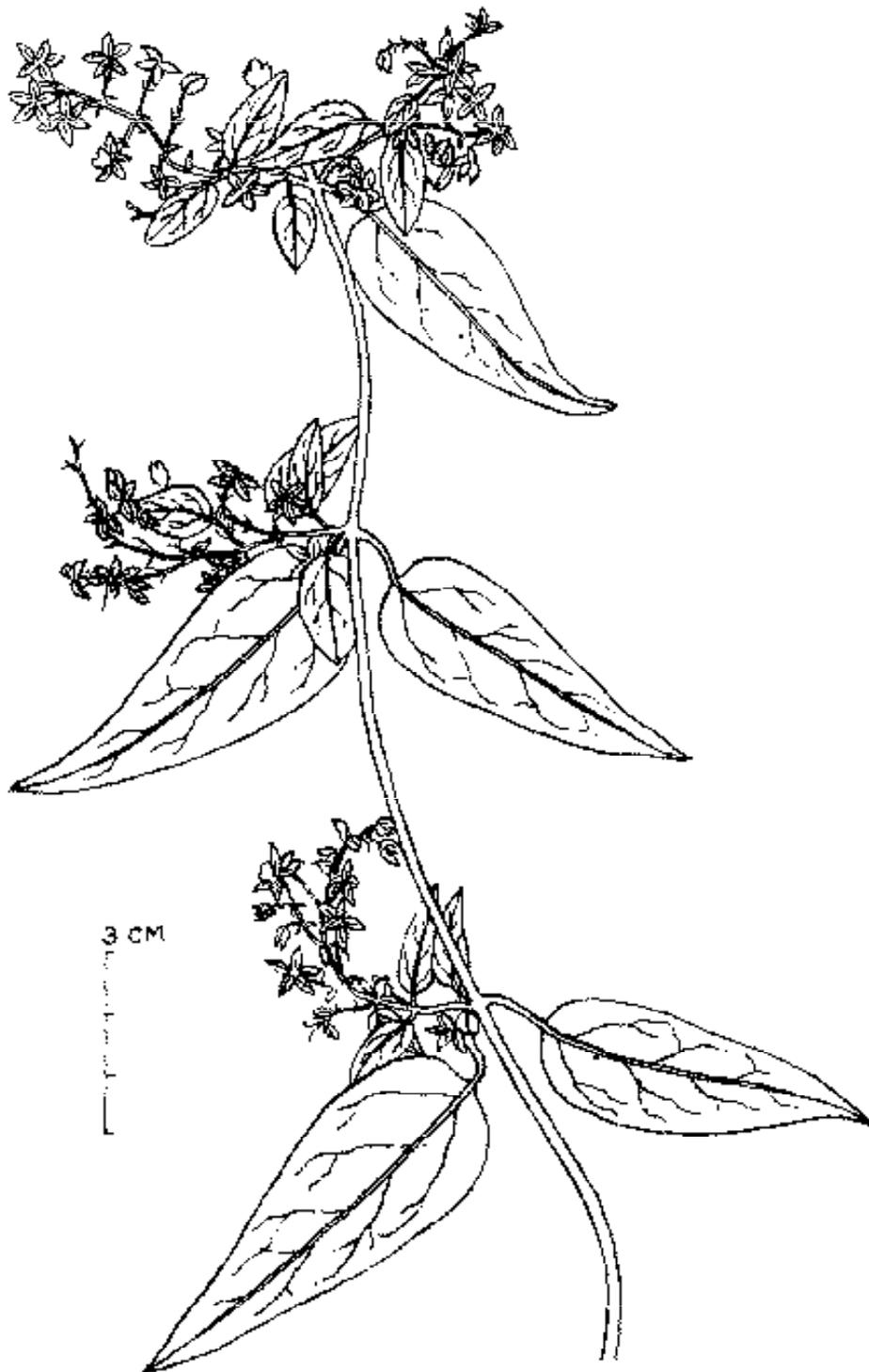


Fig. 26: *Brachystemma calycinum* D. Don

Herbs, climbing on trees, up to 6 m high; stems quadrangular, or ± pilose at apex. Leaves opposite, ovate-lanceolate, 2.5-6 x 0.8-2 cm, base cuneate or rounded, acuminate-mucronate at apex, obscurely crenulate along margins, glabrous to sparsely pubescent above; petioles 0.8-1.5 cm long, recurved and thickened. Flowers 1.2-1.5 cm wide, in axillary or terminal, 4-10 cm long panicles, white; panicle branches minutely pubescent; sepals 5, oblong-lanceolate or elliptic, 5-6 x 1.5-2 mm, ± scarious, pale yellowish; petals 5, elliptic-lanceolate, shorter than sepals 1.5-3.0 mm long; stamens 5. Capsules globose, 4-valved, 1 or few-seeded; seeds reniform, reticulate.

Fl. & Fr.: December-April.

A monotypic genus grows on rocky ground or climbing and drooping from small trees in dense forests. Siatchang, 600 m, *Parry* 151, (*vide* C.E.C. Fischer, *l.c.*); Blue mountain, 1650 m, *Wenger* 428, (*vide* C.E.C. Fischer, *l.c.*); Sialsuk, 1320 m, *Deb* 30685; Tuipang, *J.H. Rama* 00301.

2. DRYMARIA Willd. ex Schultes

Drymaria diandra Blume, *Bijdr.* 62, 1825; N.C. Majumdar in *Sharma et al.*, *Fl. India* 2: 533, 1993. *D. cordata sensu* Edgew. & Hook. *f.* in *Fl. Brit. India* 1: 244, 1874, *non* (L.) Roem & Schultes, 1819; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 80, 1938. *Paripachhi* (Lakher).

Fig. 27

Prostrate or suberect, spreading, glabrous to glandular-papillate, branching herbs, rooting at nodes. Leaves broadly ovate or orbicular or deltoid-ovate, 5-20 x 4-15 mm, base obtuse to cordate-rounded, acute or obtusely mucronate at apex, glabrous, 3-5-nerved; petioles 2-5 mm long; stipules bristly. Flowers in axillary and terminal cymes, white; pedicels glandular-papillose; sepals 5, 2-3 mm long, greenish, ovate, glandular-white, papillose on veins; petals 3-5, ca 2.5 mm long, bilobed to below the middle; stamens 2-3. Capsules ovoid, trigonous, 1.5-2.5 mm long, 2-3-valved to the base; seeds 1 or few, dark brown, orbicular, finely tuberculate.

Fl. & Fr.: January-October.

Common on ground in moist shady places or near the streams. Aizawl, *Deb* 30548; Kolasib-Bhairavi road, *K.P. Singh* 93200; Thenzawl forest

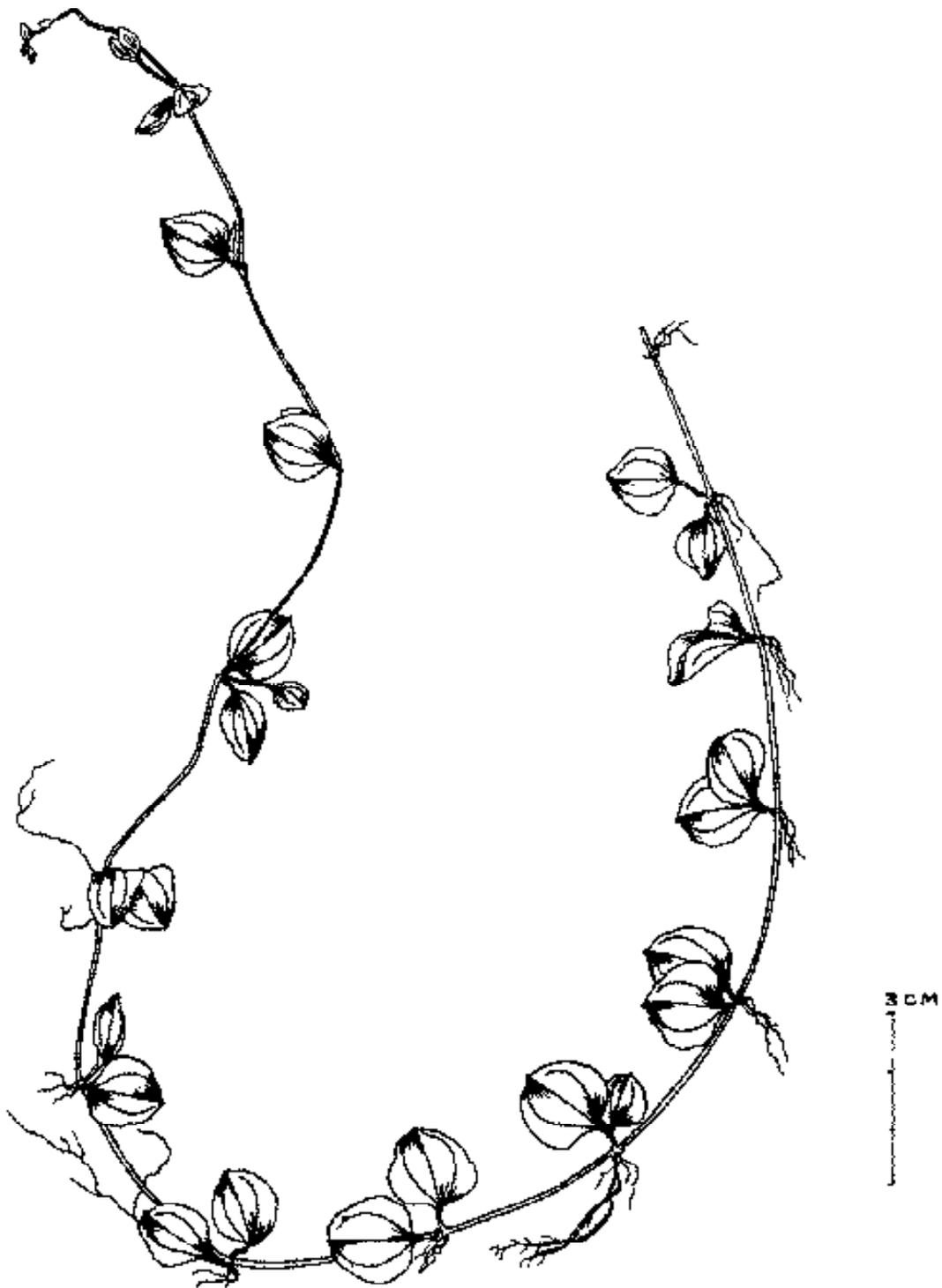


Fig. 27: *Drymaria diandra* Blume

rest house, *K.P. Singh* 93845; Champhai, *K.P. Singh* 94532; Phongphui, *K.P. Singh* 96803.

PORTULACACEAE

(*K.P. Singh*)

PORTULACA L.

Portulaca oleracea L., Sp. Pl. 445. 1753; Dyer in Hook. *f.*, Fl. Brit. India 1: 246. 1874; M.K.V. Rao in Sharma *et al.*, Fl. India 3: 4. 1993. *Sakawrekkak* (Lushai); *Tawdegaw* (Chakma).

Decumbent or prostrate, succulent, annual herbs, 15-45 cm high. Leaves fleshy, ovate or obovate, 1-2.5 x 0.5-1 cm, flat, subopposite, present below the flowers, base cuneate, rounded or obtuse at apex, entire along margins; petioles 2-5 mm long. Flowers solitary, or 2-6 in clusters or capituli with 2 involucreal leaves surrounded by bracteoles and hairs; sepals 3-7 mm long, strongly keeled and joined in a tube, persistent and enclosing fruits; petals 4 or 5, 3-8 mm long, broadly obovate, yellow; stamens 7-10. Capsules ovoid, ca 4 x 3 mm, straw-yellow; seeds 6-7 mm in diam., many, black, tuberculate-punctate.

Fl. & Fr.: April-October.

Waste and cultivated places in foot hills. Tablabagh, 150-200 m, *K.P. Singh* 94281.

HYPERICACEAE

(*K.P. Singh*)

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 1a. Trees; leaves lacking black or translucent glands; capsules dehiscing loculicidally; seeds winged | ...1. <i>Cratoxylum</i> |
| 1b. Herbs and shrubs; leaves with black or translucent glands; capsules dehiscing septocidally or along the placenta; seeds without wings | ...2. <i>Hypericum</i> |

1. CRATOXYLUM Blume

Cratoxylum sumatranum (Jack) Blume subsp. *neriifolium* (Kurz) Gog. in Blumea 15: 463. 1967, *C. neriifolium* Kurz. in J. As. Soc. Bengal 41(2): 293. 1872; Dyer in Hook. *f.*, Fl. Brit. India 1: 257. 1874; C.E.C.

Fischer in Rec. Bot. Surv. India 12(2): 81. 1938. Biswas in Sharma *et al.*, Fl. India 3: 47. 1993. *Thingsir* (Lushai).

Trees, up to 20 m tall; branchlets glabrous. Leaves ovate-elliptic to ovate-lanceolate, 6-14 x 2-4 cm, cuneate at base, acuminate at apex, glabrous, grey underneath, sometimes waxy, almost sessile. Flowers in 2-3-flowered, axillary, cymose panicles, pale-pink or bright or brick-red; sepals 5, oblong, 5-7 mm long, glabrous; petals 5, 5-7 mm long, gland dotted. Capsules oblong-ovoid, 8-10 x 3-4 mm, covered by sepals, 6-8-seeded; seeds 4-5 mm long, obovate.

Fl. & Fr.: June-March.

Rare in the dry upper mixed forests. Keitunkawn, 600 m, Parry 284, (*vide* C.E.C. Fischer, *l.c.*); 600 m, Wenger *s.loc.*, 316, (*vide* C.E.C. Fischer, *l.c.*).

2. HYPERICUM L.

- 1a. Shrubs ...5. *H. oblongifolium*
- 1b. Herbs:
- 2a. Stems quadrangular; bracts and sepals marginally not glandular-ciliate; stamens in 1 fascicle; ovary 1-locular, capsules smooth :
- 3a. Plants erect or prostrate; leaves sub-erect or spreading, elliptic-oblong; petals yellow, shorter than sepals; stamens 10-20 ...3. *H. japonicum*
- 3b. Plants always erect; leaves closely appressed to stem, linear-oblong; petals purplish or deep orange, longer than sepals; stamens 30-50 ...2. *H. gramineum*
- 2b. Stems terete, bracts and sepals marginally glandular-ciliate; stamens in 3 fascicles; ovary 3-locular; capsules ribbed:
- 4a. Leaves lanceolate, acute; flowers 3-15 in terminal corymbose racemes; bracts densely glandular-ciliate; styles longer than ovary ...1. *H. elodeoides*
- 4b. Leaves broadly elliptic, obtuse; flowers solitary or up to 3 in terminal cymes; bracts eciliate; styles shorter or \pm of same size as ovary ...4. *H. monanthemum*

1. *Hypericum elodeoides* Choisy in DC., Prodr. 1: 551. 1824; Dyer in Hook. f., Fl. Brit. India 1: 255. 1874; Kanjilal *et al.*, Fl. Assam 1: 101. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 81. 1938; Biswas in Sharma *et al.*, Fl. India 3: 56. 1993. *H. napaulense* Choisy in DC., Prodr. 1: 557. 1824; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 81. 1938.

Erect shrubs, usually unbranched, 15-60 cm high; stem terete, glabrous. Leaves variable, lanceolate or rarely ovate-lanceolate, 1.5-2.5 x 0.4-1.3 cm, base cordate-amplexicaul, often bristly glandular in upper leaves, acute to obtuse at apex; nerves prominent beneath, pellucid-punctate, with scattered, smaller, blackish marginal glands. Flowers 3-15, in terminal or subterminal corymbose cymes; bracts ciliate, glandular, lanceolate; flowers 1-2.5 cm across, yellow; sepals 6-7 x 1-1.5 mm with glandular-ciliate margins; petals oblanceolate 5-10 mm long, with a few black glands; stamens in 3 fascicles of ca 30 each; ovary 3-celled. Capsules ovoid, 4-6 x ca 4 mm, longitudinally ribbed; seeds oblong, ca 0.5 mm long, brownish-black, rounded at both ends.

Fl. & Fr.: June-October.

In open grassy ground and forest edges. Champhai, 1500 m, Parry 63, (*vide* C.E.C. Fischer, *l.c.*); Thaltlang, 1850 m, K.P. Singh 96847.

2. *Hypericum gramineum* G. Forster, Fl. Ins. Austr. 53. 1786. Biswas in Sharma *et al.*, Fl. India 3: 61. 1993. *H. lalandii auct. non* Choisy, 1824; Dyer in Hook. f., Fl. Brit. India 1: 256. 1874. **Fig. 28.**

Erect herbs, up to 15 cm high; stem 4-lined, glabrous. Leaves closely appressed to the stem, sessile, ovate, linear-oblong, 4-6 x 1-3 mm, base cordate-amplexicaul to rounded, acute or obtuse at apex, pellucid gland dotted, 3-veined. Flowers in monochasial or dichasial cymes, terminal, 1-1.5 cm across; bracts linear-lanceolate; sepals subequal, free, narrowly elliptic, 3-6 mm long, with pellucid dots and lines, entire, acute; petals usually longer than sepals, 4-6 mm long, purplish or dark orange; stamens 30-50, 3-4 mm long; ovary ovoid to ellipsoid. Capsules cylindric-ovoid, 3-6 x 1-3 mm, seeds oblong, ca 0.5 mm long, apiculate at one end.

Fl. & Fr.: June-October.

Scarce, in open grassy slopes. Zote, K.P. Singh 94572.

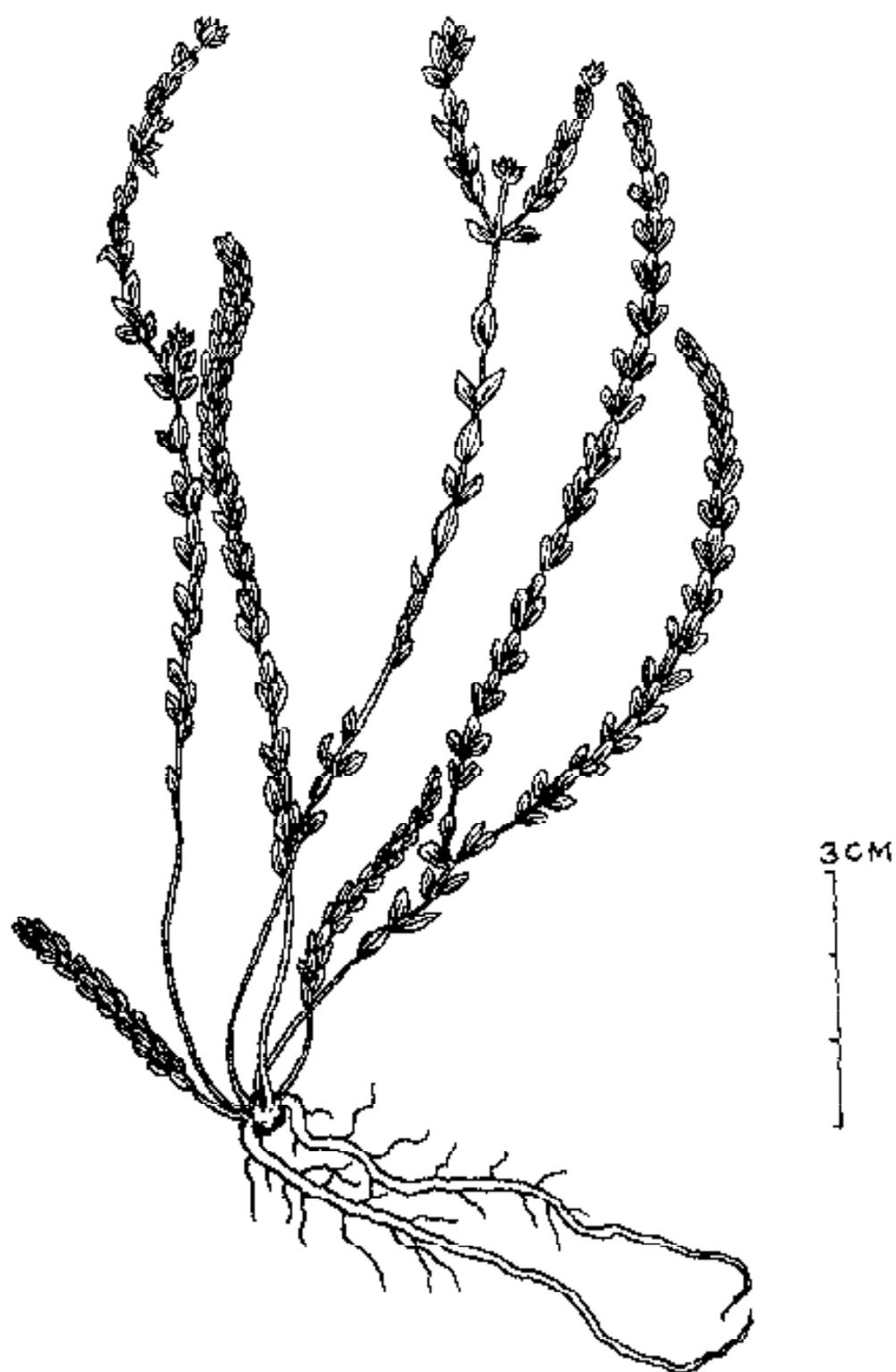


Fig. 28: *Hypericum gramineum* G. Forster

3. **Hypericum japonicum** Thunb. ex Murray, Syst. Veg. ed. 14. 702. 1784; Dyer in Hook. *f.*, Fl. Brit. India 1: 256. 1874; Kanjilal *et al.*, Fl. Assam 1: 102. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 81. 1938; Biswas in Sharma *et al.*, Fl. India 3: 69. 1993. **Fig. 29.**

Annual herbs, 8-25 cm high; suberect or diffuse, sometimes prostrate with short branches, glabrous; stems quadrangular. Leaves opposite, sessile, suberect to spreading, elliptic-oblong or ovate, 5-8 x 2-6 mm, base rounded, subobtusate to obtuse at apex, pellucid dotted along margins, covered with black glands beneath, 3-nerved. Flowers 6-10 mm across, 1 to many in terminal, dichasial or monochasial cymes, yellow; sepals 5, elliptic-obovate, 4-6 x 1-2.5 mm, with pellucid black glands and lines along margins; petals 5, oblique, elliptic to obovate, 3-4 mm long, persistent, shorter than sepals; stamens 5-30, connate at base; ovary 1-celled. Capsules ovoid, smooth; seeds oblong, transversely ribbed.

Fl.: Almost throughout the year; *Fr.*: November-February.

On grassy slopes in open places. Champhai, 1500 m, Parry 62, (*vide* C.E.C. Fischer, *l.c.*); North Vanlaiphai, D.K. Singh 99212.

4. **Hypericum monanthemum** Hook. *f.* & Thomson ex Dyer in Hook. *f.*, Fl. Brit. India 1: 256. 1874; Biswas in Sharma *et al.*, Fl. India 3: 69. 1993. **Fig. 30.**

Perennial, erect, unbranched herbs, 15-25 cm high. Leaves sessile, 10-18 x 4-8 mm, elliptic to elliptic-oblong, base rounded to cuneate, obtuse at apex, entire along margins, minutely pellucid-punctate above, scattered or with a line of punctate black glands beneath. Flowers solitary or in 2-3 flowered terminal cymes, tetramerous, 1.5-2 cm across, red; bracts 6-7 mm long, elliptic-oblong, eciliate or sparsely ciliate, punctate with black glands; sepals elliptic, 4-6 mm long, glandular ciliate, streaked; petals oblanceolate 8-9 mm long; ovary ovoid; styles 3, \pm equalling ovary. Capsules subglobose, 8-10 x 3.5-4 mm; seeds oblong, rounded at ends.

Fl. & Fr.: May-August.

Scarce, in grassy exposed slopes. Phongphui, K.P. Singh 96792.

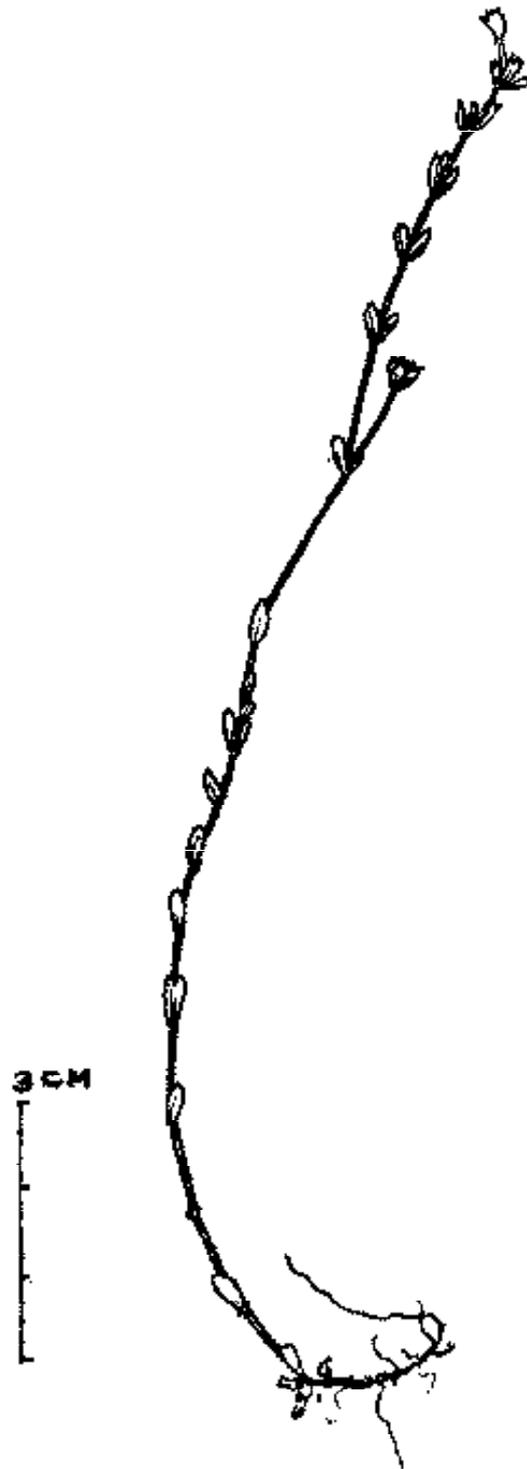


Fig. 25: *Hypericum japonicum* Thunb. ex Murray



Fig. 30: *Hypericum monanthemum* Hook. f. & Thomson ex Dyer

5. *Hypericum oblongifolium* Choisy, Prodr. Monogr. Hyperic. 42, t. 4. 1821; Biswas in Sharma *et al.*, Fl. India 3: 73. 1993. *H. cernuum* Roxb. [Hort. Beng. 59. (1814), *nom nud.*] ex D. Don. Prodr. Fl. Nep. 218. 1825; Dyer in Hook. *f.*, Fl. Brit. India 1: 253. 1874; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 81. 1938.

Evergreen shrubs, up to 2 m high, glabrous. Leaves sessile, elliptic to ovate-lanceolate, 2.5-6.5 x 1.5-2.5 cm, base acute to cuneate or rounded, acute to obtuse at apex, glabrous above, glaucous and minutely glandular punctate on both surfaces. Flowers solitary or 5, in terminal corymbose cymes, 4-6 cm across, white, later yellowish, fragrant; sepals ovate, 8-12 x 2-4 mm, acute, entire; petals narrowly obovate, 1.5-2.5 x 1-1.4 cm, apiculate; stamens many, in 5 fascicles of ca 30 each, shorter than petals; ovary 5-celled, 5-8 mm long. Capsules ovoid to conical, 0.7-1.4 cm long, smooth; seeds many, ca 1 mm long, apiculate at ends.

Fl.: Throughout the year; *Fx.*: May-June.

North-Vanlaiphai, 1500 m, Parry 62 a, (*vide* C.E.C. Fischer, *l.c.*).

CLUSIACEAE

(K.P. Singh)

- 1a. Flowers unisexual; stigma sessile or subsessile; fruits baccate ...1. *Garcinia*
- 1b. Flowers bisexual; stigma on elongated style; fruits drupaceous or capsular:
 - 2a. Sepals 2; ovary 2-4-locular; fruit a drupe, pulpy ...2. *Mammea*
 - 2b. Sepals 4; ovary 1-2-locular; fruit a capsule or a drupe, not pulpy ... 3. *Mesua*

1. GARCINIA L.

- 1a. Branches angular; flowers pentamerous ...6. *G. xanthochymus*
- 1b. Branches usually terete-weakly striate; flowers tetramerous:
 - 2a. Leaves narrowly lanceolate or elliptic-lanceolate; petals shorter than sepals ...4. *G. lanceaefolia*
 - 2b. Leaves otherwise; petals longer than sepals :

- 3a. Lateral nerves more than 20 pairs, closely parallel and not prominent ... 2. *G. anomala*
- 3b. Lateral nerves less than 15 pairs, widely spaced, prominent beneath:
- 4a. Flowers sessile or subsessile, axillary, never terminal ... 1. *G. acuminata*
- 4b. Flowers pedicellate, terminal or upper axillary :
- 5a. Leaves elliptic-lanceolate; male and female flowers in terminal fascicles ... 3. *G. cowa*
- 5b. Leaves mostly obovate; male flowers in terminal panicles, female flowers solitary or terminal racemed
- 6a. Branches spreading; stigma peltate, 10-lobed; seeds enclosed in fleshy aril ... 5. *G. pedunculata*
- 6b. Branches decussate; stigma convex, entire; seeds enclosed in pulpy aril ... 6. *G. sopsopia*

1. ***Garcinia acuminata*** Planch. & Triana in Ann. Sci. Nat. ser. 4, 14: 355. 1860; N.P. Singh in Sharma *et al.*, Fl. India 3: 102. 1993. *Thoikoy* (Lushai).

Trees, up to 20 m tall, with terete yellowish-brown branchlets. Leaves lanceolate or elliptic-oblong, 10-13 x 6-5.5 cm, base acute, acuminate to cuspidate at apex, coriaceous, glabrous; lateral nerves 10-15 pairs; petioles *ca* 1 cm long, channelled. Cymes axillary; flowers 4-5 mm across, solitary or fascicled, yellow; subsessile. *Male flowers*: sepals 4, orbicular, 1-2 mm; petals 4, 2-3 mm long; stamens *ca* 16, on short androphore; filaments confluent. *Female flowers*: ovary globose, tetralocular. Berries globose, 2-2.5 x *ca* 2 cm, smooth with persistent sepals.

Fl. & Fr.: December-June.

Recorded on the basis of N.P. Singh (*l.c.*).

2. ***Garcinia anomala*** Planch. & Triana in Ann. Soc. Nat. ser. 4, 14: 329. 1860; T. Anderson in Hook. *f.*, Fl. Brit. India 1: 266. 1874; Kanjilal *et al.*, Fl. Assam 1: 107. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 80. 1938; N.P. Singh in Sharma *et al.*, Fl. India 3: 104. 1993. *Naufadawn tuai* (Lushai).

Small trees, 6-12 m tall with yellowish branches. Leaves elliptic or ovate or oblong-lanceolate, 6-18 x 4-10 cm, base cuneate or rounded, bluntly acuminate at apex, coriaceous, dark green above, pale beneath, glossy on both sides; lateral nerves numerous, not prominent beneath; petioles 1-1.5 cm long, channelled. Cymes axillary, 3-flowered; flowers ca 1 cm across, yellowish-white. *Male flowers*: sepals 4, suborbicular, 6-8 mm; petals 4, obovate-oblong, 6-10 mm long; stamens many, monadelphous around the pistillode. *Female flowers*: slightly smaller than males; staminodes around ovary; ovary 2-celled, oblong. Berries ellipsoid, pruniform, 3-4.5 cm long, supported by accrescent sepals, orange-yellow when ripe; seeds 1-2, oblong-ellipsoid, ca 7 x 5 mm, angled.

Fl. & Fr.: February-October.

South Lushai hills, *Wenger 4* (CAL); Pharphek, *K.P. Singh 36180*.

3. *Garcinia cowa* Roxb. ex DC., Prodr. 1: 561. 1824; T. Anderson in Hook. f., Fl. Brit. India 1: 262. 1874, p.p.; Kanjilal *et al.*, Fl. Assam 1: 105. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 81. 1938; N.P. Singh in Sharma *et al.*, Fl. India 3: 108. 1993. *Cheng-kek* (Lushai).

Trees, 15-12 m tall, deciduous; branchlets ± angular. Leaves 5-12 x 3-4 cm, elliptic-lanceolate, young leaves reddish, base attenuate, acuminate at apex, lateral nerves numerous; petioles 1-1.5 cm long. Male flowers ca 1 cm across, axillary or terminal in fascicles of 3-8, short pedicelled; sepals 4, ovate, 4-5 mm long, unequal, fleshy, yellow; petals 4, twice as long as sepals, oblong, yellow, flushed with pink; stamens numerous on fleshy receptacles. Female flowers slightly larger than males, in terminal fascicles of 2-5; ovary 4-8-celled; staminodes in a ring. Berries globose, 3-4 cm across, often obscurely globular, beaked, vertically grooved, reddish when ripe, 4-8-seeded; seeds oblong, ca 2 cm long.

Fl. & Fr.: December-July.

Aizawl, 900 m, *Parry 661*, (*fide* C.E.C. Fischer, *l.c.*).

4. *Garcinia lanceaefolia* (G. Don) Roxb. [Hort. Beng. 42. (1814), *nom. nud.*], Fl. Ind. 2: 623. 1832; T. Anderson in Hook. f., Fl. Brit. India 1: 263. 1874; Kanjilal *et al.*, Fl. Assam 1: 106. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 81. 1938; N.P. Singh in Sharma *et al.*, 3: 116.

1993. *Stalagmitis lanceaefolia* G. Don, Gen Hist. 1: 621. 1831. *Pelte* (Lushai).

Large shrubs or small, evergreen trees, 4-12 m tall. Leaves narrowly lanceolate or elliptic-lanceolate, 6-10 x 2.5-3.5 cm, base cuneate, long acuminate at apex, entire along margins, shining, green above, pale beneath, glabrous, midrib prominent; lateral nerves 8-10 pairs; petioles 0.8-1 cm long. Male flowers solitary or in pairs, 7-8 mm across, terminal or axillary, creamy pink or reddish-yellow; sepals 4, 2-4 mm long, oblong; petals 4, red, slightly oblique, somewhat shorter than sepals; stamens 18-40 in globose mass. Female flowers terminal or axillary, solitary, ovary 6-8-locular, obovoid, stigmatic rays 6-10, sessile, tuberculate. Berries 2.5-3 cm across, obovoid with persistent sepals, 6-8-seeded; seeds 1-1.5 cm long.

Fl. & Fr.: February-September.

Common inside moist dense forests. Bunglang, 240 m, *Deb* 31467; Saitah, *D.K. Singh* 98940; Dampatlang, *D.K. Singh* 99161.

5. *Garcinia pedunculata* Roxb. ex Buch.-Ham. in Ann. Oriental Lit (1): 244. 1820 *et* Brewster, Edinburgh J. Sci. 7: 45, t. 1. 1827; T. Anderson in Hook. *f.*, Fl. Brit. India 1: 264. 1874; Kanjilal *et al.*, Fl. Assam 1(1): 107. 1934; N.P. Singh in Sharma *et al.*, Fl. India 3: 121. 1993. *Thaipomlein*, *Vawm-va* (Lushai).

Tall, deciduous trees, up to 20 m, with oval crown. Leaves obovate, oblong or oblanceolate, 15-30 x 7-13 cm, cuneate at base, acute-obtuse at apex, undulate along margins, subcoriaceous-membranous; midrib prominent; lateral nerves 5-15 paired; petioles 2-4 cm long. Male flowers pale green, in few-flowered, terminal panicles, *ca* 1 cm in diam.; sepals 4, outer pair 9-10 x 12 mm, inner pair 9 x 6 mm; petals 4, oblong-obovate, 9-11 mm long; stamens infinite. Female flowers solitary, terminal, *ca* 2 cm in diam.; yellow green or pale green; ovary globose, 8-12-loculed. Berries orange-yellow, globose, 7-11 cm in diam.; seeds 8-10, reniform, with fleshy aril.

Fl. & Fr.: September-July.

Recorded on the basis of J.H. Lalramnghinglova, (J. Econ. Tax. Bot Addl. ser. 12: 446. 1996).

6. *Garcinia sopsopia* (Buch.-Ham.) Mabberley in Taxon 26: 529. 1977; N.P. Singh in Sharma *et al.*, Fl. India 3: 124. 1997. *Oxycarpus sopsopia* Buch.-Ham., Mem. Wern. Soc. 5: 345. 1826. *Garcinia paniculata* Roxb. ex Wight, Illustr. Ind. Bot. 125. 1831; T. Anderson in Hook. f., Fl. Brit. India 1: 266. 1874; Kanjilal *et al.*, Fl. Assam 1: 108. 1934; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 29. 1987. *Bombhathei*, *Vawmva* (Lushai), *Bawangara* (Riang).

Trees, 15-20 m tall; branchlets decussate. Leaves oblanceolate or broadly elliptic or often obovate, 6-20 x 4-9 cm, base cuneate, shortly acuminate at apex, entire along margins, subcoriaceous, midrib conspicuous below, glabrous and shining above; lateral nerves 7-10 pairs; petioles 1.5-2 cm long. Male flowers in terminal, brachiate panicles, ca 1.5 cm across, dull white, sweet scented; sepals 4, outer pair ca 2 mm long, suborbicular, thick, inner ca 3 mm long, green; petals 4, ovate, ca 8 mm long; stamens numerous. Female flowers in 5-8 cm long, terminal spikes; ovary subglobose, tubercled, 5-loculed. Berries globose to ellipsoid, 2.5-3 cm across, yellow when ripe, succulent, usually 4-seeded; seeds arillate, aril pulpy.

Fl. & Fr.: November-July.

Common in dense, shady places. Tobze-leng, Leslie 318 (CAL); Champhai, 3400 m, Deb 30887; Saitah, D.K. Singh 98852.

Uses: Fruits edible.

7. *Garcinia xanthochymus* Hook. f. ex T. Anderson in Hook. f., Fl. Brit. India 1: 269. 1874; Kanjilal *et al.*, Fl. Assam 1: 104. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 81. 1938; N.P. Singh in Sharma *et al.*, Fl. India 3: 129. 1993. *Xanthochymus tinctorius* DC., Prodr. 1: 562. 1824, 'pictorius' *Thehmusaw* (Lushai). Fig. 31.

Medium sized trees, 10-20 m tall with drooping angular branches. Leaves oblong-lanceolate, 10-35 x 5-12 cm, base cuneate, acute or acuminate at apex, recurved along margins, coriaceous, shining above; lateral nerves 20-25 pairs; petioles 1-2 cm long. Flowers 4-8 in axillary fascicles, or from the axils of fallen leaves, pentamerous, 2-2.5 cm across, dull white; sepals 5, outer 2, 4-5 mm long, inner 3, 6-8 mm long, fimbriate,

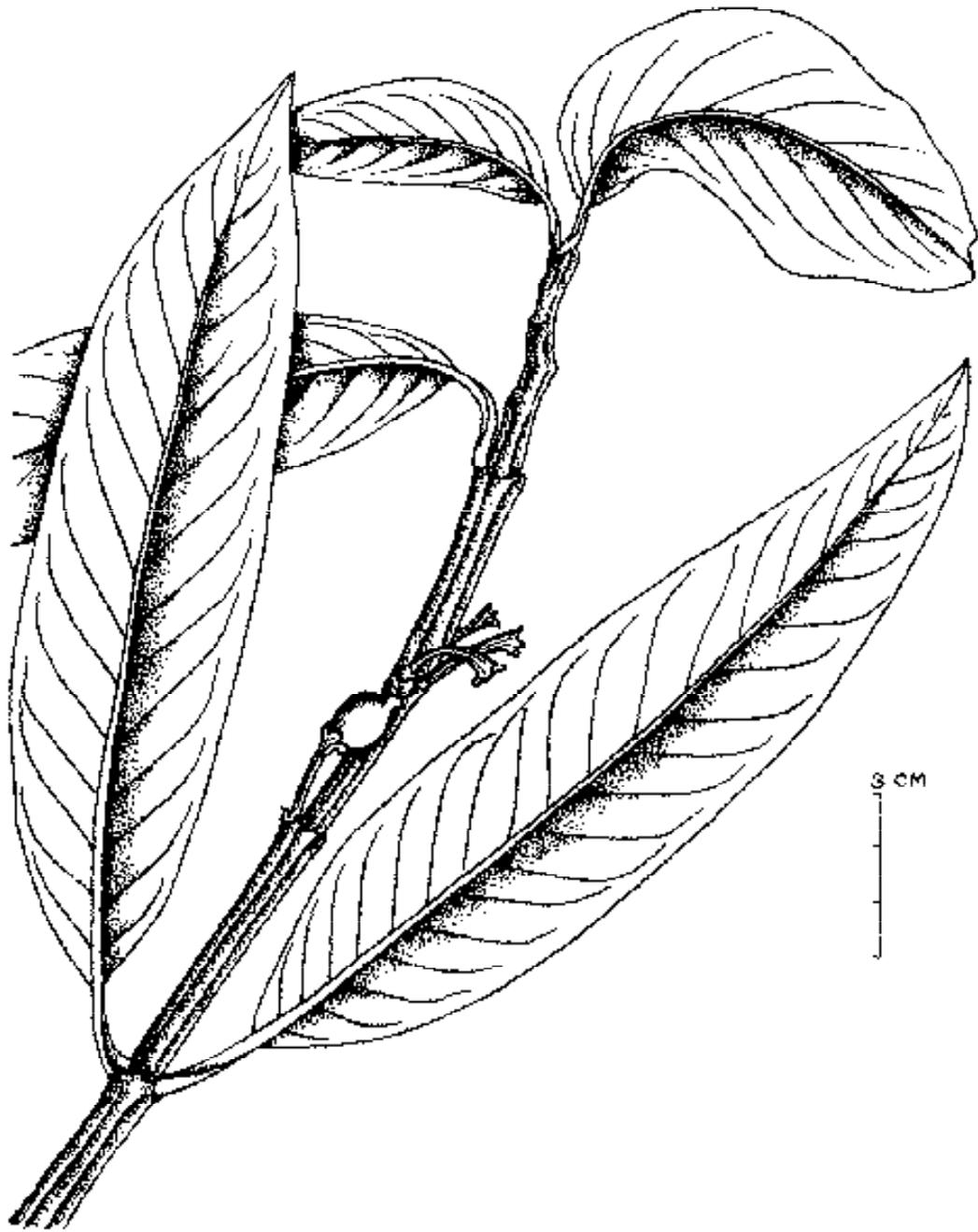


Fig. 31: *Garcinia xanthochymus* Hook. f. ex T. Anderson

concave, orbicular; petals 5, 7-8 mm long, shortly clawed. *Male flowers*: stamens in 5 bundles of 3-5 each, antipetalous, alternating with 5 fleshy glands. *Female flowers*: ovary 5-locular, ovoid; stigmatic rays 5. Berries subglobose, 3-5 cm in diam., fleshy, apiculate at apex, dark yellow when ripe, 1-4-seeded; seeds oblong, 1.5-2 x 1-1.2 cm, brown.

Fl. & Fr.: Throughout the year.

Common in evergreen forests along the ridges in shade at lower elevations. Tuichang and Demagiri, 300 m, *Gage* 205, (CAL); Kolasib to Thingdawl, *K.P. Singh* 93218; Sesawng, *M. Sawmliana* 95594.

Uses: Fruits edible.

2. MAMMEA L.

Mammea nervosa (Kurz) Kosterm. in Comm. For. Res. Inst. Indones. Bogor 72: 25, f. 20. 1961; N.P. Singh in Sharma *et al.*, Fl. India 3: 132. 1993. *Ochrocarpus siamensis* T. Anderson in Hook. *f.*, Fl. Brit. India 1: 270. 1874, *non Mammea siamensis* (Miq.) T. Anderson, 1867.

Trees, 13-15 m tall. Leaves linear-oblong or oblong-lanceolate or elliptic, 10-22 x 4-5 cm, base acute, acute at apex, coriaceous, glabrous; lateral veins 15-20 pairs, distinct; petioles *ca* 1 cm long. Flowers *ca* 1 cm across, solitary or in cymes or fascicles of 3-7 flowers, white, fragrant; sepals 2, 4-5 mm long; petals 6 or 5, oblong, rounded, 6-7 mm long; stamens many; ovary globose, glabrous with bilobed stigma. Fruits 3-4 cm long, mucronate with persistent, thick sepals.

Fl. & Fr.: March-July.

Recorded on the basis of *N.P. Singh (l.c.)*.

3. MESUA L.

Mesua ferrea L., Sp. Pl. 1: 515. 1753; T. Anderson in Hook. *f.*, Fl. Brit. India 1: 277. 1874; Kanjilal *et al.*, Fl. Assam 1: 111. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 81. 1938; N.P. Singh in Sharma *et al.*, Fl. India 3: 136. 1993. *Hershe* (Lushai). Fig. 32.

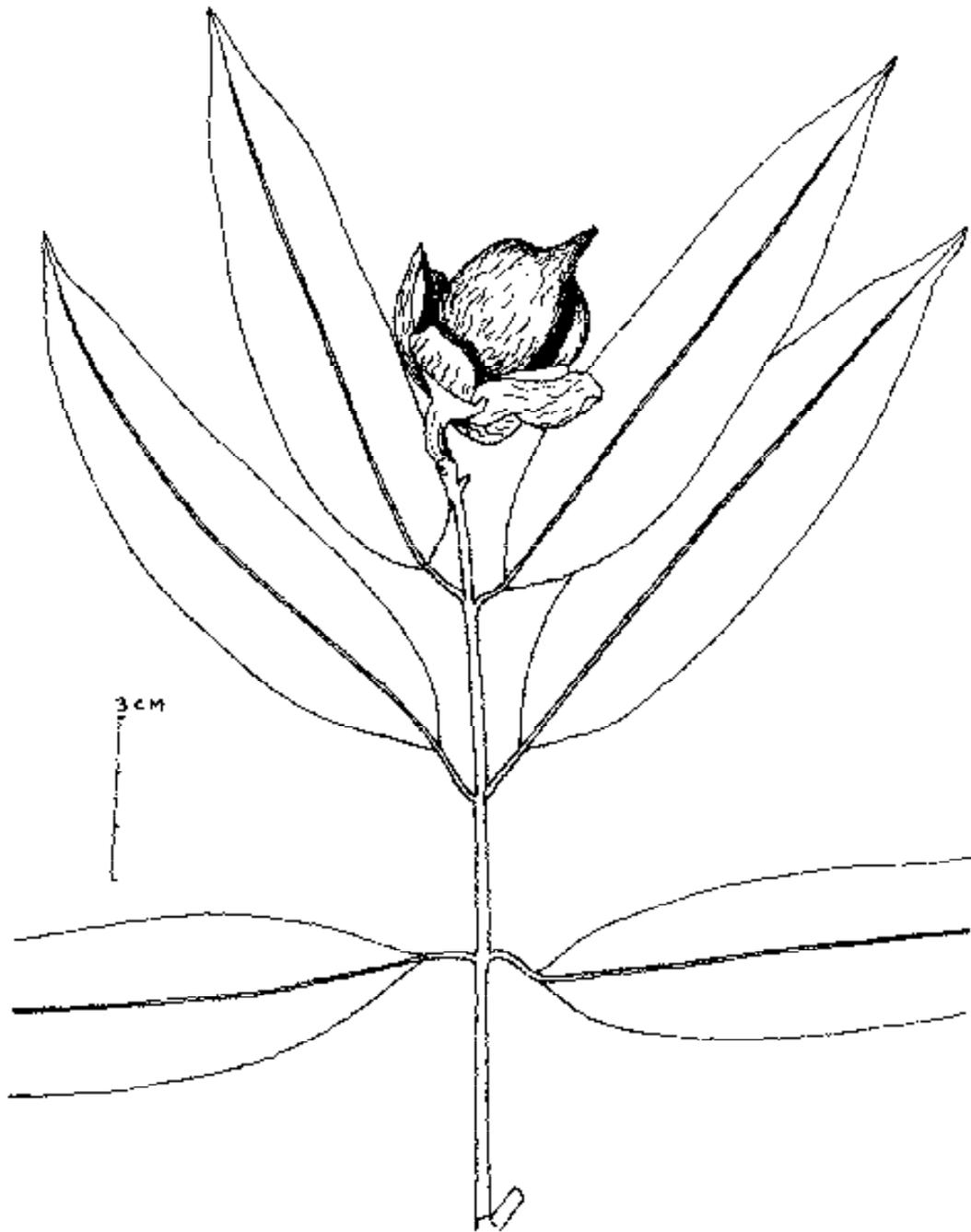


Fig. 32: Mesua ferrea L.

Large trees, 25-40 m tall with conical crown. Leaves opposite, decussate, variable, lanceolate or elliptic-lanceolate, 7-12 x 1.7-3 cm, base rounded or narrowed, cuneate, acuminate at apex, coriaceous, glossy and green above, whitish waxy beneath, pinkish soft when young; lateral nerves numerous, inconspicuous; petioles 0.5-1 cm long. Flowers 3.5-8 cm across, solitary or rarely paired, terminal or in axils of upper leaves, sweet scented; sepals 4, in 2 pairs, 1.5-2 cm long, imbricate, thick, concave, velvety, puberulous outside, persistent; petals 4, 2-3 x ca 2 cm, obovate, white with brown or purple veins, curved, caducous; stamens many, forming a globose mass; anthers yellow, conspicuous; style curved with peltate stigma. Fruits ovoid, ca 3 x 2 cm, with persistent calyx, woody and nut like, striate, 1-loculed, dehiscent; apex beaked; seeds 1-4, shining brown, pyriform, ca 2.5 mm long.

Fl. & Fr.: March-October.

Usually cultivated along the road side. Aizawl *Leslie*, 17 (CAL); Kolasib-Bualpui., *K.P. Singh* 93228.

THEACEAE

(K.P. Singh)

- 1a. Flowers unisexual; fruits subglobose ...2. *Eurya*
- 1b. Flowers bisexual; fruits ovoid-oblong :
 - 2a. Stamens free, filaments glabrous; capsules 3-valved; seeds compressed, winged ...3. *Schinus*
 - 2b. Outer stamens united in a staminal tube, filaments ciliate; capsules 1-3-valved; seeds subglobose, without wings ...1. *Camellia*

1. CAMELLIA L.

- 1a. Flowers almost sessile or subsessile, erect; sepals caducous:
 - 2a. Leaves elliptic-ovate; stamens 70-80; capsules subglobose, glabrous, apex and base rounded ...3. *C. kissi*
 - 2b. Leaves elliptic-lanceolate, stamens \pm 30; capsules pyriform, pubescent in young stages; apex pointed, base narrowed ...1. *C. caduca*

1b. Flowers distinctly pedicellate, drooping; sepals persistent :

- 3a. Branchlets glabrous; leaves acute at apex;
filaments glabrous; capsules 3-seeded ...4. *C. sinensis*
- 3b. Branchlets pubescent; leaves caudate-acuminate
at apex; filaments silky villous; capsules 1-seeded ...2. *C. caudata*

1. ***Camellia caduca*** C.B. Clarke *ex* Brandis, Indian Trees 61: 1921; Kanjilal *et al.*, Fl. Assam 1: 123, 1934.

Shrubs or small trees, 2-5 m tall. Leaves oblong-lanceolate to elliptic-lanceolate, 5-7 x 1.5-2.5 cm, base acute to cuneate, acute to short acuminate at apex, serrulate or nearly entire along margins, coriaceous, glabrous above, pilose or glabrate beneath specially towards the base; lateral nerves 6-9 pairs; petioles 2-4 mm long. Flowers 1.2-2 cm across, white, scented, axillary or terminal, solitary or 1-3 together on short peduncles; sepals tomentose, concave; petals unequal, obovate, 0.8-1.5 cm long; stamens numerous, yellow, connate into a tube; ovary silky-tomentose. Capsules *ca* 2 cm long, pyriform, pointed at apex.

Fl. & Fr.: September-March.

Moderately common in dense, evergreen forests. Theiriat, *Deb* 31271; Thaldang, *K.P. Singh* 92820; Sairep village, coffee plantations, *K.P. Singh* 94165.

2. ***Camellia caudata*** Wallich [Cat. No. 978. (1829), *nom. nud.*], Pl. As. Rar. 3: 36. 1832; Dyer in Hook. *f.*, Fl. Brit. India 1: 293. 1874; Kanjilal *et al.*, Fl. Assam 1: 122. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 81. 1938; Chauhan & Paul in Sharma *et al.*, Fl. India 3: 154. 1993. *Lallai varchi* (Lushai).

Shrubs or small trees, 2-5 m tall. Leaves 2.5-7.5 x 1-3 cm, lanceolate, elliptic-oblong-lanceolate, base cuneate, caudate-acuminate at apex, crenate-serrate along margins, glabrous above, ± pubescent or pilose beneath; midrib depressed, puberulous; lateral nerves 8-12 pairs; petioles 3-5 mm long. Flowers axillary, solitary or 2-5 together in fascicles, *ca* 2 cm across; white; sepals 5, 3-6 x 2-3 mm, ovate, silky outside; petals obovate, *ca* 1.5 cm long, stamens white, monadelphous up to middle, silky hairy; anthers yellow; ovary and style densely villous, white, ovoid. Capsules 1-celled, ellipsoid-globose, subtrigonal, *ca* 2.5 x 2 cm, unilocular, 1-seeded; seeds brown, glabrous, *ca* 1 cm across.

Fl. & Fr.: September-June.

Commonly occurs in association with *Quercus*, *Lindera*, *Picris*, etc. in evergreen forests. Sairep, 1500 m, Parry 450 (*vide* C.E.C. Fischer, *l.c.*); Sialsuk, 1310 m, Deb 30729 & 30731; Theiriat, Deb 31338; Thaltlang, K.P. Singh 96824.

3. *Camellia kssi* Wallich in As. Res. 13: 429. 1820 & Pl. As. Rar. 3: t. 256; 1832. Deb & Dutta, in J. Econ. Tax. Bot. 10 (1): 29. 1987; Chauhan & Paul in Sharma *et al.*, Fl. India 3: 154. 1993. *C. drupifera auct. non* Lour. 1790; Dyer in Hook. *f.*, Fl. Brit. India 1: 293. 1874; Kanjilal *et al.*, Fl. Assam 1: 123. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 81. 1938. *Laltai* (Lushai).

Shrubs or small trees, 2-5 m tall. Leaves elliptic-ovate, 4-9 x 1.5-3.5 cm, base cuneate, acute to long acuminate at apex, serrulate to entire along margins, glabrous above, pubescent beneath at first; lateral nerves 7-10 pairs; petioles 3-7 mm long. Flowers axillary or terminal, solitary or 2-3 fascicled, ca 2 cm across, white, fragrant, erect; bracts caducous, ± like sepals, silky-tomentose; sepals 5-6 mm long, caducous, silky-tomentose outside, glabrous inside, suborbicular; petals 6 or 7, 1-1.5 cm long, ovate, pubescent outside, glabrous inside, caducous; stamens numerous, outer connate at the base, inner free, glabrous; ovary woolly, ovoid, 3-locular; style 2-3 fid. Capsules glabrous, greenish-red, subglobose, 1.5-2 cm long, dehiscing into 3 woody valves; seeds 1-3, subglobose, 1-1.5 cm long, brown.

Fl. & Fr.: January-October.

Phongphui, 1800 m, Parry 145 a, 530, (*vide* C.E.C. Fischer, *l.c.*); Sialsuk, Deb 30747; Theiriat, Deb 31271 (CAL).

4. *Camellia sinensis* (L.) O. Kuntze in Acta Horti Petrop. 10: 195. 1887; Chauhan & Paul in Sharma *et al.*, 3: 159. 1993. *Thea sinensis* L., Sp. Pl. 515. 1753; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 82. 1938. *Camellia theifera* Eriff., Notul. 4: 558. 1854; Dyers in Hook. *f.*, Fl. Brit. India 1: 292. 1874; Kanjilal *et al.*, Fl. Assam 1: 122. 1934. *Thingpui* (Lushai); *Thangpi* (Lakhet).

Large shrubs or small trees, 1-4 m tall. Leaves oblong-elliptic to obovate, 5-12 x 2.5-5 cm, acuminate or acute at either ends, serrate along margins, glabrous above, pilose along the nerves beneath; lateral nerves

8-12 pairs; petioles *ca* 2 mm long. Flowers axillary, 3-3.5 cm across, white, solitary or few (2-6) together; pedicels 1-1.5 cm long; sepals 5, 3-4 x *ca* 2 mm diam., suborbicular, leathery, persistent, hairy outside; petals obovate, 5-8, 1-1.5 cm long; stamens many, glabrous, outer ones connate at base; ovary 1-3-celled, villous. Capsules ovoid, 1.5-2 cm diam., trigonous; seeds globose, 1.5 cm diam., one in each cell. brown.

Fl. & Fr.: January-September.

Usually cultivated; sometimes found in wild. Lungleh, *Leslie* 15 (CAL); Champhai, *Deb* 31071; Mizo hills, *Dutta* 34074; Kamthangpui, *K.P. Singh* 93238; Zotethlang, *K.P. Singh*; Saitah, *D.K. Singh* 93918; Sairep, 1350 m, *Mao* 107005.

2. EURYA Thunb.

- 1a. Shrubs; ultimate branchlets angular, glabrous ... 3. *E. japonica*
 1b. Trees, ultimate branchlets terete, pubescent:
 2a. Leaves nearly entire or serrulate,
 2-3.5 cm wide ... 2. *E. cerasifolia*
 2b. Leaves serrulate, 1-2.5 cm wide ... 1. *E. acuminata*

1. *Eurya acuminata* DC. in Mem. Soc. Phys. Hist. Nat. Geneve 1: 418, 1822. Dyer in Hook, *f.*, Fl. Brit. India 1: 285, 1874; Kanjilal *et al.*, Fl. Assam 1: 125, 1934; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 29, 1987; Chauhan & Paul in Sharma *et al.*, 3: 178, 1993.

Large shrubs or trees, 5-12 m tall; young branches pubescent with \pm spreading hairs. Leaves elliptic-oblong to elliptic-lanceolate, 2.5-9.5 x 1-2.5 cm, base cuneate, acuminate or acute at apex, crenate or serrulate in upper 2/3 part along the margins, glabrous or sparsely pubescent beneath; midrib channelled above, pubescent beneath; lateral nerves distinct beneath, 12-15 pairs; petioles 2-3 mm long, pubescent. Flowers 2-3 mm across, axillary or on fallen leaf axils, 1-5 together, yellowish, fragrant; sepals ovate, 5, *ca* 2 mm long, pubescent outside; petals obovate, 5, 3-4 x *ca* 3 mm, united at base. *Male flowers*: stamens many, yellow; anther cells not chambered. *Female flowers*: ovary subglobose, 3-5 loculed, glabrous; styles 3, united above half the length. Berries globose, *ca* 5 mm in diam. with persistent sepals below, bluish-black; seeds many, trigonous, shiny brown, *ca* 1 mm long.

Fl. & Fr.: July-December.

Common in evergreen forests. N.E. Lungleh, Helio hill, 1010 m, *Gage* 93 (CAL); North Vanlaiphai, *Leslie* 337 (CAL); Sialsuk, 1310 m, *Deb* 30749; Kawlkul to Hliapui, *K.P. Singh* 94322; Sairep, 1350 m, *Mao* 107015.

2. *Eurya cerasifolia* (D. Don) Kobuski in Ann. Missouri Bot. Gard. 25: 326. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 29. 1987; Chauhan & Paul in Sharma *et al.*, Fl. India 3: 182. 1993. *Diospyros cerasifolia* D. Don, Prodr. 144. 1825. *Eurya symplocina* Blume, Mus. Bot. 2: 114. 1856; Dyer in Hook. *f.*, Fl. Brit. India 1: 284. 1874; Kanjilal *et al.*, Fl. Assam 1: 126. 1934.

Shrubs or evergreen small trees, 1-5 m tall; buds and branches appressed-pubescent, finally glabrous. Leaves broadly elliptic-lanceolate, 4-10 x 2-3.5 cm, base acute to cuneate, obliquely acuminate at apex, entire to serrulate in upper half along margins, coriaceous; lateral veins orange-coloured, 15-20 pairs; petioles 2-5 mm long, pubescent. Flowers 3-4 mm across, white or yellowish white, fascicles of 4-5 at axils of fallen leaves; sepals broadly elliptic, 1.5-3 mm long, obtuse, appressed pubescent outside; petals elliptic, 3-5 mm long, glabrous, connate at base. *Male flowers*: stamens 15; anthers 4-6-chambered. *Female flowers*: ovary sparsely pubescent or glabrous. Berries 5-7 x 4-5 mm, subglobose to ovoid, blue black; seeds angular, many, tuberculate, brown, 1 mm long.

Fl. & Fr.: November-June.

Lawngtalai, *Dutta* 33736; Saiha-Bualpui road, *Dutta* 33847.

3. *Eurya japonica* Thunb., Nov. Gen. Pl. 3: 68. 1783; Dyer in Hook. *f.*, Fl. Brit. India 1: 284. 1874; Kanjilal *et al.*, Fl. Assam 1: 124. 1934; Chauhan & Paul in Sharma *et al.*, Fl. India 3: 184. 1993. *Sihneh* (Lushai).

Shrubs, up to 6 m tall; branchlets angular with prominent decurrent ridges, usually glabrous or sometimes sparsely pubescent at first. Leaves elliptic, obovate to oblanceolate, 5-7.5 x 1.5-2 cm, base acute or cuneate, acute at apex, bluntly serrate along margins, glabrous, coriaceous, yellowish green; midrib hairy beneath; lateral nerves 10-15 pairs; petioles short, ca 2 mm long, glabrous. Flowers in fascicles of 2-5, \pm 2 mm across, greenish-

white to yellowish, glabrous; sepals *ca* 2 mm long, unequal, broadly ovate, glabrous; petals 2-3 mm long, obovate. *Male flowers*: stamens 13-17, yellow. *Female flowers*: ovary ovoid, glabrous. Berries globose 3-5 mm in diam., style persistent, mucronate at tips, brown; seeds many, brown, tuberculate, *ca* 1 mm long.

Fl. & Fr.: January-December.

Occurs in moist places in evergreen forests. Mizo hills, *Dutta* 33680; Thenzawl to Buangpui, *K.P. Singh* 93801; Tilthlang, *K.P. Singh* 94064; Blue mountain, 1970 m, *Mao* 107149.

3. SCHIMA Reinw. *ex* Blume

Schima wallichii (DC.) Korthals in Temminck, Verh. Nat. Gesch. Ned. Bezitt. Bot, 5: 143, 1842; Dyer in Hook. *f.*, Fl. Brit. India 1: 289, 1874; Kanjital *et al.*, Fl. Assam 1: 119, 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 82, 1938; Chauhan & Paul in Sharma *et al.*, Fl. India 3: 168, 1993. *Gordonia wallichii* DC., Prodr. 1: 528, 1824. *Khiang* (Lushai); *Khaimai* (Lakher). **Fig. 33.**

Large trees, 15-40 m tall with dense crown. Leaves elliptic-oblong or elliptic-lanceolate, 6-15 x 4-6 cm, base cuneate, acute at apex, entire to undulate along margins, thinly coriaceous, glabrous above, usually pubescent beneath; lateral nerves 8-20 pairs; petioles 1-2.5 cm long. Flowers 2.5-4 cm across, scented, axillary, solitary or paired, white; pedicels 2-3 cm long; sepals 5, 2-3 mm long, imbricate, ciliate on margins, glabrescent; petals 1.5-1.8 cm long, obovate, minutely pubescent outside at base, otherwise glabrous; stamens many; anthers yellow, adnate to base of corolla; ovary hairy at base, globose, tomentose, 5 or 6-loculed. Capsules subglobose to globose 2-2.5 cm in diam., with persistent calyx, grey, pilose, loculicidal; seeds 2-6 in each locule, 6-8 x 4-5 mm, winged, glabrous.

Fl. & Fr.: March-January.

Common in evergreen forests, along roadside near villages. Lungleh, *Gage* 33 (CAL); North Vanlaiphai, *Leslie* 321 (CAL); Kolasib, *K.P. Singh* 93134; Thenzawl-Buangpui village, *K.P. Singh* 93812; Sairep forest, *K.P. Singh* 96665; Thalthlang, *K.P. Singh* 96768; Sairep, 1350 m, *Mao* 107006.

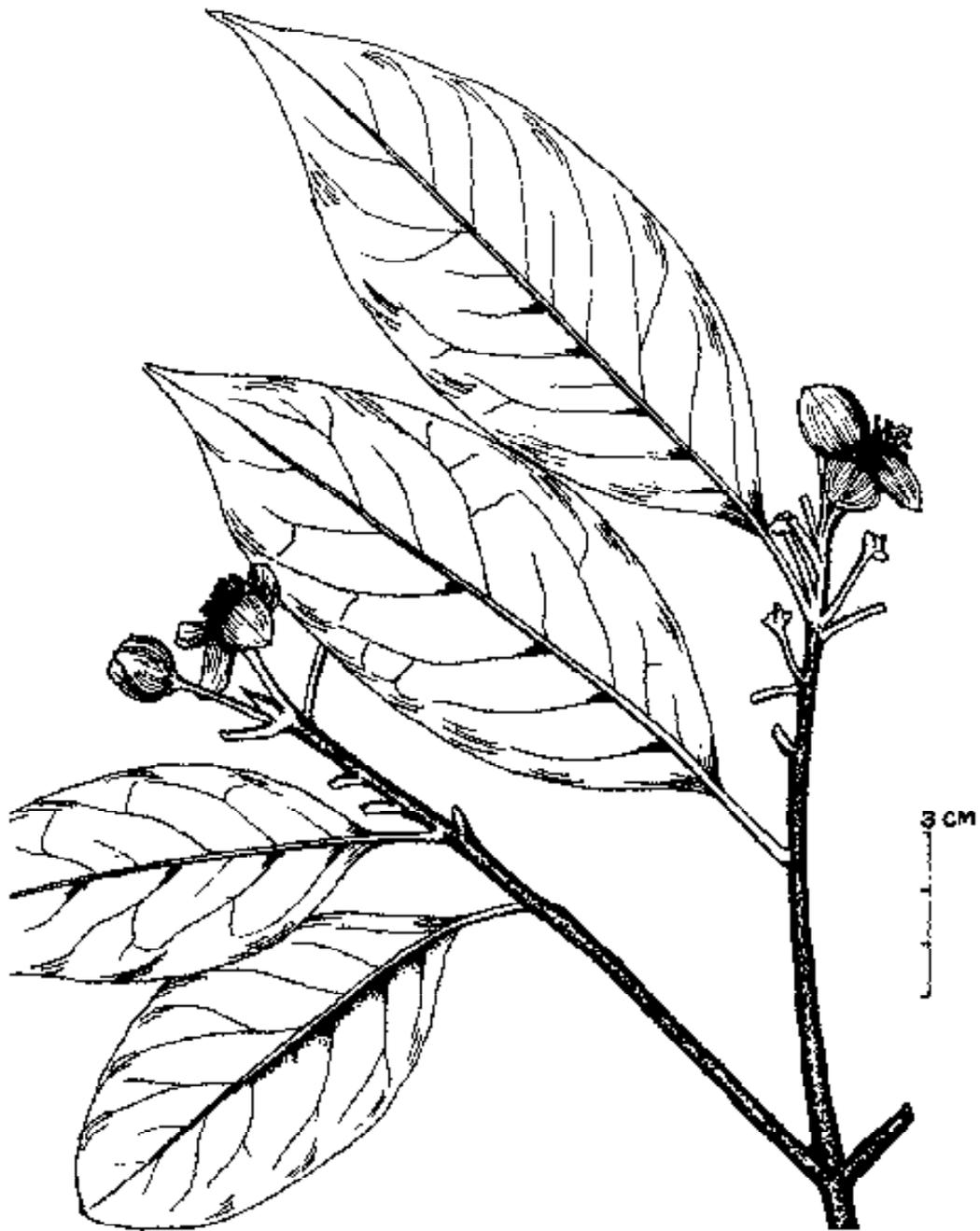


Fig. 33: *Schima walllichii* (DC.) Korthals

ACTINIDIACEAE

(K.P. Singh)

SAURAUIA Willd.

- 1a. Flowers in 10-25 cm long axillary panicles,
1.5-1.8 cm across ...1. *S. napaulensis*
- 1b. Flowers in 4-8 cm long cymes, ca 1.5 cm across ...2. *S. punduana*

1. *Saurauia napaulensis* DC., Mem. Ternstr. 29. 1822 & in Mem. Soc. Phys. Hist. Nat. Geneve 1: 421. 1822; Dyer in Hook. *f.*, Fl. Brit. India 1: 286. 1874; Kanjilal *et al.*, Fl. Assam 1: 127. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 81. 1938; T.K. Paul in Sharma *et al.*, Fl. India 3: 201. 1993. *Tiarpui* (Lushai).

Large shrubs or small trees, 5-10 m; young stem and branches covered with appressed ovate, acuminate scales. Leaves elliptic-oblongate, 15-25(35) x 5-10 cm, base rounded, abruptly acuminate or acute at apex, crenate-serrate along margins; glabrous above, brownish tomentose beneath or sometimes glabrate with age; lateral nerves 30-35 pairs; petioles 2-5 cm long, tomentose with scattered scales. Flowers 1.5-1.8 cm across, in axillary 10-25 cm long panicles, pink; sepals ovate, 4-5 mm long, glabrous; petals obovate, 6-10 x 3-6 mm, with recurved tips. Berries subglobose to globose, 8-9 mm in diam., 5-locular; seeds red-brown, many.

Fl. & Fr.: Throughout the year, especially during April-August.

Common on hill slopes in evergreen forests. North Vanlaiphai. *Parry* 384, (*vide* C.E.C. Fischer, *l.c.*); *Parry, s. num* (CAL); *Leslie* 331, 332 (CAL); Kawlkul-Hliapui, *K.P. Singh* 94320; Pharpak, *K.P. Singh* 96779.

2. *Saurauia punduana* Wallich in Pl. Asiat. Rar. 2: 40. 1831; Dyer in Hook. *f.*, Fl. Brit. India 1: 287. 1874; Kanjilal *et al.*, Fl. Assam 1: 129. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 81. 1938; T.K. Paul in Sharma *et al.*, Fl. India 3: 202. 1993. *Tiar* (Lushai); *Thobarothu* (Lakher). Fig. 34.

Shrubs or small trees, 2-8 m tall with brown, tomentose and densely scaly branchlets. Leaves elliptic-ovate to lanceolate, 10-25 x 7-10 cm, base rounded, acute or short acuminate at apex, truncate, cuspidate-serrate along

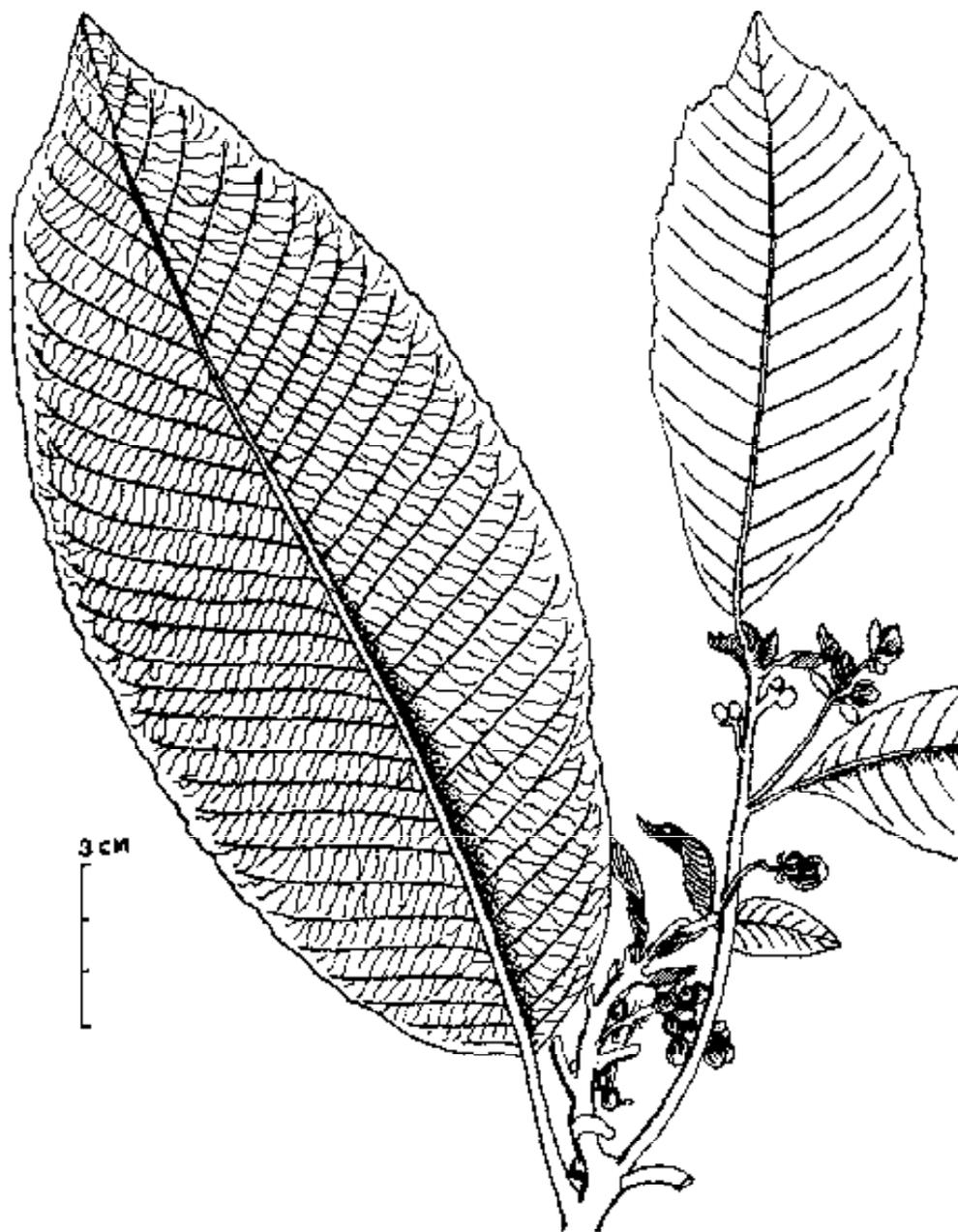


Fig. 34: Saurauia punduana Wallich

margins, glabrous above, whitish or rusty brownish tomentose with scales on mid rib beneath; lateral nerves 20-30 pairs; petioles 1-5 cm long, scaly. Cymes 4-8 cm long, scaly, pubescent, axillary or often in axils of fallen leaves, 3-many flowered; flowers *ca* 1.5 cm across, white to pink; sepals elliptic, *ca* 8 mm long, glabrous; petals rounded *ca* 15 x *ca* 8 mm in diam. Berries globose, 7-8 mm in diam., shining white; seeds many.

Fl. & Fr.: April-December.

Common in moist places on hill slopes and in dense forests in open places. Valley near Fort Lungleh, 900 m, *Gage* 31 (CAL); Aizawl, *Godfrey* 492 (CAL); Mamit, *Deb* 3453; Kolasib-Builang, *K.P. Singh* 93129; Near Hliapui, *K.P. Singh* 94340; Zowbak-Sairep, *K.P. Singh* 96721.

DIPTEROCARPACEAE

(K.P. Singh)

- 1a. Stipules amplexicaul; calyx tubular with short lobes;
fruits with 2 large erect wings ...1. *Dipterocarpus*
- 1b. Stipules not amplexicaul; calyx lobes nearly free;
fruits with 3 large and 2 small erect wings ...2. *Shorea*

1. DIPTEROCARPUS Gaertn. f.

- 1a. Fruits pointed at both ends; corolla lobes falcate ...1. *D. retusus*
- 1b. Fruits globose-subturbinate; corolla linear or linear-oblong ...2. *D. turbinatus*

1. *Dipterocarpus retusus* Blume, *Catalogus* 77. 1823; Janardhanan in *Sharma et al.*, 3: 218. 1993. *D. macrocarpus* Vesque in *Compt.-Rend.* 78: 627. 1870; Kanjilal *et al.*, *Fl. Assam* 1: 132. 1934. *Thingsen* (Lushai).

Large gregarious trees with tall bole, up to 50 m tall and in 5.5 m girth. Leaves elliptic-oblong, 12-15 x 9-15 cm, base rounded, shortly acuminate at apex, membranous, densely brown ciliate with fascicled hairs; lateral nerves 18-25 pairs; petioles 4-5 cm long. Flower solitary to 3-6, in axillary spikes, 6-8 cm long, pinkish; calyx tube turbinate, *ca* 1.5 cm long, velvety puberulous outside, silky pubescent inside; corolla lobes falcate, oblanceolate; stamens *ca* 30; ovary silky-pubescent. Fruits ovoid, *ca* 5 x 4 cm, pointed at both ends, enclosed in a glabrate and minutely punctate calyx tube; fruiting calyx *ca* 2 x 2 cm.

Fl. & Fr.: June-March.

The species is under cultivation by the forest department for commercial purposes.

2. *Dipterocarpus turbinatus* Gaertn. *f.*, *Suppl. rp.* 3: 51, t. 188, f. 1. 1805; Dyer in Hook. *f.*, *Fl. Brit. India* 1: 295. 1874, *p.p.*; Kanjilal *et al.*, *Fl. Assam* 1: 134. 1934; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 82. 1938; Janardhanan in Sharma *et al.*, *Fl. India* 3: 219. 1993. *Lawnghthing* (Lushai).

Lofty trees with a long cylindrical bole, up to 50 m tall and 5 m in girth; bark vertically fissured. Leaves ovate or ovate-lanceolate, 10-35 x 8-15 cm, base rounded or slightly cordate, acuminate at apex, crenate or entire along margins, coriaceous, glabrous on both surfaces; lateral nerves 12-20 pairs; petioles 2-5 cm long, swollen at both ends; stipules *ca* 5 cm long, buff tomentose, caducous. Flowers 3-7 in short racemes from axils of fallen leaves, 2.5-3 cm long, white or pinkish; calyx tube obconic, *ca* 12 mm long, glabrous or pruinose, 5-lobed; petals soft tomentose, 2-3 cm long; stamens *ca* 30; ovary densely pilose, 3-locular with 2 ovules in each. Fruits with 2 large wings, basal portion obtuse-oblong, 2-2.5 x *ca* 1.5 cm; wings oblanceolate-oblong, 10-13 x 1.5-3.5 cm, pink, glabrous, reticulate with 3 main nerves.

Fl. & Fr.: March-May.

In moist, tropical evergreen forests, on the slopes of the hills at lower elevations. Aizawl, *Parry* 657, (*vide* C.E.C. Fischer, *l.c.*).

2. *SHOREA* Roxb. *ex* Gaertn.*f.*

- | | |
|----------------------------------------------------------------------|--------------------------|
| 1a. Stamens 15; ovary and fruit glabrous | ...1. <i>S. assamica</i> |
| 1b. Stamens more than 15; ovary and fruit hairy to densely pubescent | ...2. <i>S. robusta</i> |

1. *Shorea assamica* Dyer in Hook. *f.*, *Fl. Brit. India* 1: 307. 1874; Kanjilal *et al.*, *Fl. Assam* 1: 136. 1934; Janardhanan in Sharma *et al.*, 3: 235. 1993.

Tall trees, up to 50 m tall; young shoots, leaves and stipules softly tomentose. Leaves oblong-lanceolate to ovate, 5-15 x 3-6 cm; lateral nerves

15-19 pairs. Flowers in axillary or subterminal panicles, 1-1.5 cm long, white or creamy; calyx pubescent, lanceolate; petals 5, velvety pubescent outside, glabrous within; stamens 15; ovary glabrous; stylopodium absent. Fruits ovoid with 3 large wings, *ca* 2 x 1.2 cm; wings 6-12 x 0.8-2.5 cm.

Fl. & Fr.: August-February.

Cultivated.

2. *Shorea robusta* Roxb. *ex* Gaertn. *f.*, *Suppl. Carp.* 3: 48, t. 186. 1805; Dyer in Hook. *f.*, *Fl. Brit. India* 1: 306. 1874; Kanjilal *et al.*, *Fl. Assam* 1: 135. 1934; Janardhanan in Sharma *et al.*, 3: 237. 1993. *Lawnghing* (Lushai).

Deciduous, tall trees, up to 50 m tall, young branches buff, tomentose. Leaves ovate-oblong, 10-38 x 5-18; lateral nerves 12-15 pairs. Flowers subsessile, in large terminal and axillary racemose panicles, yellow or creamy; calyx segment densely yellowish pubescent, ovate or triangular; petals silky outside, glabrous inside; stamens up to 50; ovary hairy; stylopodium present. Fruits ovoid, *ca* 1.5 cm long; wings 5, 3 large and 2 small.

Fl. & Fr.: March-June.

Cultivated.

MALVACEAE

(K.P. Singh)

- 1a. Styles twice as many as carpels ...9. *Urena*
- 1b. Styles as many as carpels, or styles undivided:
 - 2a. Fruit a capsule:
 - 3a. Epicalyx segments winged in fruits:
 - 4a. Flowers polygamous; staminal column short, 5-armed; fruits loculicidally dehiscent ...5. *Kydia*
 - 4b. Flowers bisexual; staminal column long, unarmed; fruits indehiscent ... 6. *Nayariophyton*
 - 3b. Epicalyx segments not winged in fruits:

- 5a. Styles unbranched, stigmas ribbed or lobed:
- 6a. Epilyx segments 3, foliaceous, persistent; seeds enveloped in silky white cotton fibres ...3. *Gossypium*
- 6b. Epicalyx segments 3-8, narrow, lacerate, caducous; seeds glabrous, puberulous ...8. *Thespesia*
- 5b. Styles distally 5-branched; stigmas spreading, globose:
- 7a. Calyx irregularly 2-3-lobed, spathaceous, caducous ...1. *Abelmoschus*
- 7b. Calyx regularly 5-lobed, not spathaceous, persistent ...4. *Hibiscus*
- 2b. Fruit a schizocarp, breaking finally into mericarps:
- 8a. Carpels 5-10; mericarps 1-seeded ...7. *Sida*
- 8b. Carpels 5-20; mericarps 2 or more seeded ...2. *Abutilon*

1. ABELMOSCHUS Medik.

Abelmoschus manihot (L.) Medik. subsp. **tetraphyllus** (Roxb. ex Hornem.) Borss. var. **pungens** (Roxb.) Hochr. in *Candollea* 2: 87. 1924; T.K. Paul in Sharma *et al.*, *Fl. India* 3: 307. 1993. *Hibiscus pungens* Roxb., [*Hort. Beng.* 52. (1814), *nom. nud.*] *Fl. Ind.* 3: 213. 1832; Masters in Hook.f., *Fl. Brit. India* 1: 341. 1874; Kanjilal *et al.*, *Fl. Assam* 1: 144. 1934; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 82. 1938. *Uichhume* (Lushai). Fig. 35.

Bristly undershrubs, up to 4 m tall; stems, petioles, pedicels and veins of the leaves densely hirsute by stiff simple hairs, other parts pubescent with minute hairs. Leaves variable in size and shape, 15-30 cm across, orbicular to broadly ovate, palmately 5 or more lobed, base cordate, acuminate at apex, crenate along margins, glabrous or tomentose on both surfaces or only on lower side; petioles 5-20 cm long, 5-9-nerved at base. Flowers axillary, solitary or in terminal racemes, 7-12 cm across; epicalyx segments 4-6, 1-2 cm long, ovate-oblong, hispid by soft, simple hairs; calyx 2-3 cm long, spathaceous; corolla yellow with purple centre; petals 4-8 x 3-6 cm, obovate. Capsules 3-8 x 2-2.5 cm, ovoid-oblong, acuminate; seeds 3-4 mm with stellate hairs, dark brown or blackish, reniform with broad sinus.

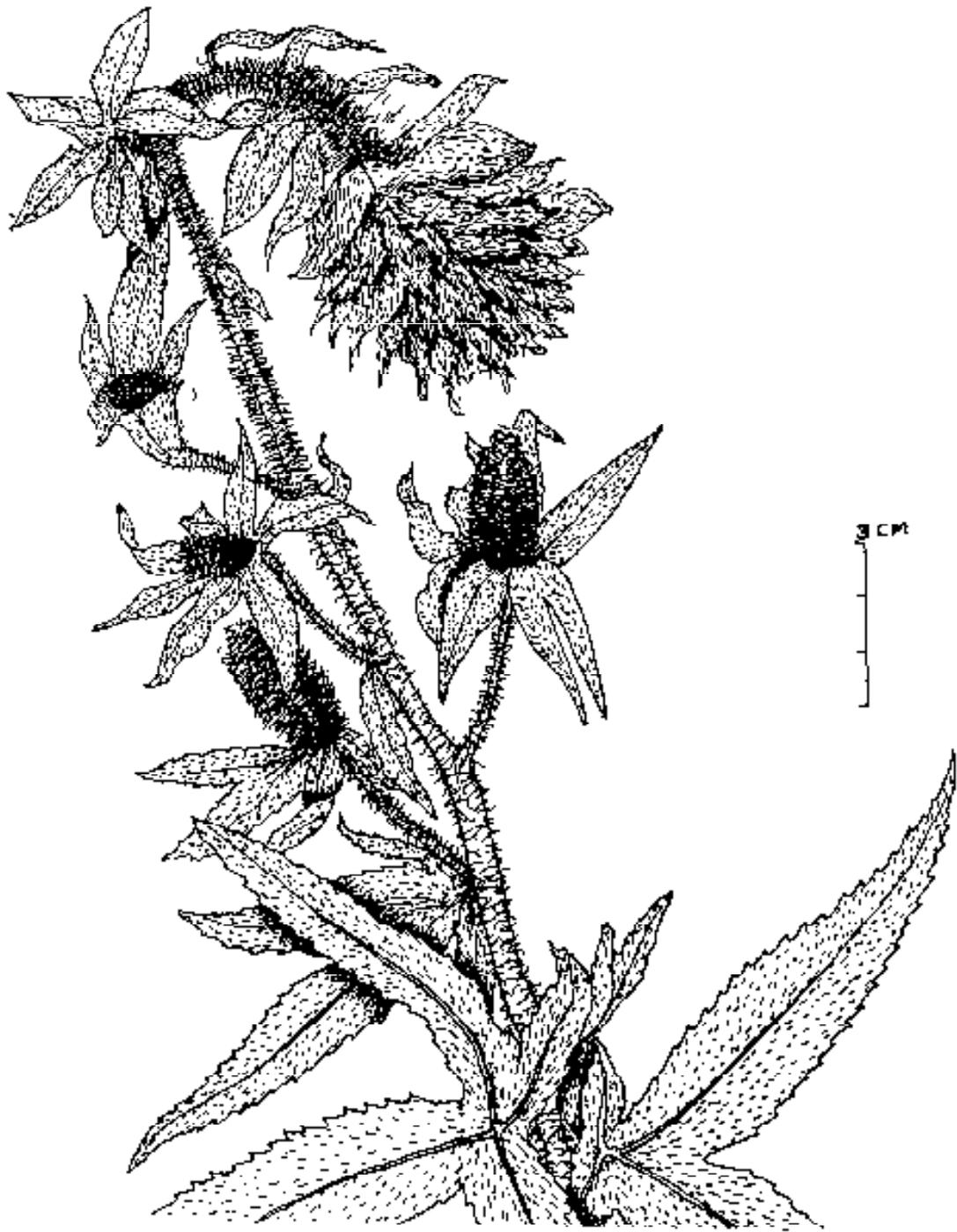


Fig. 35: *Abelmoschus manihot* (L.) Medik. subsp. *tetraphyllus* (Roxb. ex Hornem.) Borss. var. *pungens* (Roxb.) Hochr.

Fl. & Fr.: September-November.

15th miles South-east of fort Lungleh, 900 m, *Gage* 157, 159 (CAL); Sairang bungalow, *Leslie* 86 (CAL); Near Buangpui village, *K.P. Singh* 93809; Tuichang, *K.P. Singh* 94243; Hliapui village, *K.P. Singh* 94307, 94339; Keifang, *M. Sawmliana*, 99245; Hnathial, 750 m, *Mao* 107034.

CULTIVATED TAXA

Abelmoschus esculentus (L.) Moench, *Meth. Pl.* 617. 1794; T.K. Paul in *Sharma et al.*, *Fl. India* 3: 385. 1993. *Hibiscus esculentus* L., *Sp. Pl.* 696. 1753; Masters in *Hook. f.*, *Fl. Brit. India* 1: 343. 1874; Kanjital *et al.*, *Fl. Assam* 1(1): 144. 1934. *Bawrh-saia-be* (Lushai).

Cultivated as vegetable.

2. ABUTILON Miller

Abutilon persicum (Burm. f.) Merr. in *Philipp. J. Sci.* 19:364. 1921; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 82. 1938; T.K. Paul in *Sharma et al.*, *Fl. India* 3: 269. 1993. *Sida persica* Burm. f., *Fl. Ind.* 148. tab. 47, f.1. 1768. *Abutilon polyandrum* (Roxb.) Wight & Arn. *ex Wight. Cat. No.* 12. 1833, *non* G. Don. 1831; Masters in *Hook. f.*, *Fl. Brit. India* 1: 325. 1874.

Herbs or undershrubs, up to 3 m tall. Leaves 2-18 x 1-25 cm, lower ones ovate-cordate, long acuminate at apex, upper ones ovate-lanceolate, acuminate at apex, crenate-dentate along margins, densely stellate hairy above, velutinous with minute hairs beneath, 5-9-nerved at base; petioles 2-10 cm long, pubescent; stipules linear to subulate. Flowers solitary, axillary or in sub-terminal panicles or racemes; calyx cup-shaped; lobes obovate-lanceolate, 7-8 x 3-5 mm, densely hairy outside, velutinous with simple hairs inside; corolla yellow without purple centre; petals obovate, 2-3 cm long; staminal column 6 mm long. Schizocarps 10-20 mm across, ± campanulate; mericarps 5, 15-18 mm across, each with 2, stout, erecto-patent awns, stellate and simple hairy outside, glabrous inside; seeds 4-6 per mericarp, reniform, ca 2 mm across, blackish-brown.

Fl. & Fr.: November-April.

Common in dry deciduous forests. Lungleh, 900 m, *Gage* 108 (CAL).

3. GOSSYPIUM L.

- 1a. Leaf lobes linear to lanceolate with an extra tooth in the sinuses; epicalyx segments 3-4-toothed near the apex; capsules ovoid ... 1. *G. arboreum*
- 1b. Leaf lobes ovate to oblong or elliptic without any extra tooth in sinuses; epicalyx segments 7-9-toothed at apex; capsules rounded or oblong ... 2. *G. herbaceum*

1. ***Gossypium arboreum* L.**, Sp. Pl. 693, 1753; Masters in Hook. f., Fl. Brit. India 1: 347, 1874; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 82, 1938; T.K. Paul in Sharma *et al.*, Fl. India 3: 387, 1993. *La* (Lushai); *Pala* (Lakher).

Annual or perennial shrubs, up to 2 m tall, with pilose, purple branches when young. Leaves palmately 5-7-lobed with an extra tooth in the sinuses, ovate to orbicular, base cordate, apex acuminate; lobes 2.5-4 x 0.5-1 cm, petioles 1.5-4 cm long; stipules linear-lanceolate, often falcate. Flowers solitary, axillary; epicalyx segments ovate, 1-2.5 cm long, entire or toothed; calyx 4-5 mm long, cupular, 5-dentate at apex; corolla pale yellow or purple, with or without purple centre; petals obovate, 2-4 cm long, staminal column up to 2 cm long. Capsules 1.5-3 cm across, ovoid to globular, 3-4-loculed, beaked; beak 3-4 mm long; seeds 5-10 or more per locule, 4-7 mm in diam., free, covered with white wool.

Fl. & Fr.: September-November.

Usually cultivated. North Vanlaiphai, Parry 368, (*vide* C.E.C. Fischer, *l.c.*), Leslie 316 (CAL).

2. ***Gossypium herbaceum* L.**, Sp. Pl. 693, 1753; Masters in Hook. f., Fl. Brit. India 1: 346, 1874; Kanjilal *et al.*, Fl. Assam 1: 145, 1934; T.K. Paul in Sharma *et al.*, Fl. India 3: 389, 1993. *La* (Lushai).

Annual herbs or undershrubs, up to 1.5 m high. Leaves 3-6 x 3-6 cm, suborbicular, palmately 3-5 or 7-lobed, base cordate; lobes ovate or oblong-elliptic, apiculate at apex, entire along margins; petioles 2-4 cm long; stipules linear to lanceolate. Flowers solitary, axillary; epicalyx segments 1-2 cm long, ovate-cordate; calyx cup-shaped, undulate or truncate, 8-10 mm long; corolla yellow with purple centre; petals 2-3.5 cm long. Capsules ovoid, 3-4 x ca 1.5 cm, acute, 4-loculed; seeds 5-7 in each locule, ovoid 5-6 x 3-6 mm, with greyish-white floss and fuzz.

Fl. & Fr.: August-November.

Usually cultivated for its fibre. Denlang village, Hnathial *K.P. Singh* 94108.

4. HIBISCUS L.

- 1a. Small trees; capsules often 10-loculed by false septum ...2. *H. macrophyllus*
- 1b. Herbs or undershrubs or shrubs; capsules 5-loculed:
 - 2a. Stems lacking bristles or prickles; epicalyx segments not furcated ...4. *H. rosa-sinensis*
 - 2b. Stems with prickles, or bristles, or both; epicalyx segments forked at the tips:
 - 3a. Stipules foliaceous, auricled ...5. *H. surattensis*
 - 3b. Stipules not foliaceous:
 - 4a. Leaves entire or shallowly 3-5-lobed; stipules ovate-lanceolate ...1. *H. aculeatus*
 - 4b. Leaves deeply palmately 3-5-lobed; lobation reaching near the base; stipules linear ...3. *H. radiatus*

1. **Hibiscus aculeatus** Roxb., *Fl. Ind.* 3: 206. 1832; T.K. Paul in *Sharma et al.*, *Fl. India* 3: 323. 1993. *H. furcatus* Roxb. (*Hort. Beng.* 51. 1814, *nom. nud.*) *ex DC.*, *Prodr.* 1: 449. 1824, *non Willd.* 1809; Masters in *Hook. f.*, *Fl. Brit. India* 1: 335. 1824; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 82. 1938. *Kiasi* (Lakher).

Suberect or trailing undershrubs, up to 1.5 m high, covered with stiff sharp recurved bristles arising from a glandular base. Leaves unlobed or 3-5-lobed, 3-10 x 3-8 cm, base cordate, acute at apex, crenate-serrate along margins, pubescent beneath, prickly along the nerves; 5-7-nerved at the base; petioles 2-6 cm long; stipules ovate-lanceolate. Flowers solitary, axillary, 5-10 cm across; buds with a tuft of hairs at the apex; epicalyx 8-12-segmented, forked at apex; calyx deeply 5-lobed; lobes lanceolate, acute, hispid; corolla yellow with a crimson or purple centre. Capsules ovoid, ca 1.5 cm long, covered with rigid, deciduous hairs, enclosed by a large calyx; seeds 4-5 mm across, reniform, brownish.

Fl. & Fr.: September-February.

Along rivers, at low elevations. *Lorrain* 9 (CAL.).

2. **Hibiscus macrophyllous** Roxb. [Hort. Beng. 51. (1814), *nom. nud.*, ex Hornem., Hort. Hafn. Suppl. 149. 1819; Masters in Hook. *f.* Fl. Brit. India 1: 337. 1874; Kanjilal *et al.*, Fl. Assam 1: 142. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 82. 1938; T.K. Paul in Sharma *et al.*, Fl. India 3: 318. 1993. *Vaiza*, *Baiza* (Lushai); *Pazo* (Lakher).

Deciduous trees, 10-25 m tall; young branches covered with golden yellow, stellate hairs, glabrescent later. Leaves 15-30 x 15-35 cm, base cordate, abruptly acuminate at apex, entire along margins, ciliate-tomentose on both surfaces; lateral nerves 7-9 pairs; petioles 10-20 cm long; stipules foliaceous. Flowers 8-10 cm across, solitary, axillary or in terminal racemes; epicalyx segments 10-12; calyx 5-lobed, connate below the middle; lobes lanceolate, 2-3 cm long; corolla yellow with dark purple base often changing to pinkish brown; petals 5-6 cm long, obovoid; staminal column yellow; ovary villous, conical. Capsules ovoid to obovoid, 4-5 x 2.5 cm, beaked, hairy; seeds many in each locule, reniform, 3-4 mm across, hairy.

Fl. & Fr.: January-May.

Bunglang to Aizawl, 920 m, Deb 31462.

3. **Hibiscus radiatus** Cav., Diss. 3: 150. t. 54. f. 2. 1787; Masters in Hook. *f.*, Fl. Brit. India 1: 335. 1874; Kanjilal *et al.*, Fl. Assam 1: 144. 1934; T.K. Paul in Sharma *et al.*, Fl. India 3: 327. 1993.

Erect undershrubs, up to 2 m tall; stems armed with short, retrorse prickles. Leaves 4.5-8 x 1.5-5 cm; lower leaves ovate to oblong with cuneate base and acute apex; upper leaves palmately 3-5-lobed, lobation up to the base; lobes ovate to oblong or obovate or linear to lanceolate, base cuneate, rounded or cordate, acute or acuminate at apex, serrate along margins, glabrous; lateral nerves 3-5 pairs with nectaries at base; petioles 4.5-8 cm long; stipules linear-lanceolate, bristly. Flowers 4-6 cm across, solitary; epicalyx segments 8 or 10, acute, forked towards apex, covered with bulbous bristles; calyx membranous; lobes ovate 1-1.5 cm long, acuminate, armed with bristles outside, glabrous inside; corolla bell shaped, ca 6 cm across, yellow with purple centre; staminal column ca 2 cm long. Capsules ovoid, 2-2.5 x 1.5 cm, densely setose, dehiscent loculicidally into 5 valves; seeds 3-4 mm across, scabrous, brown.

Fl. & Fr.: August-February.

One mile from Chinliss, *Leslie* 4 (CAL).

4. *Hibiscus rosa-sinensis* L., Sp. Pl. 694. 1753; Masters in Hook. *f.*, Fl. Brit. India 1: 334. 1974; Kanjilal *et al.*, Fl. Assam 1: 145. 1934; Deb & Butta in J. Econ. Tax. Bot. 10(1): 30. 1987; T.K. Paul in Sharma *et al.*, Fl. India 3: 391. 1993. *Saparnbeng* (Lushai).

Erect shrubs, up to 4 m tall; stems woody. Leaves ovate or elliptic-ovate, 3-8 x 2-4 cm, base tapering, acuminate at apex, serrate-dentate along margins, glabrous or with few hairs on the veins beneath, 3-5-nerved at base; petioles 1-3 cm long. Flowers solitary, axillary; pedicels mostly longer than petioles; epicalyx segments 5-8, connate at base; calyx campanulate, glandularly stellate-pilose, lobes 1-2 cm long; corolla infundibular, 6-10 cm across, blood-red; petals 5, twisted, obovate; staminal column 4-8 cm long, slightly exerted beyond the corolla with upper portion antheriferous; anthers monothealous, horse-shoe shaped. Capsules rounded-globose, rarely formed.

Fl. & Fr.: Throughout the year.

Commonly cultivated as an ornamental plant in the gardens and lawns. Bunglang, *Deb* 31455.

5. *Hibiscus surattensis* L., Sp. Pl. 696. 1753; Masters in Hook. *f.*, Fl. Brit. India 1: 334. 1874; Kanjilal *et al.*, Fl. Assam 1: 144. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 82. 1938; T.K. Paul in Sharma *et al.*, Fl. India 3: 327. 1993. *Sehnap, Zawnganthur* (Lushai).

Herbs or undershrubs, up to 2 m high; stems armed with recurved, transparent prickles and soft hairs. Leaves 3-7 x 5-10 cm, palmately, 3-5-lobed, suborbicular or obovate; lobes linear-lanceolate, base subcordate, acute at apex, crenate-serrate along margins, 5-9-nerved at base without any nectaries, prickly along the nerves beneath; petioles 3-8 cm long; stipules foliaceous, ciliate, auricled at base. Flowers solitary, axillary; epicalyx segments 10, 12-18 x 2-3 mm, persistent, bristly stalked, spatulate; calyx campanulate, deeply 5-partite, teeth ovate to deltoid, hispid outside with recurved prickles; corolla yellow with deep purple centre; petals obovate, 3-5 cm long; staminal column much shorter than petals, antheriferous throughout; ovary conical, hairy, capsules ca 1.2 x 1 cm, ovoid, acute, covered with bristly white or yellow hairs; seeds 3-4 mm long, black brown, downy.

Fl. & Fr.: September-February.

Rather common in waste-lands and forest edges. Half mile from Renylie Inspection Bungalow, *Leslie* 1 (CAL); Hnathial-Denglang village, *K.P. Singh* 94101; Hnathial, 750 m, *Mao* 107035.

Uses: Stems yield a strong fibre of good quality.

CULTIVATED TAXA

1. *Hibiscus sabdariffa* L., Sp. Pl. 695. 1753; Masters in Hook. *f.*, Fl. Brit. India 1: 380. 1874; T.K. Paul in Sharma *et al.*, Fl. India 3: 391. 1993.

Cultivated as a substitute for jute.

2. *Hibiscus syriacus* L., Sp. Pl. 695. 1753; Masters in Hook. *f.*, Fl. Brit. India 1: 344. 1874; Kanjilal *et al.*, Fl. Assam 1(1): 145. 1934; T.K. Paul in Sharma *et al.*, Fl. India 3: 393. 1993. *Saronrosepar* (Lushai)

Cultivated in gardens.

5. KYDIA Roxb.

- | | |
|-----------------------------------------------------------------------|-----------------------------|
| 1a. Leaves stellate-pubescent beneath;
epicalyx stellate-pubescent | ...1. <i>K. calycina</i> |
| 1b. Leaves glabrous beneath; epicalyx glabrous | ...2. <i>K. glabrescens</i> |

1. *Kydia calycina* Roxb. [Hort. Beng. 50. (1814), *nom. nud.*] Pl. Corom. 3: 11, t. 215. 1819; Masters in Hook. *f.*, Fl. Brit. India 1: 348. 1874; Kanjilal *et al.*, Fl. Assam 1: 146. 1934; Deb & Dutta in J. Econ Tax. Bot. 10(1): 30. 1987; T.K. Paul in Sharma *et al.* Fl. India 3: 344. 1993. *Thaltehpa*, *Hnathap* (Lushai). **Fig. 36.**

Deciduous trees, 10-20 m tall; young branches pubescent-stellate hairy. Leaves palmately 5-7-lobed, ovate or orbicular, 4-10 x 6-14 cm, base subcordate, acute or obtuse at apex, entire or irregularly serrate along margins, stellate-hispid above, grey stellate-pubescent beneath, 5-9-nerved at base; petioles 2-5 cm long. Flowers axillary or terminal in close panicles, polygamous; epicalyx segments oblong or obovate, 4-6, 5-15 x 5-6 mm, slightly stellate-pubescent on both sides; calyx cup-shaped, connate below,

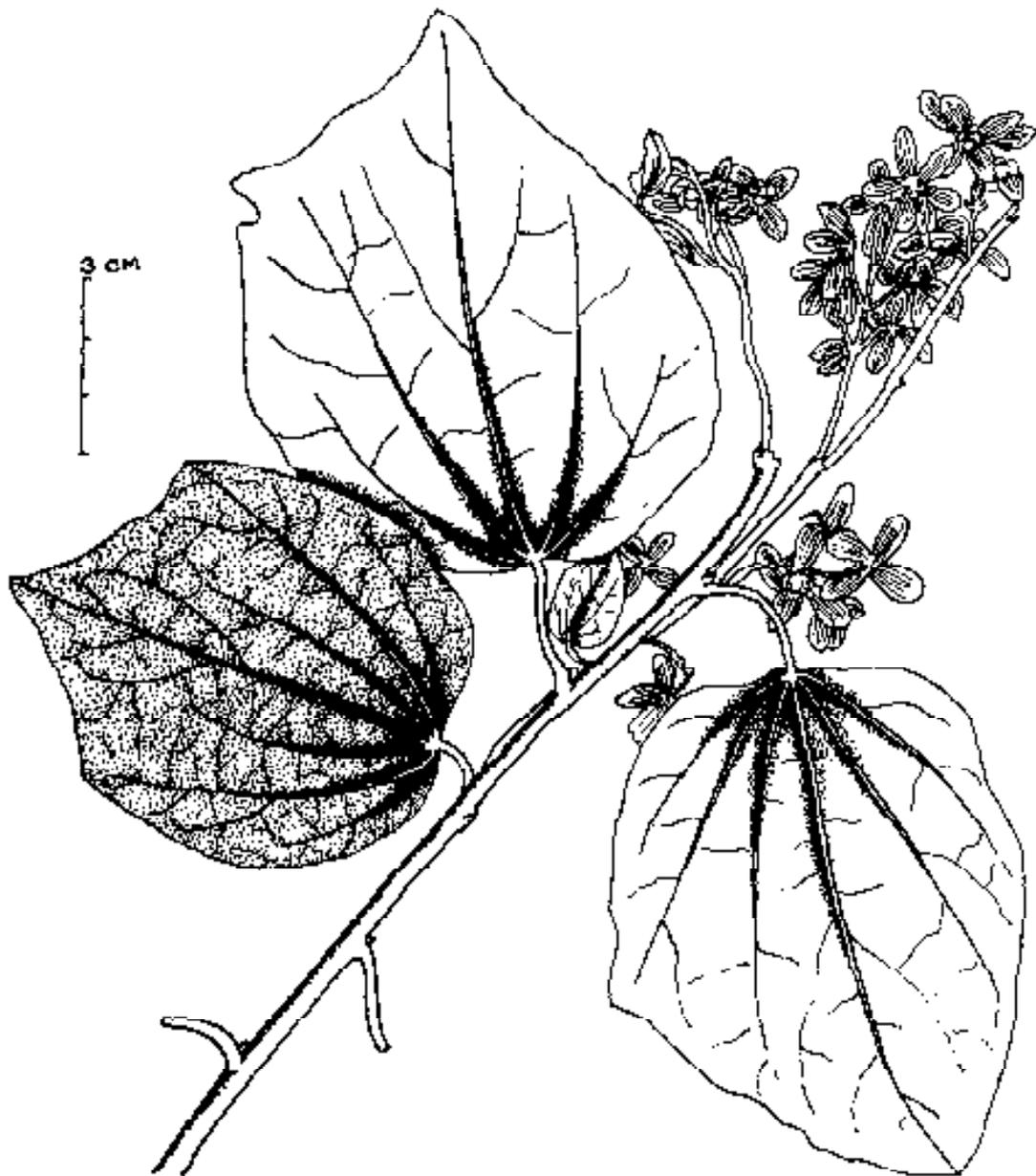


Fig. 36: *Kydia calycina* Roxb.

ovate, acute; lobes *ca* 5 x 4 mm; corolla pink or white; petals 5, adnate below with staminal tube; stamens 15; ovary 3-locular, ovoid. Capsules 3-5 mm across, subglobose, yellowish, villous; seeds reniform-ellipsoid, *ca* 3 x 2 mm, brown, glandular, striate.

Fl. & Fr.: September-February.

Common in subtropical forests. Champhai-Myanmar, *Deb* 31015; Lawngtalai-Kawlchaw, *K.P. Singh* 92852; Near Hliapui, *K.P. Singh* 94310; Kawlkuh-Tuichang, *K.P. Singh* 94431; Puilobasti, *K.P. Singh* 94469; Sangau-Hnathial road, 1100 m, *Mao* 107193.

2. *Kydia glabrescens* Masters in Hook. *f.*, *Fl. Brit India* 1: 348. 1874; Kanjilal *et al.*, *Fl. Assam* 1: 146. 193. 1934; T.K. Paul in Sharma *et al.*, *Fl. India* 3: 344. 1993. *Hnahbial* (Lushai).

Tall trees, up to 30 m; branchlets nearly glabrous. Leaves suborbicular or obovate, 6-12 x 4-12.5 cm, base rounded, rounded or slightly acute at apex, semicrenate to irregular along the margins, slightly lobed at the extremities, glabrous to sparsely pubescent above, glabrous beneath with fine reticulations. 5-7-nerved at base; petioles 3-7 cm long. Flowers in axillary or terminal panicles, white; pedicils stellate-pubescent; epicalyx segments 4 or rarely 5, 5-8 x 2-3 mm, spreading, glabrous; calyx 5, cup-shaped, lobes glabrous out side, stellate hairy inside; corolla *ca* 1 cm across; petals glabrous, ciliate. Capsules globose, *ca* 5 mm across, 3-loculed with 2 seeds in each locule; seeds *ca* 3 mm long, glabrous, brownish.

Fl. & Fr.: October-January.

Jawbak, *K.P. Singh* 94226.

5. NAYARIOPHYTON T.K. Paul

Nayariophyton zizyphifolium (Griffith) Long & A.G. Miller in *Edinburgh J. Bot.* 47: 357. 1990; T.K. Paul in Sharma *et al.* *Fl. India* 3: 345. 1993. *Kydia zizyphifolium* Griffith, *Itin. Notes* 108. 1848; *K. jujubifolia* Griffith, *Notul. Pl. Asiat.* 4: 534. 1854; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 30. 1987. *Dicellostyles jujubifolia* (Griffith) Benth. in Benth. & Hook. *f.*, *Gen. Pl.* 1: 207. 1862; Masters in Hook. *f.*, *Fl. Brit. India* 1: 333. 1874. *Nayariophyton jujubifolium* (Griffith) T.K. Paul, *Fasc. Fl. India* 19: 185. 1988, ortho. *Hnahbial* (Lushai).

Small trees, 5-8 m tall, young parts covered with stellate hairs. Leaves ovate-lanceolate, 8-15 x 4-9 cm, base rounded, acute to acuminate at apex, entire or obscurely 3-lobed, upper surface stellate pubescent or glabrous, lower surface densely pilose, 5-7-nerved at base; petioles 1-2.5 cm long; stipules subulate. Flowers axillary, solitary or in panicles of 2-5; epicalyx segments oblong-lanceolate, 4-6, 1-1.5 x 0.4-0.5 cm, persistent, rounded at apex; calyx lobes triangular, 8-15 mm long, stellate hairy; corolla white; petals oblong, 1-2 cm long; densely pubescent outside; staminal tube hairy with reniform anthers; ovary bilocular, globose, densely stellate hairy. Capsules subglobose, ca 8 mm across, indehiscent, hairy, 2-loculed; seeds reniform, ca 4 x 3 mm, single in each locule, glabrous.

Fl. & Fr.: May-October.

Common in tropical and subtropical forests. Sialsuk, *Deb* 30869; Theiriak, *Deb* 31282; Thingfal-Lawngtalai, *Dutta* 33713.

6. SIDA L.

- 1a. Leaves linear-lanceolate, glabrescent, awns glabrous ... 1. *S. acuta*
 1b. Leaves ovate, oblong, rhomboid, stellate-pubescent on both surfaces, awns with or without retrorse hairs:
 2a. Awns retrorse hairy ... 2. *S. cordifolia*
 2b. Awns not retrorse hairy ... 3. *S. rhombifolia*

1. *Sida acuta* Burm. f., *Fl. Ind.* 147. 1768; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 30. 1987; T.K. Paul in Sharma *et al.* *Fl. India* 3: 281. 1993. *S. carpinifolia* Masters in Hook. f., *Fl. Brit. India* 1: 323. 1874, *non* L. f. 1785; Kanjilal *et al.*, *Fl. Assam* 1: 140. 1934. *Ting-kilou* (Lushai).

Fig. 37.

Small, erect herbs or undershrubs, up to 2 m high. Leaves elliptic-lanceolate or lanceolate, 3-6 x 0.3-1.3 cm, base rounded or subacute, acuminate at apex, serrate along margins, both surfaces hairy, glabrescent, 3-nerved at base; petioles 2-6 mm long, pubescent; stipules of each pair different, one linear-lanceolate, other linear-filiform. Flowers 1-1.5 cm across, light yellow, solitary, axillary or in clusters of 2-3; calyx 5-lobed, campanulate; lobes ca 7 mm long; corolla light yellow, emarginate, eciliate at base, outside sparsely covered with glandular hairs; staminal tube with simple and glandular hairs; ovary ovoid. Mericarps 6-10, tetrahedral, 3-4



Fig. 37: *Sida acuta* Burm. f.

mm long, rugose with two awns at apex; awns glabrous, 1-seeded; seeds triangularly ovoid, ca 2 mm long, dark brown.

Fl. & Fr.: September-May.

Common in open places. Aizawl, *Godfrey* 537 (CAL); Sairang, 680 m, *Deb* 30575; Tlabung, *K.P. Singh* 94257; Hnathial, 750 m, *Mao* 107031.

2. ***Sida cordifolia*** L., Sp. Pl. 684. 1753; Masters in Hook. *f.*, Fl. Brit. India 1: 324. 1874; Kanjilal *et al.*, Fl. Assam 1: 140. 1934; T.K. Paul in Sharma *et al.*, Fl. India 3: 285. 1993.

Erect undershrubs, up to 1 m high. Leaves ovate-oblong or orbicular, 2-5 x 1-2 cm, base cordate, acute at apex, crenate-serrate along margins, densely velutinous with minute stellate hairs on both surfaces; lateral nerves 5-7 pairs; petioles 4-6 mm long; stipules filiform, pubescent. Flowers solitary, axillary or in axillary clusters of 2-5 flowers; calyx campanulate, lobes deltoid, acute, pubescent outside; corolla yellow; petals obliquely obovate; staminal column ca 2.5 mm long, hairy; ovary stellate-hairy. Mericarps 6-10, 3-4 mm long excluding awns, reticulate with a pair of awns at the tip; awns retrorsely hairy, exceeding the calyx; seeds reniform, ca 2 mm long, flattened, black.

Fl. & Fr.: Throughout the year.

Very common in open places along the road side and hill slopes. Hnathial-Lungle Road, *K.P. Singh* 94183, 96645; Tlabung, *K.P. Singh* 94265.

3. ***Sida rhombifolia*** L., Sp. Pl. 684. 1753 subsp. ***rhombifolia*** var. ***rhombifolia***; T.K. Paul in Sharma *et al.*, Fl. India 3: 290. 1993. *S. rhomboidea* Roxb. ex Fleming in *Asiat. Res.* 6: 178. 1810. *S. rhombifolia* L. var. *rhomboidea* (Roxb. ex Fleming) Masters in Hook. *f.*, Fl. Brit. India 1: 324. 1874. *S. rhombifolia* L. var. *obovata* Wallich ex Masters in Hook. *f.*, Fl. Brit. India 1: 324. 1874. *S. rhombifolia* L. var. *microphylla* (Cav.) Masters in Hook. *f.*, Fl. Brit. India 1: 324. 1874. *S. microphylla* Cav., *Diss.* 1: 22, t. 12. f. 2. 1785. **Fig. 38.**

Undershrubs, up to 1.5 m high; stems erect, covered with small stellate hairs. Leaves ovate-oblong, rhomboid or lanceolate, 2-5.5 x 0.6-2 cm, truncate or cordate at base, acuminate at apex, apically serrate to crenate,



Fig. 38: *Sida rhombifolia* L. subsp. *rhombifolia* var. *rhombifolia*

entire towards base, covered with minute stellate hairs on both surfaces; petioles 2-7 m long, covered with minute stellate hairs. Flowers axillary, usually solitary, yellow-pale orange, pedicels 2-3 cm long; calyx campanulate, 4-5 mm long; corolla 1-1.5 cm across; petals glabrous, staminal column shorter than petals. Mericarps 6-12, mostly with 2 mucros, occasionally with 2 awns; awns 1-2 mm long, glabrous; seeds glabrous, ca 2 mm across.

Fl. & Fr.: May-December.

Common in tropical areas, Keifang, *M. Sawamliana*, 95534.

8. THESPESIA Sol. ex Correa

Thespesia lampas (Cav.) Dals & Gibs., Bombay Fl. 19. 1861; Masters in Hook. f., Fl. Brit. India 1: 345. 1874; T.K. Paul in Sharma *et al.*, Fl. India 3: 350. 1993. *Hibiscus lampas* Cav., Diss. 3: 154, t. 56, f. 2. 1787; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 82. 1938. Fig. 39.

Arborescent shrubs, up to 3 m tall, herbaceous portion downy with densely tomentose-stellate hairy twigs. Upper leaves unlobed, 5-10 x 2-18 cm, ovate to oblong, base rounded or crenate, acuminate at apex; lower leaves pinnately 3-5-lobed, lobes orbicular, 5-15 x 1-3 cm, base cordate, acuminate at apex, serrate-dentate along margins, sparingly stellate-pilose above, densely tomentose beneath, 5-7-nerved at base, linear, nectary at the base on the midrib beneath; petioles 5-10 cm long, stellate hairy; stipules lanceolate to subulate, stellate hairy. Flowers solitary, axillary or in long stalked racemes of 1-5 flowers; epicalyx segments 5, caducous; calyx with 5 subulate-deltoid segments, ca 5 mm long, cyathiform, stellate hairy; corolla yellow with dark purple centre, campanulate; petals obovate, ca 6 cm long, rounded at apex; staminal column 1-2 cm long, glabrous; ovary hairy. Capsules ovoid to globose or oblong, 3-4 x 1.5-2 cm, minutely stellate hairy, dehiscent into 5-valves; seeds 8-15 per locule, obovoid, ca 4 mm long, angular with short simple hairs in beginning, black.

Fl. & Fr.: August-December.

Common on the hill slopes along the road side in open places. Bed of Mat River, 20 miles East of Lungleh, 450 m, *Wenger*, (*vide* C.E.C. Fischer, *l.c.*); Champhai to Myanmar border, *Deb* 31044; Hnathial-Lungleh Road, *K.P. Singh* 94185.

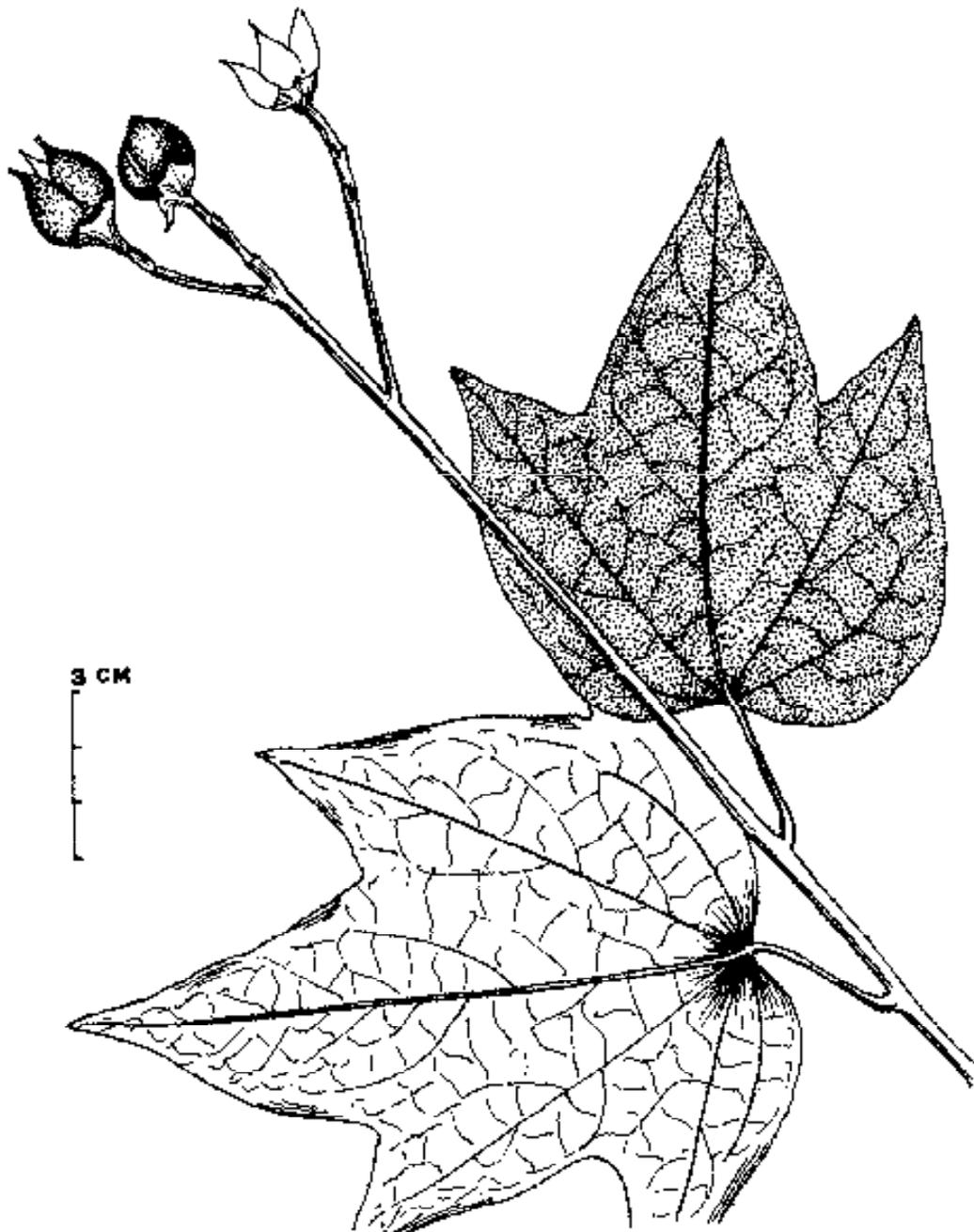


Fig. 39: *Thespesia lampas* (Cav.) Dals & Gibs.

9. URENA L.

Urena lobata L., Sp. Pl. 692. 1753; Masters in Hook. *f.*, Fl. Brit. India 1: 205. 1874; Kanjilal *et al.*, Fl. Assam 1: 141. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 82. 1938; T.K. Paul in Sharma *et al.*, Fl. India 3: 380. 1993. *Leitha, Vawkpuithal* (Lushai). **Fig. 40.**

Much branched, erect undershrubs, up to 1.5 m high. Leaves variously lobed, 4-10 x 2-8 cm, ovate to orbicular-angular or shallowly lobed, lobes 3-5, base cordate, obtuse to acute at apex, crenate to serrate along margins, both surfaces stellate hairy with linear nectaries beneath, 3-7- nerved at base; petioles 1-7 cm long; stipules lanceolate to obovate. Flowers 1.5-2.5 cm across, axillary, solitary or in clusters of 2-3; epicalyx segments 5-8 mm long, cupular, adnate to the calyx at base; calyx tubular to campanulate; sepals ovate to deltoid, 4-6 mm long, corolla pink with purple centre; petals tomentose outside, obovate, 1-1.5 cm long, ovary 5-loculed with one valve in each locule. Schizocarps 5-7 mm across, globular, tomentose, covered with barbed bristles. Mericarps *ca* 4 mm high, dorsally and laterally stellate hairy and reticulately veined; seeds 2-3 mm across, trigonous, angular, vertically grooved, hairy, brown.

Fl. & Fr.: July-February.

Common weed along the road side in open places. Bunglang, *Deb* 31443; Lawngtalai, *Dutta* 33788; Upper Thenzwal, *K.P. Singh* 93922; Leite, *K.P. Singh* 94087; Dampui, *D.K. Singh* 99010; Near Sangau, 1150 m, *Muo* 107185.

BOMBACACEAE

(K.P. Singh)

- 1a. Flowers large; stamens numerous;
filament with a single reniform anther ... 1. *Bombax*
- 1b. Flowers small; staminal tube divided into
4 filaments, each with 2-3 linear anthers ... 2. *Ceiba*

1. BOMBAX L.

- 1a. Trunk prickly; flowers 8-10 cm long; stamens less than 100;
filaments flat; capsules 10-18 cm long; seeds brown ... 1. *B. ceiba*
- 1b. Trunk without prickles; flowers 12-15 cm long;
stamens more than 400; filaments filiform;
capsules 15-20 cm long; seeds black ... 2. *B. insignis*



Fig. 40: *Urena lobata* L.

1. **Bombax ceiba** L., Sp. Pl. 511. 1753, *p.p.*; Nayar & Biswas in Sharma *et al.*, Fl. India 3: 398. 1993. *B. malabaricum* DC., Prodr. 1: 479. 1824; Masters in Hook. *f.*, Fl. Brit. India 1: 349. 1874; Kanjilal *et al.*, Fl. Assam 1: 147. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 82. 1938; *Salmalia malabarica* (DC.) Schott in Schotts & Endl., Melet. Bot. 35. 1832. *Phungchawng* (Lushai).

Large deciduous trees, 30-40 m tall; trunk buttressed with conical woody prickles; crown lax, pyramidal; bark smooth grey. Leaves digitate, 5-7-foliolate; petioles 10-15 cm long, pulvinate; leaflets 8-15 x 3-7 cm, cuneate at base, acuminate at apex, entire along margins, glossy above, puberulous to glabrous beneath; petiolules 1.5-2.5 cm long. Flowers in leaf axils, 8-10 cm long, scarlet-red or white, showy, solitary or in clusters; calyx 2-5-lobed, campanulate; lobes 3-4 cm long; petals 5, fleshy, obovate, 8-15 x 3-4.5 cm; stamens less than 100, in 5-6 bundles; filaments red; ovary conical, woolly or glabrous. Capsules oblong-ovoid, 10-18 cm long, 5-valved, velvety; seeds many, dark brown, smooth surrounded by masses of white silky fibres.

Fl. & Fr.: February-June.

Bukupui, 900 m, Parry 622, (*vide* C.E.C. Fischer, *l.c.*).

2. **Bombax insigne** Wallich, Pl. Asiat. Rar. 1: 71. t. 79, 80. 1830; Masters in Hook. *f.*, Fl. Brit. India 1: 349. 1874; Kanjilal *et al.*, Fl. Assam 1: 148. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 82. 1938; Nayar & Biswas in Sharma *et al.*, Fl. India 3: 398. 1993. *Salmalia insignis* (Wallich) Schott & Endl., Melet. 35. 1932. *Pang* (Lushai).

Large deciduous trees, up to 15 m tall, with buttressed trunk at base but without prickles; bark flesh coloured. Leaves digitately 5-9-foliolate; petioles 12-16 cm long; leaflets oblanceolate or obovate, 9-12 x 3-5 cm, cuspidate-acuminate at apex, glaucous beneath. Flowers 12-15 cm long, solitary, scattered on leafless branchlets, pink-red; calyx 3-5 cm long, campanulate, silky inside; petals 5, 10-15 cm long, scarlet, linear-oblong, stellate-pubescent outside; stamens in 5 bundles, more than 400; filaments filiform. Capsules oblong, 15-20 x 4-5 cm, glabrous, 5-valved; seeds many, obovate, smooth with white silky fibres outside.

Fl. & Fr.: December-April.

Recorded by C.F.C. Fischer (*l.c.*).

2. CEIBA Mill.

Ceiba pentandra (L.) Gaertn., *Fruct. Sem.* 2: 244, t. 133, f.J. 1791; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 29, 1987; Nayar & Biswas in Sharma *et al.*, *Fl. India* 3: 400, 1993. *Bombax pentandrum* L., *Sp. Pl.* 511, 1753. *Eriodendron anfractuosum* DC., *Prod.* 1: 479, 1824; Masters in Hook. *f.*, *Fl. Brit. India* 1: 350, 1874; Kanjilal *et al.*, *Fl. Assam* 1: 148, 1934. *Japanese cotton*; *Japan-Pang* (Lushai).

Tall deciduous trees, 15-20 m, with prickly stem when young, buttressed at base. Leaves digitate, 5-9-foliolate; leaflets 9-12 x ca 4 cm, oblong to oblong-lanceolate, narrowed at base, acuminate at apex, entire, glabrous; petioles 7-25 cm long. Flowers white, usually 2-15 together, rarely solitary, axillary or grouped on defoliate branchlets; stipules caducous; calyx irregularly 5-lobed, campanulate, ca 1 cm long, glabrous outside, silky inside; petals 5, 3.5-4.0 cm long, connate at base, oblong, woolly outside; staminal tube divided into 5 phalanges, each with 3 filiform branches bearing 2-3 anfractose anthers. Capsules fusiform to ellipsoid, 10-18 x 5-6 cm, coriaceous, brown at maturity; seeds many, subpyriform, black, embedded in silky fibres.

Fl. & Fr.: December-April.

Cultivated as a hedge plant, Darlak, Deb 3403.

STERCULIACEAE

(K.P. Singh)

1a. Herbs:

- | | |
|-------------------------------------------------------------------------------|--------------------------|
| 2a. Stamens 5, solitary; staminodes absent | ... 5. <i>Melochia</i> |
| 2b. Stamens 15, in 5 groups of 3 each;
staminodes much longer than stamens | ... 6. <i>Pentapetes</i> |

1b. Shrubs or trees:

- 3a. Flowers unisexual or polygamous; calyx coralline;
petals absent; fruits with distinct follicles :

- 4a. Leaves silvery scaly beneath; anthers 5;
fruits indehiscent samaras ...4. *Heritiera*
- 4b. Leaves without silvery scales beneath;
anthers numerous; fruits dehiscent follicles:
- 5a. Androgynophore much extending beyond
calyx; follicles membranous, opening long
before maturity ...2. *Firmiana*
- 5b. Androgynophore shorter or not extending
beyond calyx; follicles woody, not opening
before maturity:
- 6a. Seeds winged ... 8. *Pterigota*
- 6b. Seeds wingless ... 10. *Sterculia*
- 3b. Flowers bisexual; calyx and corolla distinct; petals present;
fruits combined, without distinct follicles:
- 7a. Woody climbers; capsules covered with
stout prickles and barbs; seeds not winged ...1. *Byttneria*
- 7b. Shrubs or trees; capsules not covered with stout
prickles; seeds winged or not winged:
- 8a. Usually shrubs, rarely small trees ...3. *Helicteres*
- 8b. Large trees :
- 9a. Flowers solitary or in few-flowered cymes,
large; staminal column remains inside the
flowers; staminodes 5; anthers stipitate ...7. *Pterospermum*
- 9b. Flowers in many-flowered corymbose
panicles, small; staminal column exerted;
staminodes absent; anthers sessile ...9. *Reevesia*

1. BYTTNERIA Loefl.

- 1a. Leaves glabrate, entire along margins;
capsules distantly covered stout prickles ... 1. *B. grandifolia*
- 1b. Leaves 3-5-lobed, serrulate along margins;
capsules densely covered with barbed prickles ... 2. *B. pilosa*

1. *Byttneria grandifolia* DC., Prodr. 1: 486. 1824; K.C. Malick in Sharma *et al.*, Fl. India 3: 410. 1993, *Byttneria aspera* Colebr. ex Wallich in Roxb., Fl. India 2: 383. 1824; Masters in Hook. *f.*, Fl. Brit. India 1: 377. 1874; Kanjilal *et al.*, Fl. Assam 1: 160. 1934; C.E.C. Fischer in Rec.

Bot. Surv. India 12(2): 82. 1939. *Jong-long-rhui*, *Zawnghuanghrui* (Lushai).

Large climbing or straggling shrubs; young branches grooved, stellate-tomentose. Leaves orbicular, ovate-orbicular, 11-18 x 10-18 cm, base cordate, 5-7-nerved, abruptly acuminate at apex, entire along margins, glabrate above, puberulous along the nerves beneath; lateral nerves 4-5-paired; petioles 5-12 cm long, sulcate, tomentose; stipules linear-lanceolate, deciduous. Flowers 4-6 mm across, axillary, in panicles or cymose umbels; sepals 4-5 mm long, connate below, tomentose, lanceolate; petals 4-5 mm long, clawed with hooded limb. Capsules 3-5 cm across, globose, woody, septically 5-valved, glabrous, covered with stout prickles; prickles sharp, curved, distantly situated, conical; seeds ovate-oblong, ca 5 x 3 mm, 1 in each locule, immersed in watery sap.

Fl. & Fr.: April-December.

Climbing on large trees in evergreen forests. Lungleh, 900 m, *Gage* 69, (CAL); Mizo hills, *Dutta* 33419.

2. *Byttneria pilosa* Roxb., Fl. India 1: 618, 381. 1824; Masters in Hook.f., Fl. Brit. India 1: 377. 1874; K.C. Mallick in Sharma *et al.*, Fl. India 3: 414. 1993; Kanjilal *et al.*, Fl. Assam 1: 160. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 83. 1938. *Sazukhnawnghlap*, *Zazuunghawnghlap* (Lushai); *Damsaw*, *Dum-shoh* (Riang). Fig. 41.

Large, woody, climbing shrubs; branchlets grooved, densely stellate-pubescent. Leaves orbicular to ovate, 6-16 x 7-15 cm, ± shallowly 3-5-lobed; lobes deltoid, base cordate, 7-9-nerved, abruptly acuminate at apex, serrulate-dentate along margins, stellately pubescent on both surfaces; lateral nerves 3-5, paired; petioles 3-12 cm long, pilose. Flowers in axillary paniculate cymes, 4-6 mm across, orange-yellowish; sepals longer than petals, tomentose, ca 3 mm long; petals yellow, incurved; anthers yellow; staminodes ovate. Capsules subglobose, 1.5-2 cm across, septically 5-valved, densely covered with barbed prickles; prickles soft and thin; seeds 1 in each locule, triangular, ca 5 x 2 mm.

Fl. & Fr.: September-May.

Common in shaded places in scrub jungles and shrubby areas. Between Lungleh and Ridge camp, 900 m, *Gage* 200, (CAL); Donkomia-

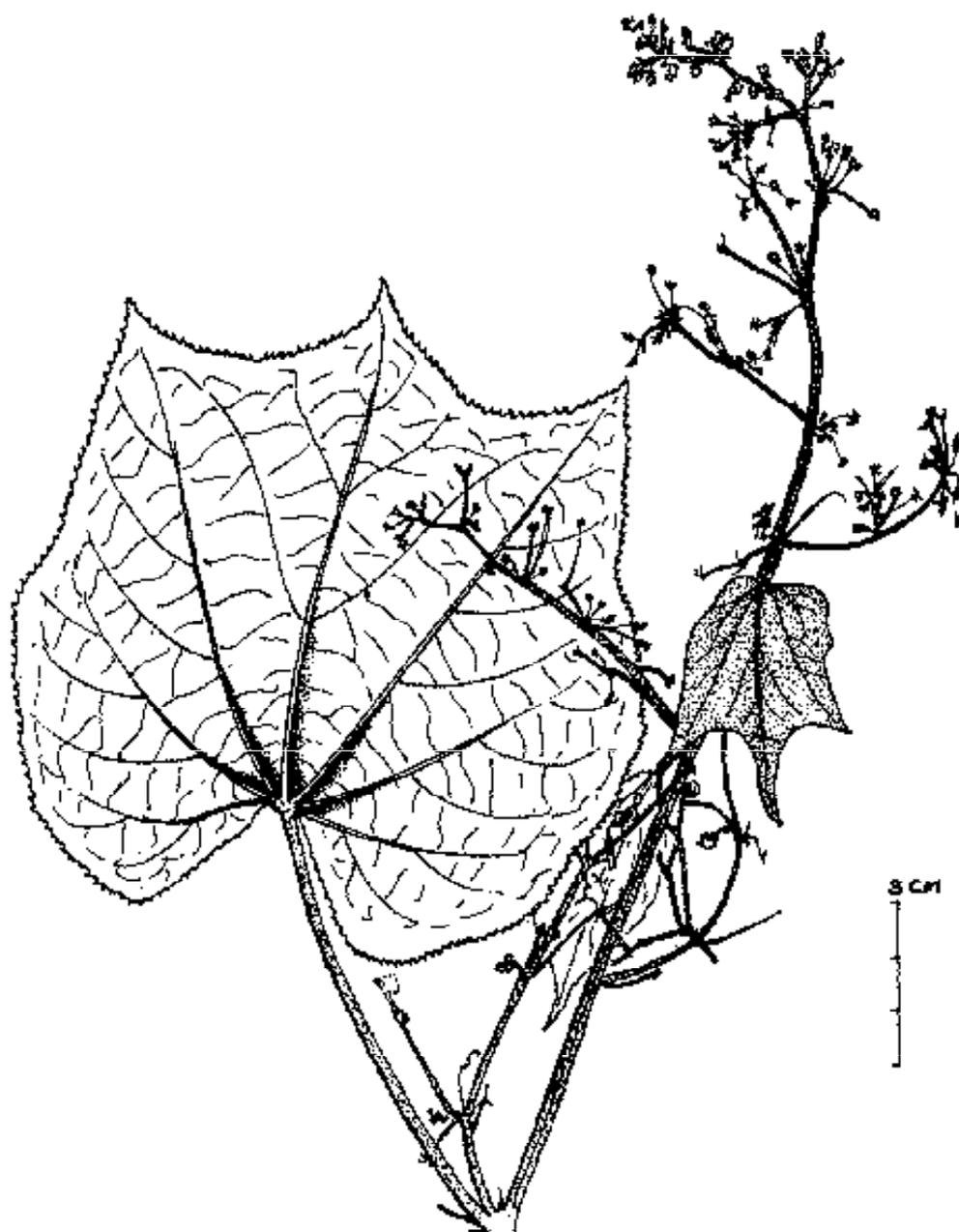


Fig. 41: *Byttneria pilosa* Roxb.

Pangsai, 1050 m, *Leslie* 388 (CAL); Thenzawl, *K.P. Singh* 93884; Tlabung, *K.P. Singh* 94297; Dampa, *D.K. Singh* 98978; Hnathial-Aizawl road, 750 m, *Mao* 107062.

2. FIRMIANA Marsili

Firmiana colorata (Roxb.) R. Br. in Benn. & R.Br., Pl. Java Rar. 235. 1844 (quoad var. a); K.C. Malick in Sharma *et al.* Fl. India 3: 420. 1993. *Sterculia colorata* Roxb., Pl. Corom.1: 26, t. 25. 1795., quoad t. 25. descr. excl. & Fl. Ind. 3: 146. 1832, *p.p.*; Masters in Hook. *f.*, Fl. Brit. India 1: 359. 1874; Kanjilal *et al.*, Fl. Assam 1: 151. 1934. *Erythropsis colorata* Roxb. in Gard. Bull. S.S. 5: 231. 1931; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 83. 1938. *Khaukhim* (Lushai).

Tall deciduous trees, up to 25 m, young parts ± pubescent. Leaves variable in size and shape, palmately 3-5-lobed, or slightly lobed or not lobed on mature trees, 10-18 x 10-22 cm, base truncate or cordate, lobes caudate-acuminate at apex, entire along margins, glabrescent on both surfaces, 5-7-nerved at base; petioles 7-26 cm long, pulvinate. Flowers 2-3 cm across, in short, scurfy-tomentose, axillary or terminal; panicles or racemes; calyx funnel-shaped, 1-1.5 cm long, stellate-tomentose outside, velvety inside; androgynophore exerted, 5-10 mm long; anthers 10, 2-celled; carpels at the tips, 3-5-lobed. Follicles 6-8 x 2-4 cm, opening at early stage, stipitate, membranous, compressed, glabrous; seeds 2- 3 in each follicle, ovoid, yellow, smooth, compressed.

Fl. & Fr.: February-June.

Frequent in deciduous forests. Aizawl, 1200 m, *Parry* 637, (*vide* C.E.C. Fischer, *l.c.*); Near Fort Lungleh, 900-1200 m, *Gage* 111 (CAL).

3. HELICTERES L.

Helicteres plebeja Kurz in J. As. Soc. Bengal 39: 67. 1870; K.C. Malick in Sharma *et al.*, Fl. India 3: 427. 1993. *H. glabriuscula* Wallich [Cat. No.1185. (1831), *nom. nud.*] *ex* Masters in Hook. *f.*, Fl. Brit. India 1: 366. 1874. Fig. 42.

Diffuse shrubs; branches purple, glabrescent. Leaves obliquely lanceolate, 8-11 x 1.5-3 cm, base cordate, acuminate at apex, serrulate

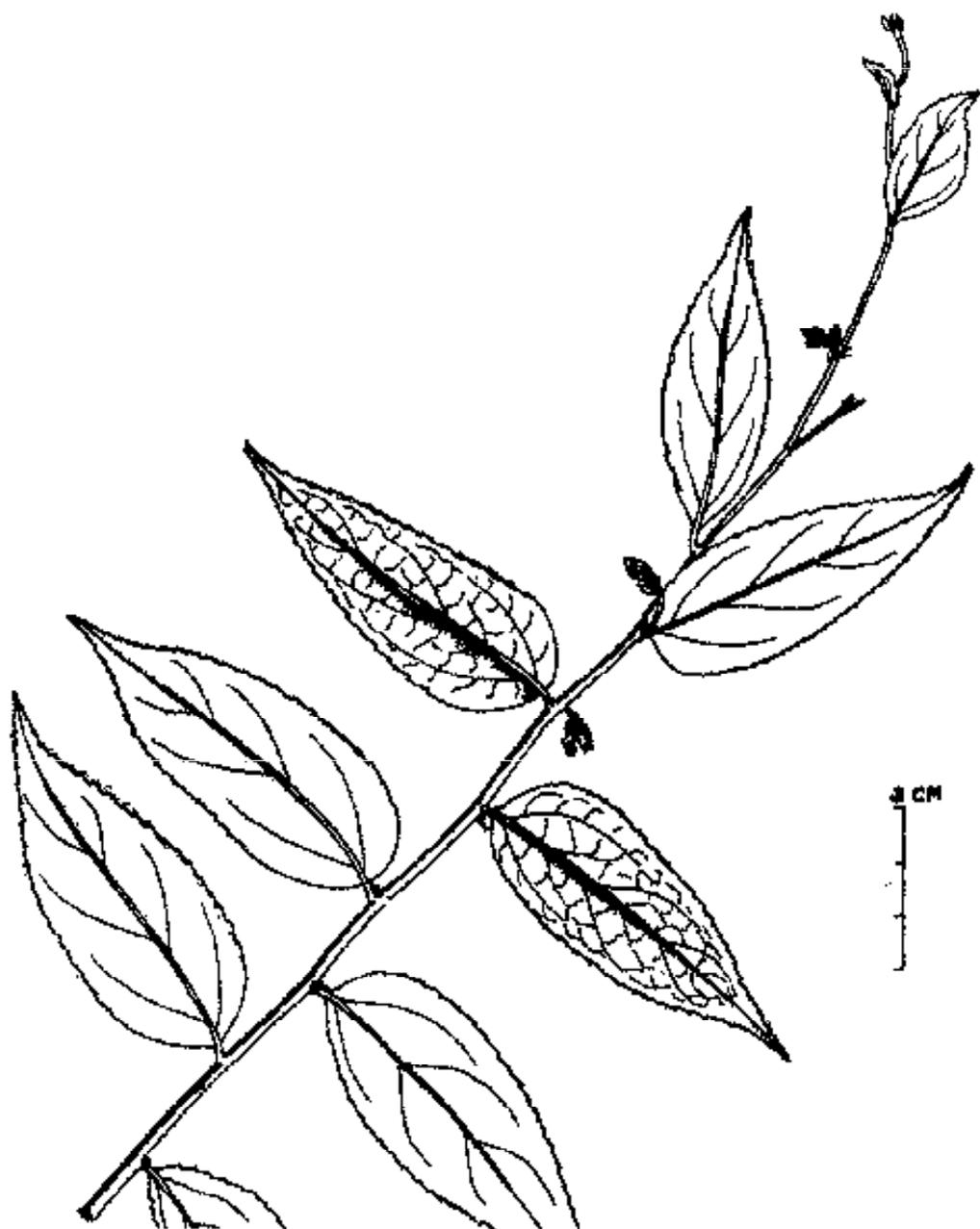


Fig. 42: *Helicteres plebeja* Kurz

along margins, thinly stellate-hairy; petioles 5-6 mm long; stipules subulate, caducous. Flowers in spikes, calyx ca 6 mm long. Ripe carpels 1.5-2 cm long, oblong, not twisted spirally, beaked, hairy.

Fl. & Fr.: June-February.

Saiha, Dutta 33806.

4. HERITIERA Aiton

Heritiera papilio Beddome, Fl. Sylvatic. 218, 1872; Masters in Hook. f., Fl. Brit. India 1: 363, 1874; K.C. Malick in Sharma *et al.*, 3: 430, 1993. *H. acuminata* Wallich ex Kurz in J. Bot. 12: 65, t. 141, f. 1. 1-3, 1874; Kanjital *et al.*, Fl. Assam 1: 155, 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 83, 1938. *Arkhar* (Lushai).

Large trees; young branches stellately-tomentose. Leaves unifoliate, lanceolate or ovate-lanceolate, 6-12 x 3-5 cm, base obtuse, acuminate at apex, coriaceous, glabrous above, silvery stellate hairy or brown scaly beneath; lateral nerves 4-5 pairs; petioles 1-2 mm long, scaly. Panicles 4-5 cm long, axillary, much branched, rusty stellate-pubescent. *Male flowers*: 4-5 mm long, cream-coloured; calyx campanulate, 4-5-lobed; staminal column slender; anther thecae in a regular ring in an androgynophore. *Female flowers*: calyx 5-6-lobed with 5-6 sessile ovaries. Fruit a samara, 5-7 cm long, glabrous, strongly veined, with a long membranous wing, 1-seeded.

Fl. & Fr.: April-December.

Wenger, s.num., s.loc., (fide C.E.C. Fischer, l.c.).

5. MELOCHIA L.

Melochia corchorifolia L., Sp. Pl. 675, 1753; Masters in Hook. f., Fl. Brit. India 1: 374, 1874; K.C. Malick in Sharma *et al.*, Fl. India 3: 441, 1993.

Small herbs, up to 1 m high; stems slender, glabrous. Leaves variable, ovate, oblong-ovate, ovate-lanceolate, 2-3 x 1-1.3 cm, base rounded or cordate, acute to rounded at apex, irregularly serrate along the margins,

glabrous on both surfaces or thinly hairy on nerves beneath, 5-nerved at base; petioles 1-1.5 cm long. Flowers pink-violet, in crowded terminal heads; calyx 5, connate at base, 1-2 m long, ciliate, hairy out side; petals 5, free, obovate, 2-4 mm long; stamens 5; staminal cup spindle-shaped; ovary 5-loculed, hairy. Capsules globose to subglobose, 3-5 mm across, hispid, loculicidally 5-valved; seeds brown, 2 mm long, 1 in each locule, trigonous.

Fl. & Fr.: July-April.

Common. Thenzawl-Buarpui road, *K.P. Singh* 93967.

6. PENTAPETES L.

Pentapetes phoenicea L., Sp. Pl. 698; Masters in Hook. f. Fl. Brit. India 1: 371. 1874; K.C. Mallick in Sharma *et al.*, Fl. India 3: 443. 1993. *Tangka Par* (Lushai).

Branched herbs, up to 2 m high, glabrous or sparsely stellate hairy. Leaves deltoid to hastate to linear, 4-12 x 0.4-0.7 cm, base deltoid, acute at apex, crenate-serrate along the margins, glabrous above, stellate hairy on the veins beneath, 1-nerved at base; petioles *ca* 1 cm long; stipules subulate. Flowers deep red, 1-2 in axillary fascicles; calyx 5-lobed, connate at base, lobes 1-1.2 cm long, stellate-hairy with simple bristles out side; petals 5, obovate, *ca* 1.2 cm long, truncate; stamens 15 in 5 groups of 3 each; ovary 5-locular with many ovules in each locule. Capsules subglobose to oblong, 1-1.5 x 0.5-1 cm, 5-valved, stellate-tomentose with bristles; seeds obovate, *ca* 2 mm long, dotted.

Fl. & Fr.: September-January.

A monotypic genus, scarce in the area. Usually cultivated. Bindamaswar, *K.P. Singh* 94279.

7. PTEROSPERMUM Schreb.

- 1a. Leaves semi sagittate at base; capsules terete ... 3. *P. semisagittatum*
 1b. Leaves not semisagittate at base;
 capsules terete or angular:

- 2a. Leaves broadly ovate to elliptic-oblong,
12-40 cm long; calyx lobes fleshy; capsules angular ...1. *P. acerifolium*
- 2b. Leaves lanceolate or oblong-lanceolate;
calyx lobes not fleshy; capsules terete ...2. *P. lancifolium*

1. *Pterospermum acerifolium* (L.) Willd., Sp. Pl. 3: 729. 1800; Masters in Hook. *f.*, Fl. Brit. India 1: 368. 1874, *p.p.*; Kanjilal *et al.*, Fl. Assam 1: 157. 1934; S.K. Chandra in Sharma *et al.*, Fl. India 3: 448. 1993. *Pentapetes acerifolia* L., Sp. Pl. 698. 1753. *Siksil, Siksilthina, Waisil Thing, Kharpuw* (Lushai). **Fig. 43.**

Tall evergreen trees, 12-15 m with oval crown; young parts brown, stellate-tomentose. Leaves variable in shape and size, broadly ovate to elliptic-oblong or orbicular, often variously lobed, 12-40 x 12-25 cm, base cordate or peltate, acute at apex, entire or remotely toothed along margins, coriaceous, glabrous above, brown tomentose beneath, palmately 7-9-nerved at base; lateral nerves 3-6-paired; petioles 4-10 cm long. Flowers solitary or in 2-3-flowered cymes, white, fragrant; sepals fleshy, linear, 8-12 x 0.8-1 cm, brown, densely tomentose; petals twisted, slightly shorter than sepals, white; staminodes up to 7 cm long; ovary oblong, obscurely 5-angled. Capsules oblong, 12-16 x 5-8 cm, woody, 5-celled, 5-angled, brown-tomentose; seeds rhomboid, 4-6 cm long (including wings), compressed, winged at one end.

Fl. & Fr.: May-February.

Moderately seen on hill slopes in mixed deciduous forests. Kawnpui, on way to Hartawki, *K.P. Singh* 93269.

2. *Pterospermum lancifolium* Roxb., [Hort. Beng 50. (1814), *nom. nud.*] Fl. Ind. 3: 163. 1832; Masters in Hook. *f.*, Fl. Brit. India 1: 368. 1874; Kanjilal *et al.*, Fl. Assam 1: 158. 1934 (as '*lancaefolium*'); S.K. Chandra in Sharma *et al.*, Fl. India 3: 450.1993. *Sakhipelthnam* (Lushai).

Evergreen trees, 12-20 m tall; young parts greyish or whitish tomentose. Leaves lanceolate, oblong-lanceolate, 7-13 x 2-4 cm, base obliquely rounded or subcordate, acuminate at apex, entire along margins, glabrous above, greyish or whitish tomentose beneath; lateral nerves 4-5 pairs; petioles 0.3-1 cm long, stipules linear-subulate, 2 - 3 fid. Flowers 4-6 cm across, pale-white, fragrant, solitary, axillary on 4-5 cm long,

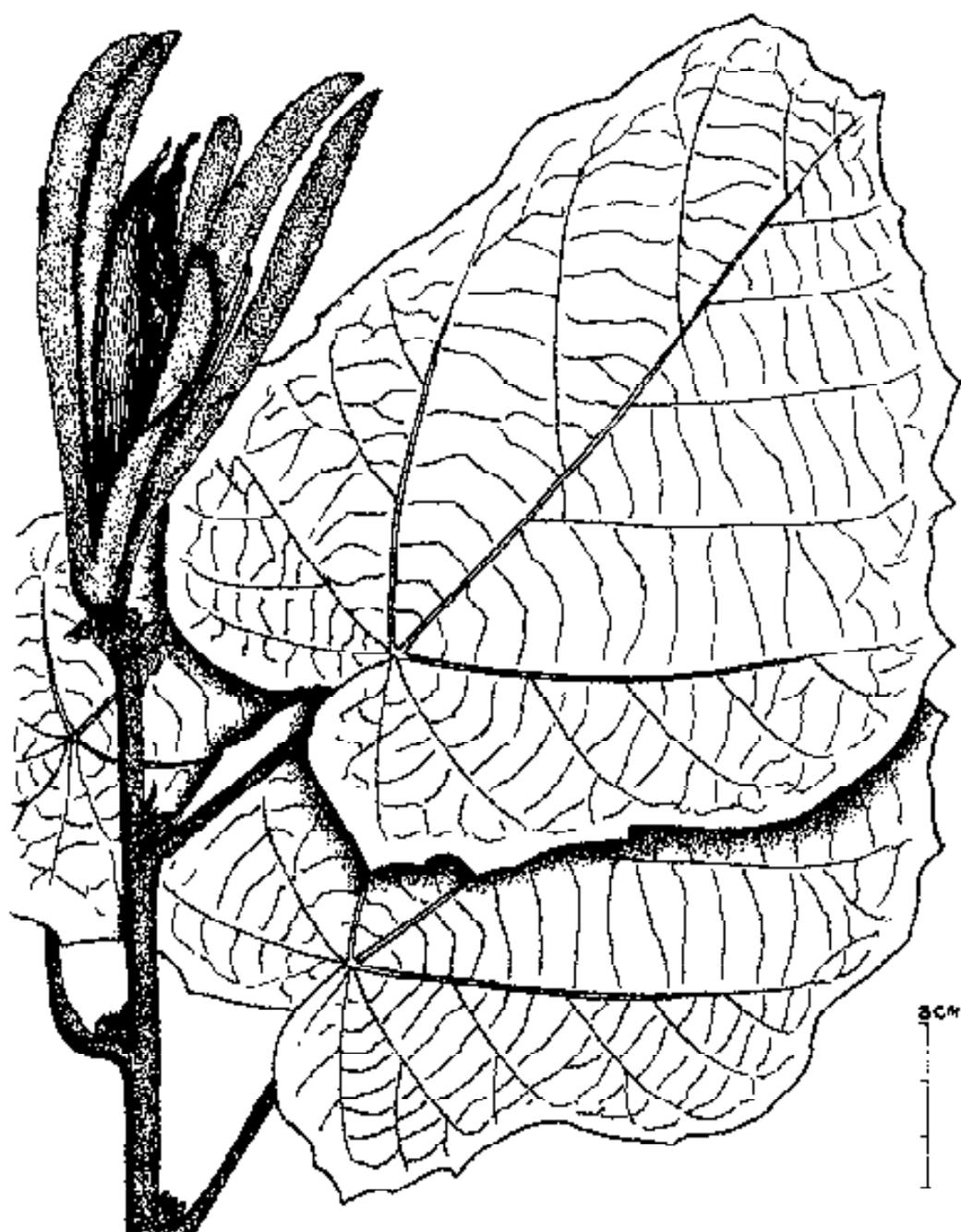


Fig. 43: *Pterospermum acerifolium* (L.) Willd.

tomentose peduncles; sepals linear, 3-3.5 cm long, brown hairy outside, villous inside; petals obliquely cuneate, white, slightly longer than sepals. Capsules elliptic-ovoid, 6-8 x 1.5-2.5 cm, woody, loculicidally 5-celled, 5-angled, terete, covered by greyish or whitish tomentum; seeds 2-4 in each locule, 3-4 cm long, winged, compressed, papery, brown.

Fl. & Fr.: March-October.

Included on the basis of state Forest department records.

3. ***Pterospermum semisagittatum*** Buch.-Ham. ex Roxb. [Hort. Beng. 50. (1814) *nom. nud.*], Fl. Ind. 3: 160. 1832; Masters in Hook. f., Fl. Brit. India 1: 368. 1874; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 83. 1938. S.K. Chandra in Sharma *et al.*, Fl. India 3: 453. 1993. *Mukau* (Lushai).

Large deciduous trees, 10-18 m tall, young parts tomentose. Leaves oblong-lanceolate, 11-18 x 3-4 cm, base unequally or obliquely cordate or rounded with one lobe much larger and sagittate, acuminate at apex, entire, glabrescent above, hoary beneath; lateral nerves 5-7-paired; petioles short, 3-4 mm long; stipules pinnatifid. Flowers 11-15 cm across, white, usually solitary, terminal or axillary on short drooping brownish tomentose peduncles; sepals 5, linear, ca 10 cm long, stellate-tomentose outside, velvety inside; petals 5, obliquely obovate-cuneate, 4-5 cm long, fragrant. Capsules elliptic-oblong, 5-8 x 2.5-3.5 cm, woody, covered with yellowish brown tomentum, terete, shortly beaked; seeds ca 10 in each locule, winged.

Fl. & Fr.: July-February.

Common in mixed and dry forests. In mountain forest, 750-900 m, Wenger 267, (*vide* C.E.C. Fischer, *l.c.*); Hauruang, 4 miles from Lungleh, 666 m. Deb 31405.

8. **PTERYGOTA** Schott & Endl.

Pterygota alata (Roxb.) R. Br. in Benn. & R. Br., Pl. Java Rar. 234. 1844; K.C. Malick in Sharma *et al.*, Fl. India 3: 454. 1993. *Sterculia alata* Roxb., Pl. Corom. 3: 84, t. 287. 1820; Kanjilal *et al.*, Fl. Assam 1: 153. 1934. *Phunber-pui* (Lushai).

Tall trees, up to 40 m, with a high narrow conical crown; trunk straight; young parts golden stellate-pubescent. Leaves simple, crowded at the end of branches, broadly ovate to cordate, 14-22 x 12-17, base cordate to truncate, subacute at apex, entire along margins, glabrous, 7-nerved at base; petioles 5-8 cm long. Flowers 1.5-2.5 cm across, brownish-yellow in few-flowered axillary panicles; calyx 5-6-lobed; lobes linear-lanceolate, ca 1 cm long, stellate-hairy outside. *Male flowers*: staminal column 0.7-1.5 cm long, bearing 4-6 sterile carpels a top, around which stamens are arranged in 4-5 groups. *Female flowers*: carpels sessile, style recurved; stamens in bisexual flowers similar to those in male flowers. Follicles 4-10 cm across, woody, shortly stalked; seeds many, winged, elliptic, compressed.

Fl.: Dec.-March: *Fr.*: July-March.

In evergreen forests. Tuivawli, *M. Sawmliana* 99248.

9. REEVESIA Lindley

Reevesia wallichii R. Br. in Benn. & R.Br., Pl. Java Rar. 231. 1844; Masters in Hook. f., Fl. Brit. India 1: 364. 1874; Kanjilal *et al.*, Fl. Assam 1: 159. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 59. 1987; K.C. Malick in Sharma *et al.*, Fl. India 3: 456. 1993. **Fig. 44.**

Trees, up to 18 m tall. Leaves ovate or ovate-oblong, 10-14 x 4-6 cm, base rounded, acuminate at apex, entire along margins, coriaceous, glabrous above, sparsely-pubescent beneath; lateral nerves 6-8 pairs; petioles 2-3 cm long; stipules deciduous. Flowers white, scented, in dense corymbiform panicles of cymes; panicles terminal or from axils of fallen leaves; calyx finally 5-lobed, 3-4 mm long, stellate-tomentose; petals spatulate, 1-1.5 cm long, clawed; staminal column exceeding the petals with a globose head of anthers in 5 bundles of 3 each. Capsules obovoid-oblong, 4-5 x 2-6 cm, pendulous, 5-loculed, brown, tomentose outside; valves woody, dorsally keeled, dehiscing septically; seeds 1-2, 2-3 cm long, winged.

Fl. & Fr.: April-February.

Kolasib-Chumliang, *Dutta* 33292; Sairep, *Dutta* 33581; Tawipui, *Dutta* 33664.

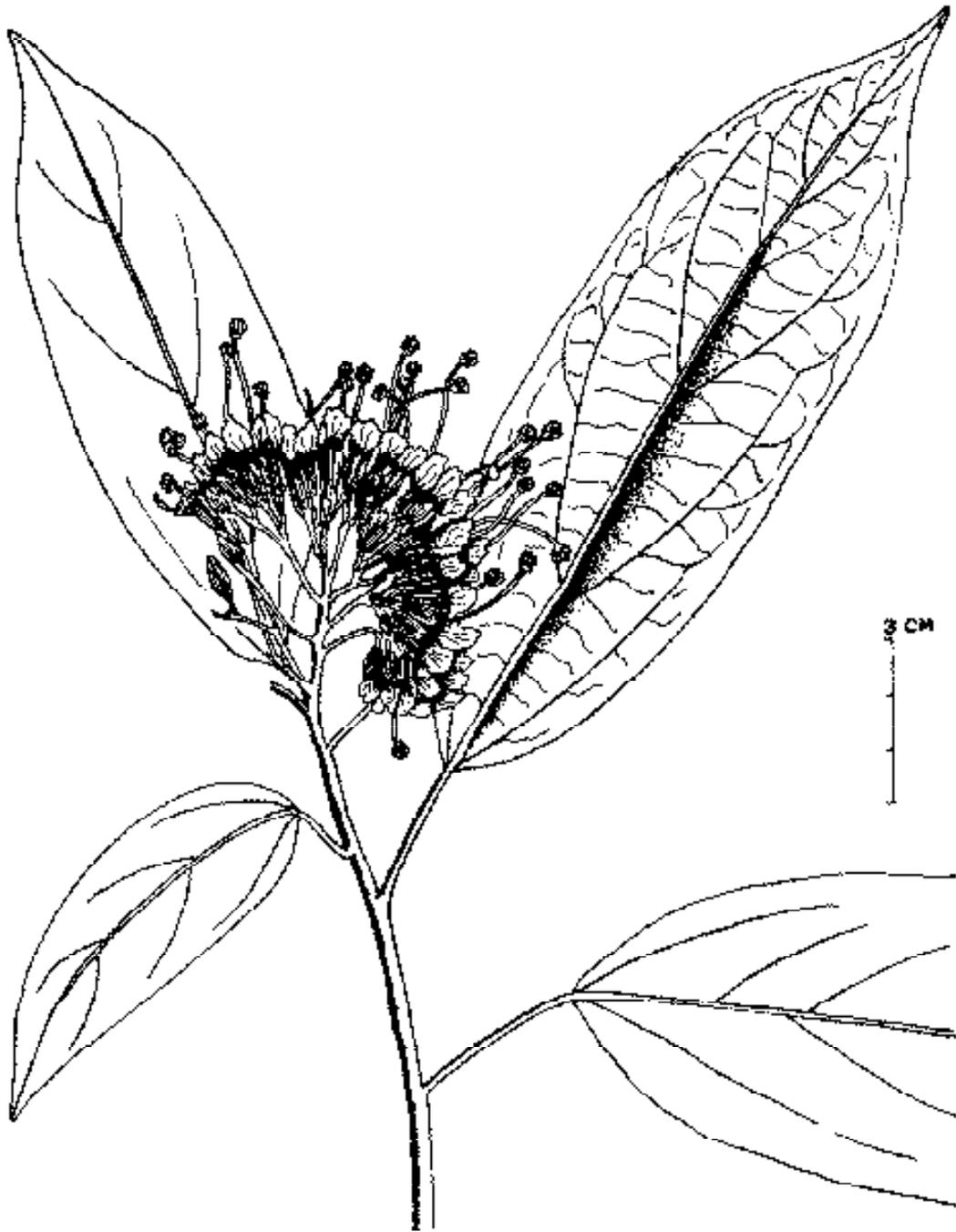


Fig. 44: *Reevesia wallichii* R. Br.

10. STERCULIA L.

- 1a. Deciduous trees; leaves palmately lobed:
- 2a. Flowers 1-1.5 mm across; follicles cylindrical, glabrescent ... 2. *S. ornata*
- 2b. Flowers 6-7 mm across; follicles oblong or obovoid, tomentose:
- 3a. Leaves shallowly 5-lobed; lobes entire, velvety beneath; panicles erect; follicles covered with short tomentum intermixed with numerous stiff fragile hairs ... 5. *S. urens*
- 3b. Leaves deeply 5-7-lobed; lobes 3-fid, villous beneath; panicles pendulous; follicles uniformly tomentose ... 6. *S. villosa*
- 1b. Evergreen trees; leaves simple:
- 4a. Follicles leafy, boat shaped ... 4. *S. scaphigera*
- 4b. Follicles woody or coriaceous, not boat shaped:
- 5a. Leaves attenuate at base, minutely adpressed hairy beneath; panicles drooping; sepals tapering, caudate, hairy; follicles crimson-red ... 1. *S. hamiltonii*
- 5b. Leaves rounded at base, glabrous on both surfaces; racemes erect; sepals glabrous; follicles pink ... 3. *S. roxburghii*

1. *Sterculia hamiltonii* (O.Kuntze) Adelb. in Blumea 5: 506. 1945 & in Backer, Bakh. f., Fl. Java Afl. 4b. fam. 107: 23. 1944; Fl. Java 1: 413. 1964; K.C. Malick in Sharma *et al.*, Fl. India 3: 464. 1993. *Clompanus hamiltonii* O. Kuntze, Rev. Gen. Pl. 1: 77. 1871. *Sterculia coccinea* Roxb. [Hort. Beng. 50. (1814), *nom. nud.*], Fl. Ind. 3: 151. 1832, *non* Jack 1822; Masters in Hook. f., Fl. Brit. India 1: 357. 1874; Kanjilal *et al.*, Fl. Assam 1: 153. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 83. 1938. Fig. 45.

Shrubs or small trees, 5-10 m tall. Leaves oblanceolate or oblong-elliptic, 12-26 x 5-10 cm, tapering at base, abruptly short acuminate at apex, entire along margins, coriaceous, glabrous above, sparsely stellately hairy beneath; lateral nerves 10-12-paired; petioles 2-5 cm long. Flowers in axillary rarely supra axillary, in 10-25 cm long, drooping panicles, 1.5-2 cm across, pinkish-red, velvety outside; calyx 5, tubular; lobes narrow, 8-12 mm long, patently white hairy outside. *Male flowers*: staminal column

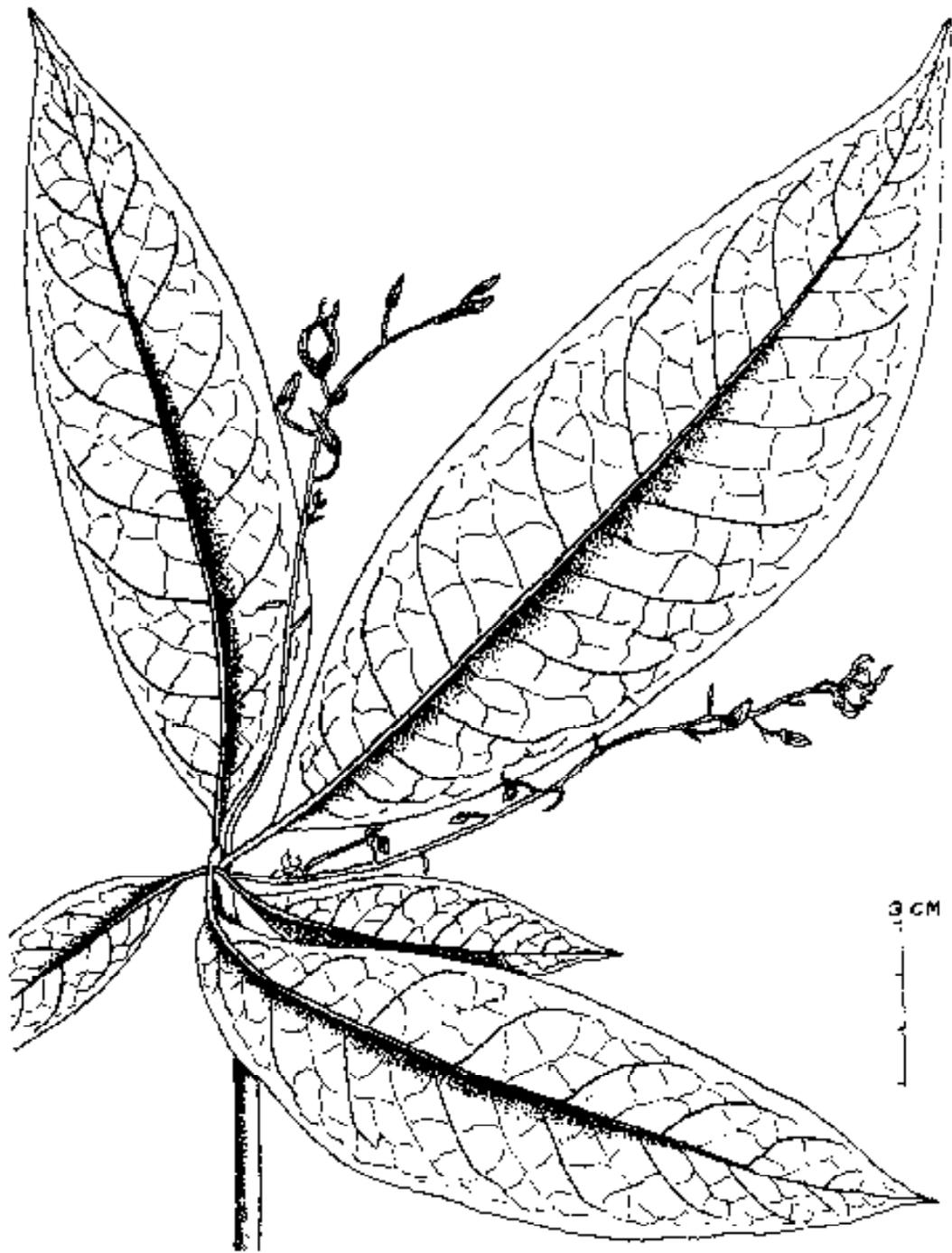


Fig. 45: *Sterculia hamiltonii* (O.Kuntze) Adelb.

short, curved, glabrous, 4-5 mm long; *Female flowers*: ovary hairy with sterile anthers at base, *ca* 2 mm long. Follicles 2-5, oblong-lanceolate, 6-10 x 1-2 cm, drooping, beaked, spreading, crimson red inside, velvety outside, compressed; seeds 4-8, 1-1.5 x *ca* 0.8 cm, black, ovoid, smooth.

Fl. & Fr.: April-October.

Common in dense evergreen forests along the road side. Lushai hills, *Parry s.num.* (CAL); Sonai-Sakachu, *Leslie* 42 (CAL); Sairep forest, *Dutta* 33574; Thingfal to Lawngtalai, *Dutta* 33714.

2. *Sterculia ornata* Wallich *ex* Voigt, *Cat. Hort. Calc* 42(1-4): 105, 1873 & in *J. As. Soc. Bengal* 42(2): 228, 1873; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 83, 1938.

Deciduous trees, up to 15-20 m tall, young shoots tomentose. Leaves 30-40 cm in diam., palmately 5-7-lobed, lobes acuminate, densely pubescent beneath with stellate hairs. Flowers 1-1.5 cm across, pale-ochraceous with reddish base, in tomentose, terminal panicles on thick branches; calyx tomentose, lobes lanceolate, spreading; ovaries hispid-tomentose. Follicles 5-7, rather cylindrical, 5-7 cm long, covered with fragile short hairs, glabrescent; seeds many, oblong, black.

Fl. & Fr.: February-April.

Lushai hills, *Parry, s.num.* (CAL).

3. *Sterculia roxburghii* Wallich [Cat. No. 1124 (1830), *nom. nud.*], *Pl. Asiat. Rar.* 3: t. 262, 1832; *Masters in Hook. f., Fl. Brit. India* 1: 356, 1874; *Kanjilal et al., Fl. Assam* 1: 153, 1934; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 83, 1938; K.C. Malick in *Sharma et al., Fl. India* 3: 468, 1993. *Tlingileh, Ngamianchawltuaina* (Lushai).

Medium sized trees, 6-15 m tall. Leaves oblong-elliptic to oblanceolate, 8-14 x 3-6.5 cm, base rounded or subcordate, abruptly acuminate at apex, entire along margins, coriaceous, glabrous; lateral nerves 6-8-paired; petioles 1-5 cm long, swollen at both ends. Panicles axillary or extra-axillary, 5-10 cm long, simple or compound, stellate-pubescent. Flowers 1.5-2 cm across, red; calyx lobes ovate-lanceolate, 6-8 mm long, scarlet-brownish, pubescent out side. *Male flowers*: staminal column *ca* 1 mm

long. *Female flowers*: ovary on gynandrophore, with 5 stigmas. Follicles 1-5, 6-8 x 1.8-2.5 cm, scarlet, long-beaked, ellipsoid-lanceolate, compressed; seeds 4-8 in each follicle, 2 cm long, oblong, black.

Fl. & Fr.: February-August.

Recorded by C.E.C. Fischer (*l.c.*).

4. *Sterculia scaphigera* Wallich [Cat. No. 1130. (1830), *nom. nud.*] *ex* Masters in Hook. *f.*, Fl. Brit. India 1: 361. 1874. *Scaphium wallichii* Sch. *et* Endl., R.Br. in Bennet & Brown, Pl. Jav. Rar. 236. 1844; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 83. 1938.

Tall deciduous trees, 30-40 m, all parts glabrous. Leaves oblong to ovate-oblong, 15-30 x 12-15 cm, base rounded, bluntly acuminate at apex, entire along margins, coriaceous, glabrous; petioles 4-12 cm long. Flowers paniced at the end of the thick branchlets, 7-9 cm across; calyx 5-lobed, 4-6 mm long, oblong-lanceolate, orange or yellowish with reddish base, stellate-puberulous. *Male flowers*: stamens 10-15 with pilose anthers. *Female flowers*: ovary villous on long gynophore. Follicles boat-shaped, 15-18 x 7-9 cm, much nerved and veined, \pm puberulous outside, 1-2-seeded; seeds globose, 1.5-2 cm in diam.

Fl. & Fr.: February-April.

Wenger s.num., s.loc., (fide C.E.C. Fischer, l.c.).

5. *Sterculia urens* Roxb., Pl. Corom. 1: 25. t. 24. 1795; Masters in Hook. *f.*, Fl. Brit. India 1: 355. 1874; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 83. 1938; K.C. Malick in Sharma *et al.*, Fl. India 3: 470.1993. *Pangkhau* (Lushai).

Soft woody trees with white papery bark. Leaves simple, crowded at the end of branches, digitately 3-5-lobed, 18-25 cm in diam., base cordate, caudate-acuminate at apex, entire along margins, glabrous or nearly so above, tomentose beneath; petioles 10-12 cm long, terete. Flowers in terminal panicles, 6-7 mm across, yellow; panicles tomentose, brown, 10-15 cm long, male and female flowers mixed; calyx 5-partite with acute tomentose spreading lobes, 5 mm long. *Male flowers*: staminal column 3 mm long with 10-15 anthers on top. *Female flowers*: ovaries with sterile

hairs at base, on ca 3 mm long gynandrophore. Follicles 4- 5, oblong to ovoid-oblong, 3-4.5 x 1.5-2 cm, orange to bright red, pubescent, with stinging hairs intermixed; seeds 3-6 in each follicles, oblong, 6-7 x ca 5 mm, black.

Fl. & Fr.: October-April.

Recorded by C.E.C. Fischer (*l.c.*).

6. *Sterculia villosa* Roxb. [Hort. Beng. 50. (1814), *nom. nud.*] *ex* Smith in Rees, Cycl. 34: no. 16, 1816; Masters in Hook. *f.*, Fl. Brit. India 1: 355, 1874; Kanjilal *et al.*, Fl. Assam 1: 151 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 83, 1938; K.C. Malick in Sharma *et al.*, Fl. India 3: 472, 1993. *Khaupui* (Lushai).

Deciduous trees, 10 -15 m tall: young parts brown tomentose with stellate hairs. Leaves simple, deeply palmately 5-7-lobed, crowded at the end of branchlets, 25-45 cm in diam., base cordate, lobes oblong or ovate-oblong, acuminate at apex, sometimes 3-fid, stellate hairy above, tomentose beneath; lateral nerves 5-7-paired; petioles 25-60 cm long, tomentose. Flowers 0.6-1.5 cm across, pinkish-yellow in crowded drooping panicles; panicles 15-30 cm long, terminal, brown, tomentose, male and female flowers intermixed; calyx campanulate with short, acute, pubescent lobes. *Male flowers*: staminal column short with 10 anthers. *Female flowers*: ovary 5, hairy; stigma 5-lobed. Follicles 2-5, 3-4 x 1.5-3 cm, sessile, oblong, reddish brown, tomentose outside, scarlet-red inside; seeds 3-5 in each follicle, 1 x 0.5 cm long, oblong, black.

Fl. & Fr.: March-September.

Common in deciduous forests. Sairang, 600 m. *G.K. Deka* 23470; Hauruang, 4 miles from Lungleh, *Deb* 31360; Tuipui, on the way to Darzo, *K.P. Singh* 96938.

TILIACEAE

(K.P. Singh)

- 1a. Fruits winged ...1. *Colona*
- 1b. Fruits not winged:
 - 2a. Trees or shrubs; fruit a drupe ...3. *Grewia*
 - 2b. Herbs or undershrubs; fruit a capsule:

- 3a. Capsules echinate ...4. *Triumfetta*
 3b. Capsules not echinate ...2. *Corchorus*

1. COLONA Cav.

Colona floribunda (Kurz) Craib. in Bull. Misc. Inform. 1925: 21. 1925 & Fl. Siam. Enum. 1(1): 188. 1925; Daniel & Chandrabose in Sharma *et al.*, Fl. India 3: 482. 1993. *Columbia floribunda* Kurz in J. As. Soc. Bengal 42(2): 63. 1873; Masters in Hook. f., Fl. Brit. India 1: 393. 1874.; Kanjilal *et al.*, Fl. Assam 1: 169. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 83. 1938. *Thaltre*, *Thalchnu*, *Hnahthep* (Lushai). **Fig. 46.**

Medium sized trees, up to 15 m tall; young parts scabrid with short stellate hairs. Leaves rotundate-ovate or obovate-oblong, often shortly lobed, 9-15 x 3-15 cm, base rounded or cordate, 3-7-nerved, acute at apex, irregularly gland-toothed, subcoriaceous, rugulose and scabrous on both surfaces; petioles 2-4 cm long. Panicles terminal, greenish, pubescent, in lax, few, small-flowered clusters; sepals 5, ca 3 mm long, red inside, hoary out side; petals 5, spatulate, yellow with scarlet dots and minute glandular cavity at base; stamens many; ovary 3-5-celled. Capsules ellipsoid, 1.5-2.5 cm across, cocci 3-5, stellate-pubescent, winged, 1-seeded; wings venose.

Fl. & Fr.: April-January.

Common in tropical forests, Lungleh, 900 m, Gage 193 (CAL); Lungleh road, 900 m, G.K. Deka s.num.; Sialsuk, Deb 30829; Lawngtalai-Saiha, Dutta 33794; Lawntalai-Mampui road, K.P. Singh 92889; Near Chipphir village, K.P. Singh 93941; Hliapui, K.P. Singh 94359; Tamdil, M. Sawmliana 95559; Jawbak, K.P. Singh 96730; Pheilang, K.P. Singh 97081; Lallen, D.K. Singh 98810.

2. CORCHORUS L.

Corchorus aestuans L., Syst. Nat. ed. 10, 2: 1079. 1759; Daniel & Chandrabose in Sharma *et al.*, 3: 485. 1993. *C. acutangulus*, auct. non Forsskal 1755; Masters in Hook. f., Fl. Brit. India 1: 398. 1874.

Annual, suberect herbs, 30-50 cm high. Leaves lanceolate to ovate, 2-5.5 x 1.5-3.5 cm, base rounded, acute at apex, serrate along margins,

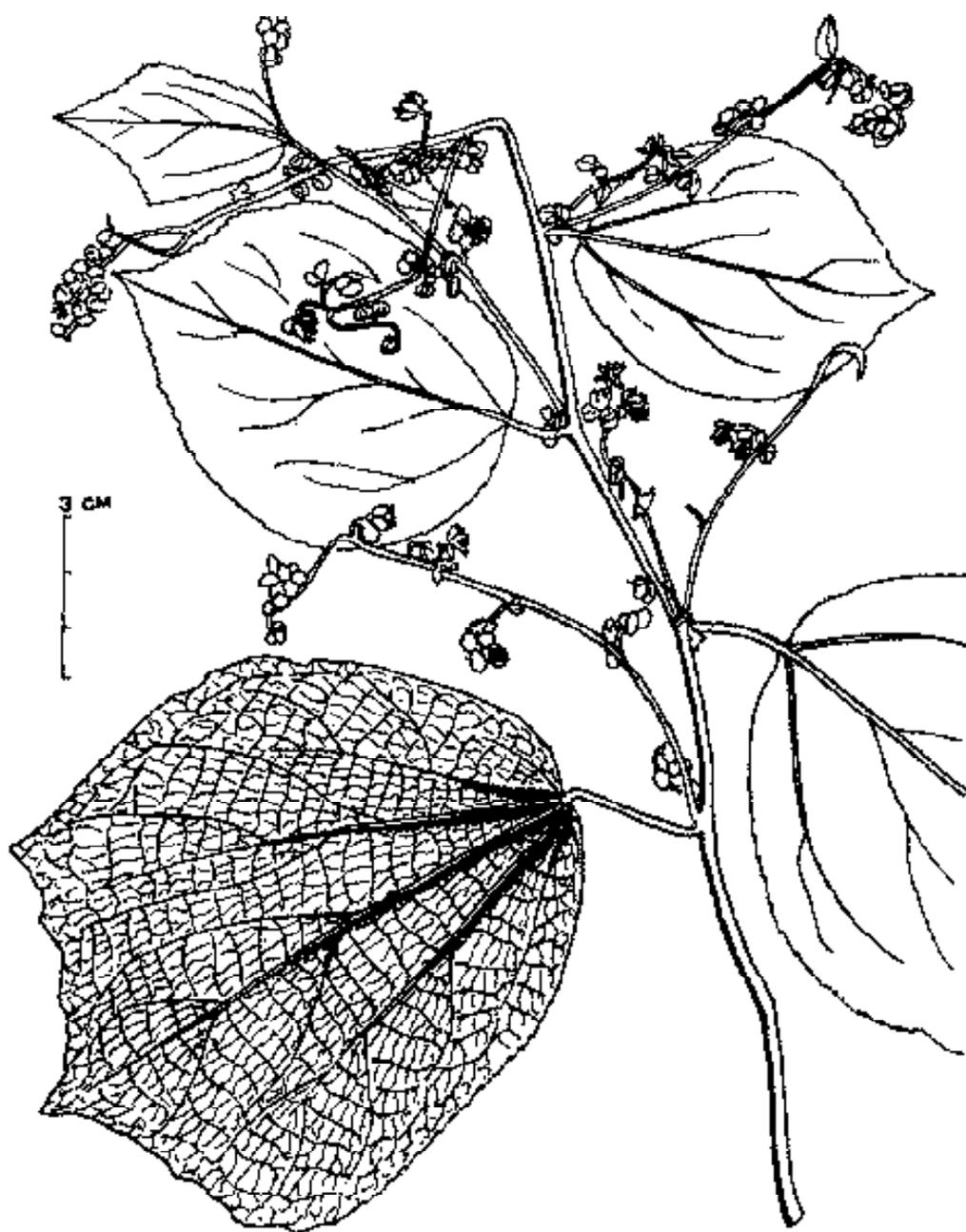


Fig. 46: *Colona floribunda* (Kurz) Craib.

glabrous above, pilose beneath specially on raised nerves, 3-5-nerved at base; petioles 0.5-3 cm long, purple, pilose; stipules setaceous, sparsely hairy, 5-10 mm long. Flowers 2-3, in leaf opposed cymes, ca 1 cm across, orange-yellow; sepals linear-oblong, 2-4 mm long, apiculate, purple dotted inside; petals obovate, 3-5 mm long, yellow, hairy at base. Capsules 10-20 x 2-5 mm, solitary or paired, 6-angled, 3 of the angles winged, 3-loculed; tips with 3, bifid, glabrous beaks; seeds numerous, truncate at both ends, brown.

Fl. & Fr.: August-February.

Common along the roadside in forests. Hnathial-Lungleh road, *K.P. Singh* 94190.

3. GREWIA L.

- 1a. Flowers in terminal panicles; leaves elliptic-oblong; margins subentire to serrulate ... 3. *G. nervosa*
- 1b. Flowers in axillary, terminal or leaf opposed cymes:
 - 2a. Peduncles minute, much shorter or as long as petioles ... 1. *G. abutilifolia*
 - 2b. Peduncles distinct, much longer than petioles:
 - 3a. Leaves lanceolate or ovate-lanceolate, glabrous on both surfaces; flowers greenish-white ... 4. *G. serrulata*
 - 3b. Leaves oblong-ovate or elliptic, stellate hairy on both surfaces; flowers yellow ... 2. *G. eriocarpa*

1. *Grewia abutilifolia* Vent. ex A.L. Juss. in Ann. Mus. Natl. Hist. Nat. 4: 92. 1804; Masters in Hook. f. Fl. Brit. India 1: 390. 1874; Kanjilal *et al.*, Fl. Assam 1: 166. 1934; Daniel & Chandrabose in Sharma *et al.*, Fl. India 3: 493. 1993. *G. macrophylla*, auct. non G. Don, 1831; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 30. 1987. Fig. 47.

Bushy shrubs or small trees, up to 2.5 m; young parts stellate-tomentose. Leaves broadly ovate or elliptic-ovate, sometimes obscurely lobed, 10-18 x 6-12 cm, base rounded or subcordate, acuminate at apex, irregularly serrate, chartaceous, rough stellate hairy on both surfaces, but more densely beneath, 3-5-nerved from base; petioles 1-2 cm long, tomentose; stipules subulate. Flowers in axillary, umbellate, 3-4-flowered cymes, ca 1.5 cm across, greenish brown; sepals 5, narrow-oblong, 8-10 mm long, woolly outside, white, turning yellow inside; petals 5, white,

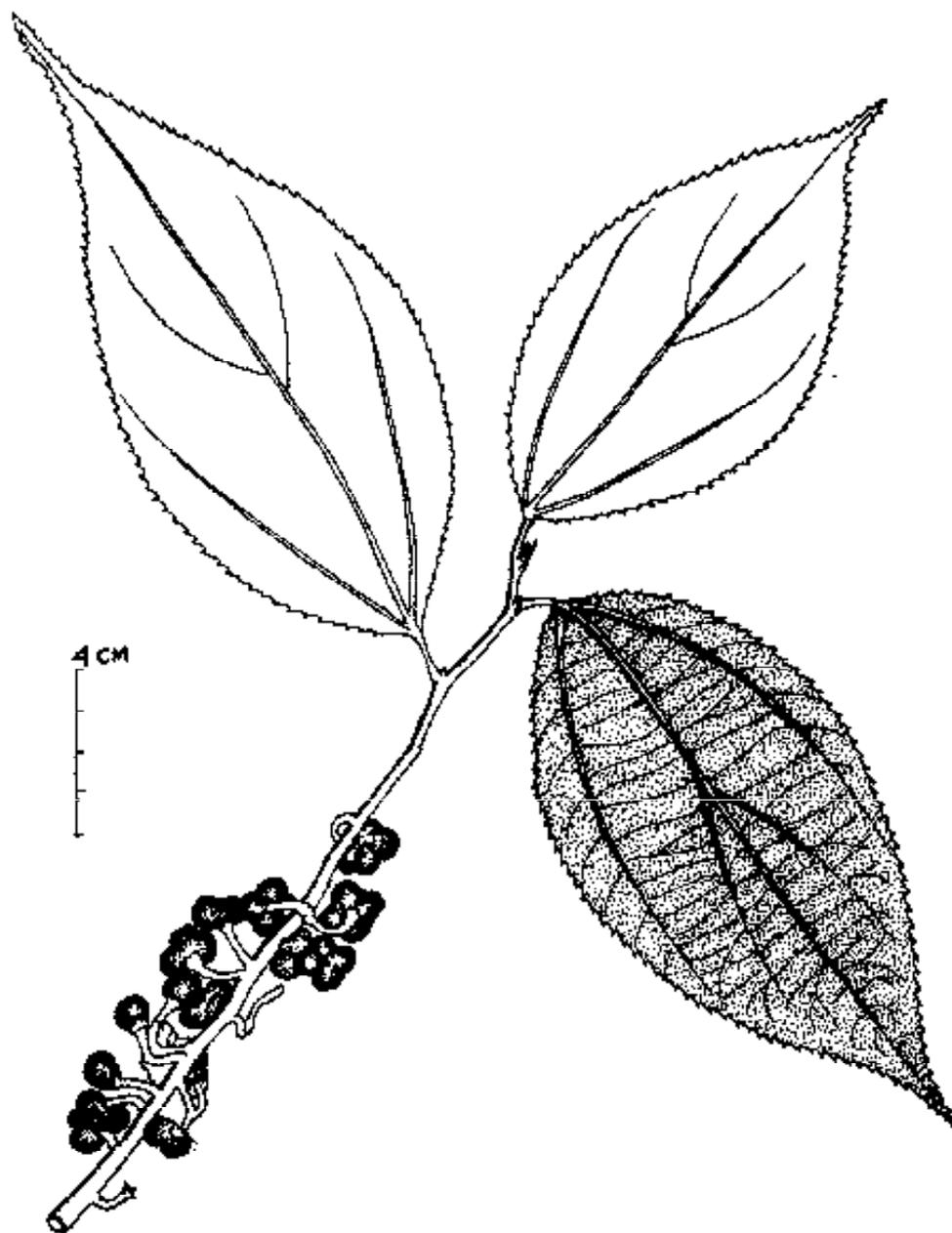


Fig. 47: *Grewia abutilifolia* Vent. ex A.L. Juss.

shorter than sepals, ciliate at base; stamens many, filaments *ca* 5.5. mm long; ovary 2-celled, villous. Drupes subglobose, 1-1.5 cm across, 2-4-lobed, turbinate, fleshy, depressed, stellate-tomentose, wrinkled.

Fl. & Fr.: Throughout the year.

Common in exposed moist areas along the forests. Champhai-Myanmar border, *Deb* 31050 (CAL); Sairep, *Dutta* 33552; Saiha, *Dutta* 33823; Kawlkuh-Hliapui road, *K.P. Singh* 94304.

2. *Grewia eriocarpa* A.L. Juss. in *Ann. Mus. Natl. Hist. Nat.* 4: 93. 1804; Daniel & Chandrabose in *Sharma et al.*, *Fl. India* 3: 493. 1993. *G. elastica* Royle, *Illus. Bot. Himal. Mts.* 1: 104. t. 22. 1834; Kanjilal *et al.*, *Fl. Assam* 1: 163. 1934. *G. asiatica* L. var. *vestita* (Wallich ex Brandis) Masters in *Hook. f.*, *Fl. Brit. India* 1: 387. 1874.

Deciduous trees, up to 20 m tall; young parts grey-tomentose. Leaves obliquely ovate, oblong-ovate or elliptic, 3-9 x 1.5-3 cm, base rounded or subcordate, acuminate at apex, crenate-serrate along margins, thinly coriaceous, hispid with stellate hairs above, softly grey-brown tomentose beneath, 5-6-nerved from base; petioles upto 5-7 mm long, grey tomentose. Flowers axillary, in cymes, greenish-yellow, 1-1.5 cm across; sepals linear-oblong, lanceolate, 5-10 mm long; hirsute; petals ovate-lanceolate, *ca* 3 mm long. Drupes globose, 5-8 mm across, glabrescent, obscurely 2-4-lobed, black.

Fl. & Fr.: February-November.

Common in deciduous forests, Mizo hills, *Dutta* 92470.

3. *Grewia nervosa* (Lour.) Panigr. in *Taxon* 34: 702. 1985; Daniel & Chandrabose in *Sharma et al.*, *Fl. India* 3: 502. 1993. *Fallopia nervosa* Lour., *Fl. Cochinch.* 336. 1790. *Microcos paniculata* L., *Sp. Pl.* 514. 1753, non *Grewia paniculata* Roxb. ex DC. 1824. *Grewia microcos* L., *Syst. Nat.*, ed. 12, 2: 602. 1767, *nom. illeg.*; Masters in *Hook. f.*, *Fl. Brit. India* 1: 392. 1874; Kanjilal *et al.*, *Fl. Assam* 1: 162. 1934. *Thei* (Lushai).

Fig. 48.

Medium sized trees or shrubs, 5-15 m tall; young shoots pubescent. Leaves bifarious, elliptic-oblong, lanceolate or ovate-lanceolate, 10-18 x 4.5-7 cm, nearly oblique to rounded or cordate at base, acuminate at apex,

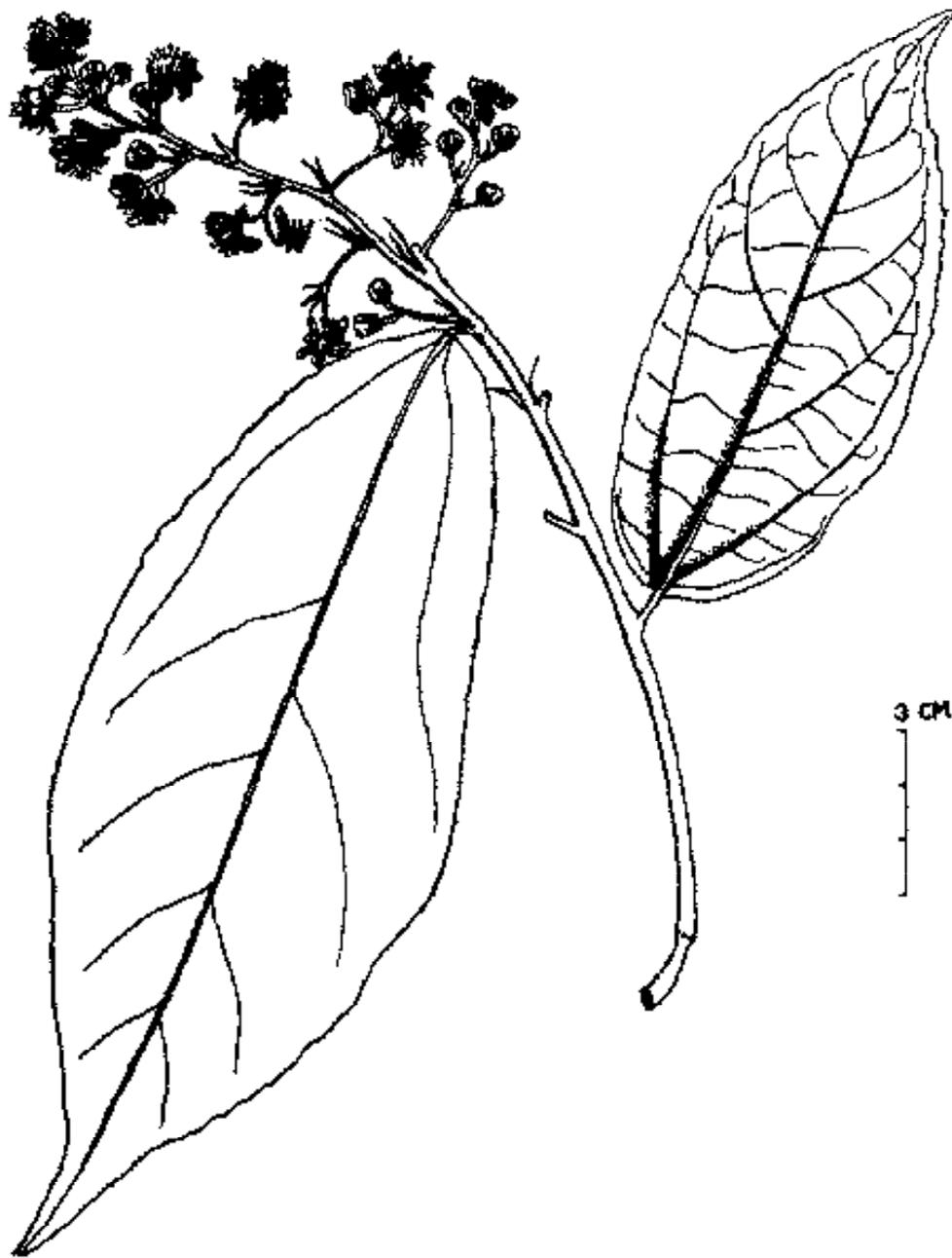


Fig. 48: *Grewia nervosa* (Lour.) Panigr.

subentire to serrulate along the margins, glabrous on both surfaces, 3-5-nerved at base; petioles hairy, up to 1 cm long. Flowers in axillary and terminal panicles, yellow; sepals 5, oblong-obovate, tomentose; petals ovate, ca 2 mm long, pubescent at base; stamens many. Drupes globose, 6-10 mm across, glabrous, purple when ripe.

Fl. & Fr.: April-February.

Common in evergreen forests. Dampa-Rengpui, *M. Sawmliana*, s. num.

4. *Grewia serrulata* DC., Prodr. 1: 510. 1824; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 30. 1987; Daniel & Chandrabose in Sharma *et al.*, Fl. India 3: 509. 1993. *G. laevigata auct non* Vahl. 1790; Masters in Hook. f., Fl. Brit. India 1: 389. 1874 incl. syns. *G. multiflora auct non* A.L. Juss. 1804. *G. glabra* Blume, Bijdr. 115. 1825. *Theiharat* (Lushui).

Shrubs or small trees, 8-15 m tall. Leaves lanceolate or ovate-lanceolate, 6-16 x 4.5 cm, base narrowed or rounded, acute or acuminate at apex, sharply serrate along margins, thinly coriaceous, glabrous on both surfaces, 3-nerved from base; petioles 1 cm long; stipules linear. Flowers in axillary umbellate cymes, 2-3 cm across, greenish-white; sepals 5, lanceolate, 9-15 mm long, stellately tomentose; petals 5, ovate-obovate; 3-4 mm long, stamens many, yellow; ovary villous, ovoid. Drupes globose, 5-12 mm across, 2-lobed, black, glabrous, each with 2 nuts, wrinkled.

Fl. & Fr.: April-March.

Common in moist evergreen or deciduous forests. Sairep, *Deb* 31414; on way to Bukpui, *D.K. Singh* 93012; Kawlkulh-Puilo basti Road, *K.P. Singh* 94474; Keifang, *M. Sawmliana* 99244.

4. TRIUMFETTA L.

- 1a. Basal leaves usually 3-lobed;
spines on capsules glabrous ...2. *T. rhomboidea*
- 1b. Basal leaves not lobed; spines on capsules
pubescent or tomentose, either straight or uncinat:
- 2a. Leaves thinly tomentose beneath; spines uncinat ...1. *T. pilosa*
- 2b. Leaves denscly tomentose beneath; spines straight ...3. *T. tomentosa*

1. *Triumfetta pilosa* Roth, Nov. Pl. Sp. 223. 1821; Masters in Hook. *f.*, Fl. Brit. India 1: 394. 1874; Kanjilal *et al.*, Fl. Assam 1: 167. 1934; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 30. 1987; Daniel & Chandrabose in Sharma *et al.*, Fl. India 3: 519. 1993. **Fig. 49.**

Herbs with a woody base and hispid stems, 1(2) m high; branchlets densely hispid and rusty tomentose. Leaves variable, basal ones sometimes lobed, upper ones oblong, ovate or elliptic-lanceolate, 6-12 x 1.5-6 cm, base cordate or rounded, 3-5-nerved, acuminate at apex, unequally serrate along margins, coriaceous, pubescent above, densely tomentose beneath; petioles 1-3 cm long; stipules linear-lanceolate. Flowers 4-5, ca 1 cm across, congested, in axillary or leaf-opposed lateral cymes; sepals 5, oblong, 7-9 mm long, beaked, densely stellate pubescent; petals 5, oblong or obovate, 6-7 mm long, yellow, ciliate at base, dentate at apex; stamens ca 10; carpels 4. Capsules globose, 6-12 mm across, covered with spines; spines 5-8 mm long, hispid in the lower half, hooked at tip; seeds plano-convex, 2 mm long, dark brown to black.

Fl. & Fr.: Almost throughout the year.

Aizawl, Deb 30643; Bunglang, 100 m, Deb 31447; Champhai, K.P. Singh 94517; Kwailuh-Tuichang, K.P. Singh 94420.

2. *Triumfetta rhomboidea* Jacq., Enum. Syst. Pl. 22. 1760; Masters in Hook. *f.* Fl. Brit. India 1: 395. 1874; Kanjalal *et al.*, Fl. Assam 1: 168. 1938; Daniel & Chandrabose in Sharma *et al.*, Fl. India 3: 520. 1993.

Suffruticose herbs, 0.5-2 m high. Leaves rhomboid-ovate, 2-4.5 x 1.5-3.5 cm, basal ones usually palmately 3-lobed, upper ones not lobed, base rounded to cuneate, acuminate at apex, irregularly serrate along margins, stellate-pubescent on both surfaces, 3-5 (7)-nerved from base; petioles 1-3 cm long, hairy; stipules subulate, hairy. Flowers 5-7 mm long, in terminal or extra axillary cymes; sepals narrowly oblong, 4-5 mm long, apiculate, stellate hairy; petals equal or shorter than sepals, yellow, oblong-lanceolate; stamens 10-15; carpels 2-3. Capsules globose, ca 4 mm across, albido-tomentose, hooked; spines uncinatae, 1.5-2 mm long, glabrous.

Fl. & Fr.: August-January.

Near Hliapui, K.P. Singh 94332; Tuivawl, M. Sawmliana 99270.



Fig. 49: *Triumfetta pilosa* Roth

3. *Triumfetta tomentosa* Bojer in Rapp. *Annuel Trav. Soc. Hist. Nat. Ile Maurice* 12: 19. 1842; Masters in Hook. *f.*, *Fl. Brit. India* 1: 394. 1874; Kanjilal *et al.*, *Fl. Assam* 1: 168. 1938; Daniel & Chandrabose in Sharma *et al.*, *Fl. India* 3: 522. 1993. **Fig. 50.**

Suffruticose herbs or undershrubs, up to 2 m high with strongly foetid hispid stem. Leaves ovate-lanceolate, 4-8 x 1.5-4 cm, base rounded or cordate, acuminate at apex, irregularly crenate-serrate, stellate hairy above, densely stellate-tomentose beneath, 3-5-nerved from base; petioles up to 3 cm long, tomentose; stipules lanceolate. Flowers 5-7 mm across, in extra axillary fascicles of cymes; sepals 4-5 mm long, apiculate, stellate hairy; petals orange-yellow, obtuse, 4-5 mm long; stamens 5-7; carpels globose, hispid. Capsules globose, 5-8 mm across, covered with straight 4-6 mm long, pilose spines.

Fl. & Fr.: June-December.

Common in plantations. Thenzawl-Buangpui Road, K.P. Singh 93837; Keifang, M. Sawmliana 95582.

ELAEOCARPACEAE

(K.P. Singh)

ELAEOCARPUS L.

1a. Anthers awned at apex:

- 2a. Leaves oblanceolate or obovate, 15-30 cm long; flowers large; petals narrowed towards base ...1. *E. aristatus*
- 2b. Leaves oblong-lanceolate or oblong-elliptic, 5-18 cm long; flowers smaller; petals broader towards base:
- 3a. Leaves 5-10 x 2.5-4 cm; racemes lax; flowers less than 1 cm across ...4. *E. prunifolius*
- 3b. Leaves 12-18 x 4-8 cm; racemes dense; flowers more than 1 cm across ...7. *E. varunua*

1b. Anthers not awned at apex:

- 4a. Leaves lanceolate or elliptic-lanceolate; petioles up to 2 cm long ...3. *E. lanceifolius*

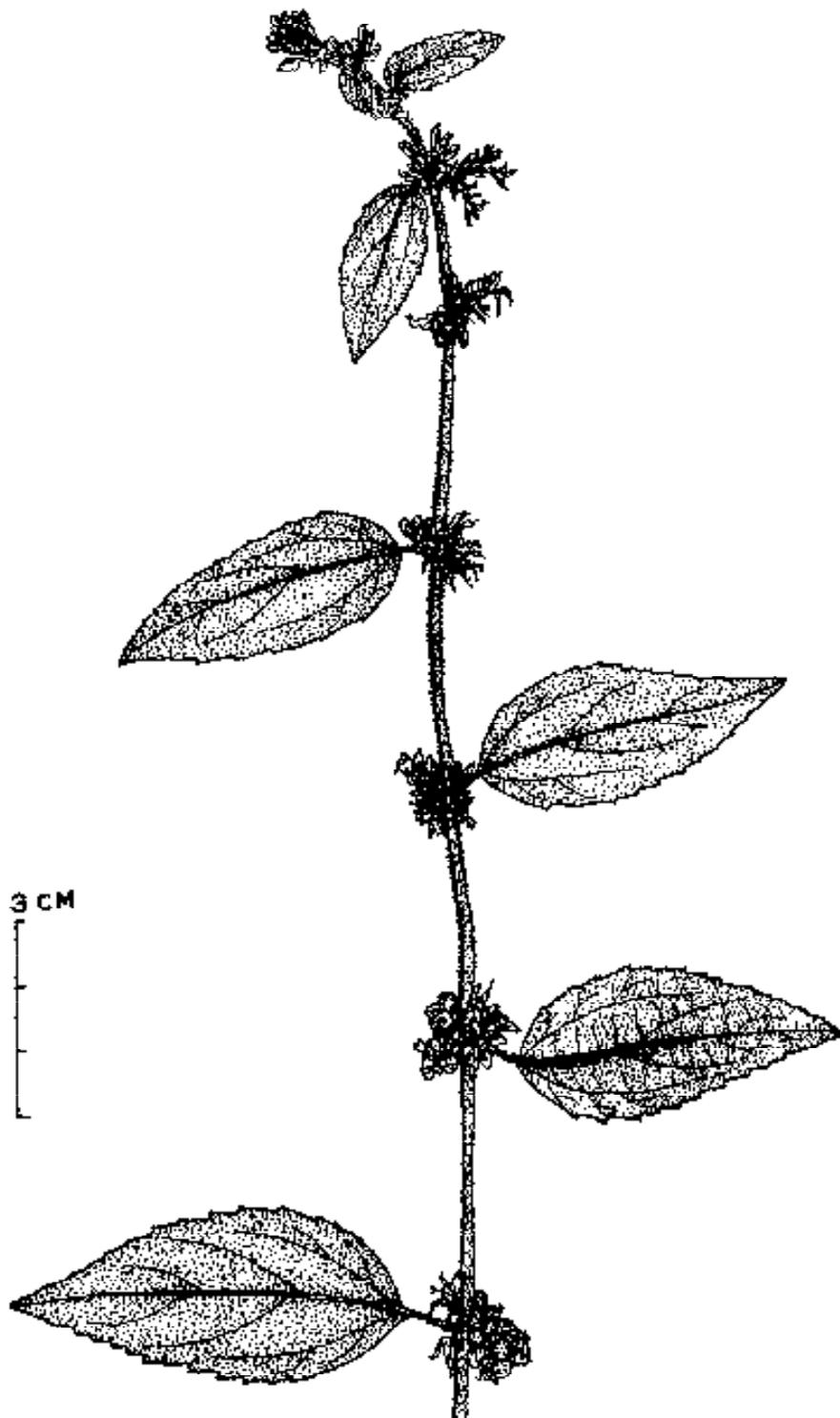


Fig. 50: *Triumfetta tomentosa* Bojer

- 4b. Leaves broadly ovate, ovate-oblong,
or ovate-elliptic; petioles 2-6 cm long;
- 5a. Petals eciliate ...5. *E. serratus*
- 5b. Petals ciliate:
- 6a. Leaves pustulate when dry, crowded
near the apices of branchlets; pyrenes
faintly rugose ...2. *E. floribundus*
- 6b. Leaves not pustulate when dry, not
crowded at the apices of branchlets;
pyrenes strongly pustulate ...6. *E. tectorius*

1. *Elaeocarpus aristatus* Roxb. [Hort. Beng. 43: (1814), *nom. nud.*] Fl. Ind. 2: 599. 1832; Masters in Hook. *f.*, Fl. Brit. India 1: 405. 1874; Kanjilal *et al.*, Fl. Assam 1: 177. 1934; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 30. 1987; S.K. Murti in Sharma *et al.*, Fl. India 3: 533. 1993.

Large trees, 20-40 m tall with conical crown; stems buttressed at base. Leaves crowded near the ends of branchlets, oblanceolate or obovate, 15-30 x 4-10 cm, base cuneate, acute or subacute at apex, minutely serrulate or subentire along margins, coriaceous, glabrous; lateral nerves 12-18-paired, obliquely arching; petioles 2-4.5 cm long, swollen or broader at both ends; stipules subulate, caducous. Racemes axillary on fallen leaf ends, 10-18 cm long; flowers *ca* 2 cm across, fragrant, white, drooping; sepals oblong, 10-15 mm long, 5-angled; petals 12-16 mm long, dull white, silky hairy outside; stamens many, subulate; ovary ovoid, hairy, 2-loculed. Drupes ellipsoid; 3-4 cm long; pyrenes pointed at both ends, compressed, oblong, rugose, 1-loculed.

Fl. & Fr.: April-October.

In moist evergreen places at an alt. of 1500 m. Lungleh, Dutta 33440.

2. *Elaeocarpus floribundus* Blume, Bijdr. 120. 1825; Masters in Hook. *f.*, Fl. Brit. India 1: 401. 1874; Kanjilal *et al.*, Fl. Assam 1: 173. 1934; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 30. 1987; S.K. Murti in Sharma *et al.*, Fl. India 3: 536. 1993.

Tall trees, 20-30 m with buttressed stems. Leaves ovate-elliptic, 7.5-18 x 4-8 cm, base cuneate, acute to bluntly acuminate at apex, coarsely serrate, glabrous, subcoriaceous, glandular punctate beneath, pustulate when

dry; petioles 3.5-5 cm long, swollen with a pair of small glands at apex. Racemes axillary, 10-15 cm long; flowers 5-8 mm across, white; sepals 5-6 mm long, lanceolate, tomentose at the margins, ciliate; petals ca 5 mm long, irregularly laciniate with filiform processes, ciliate along margins; anthers bearded, not awned, oblong; ovary villous, 3-loculed. Drupes oblong-pyriform, 2.5-4.0 cm long, light green, rounded at both ends, fleshy; pyrenes 1-3-loculed; locules 1-seeded, terete, tapering at both ends, rugulose to nearly smooth.

Fl. & Fr.: March-December.

In moist evergreen forests. South Vanlaphai, *Dutta* 34042; Aizawl, *Godfrey* 530 (CAL).

Uses: Fruits are eaten, cooked or pickled.

3. *Elaeocarpus lanceifolius* Roxb., [Hort. Beng. 42. (1814), *nom. nud.*] Fl. Ind. 2: 598. 1832; '*lanceaefolius*'; Masters in Hook. f., Fl. Brit. India 1: 402. 1874; Kanjilal *et al.*, Fl. Assam 1: 175. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 83. 1938; S.K. Murti in Sharma *et al.*, Fl. India 3: 543. 1993. Fig. 51.

Trees, 5-15 m tall with dense crown; young twigs pubescent. Leaves lanceolate or elliptic-lanceolate, 5-15 x 2-5 cm, base cuneate, acuminate at apex, distantly crenate-serrate, coriaceous, glabrous or sparsely pubescent beneath; lateral nerves 6-8-paired; petioles 7-15 mm long. Racemes axillary, 5-9 cm long; flowers 8-12 mm across; white; sepals oblong-lanceolate, 3-5 mm long, petals 3-6 mm long, laciniate, margins ciliate; anthers with short bristles above; ovary villous, 3-loculed. Drupes ovoid-ellipsoid, ca 2.5 x 2 cm; pyrenes oblong, rugose with 3 longitudinal grooves, 1-locular, 1-seeded.

Fl. & Fr.: March-December.

Scarce, in evergreen forests. On way to Phongphui, *K.P. Singh* 96808.

4. *Elaeocarpus prunifolius* (C. Mueller) Masters in Hook. f., Fl. Brit. India 1: 407. 1874; Kanjilal *et al.*, Fl. Assam 1: 180. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 83. 1938; S.K. Murti in Sharma *et al.*, Fl. India 3: 549. 1993. *Monocera prunifolius* C. Mueller, Annot. Fam. Elaeocarp. 15. 1849.



Fig. 51: *Elaeocarpus lanceifolius* Roxb.

Medium sized trees. 5-20 m tall with lax crown. Leaves oblong-lanceolate to elliptic lanceolate, 5-10 x 2.5-4 cm, base cuneate, acute to acuminate at apex, crenate-serrate or subentire along margins, glabrous, coriaceous, shining above; lateral nerves 6-10-paired; petioles 1-3 cm long. Racemes axillary, 4-9 cm long, crowded at apex, suberect, puberulous. Flowers 7-10 mm across, white to pale yellowish-green; sepals 5-7 mm long, pubescent within, distinctly pouched at base within; petals oblong, 6-8 mm long, laciniate with 6-8, short segments at the apex, silky; anthers with short awns; ovary ovoid. Drupes oblong-ovoid, ca 2 cm long, pyrenes ovoid, ca 1 cm long, 3-angled, slightly rugose.

Fl. & Fr.: February-October.

Laki 1500 m, *Parry 99* (*fide* C.E.C. Fischer, l.c.).

5. *Elaeocarpus serratus* L., Sp. Pl. 515. 1753. '*serrata*'; Masters in Hook. *f.*, Fl. Brit. India 1: 401. 1874, *p.p.*; Deb & Dutta in J. Econ. Tax. Bot. 10 (1): 31. 1987; S.K. Murti in Sharma *et al.*, Fl. India 3: 553. 1993. *E. cuneatus* Wight, Illus. Ind. Bot. 1: 83. 1840; Masters in Hook. *f.*, Fl. Brit. India 1: 402. 1874; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 31. 1987.

Trees, up to 30 m tall. Leaves oblong, obovate or elliptic, 6-12 x 2.5-6 cm, base cuneate, acuminate at apex, serrate-crenate along margins, coriaceous, glabrous; petioles 2-3 cm long, glandular pubescent. Racemes axillary, in clusters, 6-10 cm long, drooping; flowers ca 1.5 cm across, creamy white, fragrant; sepals lanceolate, pubescent, pink to red; petals obovate, 6-8 mm long, laciniate, eciliate, occasionally pustulate at base; stamens ca 35, apex pubescent, bearded; ovary 2-3-loculed, pilose. Drupes ca 4 x 2.5 cm, obovoid, greenish yellow; pyrenes oblong, 2.5 cm long, rugose, 1-2-seeded.

Fl. & Fr.: April-October.

In moist evergreen forests. Lungleh, *Dutta* 33364; Thalthlang, *Dutta* 33991.

6. *Elaeocarpus tectorius* (Lour.) Poiret. in Lam., Encycl. Suppl. 2: 704. 1812; S.K. Murti in Sharma *et al.*, Fl. India 3: 559. 1993. *Craspedum tectorium* Lour., Fl. Cochinch. 336. 1790. *Elaeocarpus robustus* Roxb., [Hort. Beng. 42. (1814), *nom. nud.*] Fl. Ind. 2: 597. 1832; Masters in Hook.

f., Fl. Brit. India 1: 402. 1874. *p.p.*; Kanjilal *et al.*, Fl. Assam 1: 193. 1934. *Kharuang* (Lushai).

Large trees, 15-35 m tall with oval crown; branchlets pubescent. Leaves ovate-oblong to ovate-lanceolate, 10-20 x 5-9 cm, base broadly rounded or obtuse, acuminate at apex, serrate-repand along margins, glabrous above, rusty tomentose beneath, pinkish brown when young, coriaceous; lateral nerves 10-12 pairs; petioles 2-5 cm long, often with 2 glands near apex, glabrous. Racemes axillary, 6-12 cm long, pubescent. Flowers 8-10 mm across, white, fragrant; sepals lanceolate, 5-6 mm long, puberulous inside; petals 5-7 mm long, laciniate at apex, ciliate along margins; stamens 40, one of them bearded; disc 5-lobed, silky, ovary 3-loculed, oblong. Drupes ellipsoid or oblong-ovoid 2-5 cm long, greenish-yellow; pyrenes 2-3-locular, oblong, with 2 longitudinal grooves, rugose, 1-seeded.

Fl. & Fr.: April-October.

In moist evergreen forests. Lushai hills, Chakramuva, *Wenger* 21514; Kolasib, *K.P. Singh* 93300.

7. *Elaeocarpus varunua* Buch.-Ham. [in Wallich, Cat. No. 2666 g, h. (1831), *nom. nud.*] ex Masters in Hook. *f.*, Fl. Brit. India 1: 407. 1874; Kanjilal *et al.*, Fl. Assam 1: 180. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 83. 1938; S.K. Murti in Sharma *et al.*, Fl. India 3: 561. 1993.

Large trees, 15-25 m tall with large spreading crown, branchlets silky pilose. Leaves oblong-lanceolate to oblong-elliptic, 12-18 x 4-8 cm, base rounded, acuminate at apex, cuspidately crenate-serrate along margins, coriaceous, grey-silky when young, glabrous above, sparsely pubescent on nerves beneath; glabrescent; petioles 3-5 cm long, geniculate at apex. Racemes crowded, axillary, pubescent; flowers ca 1.5 cm across, white; sepals lanceolate, 5-7 mm long, densely silky outside; petals oblong; 4-6 mm long, shortly laciniate; stamens many, anthers shortly awned; disc orange-red, 10-lobed; ovary ovoid-oblong, villous. Drupes oblong, ca 2 cm long, green, rounded at both ends; pyrenes pointed at base, 3-grooved, hirsute, unilocular.

Fl. & Fr.: February-October.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

MALPIGHIACEAE

(K.P. Singh)

- 1a. Flowers zygomorphic; calyx glandular; style 1 or rarely two; samaras produced into 3 unequal wings ... 2. *Hiptage*
- 1b. Flowers actinomorphic, calyx glandless; styles 3; samaras broadly winged all round ... 1. *Aspidopterys*

1. ASPIDOPTERYS A. Juss.

- 1a. Leaves glabrous; samara ovate-lanceolate, narrow towards apex ... 1. *A. glabriuscula*
- 1b. Leaves silky-pubescent beneath; samara elliptic-ovate, rounded at apex ... 2. *A. nutans*

1. *Aspidopterys glabriuscula* (Wallich) A. Juss. in Ann. Sci. Nat. Bot. ser. 2. 13: 267. 1840; Kanjilal *et al.*, Fl. Assam 1: 189. 1936; Srivastava in Hajra *et al.*, Fl. India 4: 7. 1997. *Hiraea glabriuscula* Wallich, Cat. 6626. 1832. *A. roxburghiana* A. Juss.: Dutta in J. Econ. Tax. Bot. 3. 10(1): 30. 1987. *A. roxburghiana* A. Juss. var. *glabriuscula* Hook. f., Fl. Brit. India 1: 420. 1874. **Fig. 52.**

Woody climbers, young parts finally becoming glabrescent. Leaves opposite, elliptic or elliptic-lanceolate to ovate, 4-10 x 1-4.5 cm, rounded or obtuse at base, acuminate at apex, entire along margins, glabrous, membranous; lateral nerves 4-7-paired, petioles 5-10 mm long. Panicles rusty tomentose, axillary and terminal, lax; panicle branches verticillate; flowers 2 mm across; calyx lobes oblong-elliptic, ca 1 mm long, hairy or glabrous; petals oblong-elliptic, ca 2-6 mm long, white; ovary pilose, 3-celled. Samaras with wings ovate-oblong or ovate-lanceolate, 3.5-4.5 x 1-2 cm, rounded and narrowed upwards, membranous, pale brown, finely veined.

Fl. & Fr.: May-October.

Common. Thaklang to Vanlaiphai, Dutta 34022, 30724.

2. *Aspidopterys nutans* (Roxb.) A. Juss. in Ann. Sci. Nat. ser. 5, 13: 267. 1840; Hook. f., Fl. Brit. India 1: 421. 1874 *p.p.*; Kanjilal *et al.*, Fl. Assam 1: 190. 1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 30.

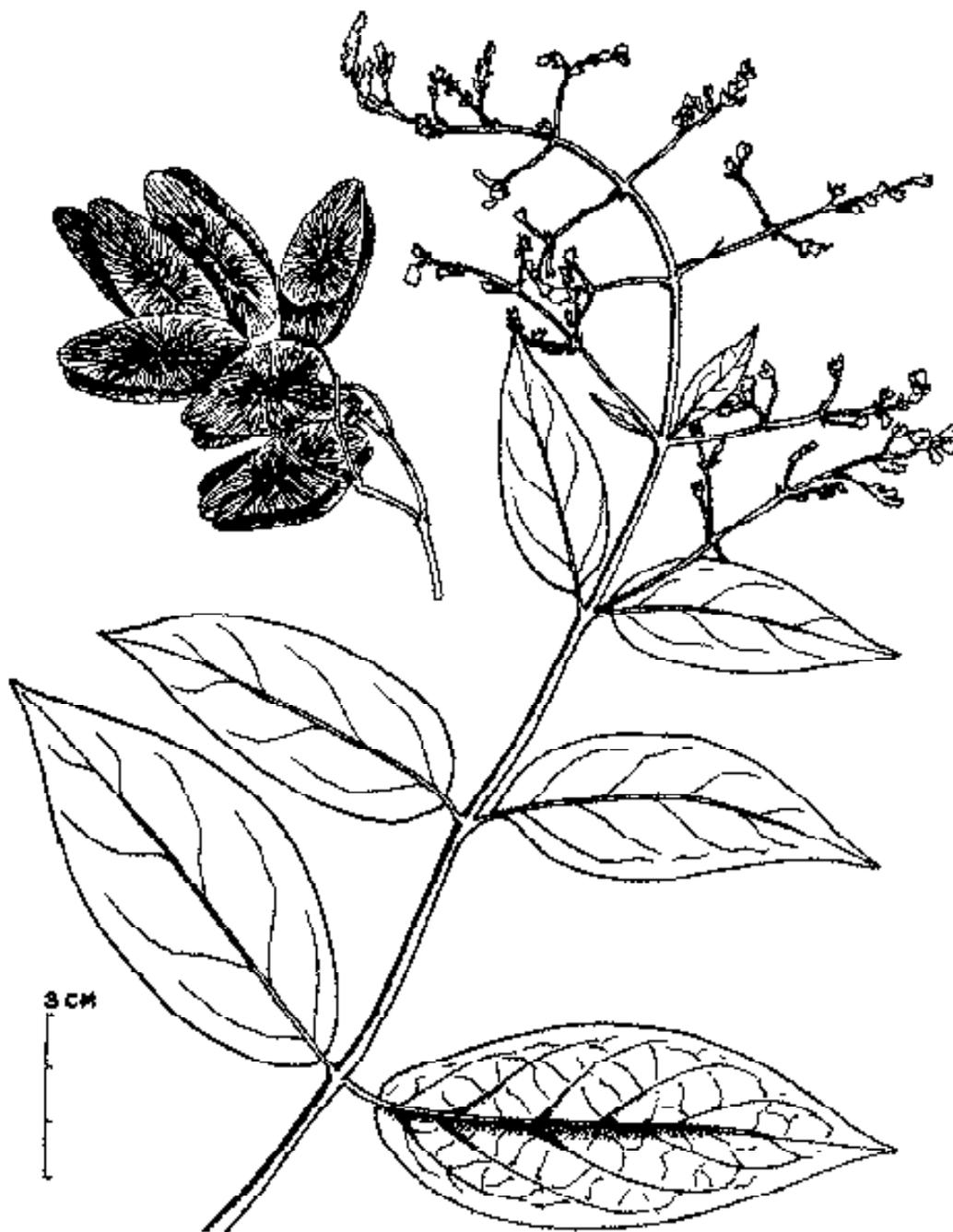


Fig. 52: *Aspidopterys glabriuscula* (Wallich) A. Juss.

1987; Srivastava in Hajra *et al.*, Fl. India 4: 9. 1997. *Hiraea nutans* Roxb., Fl. Ind. 2: 448. 1824.

Climbers; young shoots silky tomentose. Leaves broadly orbicular, ovate, 7-18 x 5-11 cm, base rounded, acuminate at apex, glabrous above, silky adpressed-pubescent beneath; petioles 3-5 cm long; lateral nerves 5-6 pairs. Flowers in lax, axillary or terminal, panicles, 5-7 mm across; calyx 0.5-1 mm long, obtuse, glabrous; petals oblong-elliptic, 2-3 mm long, white; ovary silky. Samaras 2-4 x 1.5-2.5 cm; wings elliptic-ovate, reticulate, adpressed pubescent on both sides, translucent, brown.

Fl. & Fr.: May-October.

Mizo hills, Theiriat, Deb 31328 (CAL).

2. HIPTAGE Gaertner

- 1a. Leaves linear-elliptic; petals subdentifolate to denticulate at margins; samaras ecristate ... 2. *H. Jacobsii*
- 1b. Leaves oblong to ovate-lanceolate; petals fimbriate at margins; samaras cristate ... 1. *H. benghalensis*

1. *Hiptage benghalensis* (L.) Kurz in J. As. Soc. Bengal Part 2, Nat. Hist. 43: 136. 1874; Srivastava in Hajra *et al.*, Fl. India 4: 14. 1997. *Banisteria benghalensis* L., Sp. Pl. 437. 1753. *Hiptage madablota* Gaertn., Fruct. 2: 169. t. 116. 1791; Hook. f., Fl. Brit. India 1: 418. 1874; Kanjilal *et al.*, Fl. Assam 1: 188. 1936. **Fig. 53.**

Evergreen, scandent woody shrubs; young parts ± silky pubescent. Leaves oblong to ovate-lanceolate, 8-12 x 4.5-6 cm, base acute to rounded, acuminate at apex, entire to wavy along margins, glabrous; lateral nerves prominent, 6-7-paired; petioles 4-6 mm long. Flowers in terminal or axillary, 10-15 cm long, racemes, white, 1.5-3 cm across, fragrant; calyx 5-lobed with a large gland outside; lobes silky, ovate or elliptic, ca 1 cm long; petals unequal, obovate, ca 1 cm long, fimbriate on margins, hairy out side; stamens connate at base. Samaras unequally 3-winged; middle wing linear-oblong 3-6 x 1-2 cm, with rounded apex; lateral wings oblong, 2-3 x 1-1.5 cm; dorsal cristate, ca 1 cm long.

Fl. & Fr.: February-June.



Fig. 53: *Hiptage benghalensis* (L.) Kurz

In Primary forests. Lushai hills, *s.loc. s.num.*, Prazer 1980 (CAL).

2. *Hiptage jacobsii* Srivastava, Indian For. 110(5): 499. 1984; Srivastava in Hajra *et al.*, Fl. India 4: 21. 1997.

Scandent shrubs; branches glabrous. Leaves linear-elliptic, 5-9 x 1.8-3.5 cm, base acute, acuminate at apex, glabrous, shiny; petioles 4-5 mm long; lateral nerves 4-6-paired. Panicles axillary or terminal; peduncles 4-9 cm long, white, tomentose; flowers *ca* 1-1.5 cm across; sepals 1.5-2 mm long with a calycinal gland; petals denticulate, *ca* 1 cm long. Samaras 3-winged, pale brown, wings unequal; middle wing elliptic or oblanceolate, 2.5-4 x 0.5-1 cm, subacute or rounded at apices, glabrous; lateral wings obovate, 1.5-2 x 0.7-0.8 cm.

Fl. & Fr.: March-May.

Endemic. Aear forest, Lungle. Gage 146 (CAL); *s.loc. s.num.*, Parry (CAL).

Gage's above specimen was earlier identified as variety of *Hiptage acuminata* Wallich *ex* A. Juss. by C.E.C. Fischer (1938).

GERANIACEAE

(K.P. Singh)

GERANIUM L.

Geranium nepalense Sweet, Geraniaceae 1: t. 12. 1820; Edgew. & Hook. *f.* in Fl. Brit. India 1: 430. 1874; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 34. 1938; Malhotra in Hajra *et al.*, Fl. India, 4: 75. 1997.

Perennial, sprawling to decumbent herbs, 8-35 cm high, hairy or villous. Leaves orbicular, 1.5-5 cm across, palmately divided into 3-5, ovate or rhombic lobes, brownish above, dark green-purple beneath; lobes unequally toothed, pubescent; petioles 10-30 mm long, shorter in upper leaves, pubescent; stipules linear-lanceolate, 4-8 mm long. Flowers solitary or paired, on 1-5 cm long, axillary peduncles, 5-10 mm across, pale purple with 3 dark maroon stripes inside; sepals silky, 4-5 mm long; petals 6-8 mm long; anthers violet blue. Capsules ellipsoid to subglobose, 12-15 x 2-3 mm, hairy, 5-lobed; mericarps *ca* 3 mm long.

Fl. & Fr. May-October.

Hmuifang, 1500 m, *Parry* 263 (*vide* C.E.C. Fischer, *l.c.*)

OXALIDACEAE

(K.P. Singh)

- 1a. Leaves trifoliolate; valves of capsules attached to the central axis ... 2. *Oxalis*
- 1b. Leaves pinnate, many foliolate; capsules dehiscing to 5-rayed star without leaving a central axis ... 1. *Biophytum*

1. BIOPHYTUM DC.

- 1a. Stems 6-15 cm long; peduncles 3-8 cm long; sepals about half as long as petals ... 1. *B. reinwardtii*
- 1b. Stems 15-30 cm long; peduncles 5-15 cm long; sepals almost as long as petals ... 2. *B. sensitivum*

1. *Biophytum reinwardtii* (Zucc.) Klotzsch in Peters, *Reise Mossamb. Bot.* 1: 85: 1862; Edgew & Hook. *f.* in *Fl. Brit. India* 1: 437. 1874, incl. var. *metziana*; C.E.C. Fischer in *Rec. Bot. Surv. India*. 12(2): 84. 1938; Manna in Hajra *et al.*, *Fl. India* 4: 236. 1997. *Oxalis reinwardtii* Zucc. in *Abh. Math.-Phys. Cl. Koemigl. Bayer. Akad. Wiss.* 1: 274. 1829-1830.

Annual herbs, stems 6-15 cm long, erect, pubescent. Leaves evenly pinnate, 10-20 in a whorl at the apex of stem; leaflets 6-12 pairs, terminal ones largest, obovate, 6-12 x 4-6 mm, base oblique, apiculate at apex, glabrous; lower ones oblong; petioles 1-2 cm long. Peduncles 3-8 cm long, glandular-hairy, 4-8-flowered in umbels; sepals ovate-lanceolate, 2-4 mm long; petals yellow, elliptic, 6-8 mm long. Capsules ovoid or oblong, 2-3 x ca 2 mm, with gland tipped hairs.

Fl. & Fr.: July-December.

Common along river banks and way side. *S.num.* *Wenger* (*vide* C.E.C. Fischer, *l.c.*); 60 miles South of Lungleh, *Wenger* 318 (*vide* C.E.C. Fischer, *l.c.*).

2. *Biophytum sensitivum* (L.) DC., Prodr. 1: 690 1824; Edgew. & Hook. f. in Fl. Brit. India 1: 436. 1874; Manna in Hajra *et al.*, Fl. India 4: 238. 1997. *Oxalis sensitiva* L., Sp. Pl. 434. 1753. **Fig. 54.**

Annual herbs, stems 15-30 cm long, erect, hispidly pubescent. Leaves 8-12 cm long, whorled at the top of the stem; leaflets 6-15 pairs, opposite, variable in size, oblong, 7-13 x 3-6 mm, nearly straight, base equal except terminal one which is obovate and with very oblique base, apiculate at apex, glabrous, size increasing towards apex; petioles 1-1.5 cm long. Peduncles 5-15 cm long, hispid; flowers yellow; sepals ovate-lanceolate, 4-6 x ca 1 mm, much exceeding in front, grooved, glandular hispid; petals lanceolate, 5-7 x 1-2 mm. Capsules elliptic, 2-3 mm long, shining; locules 2-5-seeded; seeds few with distinct ridges, not tubercled.

Fl. & Fr.: August-January.

Common in moist places. Lawngtalai-Saiha, Dutta 33800.

2. OXALIS L.

- 1a. Plants acaulescent with prostrate stems;
petioles 2-6 cm long; flowers yellow ... 1. *O. corniculata*
- 1b. Plants acaulescent with an underground bulbous root stock;
petioles 8-20 cm long; flowers pink-rose ... 2. *O. corymbosa*

1. *Oxalis corniculata* L., Sp. Pl. 435. 1753; Edgew. & Hook. f., Fl. Brit. India 1: 436. 1874; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 85. 1938; Manna in Hajra *et al.*, Fl. India 4: 242. 1997. *Sialthur* (Lushai); *Ruahpa* (Lakher).

Perennial herbs; stems prostrate, up to 30 cm long, rooting at nodes with erect, pubescent or puberulous branches. Leaves palmately 3-foliolate; leaflets obcordate, 3-12 x 7-12 mm, base cuneate or acute; lobes rounded, glabrous to sericeous above, pale to glaucous beneath, entire along margins, chartaceous; petioles 2-6 cm long, pubescent; stipules adnate to petiole, ca 2 mm long. Inflorescence cymose to pseudo-umbellate; peduncles 3-10 cm long, axillary; flowers ca 8 mm across, yellow; sepals 5, linear-elliptic, 4-5 x 1-1.5 mm; petals 5, oblanceolate, 5-7 mm long, apex obtuse; stamens 10, united at base; ovary 5-celled. Capsules oblong-subcylindric, 10-20 x 2-2.5 mm, puberulous, 5-angled; seeds 5-10 per locule, dark brown, flattened-ovoid, 1-1.5 mm long, transversely ridged.

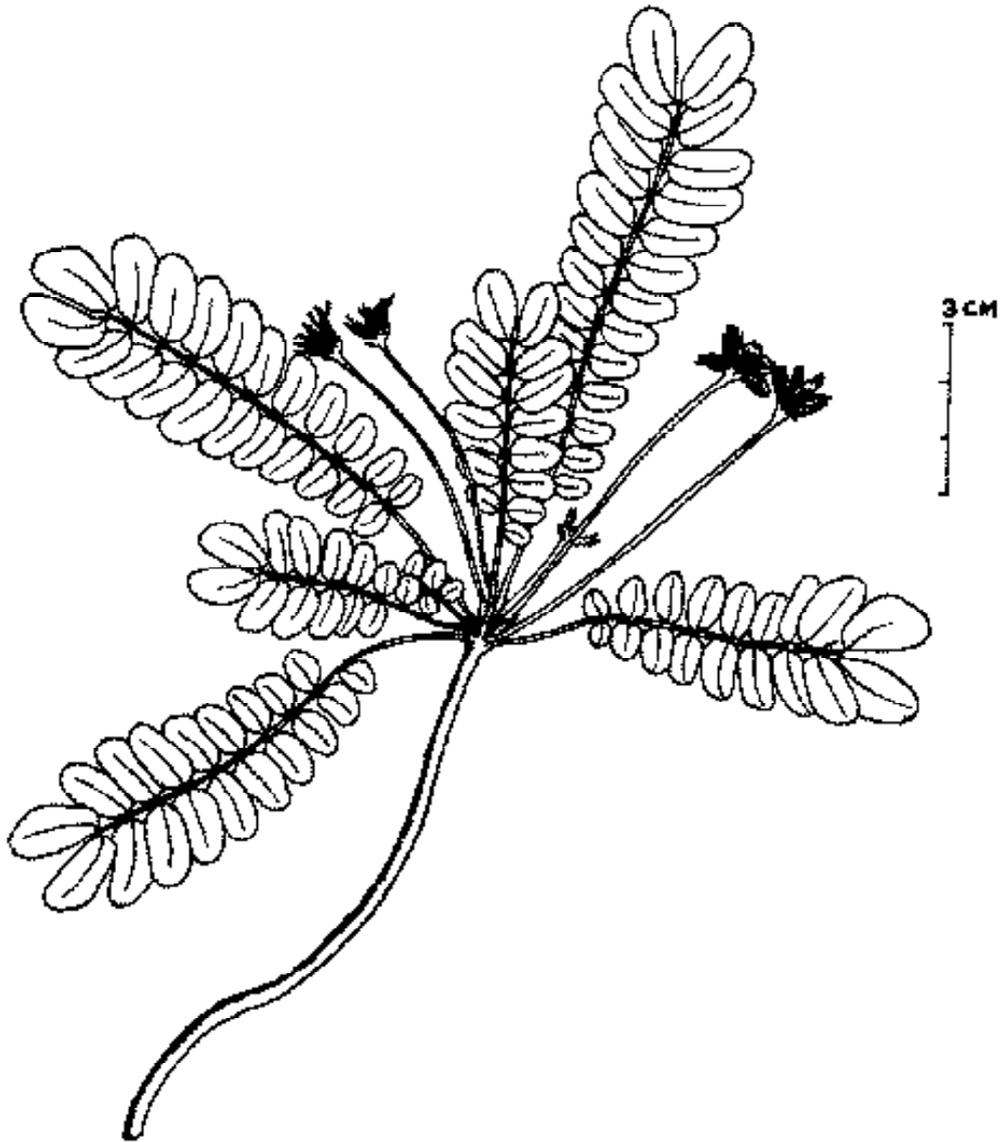


Fig. 54: *Biophytum sensitivum* (L.) DC.

Fl. & Fr.: Throughout the year.

Common on ground throughout the year. Lungleh, 900 m *Gage* 216 (CAL); Sakae Lui- Saitual, *Leslie*, 116 (CAL); Bunglang, *Deb* 31470; Lungleh-Sairep, *Dutta* 33491; Chummliang to Meboi, *Dutta* 33328; Lawngtalai-Kawlchaw, *K.P. Singh* 92849; Darzo, *D.K. Singh* 93999; Sairep, *K.P. Singh* 96701.

2. *Oxalis corymbosa* DC., Prodr. 1: 696. 1824; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 31. 1987; Manna in Hajra *et al.*, *Fl. India* 4: 246. 1997.

Acaulescent, perennial herbs with underground bulbous rootstocks; bulbs globose, 1-2.5 cm across, scaly. Leaves 9-12, 3-foliolate; petioles 8-20 cm long, hairy; leaflets subsessile, 1-3 x 2-3.5 cm, cuneate at base, membranous, appressed hairy on both surfaces; lobes rounded and deeply notched at apex. Inflorescence pseudo-umbellate, 2-many-flowered; peduncles hairy, 5-20 cm long; flowers 1-1.5 x 0.8-1 cm; sepals 5, elliptic 3-5 mm long, with 2 narrow orange dots at apices; petals 5, violet, spatulate, 10-13 x ca 5 mm, hairy out side; stamens 10 in 2 series; ovary 5-angled, glabrous. Capsules not seen.

Fl. & Fr.: January-April.

Aizwal protected forest, *Deb* 30536; Lungleh-Sairep, *Dutta* 3349.

BALSAMINACEAE

(K.P. Singh & P.J. Bora)

IMPATIENS L.

- 1a. Flowers white or straw-coloured ...5. *I. jurpia*
- 1b. Flower colour otherwise:
 - 2a. Leaves stipulate; stipular gland at base:
 - 3a. Leaves usually alternate:
 - 4a. Flowers yellow, streaked with pink; capsules glabrous ...6. *I. laevigata*
 - 4b. Flowers rose-purple; capsules tomentose ...1. *I. balsamina*

- 3b. Leaves usually opposite or whorled:
- 5a. Flowers in compact terminal racemes or umbel like; capsules beaked ... 4. *I. glandulifera*
- 5b. Flowers solitary or fascicled; capsules not beaked:
- 6a. Leaves linear or oblanceolate, sessile or subsessile; seeds oblong ... 2. *I. chinensis*
- 6b. Leaves elliptic or ovate-lanceolate, stalked; seeds pyriform :
- 7a. Lateral sepals ovate-lanceolate; standard semicucullate ... 10. *I. trilobata*
- 7b. Lateral sepals linear-lanceolate; standard obcordate ... 11. *I. tripetala*
- 2b. Leaves exstipulate :
- 8a. Capsules turgid in the middle ... 9. *I. pulchra*
- 8b. Capsules not turgid in the middle :
- 9a. Spur of lip annular, wings rose-tinged ... 13. *I. uncipectala*
- 9b. Spur of lip not annular, curved or incurved; wings not rose tinged:
- 10a. Lateral sepals transparent, orbicular to ovate ... 12. *I. tropaneoliflora*
- 10b. Lateral sepals not transparent, usually ovate to ovate-lanceolate :
- 11a. Flowers solitary, violet-coloured; capsules fusiform ... 8. *I. puberula*
- 11b. Flowers 2-3 together, yellow or orange-yellow coloured; capsules not fusiform:
- 12a. Leaves alternate; flowers orange-red or pale yellow; lateral sepals ovate-lanceolate, subacute; capsules tomentose ... 7. *I. porrecta*
- 12b. Leaves alternate or opposite; flowers bright yellow; lateral sepals long awned, uncinato; capsules usually glabrous ... 3. *I. drepanophora*

1. *Impatiens balsamina* L., Sp. Pl. 938. 1753; Hook. f., Fl. Brit. India 1: 453. 1874; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 30. 1987; Vivekanathan *et al.* in Hajra *et al.*, Fl. India 4: 123. 1997.

A stout, succulent, annual herb, 30-70 cm high. Leaves variable in size, alternate, lanceolate, 8-13 x 1-3 cm, base narrowed, acuminate at apex, serrate along margins, glabrous; petioles 1.5-6 cm long, glandular. Flowers 2-2.5 cm across, axillary, solitary or in fascicles of 2-3, rose-purple or white; sepals small, broad, ovate; lip cymbiform, petaloid with yellowish blotch; spur filiform. Capsules ellipsoid-oblong, 3-14 x 4-6 mm, turgid in middle, narrowed at both ends, densely tomentose; seeds globose, black, reticulate.

Fl. & Fr.: March-October.

Common in moist places, usually near water sources. It is usually cultivated in the gardens. Lungleh-Sairep, *Dutta* 33514.

2. *Impatiens chinensis* var. *chinensis* L., Sp. Pl. 937. 1753; Hook. f., Fl. Brit. India 1: 444. 1874; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 34. 1938; Vivekanathan *et al.* in Hajra *et al.*, Fl. India 4: 132. 1997. *Hawilo* (Lushai).

Erect annual herbs, 12-45 cm high; stem slender, angled, succulent, rooting at base. Leaves sessile or subsessile, opposite, linear or oblanceolate, 2.5-5 x 0.3-1 cm, base \pm rounded or subcordate, acute to acuminate at apex, serrate along margins, glabrous above, glaucous-white beneath. Flowers 1.5-2 cm across, axillary, solitary or 2-3 in fascicles, bright pink or reddish-white; pedicels 3.5-5 cm long; lip boat shaped; spur curved, 1.5-2 cm long, violet-red. Capsules ellipsoid, 10-20 x 3-6 mm, \pm glabrous, turgid in middle; seeds black, many, oblong, smooth.

Fl. & Fr.: June-October.

Common along the river banks and road sides in humid places. Lushai hills, *Mrs Parry s.num.* (CAL); 60 miles South of Lungleh, *Wenger* 318 (*vide* C.E.C. Fischer, *l.c.*); Champhai-Zote road, *K.P. Singh* 94583; North Vanlaiphai *D.K. Singh* 99215.

3. *Impatiens drepanophora* Hook. f. in Rec. Bot. Surv. India 4: 17. 1905; C.E.C. Fischer in Rec. Bot. Surv. India 12: 84. 1938;

Vivekanathan *et al.* in Hajra *et al.*, Fl. India 4: 142. 1997. *Nuaieng* (Lushai).

Annual, glabrous, slender herbs, 20-55 cm high; stem base creeping. Leaves alternate or opposite, crowded towards apex, elliptic-ovate, lanceolate, 3-8 x 1.5-4.5 cm, base alternate, acute to bluntly acuminate at apex, serrulate along margins, glabrous above, white, glaucous beneath; petioles 2-5 mm long. Flowers 2-3 cm long, in long peduncled racemes, bright yellow; lateral sepals unciniate, 2-3 mm long; lip spurred, tubiform; spur filiform, 12-15 mm long. Capsules linear-ellipsoid to fusiform, 15-20 x 2-3 mm; seeds oblong, glabrous, tuberculate.

Fl. & Fr.: June-September.

Common in humid places. Tuizeuhnar, 1200 m, Parry 324 (*vide* C.E.C. Fischer, *l.c.*).

4. *Impatiens glandulifera* Royle., Illus. Bot. Himal. Mts, 151, 28, t.2. 1853; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 30. 1987; Vivekanathan *et al.* in Hajra *et al.*, 4: 151. 1997. *Impatiens roylei* Walpers: Hook. f., Fl. Brit. India 1: 468. 1875 & in Rec. Bot. Surv. India 4: 5. 1904.

Annual, branched, glabrous, erect herbs, 1-2 m high; stems succulent, erect. Leaves variable in size, opposite-verticillate, elliptic-ovate or lanceolate, 4.5-15 x 2-6 cm, base cuneate to alternate, acuminate at apex, crenate serrate along margins, glabrous or finely pubescent; petioles glandular, 2-5 cm long. Flowers 2-3.5 cm long excluding spur in compact subterminal racemes or umbels, purplish-pink; lateral sepals 5-8 mm long; lip bell-shaped, spotted with yellow; 12-20 mm long, spur yellow, filiform, incurved. Capsules broadly clavate, 5-15 x 3-8 mm, turgid in middle, drooping, beaked, glabrous; seeds obovoid, 3-4 mm long, grey, wrinkled.

Fl. & Fr.: July-September.

Common along the streams and damp places. Saiha-Bualpui, Dutta 33863.

5. *Impatiens jurpia* Buch.-Ham. ex Hook f. & Thomson in J. Linn. Soc. Bot. 4: 140. 1860; Hook f., Fl. Brit. India 1: 471. 1875; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 84. 1938; Vivekanathan *et al.* in Hajra *et al.* Fl. India 4: 161. 1997.

Undershrubs, erect, 0.5-2.5 m tall; stems branched, finely pubescent, woody below. Leaves alternate, ovate-elliptic to elliptic-lanceolate, 10-18 x 2-6 cm, base acute to cuneate and often oblique, caudate-acuminate at apex, crenate-serrate along margins and glandular-ciliate in crenations, pubescent on both sides; petioles 2-5 cm long, glandular, narrowly winged. Peduncles 5-14 cm long, 1-3-flowered, axillary; Flowers 4-5 cm long, white or straw-coloured, or pinkish-red. Lip large, saccate, navicular; spur short, coiled, obtuse. Capsules narrow, linear-clavate, 2-3.5 x 0.5-0.6 cm, glabrous; seeds many, suborbicular, tubercled.

Fl. & Fr.: June-December.

Common in shady moist forests near water. *S.loc.* Wenger 208 (*vide* C.E.C. Fischer, *l.c.*); 10 miles South of Lungleh, 1200 m, Wenger 337 (*vide* C.E.C. Fischer, *l.c.*).

6. ***Impatiens laevigata*** Wallich ex Hook. f. & Thomson in J. Linn. Soc. Bot. 4: 146. 1860; Hook. f., Fl. Brit. India 1: 473. 1875; C.E.C. Fischer in Rec. Bot. Surv. India. 12(2): 84. 1938; Vivekanathan *et al.* in Hajra *et al.*, Fl. India 4: 167. 1997. *Nuaieng* (Lushai).

Erect, glabrous undershrubs, 0.5-1.2 m tall; stems branched, woody below. Leaves alternate, crowded at top of stem, elliptic or obovate-lanceolate, 7-19 x 2-5 cm, base obliquely cuneate, acute to caudate-acuminate at apex, distantly serrate along margins with ciliate or mucronate crenations; glabrous; petiole 1-3.5 cm long, glandular. Peduncles 1-2 cm long, 1-4-flowered; flowers 2-3 cm across, yellow, streaked with brown on the wings; lateral sepals large, orbicular; lip funnel-shaped, yellow, 2-3 cm long, narrowed into hooked spur. Capsules narrowly fusiform, ca 20 x 4 mm, turgid in middle, glabrous; seeds obovoid, smooth, glabrous.

Fl. & Fr.: July-December.

Common in shady moist places. *S.loc.* Parry, 1200 m, *s.num.* (*vide* C.E.C. Fischer, *l.c.*).

7. ***Impatiens porrecta*** Wallich [Cat 245. no. 7275. (1832), *nom. nud.*] ex Hook. f. & Thomson in J. Linn. Soc. Bot. 4: 138. 1860; Hook. f., Fl. Brit. India 1: 472. 1875; Vivekanathan *et al.* in Hajra *et al.*, Fl. India 4: 195. 1997.

Slender herbs, 20-40 cm high; stems creeping below, glandular, hairy. Leaves alternate, ovate to lanceolate, 2-6 x 1.5-3 cm, base cuneate to slightly attenuate into petiole, acuminate at apex, serrate along margins, sparsely pubescent beneath; petioles 5-10 mm long. Peduncles axillary in terminal region, 2-3-flowered; flowers 2-2.5 cm across, orange-red or pale yellow with purplish nerves at throat; lateral sepals ovate lanceolate, hairy, white with red dots; lip \pm navicular, narrowed into a long incurved spur. Capsules ellipsoid, 10-15 mm long, pubescent; seeds subglobose, puberulous.

Fl. & Fr.: July-December.

Scarce in moist places. Sairep-Aizawl road, *Wenger* 21520.

8. ***Impatiens puberula*** DC., Prodr. 1: 687 Jan. 1824; Hook f., Fl. Brit. India 1: 470. 1875; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 84. 1938; Vivekanathan *et al.* in Hajra *et al.*, Fl. India 4: 198. 1997.

Erect slender, pubescent herbs, 60-100 cm high, sparingly branched. Leaves alternate, elliptic-lanceolate, 2.5-7 x 1.5-2.5 cm, attenuate at base, acuminate at apex, dentate-crenate along margins, pubescent above, lower surface white, eglandular; petioles short. Flowers solitary, 2-3 cm across, usually confined to the upper most axils, pubescent, reddish-violet; pedicels 2-3 cm long; lateral sepals broad, ovate-acuminate; lip conoidal, pinkish-white; spur ca 1 cm long, incurved. Capsules linear, 4-5 mm long, glabrous.

Fl. & Fr.: July-November.

Found only in one damp shady spot, 10 miles South-east of Lungleh, 1200 m, *Wenger* 328 (*vide* C.E.C. Fischer, *l.c.*).

9. ***Impatiens pulchra*** Hook. f. & Thomson in J. Linn. Soc. Bot. 4: 139. 1860; Hook f., Fl. Brit. India 1: 459. 1874; C.E.C. Fischer in Rec. Bot. Surv. India 12: 34. 1938; Vivekanathan *et al.* in Hajra *et al.*, Fl. India 4: 199. 1997. *Hmezhial* (Lushai); *Radang* (Lakher).

Erect herbs, 10-35 cm high; stems nodose, usually simple. Leaves alternate, elliptic-lanceolate, 4-10 x 1-2 cm, base attenuate or cuneate, acuminate at apex, serrate-crenate along margins, glabrous on both surfaces; petioles 5-15 mm long, naked. Flowers 4-5 cm across, purplish-pink with red marks; peduncles 2-6 cm long, 1-2-flowered; lateral sepals 2, broad, 5-10 mm long; lip funnel-shaped, narrowed into a hooked spur;

spur sometimes spiral, curved. Capsules ellipsoid-oblong, 1.5-2 x ca 0.3 cm, glabrous, narrowed at both ends, turgid in middle; seeds many, subglobose, papillose.

Fl. & Fr.: July-December.

Common in shady places. Hnuifang 1500 m, *Parry 34 (fide C.E.C. Fischer, l.c.)*; North Vanlaiphai, *Parry 34 (fide C.E.C. Fischer, l.c.)*; Sialsuk, 1200 m, *Parry 35 (fide C.E.C. Fischer, l.c.)*.

10. *Impatiens trilobata* Colebr. in Hook., *Exot. Fl.* 2: t. 141. 1825; Hook. f., *Fl. Brit. India* 1: 451. 1874; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 30. 1987; Vivekanathan *et al.* in Hajra *et al.*, *Fl. India* 4: 219. 1997.

Erect, glabrous herbs, 30-60 cm high. Leaves opposite or whorled, elliptic or ovate-lanceolate, 6-13 x 1.5-4.5 cm, base cuneate to attenuate, acute to long acuminate at apex, crenate-serrate along margins, sparsely hairy above; petioles up to 5 cm long. Flowers solitary or in fascicles of 2-4 on 1-4 cm long peduncles, 15-25 mm across, purple-reddish, axillary; lateral sepals thickened at tips, 5-6 mm long; lip variable, saccate, sometimes conoid, curved or abruptly curved; spur abruptly curved. Capsules ellipsoid, 10-15 x 2-3 mm, glabrous, turgid in middle; seeds pyriform, glabrous.

Fl. & Fr.: June-September.

In moist places. Saiha-Bualpui, *Dutta 33862*.

11. *Impatiens tripetala* Roxb. ex DC., *Prodr.* 1: 687. 1824; Hook. f., *Fl. Brit. India* 1: 470. 1875; Deb & Dutta in *J. Econ. Tax.* 10(1): 30. 1987; Vivekanathan *et al.* in Hajra *et al.*, *Fl. India* 4: 219. 1997.

Annual, erect, glabrous, branched herbs, 25-70 cm high; stems succulent, swollen at nodes. Leaves opposite or whorled, elliptic-lanceolate, 3-6 (10) x 1.5-2.5 (4.5) cm, base cuneate, acuminate at apex, crenate at margins, glabrous or sparsely pubescent above; petioles 1.5-2 cm long. Flowers axillary, 1-2 cm across excluding spur, solitary or fascicled, pinkish-purple; lateral sepals acuminate, ca 3 mm long, lip saccate, shortly abruptly spurred; spur curved. Capsules linear-ellipsoid, 10-15 x 0.3-0.4 mm, glabrous, turgid in middle; seeds many, pyriform, rough, granulose.

Fl. & Fr.: November-December.

In moist shady places. Taitaw, *Dutta* 33202; Sairep, *Dutta* 33542.

12. *Impatiens tropaeoliflora* Griffith *ex* Hook. *f.*, Fl. Brit. India 1: 472. 1875 (*tropaeolifolia*); C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 84. 1938; Vivekanathan *et al.* in Hajra *et al.*, Fl. India 4: 221. 1997. *Hmehzial* (Lushai); *Radang* (Lakher).

Annual, erect, glabrous herbs, up to 30 cm high with succulent stems. Leaves alternate, elliptic-obovate, 5-9 x 1-2.5 cm, slightly attenuate at base, acuminate at apex, crenate-serrulate along margins, glabrous to puberulous above, glaucous beneath; petioles 5-15 mm long. Peduncles axillary, 2-3-flowered, succulent; flowers 18-22 mm across, bright orange-yellow with dull red tips; lateral sepals broad, orbicular; basal lobe of wing mucicous; lip funnel-shaped, narrowed into a stout incurved spur; spur constricted. Capsules linear, acute.

Fl. & Fr.: July-September.

North Vaulaiphai, 1500 m, *Parry* 376 (*fide* C.E.C. Fischer, *l.c.*).

13. *Impatiens uncipetala* C.B. Clarke *ex* Hook. *f.* in Rec. Bot. Surv. India 4: 18 & 22. 1905; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 34. 1938; Vivekanathan *et al.* in Hajra *et al.*, Fl. India 4: 223. 1997. *Impatiens scabrida auct non wallich* in Hook. *f.*, Fl. Brit. India 1: 472. 1875, *p.p.*

Annual herbs, 30-40 cm high. Leaves alternate, elliptic-ovate or elliptic-lanceolate, 3-6 x 2-3.5 cm, attenuate into petiolate base, acuminate at apex, dentate-serrate along margins, densely tomentose on upper side, lower side white, sparsely tomentose specially on nerves; petioles 3-15 mm long. Flowers 1-2 on short peduncles, 2.5-3.5 cm across, including spur, binate, yellow; lateral sepals ovate, *ca* 1 cm long; lip navicular; spur *ca* 5 mm long, slightly curved, rounded, swollen at tip. Capsules linear, 2-4 cm long, glabrous, pendulous; seeds glabrous.

Fl & Fr.: August-September.

S.loc., *Wenger* 209 (*fide* C.E.C. Fischer, *l.c.*).

AVERRHOACEAE

Averrhoa carambola L., Sp. Pl. 428. 1753; Edgew. & Hook.f., Fl. Brit. India 1: 439. 1874; Kanjilal *et al.*, Fl. Assam 1(2): 192. 1936; Manna in Hajra *et al.*, Fl. India 4: 257. 1997. *Thei-her-awt* (Lushai).

Small- medium trees, up to 12 m tall; stems irregularly fluted; branches drooping. Leaves imparipinnate, 10-30 cm long, exstipulate; leaflets 5-11, subopposite, ovate-lanceolate or rhomboid, 2-7 x 1.5-4 cm, acute-acuminate at both ends, entire, membranous, glabrous above, glaucous and pubescent along the main and lateral nerves beneath; lateral nerves 4-10 pairs; petiolules very small, ca 2.5 mm long. Flowers small, variegated, white and purple in axillary or terminal panicles; sepals 5, red; petals 5, twisted; stamens 10, dimorphic; ovary elliptic. Fruits oblong, 7-12 x 5 cm, 3-5-angled.

Fl. & Fr.: May-August.

Cultivated for edible fruits. Tlabung. Recorded on the basis of J.H. Lalramnghinglova (J. Econ. Tax. Bot. Addl. ser. 12: 444. 1996).

Uses: Fruits taken for jaundice, bleeding piles and as antiscorbutic.

RUTACEAE

(K.P. Singh)

1a. Leave opposite :

- | | |
|-----------------------------------------------------------------------------------|-------------------------|
| 2a. Leaves 1-foliolate; stamens 7-10;
ovary obscurely lobed; fruits drupaceous | ...1. <i>Acronychia</i> |
| 2b. Leaves 2-7-foliolate; stamens 4-5;
ovary deeply lobed; fruits follicular | ...11. <i>Tetradium</i> |

1b. Leaves alternate or spiral:

3a. Plants armed :

4a. Petioles narrowly or distinctly winged :

- | | |
|------------------------------------------------------------------------|---------------------------|
| 5a. Leaves 1-foliolate;
ovules many in each cell; fruits berry | ...5. <i>Citrus</i> |
| 5b. Leaves 5-11-foliolate;
ovules 1-2 in each cell; fruits capsular | ...13. <i>Zanthoxylum</i> |

- 4b. Petioles not winged :
- 6a. Stamens up to 10; ovules 1-2 in each cell;
fruits capsular or drupaceous:
- 7a. Leaves 1-foliolate; flowers bisexual;
stamens 8-10 ...10. *Paramignya*
- 7b. Leaves 2-many foliolate; flowers
polygamous; stamens 3- 5:
- 8a. Leaves 3-foliolate; ovary entire;
styles united; fruits drupaceous ...12. *Toddalia*
- 8b. Leaves pinnate; ovary deeply lobed;
styles free; fruits capsular ...13. *Zanthoxylum*
- 6b. Stamens numerous; ovules many in each cell;
fruits berry :
- 9a. Leaves 1-foliolate; fruits with soft
gland dotted rind ...5. *Citrus*
- 9b. Leaves 3-foliolate; fruits with woody rind ... 2. *Aegle*
- 3b. Plants unarmed:
- 10a. Perennial herbs; fruits capsular of distinct carpels ...4. *Boerhinghausenia*
- 10b. Shrubs or trees; fruits berry:
- 11a. Leaves 1-foliolate ...3. *Atalantia*
- 11b. Leaves more than one foliolate or imparipinnate:
- 12a. Leaves 3-5-foliolate;
style short, persistent ...7. *Glycosmis*
- 12b. Leaves imparipinnate; styles caducous,
usually joined on the top of the ovary:
- 13a. Leaflets opposite; flowers in terminal or
axillary cymes or racemes; ovary 4-celled ...6. *Clausena*
- 13b. Leaflets alternate; flowers in terminal,
corymbose panicles; ovary 2 or 5-celled:
- 14a. Petals valvate; styles and ovary
pubescent, 5-celled; berries dry ...8. *Micromelum*
- 14b. Petals imbricate; styles and ovary
glabrous, 2-celled; berries fleshy ...9. *Murraya*

1. ACRONYCHIA J.R. & G. Forster

Acronychia pedunculata (L.) Miq., Fl. Ind. Bat. Suppl. 532. 1861; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 392. 1997. 1861. *Jambolifera pedunculata* L., Sp. Pl. 349. 1753. *Acronychia laurifolia* Blume, Cat. Gen. Buitnez. 63. 1823; Hook. f., Fl. Brit. India 1: 498. 1875; Kanjilal *et al.*, Fl. Assam 1: 203. 1936. *Rah-var* (Lushai) **Fig. 55.**

Shrubs or trees, 3-8 m tall, all parts glabrous. Leaves 1-foliolate, opposite, very variable, 7-20 cm long; petioles 1-4 cm long, swollen at both ends; leaflets elliptic or oblong-lanceolate to oblanceolate, 6-14 x 2.5-6 cm, base acute or cuneate, obtusely acuminate at apex, quite entire along margins, glaucous green, glabrous, minutely pellucid dotted below; lateral nerves 10-12 pairs. Panicles axillary, corymbose; peduncles 4-6 cm long; flowers 8-12 mm across, white or yellowish-white, fragrant; calyx 4-lobed, lobes rounded; *ca* 1 mm long, connate below, imbricate; petals 4, linear-oblong, 4-5 mm long, villous on inner side; stamens 8; ovary 4-celled. Drupes globose or obovoid, 1-1.5 x *ca* 1.2 cm, 4-angled, beaked, glabrous to adpressedly pubescent, green when ripe, black when dry; seeds 2 to 4, ovoid.

Fl. & Fr.: January-December.

Scarce, on slopes of the hills in evergreen tropical forests. Kamthangpui-Kolasib, K.P. Singh 93212; Aizawl, M. Sawmliana 95569; Mini-zoo, Bethlehem, Aizawl, 650 m, M. Sawmliana 101754.

2. AEGLE Correa

Aegle marmelos (L.) Correa in Trans. Linn. Soc. London 5: 223. 1800; Hook. f., Fl. Brit. India 1: 516. 1875; Kanjilal *et al.*, Fl. Assam 1: 215. 1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 31. 1987; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 264. 1997. *Crateva marmelos* L., Sp. Pl. 444. 1753. *Bel-thei* (Lushai).

Large, deciduous, armed trees, up to 12 m tall; with oval crown; spines up to 2.5 cm long, erect, axillary. Leaves up to 18 cm long, alternate, trifoliolate or occasionally 5-foliolate; lateral ones smaller and shortly petioluled or almost sessile; the terminal one large and long petioluled; leaflets elliptic, ovate-lanceolate, 4-8 x 1.5-3 cm, terminal ones 10-13 x 5-

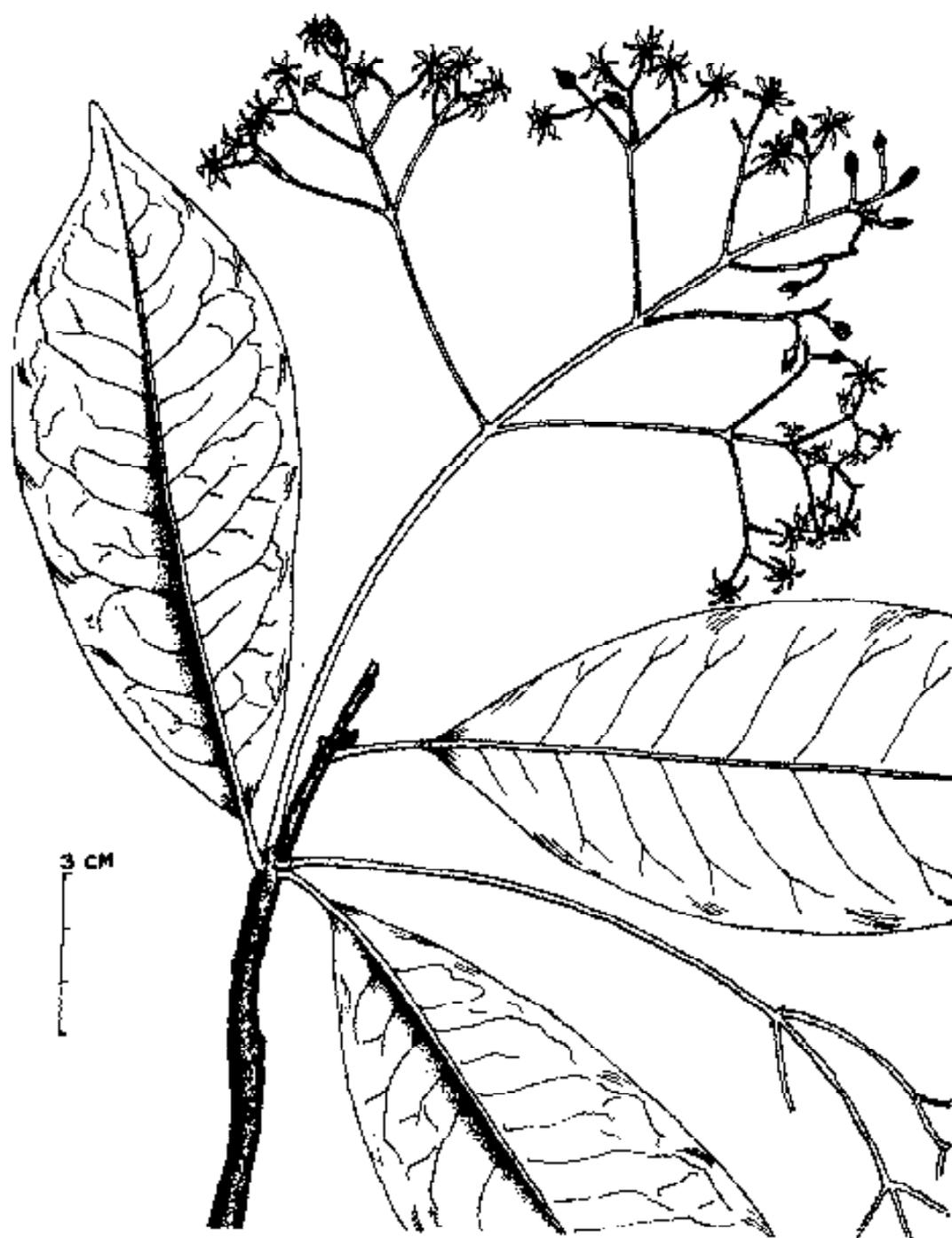


Fig. 55: *Acronychia pedunculata* (L.) Miq.

6.5 cm, base narrowed, cuneate, oblique, acuminate at apex, entire to subcrenulate along margins, glabrous. Flowers 2-2.5 cm across, greenish-white or yellowish, in lateral and subterminal panicles, sweet scented; calyx cupular, pubescent, obscurely 5-lobed; petals 4 or 5, oblong, 1-1.5 cm long, fleshy, deflexed glandular; stamens numerous in 2 or 3 series, basifixed; stigma club-shaped. Berries woody, globose, oblong or slightly pear shaped, 5-15 cm across, grey or yellowish, 10-15 chambered, each chamber containing 6-10, oblong, woolly seeds embeded in a sweet, orange coloured, mucilaginous, slimy, edible pulp.

Fl.: March-May. *Fr.*: Oct.-Nov., ripens next year.

Common at lower elevations, usually cultivated. Bunglang 75 m, *Deb* 31418, 32421; Taitaw, *Dutta* 33243.

3. ATALANTIA Correa

Atalantia simplicifolia (Roxb.) Engl. in Engl. & Prantl, Nat. Pflanzenfam. 3(4): 192. 1896; ed. 2, 19a: 328. 1913, excl. descr; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 271. 1997. *A. simplicifolia* (Roxb.) Tanaka in J. Bot. 68: 232. 1930, *comb. superfl.* *Amyris simplicifolia* Roxb., Fl. Ind. 2: 244. 1832. *Atalantia caudata* Hook. f., Fl. Brit. India 1: 513. 1875; Kanjilal *et al.*, Fl. Assam 1: 210. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 85. 1938. *Lallaiting* (Lushai).

Unarmed erect shrubs or small trees up to 5 m tall, with slender branches. Leaves 1-foliolate; petioles channelled, 5-10 mm long; leaflets variable, linear-lanceolate to elliptic, 7-10 x 2.5-4.5 cm, base narrower, obtuse or obtusely acuminate at apex, sometimes with a broad 2-lobed tip, wavy-entire along margins, glabrous, lower side pale dotted. Flowers in short, glabrous, axillary racemes, 0.5-0.6 cm across, white, fragrant; calyx sub-regularly 4-lobed, very small; petals 4, ovate-oblong; stamens 8, free; ovary 2-locular, sessile. Berry globose, 1-2 cm across, glandular.

Fl. & Fr.: March-December.

Lushai hills, between Changsie and Thunrumah Camp. *J.C. Prazer s.nun.* (CAL).

4. BOENNINGHAUSENIA Reichb. ex Meissner

Boenninghausenia albiflora (Hook.) Meissner, Consp. 197. 1828 & Pl. vase. Gen 2: 44. 1837; Hook. f., Fl. Brit. India 1: 486. 1875; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 85. 1938; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 357. 1997. *Ruta albiflora* Hook., Exot. Fl. 1: 79. 1823.

Perennial, woody, erect, branched herbs, 30-60 cm high; stems minutely tubercled, glabrous. Leaves bi- or tripinnate, imparipinnate, 6-10 cm long; leaflets subsessile, narrowly obovate or obcordate, (0.1) 1-2 x (0.2-0.3) 0.5-1.5 cm, terminal one largest, lateral ones smaller, base narrowed or cuneate, rounded or obtuse at apex, entire, membranous, glabrous, glaucous beneath; petiolules obsolete, or *ca* 1 mm long in terminal leaflet. Inflorescence compound, in terminal leafy cymes, up to 20 cm long, many-flowered. Flowers white, drooping, 5-12 mm across; pedicels thin, slender, up to 5 mm long; calyx urceolate, *ca* 1 mm long, 4-5-lobed; petals 4, obovate, 5-6 mm long, obtuse at apex; stamens 6-8; ovary 4-carpellate, stipitate, 3-5-lobed. Capsules 4-6 mm across, membranous, ventrally dehiscent into few-seeded carpels; seeds black, granulate, ovoid-ellipsoid, *ca* 1 mm long.

Fl. & Fr.: July-October.

Common in moist shady places. Lushai hills, *Parry s.num.* (CAL); *s.loc. Leslie*, 282 (CAL); Sairep, *K.P. Singh* 94156.

5. CITRUS L.

- 1a. Leaflets acute or acuminate at apex; berries globose without an apical knob; rind usually thin ...1. *C. indica*
- 1b. Leaflets obtuse or nearly so at apex; berries oblong with an apical knob; rind usually thick :
 - 2a. Bushy shrubs or small trees, upto 5 m tall; leaves \pm wingless ...2. *C. medica*
 - 2b. Medium-large trees, up to 15 m tall; leaves broadly winged ... 3. *C. microptera* var. *annamensis*

1. **Citrus indica** Tanaka, Stud. Citrol. 2: 164. 1928; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 85. 1938; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 281. 1997. *Serh* (Lushai); 'Indian wild orange' **Fig. 56.**

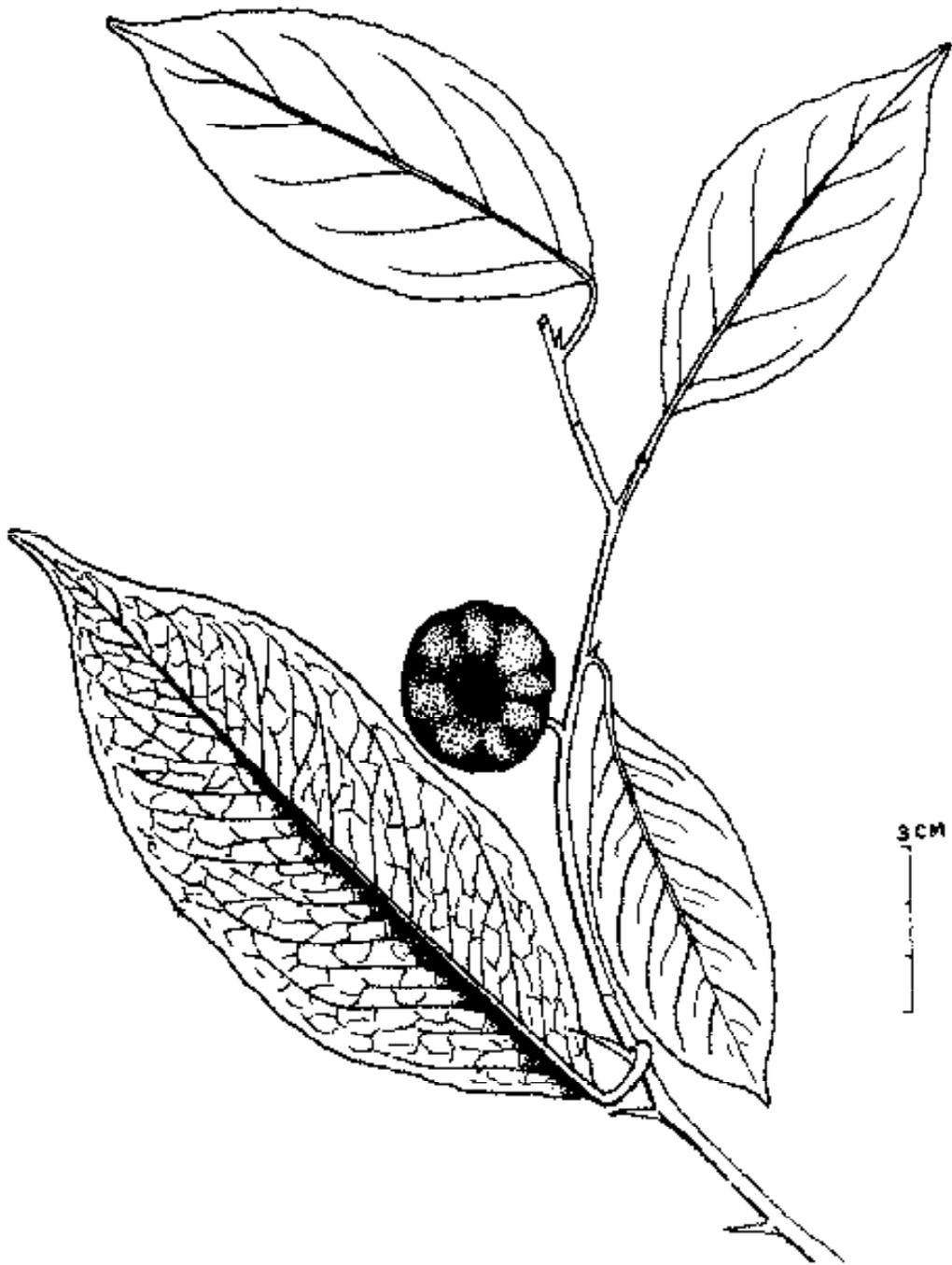


Fig. 56: *Citrus indica* Tanaka

Small shrubs or trees, up to 5 m tall; branches terete, glabrous with 2-3 cm long spines. Leaves unifoliolate; petioles 8-15 mm long, wingless to narrowly winged or flat; leaflet blades oblong to lanceolate, 6-10 x 2.5-3.5 cm, base narrower, acute to acuminate at apex, usually entire along margins, rarely crenulate. Flowers solitary, rarely in pairs, white, axillary; calyx greenish-white, cupular, 4 or 5-lobed, glabrous; petals 5, oblong, 1-1.5 x 3-6 mm, gland dotted on outer side; stamens 22-25, pubescent, anthers yellow, introrse, 2-3 mm long. Fruits aromatic, spherical to globose, 2-3.5 cm across, smooth, gland dotted with thin rind, 8-11-locular, deep orange to scarlet red; mesocarp white, sweet; endocarp 8-11-segmented; pulp vesicle white; seeds 5-7 per fruit, suborbicular, ca 1.5 x 1 cm, flattened, ends pointed.

Fl. & Fr.: March-December.

Sialsuk, 900 m, *Parry 78* (*vide* C.E.C. Fischer, *l.c.*); Saitual, *M. Sawmliana 95547*.

2. *Citrus medica* L., Sp. Pl. 782. 1753; Hook. f., Fl. Brit. India 1: 514. 1875; Kanjilal *et al.*, Fl. Assam 1: 213. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 85. 1938; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 284. 1997. *Serh* (Lushai); *Isa* (Lakher).

Bushy shrubs or small trees, 1-5 m high; spines erect, axillary, up to 3 cm long. Leaves unifoliolate; petioles 5-7 mm long, wingless or slightly winged or flat; leaf blades elliptic-ovate or oblong-lanceolate, 8-15 x 2-8 cm, base narrowed or cuneate, obtuse at apex, crenate-serrate along margins, glabrous. Inflorescence axillary, solitary or few-flowered racemes. Flowers sweet scented, 15-18 mm across, pink or purplish white; calyx 4-5-lobed, obconic, truncate; petals 4 or 5, oblanceolate, 1.2-2.5 x 1 cm, gland dotted; stamens 20-40; filaments white to reddish, pubescent; ovary cylindrical, 12-14-locular. Fruits ovoid-oblong, 7-12 x 5-7 cm, mamillate at apex, yellow when ripe, aromatic with a thick spongy rind; pulp-vesicle present; seeds 20-30, ca 10 x 4 mm, smooth.

Fl. & Fr.: January-December.

Helio hills, N.E. of Lungleh, 1110 m, *Gage 65* (CAL); Bunglang, *Deb 31456*; Thaltlang to South Vanlaiphai, *Dutta 34000*; Near Sherchip, *K.P. Singh 96609*; Kawapui, *K.P. Singh 97037*.

Uses: Fruits edible.

3. **Citrus microptera** Montr. var. **annamensis** Tanaka in Bull. Mus. Hist. Nat. (Paris) 2, ser. 2: 164, 1930 (as *C. macroptera*); K.N. Nair and Nayar in Hajra *et al.*, Fl. India 4: 290, 1997. *Hut-kora* (Lushai).

Medium to large trees, up to 15 m tall; branches spinous. Leaves unifoliolate; petioles broadly winged; wings obcordate, oblong-obovate; leaflet blades ovate-elliptic, 4-7 x 3.5-5 cm, obtuse at base, obtuse or emarginate at apex, obscurely crenate along margins. Flowers white, in 2-10-flowered, glomerate, cymose inflorescence; calyx cupular, 4-5-lobed; lobes deltate, acute; petals 4-5, ovate; stamens 20-30, filaments free, white. Fruits oblate-pyriform, up to 9 x 12 cm, yellow, smooth, pitted or papillate with thick rind, 13-15 locular; mesocarp white; seeds 20-40, cuneate-triangulate, pointed at tips.

Fl. & Fr.: March-January.

Dampui, 800 m. *M. Samliana* 107438.

Uses: Fruits are edible.

CULTIVATED TAXA

Citrus aurantium L., Sp. Pl. 782, 1753; Hook. *f.*, Fl. Brit. India 1: 515, 1875, excl. var. *bergamia*; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 279, 1997.

A native of South China and Indo-China, frequently cultivated throughout India including Mizoram.

Citrus limetta Risso in Ann. Mus. Par. 20: 195, t. 2, f. 1, 1813; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 293, 1997.

Cultivated for its delicious fruits.

Citrus sinensis (L.) Osbeck., Dagb. Ostind. Resa 41, 1775; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 287, 1997.

Probably a native of South China or Indo-China, the sweet orange is widely cultivated for its esteemed fruits.

6. *CLAUSENA* Burm. f.

- 1a. Panicles axillary, raceme like ...1. *C. anisata* var. *pancijuga*
 1b. Panicles terminal :
 2a. Leaves 7-11-foliolate; leaflets mostly equal,
 sometimes slightly oblique at base; ovary glabrous ...3. *C. heptaphylla*
 2b. Leaves 13-30-foliolate; leaflets strongly oblique at base;
 ovary ± hirsute or pilose ... 2. *C. excavata*

1. *Clausena anisata* (Willd.) Hook. f. ex Benth. var. *pancijuga* (Kurz) J.F. Molino in Bull. Mus. Hist. Nat. (Paris) 16: 132. 1994; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 322. 1997. *Clausena suffruticosa* (Roxb.) Wight & Arn. ex Steudel var. *pancijuga* Kurz in J. As. Soc. Bengal 44: 133. 1875. Hook f., Fl. Brit. India 1: 506. 1875; Kanjilal *et al.*, Fl. Assam 1: 207. 1936; C.E.C.Fischer in Rec. Bot. Surv. India 12(2): 85. 1938. *Clausena dentata* (Willd.) M. Roemer, Syn. Mem. Hesper. 44. 1846; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 85. 1938. *C. willdenowii* Wight & Arn., Prodr. 96 1834, *nom. superfl.*; Hook. f., Fl. Brit. India 1: 506. 1875. **Fig. 57.**

Shrubs or small trees, up to 5 m tall, glabrous, young parts tomentose. Leaves 15-30 cm long, 5-15-foliolate or sometimes more, imparipinnate; leaflets alternate, obliquely ovate-oblong or ovate-lanceolate, 4-10 x 2-4 cm, obtuse, caudate-acuminate at apex, glandular crenulate along margins, membranous, young ones tomentose, older ones glabrous; petiolules upto 5 mm long. Racemes axillary in the upper portions of branchlets, glabrous or tomentose, 6-20 cm long; flowers 4-6 mm across, whitish, fragrant; calyx ovate-deltate, *ca* 1 mm long, glandular, glabrescent or ciliolate petals oblong, 2-5 mm long, concave, glabrous; stamens 8; gynophore *ca* 1 mm long; ovary stipitate, 4-locular, oblong, glandular-tuberculate. Berries globose, 6-20 mm across, purplish-orange when ripe, pellucid; seeds solitary, ovoid, compressed.

Fl. & Fr.: February-August.

Common in evergreen forests. Lushai hills, *Parry s.nun.* (CAL); valley near Fort Lungleh, 900 m, *Gage 46* (CAL); Mizo hills, *Dutta 33595*; Phelawn forest, *K.P. Singh 97053*.



Fig. 57: *Clausena anisata* (Willd.) Hook. *f. ex* Benth.
var. *pancijuga* (Kurz) J.F. Molino

2. *Clausena excavata* Burm. f., Fl. Ind. 87, t. 29, f. 2. 1768; Hook. f., Fl. Brit. India 1, 504. 1875; Kanjilal *et al.*, Fl. Assam 1: 206. 1936; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 325. 1997.

Evergreen shrubs or small trees, 3-5 m tall; young parts softly tomentose. Leaves 13-25 (35)-foliolate, 15-30 cm long, imparipinnate with tomentose, terete, 15-25 cm long petiole and rachis; leaflets lanceolate or oblong to lanceolate, 2-8 x 1.2-3 cm, base oblique, acuminate at apex, entire to obscurely crenate or waved along margins, membranous, softly ± tomentose on both surfaces especially on nerves beneath, sometimes glabrescent above; petiolules 1-2 mm long, tomentose. Panicles terminal, 12-25 cm long, tawny hirsute or softly tomentose; flowers in cymes, 3-5 mm across, tetramerous, dull white; sepals 4, ovate, ca 1 mm long, acute; petals broadly elliptic, ca 3 mm long, obtuse, glabrous; stamens 8; gynophore hourglass-shaped; ovary 4-locular, tawny hirsute. Berries ovoid to oblong, 8-15 x 4-8 mm, pink when mature, glandular-punctate, 1-2-seeded, crowned with a short style; seeds oblong.

Fl. & Fr.: March-October.

Scarce, on roadside ridges in tropical moist forests. Kawnpui, K.P. Singh 93274.

Uses: Leaves and twigs are used as spices.

3. *Clausena heptaphylla* (Roxb.) Wight & Arn. ex Steudel, Nomencl. Bot. ed. 2, 1: 377. 1840; Hook. f., Fl. Brit. India 1: 504. 1875; Kanjilal *et al.*, Fl. Assam 1: 206. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 85. 1938; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 326. 1997. *Amyris heptaphylla* Roxb. [H. Beng. 28. (1814), *nom. nud.*] Fl. Ind. 2, 2: 248. 1831. *Santhlung-Suirhui*, *Bawktetial* (Lushai); *Hriseupakong* (Lakher). Fig. 58.

Bushy shrubs or small trees, up to 5 m high. Leaves 15-35 cm long, imparipinnate, 7-11-foliolate; leaflets elliptic-lanceolate, 5-16 x 1-6 cm, equal or obliquely acute at base, acute to acuminate at apex, entire to crenulate along margins with uniseriate-glands, glabrous, puberulous on nerves beneath, profusely gland-dotted; lateral nerves 6-8 pairs. Panicles terminal or axillary, corymbose, 2.5-10 cm long, di- or trichotomously branched; flowers ca 3 mm across, white or greenish-yellow; sepals 4(5), ca 1 mm long, ciliolate; petals oblong, 3-4 mm long, stamens 8; gynophore distinct;

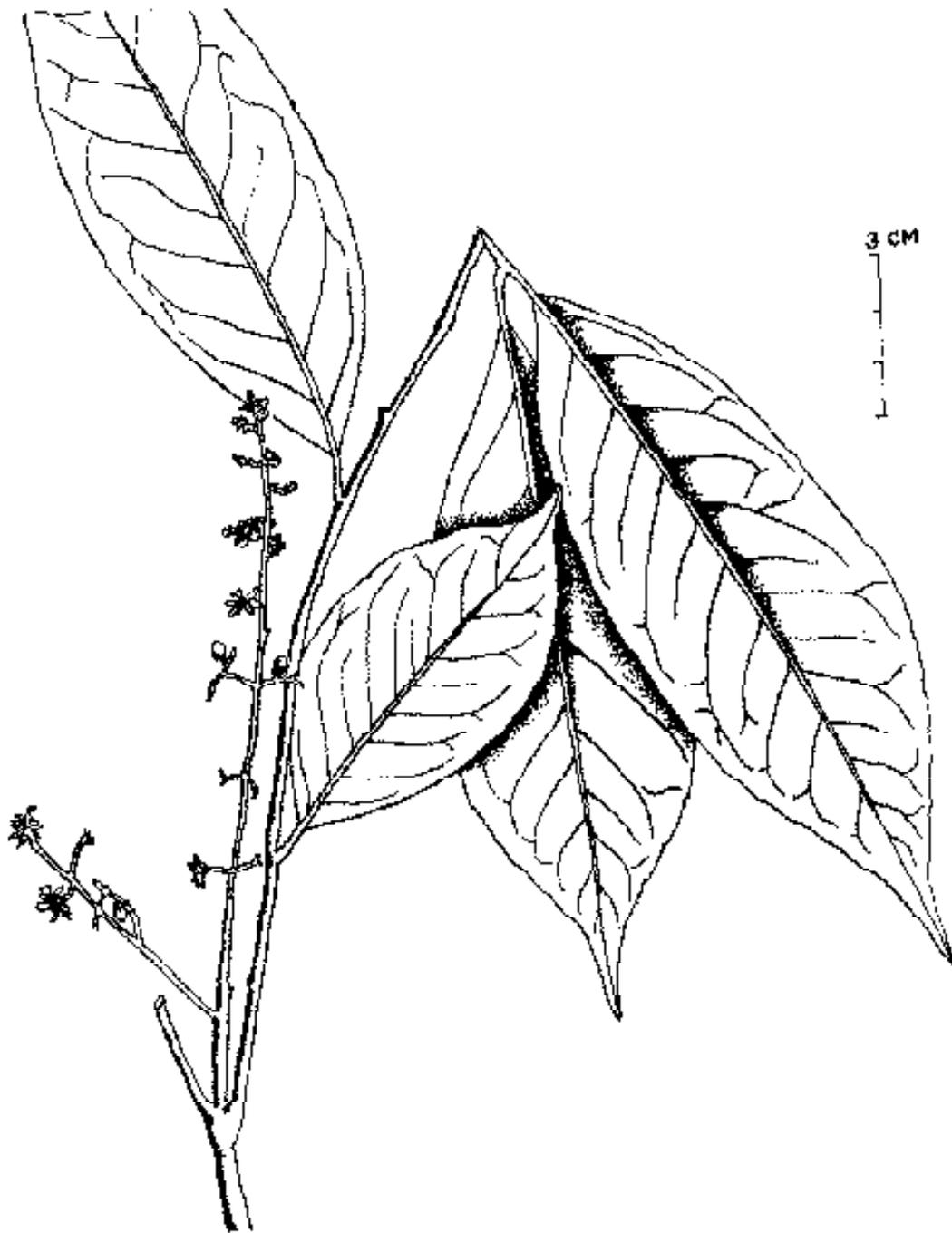


Fig. 58: *Clausena heptaphylla* (Roxb.) Wight & Arn. ex Steudel

ovary 4-locular. Berries oblong-ovoid or ellipsoid, 7-14 x 4-6 mm, orange or red when ripe, glandular pitted, 1-seeded; seeds ovoid.

Fl. & Fr.: February-August.

Common in shady places, Tipaimukh, *Kanjilal* 4779; Lawngtalai-Saiha, *Dutta* 33792; Rieng, *D.K. Singh* 92954; Bukpui, *D.K. Singh* 93016; Tilthlang, *K.P. Singh* 96631; Kawnpui, *K.P. Singh* 97047.

Uses: Leaves chewed with betel leaves, have a pleasant taste and also used by Lakhers as febrifuge.

7. GLYCOSMIS Correa

- 1a. Leaflets entire along margins; inflorescence 2-4 cm long; stamens subequal; berries ellipsoid, purplish-black when ripe, outer rind smooth or pitted ... 1. *G. cyanocarpa*
- 1b. Leaflets crenulate along margins; inflorescence 4-10 cm long; stamens equal; berries globular, creamy-white or salmon-reddish when ripe, outer rind mamillate ... 2. *G. pentaphylla*

1. *Glycosmis cyanocarpa* (Blume) Spreng., Syst. Veg. ed. 16: 161. 1827; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 335. 1997. *Cookia cyanocarpa* Blume, Bijdr. 3: 136. 1825.

Evergreen shrubs or small trees, 3-8 m tall, glabrous. Leaves very variable, imparipinnate, up to 35 cm long, 3-5-foliolate; rachis 6-12 cm long; leaflets ovate-elliptic to oblong-lanceolate or linear-lanceolate, 5-15 x 0.5-6 cm, base acute to cuneate, acute or bluntish acuminate at apex, entire along margins, coriaceous or chartaceous, glabrous; petiolules 2-3 mm long; lateral nerves 7-12 pairs. Cymes axillary or terminal, 2-4 cm long; flowers 2-5 mm across, white; calyx 4 or 5-lobed, lobes suborbicular; ca 1 mm long, petals 4 or 5, obovate, glandular. Berries glandular, obovoid-oblong, 10-12 x 8-10 mm, smooth, blue; seeds solitary, pitted.

- 1a. Leaflets broad, caudate-acuminate at apex, 5-15 x 2.5-6 cm ... 1.1 var. *cymosa*
- 1b. Leaflets narrow, tapering at both ends, 5-8 x 0.5-1 cm ... 1.2 var. *linearifolia*

1.1 var. *cymosa* Kurz in J. Bot. 14: 34. 1876; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 336. 1997. *Glycosmis cymosa* Zipp. ex Span. in Linnaea 15: 178. 1851; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 31. 1987.

Fig. 59.



Fig. 59: *Glycosmis cyanocarpa* (Blume) Spreng. var. *cymosa* Kurz

Fl. & Fr.: September-May.

Darlak, *Deb* 3411; Kheitung, 1000 m, *Deb* 31230; Theiriak, *Deb* 31353; Sabual, 1000 m, *D.K. Singh* 99033.

1.2 var. *linearifolia* Narayanswamy ex Tanaka in J. Indian Bot. Soc. 16: 229. 1937 ('*linearifoliolis*'). var. *changsiliana* Narayanswamy in Rec. Bot. Surv. India 14: 32, f. 10. 1941; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 337. 1997.

Fl. & Fr.: February-August.

In primary forests, at 1000 m. Lushai hills, Changsil, *Praxer* 1890. *s.num.* (CAL). Endemic to N.E. India.

2. *Glycosmis pentaphylla* (Retz.) DC., Prodr. 1: 538. 1824 (*quoad* Basionym); K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 343. 1997. *Limonia pentaphylla* Retz., Obs. Bot. 5: 24. 1788; Kanjilal *et al.*, Fl. Assam 1: 205. 1936. *p.p.*; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 85. 1938. *Glycosmis arborea* (Roxb.) DC., Prodr. 1: 538. 1824. *G. pentaphylla*, *auct. non* DC., 1824; Hook. f., Fl. Brit. India 1: 449. 1875. *p.p.*

Shrubs or small trees, up to 6 m tall; branchlets glabrescent at maturity. Leaves pinnately 3-5-foliolate; rachis 3-7 cm long; leaflets opposite-alternate, oblanceolate, elliptic-lanceolate, 9-15 x 3.5-6 cm, base cuneate obtusely to acute, apiculate or obtusely acuminate at apex, crenulate-dentate along margins, chartaceous, glossy, glabrous; petiolules 1-3 mm long; lateral veins 8-16-paired. Panicles or cymes 4-10 cm long, rusty pubescent, axillary-terminal; flowers in dense clusters, 2-4 cm across, white; sepals 5, ca 1 mm long, imbricate, margins ciliolate; petals 5, imbricate, lanceolate, 3-4.5 x 2-3 mm, creamy white, glabrous; recurved; stamens 10; ovary ovoid-cylindrical; Berries globose, 5-10 mm in diam., pinkish when ripe, mamillate, 1-seeded.

Fl. & Fr.: February-December.

Common in evergreen forests. Lungleh, 900 m, *Gage* 80 (CAL).

8. MICROMELUM Blume

Micromelum integerrimum (Roxb.) ex DC.) M. Roemer., Syn. Mon. Hesper 1: 47. 1846 [as *M. integerrimum* Wight & Arn. (1834), *nom. illegit.*]; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 31. 1987; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 349. 1997. *Bergera integerrima* Roxb. (Hort. Bengal. 32. (1814), *nom. nud.*) ex DC., Prodr. 1. 537. 1824. *Micromelum pubescens*, auct. non Blume, 1825; Hook. f., Fl. Brit. India 1: 501. 1875, *p.p.*, excl. vars. 1 & 3; Kanjilal *et al.*, Fl. Assam 1: 208. 1936.

Evergreen shrubs or small trees, 2-10 m tall; young parts ± densely puberulous. Leaves 12-40 cm long; leaflets 7-15, alternate, sub-opposite, obliquely ovate-lanceolate or oblong-lanceolate, 5-18 x 2-6.5 cm, base cuneate, oblique, long acuminate at apex, entire to wavy or crenulate along margins, greenish-glabrous above, tomentose or pubescent along the nerves beneath, gland dotted; lateral nerves 8-15-paired; petiolules 3-4 mm long. Corymbs terminal, or from the axil of upper most leaf, up to 20 cm long, divaricate or crowded, tawny appressed-pubescent; flowers 7-10 mm long, dull white, fragrant; calyx small, 5-toothed; sepals *ca* 0.5 mm long, glandular, pubescent outside; petals 5, rounded at tip, oblong, *ca* 6 mm long, pubescent; stamens 10; ovary subglobose, ± hairy. Berries ellipsoid, 8-12 x 6-7 mm, orange or reddish-yellow when ripe; pellucid-punctate, shortly stipitate below, terminated by a stylar scar; seeds 2 or 3, compressed, bean-shaped.

Fl. & Fr.: November-June.

Common in tropical, moist evergreen mixed forests, Valley near fort Lungleh, Gage 20, 36 (CAL); Darlak, Deb 3412 (CAL); Kheitum, Deb s. num.; Tilthlang, K.P. Singh 94073; Tlabung, K.P. Singh 94300; Kawnpui, K.P. Singh 97043; Lungchuan, D.K. Singh 99208.

9. MURRAYA Koenig ex L. *nom. cons.*

- 1a. Leaves with 15-27 leaflets; berries purple-black when ripe ... 1. *M. koenigii*
 1b. Leaves with 3-7 leaflets; berries reddish when ripe ... 2. *M. paniculata*

1. *Murraya koenigii* (L.) Spreng., Syst. Veg. 2: 315. 1825; Hook. f., Fl. Brit. India 1: 503. 1875; Kanjilal *et al.*, Fl. Assam 1(2): 208. 1936;

K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 351. 1997. *Bergera koenigii* L., Mant. Pl. Alt. 563. 1771. *Arpatil* (Lushai).

Large shrubs, up to 4 m tall, branches puberulous or glabrous; bark dark brown. Leaves up to 45 cm long, 15-27 foliolate; leaflets ovate-lanceolate, 2-8 x 1-2.5 cm, oblique at base, obtusely acuminate-retuse at apex, glandular-crenulate along margins; petiolules up to 3 mm long; lateral nerves 4-10 pairs. Flowers many, white; in terminal, corymbose panicles; sepals 5, fused at base; petals 5, valvate, linear, 6.5-8 x 1-1.2 mm, obtuse, greenish white; stamens 10. Ovary 2-loculed, oblong-ovoid. Berries subglobose, ca 10 mm in diam., purplish-black when ripe; seeds 1-2, ovoid-oblong, green.

Fl. & Fr.: March-July.

Recorded on the basis of L.K. Jha [*Natural Resource Management*, 1 (Mizoram). 1997].

2. ***Murraya paniculata*** (L.) Jack., Malay. Misc. 1(5): 31. 1820; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 85. 1938; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 352. 1997. *Chalcas paniculata* L., Mant. Pl. 68. 1767. *Murraya exotica* L., Mant. Pl. Alt. 563. 1771 (*Murraea*); Hook. f., Fl. Brit. India 1: 502. 1875; Kanjilal *et al.*, Fl. Assam 1: 207. 1936. *Mungthi*, *Mungthing*, *Ling-Kun* (Lushai).

Evergreen shrubs or small trees, 3-6 m tall, bark whitish grey. Leaves up to 20 cm long, 3-7-foliolate, rachis 4-8 cm long; leaflets alternate, varying in size, ovate, obovate or elliptic, obliquely rhomboid, 2-7.5 x 1.5-3 cm, acute to cuneate at base, obtusely acuminate, often notched at apex, irregularly crenulate-entire along margins, glabrous or minutely hairy along the mid rib on both sides, glossy; petiolules 3-4 mm long; lateral nerves 8-10-paired. Flowers few, in terminal or axillary corymbs, ± 2.5 cm long, white, fragrant; sepals 5, acute, ovate 0.5-1 mm long; petals 5, oblong-elliptic, 1.2-2 cm long; stamens 10, white; ovary glabrous, 2 or 3-locular, ovoid-ellipsoid. Berries ovoid-oblong, 1.0-1.5 cm long, narrowed at both ends, rugose, red or orange-red when ripe, 1-2-seeded; seeds oblong, villous, hairy.

Fl. & Fr.: March-July.

Common in tropical, evergreen moist forests, also cultivated. Near Fort Lungleh, 900-1200 m, *Gage* 183 (CAL).

10. **PARAMIGNYA** Wight

Paramignya monophylla Wight, *Illus. Ind. Bot.* 1: 108. t.42. 1840; Hook. *f.*, *Fl. Brit. India* 1: 510. 1875; Kanjilal *et al.*, *Fl. Assam* 1: 212. 1936; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 31. 1987; K.N. Nair & Nayar in Hajra *et al.*, *Fl. India* 4: 312. 1997.

Erect, evergreen, woody climbing shrubs with curved branches and 10-20 mm long, axillary, recurved spines. Leaves 1-foliolate; petioles 5-12 mm long; leaf blades elliptic-oblong, oval or oblong, sometimes elliptic-lanceolate, 6-12 x 2.5-4.5 cm, rounded at both ends, or shortly acuminate or abruptly acute at apex, entire or obscurely crenate, glabrous, pubescent on the midrib beneath, coriaceous, gland dotted; petiolules 10-12 mm long. Flowers in axillary cymes or sometimes solitary on tomentose pedicels, ca 20 mm across, bright orange, fragrant; calyx broadly 5-lobed, cup-shaped, ca 5 mm long; petals 4 or 5, oblong, 12-15 mm long, imbricate, glandular; stamens 8 or 10, free; ovary 3-5-celled, ovoid, pilose. Berries ovoid or obovate, ca 25 mm across, downy-pubescent, yellow to orange when ripe, 1-seeded; seeds compressed.

Fl. & Fr.: April-December.

North Vanlaiphai, *Deb* 31156; Vanrubak-Thalthlang, *Dutta* 33916.

11. **TETRADIUM** LOUR.

Tetradium fraxinifolium (Hook.) T.G. Hartley in *Gard. Bull. Straites Settle.* 34(1): 102. 1981; K.N. Nair & Nayar in Hajra *et al.*, *Fl. India* 4: 371. 1997. *Philagonia fraxinifolia* Hook., *Jc. Pl.* t. 710. 1848. *Evodia fraxinifolia* (Hook.) Benth., *Fl. Hongkong* 59. 1861; Hook. *f.*, *Fl. Brit. India* 1: 490. 1875; Kanjilal *et al.*, *Fl. Assam.* 1: 1936; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 31. 1987. **Fig. 60.**

Medium sized trees, 6-15 m tall; branchlets glabrous to occasionally pubescent. Leaves 30-60 cm long; rachis 6-10 cm long; leaflets 4-12, opposite, lanceolate or ovate, elliptic-oblong or elliptic, 5-18 x 3-7.5 cm, base acute to rounded, sometimes oblique, acuminate at apex, glandular-crenulate along margins, chartaceous to subcoriaceous, glabrous or puberulent, conspicuously oil dotted, marginal oil dots larger than those scattered elsewhere on the lamina; petiolules obsolete to 5 mm long in lateral leaflets; lateral nerves 12-22-paired. Panicles large, corymbose,



Fig. 60: *Tetradium fraxinifolium* (Hook.) T.G. Hartley

terminal from the axils of the uppermost leaves; flowers tetramerous, unisexual, 10-12 mm across, greenish-white. *Male flowers* : sepals valvate, 1-1.5 mm long, pubescent to glabrous; petals valvate, 3-5 mm long, white to pale yellow to green. *Female flowers* : staminodes 4; ovary 4-carpellate, globose. Fruits follicular; follicles glabrous to sparsely hairy, compressed-subglobose, 6-15 mm across, connate towards base; seeds reddish to blackish, 2 per follicle, subtrigonal, 4-5 mm long, arillate.

Fl. & Fr.: May-December.

Chumliang, *Dutta* 33297; Phelawn forest, *K.P. Singh* 97005; Rulehawn, *M. Sawmliana* 99243.

12. TODDALIA Juss.

Toddalia asiatica (L.) Lam., Tab. Encycl. Meth. 2: 116. 1797; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 85. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 31. 1987; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 403. 1997, *Paullinia asiatica* L., Sp. Pl. 365. 1753; *Toddalia aculeata* (Smith) Pers., Syn. Pl. 1: 249. 1805, *nom. superfl.*; Hook. f., Fl. Brit. India 1: 497. 1875. Fig. 61.

Large, evergreen, scandent shrubs, up to 15 m tall; stems with numerous short, black, straight or curved prickles, also sometimes unarmed. Leaves digitately trifoliolate, alternate; common petioles 4-5 cm long; leaflets sessile, variable, oblanceolate, oblong-elliptic, 6-10 x 2-4 cm, base narrowed or cuneate, bluntly long acuminate at apex, subentire to crenulate along margins, glabrous, pellucid punctate, chartaceous; lateral nerves 10-12 paired. Cymes axillary or terminal, paniculate, up to 7 cm long; flowers white or yellowish white, 6-8 mm across, unisexual, calyx 5-lobed, ca 0.5 mm long, pubescent outside; glandular; petals oblong, 2-3 mm long, hooded at apex, 2-6 x ca 1 mm. Male flowers with 5 stamens. *Female flowers*: staminodes absent, ovary 4-celled. Drupes obscurely 4-5 lobed or grooved, globose, 6-10 mm diam., beaked, reddish or orange when ripe, 1-seeded; seeds reniform, 2-3 x ca 1 mm, brownish.

Fl. & Fr.: September-August, ripens during May-June.

Common in open or evergreen forests. Helio hill, N.E. of Lungleh, 1010-1200 m, *Gage* 42, 102 (CAL); Aizawl, *Deb* 30544; Sialsuk-Aizawl, *Deb* 30837; Sairang road, *G.K. Deka*, s.num.; Champhai-Myamar border,

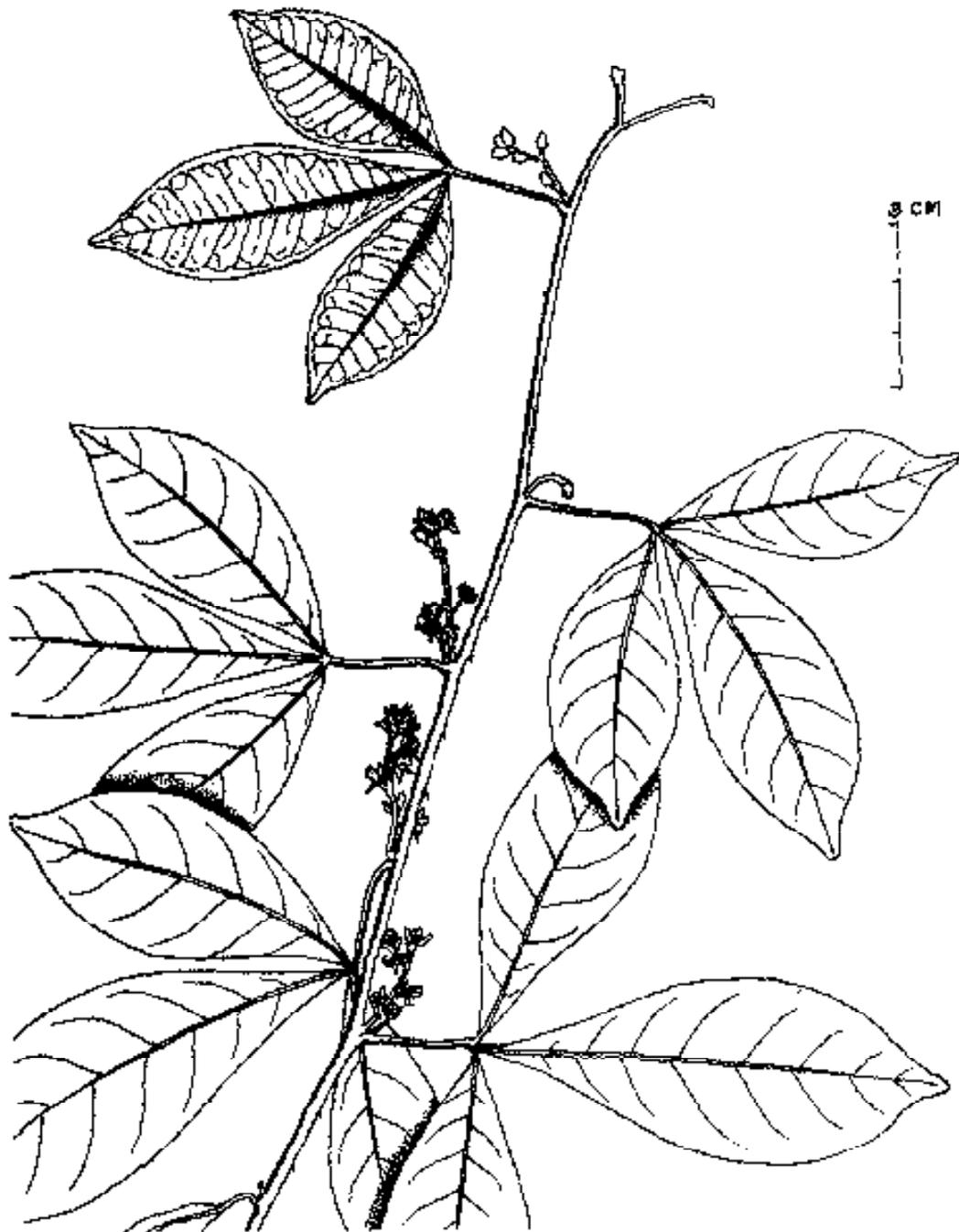


Fig. 61: *Toddalia asiatica* (L.) Lam.

Deb 31042; Kawnpui forest, *K.P. Singh* 96980; Sabual, 1000 m. *D.K. Singh* 99040.

13. ZANTHOXYLUM L.

- 1a. Petioles and rachis flat, winged; petals absent :
- 2a. Branchlets pubescent; cymes glomerate,
dense, 1-1.5 cm long ...1. *Z. acanthopodium*
- 2b. Branchlets glabrous; cymes in
lux panicles, 4-10 cm long ...2. *Z. armatum*
- 1b. Petioles and rachis wingless; petals present :
- 3a. Large trees; follicles solitary ...4. *Z. thesta*
- 3b. Scandent shrubs; follicles 1-4 :
- 4a. Leaflets 3-9; 6-13 cm long, base scarcely oblique ...3. *Z. nitidum*
- 4b. Leaflets 10-25, 2-5.5 cm long, base oblique ...5. *Z. scandens*

1. *Zanthoxylum acanthopodium* DC., Prodr. 1: 727. 1824; Hook. f., Fl. Brit. India 1: 493. 1875; Kanjilal *et al.*, Fl. Assam 1: 200. 1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 31. 1987; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 378. 1997. **Fig. 62.**

Shrubs or small trees, up to 6 m tall, with sharp, straight or curved, reddish brown prickles, ferruginous-pubescent. Leaves up to 20 cm long, 3-foliolate or imparipinnate; rachis flat and narrowly foliaceous, winged, 5-8 cm long; leaflets 3-15, opposite, elliptic-lanceolate or oblong, 3-7 x 1-2.5 cm, smaller downwards, base rounded or cuneate, acute or acuminate at apex, glandular, serrulate along margins, glabrous, only nerves ferruginous-puberulous below, pellucid-punctate. Cymes paniculate, 1-1.5 cm long, dense, axillary, ferruginous-pubescent. Male flowers *ca* 3 mm long; perianth uni- or irregularly biseriolate, segments 5-8, linear, yellowish; stamens 4-6, purplish; disc pulvinate. Female flowers *ca* 2 mm long, perianth and disc as in male flowers; ovary 2-5-carpellate. Follicles 2-5 with 4-1 or 0 caducous carpels; carpels obliquely globose, 3-4 mm across, pitted, compressed, reddish; seeds glossy, black, pitted, *ca* 3 mm across.

Fl. & Fr.: March-October.

Lungleh, *Dutta* 33465; Blue mountain, 2000 m, *Mao* 107148.

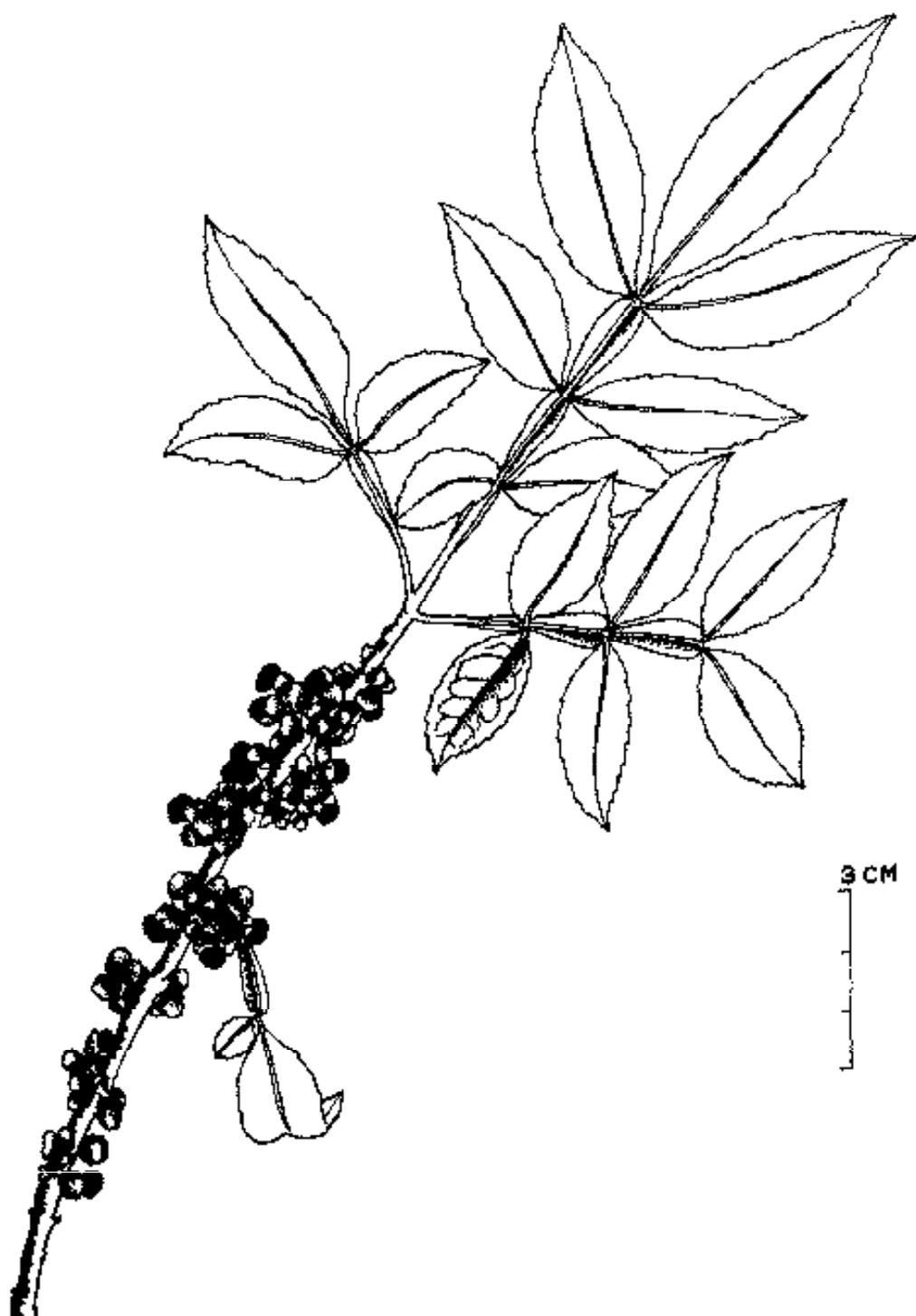


Fig. 62: *Zanthoxylum acanthopodium* DC.

2. *Zanthoxylum armatum* DC., Prodr. 1: 727. 1824; K.N. Nair & Nayar in Hajra *et al.*, Fl. India 4: 379. 1997, *Z. alatum* Roxb. [Hort. Bengal, 72, (1814), *nom. nud.*], Fl. Ind. ed. 2. 3: 768. 1832; Hook. *f.*, Fl. Brit. India 1: 493. 1875; Kanjilal *et al.*, Fl. Assam 1: 199. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2) 85. 1938. *Arthrikreh* (Lushai).

Shrubs or small trees, up to 8 m tall with incurved reddish-brown prickles from broad base. Leaves 3-foliolate, up to 20 cm long, imparipinnate; petioles and rachis broadly winged; wings foliaceous, 2-4 mm long; leaflets 5-11, opposite, sessile, elliptic to oblong-lanceolate, 3-8 x 1-3 cm, base acute to cuneate, acuminate to bluntly acuminate at apex, entire or obscurely glandular, serrulate along margins, glabrous, chartaceous, pellucid punctate beneath. Cymes terminal on short lateral branchlets, 4-10 cm long, paniculate, pubescent. Male flowers *ca* 0.5 mm long; perianth uni- or irregularly biseriate; segments 6-8, linear, yellowish; stamens 6-8. *Female flowers* : perianth similar to male flowers; ovary 1-3-carpellate, ovoid, unilocular with 2 ovules. Follicles 1-3 with 2, 1 or 0 abortive carpels, globose, free, reddish when ripe, tubercled; seeds glossy, black, ovoid, *ca* 3 mm across.

Fl. & Fr.: March-November.

Lushai hills, *Parry s.loc., s.num.* (CAL); Kawlkulh-Hliapui, *K.P. Singh* 94327; Kawnpui, *K.P. Singh* 97028.

3. *Zanthoxylum nitidum* (Roxb.) DC., Prodr. 1: 727. 1824; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 31. 1987; K.N. Nair & Nayar in Hajra *et al.*, Fl. India: 382. 1997. *Fagaria nitida* Roxb., Fl. Ind. 1: 439. 1820. *Zanthoxylum hamiltonianum* Wallich ex Hook. *f.*, Fl. Brit. India 1: 494. 1875; Kanjilal *et al.*, Fl. Assam 1: 201. 1936.

Large, evergreen, climbing shrubs with short, recurved, brownish, 2-4 mm long prickles; young parts tomentose or pubescent. Leaves 3-foliolate, 15-25 cm long, imparipinnate; petioles and rachis grooved; leaflets 3-9, ovate to oblong or elliptic, 6-13 x 3-6 cm, base subacute or rounded, scarcely oblique, abruptly or gradually long acuminate at apex, entire along margins, coriaceous, glossy on both side, glabrous above, pubescent along the midrib beneath, pellucid dotted; petiolules 2 mm long. Cymes paniced, 5-10 cm long, axillary. Male flowers 3-5 mm long, white, sepals 4, *ca* 1 mm long; petals 4, ovate, 2-3 mm long; stamens 4. *Female flowers* 2-3 mm long:

disc pulvinate; gynoecium 4-carpellate. Follicles 1-4, obliquely globose, 4-5 mm across, ± compressed, glabrous, apiculate, pitted, 1-seeded; seeds black, smooth, shiny, ca 5 mm across.

Fl. & Fr.: February-October.

Scarce in the forests. Aizawl forest, *Deb* 30544.

4. *Zanthoxylum rhesa* (Roxb.) DC., *Prodr.* 1: 728, 1824; Hook. *f.*, *Fl. Brit. India* 1: 495, 1875; Kanjilal *et al.*, *Fl. Assam* 1: 197, 1936; K.N. Nair & Nayar in Hajra *et al.*, *Fl. India* 4: 387, 1997. *Fagara rhesa* Roxb., *Fl. Ind.* 1: 438, 1820. *Zanthoxylum budrunga* (Roxb.) DC., *Prodr.* 1: 728, 1824. *Z. budrunga* (Roxb.) DC. var. *rhesa* (Roxb.) Haines, *Bot. Bihar Orissa* 1: 165, 1921. *Ching-it* (Lushai).

Large trees, 20-30 m tall; branches with straight to curved, sharp, conical, up to 5 mm long prickles. Leaves up to 60 cm long, clustered at the end of branchlets; leaflets 5-25, opposite, lower ones smaller, oblong-lanceolate, or oblong, unequal sided, 5-15 x 3-5.5 cm, base acute to cuneate, strongly oblique, caudate-acuminate at apex, quite entire to distantly crenate along margins with glands in sinuses of crenations, glabrous and glossy above, glaucous beneath; petiolules 4-5 mm long. Cymes paniced, up to 18 cm long, crowded, subterminal and terminal. Male flowers 1-2.5 mm long, greenish yellow; sepals 4, minute, ovate triangular, green; petals 4, elliptic, 1-2 mm long, white or creamy yellow; stamens 4 with yellow anther; disc lobulate. Female flowers 1.5-2.5 mm long; ovary 1-carpellate. Follicles solitary, globose, 5-8 mm across, 2-valved, pitted, apiculate, 1-seeded; seeds bluish-black, glossy, globular 5-6 mm across.

Fl. & Fr.: March-November.

Common in primary evergreen forests. Mizoram area, *s.loc. s.num.* Sharma 99209.

5. *Zanthoxylum scandens* Blume, *Bijdr.* 249, 1825; K.N. Nair & Nayar in Hajra *et al.*, *Fl. India* 4: 388, 1997. *Z. khasianum* Hook. *f.*, *Fl. Brit. India* 1: 494, 1875; Kanjilal *et al.*, *Fl. Assam* 1: 202, 1936.

Scandent or climbing shrubs; branches prickly or sometimes unarmed, tomentose. Leaves imparipinnate, up to 25 cm long; petioles and rachis

slender, prickly; leaflets 10-25, ovate to elliptic-lanceolate, 2-5.5 x 1-2.5 cm, base acute to cuneate or oblique, caudate at apex, entire to glandular-crenate along margins, glabrous, glossy above; petiolules ca 4 mm long. Cymes axillary and terminal, paniculate, up to 10 cm long. Male flowers ca 2 mm long; sepals 4, ovate, ciliate; petals 4, ca 2 mm long; stamens 4 with yellowish anthers, extrose. *Female flowers* : gynoecium 2-4-carpellate. Follicles 1-4, subglobose-obovoid, ca 5 mm across; seeds black, shiny.

Fl. & Fr.: April-December.

In moist evergreen forests. Recorded on the basis of K.N. Nair & Nayar (*l.c.*).

SIMAROUBACEAE

(K.P. Singh)

- 1a. Stipules present, caducous; sepals and petals persistent in fruit ...3. *Picrasma*
- 1b. Stipules absent; sepals and petals not persistent :
- 2a. Large trees, up to 50 m tall; leaves paripinnate; fruit a samara ...1. *Ailanthus*
- 2b. Shrubs or small trees, up to 4 m tall; leaves imparipinnate; fruits a nut ...2. *Brucea*

1. *AILANTHES* Desf., *nom. cons.*

Ailanthus integrifolia Lam. subsp. *calycina* (Pierre) Nootb. in Steenis, *Fl. Males.* ser. I. 6: 218. 1962; Basak in Hajra *et al.*, *Fl. India* 4: 411. 1997. *Pongelion calycinum* Pierre, *Fl. Forest Cochinch.* 4: t 294A (text). 1893. *Ailanthus grandis* Prain in *Indian For.* 28: 131, t. 210. 1902; Kanjilal *et al.*, *Fl. Assam* 1: 216. 1936. *Phuanberhpui* (Lushai).

Tall trees, up to 50 m. Leaves alternate, paripinnate, 60-100 cm long; petioles up to 20 cm long; leaflets alternate, ovate or ovate-lanceolate, 6-18 x 3-9 cm, oblique-cuneate at base, acuminate at apex, entire-sinuate along margins, glabrous; lateral nerves 10-12 pairs. Flowers in 30-40 cm long panicles; calyx lobes 3-angled, pubescent; petals ca 4 mm long;

anthers ca 2 mm; ovary hairy; styles 5, connate; stigma spreading. Fruit a samara, apically twisted, rounded along outer margin, straight along the inner, up to 13 x 4 cm, light brown; seeds flat, up to 1.5 cm across.

Fl. & fr. : December-April.

Dampui, 950 m, *M. Sawmliana* 107429.

Uses : Wood is used in construction work.

2. BRUCEA J.F. Miller

Brucea mollis Wallich [Cat. 287. no. 8483. (1847), *nom. nud.*] *ex* Kurz in J. As. Soc. Bengal 42: 64. 1873; A.W. Bennett in Hook. *f.*, Fl. Brit. India 1: 521. 1875; Kanjilal *et al.*, Fl. Assam 1: 218. 1936; R.K. Basak in Hajra *et al.*, Fl. India 4, 415. 1997. Fig. 63.

Shrubs or small trees, up to 4 m tall; young parts tomentose. Leaves alternate, 20-35 cm long with pubescent rachis, 3-9(13)-foliolate; leaflets opposite, ovate or oblong to ovate-lanceolate, 4-10 x 2-4 cm, size increasing upwards, base rounded or unequal, acuminate at apex, entire along margins; membranous, pubescent on both surfaces; lateral nerves 8-11 paired; petiolules up to 1 cm long. Flowers ca 3 mm across, in axillary, pubescent, 7-18 cm long paniculate cymes, greenish-white to creamy white or red; sepals 4, ca 1 mm long, imbricate; petals 4, linear; 1-2 mm long; stamens 4; ovary 4-lobed; glabrous. Nuts of 1-2 drupelets, ovoid, 8-12 x 4-6 mm, pointed at the apex, orange-red when ripe; surface reticulated.

Fl. & Fr.: November-May.

Scarce in evergreen forests. Kawnpui forests, *K.P. Singh* 79015.

3. PICRASMA Blume

Picrasma javanica Blume, Bijdr. 5: 248. 1825; A.W. Bennett in Hook. *f.*, Fl. Brit. India 1: 520. 1875, incl. var *mishmiensis* A.W. Bennett. *P. nepalensis* J.J. Bennett, Pl. Java Rar. 201. 1844. *P. andamanica* A.W. Bennett. *l.c.* 520; Kanjilal *et al.*, Fl. Assam 1:217. 1936; Basak in Hajra *et al.*, Fl. India 4: 418. 1997.



Fig. 63: *Brucea mollis* Wallich ex Kurz

Medium sized trees, 10-16 m tall, bark thin, dark brown, ± smooth. Leaves oblong-ovate or elliptic or obavate-oblong, 6-15 cm long, cuneate at base, abruptly acuminate at apex, entire to wavy along margins; petioles 1-5 cm long, leaflets 3-7, opposite, 5-12 x 2-5 cm, glabrous, lateral nerves 3-6 paired; petiolules 1-2 cm long; stipules broadly ovate-rounded at apex, acute at base, ca 1 cm long. Inflorescence axillary, cymose; panicles 3-10 cm long; bracts obovate, caducous. Flowers 4-merous, dull white; pedicels ca 1 mm long, villous, elongating in fruits; sepals triangular to ovate, ca 1 mm long, glabrous to puberulous, acute; petals ovate-oblong or oblong, 2-3 x 1-1.5 mm in male flowers, 3-5 x 2.5-3 mm in female flowers. Stamens 4, 2-5 mm long; filaments short, subulate, hairy; carpels 4. Fruits a drupe, 1-4, ovoid-subglobose, shining, black when ripe with persistent sepals and petals.

Fl. & Fr.: Throughout the year.

Moderately common. Dampa, *D.K. Singh* 98987.

BURSERACEAE

(K.P. Singh)

- | | |
|-------------------------------------------------------------------------------------------|-----------------------|
| 1a. Leaves exstipulate; drupes ellipsoid-oblong or obovoid | ...1. <i>Canarium</i> |
| 1b. Leaves stipulate; drupes globose : | |
| 2a. Flowers terminal or at tips of branches;
disc cup-shaped, adnate to the calyx tube | ...2. <i>Garuga</i> |
| 2b. Flowers in axillary panicles; disc annular,
lining the base of calyx | ...3. <i>Protium</i> |

1. CANARIUM L.

Canarium strictum Roxb., Fl. Ind. 3: 138. 1832; A.W. Bennet in Hook.f., Fl. Brit. India 1: 534. 1875; Chithra & Henry in Hajra *et al.*, Fl. India 4: 440. 1997. *C. resiniferum* Brace ex King in J. As. Soc. Bengal, Pt. 2, Nat. Hist. 62 (2): 188. 1894; Kanjilal *et al.*, Fl. Assam 1: 224. 1936. *Berawthing* (Lushai).

Tall trees, up to 50 m, buttressed towards base; young branches densely ferruginous tomentose. Leaves exstipulate, 7-9 (-15)-jugate; rachis tomentose; leaflets elliptic-ovate to oblong-lanceolate, 6-15 (-30) x 4-13

cm, oblique, rounded or broadly cuneate at base, apex acuminate, subentire or denticulate-serrate along margins, glabrescent above, laxly pubescent-tomentose beneath; lateral nerves 10-15 pairs. Flowers in supra-axillary panicles, unisexual or bisexual, dull white-yellow with mango-like smell; panicles thyrsoid or racemose, densely ferruginous-fulvous tomentose; male 15-40 cm long; female 7-20 cm long; bracts caducous. *Male flowers* : calyx tube campanulate, 5-5.5 x 3-4 mm; lobes 3-angulate, brown pubescent outside; petals oblong-lanceolate, up to 8.5 x 4.5 mm; stamens 6-8 mm long, connate into a tube. *Female flowers* : calyx urceolate, up to 6 x 5 mm, pubescent outside; petals oblong-ob lanceolate, ca 8 x 4 mm; staminodes 3-4 mm long; filaments broad, connate into a cup; ovary and styles hairy; stigma capitate. Drupes oblong-ellipsoid, ca 4 x 2 cm, dark blue.

Fl. & Fr. : Throughout the year.

Recorded on the basis of J.H. Lalramnghinglova (Ethnobotany 11: 60. 1999).

Uses : Infusion of bark used for colic and tonsillitis; suspension of boiled bark used for curing skin eruptions; also a mosquito repellent.

2. GARUGA Roxb.

- 1a. Leaves pubescent; calyx deciduous;
drupes horned apically, 12-25 mm across ... 2. *G. pinnata*
- 1b. Leaves glabrous at maturity, calyx persistent;
drupes obtuse apically, 5-10 mm across ... 1. *G. floribunda* var. *gamblei*

1. *Garuga floribunda* Decne. in Nouv. Ann. Mus. Hist. Nat. 3: 477. 1834 var. *gamblei* (King ex W. Smith) Kalkman in Blumea 7: 466. 1953; Chitra & Henry in Hajra *et al.*, Fl. India 4: 448. 1997. *G. gamblei* King ex W. Smith in Rec. Bot. Surv. India 4: 262. 1911; Karjilal *et al.*, Fl. Assam 1: 222. 1936. *Tuai-ram* (Lushai).

Large trees, up to 20 m tall with buttressed base; young parts puberulous. Leaves alternate, imparipinnate, 30-45 cm long; stipules caducous; petioles 6-8 cm long; leaflets 9-15, ovate-oblong or oblong-lanceolate, 8-15 x 2.5-3.5 cm, oblique-cuneate at base, acuminate at apex, serrate-crenate along margins, chartaceous, puberulous in young stages,

glabrous at maturity; petiolules *ca* 2 mm long or absent in some. Panicles on extremities of leafless branchlets, up to 20 cm long, glabrescent; flowers yellow or white, fragrant; calyx tube 5-fid, *ca* 1.5 mm long, campanulate, persistent, glabrous inside, puberulous outside; petals 5, ovate, 3-4 mm long, pubescent; stamens 10. Drupes irregularly globose, 4-lobed, glabrous, 5-10 mm across, obtuse at tip; pyrenes 4, 1-seeded.

Fl. & Fr.: February-September.

Rather common. West Phaileng, *ca* 600 m, *M. Sawmliana* 101743.

2. **Garuga pinnata** Roxb. [H. Beng. 33. (1814), *nom. nud.*], Pl. Coromandel 3: 5. t. 208. 1811; A.W. Bennett in Hook. *f.*, Fl. Brit. India 1: 528. 1875; Kanjilal *et al.*, Fl. Assam 1: 221. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 85. 1938; Chithra & Henry in Hajra *et al.*, Fl. India 4: 448. 1997. *Bung-bu-tuai-ram* (Lushai).

Tall trees, up to 20 m tall; branchlets pubescent. Leaves up to 40 cm long, imparipinnate, crowded towards the ends of branches; petioles up to 5 cm long; leaflets 11-17, opposite, ovate-obovate, or oblong, 6.5-12 x 1.5-3 cm, base oblique, cuneate or subacute, caudate-acuminate at apex, crenate-serrate along margins, subcoriaceous, puberulous beneath; petiolules up to 2 mm long; stipules falcate. Panicles branched, terminal, tomentose; flowers greenish-yellow, 0.5-0.8 cm long; calyx tube *ca* 4 mm long, 5-fid, broadly campanulate, valvate, tomentose; petals 5, linear-oblong, tomentose outside, 5-8 mm long; stamens 10, pubescent; ovary 5-celled, stipitate, ovoid, densely hairy. Drupes \pm globose to oblong, horned, 1.2-2.5 cm across, yellowish-green, fleshy; pyrenes 2-3; seed 1 per pyrene.

Fl. & Fr.: March-November.

Near fort Lungleh, 600-900 m, *Gage* 274 (CAL).

Uses : Fruits edible.

2. PROTIUM Burm. *f.*

Protium serratum (Wallich *ex* Colebr.) Engl. in A. & C. DC., Monogr. Phan. 4: 88. 1883; Chithra & Henry in Hajra *et al.*, Fl. India 4: 451. 1997. *Bursera serrata* Wallich *ex* Colebr. in Trans. Linn. Soc. London

15: 361, t. 4. 1827; A.W. Bennett in Hook. *f.*, Fl. Brit. India 1: 530. 1875; Kanjilal *et al.*, Fl. Assam 1: 223. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 85. 1938.

Large trees, up to 20 m tall; young branches tomentose. Leaves alternate, up to 25 cm long, 5-7 (11)-foliolate; rachis pubescent; leaflets ovate-oblong to oblong-lanceolate, 5-12 x 2-4 cm, base oblique or rounded, bluntly caudate at apex, oblique or entire to coarsely serrate along margins, coriaceous, glabrous above, pubescent beneath; lateral nerves 4-14 pairs; petiolules 1-1.5 cm long, swollen at both ends. Panicles lax, axillary or in axils of fallen leaves, up to 15 cm long. Flowers 2-3 mm across, green; calyx saucer-shaped, pubescent; petals pubescent, 5-lobed; stamens 10; disc annular; ovary hairy. Drupes globular, sometimes obscurely 2-3-furrowed, 1-2 cm across, red-pink, 1-3-seeded nuts; pulp edible.

Fl. & Fr.: April-July (Fruits up to December).

S. loc., Parry s.num. (fide C.E.C. Fischer, *l.c.*).

MELIACEAE

(K.P. Singh)

- 1a. Undershrubs or shrubs; flowers more than 2 cm long; petals connate for more than half way ...6. *Munronia*
- 1b. Trees; flowers less than 2 cm long; petals connate less than halfway or sometimes connate at base only :
 - 2a. Ovules 1-2 in each cell, seeds lacking wings :
 - 3a. Leaves usually serrate; fruits drupaceous ...5. *Melia*
 - 3b. Leaves usually entire or nearly so; fruits capsular or baccate :
 - 4a. Leaves 3-5-foliolate; young parts densely lenticellate ...10. *Walsura*
 - 4b. Leaves 5-many foliolate :
 - 5a. Inflorescence a corymbose panicle; filaments free towards apex; capsules 2-valved, 1-seeded ...9. *Trichilia*

- 5b. Inflorescence otherwise; filaments united throughout their length; capsules or berries more than 1-seeded :
- 6a. Stigma sessile or subsessile :
- 7a. Petals 3; fruit a capsule ...2. *Aphanamixis*
- 7b. Petals 4-5; fruit a berry ...1. *Aglaia*
- 6b. Stigma on a elongated style :
- 8a. Flowers bisexual, stout; anthers short; disc conspicuous, cupular, enclosing the ovary ...4. *Dysoxylum*
- 8b. Flowers polygamous; anthers long, disc inconspicuous, not enclosing the ovary ...3. *Chisocheton*
- 2b. Ovules many in each cell; seeds winged :
- 9a. Stamens free ...8. *Tinna*
- 9b. Stamens united into a tube ...7. *Swietenia*

1. AGLAIA Lour.

- 1a. Fruit a berry ...2. *A. edulis*
- 1b. Fruit a capsule :
- 2a. Leaflets 2-6, alternate or subalternate ...1. *A. chittagonga*
- 2b. Leaflets 11-13, opposite or subopposite ...3. *A. spectabilis*

1. *Aglaia chittagonga* Miq. in Ann. Mus. Bot. Lugd.-Bat. 4: 44. 1868; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 86. 1938; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 459. 1997. *Amoora chittagonga* (Miq.) Hiern in Hook *f.*, Fl. Brit. India 1: 559. 1875; Kanjilal *et al.*, Fl. Assam 1: 237. 1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 31. 1987. *Aphanamixis chittagonga* (Miq.) Haridasan & R.R. Rao, For. Fl. Meghalaya 1: 204. 1985. Fig. 64.

Evergreen tress, 10-14 m tall with young parts silvery scaly (lepidote). Leaves 15-30 cm long; rachis lepidote, 2-6-foliolate; leaflets alternate, elliptic, oblong-elliptic to lanceolate, 7-4 x 2.5-4.5 cm, base \pm oblique, narrowed, bluntly acuminate at apex, entire along margins, glabrous above, lepidote along the midrib and nerves beneath specially when young; lateral nerves 12-16 pairs; petiolules lepidote, 3-10 mm long. Male panicles

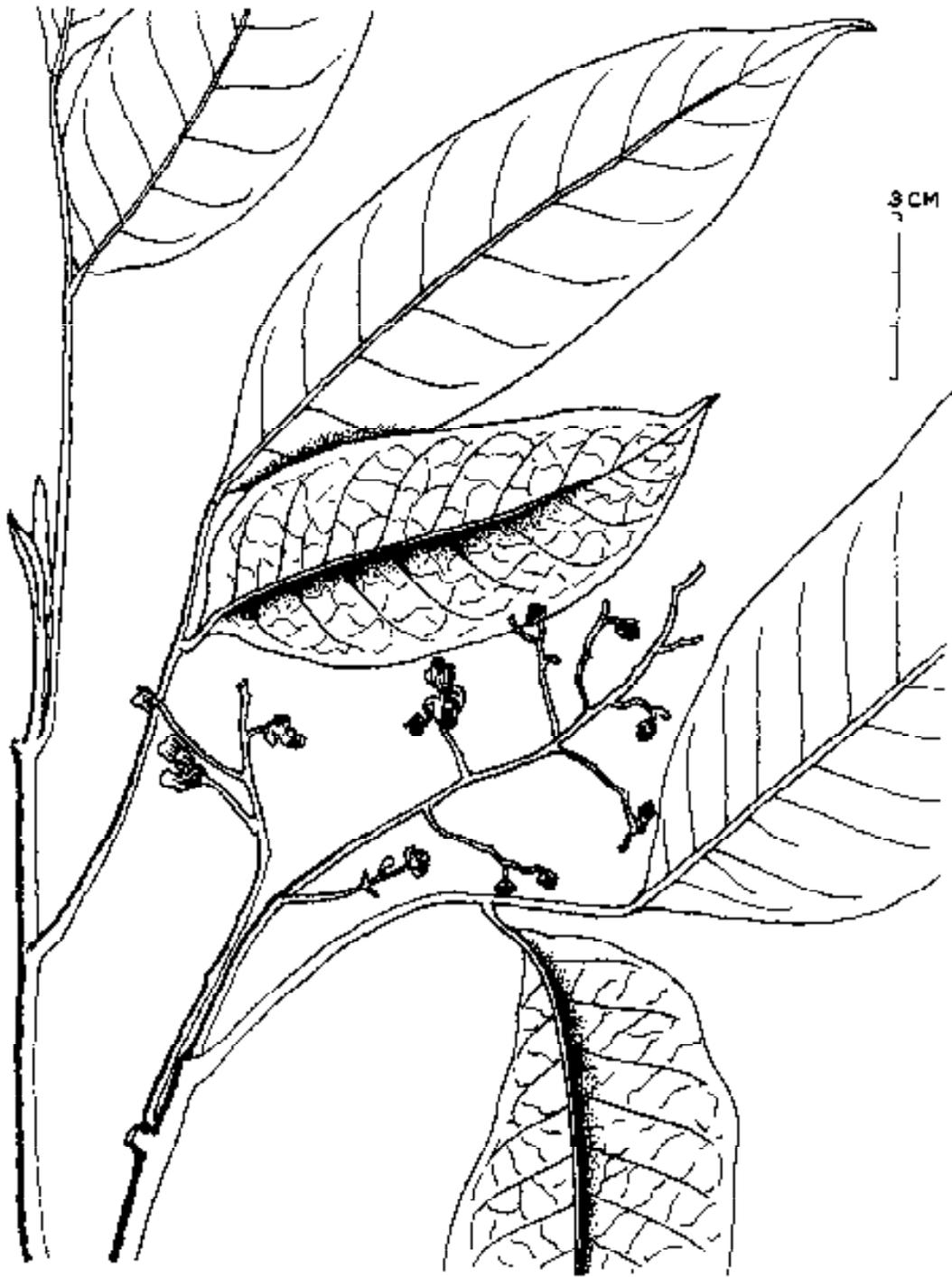


Fig. 64: *Aglaia chittagonga* Miq.

racemose, 10-15 cm long, lax, axillary. Female panicles shorter than males. Flowers whitish, 1-3 mm across; calyx cup-shaped, 3-lobed; petals 3-4, ca 3 mm long; ovary 2-3-locular. Capsules obovoid-globose, 1.5-2 x 1.8 cm, indehiscent, 2-3-locular, usually 2-seeded.

Fl. & Fr.: August-March.

Common in tropical forests. 15 miles South-east of Lungleh, 900-1200 m, *Gage* 161 (CAL); Darzo-Leite, *Dutta* 34031; Aizawl protected forest, 3500 m, *Deb* 30555; Keifang, *M. Sawmliana* 95581.

2. *Aglaia edulis* (Roxb.) A. Gray in Bot. U.S. Expl. Exped. 1: 237. 1854; Hiern. in Hook. *f.*, Fl. Brit. India 1: 556. 1875; Kanjilal *et al.*, Fl. Assam 1: 239. 1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 31. 1987; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 461. 1997. *Rai-Thei* (Lushai). Fig. 65.

Large trees, up to 25 m tall with young parts covered with stellate hairs and scales. Leaves 20-35 cm long; leaflets opposite, elliptic-lanceolate, oblanceolate or oblong-lanceolate, 9-13, 8-15 x 2.5-4, base acute to rounded, obtusely acuminate at apex, entire along margins, rusty tomentose when young, glabrescent at maturity, lateral nerves 12-16 paired; petiolules 5-10 mm long. Panicles 8-20 cm long, axillary, rusty tomentose. Flowers 1-2 mm across, yellow; calyx 5-lobed, minute, ovate; petals ovate-oblong, 1-2 mm long. Berries globose, 2-3 cm across, 1-3-seeded, yellowish, covered with lepidote scales, pulpy.

Fl. & Fr.: April-November.

Common in tropical evergreen forests. Lawngtalai to Saiha, *Dutta* 33782; Daulang forest, *M. Sawmliana* 99295.

3. *Aglaia spectabilis* (Miq.) S.S. Jain & Bennet in Indian J. For. 9: 271. 1986 & in Hajra *et al.*, Fl. India 4: 474. 1997. *Amoora spectabilis* Miq. in Ann. Mus. Bot. Lugd.-Bat. 4: 37. 1863; Hiern in Hook. *f.*, Fl. Brit. India 1: 561. 1875. *Amoora wallichii* King in J. As. Soc. Bengal 64(2): 56. 1895; Kanjilal *et al.*, Fl. Assam 1: 237. 1936. *Aphanamixis wallichii* (King) Haridasan & R.R. Rao, Forest Fl. Meghalaya 1: 206. 1985. *Sahatah* (Lushai).

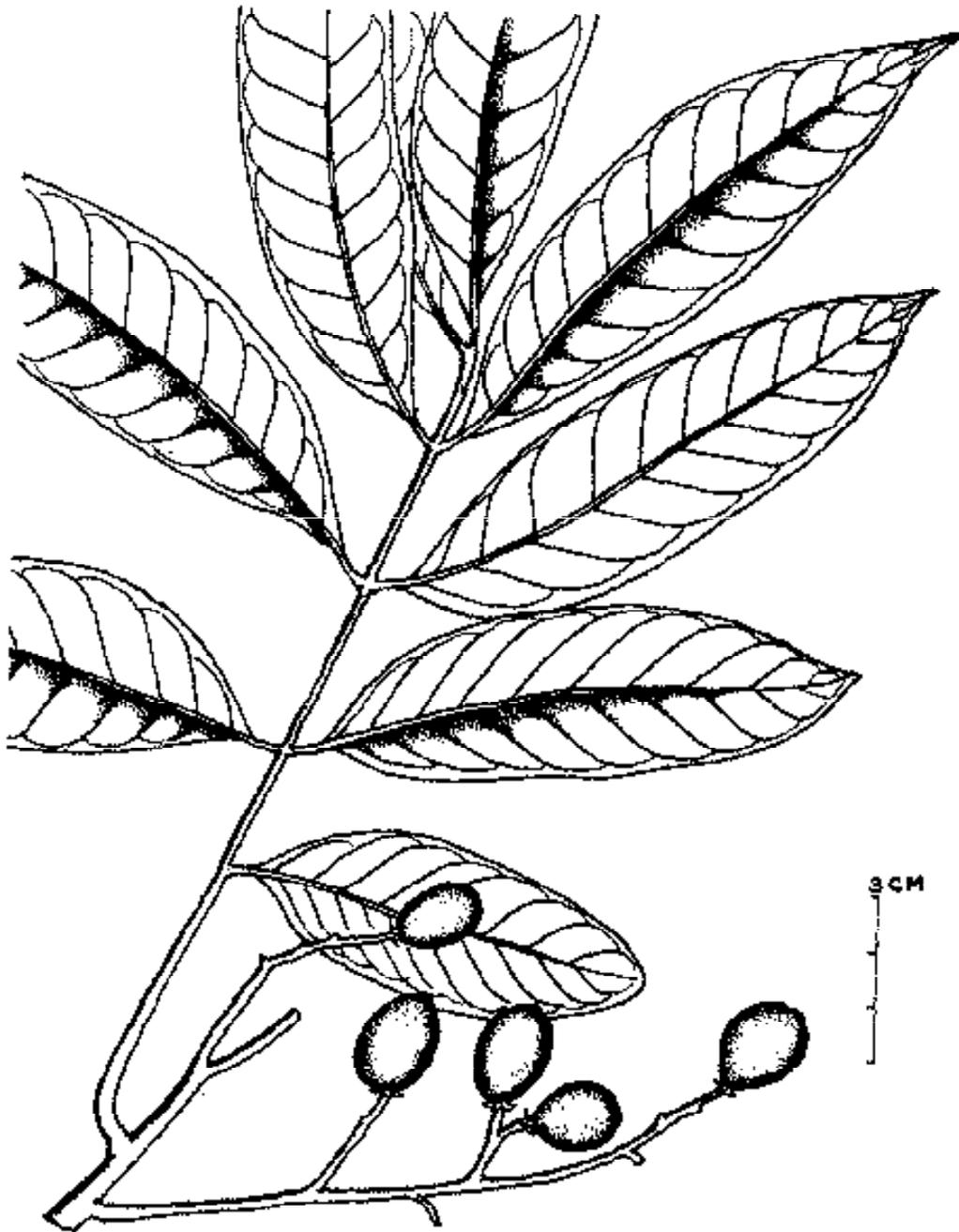


Fig. 65: *Aglaia edulis* (Roxb.) A. Gray

Evergreen trees, 20-25 m tall; young shoots and inflorescences covered with rusty brown fimbriated scales and stellate hairs. Leaves 35-45 cm long; leaflets 11-13, opposite, oblong, ovate-oblong, 8-18 x 3.5-7 cm, base narrowed or rounded, oblique, acuminate at apex, entire along margins, almost glabrescent except on nerves beneath; lateral nerves 12-16 paired; petiolules 3-10 mm long. Male panicles 40-50 cm long, many flowered; female panicles 17-15 cm long; male flowers smaller than females; flowers dull white; calyx obtusely 3-lobed with lepidote-stellate margins; petals 3, ca 2 mm long, tomentose; staminal tube urceolate; ovary 3-4-locular; Capsules long, obovate or pyriform, 2.5-3.8 x 2-2.5 cm, tomentose, yellow when ripe, 3-valved, 2-3-seeded; seeds black with red aril.

Fl. & Fr.: June-March.

As per records of the Forest department, Government of Mizoram.

2. APHANAMIXIS Blume

Aphanamixis polystachya (Wallich) R. Parker in Indian For. 57: 486. 1931; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 477. 1997. *Aglaia polystachya* Wallich in Roxb., Fl. Ind. 2: 429. 1824. *Amoora rohituka* (Roxb.) Wight & Arn. in Wight, Cat. Indian Pl. 24. 1833 & in Prodr. 119. 1834; Hiern in Hook. f., Fl. Brit. India 1: 559. 1875.

Evergreen trees, 10-20 m tall. Leaves crowded at the ends of branchlets, 20-50 cm long, 9-19-foliolate; rachis 5-10 cm long; leaflets opposite, oblong-ovate, 7-20 x 4-8 cm, base oblique or caudate, acuminate at apex, entire along margins; petiolules 3-4 mm long; lateral nerves 12-15 paired. Male spikes paniculate, as long as leaves; female spikes shorter. Flowers dull-white, female ones larger than males; calyx 5-lobed with ciliate margins; petals 3, hairy inside, ca 5 mm long. Capsules obovoid, 3-4 cm across, 3-valved, smooth, yellow when ripe, fleshy; seeds oblong; aril scarlet.

Fl. & Fr.: January-December.

Recorded on the basis of Jain & Bennet (*l.c.*).

3. CHISOCHETON Blume

Chisocheton cumingianus (C. DC.) Harms var. **balansae** (C. DC.) Mabb. in *Taxon* 26: 528. 1917 & *Bull. Brit. Mus. (Nat. Hist.) Bot.* 6: 347. 1979; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, *Fl. India* 4: 479. 1997. *C. balansae* C. DC. in *Bull. Herb. Boissier* 2: 578. 1894. *Chisocheton paniculatus* (Roxb.) Hiern in *Hook. f., Fl. Brit. India* 1: 552. 1825; Kanjilal *et al.*, *Fl. Assam* 1: 234. 1936; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 86. 1938. *Guarea paniculata* Roxb., *Fl. Ind.* 1: 242. 1832.

Trees, 10-15 m tall; young parts tomentose. Leaves 0.3-1.1 m long; leaflets 7-24 (30), opposite or subopposite, oblong-lanceolate, 8-28 x 4-9.5 cm, unequally acute at base, acuminate at apex, entire along margins, glabrescent above, thinly pubescent specially along the nerves beneath; lateral nerves 7-18 paired; petiolules 4-5 mm long. Panicles 30-80 cm long, axillary, pendulous; flowers 1-1.5 cm long, yellowish, tetramerous; buds club-shaped; calyx cup-shaped, ca 2 mm long; petals strap-shaped, puberulus; ovary 4-locular. Capsules globose or subglobose 4-8 cm across, with pyriform base, smooth, orange-red; seeds black with a white or pale yellow aril.

Fl. & Fr.: June-April.

Common on hill slopes in tropical forests. Between ridge camp and Lungsin, 600-900 m, *Gage* 203 (CAL); Near Fort Lungleh, *Gage* 271 (CAL); Lungleh hills, *Prazer, s.num.* (CAL); Sairang *Deb* 30630 (CAL); Sialsuk, *Deb* 30692.

4. DYSOXYLUM Blume

- 1a. Calyx almost entire, bow-shaped, coriaceous ... 1. *D. binectariferum*
- 1b. Calyx deeply 4-5-lobed, not coriaceous :
 - 2a. Flowers in panicles; disc hairy at the mouth ... 2. *D. gobarum*
 - 2b. Flowers in racemes or spikes :
 - 3a. Staminal tube glabrous :
 - 4a. Leaves 20-30 cm long; leaflets opposite, 2 paired ... 5. *D. rugulosum*

- 4b. Leaves 30-60 cm long; leaflets alternate, 2-5 paired ...6. *D. pallens*
- 3b. Staminal tube hairy :
- 5a. Shrubs or small trees, up to 5 m tall ... 4. *D. racemosum*
var. *racemosum*
- 5b. Trees, 12-20 m tall ...3. *D. microbotrys*

1. *Dysoxylum binectariferum* (Roxb.) Hook f. ex Beddome in Trans. Linn. Soc. London 25: 212, 1866; Hiern in Hook. f., Fl. Brit. India 1: 546, 1875; Kanjilal *et al.*, Fl. Assam 1: 232, 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 86, 1938; S.S. Jain and S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 486, 1997. *Guarea binectarifera* Roxb., Fl. Ind. 2: 240, 1830 (as '*binertarifera*'). *Sahatah* (Lushai).

Evergreen trees, upto 15-30 m tall with young shoots and inflorescences minutely pubescent. Leaves 35-40 cm long; rachis 12-25 cm long; leaflets 6-8, alternate, obliquely ovate-oblong, 9-16 x 4.5-7 cm, base cuneate, abruptly acuminate at apex, entire or obscurely dentate along margins; glabrous; lateral nerves 5-10 paired; petiolules 5-10 mm long. Panicles 20-30 cm long, axillary; flowers 3-7 mm long, pale white; calyx bowl-shaped, ca 3 mm long, thick, glabrous, almost entire or obscurely 5-lobed; petals 4, velvety outside; disc tubular, glabrous inside. Capsules globose with narrow base, 2.5-4.5 cm across, smooth, 4-locular, pale yellow, turning deep orange; seeds 4, oblong to ovoid, 1.5-2.5 x 1-1.5, shining, dark purple with large yellow hilum and white aril.

Fl. & Fr.: January-January.

Changsil, Prazer, *s.num.* (CAL). Between Lungleh and ridge camp, 900 m, Gage 198 (CAL).

2. *Dysoxylum gobarum* (Buch.-Ham.) Merr. in J. Arn. Arb. 23: 173, 1942; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 487, 1997. *Guarea gobara* Buch.-Ham. in Mem. Wern. Nat. Hist. Soc. 6: 306, f. 1, 1832. *Dysoxylum procerum* Hiern in Hook. f., Fl. Brit. India 1: 547, 1875; Kanjilal *et al.*, Fl. Assam 1: 231, 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 86, 1938. *Thing thupui*, *Ratansahatta* (Lushai).

Large trees, 15-25 m tall with young shoots slightly pubescent. Leaves 30-65 cm long; rachis terete; leaflets 7-13, opposite or alternate, obovate

or elliptic-oblong, ovate-oblong, 10-27 x 5-10 cm, base rounded or obliquely acute, bluntly acuminate at apex, coriaceous, glabrous, lateral nerves 10-16 paired; petiolules 10-15 mm long. Panicles 30-45 cm long, axillary; flowers creamy white, 0.8-1.2 cm across, fragrant; calyx cup shaped, pubescent; petals 4, oblong, valvate; disc hairy at the mouth, encircling the hairy ovary. Capsules pyriform, 5-6 cm across, 3-4-locular; seeds 2-3, black with orange aril.

Fl. & Fr.: December-August.

Common in evergreen forests. Near fort Lungleh, 900-1200 m, *Gage* 177 (CAL); Tepaimukh, *U.N. Kanjilal* 4776.

3. *Dysoxylum microbotrys* King in *J. As. Soc. Bengal* 64: 48. 1895; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 31. 1987; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, *Fl. India* 4: 491. 1997.

Trees, 12-20 m tall. Leaves 30-50 cm long, paripinnate; leaflets *ca* 3 paired, opposite, elliptic or elliptic-oblong, 15-23 x 4-9 cm, cuneate at base, broadly cuspidate at apex, glabrous on both surfaces; lateral nerves 9-11 paired; petiolules 5-8 mm long. Racemes axillary; flowers solitary, 12-15 mm long; calyx 4-toothed, cup-shaped, puberulous-rugose; petals 4, oblong, puberulous; staminal tube shorter than petals, puberulous, anther 8. Disc tubular, puberulous. Capsules pyriform, 2.5-3.5 x 3-4 cm, top flattened, subglabrous; seeds 2 cm long, plano-convex.

North Vanlaiphai, *Deb* 31167 (CAL).

4. *Dysoxylum pallens* Hiern in *Hook. f., Fl. Brit. India* 1: 548. 1875; Kanjilal *et al.*, *Fl. Assam* 1: 233. 1936; C.E.C. Fischer in *Rec. Bot. Surv. India* 12 (2): 86. 1938; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, *Fl. India* 4: 491. 1997.

Small trees. Leaves 30-60 cm long; leaflets 4-10, alternate, oblong or ovate-oblong, 10-20 x 4-8 cm, base oblique, narrowly acuminate at apex, entire along margins, glabrous; lateral nerves 15-20 paired; petiolules 3-5 mm long. Racemes 5-22 cm long; axillary, spicate, flowers 4-6 mm long, greenish-white, fragrant; calyx deeply 4-lobed, cup-shaped, puberulous; petals 4, pubescent outside, *ca* 8 mm long; staminal tube and disc glabrous. Capsules pyriform, 3-4 cm long, slightly pubescent outside.

Fl. & Fr.: February-September.

Recorded on the basis of C.E.C. Fischer (*l.c.*)

5. **Dysoxylum racemosum** King. var. **racemosum** King in J. As. Soc. Bengal 64: 47. 1895; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 31. 1987; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 492. 1997.

Shrubs or small trees, up to 5 m tall. Leaves 30-40 cm long, pinnate; leaflets alternate, thin, elliptic-oblong, 12-20 x 5-8 cm, base broad, slightly unequal, acuminate at apex, glabrous on both surfaces, petiolules 2-5 mm long; lateral nerves 8-10 paired. Racemes 9-12 cm long, supra axillary, puberulous; flowers 3 mm long, scattered, calyx 4-toothed, cup-shaped, puberulous; petals 4, longer than calyx, elliptic, base truncate, puberulous, staminal tube shorter than petals, sparsely puberulous; disc tubular, slightly longer than ovary, glabrous, fleshy; stigma subcapitate with annular disc at its base. Capsules ovoid, 4-5.5 x 2.5-3 cm, rusty-puberulous, leathery.

Fl. & Fr.: December.

Theriat, *Deb* 31289 (CAL).

6. **Dysoxylum rugulosum** King in J. As. Soc. Bengal 64: 49. 1895; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 31. 1987; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 493. 1997.

Small trees, 5 to 8 m tall. Leaves equally pinnate, 20-30 cm long; leaflets in 2 pairs, opposite, oblong, upper pair much larger, 13-18 x 5-7 cm, thin, lower pair 9-11 x 4-4.5 cm, base narrow, abruptly acuminate at apex, rugulose when dry; petiolules 2 mm long. Lateral nerves 8-10 paired. Racemes 1-2 cm long, supra-axillary, 3 or 4-flowered, puberulous; flowers ca 5 mm long; calyx 4, flat, reticulate and glabrous inside; petals 4, elliptical, puberulous outside, glabrous inside; staminal tube shorter than petals, cylindric, pubescent outside; disc shortly cylindric, 8-9-toothed, slightly exceeding the ovary, fleshy, glabrous. Capsules pyriform, ca 3 x 2 cm, apiculate, puberulous.

Tawipui-Thingfal, *Dutta* 33700.

5. MELIA L.

- 1a. Flowers lilac; staminal tube glabrous, suddenly expanded at mouth; drupes less than 2 cm long ...1. *M. azedarach*
- 1b. Flowers white; staminal tube \pm hairy and suddenly not expanded at mouth; drupes more than 2 cm long ...2. *M. dubia*

1. *Melia azedarach* L., Sp. Pl. 384. 1753; Hiern in Hook.f., Fl. Brit. India 1: 544. 1875; Kanjilal *et al.*, Fl. Assam 1: 228. 1936; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 494. 1997. *Neempata*, *Neemthing*, *Zaizaw* (Lushai).

Medium sized deciduous trees, 12-16 m tall. Leaves 30-90 cm long, bi- or rarely tri-pinnate; pinnae 5-9, opposite; leaflets 3-7 on each pinna with terminal leaflet largest, ovate-lanceolate, lanceolate or elliptic lanceolate, 2.5-5 x 1-2 cm, base obliquely cuneate, acuminate at apex, toothed or lobed along margins, stellate tomentose when young; petiolules upto 5 mm long. Panicles axillary; peduncles 7-10 cm long; flowers pale lilac, 1-1.5 cm across, puberulous; calyx 5, minutely stellate-tomentose; petals 5, 4-7 mm long, linear-oblong, pubescent outside; staminal tube purple, glabrous. Drupes elliptic or oblong, 1-1.8 cm long, yellow when ripe, 1-seeded, fleshy.

Fl. & Fr.: May-December.

Common. Probably cultivated. Bualpui, *D.K. Singh* 93273; Thenzawl, *K.P. Singh* 93891; North Vanlaiphai, *D.K. Singh* 99216; Hnathial, 750 m, *Mao* 107048.

2. *Melia dubia* Cav., Diss. 7: 364. 1789; Hiern in Hook. f., Fl. Brit. India 1: 454. 1875; S.S. Jain & S.S. R. Bennet in Hajra *et al.*, Fl. India 4: 495. 1997. *Melia composita* Willd., Sp. Pl. 2: 559. 1799; Kanjilal *et al.*, Fl. Assam 1: 228. 1936.

Large deciduous trees, up to 25 m tall with large oval crown. Leaves bipinnate, 25-60 cm long; pinnae 3-8 pairs; leaflets 3-13, ovate-lanceolate to ovate-rotund, 2.5-6 x 1.5-2.5 cm, base oblique, acuminate at apex, serrate to entire along margins, glabrescent with age; lateral nerves 6-10 pairs; petiolules up to 4 mm long. Panicles 12-16 cm long, many flowered; flowers 6-8 mm across, white; calyx 5-partite, tomentose; petals linear-

spathulate with white dots, ca 5 mm long. Drupes smooth, globose to oblong, 2.5-4 x 1.5-2.5 cm, pulpy, 1-6-seeded.

Fl.: March-April, *Fr.*: ripens December to February.

Tuivawal, *M. Swamliana* 95596.

Fruits are eaten by barking deer.

6. MUNRONIA Wight

Munronia pinnata (Wallich) Harms in Ber. Deutsch. Bot. Ges. 35: 78. 1917; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 497. 1997. *Turraea pinnata* Wallich, Pl. Asiat. Rar. 2: 119. t. 21. 1829. *Munronia waltichii* Wight, Illus. Indian Bot. 1: t. 54. 147. 1840; Hiern in Hook. *f.*, Fl. Brit. India 1: 543. 1875; Kanjilal *et al.*, Fl. Assam 1: 235. 1936; C.E.C. Fischer, Rec. Bot. Surv. India 12(2): 86. 1938.

Undershrubs, 0.25-1 m high. Leaves alternate, 15-30 cm long, crowded at ends of shoots; petioles 5-10 cm long; leaflets opposite, 5-9, ovate-oblong or lanceolate, 3-10 x 1.5-3 cm, base obliquely acute or rounded, bluntly acuminate at apex, entire or undulate along margins, pubescent on nerves beneath; lateral nerves 5-6 paired; petiolules of lateral leaflets short, terminal leaflet up to 1.5 cm long. Peduncles 10-15 mm long; flowers axillary towards end of shoots, 2-4 cm long, white or pink; calyx 5-partite, ovate, 5-6 mm long, foliaceous, pubescent out side; petals 5, narrow, spathulate, 1.5-3 cm long, clawed; disc tubular; ovary 5-locular. Capsules globose, 1-1.5 cm across, 5-valved, hairy, red; valves 1 or 2-seeded; seeds black, shining, plano-convex.

Fl. & Fr.: September-March.

In shady forests. Tuivalmukh, 600 m, *Parry* 210. (*vide* C.E.C. Fischer, *l.c.*); *s.loc.* *Wenger* 342 (*vide* C.E.C. Fischer, *l.c.*); Saithah, *D.K. Singh* 92925.

7. SWIETENIA Jacq.

Swietenia macrophylla King in Hooker's. Icones Pl. 16, t. 1550. 1886; C.E.C. Fischer in Rec. Bot. Surv. India 12 (2): 86. 1938; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 526. 1997.

Trees, glabrous. Leaves 30-45 cm long, spirally arranged, paripinnate; leaflets opposite, or subopposite, 5-6 pairs, 4-15 x 2-6 cm, obliquely lanceolate, base unequally rounded, acuminate at apex, entire along margins, glabrous; petiolules up to 7 mm long. Panicles 8-21 cm long, axillary. Flowers 4-8 mm across, greenish, fragrant, pentamerous; calyx cupuliform, imbricate; petals 4-5 mm long, obovate-oblong; staminal tube urceolate. Capsules 15-17 x 6-9 cm, inverted club like, reddish-brownish, minutely tuberculate, 5-celled; valves woody, thick; seeds many per cell, winged, 7-9 cm long along with wings, brownish.

Fl. & Fr.: April -onwards.

Cultivated. Recorded on the basis of C.E.C. Fischer (*l.c.*).

8. TOONA (Endl.) M. Roemer

Toona ciliata M. Roemer, *Fam. Nat. Syn. Monogr.* 1: 139. 1846; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, *Fl. India* 4: 504. 1997; *Cedrela toona* Roxb. ex Rottler in *Ges. Naturf. Freunde Berlin Neue Schr.* 4: 198. 1803; Hiern in Hook. *f.*, *Fl. Brit. India* 1: 568. 1875, p.p.; Kanjilal *et al.*, *Fl. Assam* 1: 242. 1936; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 86. 1938. subsp. *ciliata* Bahadur, *Monogr. Gen. Toona* 64. 1988; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, *Fl. India* 4: 504. 1997. **Fig. 66.**

Large trees, up to 27 m tall, all parts glabrous. Leaves 45-70 cm long, usually paripinnate; leaflets 8-20, opposite or nearly so, obliquely ovate-lanceolate, oblong-lanceolate, 10-20 x 4-7 cm, base cuneate, acuminate at apex, waved to entire along margins, glabrous; lateral nerves 10-15 pairs; petiolules 8-15 mm long. Panicles 10-40 cm long; flowers 6-8 mm across, greenish or creamish-yellow, unisexual, slightly fragrant; sepals free; lobes ovate; petals 5, oblong, 4-5 mm long, with ciliate margins; filaments pilose or hairy, disc orange-red; ovary 5-locular; stigma hirsute. Capsules oblong-ellipsoid, ca 2-2.5 x 0.8-1.2 cm, dark brown, 5-valved; seeds brown, very light, winged at both ends, ca 1.5 cm long.

var. **australis** (F. Muell.) Bahadur, *Monogr. Gen. Toona* 78. 1988. S.S. Jain & S.S.R. Bennet in Hajra *et al.*, *Fl. India* 4: 505. 1997. *Cedrela australis* F. Muell., *Fragm. Phytogr. Austral.* 1: 4. 1858.

Leaflets 7-13 x 3-4.5 cm; capsules ca 2 x 0.9 cm.

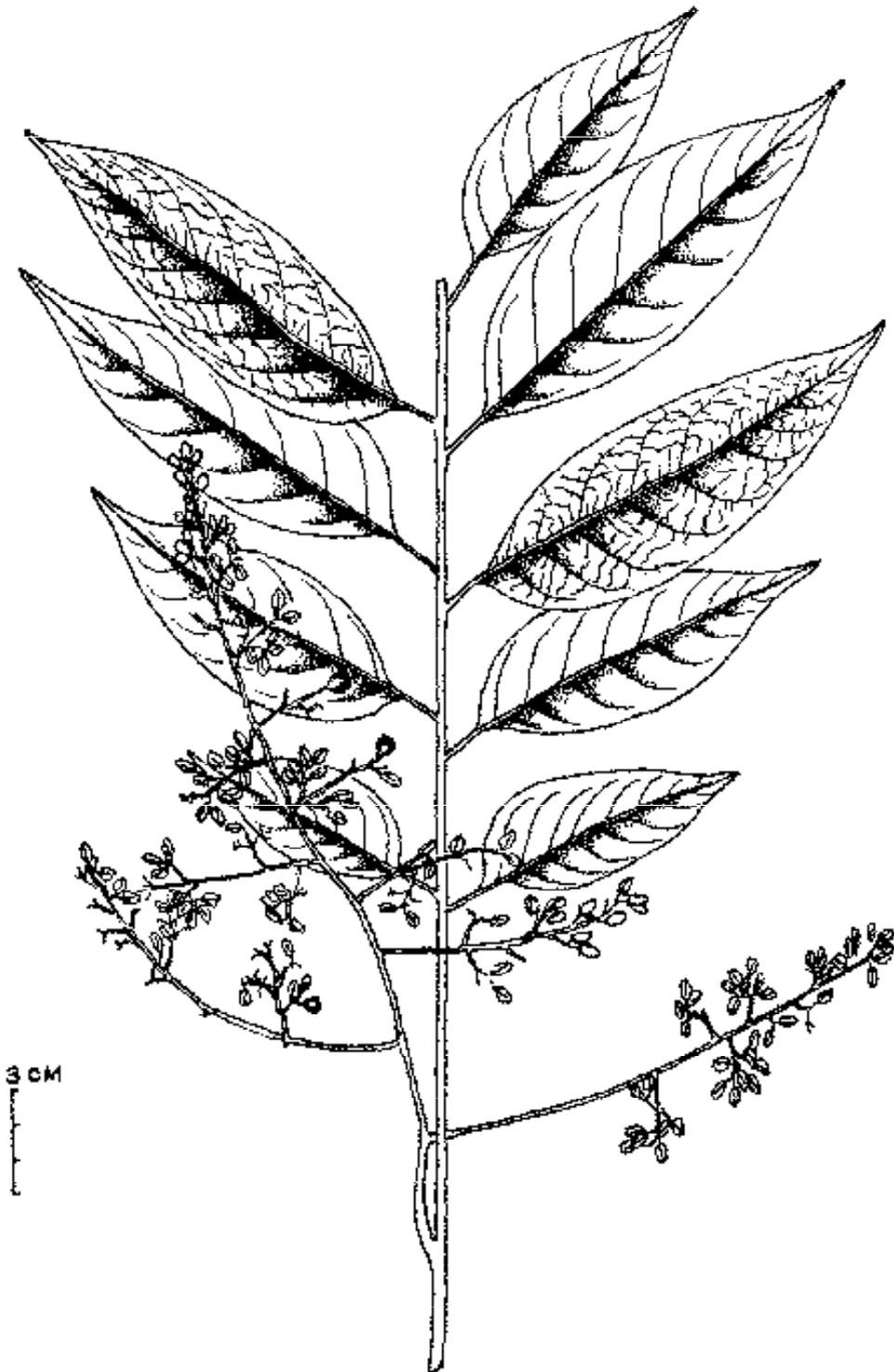


Fig. 66: *Toona ciliata* M. Roemer

Fl. & Fr.: March-July.

Near Vanopa Hall, Aizawl, *J.H. Rama* 00319 (Mizoram forest herb).

var. **grandilifolia** (C.DC.) Bahadur, Monogr. Gen. Toona 91, 1988; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 505, 1997. *Cedrela microcarpa* C. DC. var. *grandifolia* C.DC. in Rec. Bot. Surv. India. 3: 371, 1908.

Leaflets more than 18 x 7 cm; capsules larger, 2.5 x 1.2 cm.

Fl. & Fr.: October-January.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

9. TRICHILIA P. Browne

Trichilia connaroides (Wight & Arn.) Bentvelzen in Acta Bot. Neerl. 11: 13, 1962; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 31, 1987; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 515, 1997. *Zanthoxylum connaroides* Wight & Arn., Prodr. 148, 1834. *Heynea trijuga* Roxb. [H. Beng. 33, 1814, *nom. nud.*] *ex* Sims in Bot. Mag. 41: t. 1738, 1815, *non* *Trichilia trijuga* Vell. 1825; Hiern in Hook. *f.*, Fl. Brit. India 1: 565, 1875; Kanjilal *et al.*, Fl. Assam 1: 229, 1936.

Small trees or shrubs, up to 5 m tall, glabrous at maturity. Leaves alternate, crowded at ends of branchlets, 20-50 cm long with angular rachis; leaflets 5-7(11), ovate-oblong, ovate-lanceolate, 9.5-15 x 3.5-7 cm, base rounded or obliquely subacute, acuminate at apex, entire along margins; lateral nerves 10-13 paired; petiolules 15-18 mm long, articulate at apex. Cymes corymbosely paniculate; flowers white or cream coloured. 4-6 mm across; calyx 5-lobed, hairy outside, ovate; petals 5, puberulous outside, ciliolate; staminal tube with yellow lobes. Capsules oblong to subglobose, 3-12 mm across, red, 1-celled, 2-valved; seed 1, ovoid with thin white aril, brown when dry.

Fl. & Fr.: March-December.

Thingfal-Lungleh, *Dutta* 33720.

10. WALSURA Roxb.

Walsura robusta Roxb., Fl. Ind. 2: 386. 1832; Hiern. in Hook. f., Fl. Brit. India 1: 565. 1875; Kanjilal *et al.*, Fl. Assam 1: 241. 1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 31. 1987; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 522. 1997. **Fig. 67.**

Trees, 20-25 m tall with young shoots pubescent. Leaves 15-25 cm long; petioles 4-6 cm long; leaflets 3-5, elliptic to oblong-lanceolate, 4-10 x 2-7 cm, base acute to cuneate, bluntly acuminate at apex, entire along margins, glabrous, shining above, pale beneath; lateral nerves 5-7 paired; petiolules 5-15 mm long. Panicles 10-18 cm long, terminal; flowers 4-5 mm across, white or yellowish; calyx 5-toothed, pubescent; petals 5, ovate, 3 mm long, pubescent outside; stamens 10; filaments free, subulate. Berries subglobose, upto 2 cm across, 1-2-seeded, indehiscent.

Fl. & Fr.: December-August.

In evergreen forests. Lungleh, Dutta 33416.

CULTIVATED TAXA

1. **Azadirachta indica** A. Juss. in Mem. Mus. Hist. Nat. Paris 19: 221. t. 13, f. 5. 1830; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 478. 1997. *Melia azadirachta* L., Sp. Pl. 385. 1753; Hiern in Hook. f., Fl. Brit. India 1: 544. 1875; Kanjilal *et al.*, Fl. Assam 1: 227. 1936.

2. **Chukrasia tabularis** A. Juss. in Mem. Mus. Hist. Nat. 19: 251. t. 22. 1830; Hiern. in Hook.f., Fl. Brit. India 1: 568. 1875 (as "*Chikrassia*"); S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 481. 1997. *Zawngtei* (Lushai).

OLACACEAE

(K.P. Singh)

- | | |
|---------------------------------------------------------------------------------------|----------------------------|
| 1a. Climbing shrubs; leaves palmatinerved at base;
bracts free, caducous or absent | ... 1. <i>Erythrolalum</i> |
| 1b. Trees; leaves penninerved at base;
bracts connate, forming persistent epicalyx | ... 2. <i>Schoepfia</i> |

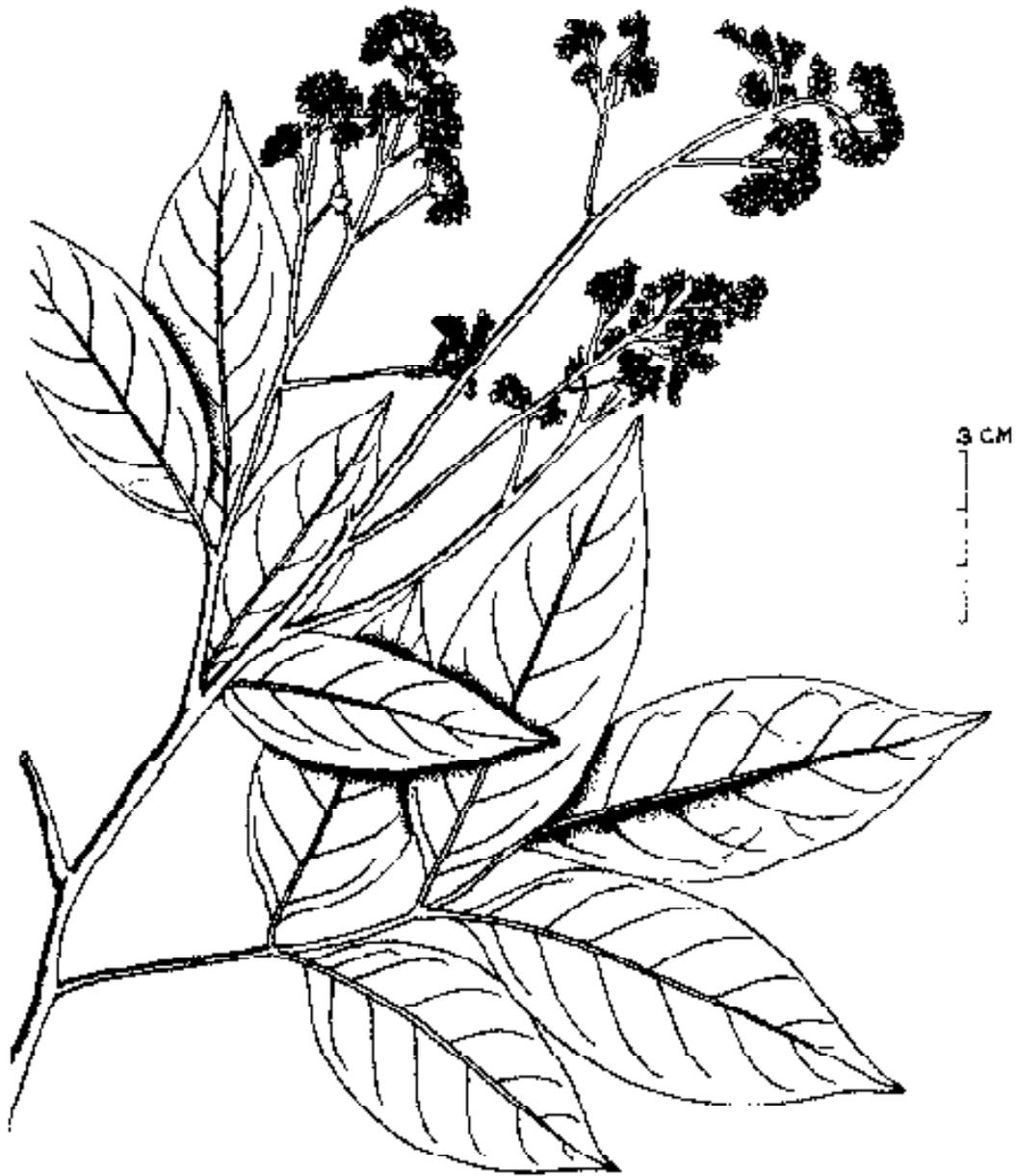


Fig. 67: *Walsura robusta* Roxb.

1. ERYTHROPALUM Blume

Erythropalum scandens Blume, Bijdr. 921. 1826; Masters in Hook. f., Fl. Brit. India 1: 578. 1875; Kanjilal *et al.*, Fl. Assam 1: 248. 1936; Uniyal in N.P. Singh *et al.*, Fl. India 5: 5. 2000. *E. vagum* (Griffith) Masters in Hook. f., Fl. Brit. India 1: 578. 1875; Kanjilal *et al.*, Fl. Assam 1: 248. 1936; Deb & Dutta in J. Econ. Tax Bot. 10(1): 31 1987.

Rambling climbers with axillary tendrils. Leaves distichous, alternate, ovate-oblong to lanceolate, 7-15 x 3.5-6.5 cm, base rounded or narrowly peltate, acuminate at apex, entire along margins, membranous, glabrous, shining, palmately 3-nerved; petioles 2-5 cm long. Cymes axillary, paniculate, peduncles 4-10 cm long; flowers white or yellow, 2-3 mm long. Drupes ellipsoid, 15-23 x ca 10 mm, 5-valved, orange-yellow, surface rough; ends obtuse, seed single, purplish grey, naked.

Fl. & Fr.: August-March.

Moist and shady places in primary forests. Rieng, D.K. Singh, 92947.

2. SCHOEPFIA Schreb.

Schoepfia fragrans Wallich in Roxb., Fl. Ind. ed. 2: 188. 1824; Masters in Hook. f., Fl. Brit. India 1: 581. 1875; Kanjilal *et al.*, Fl. Assam 1: 249. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2) : 86. 1933; Uniyal in N.P. Singh *et al.*, Fl. India 5: 13. 2000. *Anpangthuam* (Lushai).

Evergreen trees, 5-15 m tall with angular branchlets. Leaves elliptic-lanceolate, 3-8 x 1-3 cm, base cuneate, acute to acuminate at apex, entire along margins; glabrous on both surfaces; lateral nerves 5-7 pairs; petioles 4-8 mm long. Racemes 2-3 cm long, axillary; flowers 8-12 mm long, yellowish-white, fragrant; calyx entire; petals 5, 6-7 mm, long, combined up to three fourth of their length and forming a campanulate corolla, valvate. Drupes ellipsoid, 10-15 mm long, white, nearly covered accrescent calyx, 1-seeded, succulent when ripe, surface striated.

Fl. & Fr.: August-January.

A second storey tree in evergreen forests. Hmuifang, 1500 m, Parry 205 (*vide* C.E.C. Fischer, *l.c.*); 247 (CAL); *s.loc.*, Dutta 33566; Champhai, 1600 m, K.P. Singh 94507.

ICACINACEAE

(K.P. Singh)

- 1a. Leaves stellately hairy underneath at least in young stage;
calyx deeply divided, imbricate ... 3. *Platan*
- 1b. Leaves glabrous underneath; calyx cupular with short,
often obscure teeth, not imbricate:
- 2a. Flowers bisexual; petals free;
drupes with a fleshy puffy appendage ... 1. *Apodytes*
- 2b. Flowers polygamous-dioecious; petals connate;
drupes without a fleshy appendage ... 2. *Gomphandra*

1. APODYTES E. Meyer ex Arn.

Apodytes dimidiata E. Meyer ex Arn., in Hook., J. Bot. 3: 155. 1840; Mathur in N.P. Singh *et al.*, Fl. India 5: 18. 2000. *Apodytes benthamiana* Wight, Icon. Pl. Ind. Or. 3(4): 14, t. 1153. 1846; Masters in Hook. f., Fl. Brit. India 1: 588. 1875; Kanjilal *et al.*, Fl. Assam 1: 251. 1936. *Thinguihahui* (Lushai).

Tall trees with straight boles, 20-30 m; young shoots pubescent. Leaves alternate, elliptic to ovate-lanceolate, 7-14 x 3.5-5 cm, base obtuse or subequally acute, acute or shortly acuminate at apex, revolute along margins, glabrous or glabrescent, turning black on drying; lateral nerves 4-7 pairs; petioles 1.5-2.8 cm long. Panicles 6-11 cm long, terminal, corymbose; flowers white, bisexual, 6-7 mm across, sweet scented; calyx minute, salver shaped; petals oblong; styles persistent, pushed downwards as the fruit develops. Drupes obliquely obovoid, ca 8 x 5 mm, compressed, longitudinally striated, hirsute, furnished with a fleshy puffy appendage covering the whole flat inner face that turns reddish-brown in ripe fruits, 1-seeded; seeds obovate.

Fl. & Fr.: May-December.

Scarce in the area. It is a rare plant. Denglang forest, K.P. Singh 94115; Forest training school, Bethlehem, M. Sawmliana 99292.

2. GOMPHANDRA Wallich *ex* Lindley

Gomphandra terandra (Wallich *ex* Roxb.) Sleumer in Notizbl. Berlin-Dahlem 15: 238. 1940; Mathur in N.P. Singh *et al.*, Fl. India 5: 25. 2000. *Lasianthera tetrandra* Wallich *ex* Roxb., Fl. Ind. 2: 328. 1824. *Gomphandra axillaris* Wallich [Cat. no 3718. (1831), *nom. nud.*] *ex* Voigt, Hort. Suburb. Calc. 31. 1845; *nom. illeg.*; Masters in Hook. *f.*, Fl. Brit. India 1: 586. 1875, Kanjilal *et al.*, Fl. Assam 1: 252. 1936.

Large shrubs or small trees. Leaves alternate, bifarious, oblong or lanceolate, 8-12.5 x 2.5-3.5 cm, base rounded or acute, acuminate at apex, entire along margins, membranous to chartaceous, glabrous on both surfaces, paler beneath; petioles 4-5 mm long, Panicle cymes axillary, 6-12 mm long, puberulous, few-flowered; flowers creamy-white, unisexual or polygamous; calyx minute, cup-shaped; petals ovate; filaments thick, pilose with glandular hairs at apex. Drupes oblong-ellipsoid, 1-2 x 0.5-0.8 cm, broadly attenuate at base, not swollen; seeds striated outside, large.

Fl. & Fr.: May-December.

Scarce on the hilly slopes. Lungte forest, Prazer 1890, *s.num.* (CAL); Tilthlang, K.P. Singh 96627.

3. PLATEA Blume

Platea latifolia Blume Bijdr. 647. 1826. Mathur in N.P. Singh *et al.*, Fl. India 5: 33. 2000. *Sideroxylon gamblei* C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 538. 1882; *Platystigma myristiceum* R. Br. in Wallich, Cat. no. 7523. 1832. *nom. nud.*; Hook. *f.* in Fl. Brit. India 5: 381. 1887.

Trees, 20-30 m tall; shoots rusty-villous. Leaves ovate-elliptic or elliptic-oblong, 8-18 x 3-8 cm, base rhomboid or broadly cuneate, acuminate at apex, entire along margins, mature leaves glabrous above, young leaves ferrugineous stellate hairy and woolly; lateral nerves 7-12 paired, prominent beneath; petioles 2-4 cm long, Male flowers in panicles pseudo-spikes up to 6 cm long, axillary; calyx deeply divided; lobes ovate, minutely villous; petals connate at base. Females flowers in few flowered cymes; corolla and staminodes none; ovary woolly or glabrous. Drupes oblong, 1.5-4.5 x 0.8-2 cm, with broad obtuse apex; yellow-orange to red.

Fl. & Fr.: February-September.

Hmuifang, 1250 m, *Deku s. num.*

OPILIACEAE

(K.P. Singh)

LEPIONURUS Blume

Lepionurus sylvestris Blume, Bijdr. 1148. 1826; Kanjilal *et al.*, Fl. Assam 1: 250. 1936; Mathur in N.P. Singh *et al.*, Fl. India 5: 43. 2000. *L. oblongifolius* Masters in Hook. f., Fl. Brit. India 1: 583. 1875; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 86. 1938. *Anpangtkuam*, *Anpangthuam* (Lushai).

Large shrubs or small trees, 0.5-3 m tall, with switchy branches, glabrous. Leaves alternate, oblong-lanceolate to elliptic or obovate, 6-10 x 3-6.5 cm, base acute, acuminate at apex, entire, membranous, glabrous, pustulate; lateral nerves 6-9 paired; petioles 2-4 mm long. Racemes axillary, 1-7 in each axil, 3-6 cm long, erect or drooping; flowers 1-2 mm long, greenish to pale yellow, faintly scented, bisexual; perianth 4-lobed, 3-4 mm in diam., urceolate; disc fleshy. Drupes ellipsoid, up to 1.5 cm long, orange; 1-seeded, glabrous.

Fl. & Fr.: March-January.

Darlawn, 1100 m, *M. Sawmliana s.num.*

CARDIOPTERIDACEAE

(K.P. Singh)

CARDIOPTERIS Wallich ex Royle

Cardiopteris quinqueloba (Hassk.) Hassk., Nat. Tijd. N. 10. 64. 1855; Mathur in N.P. Singh *et al.*, Fl. India 5: 47. 2000. *Peripterygium quinquelobum* Hassk., Tijd. Nat. Gesch. Phys. 10: 142. 1843; *Cardiopteris lobata* R. Br. (Wallich Cat. 8033.1847, *nom. nud.*) ex Benn. & Br. Pl. Jav. Rar. 246, t. 49. 1852, *nom. illeg.*; Masters in Hook.f., Fl. Brit. India 1: 597. 1875; Kanjilal *et al.*, Fl. Assam 1: 254. 1936; C.E.C.

Fischer in Rec. Bot. Surv. India 12(2): 86. 1938. *Lalruna-bupfiari-Thup* (Lushai). Fig. 68.

Climbing herbs with milky juice; stems terete, striate. Leaves alternate, polymorphous, broadly ovate in outline, 3-5-lobed, 8-13 x 9-13 cm, base cordate, palmately 7-9-nerved; lobes acute or acuminate at apex, glabrous-herbaceous, widely divergent, membranous; petioles 4-8 cm long. Flowers 3-4 mm across, in axillary racemes or paniced cymes, white; peduncles dichotomous 7-12 cm long; calyx persistent, puberulous; corolla caducous. Fruits ovate-orbicular or obcordate, 18-25 x 12-20 mm, compressed, broadly winged, tipped with linear, 1-1.5 cm long style, apically notched, 1-celled; seeds 1, linear, furrowed.

Fl & Fr.: July-January.

Common on hill slopes in open places and in dry bamboo jungles. North Vanlaphai, 1500 m, Parry 367 (*vide* C.E.C. Fischer, *l.c.*); Theriat, Deb 31312; Tut, on way to Mamit, D.K. Singh 99200.

AQUIFOLIACEAE

(K.P. Singh)

ILEX L.

- 1a. Shrubs or small trees, up to 8 m;
young shoots glabrous; drupes ca 3 mm across ... 1. *I. godajam*
- 1b. Trees, up to 18 m; young shoots glabrous;
drupes ca 6 mm across ... 2. *I. umbellulata*

1. *Ilex godajam* Wallich *ex* Hook. *f.*, Fl. Brit. India 1: 604. 1875; Kanjilal *et al.*, Fl. Assam 1: 256. 1934; Basu in N.P. Singh *et al.*, Fl. India 5: 58. 2000.

Evergreen shrubs or small trees, up to 8 m tall; young shoots and inflorescence pubescent. Leaves ovate, elliptic or oblong 4-12 x 1.5-4.5 cm, acute at base, bluntly short acuminate above, entire to undulate along margins, thinly coriaceous, glabrous above, pale beneath; lateral nerves 8-10 paired; petioles 1-1.5 cm long, pubescent. Inflorescence umbels or panicles; flowers 4-5-merous, scented. Male inflorescence 1-30-flowered, up to 2 cm long; calyx lobes 4-5, patelliform, pubescent, obtuse, ciliate;

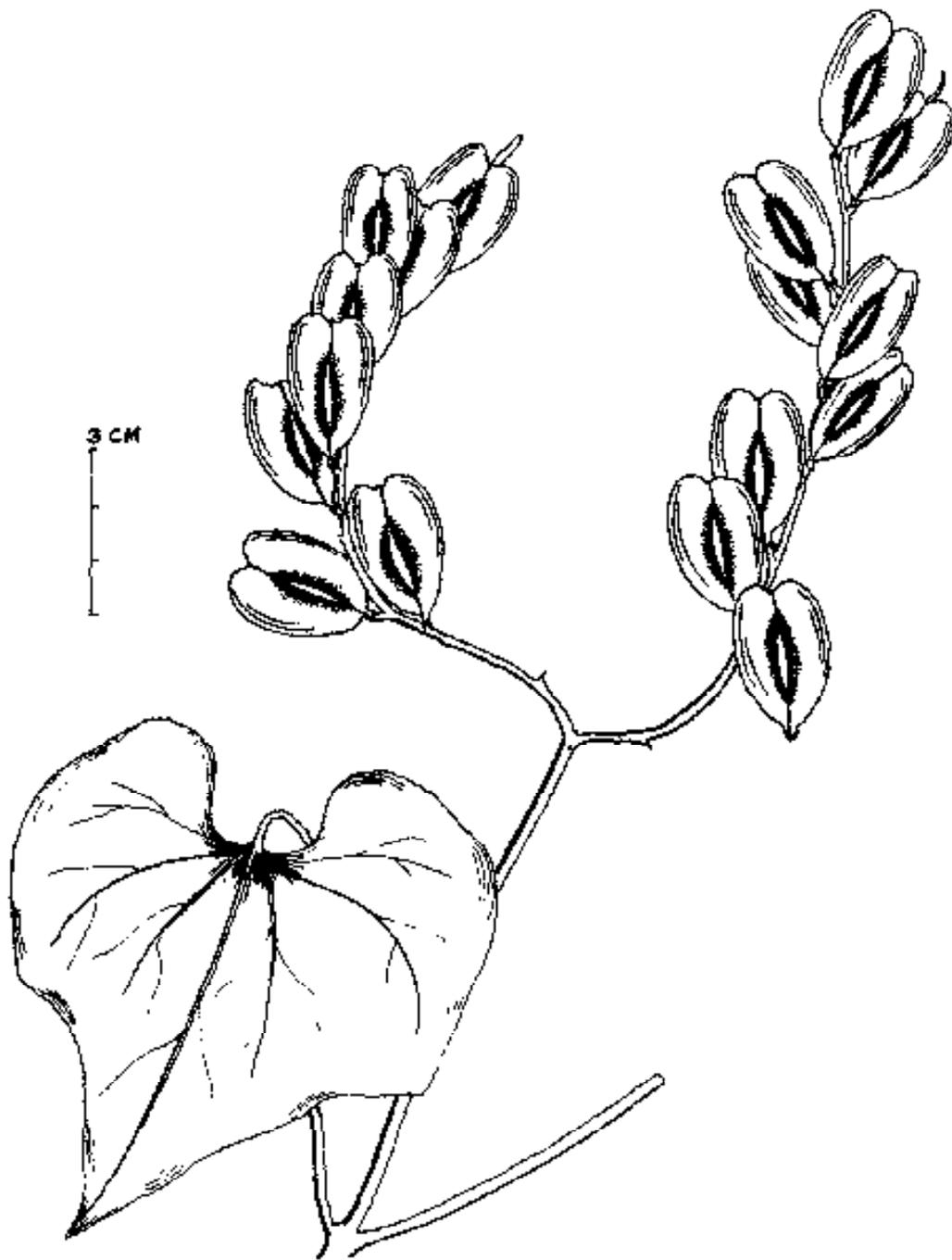


Fig. 68: *Cardiopteris quinqueloba* (Hassk.) Hassk.

petals broadly obovate or oblong, *ca* 2.5 mm long, connate below. Female inflorescence 4-15-flowered; ovary ovoid with capitate stigma. Drupes globose; *ca* 3 mm across; pyrenes 4-6, *ca* 2 mm long, 3-striate.

Fl. & Fr.: February-April.

Kharuwhlian F.R.H., K.P. Singh 97125.

2. *Ilex umbellulata* (Wallich) Loes. in Nov. Act. Acad. Caes. Leop. Carol. Nat. Cur. 78: 99. 1901; Basu in N.P. Singh *et al.*, Fl. India 5: 70. 2000. *Ehretia umbellulata* Wallich in Roxb., Fl. Ind. 2: 344. 1824. *Ilex sulcata* Wallich *ex* Hook.f., Fl. Brit. India 1: 604. 1875.

Trees, up to 18 m tall, young shoots glabrous. Leaves ovate or elliptic-oblong, 10.5-14 x 5-6 cm, rounded or obtuse as base, acute-acuminate at apex, entire, undulate at margins, membranous; lateral nerves 9-12 paired; petioles up to 2 cm long. Inflorescence subumbelliform; flowers 4-5 merous. Male inflorescence 6-16-flowered; calyx lobes 4-5-patelliform, semi-orbicular, pubescent and ciliate out side; petals oblong, *ca* 2 x 1.5 mm, connate at base. Drupes globose *ca* 6 mm across; pyrenes 6-10, trigonous-laterally compressed, *ca* 4 x 2.5 mm, 3-striate.

Fl. & Fr. : April-September.

Recorded on the basis of J.H. Lalramnghinglova (J. Econ. Tax. Bot. Addl. Ser. 12: 442. 1996).

CELASTRACEAE

(K.P. Singh)

1a. Leaves alternate :

- 2a. Scandent shrubs; inflorescence paniculate or racemose, usually at branch tips; ovary free from disc; seeds completely enclosed by aril ... 1. *Celastrus*
- 2b. Small trees or erect shrubs; inflorescence axillary cymes, dichotomously branched; ovary partly immersed in the disc; seeds partially enclosed (basal half) by aril ... 3. *Maytenus*

1b. Leaves opposite:

- 3a. Flowers peduncled; petals free, spreading; disc conspicuous; capsules more than 3-seeded; seeds arillate ... 2. *Euonymus*
- 3b. Flowers in sessile clusters; petals erect, slightly connate at base; disc absent; capsules 1-seeded; seeds carillate ... 4. *Microtropis*

1. CELASTRUS L.

- 1a. Flowers in terminal panicles; styles simple ... 2. *C. paniculatus*
- 1b. Flowers in terminal and axillary racemose cymes; styles 3-lobed at apex
- 2a. Young shoots lenticellate, terete ... 3. *C. stylosus*
- 2b. Young shoots not lenticellate, quadrangular ... 1. *C. hindsii*

1. *Celastrus hindsii* Benth. in Hook., J. Bot. Kew Misc. 3: 334. 1851; Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 85. 2000. *Celastrus monosperma sensu* M. Lawson in Hook.f., Fl. Brit. India 1: 618. 1875. *p.p.*; Kanjilal *et al.*, Fl. Assam 1: 269. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 86. 1938.

Glabrous woody climbers without lenticellate, quadrangular branchlets. Leaves elliptic or elliptic-oblong, 6-13 x 2.5-7 cm, base acute or rounded, bluntly or shortly acuminate at apex, serrate along margins, coriaceous, glabrous, pinkish beneath; lateral nerves 5-7 paired, much arched; petioles 5-8 mm long. Peduncled cymes ca 14 cm long, terminal and axillary; flowers ca 4 mm across, whitish. *Male flowers* : sepals obtuse, ciliate, up to 2 mm long; petals oblong-obovate, 2-5 mm long; stamens arising from the margin of disc. *Female flowers* : ovary subglobose, 3-locular; stigma 3-lobed; disc cup shaped. Capsules obovoid, 1-celled, 3-valved, 10-15 mm long, 1 or rarely 2-seeded; seeds elliptical, 5-6 mm long, brown, transversely wrinkled.

Fl. & Fr.: March-October.

Valley near Fort Lungleh, 900-1200 m, Gage 16, 40, 147 (CAL).

2. *Celastrus paniculatus* Willd., Sp. Pl. 1: 1125. 1797; Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 87. 2000. M. Lawson in Hook.f., Fl. Brit. India 1: 617. 1875; Kanjilal *et al.*, Fl. Assam 1: 268. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 86. 1938.

Large, deciduous, woody climbers with lenticellate branchlets. Leaves variable in size, broadly oval and ovate to obovate or oblong-obovate, 6-17 x 4.5-8.5 cm, base rounded or acute, bluntish or shortly acuminate at apex, crenate-serrulate along margins, glabrous, pubescent beneath, \pm coriaceous; lateral nerves 4-8 paired; petioles 6-10 mm long. Panicles up to 15 cm long, terminal, drooping, pubescent; flowers 3-4 mm across, pale greenish. *Male flowers* : sepals 5-lobed, ca 2 mm long; petals oblong-obovate, 2-3 mm long; stamens ca 3 mm long. *Female flowers* : sepals and petals as in male flowers; stamens sterile; ovary globose with 3-lobed stigma. Capsules globose, 6-10 mm across, obscurely trigonus, usually 3-celled, orange-yellow when ripe; seed 1-2 in each cell, oval; seeds ellipsoid, 3-5 mm long, arillate.

Fl. & Fr.: April-December.

Puilo basti Road, K.P. Singh 94492.

3. *Celastrus stylosus* Wallich [Cat. 151, no. 4313. (1831), *nom. nud.*] ex Roxb., Fl. Ind. 2: 401. 1824; M. Lawson in Hook. f., Fl. Brit. India 1: 618. 1875 *p.p.*; Kanjilal *et al.*, Fl. Assam 1: 268. 1936; Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 89. 2000. *Gymnosporia neglecta* Wallich ex M. Lawson in Fl. Brit. India 1: 619. 1875.

Subscandent shrubs with lenticellate branchlets. Leaves elliptic, oblong-elliptic to lanceolate or obovate, 7-11 x 5-7 cm, base obtuse or acute, acute to obtusely acute at apex, cuspidate-serrate along margins, glabrous, coriaceous; lateral nerves 5-8 paired; petioles 1-2.5 cm long. Cymes racemose, axillary, up to 2 cm long; peduncles 5-10 mm long; flowers 4-5 mm across, greenish-white. *Male flowers* : sepals 5-lobed, ca 2 mm long; petals obovate, 2-3 mm long, papillose; disc cupular; stamens papillose, arising between the disc lobes. *Female flowers* : ovary subglobose; stigma 3-lobed. Capsules globose, 7-10 x 5-10 mm, yellow when ripe; 3-6-seeded, seeds enclosed in a red aril, plano-convex, ca 4-5 mm long, dark brown.

Fl. & Fr.: March-October.

In moist dense forests. Sabual, ca 1000 m, D.K. Singh 99038.

2. **EUONYMUS** Tour. *ex* L.

1a. Flowers pentamerous :

- 2a. Leaves serrate upward only; flowers white ... 3. *E. glaber*
 2b. Leaves entire throughout; flowers blood-red ... 1. *E. attenuatus*

1b. Flowers tetramerous :

- 3a. Climbing shrubs with terete branches;
 flowers greenish-white ... 4. *E. theifolius*
 3b. Erect shrubs with glandular branches; flowers
 greenish-yellow ... 2. *E. frigidus*

1. *Euonymus attenuatus* Wallich *ex* M. Lawson in Hook. *f.*, Fl. Brit. India 1: 610. 1875; Kanjilal *et al.*, Fl. Assam 1: 262. 1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 32. 1987; Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 94. 2000.

Shrubs or small trees, 3-5 m tall. Leaves oblong-lanceolate, elliptic, 5-12 x 2-4 cm, base cuneate, bluntly acuminate at apex, entire along margins, glabrous, coriaceous; lateral nerves 6-8 paired; petioles 0.8-1.5 cm long. Cymes axillary or supra axillary, dichotomously branched; peduncles 2-5 cm long; flowers 5-8 mm across, red, pentamerous; calyx lobes unequal, ovate; petals obovate-orbicular. Capsules 5- or 4-lobed, obovoid, 8-12 mm across, glabrous. 1-seed in each cell; seeds black with yellow aril.

Fl. & Fr.: April-November.

Thingfal, Dutta 33665; South Vanlaiphai, Dutta 34019.

2. *Euonymus frigidus* Wallich *ex* Roxb., Fl. Ind. 2: 409. 1824; M. Lawson in Hook. *f.*, Fl. Brit. India 1: 611. 1875; Kanjilal *et al.*, Fl. Assam 1: 265. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 86. 1938; Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 99. 2000.

Shrubs, 1-2 m tall with 4-angled branchlets. Leaves oblong-lanceolate or lanceolate, 5-13 x 1.5-3 cm, base tapering, caudate acuminate at apex, sharply serrate along margins, glabrous, coriaceous; lateral nerves 8-12 paired; petioles 6-10 mm long. Cymes axillary or extra axillary, few flowered, dichotomously branched; peduncles 3-5 cm long; flowers 2-3

mm across, tetramerous, greenish-yellow; calyx lobes suborbicular; petals orbicular, entire. Capsules leathery, 4-winged or lobed at base, ovate-rounded; wings narrow, triangular.

Fl. & Fr.: May-November.

S.loc. 1050 m, *Wenger* 219 (*vide* C.E.C. Fischer, *l.c.*).

3. *Euonymus glaber* Wallich in Roxb., *Fl. Ind.* ed 2, 1: 628. 1832; M. Lawson in Hook. *f.*, *Fl. Brit. India* 1: 609. 1875; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 86. 1938; Ramamurthy in N.P. Singh *et al.*, *Fl. India* 5: 100. 2000. *Hangsen* (Lushai).

Evergreen trees, 10-13 m tall with terete branchlets. Leaves obovate-oblong to oblong, 7-10.5 x 3.5-3.8 cm, base cuneate, bluntly acuminate at apex, obtusely slightly serrate upwards, glabrous; lateral nerves 5-7 paired; petioles 5-15 mm long. Cymes axillary, dichotomously branched; peduncles 2-4 cm long; flowers 4-7 mm across, pentamerous, white; petals broadly oblong. Capsules obovate, 10-12 mm long, 5 or 4-lobed, smooth, convex at apex, narrowed towards base; seeds black, 1 in each locule.

Fl. & Fr.: March-September.

S.loc. 1050 m, *Wenger* 218 (*vide* C.E.C. Fischer, *l.c.*); *s.loc.*, *Parry* 21 (CAL).

4. *Euonymus theifolius* Wallich [Cat. 151. no. 4293 (1831) *nom. nud.*] *ex* M. Lawson in Hook. *f.*, *Fl. Brit. India* 1: 612. 1875; Kanjilal *et al.*, *Fl. Assam* 1: 264. 1936; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 87. 1938.

Subscandent shrubs, 2-3 m high with terete branches. Leaves variable, elliptic-lanceolate or oblong-lanceolate, 5-11 x 1-5 cm, base cuneate or acute, acuminate at apex, recurved or distantly serrate along margins, glabrous; lateral nerves 7-10 paired; petioles 4-10 mm long. Cymes axillary or supra axillary, dichotomously branched; peduncles up to 15 mm long; flowers 4-8 mm across, white or greenish-white, tetramerous; calyx lobes rounded; petals orbicular, entire. Capsules subglobose, red, 5 or 4-lobed, 7-12 mm across; seeds 2 in each cell, 6-7 mm long, black, plano-convex with yellowish-orange aril.

Fl. & Fr.: April-January.

Phongphui, 2100 m. *Parry 566* (*vide* C.E.C. Fischer, *l.c.*).

3. MAYTENUS Molina

- 1a. Flowers in cymes only ... 1. *M. hookeri*
 1b. Flowers in cymes or in fascicles ... 2. *M. thomsonii*

1. **Maytenus hookeri** Loes. in Engler & Prantl., Nat. Pflanzenfam. 20b: 140. 1942; Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 123. 2000. *Gymnosporia acuminata* Hook.f. ex M. Lawson in Hook.f., Fl. Brit. India 1: 619. 1875, non (L.f.) Szysz. 1888. nec *M. acuminata* (L.f.) Loes., 1942; Kanjilal *et al.*, Fl. Assam 1: 271. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12 (2): 87. 1938.

Shrubby trees, up to 10 m tall; branchlets angular, thorny. Leaves lanceolate, elliptic-lanceolate or oblanceolate, 5.5-15 x 2.5-6 cm, base cuneate, acuminate at apex, serrate along margins, glabrous; lateral nerves 7-9 paired; petioles 5-7 mm long, channelled. Cymes 5-8 cm long, axillary, dichotomously branched; flowers 4-5 mm across, reddish-brown; sepals 5, ca 1 mm long, ovate; petals 5, 2-3 mm long. Capsules obcordate or subglobose, 7-8 mm across, compressed, 2-celled; seeds ca 2 mm across, ellipsoid, black.

Fl. & Fr.: March-October.

Lungleh, 900 m, *Gage 10* (CAL); N. Lushaj hills, Kulikawn, *Godfrey 437* (CAL); Kawnpui, *K.P. Singh 96985*.

2. **Maytenus thomsonii** (Kurz) Raju & Babu in Bull. Bot. Surv. India 10: 349. 1969; Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 127. 2000. *Gymnosporia thomsonii* Kurz in J. As. Soc. Bengal 44(2): 202. 1875; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 87. 1938.

Trees with armed branches. Leaves lanceolate to oblong-lanceolate, 7-12 x 5 cm, base tapering, acuminate at apex, serrate along margins, subcoriaceous, glabrous; lateral nerves 7-10 paired. Flowers in axillary cymes or fascicles, sepals and petals 4-5-lobed. Capsules broadly ovate, 2-valved, 2 (1)-loculed, smooth; seeds 2.

Fl. & Fr.: April-October.

Lushai hills, *Parry, s.num.* (CAL).

4. **MICROTROPIS** Wallich *ex* Meissner

Microtropis discolor (Wallich) Wallich. Cat. no. 4337. 1830; Arn. in *Ann. Nat. Hist.* 3: 152. 1839; M. Lawson in *Hook.f., Fl. Brit. India* 1: 614. 1875; Kanjital *et al.*, *Fl. Assam* 1: 267. 1936; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 87. 1938; Ramamurthy in N.P. Singh *et al.*, *Fl. India* 5: 129. 2000. *Cassine discolor* Wallich in *Roxb., Fl. Ind.* 2: 378. 1824.

Evergreen shrubs or small trees, 3-8 m tall, all parts glabrous. Leaves elliptic to lanceolate, 5.5-12 x 2-4 cm, base attenuate, acuminate at apex, entire along margins; lateral nerves 5-7 paired; petioles up to 10 mm long. Cymes 10-15 mm long, axillary or supra-axillary, corymbose or umbellate; flowers 3-5 mm across, greenish-white or purplish-green; calyx lobes broadly orbicular; petals elliptic, ca 2 mm long. Capsules ellipsoid-oblong, 12-15 x 8-12 mm, smooth, 2-valved, 1-celled; seeds stipitate, ellipsoid, 10-12 x 7-8 mm, scarlet red.

Fl. & Fr.: July-June.

Tuipang, 1200 m, *Parry*, 471 (*vide* C.E.C. Fischer, *l.c.*); *s.loc.*, *Parry s.num.* (CAL); 5th mile, S.E. from Lungleh, 900-1200 m, *Gage* 159 (CAL); Theriat, *Deb* 31311; Tamadil, *M. Sawmliana* 95560.

HIPPOCRATEACEAE

(K.P. Singh)

- | | |
|-------------------------------------------------------------------------------------------------------|-----------------------------|
| 1a. Inflorescence of sessile fascicles; petals clawed;
fruits follicular, dehiscent, seeds winged | ... 1. <i>Loeseneriella</i> |
| 1b. Inflorescence a pedunculate corymb of cymes;
petals not clawed; fruits a berry; seeds wingless | ... 2. <i>Salacia</i> |

1. **LOESENERIELLA** A.C. Smith

Loeseneriella obtusifolia (Roxb.) A.C. Smith in *Am. J. Bot.* 28: 440. 1941; Ramamurthy & Naithani in N.P. Singh *et al.*, 5: 141. 2000.

Hippocratia obtusifolia Roxb., Fl. Ind. 1: 170 1820; M. Lawson in Hook. f., Fl. Brit. India 1: 623. 1875. *Loeseneriella macrantha* (Korth.) A.C. Smith, Amer. J. Bot. 28: 439. 1941; *Hippocratia macrantha* Korth., Kruidk. Verh. Nat. Gescheid. Neder. Ind. 187. Pl. 39. 1839, 42; Kanjilal *et al.*, Fl. Assam 1: 274. 1936.

Large woody climbing shrubs, reaching up to the top of trees; branchlets terete, quadrangular. Leaves elliptic-ovate, 8-13 x 3-5 cm, base rounded or obtuse, shortly acuminate at apex, subentire to entire along margins, subcoriaceous, glabrous on both sides; lateral nerves 6-8 pairs; petioles 5-8 mm long. Cymes terminal as well as axillary, 5-12 cm long, dichotomously branched; flowers pale-yellow or white, 2-6 mm long; calyx 5-lobed ovate with thin reddish margins; petals 5, 4-5 mm long, glabrous, or pilose on the upper half, glabrous within; disc cup-shaped; stamens 3. Ripe carpels (Samara) ovate or oblong-ovate, 5-8 x 2-3 cm, base acute, flat, woody, reddish in side, 3-6-seeded; seeds 1.5-1.3 x 0.6-0.8 cm, winged, brown, compressed; wings 3-5 x 1.5-2 cm, membranous, thin, shining brown.

Fl. & Fr.: September-February.

Teirei, D.K. Singh 99110.

2. SALACIA L.

- | | |
|-------------------------------------------------------------------------------|------------------------------|
| 1a. Cymes peduncled and dichotomously branched | ... 1. <i>S. floribunda</i> |
| 1b. Cymes sessile; pedicels axillary, arising directly from tubercle or wart: | |
| 2a. Flowers pedicellate, 3-6 | ... 3. <i>S. satacioides</i> |
| 2b. Flowers nearly sessile, 1-3 | ... 2. <i>S. khasiana</i> |

1. **Salacia floribunda** Wight, Illustr. Ind. Bot. 1: 134. 1840; M. Lawson in Hook.f., Fl. Brit. India 1: 629. 1875; Kanjilal *et al.*, Fl. Assam 1: 275. 1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 32. 1987; Ramamurthy & Naithani in N.P. Singh *et al.*, Fl. India 5: 153. 2000.

Scandent shrubs. Leaves elliptic-lanceolate to oblong, 9-14 x 3-6 cm, base acute to subobtuse, bluntly acuminate at apex, serrate along margins, coriaceous, glabrous; lateral nerves 9-12 pairs; petioles up to 1 cm long. Cymes axillary, paniculate with 10-15 mm long peduncles; flowers 3-4 mm

across, pale yellowish-greenish; calyx 5-lobed, small; petals broadly orbicular, imbricate; stamens inserted in the disc near ovary. Drupes globose to ellipsoid, 3-3.5 x 2-3 cm, red; 1-4-seeded, embedded in mucilaginous pulp.

Fl. & Fr.: October-May.

Khaitum, Deb 31209.

2. **Salacia khasiana** Purkayastha in Indian For. 64: 276. 1938; Ramamurthy & Naithani in N.P. Singh *et al.*, Fl. India 5: 156. 2000.

Woody climbing shrubs. Leaves elliptic, oblong-lanceolate, 6-12 x 2.5-4 cm, base subacute, acuminate at apex, entire to recurved along margins, glabrous, coriaceous; lateral nerves 5-8 pairs; petioles 5-8 mm long. Flowers usually solitary to 3, arising from a tubercle in axil of leaves, sessile to subsessile, greenish; sepals 5, orbicular; petals 5, ca 1 mm long. Drupes (berry) oblong-ellipsoid or globose, 12-35 x 8-13 mm, 4-seeded.

Fl. & Fr.: April-October.

Valley near fort Langleh, 900-100 m, Gage 17, 154 (CAL).

3. **Salacia salacioides** (Roxb.) Rolla Rao & Hemadri in J. Bombay Nat. Hist. Soc. 67(92): 359. 1970; Ramamurthy & Naithani in N.P. Singh *et al.*, Fl. India 5: 162. 2000. *Johnia salacioides* Roxb. in Hort. Beng. 5: 1844 & Fl. Ind. 1: 168. 1820. *Salacia roxburghii* Wallich *ex* Wight & Arn. Prodr. 105. 1834; M. Lawson in Hook.f., Fl. Brit. India 1: 627. 1875; Kanjilal *et al.*, Fl. Assam 1: 275. 1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 32. 1987.

Lofty woody climbers, all parts glabrous. Leaves elliptic-oblong or oblong-lanceolate, 9-15 x 4-6 cm, base acute or subacute, caudate-acuminate at apex, entire or nearly so along margins, glabrous, coriaceous; lateral nerves 6-8 pairs; petioles 6-10 mm long. Fascicles axillary, 3-6-flowered, arising from a bracteate globular tubercle; flowers ca 2 mm across, yellow-green or greenish-orange; sepals orbicular, ciliolate; petals rotundate, ca 1 mm long, sessile. Drupes globose, 3-5 cm across, pinkish-red, 2-3-celled with a solitary large seed in each cell; pulp edible.

Fl. & Fr.: March-October.

Common in evergreen tropical forests. Theiriat, *Deb* 31329.

RHAMNACEAE

(K.P. Singh)

- 1a. Leaves palmately 3-veined at base:
 - 2a. Branches with stipular spines; fruit with 1 pyrene ... 5. *Ziziphus*
 - 2b. Branches without stipular spines; fruits with 3 pyrene ... 2. *Hovenia*
- 1b. Leaves pinnately veined:
 - 3a. Trees or erect shrubs; fruits not winged ... 3. *Rhamnus*
 - 3b. Climbers; fruits winged or compressed like wing at the apex:
 - 4a. Branchlets with tendrils; disc with linear processes; ovary inferior, fruits indehiscent, 3-winged ... 1. *Gouania*
 - 4b. Branchlets without tendrils; disc without processes; ovary superior or half inferior; fruits dehiscent, compressed like a wing above the seed ... 4. *Smythea*

1. GOUANIA Jacq.

- 1a. Leaves usually entire along margins; flowers sessile, densely pubescent ... 2. *G. microcarpa*
- 1b. Leaves serrate along margins; flowers shortly pedicellate, glabrous ... 1. *G. leptostachya*

1. *Gouania leptostachya* DC., Prodr. 2:40. 1825; Lawson in Hook. f., Fl. Brit. India 1: 643. 1875; Kanjilal *et al.*, Fl. Assam 1: 286, 1936; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. India 5: 174. 2000. *Gouania tiliaefolia* Roxb., Pl. Cor. 67, t. 98. 1798 & Fl. India 2: 417. 1824, non Lam. 1789, nec Rottb. ex DC. 1825; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 32. 1987.

Unarmed, scandent shrubs with circinate, axillary or supra axillary tendrils; branches glabrous. Leaves alternate, ovate to oblong-ovate, 5-13 x 3-6 cm, base rounded to subcordate or cordate, acuminate at apex, crenate or serrate along the margins, glabrous, sparingly sprinkled with short appressed hairs along the nerves beneath; lateral nerves 5-6 pairs;

petioles 1.5-3 cm long. Racemes 10-30 cm long, axillary and terminal, simple or branched, slightly puberulous; flowers 3-4 mm across, greenish-white; calyx lobes glabrous; petals 1-2 mm long, hooded, inserted below the margins of the disc; disc 5-angled; ovary immersed in the disc; style 3-cleft up to middle. Capsules 7-10 mm across, coriaceous with 3 rounded short wings, 3-celled, glabrous, splitting into 3, 1-seeded indehiscent cocci; seeds \pm compressed, shining, ca 5 mm long.

Fl. & Fr.: July-December.

Common around village forests and along the streams. Vanjoh-Kapleya, Leslie 289 (CAL); Mamit, Deb 3456; Aizawl, Deb 30826; Tlabung K.P. Singh 94255; Near Hliapui, K.P. Singh 94331; North Vanlaiphai, D.K. Singh 93058.

2. *Gouania microcarpa* DC., Prodr. 2: 40, 1825; M. Lawson in Hook.f., Fl. Brit. India, 1: 643, 1875; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 32, 1987; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. India 5: 176, 2000.

Climbing, tendriled shrubs; tendrils axillary or supra-axillary. Leaves elliptic-ovate, 5-8 x 2-3.5 cm, base rounded to subcordate, acute at apex, entire or slightly serrate at margins, glabrous; lateral nerves 4-6 pairs; petioles ferruginous, 5-10 mm long. Racemes pubescent, axillary; flowers greenish-white, 4-5 mm across, sessile; calyx densely tomentose outside, ca 2 mm long; petals obovate-oblong, cucullate, 1-1.5 mm long; disc 5-lobed, glabrous, saucer-shaped. Capsules ca 5 x 8 mm, shortly 3-winged, glabrous, 3-angled, tipped by persistent style; seeds ca 5 x 4 mm.

Fl. & Fr.: June-May.

Scarce along the margins of evergreen forests. Taitaw, 700 m, Dutta 33211.

Uses : Fruits are edible.

2. HOVENIA Thunb.

Hovenia dulcis Thunb., Nov.-Gen. 8, 1781 & Fl. Jap. 101, 1784; M. Lawson in Hook. f., Fl. Brit. India 1: 640, 1875; Kanjilal *et al.*, Fl.

Assam 1: 282. 1936; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. India 5: 180. 2000. *Vai-Tang-Bawk* (Lushai). **Fig. 69.**

Medium, deciduous, unarmed trees, up to 30 m high; young shoots tomentose. Leaves simple, alternate, elliptic to suborbicular-ovate, 7-13 x 5-7.5 cm, rounded or acute at base, long acuminate at apex, serrate along margins, glabrescent on both surfaces, hairy beneath on veins, 3-nerved from base; petioles 2-2.5 cm long; stipules lanceolate, ca 3 mm long. Cymes axillary and terminal, dichotomously branched, 3-5 cm long; flowers bisexual, white to yellowish, ca 6 mm across; calyx 5-fid, white, tube funnel-shaped; petals 5, clawed; disc lining the calyx tube. Drupes spherical, 3-celled, 7-8 mm across, nearly dry; seeds 3, orbicular, 3-4 mm across, lilac.

Fl. & Fr.: April-October.

Scarce, in primary forests. Mulapheng, ca 1300 m, *M. Sawmliana* 101729.

3. RHAMNUS L.

Rhamnus nepalensis (Wallich) M. Lawson in Hook.f., Fl. Brit. India 1: 640. 1875, '*nipalensis*'; Kanjilal *et al.*, Fl. Assam 1: 285. 1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 32. 1987; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. India 5: 187. 2000. *Ceanothus nepalensis* Wallich in Roxb., Fl. India 2: 375. 1824.

Bushy shrubs with straggling, slender branches. Leaves oblong, elliptic or ovate, 3-12 x 2-5.5 cm, base \pm rounded, abruptly acuminate at apex, serrulate along margins, glabrous; lateral nerves 5-7 pairs; petioles 8-15 mm long. Fascicles of flowers in simple or paniced pubescent racemes; panicles 2-5 cm long, bracts leaf like; flowers 5-merous, ca 4 mm across, white; calyx persistent, accrescent; petals oblong. Drupes baccate, obovoid, 5-7 mm across, dark-red, turning black when fully ripe, seated on the reflexed calyx; 2-4-seeded; seeds obovoid, 2-3 mm long, blackish.

Fl. & Fr.: June-February.

Scarce, in humid forests as well as in open places along the road side. Aizawl protected forests, Deb 30532 (CAL); Champhai, K.P. Singh 94529; North Vanlaiphai, D.K. Singh; Rulchawm, *M. Sawmliana* 99242.

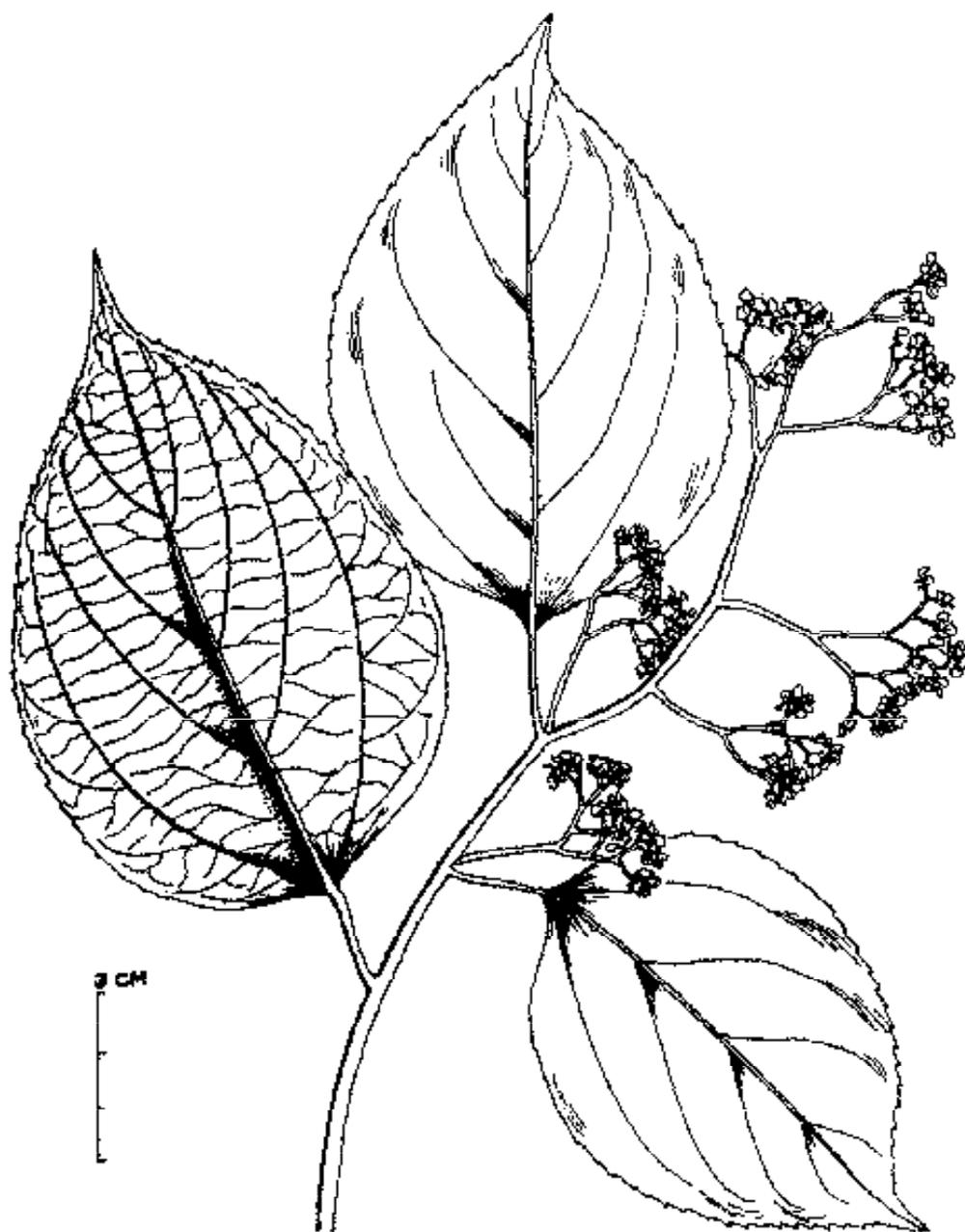


Fig. 69: *Hovenia dulcis* Thunb.

4. *SMYTHEA* Seem ex A. Gray

Smythea macrocarpa Hemsley in Hook., Ic. Pl. 16. t. 1558. 1886-87; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 32. 1987; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. India 5: 214. 2000. *Smythea calpicarpa sensu* Kanjilal *et al.*, Fl. Assam 1: 278. 1936.

Large, woody climbers with cirrhiform rusty tomentose branchlets. Leaves lanceolate, oblong-lanceolate, ovate-lanceolate, 6-12 x 2-4 cm, those on flowering branches smaller in size, base unsymmetrical, rounded on inner half, subacute on the outer, acuminate at apex, serrate along margins, glabrous with age; lateral nerves 6-7 pairs; petioles 3-4 mm long. Inflorescence 10-15-flowered fascicles, axillary; calyx 5-lobed, tube persistent; petals truncate. Capsules samaroid, obovate or elliptic-oblong, 5-6 x 1-1.5 cm, 1-celled, adnate at base to calyx tube, compressed above, wing glabrous mucronate at tips, base narrowed, grey-brown, pubescent, strongly ribbed with parallel nerves, dehiscing along the middle into 2 valves; 1-seeded; seeds black.

Fl. & Fr.: February-December.

Theiriat, Deb 31281 (CAL).

5. *ZIZIPHUS* Tourn ex Miller

- 1a. Leaves ± glabrous beneath except on nerves;
flowers in pedunculate cymes 1. *Z. incurva*
- 1b. Leaves tomentose beneath;
flowers fascicled in sessile cymes:
- 2a. Scrambling shrubs; leaf apex acuminate;
drupes black when ripe, 5-8 mm across;
pyrenes 1-celled ... 3. *Z. oenoptia*
- 2b. Trees or erect shrubs; leaf apex rounded;
drupes orange-red when ripe, 1.5-2 cm long;
pyrenes 2-celled ... 2. *Z. mauritiana*

1. *Ziziphus incurva* Roxb., Fl. Ind. 2: 364. 1824; M. Lawson in Hook.f., Fl. Brit. India 1: 635. 1875; Kanjilal *et al.*, Fl. Assam 1: 280. 1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 32. 1987; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. India 5: 230. 2000.

Shrubs or small trees with young parts adpressed pubescent, unarmed. Leaves ovate-oblong, 3-8.5 x 2-4 cm, base oblique, strongly 3-nerved, acuminate at apex, serrate along margins, coriaceous, glabrous above, sparsely pilose along the main nerves beneath; stipular spines absent in mature plants, solitary or in pairs on young plants, villous; petioles 6-15 mm long. Cymes up to 2.5 cm long, peduncled, pubescent, 5-10-flowered; flowers 3-5 mm across, greenish. Calyx lobes ca 2 mm long, hairy outside; petals subcucullate; disc 10-lobed with a pit at base of each lobe. Drupes ellipsoid, ca 1 x 0.6 cm; pyrenes usually unequally 2-celled; seeds compressed black.

Fl. & Fr.: May-October.

Fairly common. Sialsuk, *Deb* 30735 (CAL); Mualpheng, *M. Sawmliana* 95572.

2. *Ziziphus mauritiana* Lam., *Encycl.* 3: 319. 1789; Bhandari & Bhansali in N.P. Singh *et al.*, *Fl. India* 5: 233. 2000. *Ziziphus jujuba* (L.) Gaertn., *Fruct* 1: 203. 1788, *non* Miller, 1768; M. Lawson in Hook. *f.*, *Fl. Brit. India* 1: 632. 1875; Kanjilal *et al.*, *Fl. Assam* 1: 279. 1936. *Bawrai*, *Kawrsinhlo* (Lushai); *Borai* (Chakma).

Small trees, up to 10 m tall with young parts rusty tomentose. Leaves variable, alternate, elliptic-oblong or suborbicular, 1.5-7 x 1-3.5 cm, base obliquely rounded, 3-nerved, rounded to subacute at apex, crenate to entire along margins, glabrous and shining above, densely grey or brownish tomentose beneath; stipular spines solitary or in pairs, usually straight; petioles 3-10 mm long. Cymes 1.5-2 cm across, sessile or sub sessile, axillary, densely tomentose; flowers 3-4 mm across, greenish-yellow; calyx lobes 1-2 mm long, densely tomentose outside, glabrous inside; petals subspathulate, ca 1 mm long, concave; disc 10-lobed. Drupes obovoid-globose, 1.5-2 cm long, orange-red when ripe, pulpy, acidic; pyrenes solitary; 2-celled; seeds 1 or 2, compressed.

Fl. & Fr.: September-February.

Common, in deciduous forests at lower elevations; also cultivated in and around villages. Phairuang, *K.P. Singh* 94208; Tablabagh, *K.P. Singh* 94269.

Uss : Fruits are edible.

3. *Ziziphus oenoplia* (L.) Miller, Gard. Dict. ed. 8: 3, 1768; M. Lawson in Hook. f., Fl. Brit. India 1: 634 1875; Kanjilal *et al.*, Fl. Assam 1: 280, 1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 32, 1987; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. India 5: 236, 2000. *Rhamnus oenoplia* L., Sp. Pl. 194, 1753. *Hlingkhang* (Lushai).

Bushy, straggling or climbing, thorny shrubs with sarmentose branches. Leaves obliquely ovate or elliptic, 3.5-5.5 x 2-3 cm, base oblique, 3-4-nerved, acuminate at apex, finally serrulate or subentire to entire along margins, glabrous above and with appressed rufous hairy beneath on nerves; petioles 2-3 mm long; stipular spines solitary, recurved. Cymes up to 2 cm across, axillary, almost sessile or shortly peduncled (up to 3 mm); flowers greenish-yellow, 2-3 mm, across; calyx 1-2 mm long, pubescent outside; lobes ovate-acuminate; petals hooded, shorter than calyx; disc glabrous, 10-lobed. Drupes 5-8 mm across, ovoid-globose, black when ripe, edible; pyrenes usually 1 or rarely 2-celled, tubercled; seeds 1-2, 1 cm long.

Fl. & Fr.: August-February.

Common, along the roadside forests, shrubberies etc. Mizo hills, Leslie 38 (CAL); Bunglang, 75 m, Deb 31429; Mizo hills, Dutta 33310 (CAL); Tuipui, K.P. Singh 94025; Deb 31429; Tut, on way to Mamit, 350 m, D.K. Singh 99006.

VITACEAE

(K.P. Singh)

- 1a. Petals 5, connate into a deciduous cap at the top ... 7. *Vitis*
- 1b. Petals 4-5, free :
- 2a. Inflorescence cirriferous (tendrils bearing) ... 1. *Ampelocissus*
- 2b. Inflorescence not cirriferous :
- 3a. Flowers mostly tetramerous :
- 4a. Flowers unisexual; stigma 4-lobed ... 6. *Tetrastigma*
- 4b. Flowers bisexual; stigma not lobed
- 5a. Leaves simple; berries 1-seeded; seeds ellipsoid or pyriform ... 4. *Cissus*

- 3b. Leaves pedately 5-foliolate; berries 2-4-seeded; seeds hemispherical ...3. *Cayratia*
- 3b. Flowers mostly pentamerous:
- 6a. Leaves pinnate; disc cupular, sharply set off from the ovary ... 2. *Ampelopsis*
- 6b. Leaves trifoliolate; disc adnate to the ovary, hardly to be observed ... 5. *Parthenocissus*

1. AMPELOCISSUS Planchon

- 1a. Weak creepers; young shoots, petioles and peduncles glabrous; leaves simple, glabrous beneath; flowers umbellately cymose ...2. *A. sikkimensis*
- 1b. Large woody climbers; young shoots, petioles and peduncles glandular hairy; leaves usually 3-lobed, densely brown tomentose beneath; flowers paniculately cymose ... 1. *A. barbata*

1. *Ampelocissus barbata* (Wallich) Planchon in DC., Monogr. Phan. 5: 375, 1887; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 32, 1937, Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 251, 2000. *Vitis barbata* Wallich in Roxb., Fl. Ind. 2: 478, 1824; M. Lawson in Hook. f., Fl. Brit. India 1: 651, 1875; Kanjilal *et al.*, Fl. Assam 1: 292, 1936.

Large woody climbers; branches terete, hollow, pubescent to tomentose. Leaves broadly ovate-cordate, 7-16 x 12-18 cm, deeply cordate at base, acute or acuminate at apex, irregularly sinuate-toothed along margins, not or obsoletely 3-lobed, glabrate above, usually densely brown-tomentose beneath; base strongly 5-nerved; petioles 4-8 cm long, woolly-tomentose, glandular, intermixed with spreading blackish stiff hairs; tendrils leaf opposed, woolly, beset with long stiff hairs, 2-3-cleft, one brach transformed in a elongate, 6-10 cm long, laxly ovate panicles of cymes. Peduncles glandular, capitate hairy; flowers shortly pedicelled, ca 1.5 mm long, pentamerous; style absent. Berries globose to elliptic, 8-12 x 5-8 mm, 1-2-seeded, fleshy, seeds ca 6 x 2 mm, laterally compressed, grooved on back.

Fl. & Fr.: May-September.

Common, in low level forests. Saiha, Dutta 33820.

2. *Ampelocissus sikkimensis* (M. Lawson) Planchon in J. Vigne Amer. 8: 375. 1884 & in DC., Monogr. Phan. 5: 371. 1887; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 32. 1987; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 259. 2000. *Vitis sikkimensis* M. Lawson in Hook.f., Fl. Brit. India 1: 650. 1875; Kanjilal *et al.*, Fl. Assam 1: 294. 1936.

Plants with weak trailing stems; young parts glabrous, terete, glaucous. Leaves simple, orbicular-ovate with reddish tinge, 7-27 x 6-27 cm, base rounded-cordate, abruptly acuminate at apex, cuspidately denticulate along margins, membranous, glabrous; petioles 5-13 cm long; tendrils branched. Panicles umbellately cymose; flowers 1-2 mm long, pentamerous, greenish in buds; calyx 5-notched petals free, ca 1 mm long, oblong-ovate. Berries obovoid, 4-6 mm long, 2-4-seeded; seeds ellipsoid-obovoid ca 5 x 2 mm with a spatulate tubercle on back, one end pointed.

Fl. & Fr.: July-October.

Scarce, in moist places of evergreen forests. Sairep-Tawipui, Dutta 33654.

2. AMPELOPSIS A. Rich. ex Michaux

Ampelopsis rubifolia (Wallich) Planchon in DC., Monogr. Phan. 5: 463. 1887; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 32. 1987; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 265. 2000. *Vitis rubifolia* Wallich in Roxb., Fl. Ind. 2: 480. 1824; M. Lawson in Hook.f., Fl. Brit. India 1: 663. 1875.

Fig. 70.

Climbing shrubs with branches and young parts pubescent. Leaves imparipinnate, 15-21 cm long; petioles 2-4 cm long; leaflets oblong or ovate, 7-11, 4.5-8 x 2.5-4 cm, base subcordate, acuminate to acute at apex, sharply serrate along margins, glabrous above, minutely pubescent beneath; lateral nerves 6-8 pairs; petiolules 6-8 mm long; tendrils leaf opposed, bifid. Cymes corymbose, dichotomous, slightly villous; flowers 1-2 mm long, green, pentamerous, umbellate, fragrant; calyx minute, cupular; petals ca 1 mm long; disc cupular at base, adnate to the ovary, irregularly lobed. Berries red, turning black, 2-4-seeded, ca 6 mm across; seeds obovoid with a convex back.

Fl. & Fr.: June-October.

Kolasib, Godfrey 546 (CAL); Lungleh, Dutta 33376.

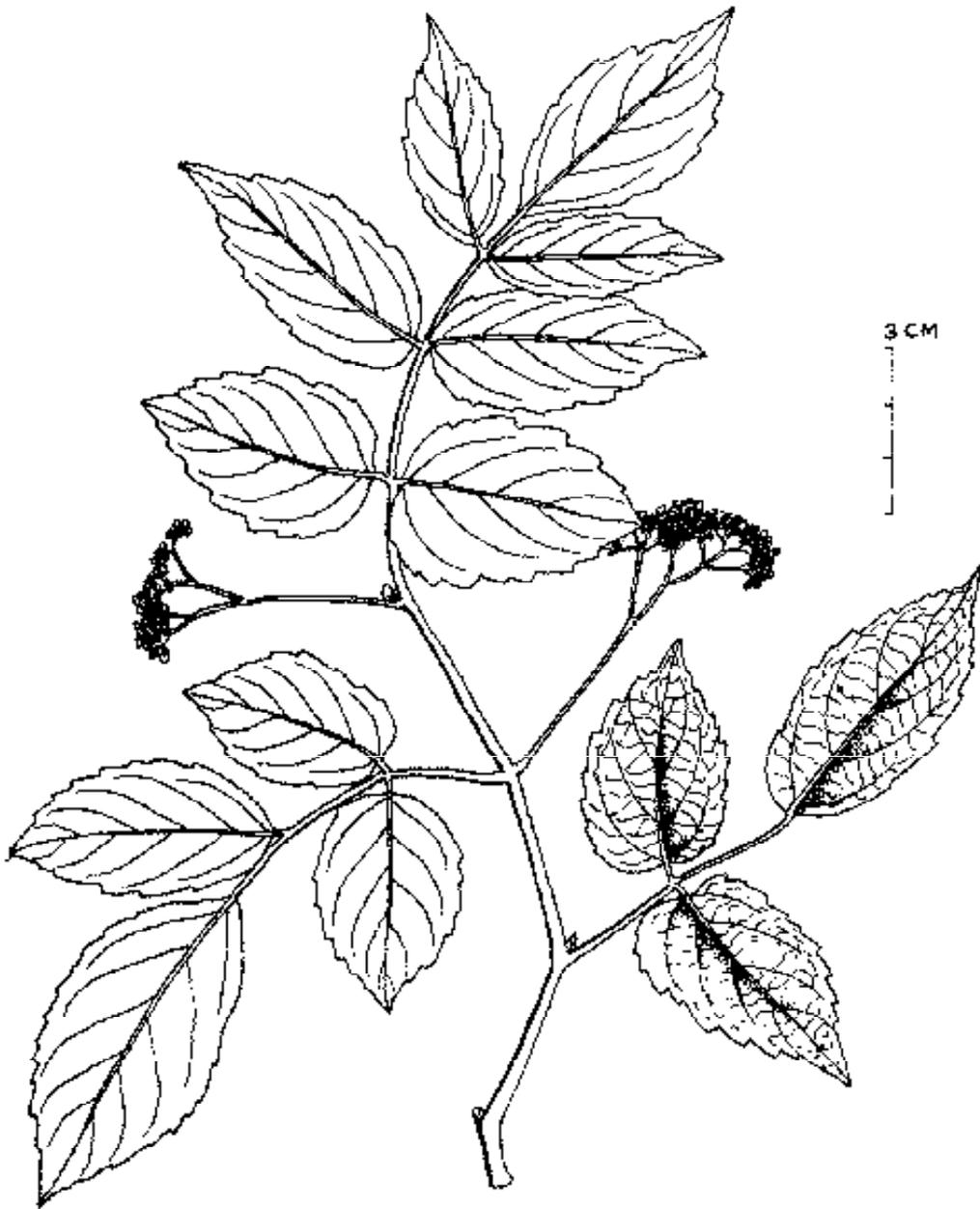


Fig. 70: *Ampelopsis rubifolia* (Wallich) Planchon

3. CAYRATIA A.L. Juss.

Cayratia japonica (Thunb.) Gagnepain in Notul. Syst. (Paris) 1: 349, 1911; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 269, 2000. *Vitis japonica* Thunb., Fl. Jap. 104, 1784; Kanjilal *et al.*, Fl. Assam 1: 301, 1936. *Vitis mollis* Wallich [Cat. 206, no. 6025, (1831-1832) *nom. nud.*] ex M. Lawson in Hook.f., Fl. Brit. India 1: 660, 1875. *Cissus japonica* var. *mollis* (Wallich) Planchon in DC., Monogr. Phan. 5: 562, 1887; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 87, 1938. *Cayratia japonica* (Thunb.) Gagnepain var. *mollis* (Wallich ex M. Lawson) Momiy in Hara Fl. E. Himal. 1: 199, 1966. Fig. 71.

Slender climbers with pubescent branchlets; tendrils slender, leaf opposed, simple or forked. Leaves pedately 5-foliolate; petioles 4-8 cm long; terminal leaflets larger than laterals; leaflets ovate to broadly lanceolate, elliptic-lanceolate or oblong-obovate, 3.5-9 x 2-5 cm, base acute or cuneate, oblique, acute to acuminate at apex, crenate-serrate along margins, glabrous at upper side, softly pubescent specially on the nerves beneath; lateral nerves 4-7 pairs; petiolules 5-15 mm long. Cymes 4-15 cm long, axillary, subcorymbose; dichotomously branched, pubescent; flowers 2-3 mm across, green, bisexual, tetramerous; calyx and petals pubescent outside. Berries 5-8 mm across, turbinate, globose, 3-4-seeded, white, turning purple; seeds trigonous, face ridged, back convex, rugose, tubercled.

Fl. & Fr.: April-June.

Common, in evergreen forests in shady places. 15th mile from Lungleh, Gage 140 (CAL); Demagiri; Gage 219 (CAL); Kolasib-Chumliang, Dutta 33289; Kolasib-Bhairavi road, K.P. Singh 93198; Sairep, K.P. Singh 96706; Dampa, D.K. Singh 99105.

4. CISSUS L.

1a. Leaves tomentose beneath :

2a. Trichomes on lower side of leaves 2-armed;
ovary glabrous at summit

... 2. *C. aristata*

2b. Trichomes on lower side of leaves simple;
ovary pubescent at summit

... 1. *C. adnata*

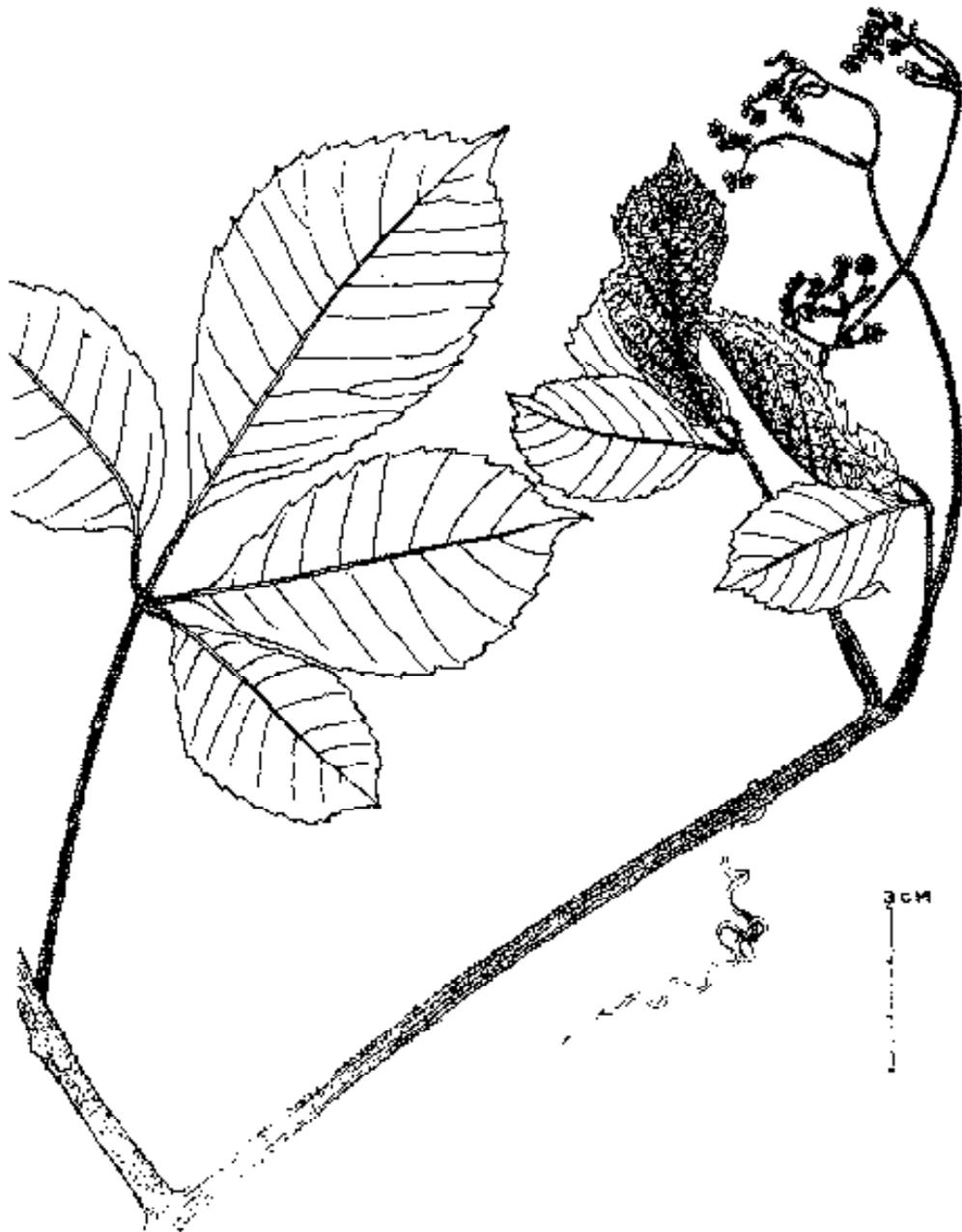


Fig. 71: *Cayratia japonica* (Thunb.) Gagnepain

- 1b. Leaves glabrous or nearly so :
- 3a. Young shoots glaucous or mealy white;
calyx equal sided5. *C. repens*
 - 3b. Young shoots not mealy white,
calyx unequal sided
 - 4a. Slender climbers; tendrils forked, leaves variegated4. *C. discolor*
 - 4b. Woody climbers, tendrils simple, leaves not variegated3. *C. ussamica*

1. **Cissus adnata** Roxb., Fl. Ind. 1: 423. 1820; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 87. 1938; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 279. 2000. *Vitis adnata* Wallich [Cat. 205, no. 5998 (1831-1832 *nom. nud.*)] *ex* Wight & Arn. Prodr. 1: 126. 1834; M. Lawson in Hook. f., Fl. Brit. India 1: 649. 1875; Kanjilal *et al.*, Fl. Assam 1: 291. 1936. Fig. 72.

Slender, climbing shrubs with rusty, pubescent branches; tendrils leaf opposed, bifid, hard. Leaves simple, ovate to orbicular, 6-10 x 3-8 cm, base cordate, acute to acuminate at apex, bristly-serrate along margins, glabrescent above, rusty-tomentose beneath; basal nerves 3-5; lateral nerves 4-6 pairs; petioles 2-5 cm long. Cymes axillary, drooping, umbelliform; peduncles 2-7 cm long; flowers 3-4 mm across, greenish-yellow, tetramerous; sepals and petals pubescent out side. Berries obovoid, 6-8 mm across, blue-black, smooth, 1-seeded; seeds obliquely pyriform, ca 6 x 4 mm.

Fl. & Fr.: June-December.

Scarce, in shady forests. Demagiri, 115 m, Gage 220, (CAL); *s.loc.*, Dutta 33252; Kolasib-Bukpui road, K.P. Singh 93026.

2. **Cissus aristata** Blume, Bijdr. 183. 1825; Kanjilal *et al.*, Fl. Assam 1: 291. 1936; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 280. 2000. *Vitis adnata auct. non* (Roxb.) Wallich; Wight & Arn., Prodr. 126. 1834.

Climbing shrubs with tomentose woody branches; tendrils branched. Leaves ovate, 5-12 x 4-10 cm, base truncate to cordate, acuminate at apex, bristly serrate along margins, glabrous to hairy above, arachnoid hairy beneath; petioles 2-8 cm long, pubescent. Cymes umbellate, 2-6 cm long.

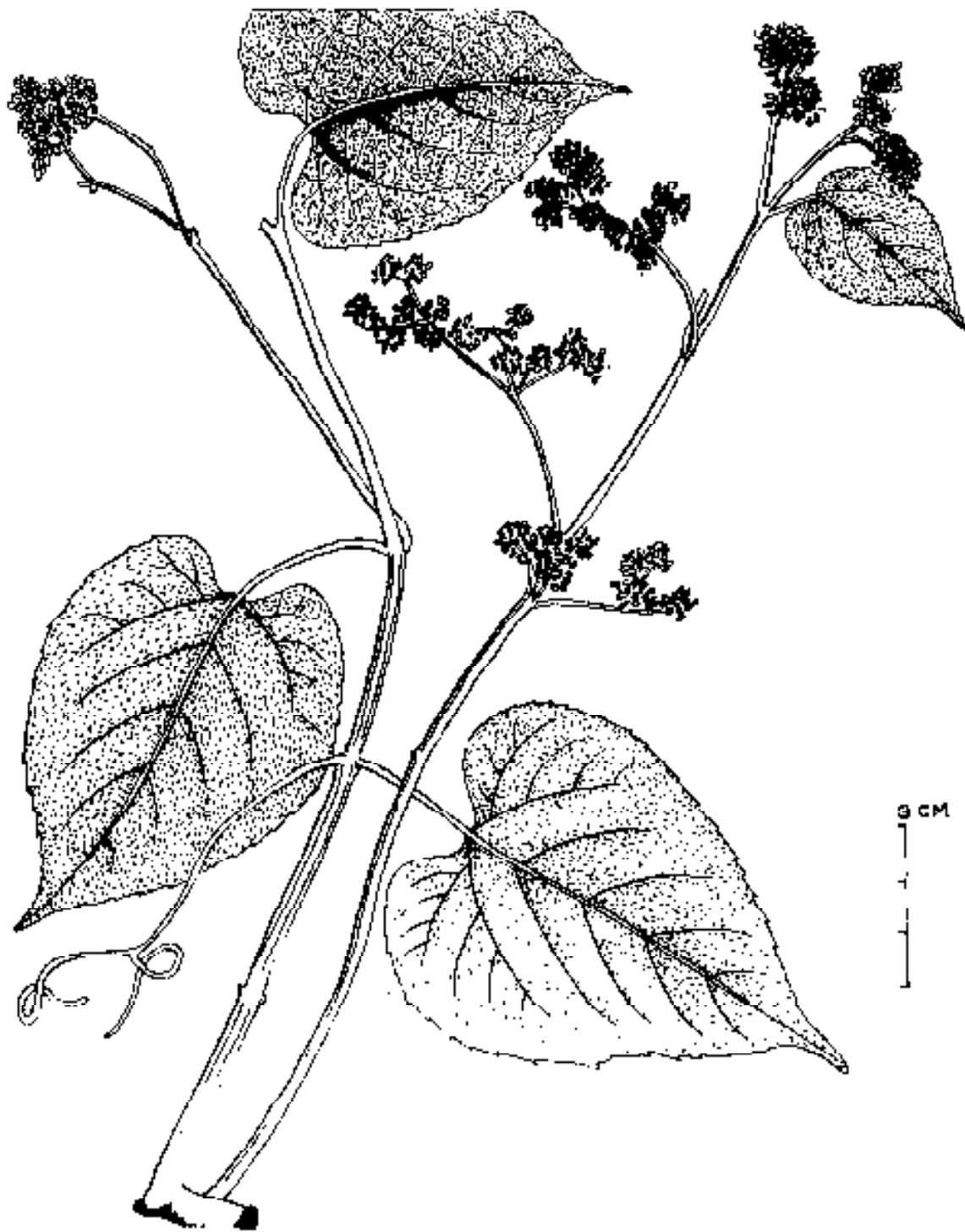


Fig. 72: *Cissus adnata* Roxb.

axillary; flowers *ca* 1.5 mm across, tetramerous; calyx cupular, hairy; petals hooded, oblong-ovate, pubescent. Berries ob-ellipsoid, *ca* 5 mm across; 1-seeded; seeds oblique at base, obovoid, *ca* 5 mm long.

Fl. & Fr.: July-January.

Recorded on the basis of Shetty & P. Singh (*l.c.*).

3. *Cissus assamica* (M. Lawson) Craib. in Kew Bull. 31: 1911; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 282. 2000. *Vitis assamica* M. Lawson in Hook.f., Fl. Brit. India 1: 648. 1875; Kanjilal *et al.*, Fl. Assam 1: 291. 1936.

Woody climbers, glabrous; tendrils simple, hard. Leaves simple, ovate-orbicular to lanceolate, 6-12 x 3.5-8 cm, base cordate, bluntly acuminate at apex, bristly-serrate along margins, subcoriaceous, glabrous, strongly nerved beneath; basal nerves 5; lateral nerves 5-7 pairs; petioles 2-5 cm long. Cymes in axillary compound umbels; peduncles 2-4 cm long; flowers 3-4 mm across, greenish-yellow, tetramerous; sepals and petals glabrous. Berries obovoid-turbinate, 5-7 mm across, blue, turning black, 1-seeded; seeds pyriform, *ca* 5 x 4 mm, smooth.

Fl. & Fr.: July-November.

Scarce, in shady moist forests. Thenzawl-Buangpui road, K.P. Singh 93834; Tuipui, K.P. Singh 94021.

4. *Cissus discolor* Blume, Cat. Gew. Bizg. 39. 1823 & Bijdr. 1: 181. 1825; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 282. 2000. *Vitis discolor* (Blume) Dalz. in Hook. Kew. J. Bot. 2: 39. 1850; M. Lawson in Hook.f., Fl. Brit. India 1: 647. 1875; Kanjilal *et al.*, Fl. Assam 1: 290. 1936. *Cissus javana* DC., Prodr. 1: 628. 1824; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 32. 1987. Fig. 73.

Slender climbers with a hard base and subangular, glabrous, red branches; tendrils forked. Leaves ovate-lanceolate, oblique, 6-14 x 3-7.5 cm, base cordate or subtruncate, acute to acuminate at apex, bristly-crenate along margins, membranous, glabrous with white blotches on upper surface, purplish beneath; basal nerves 5-7; lateral nerves 3-4 pairs; petioles 1.5-3 cm long; stipules oblong. Cymes compound umbellate, leaf opposed;

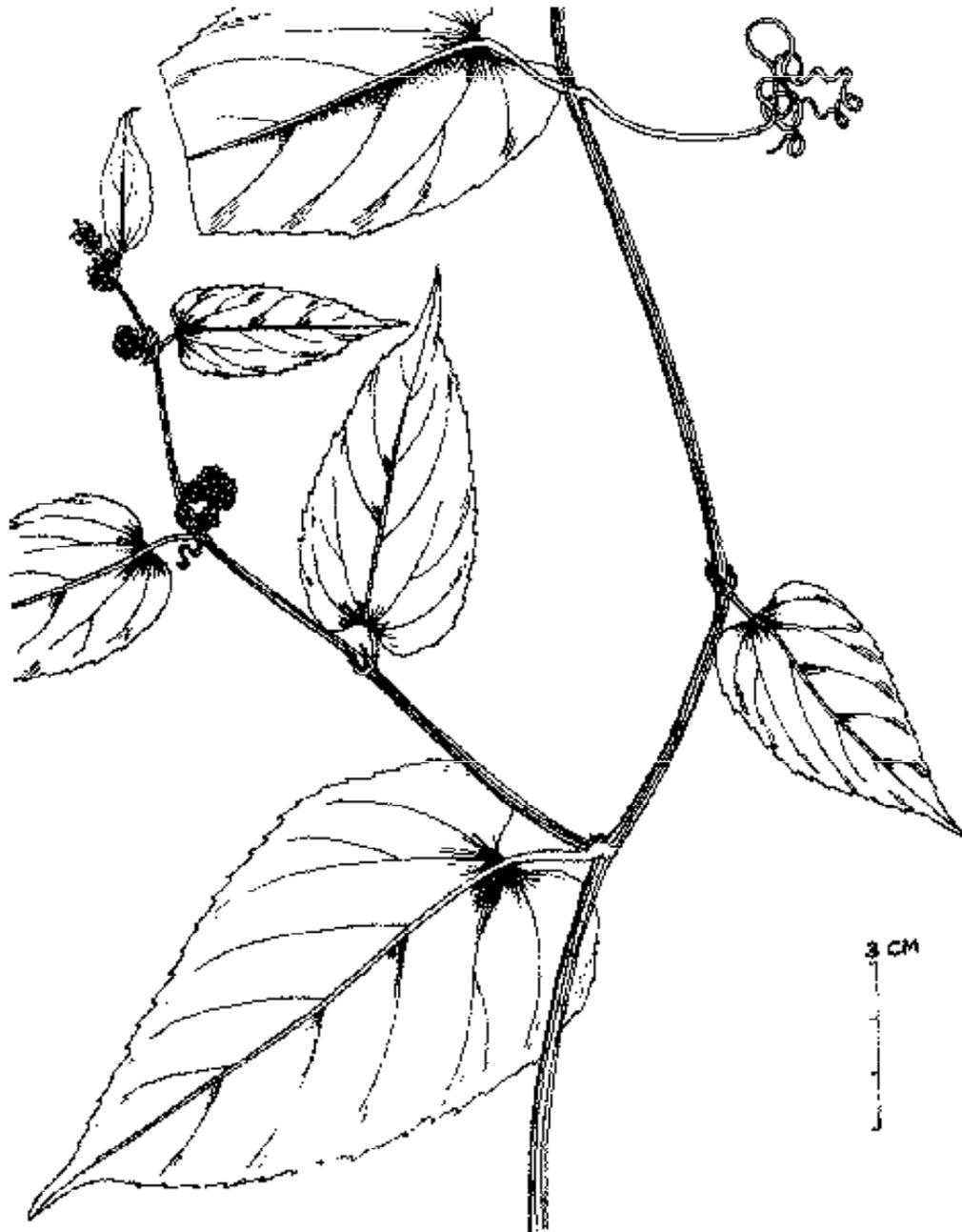


Fig. 73: *Cissus discolor* Blume

peduncles 2-3 cm long; flowers 3-4 mm across, greenish-yellow, tetramerous; calyx cupular, fleshy; petals oblong, glabrous. Berries obovoid, 5-7 mm across, red, turning to black, 1-seeded; seeds globose-pyriform, ca 4 x 3 mm.

Fl. & Fr.: May-November.

Common, in shady places. Tepaimukh, *Kanjilal* 4763; Sairang, 670 m, *Deb* 30588; Hauraung, 670 m, *Dutta* 31393; Taitaw, 700 m, *Dutta* 33234; Kolasib-Bhairavi road, *K.P. Singh* 93183; Near Rawpui, *K.P. Singh* 93983; Phaileng, *D.K. Singh* 98973; Zotethlang, *K.P. Singh* 94591.

5. *Cissus repens* Lam., *Encycl. Meth. Bot.* 1: 31, 1783; *Deb & Dutta* in *J. Econ. Tax. Bot.* 10(1): 32, 1987; *Shetty & P. Singh* in *N.P. Singh et al.*, *Fl. India* 5: 290, 2000. *Vitis repens* (Lam.) *Wight & Arn.* in *Wight, Cat.* 58, 1833, *M. Lawson* in *Hook. f.*, *Fl. Brit. India* 1: 646, 1875; *Kanjilal et al.*, *Fl. Assam* 1: 290, 1936.

Spreading, climbing shrubs, glabrous; young shoots covered with white bloom; tendrils fleshy, forked. Leaves simple, ovate to triangular, 6-10.5 x 3-8.5 cm, base broadly cordate, acute at apex, bristly dentate along margins, membranous, glabrous; basal nerves 5-7; lateral nerves 3-4 pairs; petioles 4-7 cm long. Umbels compound, axillary; peduncles 3-6 cm long; flowers 3-4 mm across, greenish-red, tetramerous; calyx truncate; petals ovate. Berries globose-ellipsoid, 3-4 mm, red, turning black when ripe, 1-seeded; seeds globose, pyriform, ca 5 x 3 mm.

Fl. & Fr.: April-January.

Scarce, in moist places. Donkoma, Pangsai, *Leslie* 386 (CAL); Sairang, *Godfrey* 514 (CAL); Saiha, *Dutta* 33826; Kawichaw, 600 m, *K.P. Singh* 92829.

5. PARTHENOCISSUS Planchon

Parthenocissus semicordata (Wallich) *Planchon* in *DC.*, *Monogr. Phan.* 5: 451, 1887; *Deb & Dutta* in *J. Econ. Tax. Bot.* 10(1): 32, 1937. *Shetty & P. Singh* in *N.P. Singh et al.*, *Fl. India* 5: 302, 2000. *Vitis semicordata* *Wallich* in *Roxb.*, *Fl. Ind.* 2: 481, 1824; *Kanjilal et al.*, *Fl.*

Assam 1: 296. 1936. *Vitis himalayana* (Royle) Brandis var. *semicordata* (Wallich) M. Lawson in Hook.f., Fl. Brit. India 1: 656. 1875.

Large, woody, climbing shrubs; tendrils absent or sometimes present then branched. Leaves 3-foliolate; petioles 5-11 cm long, sparsely pubescent; leaflets ovate, obovate or rhomboid, 8-12.5 x 3.5-7 cm, terminal more longer than laterals, base cuneate in terminal leaflets, but in laterals very oblique, outer half rounded or semicordate, inner half acute, abruptly acuminate at apex, sharply serrate along margins, shining glabrous above, lighter colour and often pubescent along the midrib and nerves beneath; petiolules 8-15 mm long; lateral nerves 6-8 pairs. Cymes 6-8 cm long, dichotomously branched, leaf opposed or terminal; flowers *ca* 3 mm long, yellowish-green or reddish-brown, bisexual, tetramerous, or rarely pentamerous; calyx glabrous, angular, salver-shaped; petals oblong, glabrous with a conical hood. Berries globose, 7-8 mm across, black when ripe; 4-seeded; seeds black, *ca* 6 x 5 mm.

Fl. & Fr.: May-November.

Rather common, in evergreen forests in moist places. Lungleh, Prazer 1890, *s.num.* (CAL); Dutta 33371.

6. TETRASTIGMA (Miq.) Planchon

1a. Leaves digitately 3-5-(-6)-foliolate:

2a. Petals with a dorsal spur:

3a. Leaves 3-foliolate; petals *ca* 1 mm long;
ovary glabrous; berries globose ... 2. *T. bracteolatum*

3b. Leaves (3-) 5-foliolate; petals *ca* 2.5 mm long;
ovary pubescent; berries ellipsoid ... 6. *T. obovatum*

2b. Petals without a dorsal spur:

4a. Flowers rusty pubescent;
berries oblong-ellipsoid, less than 10 mm long ... 3. *T. campylocarpum*

4b. Flowers not rusty pubescent;
berries globose, more than 10 mm across:

5a. Leaves 3-foliolate; leaflets petiolulate ... 1. *T. angustifolium*

5b. Leaves 5-foliolate; leaflets almost sessile ... 7. *T. obtectum*

1b. Leaves petiolately 3-5-foliolate :

6a. Berries turbinate-globose ... 8. *T. tumieispermum*

6b. Berries globose-ovoid :

7a. Style present; stigma 4-rayed ... 4. *T. dubium*

7b. Style absent; stigma 4-lobed :

8a. Large lianas; branches thick;
tendrils simple ... 5. *T. leucosaphyllum*

8b. Weak climbers; branches slender;
tendrils forked at tips ... 9. *T. serrulatum*

1. ***Tetrastigma angustifolium*** (Roxb.) Planchon. in DC., Monogr. Phan. 5: 439. 1887; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 309. 2000; *Cissus angustifolia* Roxb., Fl. Ind. 1: 427. 1820; *Vitis angustifolia* (Roxb.) Wight, Ic. Pl. Ind. Or. 1: 9. t. 176. 1839; M. Lawson in Hook. f., Fl. Brit. India 1: 654. 1875; Kanjilal *et al.*, Fl. Assam 1: 297. 1936.

Slender, herbaceous climbers with flattened glabrous stems; tendrils simple, leaf opposed, slender. Leaves 3-foliolate, glabrous; petioles 2-7 cm long; leaflets elliptic-lanceolate, 5-12 x 2.5-4.5 cm, terminal larger than laterals, base obliquely rounded to acute, acute to acuminate at apex; distantly serrate along margins, glabrous above, puberulous on the nerves beneath; lateral nerves 5-7 pairs. Cymes axillary, densely corymbose, shortly peduncled; peduncles pubescent; flowers 2-3 mm across, greenish-yellow; calyx subtruncate; petals oblong, hooded, pubescent. Berries globose, 4-6 mm across, black when ripe, 2-4-seeded; seeds furrowed on each face, rugose on sides, ca 5 x 4 mm.

Fl. & Fr.: February-December.

Near Fort Lungleh, *Gage s.num.* (CAL); Aizawl, *Deka* 23463.

2. ***Tetrastigma bracteolatum*** (Wallich) Planchon in DC., Monogr. Phan. 5: 428. 1887; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 87. 1938; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 310. 2000. *Vitis bracteolata* Wallich in Roxb., Fl. India 2: 483. 1824; M. Lawson in Hook. f., Fl. Brit. India 1: 654. 1875. Kanjilal *et al.*, Fl. Assam 1: 296. 1936. *Hruithet* (Lushai).

Climbers; stems woody, glabrous; tendrils simple. Leaves 3-foliolate; petioles 5-7 cm long; leaflets ovate or ovate-lanceolate, 4-10.5 x 3.5-6 cm, base rounded or cuncate in terminal leaflets, oblique in laterals, acuminate at apex, cuspidate-serrate along margins, membranous, glabrous above, puberulous on nerves beneath; lateral nerves 5-10 pairs; petiolules 5-15 mm long. Cymes 6-10 cm long, axillary, pubescent, corymbose with divaricate ramifications; flowers *ca* 1 mm across, tetramerous, dioecious, whitish, pubescent outside; petals oblong-ovate with a dorsal sput at apex, *ca* 1 mm long; style absent; stigma 4-lobed. Berries globose, 5-7 cm across, black when ripe, 1-3-seeded; seeds \pm horizontally wrinkled, obovoid, *ca* 6 x 5 mm.

Fl. & Fr.: August-March.

S.loc., Parry s.num. (CAL); North Vanlaphai, D.K. Singh 93061.

3. *Tetrastigma campylocarpum* (Kurz) Planchon in DC., Monogr. Phan. 5: 437. 1887; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 311. 2000. *Vitis campylocarpa* Kurz in J. As. Soc. Bengal 41(2) : 302. 1872; M. Lawson in Hook.f., Fl. Brit. India 1:657. 1875; Kanjilal *et al.*, Fl. Assam 1: 297. 1934. *Bepui-rhui* (Lushai).

Large, fleshy climbers with terete stems; tendrils simple, leaf opposed, hard. Leaves digitately 3-6-foliolate, glabrous; petioles 6-10 cm long; leaflets elliptic, ovate or obovate, 4.5-10 x 2.5-5 cm, base oblique, acute; acuminate at apex, cuspidate-serrate along margins, coriaceous, glabrous; lateral nerves 4-8 pairs; petiolules 10-15 mm long. Cymes axillary, 5-7 cm long, dichotomously branched, subcorymbose, puberulous, shortly peduncled; flowers 3-4 mm across, tetramerous, dioecious; calyx cupular, rusty pubescent; petals incurved at apex; style absent; stigma 4-lobed. Berries oblong-ellipsoid, 10-5 x 6-7 mm, brown, smooth, usually 1-seeded; seeds cylindrical, striate, oblong-ellipsoid, 10-12 mm long.

Fl. & Fr.: December-May.

Tepuimukh, Kanjilal 4778 (CAL).

4. *Tetrastigma dubium* (M. Lawson) Planchon in DC., Monogr. Phan. 5: 437. 1887; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 1938; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 311. 2000. *Vitis dubia* M. Lawson in Hook.f., Fl. Brit. India 1: 661. 1875. *V. oxyphylla* Wallich

ex Prain, Bengal Pl. 337, 338, 1903; Kanjilal *et al.*, Fl. Assam 1: 299, 1936.

Climbing shrubs, glabrous; branches striate; tendrils leaf opposed, simple. Leaves pedately 3-5-foliolate; petioles 4-8 cm long; leaflets 5-10.5 x 2-6 cm, terminal larger, elliptic to ovate-lanceolate or oblanceolate, base rounded, oblique, bluntly long acuminate at apex, incise-serrate along margins, glabrous on both sides; petiolules 3-15 mm long; lateral nerves 7-10 pairs. Cymes 3-6 cm long, compact, axillary, subcorymbose to corymbose; flowers 2-3 mm across, pale to yellowish-green, tetramerous, polygamo-dioecious; style 4-rayed. Berries globose, 6-8 mm across, black when ripe, 1-2-seeded; seeds rugose, oblong-ellipsoid, ca 7 mm long.

Fl. & Fr.: February-May.

Common, in evergreen forests in shady places. Chinchip, 1500 m, Parry 225 (*vide* C.E.C. Fischer, *l.c.*); Ghutter moorth hills, Prazer *s.num.* (CAL); on the way to Bukpui, K.P. Singh 93025; Hnathial, K.P. Singh 96906.

5. ***Tetrastigma leucostaphylum*** (Dennst.) Alston ex Mabb. in Taxon, 26: 539, 1977; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 314, 2000. *Cissus leucostaphyla* Dennst in Schluss. Hort. Malab. 17, 19, 33, 1818. *C. lanceolaria* Roxb. in Fl. Ind. 1: 430, 1820, *nom. illegit.* *Vitis lanceolaria* Wallich ex Wight & Arn., Prodr. 128, 1834; M. Lawson in Hook.f., Fl. Brit. India 1: 660, 1875; Kanjilal *et al.*, Fl. Assam 1: 300, 1936; *Tetrastigma lanceolarium* Planchon in DC., Monogr. Phan. 5(2): 423, 1887, *nom. illegit.*; C.E.C. Fischer. in Rec. Bot. Surv. India 12(2): 87, 1938. *Thurpui* (Lushai).

Large climbers with flat woody stems; tendrils simple, leaf opposed, stout. Leaves pedately 5-(-7)-foliolate; petioles 5-12 cm long; leaflets ovate or lanceolate, 6.5-14 x 3-6.5 cm, terminal largest, base obliquely acute, acute to acuminate at apex, dentate-serrate along margins; coriaceous, glabrous; lateral nerves 8-10 pairs; petiolules 5-15 mm long. Cymes 4-7 cm across, axillary, subcorymbose; female cymes smaller than males; flowers 3-5 mm across, pale green, unisexual; calyx cupular, ciliate-pubescent at margins; petals ovate-oblong, pubescent; style absent. Berries globose, 1.5-2.5 cm across, smooth, brownish-red; seeds 1-2, subpyriform, 6-8 mm across, wrinkled, plano-convex.

Fl. & Fr.: February-September.

Common in evergreen forests in shady places. Valley in jungle, Fort Lungleh, 900-1010 m, *Gage* 8 (CAL); Mizo hills, *Dutta* 33436; Kolasib-Builang road, *K.P. Singh* 93145; Lallen, 850 m, *D.K. Singh* 98809.

Uses : Fruits are eaten by the local people.

6. *Tetrastigma obovatum* (M. Lawson) Gagnepain in Notul. Syst. 1: 266. 1910; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 315. 2000. *Vitis obovata* M. Lawson in Hook.f., Fl. Brit. India 1: 658. 1875, *nom. illegit. non Rafin.*, 1830; nec Baker 1857; Kanjilal *et al.*, Fl. Assam 1: 298. 1936. *Puarpeng* (Lushai).

Large climbers with flattened, pubescent stems; tendrils leaf opposed, simple. Leaves digitately (3)-5-foliolate; petioles 8-15 cm long, covered with brown hairs; leaflets obovate or elliptic, 7-16 x 5-10 cm, base acute to cuneate; acuminate at apex, crenate-serrate along margins, glabrous above, glandular-fulvous pubescent specially on the nerves beneath; lateral nerves 7-9 pairs; petiolules 1.5-2.5 cm long. Cymes umbellate, divaricately or trichotomously branched, subcorymbose, shortly peduncled; flowers 3-5 mm across, greenish-yellow; calyx cupular, 4-toothed, pubescent; petals hooded, pubescent. Berries ellipsoid-globose, 1.5-2 cm across, black, 1-3-seeded; seeds ellipsoid, 10-12 mm long, plano-convex.

Fl. & Fr.: January-November.

Scarce, in moist forests. Tuipang, 1200 m, *Parry* 472 (*vide* C.E.C. Fischer, 1938).

Uses : Fruits edible.

Note. The species was recorded as *Cayratia obovata* by C.E.C. Fischer, *l.c.* (1938), that is not a valid name.

7. *Tetrastigma obtectum* (Wallich *ex* M. Lawson) Planchon *ex* Franch. in Bull. Soc. Bot. France 33: 458. 1886; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 87. 1938; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 316. 2000. *Vitis obtecta* Wallich [Cat 206, no. 6026. (1831-1832), *nom. nud.*] *ex* M. Lawson in Hook.f., Fl. Brit. India 1: 657. 1875. *Remte* (Lushai).

Climbers; young branches slender and rusty-hirsute; tendrils short, branched, slender. Leaves digitately 5-foliolate; petioles 2.5-4 cm long; leaflets ovate, elliptic or obovate, 3-5 x 1.5-2.5 cm, laterals much smaller than the terminal, base oblique or acute, acuminate at apex, cuspidate-serrate along margins, almost sessile, glabrous; lateral nerves 5-8 pairs. Flowers in umbellate cymes, tetramerous, ca 2.5 mm long, unisexual; calyx cupular, ciliate at margins; petals oblong-ovate, ca 2 mm long, hooded; style absent. Berries globose, 1-seeded; seeds ca 7 mm long, rugose.

Fl. & Fr.: April-September.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

8. *Tetrastigma rumicispermum* (M. Lawson) Planchon in DC., *Monogr. Phan.* 5: 429. 1887; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 32. 1987; Shetty & P. Singh in N.P. Singh *et al.*, *Fl. India* 5: 318. 2000. *Vitis rumicisperma* M. Lawson in Hook. *f.*, *Fl. Brit. India* 1: 661. 1875; Kanjilal *et al.*, *Fl. Assam* 1: 301. 1936. **Fig. 74.**

Lianas with terete and warty stems; tendrils bifid. Leaves pedately 5-(3)-foliolate, glabrous; petioles 4-7 cm long; leaflets ovate-oblong to oblanceolate, 3-8 x 1.5-3 cm, base obliquely acute to cuneate, shortly acuminate at apex, sharply serrate at margins, glabrous; lateral nerves 8-10 pairs; petiolules 2-10 mm long. Cymes axillary and terminal, 8-10 cm long, subcorymbose; peduncles up to 5 cm long; flowers 3-4 mm across, pale green, tetramerous; calyx 4-lobed, cupular petals oblong, ca 2 mm long. Berries globose, 8-10 mm diam., turbinate, reddish-black, minutely tubercled below the middle, 1-4-seeded; seeds obovate, 5-7 mm long.

Fl. & Fr.: April-September.

Common, in evergreen forests. Tawitaw, Dutta 33238; Sairep, Dutta 33508; Thalthlang, Dutta 33967.

9. *Tetrastigma serrulatum* (Roxb.) Planchon in DC., *Monogr. Phan.* 5: 432. 1887; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 87. 1938; Shetty & P. Singh in N.P. Singh *et al.*, *Fl. India* 5: 319. 2000. *Cissus serrulata* Roxb., *Fl. Ind.* 1: 432. 1820. *Vitis capreolata* D. Don, *Prodr. Fl. Nep.* 188. 1825; M. Lawson in Hook. *f.*, *Fl. Brit. India* 1: 659. 1875;

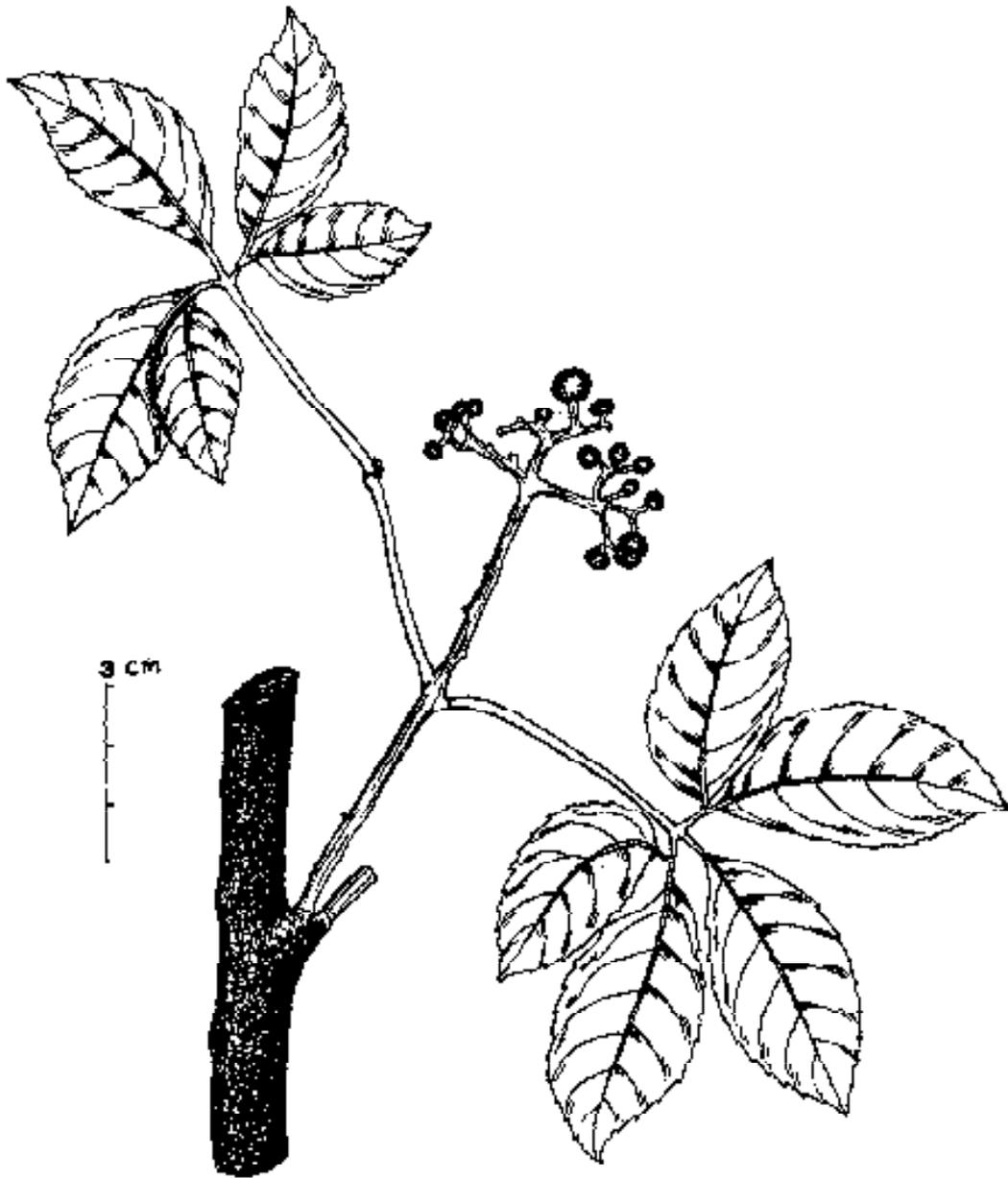


Fig.74: *Tetrastigma runcisperrum* (M. Lawson) Planchon

Kanjilal *et al.*, Fl. Assam 1: 299. 1936 (as *capriolata*). *Remte* (Lushai).

Fig. 75.

Wiry climbers, glabrous; tendrils often with adhesive discs, simple or forked. Leaves pedately 5-foliolate; petioles 2-6 cm long; leaflets rhomboid to obovate or lanceolate, 4-9.5 x 2-3.5 cm, terminal largest, base obliquely acute to cuneate, cuspidate-acuminate at apex, sharply serrate at margins, glabrous; lateral nerves 5-10 pairs; petiolules 2-13 mm long. Cymes terminal or axillary, 5-7 cm long, umbellate, glabrous; peduncles 1.5-3.5 cm long; flowers 4-5 mm across, green, tetramerous; calyx glabrous, truncate; petals thickened at apex; style absent; stigma 4-lobed. Berries globose, 5-10 mm across, reddish-brown; seeds 2-4, obovoid, ca 5 x 3 mm.

Fl. & Fr.: January-December.

Common, in evergreen forests. N. Lungleh, Helio hills, 960 m, *Gage* 104 (CAL); Pangsai-Thlimthing, 900 m, *Leslie* 39b (CAL); Saithah, *D.K. Singh* 98817.

Uses : Berries edible.

7. VITIS L.

Vitis tuberculata (Blume) M. Lawson in Hook.f., Fl. Brit. India 1: 656. 1875; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 33. 1987. *Cissus tuberculata* Blume Bijdr. 189. 1825. *Lengphek*, *Perhui* (Lushai).

Climbers with glabrous, warty stems; tendrils simple, leaf opposed, wiry. Leaves 3-foliolate; petioles 3-10 cm long; leaflets ovate-lanceolate, 5-12 x 3-5.5 cm, base acute to cuneate, shortly acuminate at apex, entire to serrulate upwards along the margins; glabrous on both surfaces; lateral nerves 4-7 pairs; petiolules 3-7 mm long. Cymes dense, compact, axillary; flowers 1.5-2 cm across. Berries globose, brown, 1-3-seeded, seeds obovoid.

Fl. & Fr.: May-September.

Scarce, in evergreen forests. Bualpui, *Dutta* 33874; Saithah, *D.K. Singh* 99281.

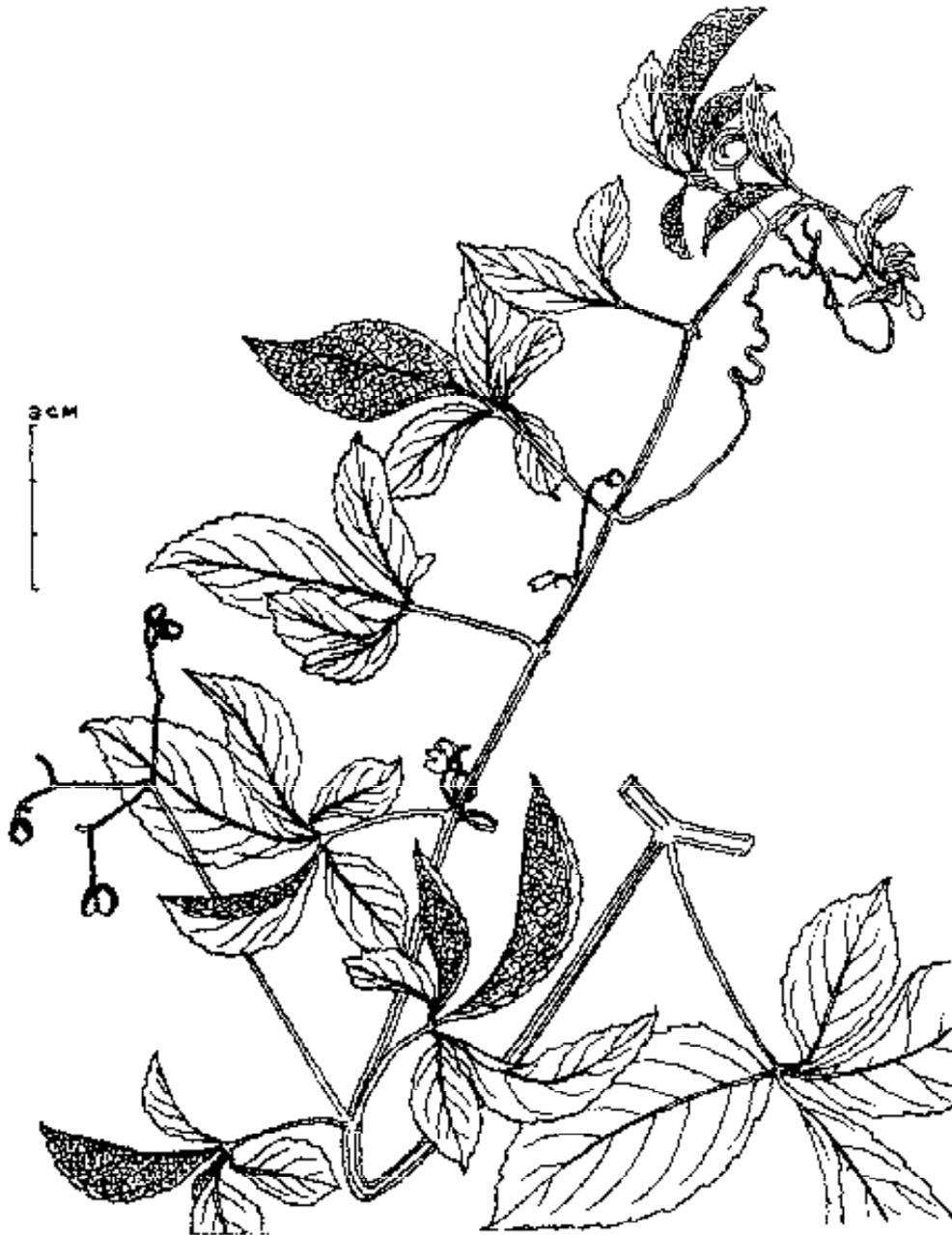


Fig. 75: *Tetrastigma serrulatum* (Roxb.) Planchon

LEEACEAE

(K.P. Singh)

LEEAE Van Royen *ex* L.

- 1a. Flowers bright red ...4. *L. gaiterensis*
- 1b. Flowers white or greenish-white or yellowish:
 - 2a. Leaves large, simple or sometimes 3 ...6. *L. macrophylla*
 - 2b. Leaves variously pinnate:
 - 3a. Stems and petioles winged or crisp winged:
 - 4a. Both stem and petioles crisp winged; bracts small ...2. *L. asiatica*
 - 4b. Only petioles winged at the base; bracts very conspicuous ...3. *L. compactiflora*
 - 3b. Stems and petioles not winged :
 - 5a. Leaflets glabrous, often pinkish; not gland dotted beneath ...5. *L. indica*
 - 5b. Leaflets pubescent or hairy along the nerves, not pinkish; densely gland dotted beneath ...1. *L. aequata*

1. *Leea aequata* L., Syst. Nat. ed. 12, 2: 627. 1767; Kanjilal *et al.*, Fl. Assam 1: 307. 1936; Naithani in N.P. Singh *et al.*, Fl. India 5: 326. 2000. *L. hirta* Roxb. *ex* Hornem., Hort. Hafn. 1: 231. 1813; M. Lawson in Hook. *f.*, Fl. Brit. India 1: 668. 1875. *Kawekar* (Lushai).

Shrubs, 2-3 (10) m tall; young parts ± brown, tomentose. Leaves up to 1 m long, (1-) 2 (-3) pinnate; petioles 6-12 cm long; leaflets oblong-lanceolate or oblong-elliptic, 10-25 x 3-5.5 cm, base rounded or acute, sometimes oblique, long acuminate at apex, sharply serrate along margins, scabrous above, grey hairy beneath, hirsute along the nerves, copiously gland dotted; lateral nerves 8-14 pairs; petiolules up to 7 mm long. Umbels 3-12 cm long, tawny pubescent, subterminal; flowers 4-6 mm across, 5-merous, greenish-white or brownish; calyx puberulous or glabrous, petals ca 2 mm long. Berries globose, 7-10 mm across, depressed smooth, ± 5-6-lobed, pinkish or red when ripe, 3-6-seeded.

Fl. & Fr.: May-November.

Common, in dense evergreen, moist forests. Upper Thenzawl. *K.P. Singh* 93920; Tuipui, *K.P. Singh* 94016.

2. *Leea asiatica* (L.) Ridsdale in Manilal, Bot. Hist. Hort. Malab. 189. 1980; Naithani in N.P. Singh *et al.*, Fl. India 5: 330. 2000. *Phytolacca asiatica* L., Sp. Pl. 474. 1753. *Leea crispa* L., Syst. Nat. ed. 12, 2: 627. 1767; M. Lawson in Hook. f., Fl. Brit. India 1: 665. 1875; Kanjilal *et al.*, Fl. Assam 1: 305. 1936. *L. aspera* Edgew. in Trans. Linn. Soc. Lond. 20: 36. 1846, *nom. illeg. non* Wallich *ex* G. Don, 1831; M. Lawson in Hook. f., Fl. Brit. India 1: 665. 1875.

Undershrubs or shrubs, 1-8 m tall; stems, branches, petioles, petiolules, rachis and peduncles crispately winged. Leaves 15-35 cm long, 1-2-pinnate, crisp winged; petioles 1-2 cm long, leaflets elliptic, ovate-oblong or oblong-lanceolate, 3-7, 6.5-11 x 2-4 cm, base rounded, acuminate at apex, serrate along margins, glabrous above, minutely pubescent on the nerves beneath, coriaceous; lateral nerves 10-20 pairs, parallel, straight; petiolules 5-10 mm long. Corymbs 3-5 cm long, axillary, solitary or paired; flowers *ca* 5 mm across, greenish-white or pale yellow; calyx glabrous; petals 2-3 mm long. Berries depressed-globular, 7-8 mm across, smooth, black, 5-6-seeded.

Fl. & Fr.: June-October.

Sairang road at 6th mile, *B. Godfrey* 501 (CAL).

3. *Leea compactiflora* Kurz in J. As. Soc. Bengal 42(2): 65. 1873; Naithani in N.P. Singh *et al.*, Fl. India 5: 332. 2000. *L. trifoliata* M. Lawson in Hook. f., Fl. Brit. India 1: 666. 1875. *L. bracteata* C.B. Clarke in J. Bot. 19: 164. 1881; Kanjilal *et al.*, Fl. Assam 1: 308. 1936. *Kumintoi* (Lushai).

Evergreen, straggling shrubs, up to 5 m high; young parts brown tomentose. Leaves trifoliolate or units bipinnate; petioles winged at the base, 4-6 cm long; leaflets ovate-elliptic or oblong-lanceolate, 7-15, 15-35 x 8-15 cm, base rounded; acuminate at apex, serrulate at margin, glabrous above, pubescent beneath; lateral nerves 8-20 pairs; petiolules up to 1 cm long. Inflorescence 5-12 cm long, congested with bright red pubescent branches and numerous ovate bracts. Flowers greenish-white; glabrous to pubescent; calyx glabrous to pubescent; petals *ca* 3 mm long.

Berries depressed-globose, 8-10 mm across, orange-yellow, black when ripe, smooth, 5-6-seeded.

Fl. & Fr.: May-December.

Recorded on the basis of Kanjilal *et al.* (*l.c.*).

4. *Leca guineensis* G. Don, Gen Hist. 1: 712. 1831; Naithani in N.P. Singh *et al.*, Fl. India 5: 336. 2000. *L. acuminata* Wallich ex C.B. Clarke in J. Bot. 19: 141. 1881; Kanjilal *et al.*, Fl. Assam 1: 304. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 87. 1938. *L. sambucina* M. Lawson in Hook.f., Fl. Brit. India 1: 666. 1875, *p.p.* Kawliar (Lushai).

Herbaceous shrubs or small trees, up to 5 m or little more high; stems annulated, glabrous or sparsely pubescent. Leaves large, variable, 2 or 3, rarely 4-pinnate; rachis 20-50 cm long; leaflets many, ovate to ovate-lanceolate, 8-16 x 3.5-8.5 cm, base cuneate, acuminate at apex, setose, serrate along margins, glabrous or under surface sparsely pubescent; lateral nerves 8-10 pairs; petiolules 4-10 mm long; stipules caducous. Corymbs puberulous, coral red; peduncles 4-10 cm long. Flowers *ca* 2 mm across, red, crowded; calyx 5-lobed, glabrous or pubescent, campanulate; petals 5, connate at the base. Berries globular, 6-8 mm across, depressed, orange-red, supported by a persistent calyx, usually 6-or fewer seeded; seeds smooth, convex on the back.

Fl. & Fr.: May-February.

Common, in evergreen forests in moist places. *Parry, s.num.* (CAL); Kolasib-Builang Road, *K.P. Singh* 93146; Phairuang, *K.P. Singh* 94201.

5. *Leca indica* (Burm.f.) Merr. in Philipp. J. Sci. Bot. 14: 245. 1919; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 87. 1938; Naithani in N.P. Singh *et al.*, Fl. India 5: 337. 2000. *Staphylea indica* Burm. f., Fl. Ind. 75, t. 24, f. 2. 1768. *Leca sambucina* Willd., Sp. Pl. 1: 1177. 1798; M. Lawson in Hook. f., Fl. Brit. India 1: 666. 1875, *p.p.*; Kanjilal *et al.*, Fl. Assam 1: 307. 1936.

Large shrubs or small trees, up to 5 m high; branches glabrous. Leaves 2-3-pinnate, 30-130 cm long; petioles purple, 15-20 cm long; leaflets oblong, ovate-lanceolate or ovate-oblong, 5-20 x 2-8 cm, base rounded, caudate-

acuminate at apex, sharply serrate at margins; glabrous to subrugose; petiolules 5-20 mm long; lateral nerves 7-12 pairs. Cymes 10-15 cm long, in subterminal corymbs, glabrous to pubescent; peduncles rusty-villous, *ca* 5 cm long; flowers 5-merous, *ca* 0.7 cm across, pale green; calyx lobes 2-4 mm long, glabrous or pubescent; petals *ca* 3 mm long; staminal tube white. Berries depressed, 5-8 mm diam., red or black when ripe, 3-6-seeded.

Fl. & Fr.: April-December.

Lungleh 900 m, *Gage* 85 (CAL); Kheitum, *Deb* 31223; Aizawl to Haitaw, *Dutta* 33232; North Vanlaiphai, *D.K. Singh* 93081; Leite, *K.P. Singh* 94094.

6. *Leea macrophylla* Roxb. ex Hornem., II. Hafn. 1: 213. 1813; M. Lawson in *Hook.f.*, Fl. Brit. India 1: 664. 1875; Kanjilal *et al.*, Fl. Assam 1: 305. 1936; Naithani in N.P. Singh *et al.*, Fl. India 5: 339. 2000. *L. robusta* Roxb. [H. Beng. 18, (1814), *nom. nud.*], Fl. Ind. 2: 468. 1824; M. Lawson in *Hook.f.*, Fl. Brit. India 1: 667. 1875, *p.p.* *L. diffusa* M. Lawson in *Hook.f.*, Fl. Brit. India 1: 667. 1875, *p.p.*

Perennial herbs or semi-herbaceous shrubs, up to 2 m high; young branches, petioles, rachis and inflorescence hairy to mealy pubescent. Leaves variable in shape and size, foliolate and then leaflets broadly ovate or elliptic, 15-50 cm long with cordate base, lower ones sometimes larger or 1-3-pinnate, and then leaflets numerous, oblong, ovate-lanceolate, 10-24 x 7-8.5 cm, rounded or subcordate at base, acute at apex, dentate-serrate along margins, coriaceous, glabrous above, greyish puberulous or mealy pubescent beneath; petiolules up to 20 mm long; lateral nerves 9-12 pairs, straight. Corymbs 20-30 cm long, puberulous; flowers greenish-white; calyx 1.5-3 mm long, nearly pubescent; petals 3-4 mm long, pubescent to papillose. Berries depressed, 5-10 mm across, black when ripe, smooth, 5-6-seeded; seeds *ca* 4 x 3 mm.

Fl. & Fr.: August-March.

Between Aizawl-Sonai, *Leslie* 30 (CAL); Hnathial, 750 m. *Mao* 107052.

SAPINDACEAE

(D.K. Singh)

- 1a. Leaves simple; fruits compressed and winged ...3. *Dadaimia*
- 1b. Leaves compound; fruits neither compressed nor winged :
- 2a. Leaves palmately compound ...1. *Allophylus*
- 2b. Leaves pinnately compound :
- 3a. Petals absent or very small ...5. *Mischocarpus*
- 3b. Petals present :
- 4a. Fruits tubercled or mucicled :
- 5a. Panicles glabrous; sepals imbricate; fruits ellipsoid ...7. *Xerospermum*
- 5b. Panicles puberulous or tomentose; sepals valvate; fruits globose ...2. *Dinocarpus*
- 4b. Fruits not tubercled :
- 6a. Petaline scales on the back with a pilose crest; ovary hairy; cocci oblong ...4. *Lepisanthes*
- 6b. Petaline scales without a crest; ovary glabrous; cocci globose ...6. *Sapindus*

1. ALLOPHYLUS 1.

- 1a. Leaflets glabrous ... 1. *A. subfalcatus*
- 1b. Leaflets tomentose :
- 2a. Branchlets glabrous ... 2.1. *A. villosus* f. *aporeticus*
- 2b. Branchlets densely hairy ... 2.2. *A. villosus* f. *villosus*

1. *Allophylus subfalcatus* Radlk. in Rec. Bot. Surv. India 3(3): 342. 1907; Pant in N.P. Singh *et al.*, Fl. India 5: 351. 2000. *Allophylus cobbe* Blume, Rumph. 3: 131. 1847; C.E.C. Fischer in Rec. Bot. Surv. India 12: 87. 1958. *A. cobbe* forma *distachyus* Hiern. in Hook. f., Fl. Brit. India 1: 674. 1875; Kanjilal *et al.*, Fl. Assam 1: 315. 1936.

Woody shrubs, 3-5 m high; leaves alternate, trifoliolate; rachis 5.5-17 cm long; leaflets highly variable, elliptic, oblanceolate or oblong-lanceolate,

7.5-18 x 2.5-8 cm, base oblique-cuneate, acuminate at apex, crenulate along margins, glabrous to glossy; petiolules ca 5 mm long; lateral nerves 10-14 pairs. Racemes dense flowered, simple, up to 8 cm long; flowers greenish-white, minute, ca 0.25 cm across; sepals 4 in opposite pairs, ca 1 mm long, outer smaller, inner caudate, imbricate; petals white, cuneate. Capsules with globose cocci, glabrous; cocci orange-red when ripe.

Fl. & Fr.: Apparently throughout the year.

Parry s.loc. and num. (fide C.E.C. Fischer l.c.).

2.1 *Allophylus villosus* (Roxb.) Blume, forma *aporeticus* (Voigt ex Kurz) Mukerjee in Indian For. 98. 492. 1972; Pant in N.P. Singh *et al.*, Fl. India 5: 353. 2000. *A. aporeticus* Voigt ex Kurz in J. As. Soc. Bengal 44(2): 185. 1875. Fig. 76.

Shrubs, 1-2 m high; branchlets glabrous. Leaves trifoliolate; rachis 2-8 cm long, glabrous; leaflets 3, oblong-ovate to oblanceolate, 9-18 x 3-6 cm, acute or cuneate at base, acute to acuminate at apex, serrulate-dentate at margins, glabrous above, villous beneath; petiolules 5-10 mm long; lateral nerves 10-15 pairs. Racemes solitary, axillary, simple to occasionally branched, 4-18 cm long; flowers pale whitish-yellow, ca 2 mm across; sepals 4, ca 1 mm long; petals 4. Capsules with globose cocci, glabrous, orange-red when ripe; cocci ca 7 mm in diam.

Fl. & Fr.: August-December.

Scarce in the area. Sabual, 1000 m. *D.K. Singh* 99035.

2.2. *Allophylus villosus* (Roxb.) Blume, Rumph. 3: 132. 1847; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 33. 1987; Pant in N.P. Singh *et al.*, Fl. India 5: 353. 2000. *Ornitrophe villosus* Roxb., Fl. Ind. 2: 265. 1832. *Allophylus cobbe* forma *villosus* (Roxb.) Hiern. in Hook.f., Fl. Brit. India 1: 647. 1875 and forma *aporitica* Hiern. in Fl. Brit. India 1: 674. 1875; Kanjilal *et al.*, Fl. Assam 1: 315. 1936. forma *villosus*. *Pichrangpa* (Lushai).

Shrubs, 2-3 m high; rachis 4-12 cm long, villous-hairy; leaflets 3-5, oblong, oblanceolate, lanceolate, broadly elliptic-lanceolate, 8-24 x 4-10 cm, base subequally cuneate, acute to acuminate at apex, serrate along margins, glabrescent above, villous beneath; lateral nerves 10-15 pairs; petiolules

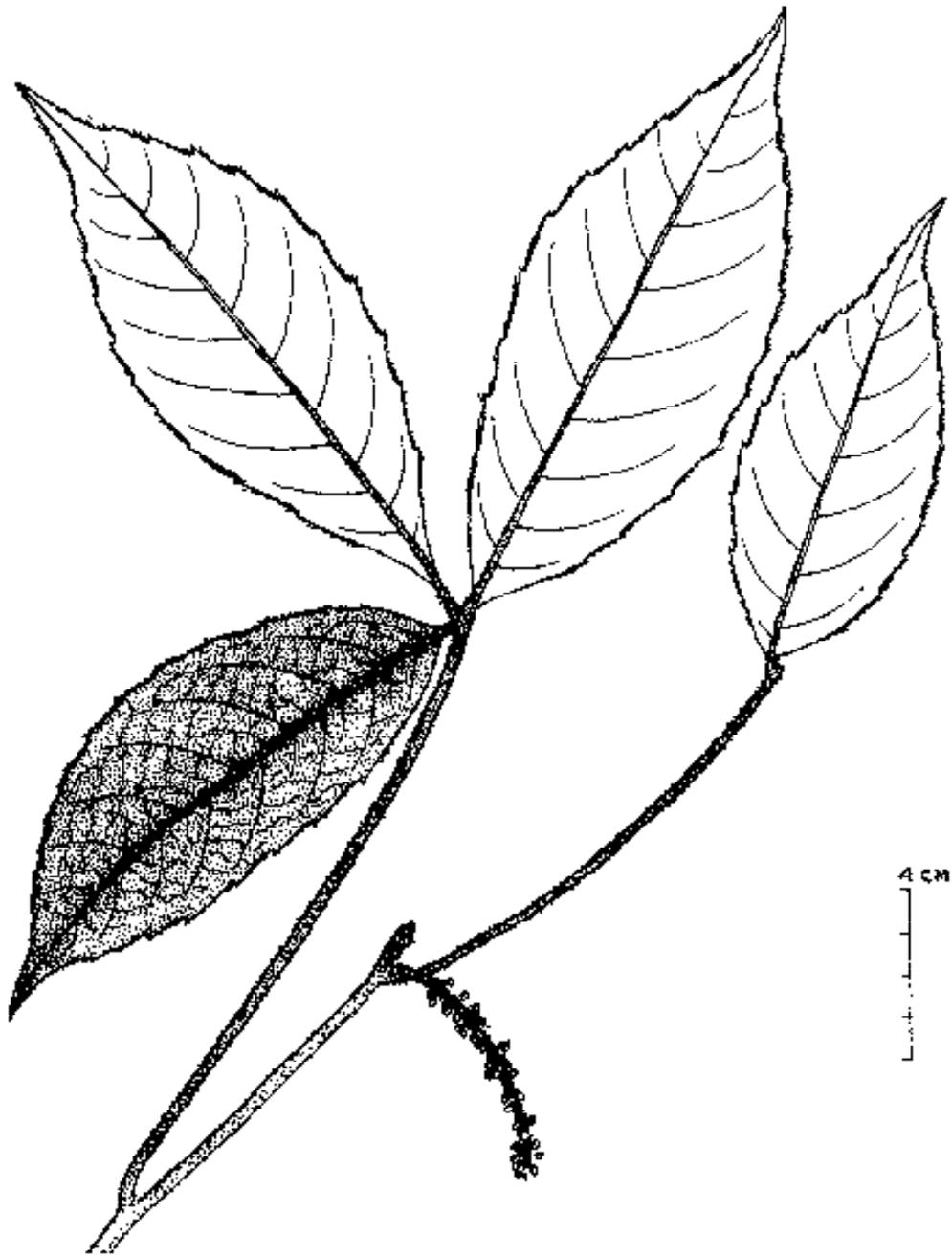


Fig. 76: *Allophylus villosus* (Roxb.) Blume *f. aporeticus* (Voigt ex Kurz) Mukerjee

short, up to 5 mm long. Racemes simple, axillary, solitary, 3-9 cm long; flowers yellowish-green or dull white, ca 0.25 cm across. Capsules with subglobose cocci, glabrous; cocci 0.7-0.8 cm across, orange-red, pilose.

Fl. & Fr.: February-August.

Common, in moist and dense forests. Darzo-Leite, *Dutta* 34077; Dampa, *D.K. Singh* 98995; Chhikhatlang, *D.K. Singh* 99145.

Uses : Aril is sweet delicious and edible. Plant is also used for fermentation.

2. DIMOCARPUS Lour.

Dimocarpus longan Lour., *Fl. Cochinch.* 293. 1790; Pant in N.P. Singh *et al.*, *Fl. India* 5: 358. 2000. *Nephelium longan* Cambess., *Mem. Mus. Hist. Nat. Paris* 18: 30. 1829; Hieron. in Hook. *f.*, *Fl. Brit. India* 1: 688. 1875; Kanjilal *et al.*, *Fl. Assam* 1: 323. 1936; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 87. 1938.

Medium-large evergreen trees, up to 25 m tall; young parts ferruginous, stellate tomentose; crown large, spreading, more or less ovoid. Leaves alterate, 10-30 cm long; leaflets 4-10, sub-opposite, variable, oblong or ovate-lanceolate, 4-15 x 1-5 cm, base oblique-cuneate, acute or obtuse at apex, entire along margins; glabrous above, glaucous and glabrous beneath, coriaceous; panicles up to 12-25 cm long, terminal or axillary, rusty tomentose; flowers pale or yellowish-white, 0.4-0.6 cm across, polygamous; sepals 5-6, ovate, 2-3 mm long, valvate, saccate at base, yellow, pubescent; petals 5-6, lanceolate-spathulate, 2.5-4 mm long, pilose at base; disc velutinous; ovary 2-3-lobed, 1-celled. Fruits tubercled, globose, 1-2 cm across, purplish-red.

Fl. & Fr.: February-August.

Lungleh, 1300 m, *Parry* 287 (*vide* C.E.C. Fischer *l.c.*).

3. DODONAEA L.

Dodonaea viscosa Jacq., *Enum. Syst. Pl. Carib.* 19. 1760; Hiern, in Hook. *f.*, *Fl. Brit. India* 1: 697, 1875; Kanjilal *et al.*, *Fl. Assam* 1: 323,

1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 33. 1987; Pant in N.P. Singh *et al.*, Fl. India 5: 361. 2000.

Small, evergreen, resinous shrubs, up to 3 m high; stems terete-angulate, glabrous. Leaves alternate, sub-sessile, exstipulate, oblanceolate or broadly elliptic, 2-6 x 0.6-2 cm, base cuneate-attenuate, subapiculate at apex, revolute, entire along margins, glabrous and white dotted on both sides, viscid with a shining yellow fluid, coriaceous. Panicles terminal, up to 6 cm long, short; flowers polygamous, minute, yellowish-green; sepals 5, oblong, ca 3 mm long, glabrous; petals absent; stamens 8; filaments short; anther linear-oblong. Capsules compressed, glabrous, 1-1.3 x 1-1.6 cm, membranous, 2-4-winged, septicidally 2-4-valved, 1- 2-seeded; seeds black.

Fl. & Fr.: February-August.

Cultivated as hedge plant. North Vanlaiphai, 1470 m, *Deb* 31112.

4. LEPISANTHES Blume

- 1a. Flowers ca 2 mm across, red; petals as long as sepals ... 1. *L. senegalensis*
 1b. Flowers 2-4 mm across, white; petals longer than sepals ... 2. *L. tetraphylla*

1. *Lepisanthes senegalensis* (A.L. Juss. ex Poiret) Leenh. in *Blumea* 17(1): 85. 1969; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 33. 1987; Pant in N.P. Singh *et al.*, Fl. India 5: 371. 2000. *Sapindus senegalensis* A.L. Juss. ex Poiret, in Lamk. Enc. 6: 666, 1805. *Sapindus attenuatus* Wallich ex Hiern. in Hook.f., Fl. Brit. India 1: 684. 1875; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 88. 1938. *Chepatil*, *Zutal*, *Chuibathe* (Lushai).

Evergreen shrubs or small trees, attaining a height of up to 8 m; bark minutely fissured, greyish-dark brown. Leaves alternate, crowded at the end of the branches, usually paripinnate, rarely unifoliolate; leaflets 8-10, subopposite, ovate-lanceolate, elliptic-oblong, 10-20 x 4-6 cm, base rounded-subcuneate, acute or acuminate at apex, entire along margins, glabrous on both surfaces; petiolules 5-10 mm long. Panicles terminal, axillary, up to 25 cm long, puberulent; flowers small ± 2 mm across, red, glabrous; sepals 5, ca 0.15 cm long, ciliolate; petals 5, ciliolate. Fruits ellipsoid, 1.5-2.5 cm long, red or deep purple; aril edible.

Fl. & Fr.: February-May.

Common, in shady dense forests. Aizawl, 1000 m, *Parry* 618 (*vide* C.E.C. Fischer, *l.c.*); Darlak, *Deb* 3404, 3420; Aizawl protected forest, 1050 m, *Deb* 30540; Sairang, 660 m, *Deb* 30604; Kawnpui, *K.P. Singh* 97025, 97050, 97051, 97063; Changsil hills, *ca* 1/4 mile from Stockade towards North, *Prazer* (1890), *s.num.* (CAL); Serzawl, *ca* 1300 m, *M. Sawmliana* 101751.

Uses : Fruits used as medicine for dysentery.

2. *Lepisanthes tetraphylla* (Vahl) Radlk. in Sitz. Maths.-Phys. Acad. Muench. 8: 276. 1878; Pant in N.P. Singh *et al.*, *Fl. India* 5: 372. 2000. *Sapindus tetraphylla* Vahl, *Symb.* 3: 54. 1794. *Hemigyrosa canescens* Blume in Rumph. 3: 166. 1847; Hiern in Hook.f., *Fl. Brit. India* 1: 671. 1875. *Lepisanthes assamica* Radlk. in Rec. Bot. Surv. India 3: 343. 1909; Kanjilal *et al.*, *Fl. Assam* 1: 319. 1936.

Mostly shrubs or sometimes trees, up to 10 m tall; twigs variably hairy. Leaves compound, paripinnate; petioles 30-35 cm long; leaflets 4-8, subopposite to alternate, widest above, lanceolate-oblong, 5.5-13 x 2-3.5 cm, base slightly oblique to equal sided, acute to rounded or subcordate, variably acuminate at apex, entire along margins, coriaceous, glabrous and shining; lateral nerves many pairs; petiolules 2-3 mm long. Racemes fascicled, axillary, 3-8 cm long, dark brown, pubescent; flowers white to greenish-white, sweet scented, 2-4 mm across; sepals 5, outer 2 smaller, ovate or elliptic, *ca* 5 x 4 mm, densely ciliolate, inner 3 sepals ovate to obovate, *ca* 5 x 5 mm; petals 5, 5-6 mm long, broadly spatulate, scales bilobed, outside sericeous. Fruits flattened, ellipsoid, 1.3-5.5 mm across, smooth, densely hairy outside; seeds brown, glabrous.

Fl. & Fr.: February-November.

Scarcely distributed in the hilly forests. Near fort Lungleh, 900-1200 m, *Gage* 185 (CAL).

5. MISCHOCARPUS Blume

Mischocarpus pentapetalus (Roxb.) Radlk., *Sapind.* Holl.- Ind. 43, 1879; Pant in N.P. Singh *et al.*, *Fl. India* 5: 375. 2000. *Schleichera pentapetala* Roxb., *Fl. Ind.* 2: 275. 1832. *Cupania pentapetala* Wight

& Arn., Prodr. 113. 1834; Hiern. in Hook.f., Fl. Brit. India 1: 678. 1875; Kanjilal *et al.*, Fl. Assam 1: 317. 1936. *C. sumatrana* Miq., Fl. India Bat. 1(2): 566. 1859; Hiern. in Hook.f., Fl. Brit. India 1: 678. 1875; Kanjilal *et al.*, Fl. Assam 1: 317. 1936. *Mischocarpus sumatranus* Blume in Rumph., 3: 168. 1847; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 33. 1987.

Large, evergreen trees, up to 20 m tall with a narrow crown; young branches reddish, puberulous. Leaves alternate, paripinnate, 15-40 cm long; leaflets 2-4 pairs, alternate to sub-opposite, elliptic or oblong-lanceolate, 8-27 x 3-8 cm, rounded or cuneate at base, laxly acuminate at apex, entire along margins, glabrous, chartaceous; shining above; petiolules short, 3-5 mm long. Panicles axillary, or subterminal, minutely rusty tomentose, bracteolate, flowers yellowish-green, 3-4 mm across, pentamerous, pubescent; sepals 5, often connate at base, subvalvate; petals very small or absent; stamens 8, exserted; filaments pubescent. Capsules stipitate, pyriform, 1.5-2 cm across, 3-4-ribbed, red; seeds arillate, ellipsoid-globose.

Fl. & Fr.: April-August.

Scarce in the area. Saiha, Dutta 33819.

6. SAPINDUS L.

Sapindus mukorossi Gaertner, Fruct. 1:342, t. 70. f. 3 g.h, 1788; Hiern. in Hook.f., Fl. Brit. India 1: 683, 1875; Kanjilal *et al.*, Fl. Assam 1:320, 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 88. 1938; Pant in N.P. Singh *et al.*, Fl. India 5: 382. 2000. *Hlingsi* (Lushai). **Fig. 77.**

Small, deciduous trees, up to 13 m high with globose, spreading crown; bark greenish brown with fine lenticels and fissures; branchlets tomentose. Leaves paripinnate, 30-50 cm long, crowded at the branch heads; leaflets 10-18, alternate-subopposite, 5-12 x 1.5-5 cm, base oblique-cuneate, acuminate at apex, entire along margins, coriaceous, glabrous; lateral nerves 12-22 pairs; petiolules 3-6 mm long. Panicles terminal, 25-35 cm long, pubescent; flowers polygamous, \pm 3 mm across, white or purplish-white; sepals 4-5, ciliate; petals 5, with a woolly scale on either side; stamens 8 with woolly filaments and exserted anthers. Fruits fleshy or coriaceous; pericarp and endocarp saponaceous, wrinkled and often translucent; seeds globose, 8-12 mm across, black.

Fl. & Fr.: May-March.

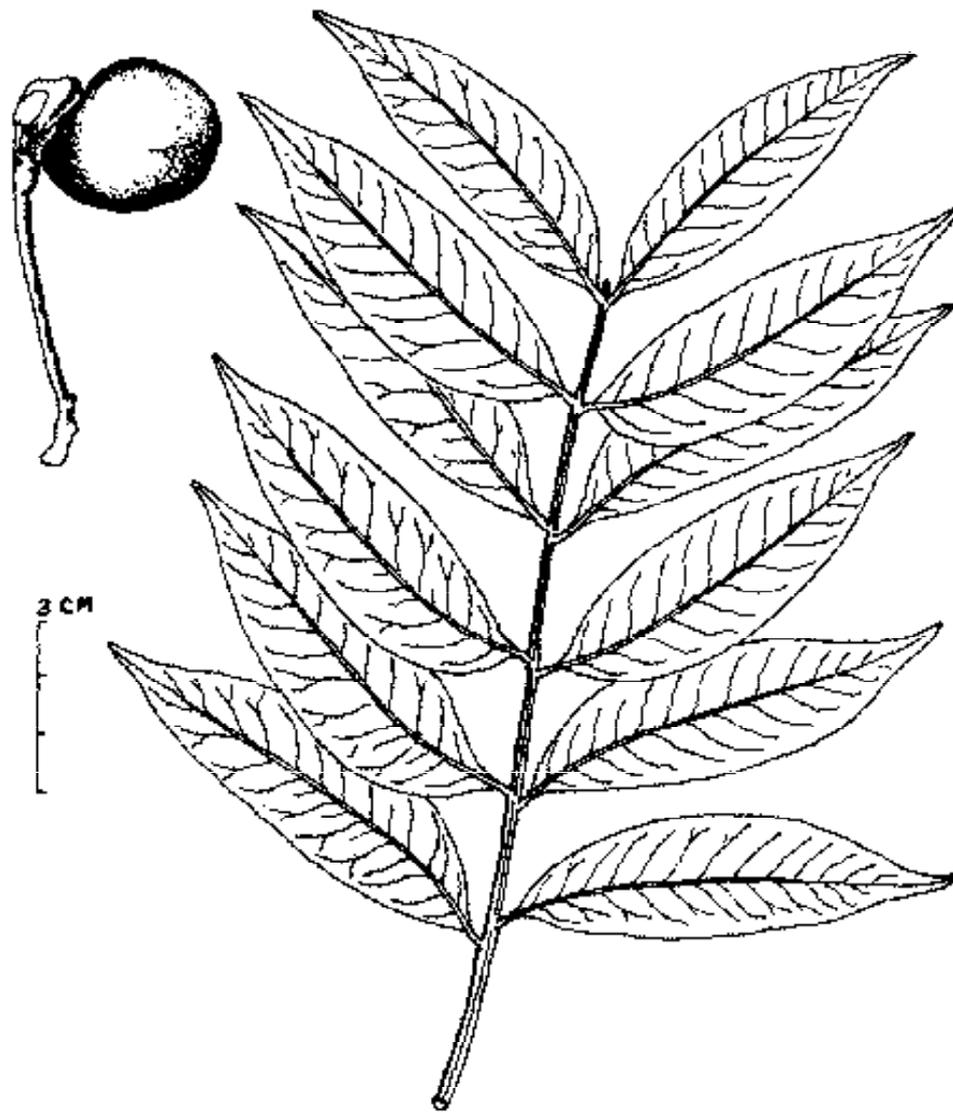


Fig. 77: *Sapindus mukorossi* Gaertner

Scarce. North Vanlaiphai, *Deb* 31164; Aizawl, 1100 m, *Parry* 629 (*vide* C.E.C. Fischer *l.c.*).

Uses: Fruits are used by Lushais (local tribe) as substitute for soap.

7. XEROSPERMUM Blume

Xerospermum glabratum (Kurz) Radlk., *Sapind.* *Holk.-Ind.* 23: 93. 1877; Pant in N.P. Singh *et al.*, *Fl. India* 5: 385. 2000. *Cupania glabrata* Kurz in *J. As. Soc. Bengal* 44: 186. 1875 *non* Hiern. in *Hook. f.*, 1875. *Xerospermum noronhianum* Hiern. in *Hook. f.*, *Fl. Brit. India* 1: 686, 1875 *non* Blume, 1847; Kanjilal *et al.*, *Fl. Assam* 1: 322, 1936; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 33. 1987.

Medium sized, evergreen trees, up to 15 m tall; crown dense, oval; young shoots terete, pubescent; bark brownish-black. Leaves alternate, paripinnate, exstipulate, 15-30 cm long; petioles 2-4 cm long; leaflets almost opposite, (1) 2-4, oblong or elliptic-lanceolate, 7-13 x 2-5 cm, base acute-cuneate, acuminate at apex, entire along margins, glabrous, coriaceous; lateral nerves 10-12 pairs; petiolules 3-7 mm long. Racemes paniced, axillary, 7-10 cm long, simple to branched; flowers small, light yellow or greenish, 2-3 mm across; calyx 4-8-lobed, imbricate, in 2 series, outer ciliate; petals 4, ciliate, basal scales absent; stamens usually 5-10, inserted in pubescent disc. Fruits dark brown, ellipsoid, 2-2.5 x 1.5-2 cm, muricate, with pyramidal scales; seeds pilose.

Fl. & Fr.: April-March.

Rare, in dense forests. Sairep, *Dutta* 33541.

HIPPOCASTANACEAE

(D.K. Singh)

AESCULUS L.

Aesculus assamica Griffith, *Notul.* 4: 540. 1854; Pant in N.P. Singh *et al.*, *Fl. India* 5: 389. 2000. *Aesculus punduana* Wallich *ex* Hiern. in *Hook. f.*, *Fl. Brit. India* 1: 675. 1875; Kanjilal *et al.*, *Fl. Assam* 1: 313. 1936. Fig. 78.



Fig. 78: *Aesculus assamica* Griffith

Medium sized, handsome, deciduous trees with glabrous, terete branches; bark slightly greyish, warty. Leaves opposite, digitate, exstipulate, up to 60 cm across; petioles 16-30 cm long, terete, glabrescent; leaflets 5-8, oblanceolate, ovate-elliptic, 12-26 x 4-6 cm, terminal one largest, base narrowed, long acuminate at apex, slightly arched, glabrous, delicately serrate along margins; petiolules 1-2.5 cm long. Panicles erect, thyrsoid up to 60 cm long, pale brown, arising from the base of leaf clusters; flowers creamy-white, 2-2.5 cm across; calyx campanulate, 5-8 mm long, 5-lobed, pubescent; petals 4, unequal, clawed, pubescent outside; stamens 2-3 cm long. Fruits a loculicidal capsule, rugose, rusty brown, ovoid-obovoid, 5-7.5 cm long; apiculate; seeds brown, 2-5 mm long, 1 in each cell.

Fl. & Fr.: April-September.

Occurs scarcely in the area. Lungchhuan (near North Vanlaiphai), *D.K. Singh* 97163.

ACERACEAE

(*D.K. Singh*)

ACER L.

- 1a. Leaves simple with 3-basal nerves;
wings of samaras always divergent :
- 2a. Leaves green on both surfaces;
petioles up to 1.5 cm long ... 2. *A. laevigatum*
- 2b. Leaves silvery white or grey beneath;
petioles up to 9 cm long:
- 3a. Cymes glabrous; samara wings 3 x 1.4-1.5 cm ... 3. *A. laurinum*
- 3b. Cymes pubescent, samara wings 2.5 x 0.6-1 cm ... 4. *A. oblongum*
- 1b. Leaves lobed with 5-7-basal nerves;
wings of samaras either straight or divergent :
- 4a. Leaves 3-lobed with 5 basal nerves,
samara wings straight ... 5. *A. thomsonii*
- 4b. Leaves 5-lobed, sometimes 7-lobed with
5-7 basal nerves; samara wings divergent ... 1. *A. cappadocicum*

1. *Acer cappadocicum* Gleditsch in *Schrift. Ges. Naturf. Freunde Berl.* 6: 116, t. 2, 1785; Nayar & A. Dutta in N.P. Singh *et al.*, *Fl. India* 5: 397, 2000. *A. pictum sensu* Hiern. in *Hook.f.*, *Fl. Brit. India* 1: 696, 1895, *non* Thunb., 1784.

Large deciduous trees, up to 20 m tall. Leaves alternate, 5-lobed, 4-12 x 6-18 cm, base truncate or subcordate, 5-7-nerved; lobes equal, ovate, sinuses rounded, apex acuminate, entire along margins, glabrous, underside hairy at the axil of nerves at base; petioles 3-5 cm long. Panicles corymbose, terminal, appearing with leaves, 5-15 cm long; flowers yellowish-green; petals equalling the calyx; stamens 3. Samaras 3.5-5 cm long, compressed, divaricate to subhorizontal, glabrous; wings diverging in a straight line, sinuous.

Fl. & Fr.: April-September.

Recorded on the basis of Nayar & A. Dutta (*l.c.*). According to them it is the commonest Himalayan Maple, distributed from Kashmir to farthest end of eastern Himalaya.

2. *Acer laevigatum* Wallich [Cat. no. 1223, (1829), *nom. nud.*], *Pl. Asiat. Rar.* 2: 3-4, t. 104, 182, 1830; Hiern. in *Hook.f.*, *Fl. Brit. India* 1: 693, 1875; Kanjital *et al.*, *Fl. Assam* 1: 312, 1936; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 87, 1938; Nayar & A. Dutta in N.P. Singh *et al.*, *Fl. India* 5: 401, 2000. *Thingkhim* (Lushai).

Medium-large, deciduous trees, up to 15 m tall with irregularly oval, spreading crown; bark dark greyish-green. Leaves simple, oblong, ovate or elliptic-lanceolate, 5-12 x 2.5-5 cm, base rounded or subacute, acuminate at apex, glabrous, entire to minutely serrulate along margins, glabrous, chartaceous; lateral nerves 6-9 pairs; petioles 1.5-1.8 cm long. Racemes subcorymbose or paniced, glabrous, appearing with leaves terminal, 5-10 cm long; flowers white; sepals 5, ovate-lanceolate, ca 2 mm long, purplish-green; petals 5, obovate, clawed; ovary pubescent. Samaras glabrous; nuts elliptical, almost terete reticulate; wings 1.5-3 x 0.5-0.8 cm, divergent, reddish when young.

Fl. & Fr.: March-November.

S.loc., Parry s.num. (*vide* C.E.C. Fischer, *l.c.*).

3. *Acer laurinum* Hassk. apud Hoeven de Vriese in Tijdschr. Naturl. Geschied. Phys. 10: 138. 1843; Nayar & A. Dutta in N.P. Singh *et al.*, Fl. India 5: 402. 2000. *A. niveum* Blume in Jahrb. K. Nederl. Maatsch. Aanmoed. Twinbouw. 1844: 84. 1845; Hiern. in Hook.f., Fl. Brit. India 1: 693. 1875; Kanjilal *et al.*, Fl. Assam 1: 311. 1936.

Large trees, 30-45 m tall. Leaves simple, opposite, oblong or ovate-oblong to ovate-elliptic, 8-14 x 3.5-5 cm, base rounded or cuncate with 3 basal nerves, abruptly acuminate at apex, entire along margins, glabrous above, silvery white or grey beneath, coriaceous; lateral nerves 7-9 pairs; petioles 2-4 cm long, terete, glabrous. Panicles corymbose, glabrous, 3-5 cm long, appearing with leaves; terminal, flowers small, yellowish-green; sepals lanceolate or oblong, 2.5-3 mm long, white; petals equal to sepals. Samaras glabrous, 3-3.5 cm long; wings constricted at base, ca 3 x 1.4-1.5 cm, slightly divergent, much veined.

Fl. & Fr.: August-May.

Scarcely distributed. Thaltlang, *Wadhwa* 96833.

4. *Acer oblongum* Wallich [Cat. 33. no. 1222 (1829). *nom. nud.*] *ex* Hiern. in Hook.f., Fl. Brit. India 1: 693. 1875; Kanjilal *et al.*, Fl. Assam 1: 311. 1936; Nayar & A. Dutta in N.P. Singh *et al.*, Fl. India 5: 402. 2000.

Medium, deciduous trees, 8-15 m tall, often irregularly buttressed at base; bark brownish, laxly furrowed. Leaves opposite, often ternate in young shoots, oblong-elliptic or ovate-lanceolate, 5-18 x 3-6 cm, base rounded-obtuse, long acuminate at apex, entire along margins, chartaceous, glaucous beneath; lateral nerves 6-3 pairs, petioles 2-6 cm long, slender, terete. Cymes paniced, 6-12 cm long, corymbose, terminal or lateral, contemporary with leaves, pubescent; flowers white, 3-4 mm across; sepals and petals linear-oblong, ca 2 mm long. Samaras pale brown, 2.5-3 cm long, glabrous, 2-winged; nuts ± angular; wings divergent ca. 2.5 x 0.6-1 cm, constricted at base, closely veined.

Fl. & Fr.: May-February.

Common, along the road side as well as inside forests. Kawlhkult-Tuichang, *D.K. Singh* 94429; Pheileng, *K.P. Singh* 97060.

5. *Acer thomsonii* Miq. in Arch. Neerl. Sci. Nat. 2: 470. 1852; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 33. 1987; Nayar & A. Dutta in N.P. Singh *et al.*, Fl. India 5: 410. 2000. *A. villosum* Wallich var. *thomsonii* (Miq.) Hiern. in Hook. f., Fl. Brit. India 1: 695. 1875. **Fig. 79.**

Large trees. Leaves 3-lobed; middle lobe broadly triangulate, larger than the laterals, 9-18 x 5-16 cm, base cordate, 5-nerved, acuminate at apex; entire, repand or serrate along margins; coriaceous, glabrous on both sides; petioles 5-17 cm long, canaliculate. Racemes lateral, spicate, 7-21 cm long, appearing with leaves; flowers pentamerous, yellowish-green; sepals elliptic-ovate, ciliate; petals linear-oblong, ciliate. Samaras brown, 5-8 cm long; wings straight, 6-7 x 2.3-2.8 cm, base narrow.

Fl. & Fr.: November-July.

Scarce in the area. 15th mile S.E. of Lungleh, Gage 138 (CAL); Theiriat, Deb 31260.

STAPHYLEACEAE

(D.K. Singh)

TURPINIA Venetant, *nom. cons.*

- 1a. Shrubs or small trees, not exceeding 7 m in height;
leaves 3-5-foliolate; margins serrulate;
fruits less than 1.5 cm across ... 1. *T. cochinchinensis*
- 1b. Small-medium trees, 15-20 m in height;
leaves 5-9-foliolate; margins serrate;
fruits more than 1.5 cm across ... 2. *T. pomifera*

1. *Turpinia cochinchinensis* (Lour.) Merr. in J. Arn. Arb. 19: 43. 1938; Pant in N.P. Singh *et al.*, Fl. India 5: 415. 2000. *Triceros cochinchinensis* Lour., Fl. Cochinch. 184. 1790. *Turpinia nepalensis* Wight & Arn., Prodr. 156. 1834; Kanjilal *et al.*, Fl. Assam 1: 310. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 88. 1938. *T. pomifera* auct. Hiern. in Hook. f., Fl. Brit. India 1: 698. 1875, *p.p. non* (Roxb.) DC., 1825. *Lambmuck* (Lushai). **Fig. 80.**

Shrubs or small trees, rarely exceeding 7 m in height; bark grey. Leaves opposite, stipulate, 10-20 cm long; leaflets 3-5, elliptic, oblong or

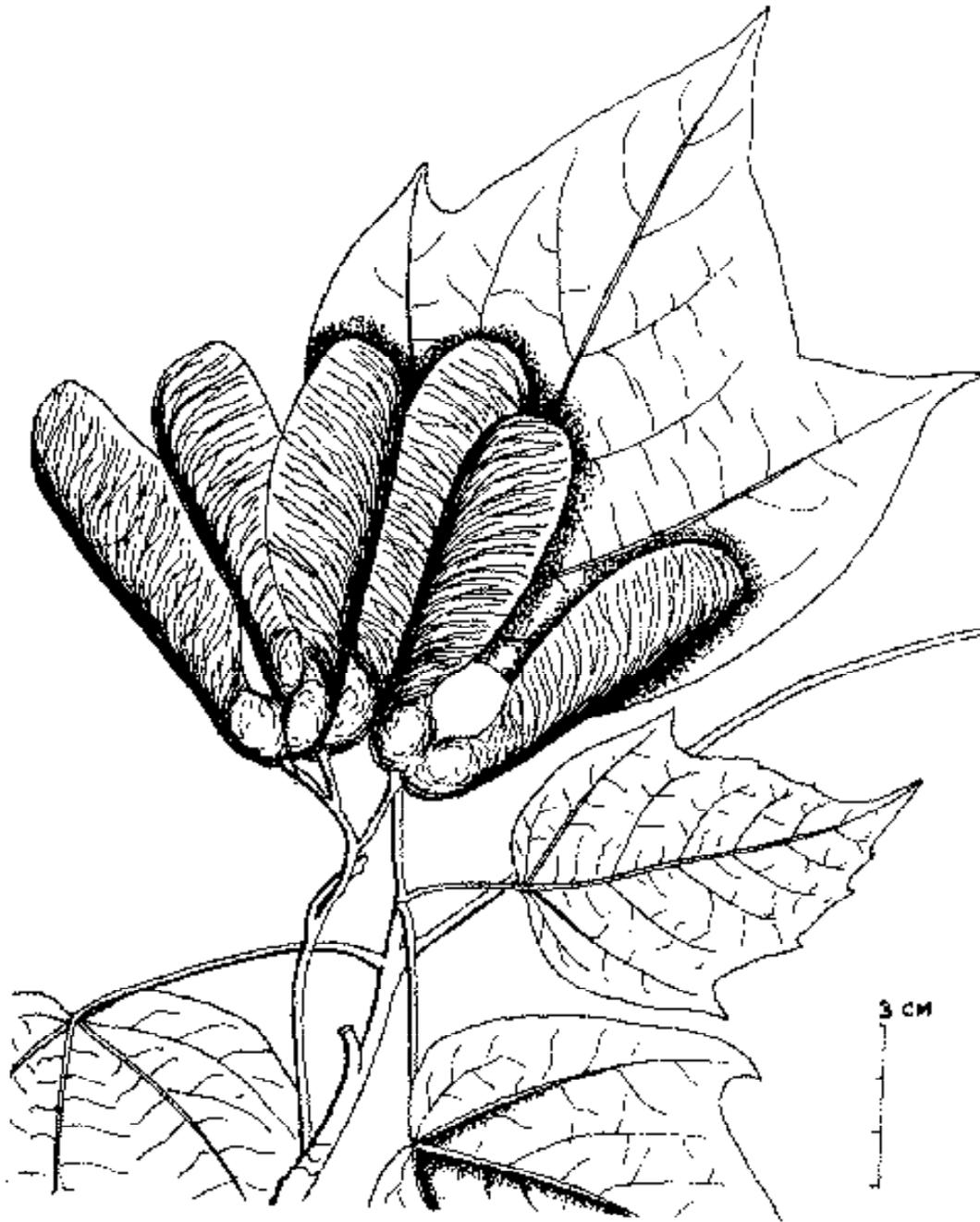


Fig. 79: *Acer thomsonii* Miq.

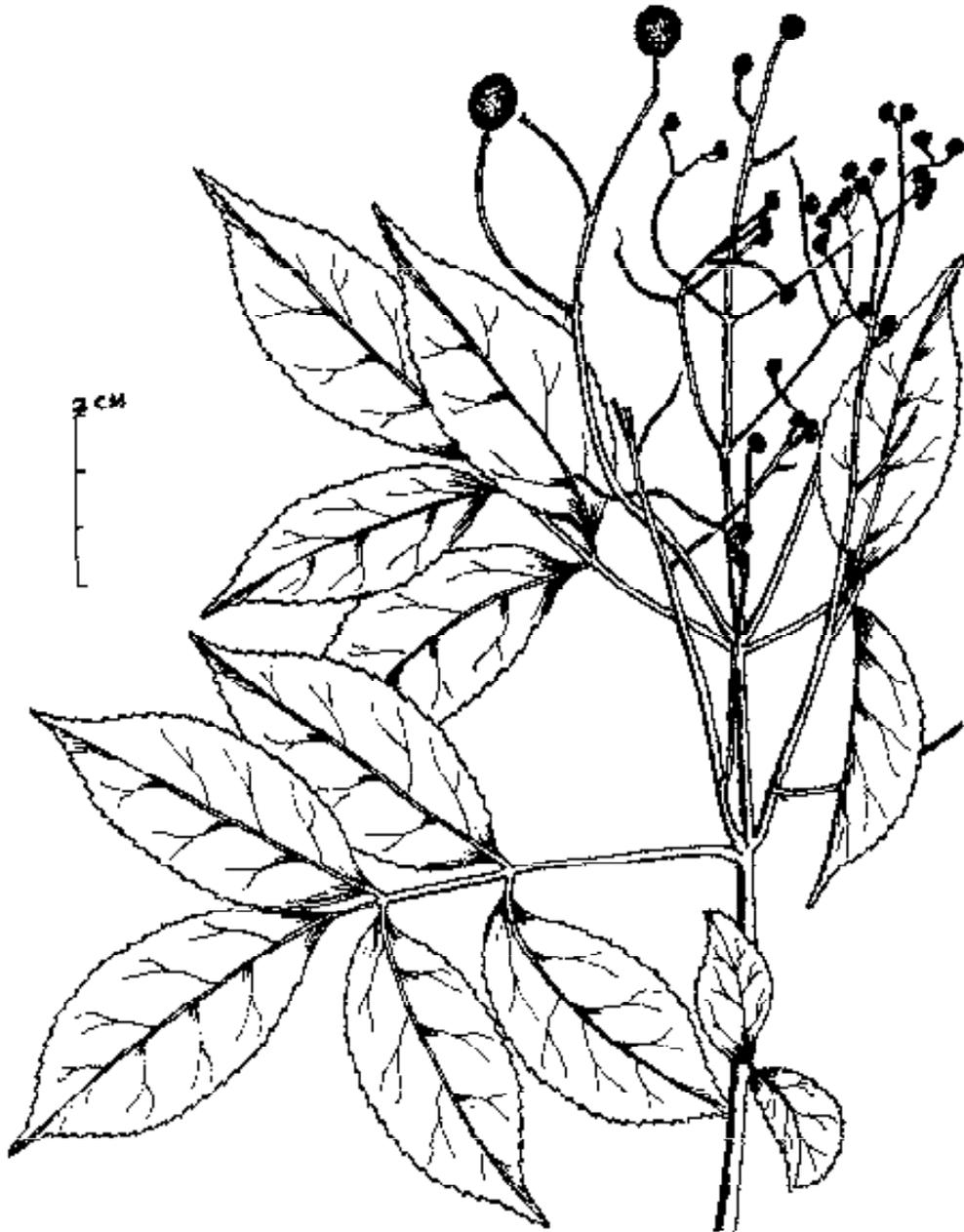


Fig. 80: *Turpinia cochinchinensis* (Lour.) Merr.

ovate. 5-13 x 2-5 cm, base acute or cuneate, caudate-acuminate at apex, closely serrulate along margins, glabrous on both surfaces; lateral nerves 4-7 pairs; petiolules of lateral leaflets 4-10 mm long, of terminal leaflets 2-3 cm long. Panicles axillary or terminal, 5-18 cm long; flowers greenish-white, small, 0.2-0.3 cm across; sepals 5, ca 1 mm long, imbricated; petals 5, ca 2 mm long, imbricated, ciliate. Nuts globose, 0.8-1.5 cm in diam., purplish-red, laxly lobed, fleshy, 1-3-lobed.

Fl. & Fr.: February-December.

Very common, in primary and secondary forests. Aizawl, 1100 m, Parry 619 (*vide* C.E.C. Fischer, *l.c.*); Aizawl-Lungleh road, Godfrey 435 (CAL). Sairep, K.P. Singh 96665; Pharpak, K.P. Singh 96799; Phongphui, K.P. Singh 96828; Pheileng, K.P. Singh 97070; Lungchhuan, D.K. Singh 97164.

2. *Turpinia pomifera* (Roxb.) DC., Prodr. 2: 3. 1825; Hiern. in Hook. f., Fl. Brit. India 1: 698. 1875, *p.p.*; Kanjilal *et al.*, Fl. Assam 1: 309. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 88. 1938; Pant in N.P. Singh *et al.*, Fl. India 5: 418. 2000. *Dalrymplea pomifera* Roxb. [H. Beng. 17 (1814). *nom. nud.*], Pl. Corom. 3: 76. t. 279. 1819.

Small-medium trees, up to 18 m tall; crown oval; bark brown, fairly smooth on young branches. Leaves opposite, imparipinnate, 20-50 cm long; leaflets 5-9, oblong-elliptic or ovate, 7-20 x 5.5-8 cm, base rounded or obtuse, cuneate, acuminate at apex, serrate along margins, glabrous on both surfaces, glossy green above, pale beneath; lateral nerves 6-8 pairs; petiolules of lateral leaflets 4-10 mm long, of terminal leaflets 2.5-4 cm long. Panicles terminal, subterminal or axillary, up to 30 cm long; flowers yellowish-white, ca 0.5 cm across, minutely bracteolate; sepals 5, ovate or elliptic-oblong, ca 2 mm long, deciduous, ciliolate; petals 5, oblong-ob lanceolate, ciliate at margins. Nuts globular, 1.6-4 cm across, obscurely 2-3-grooved, fleshy; seeds brown, shining.

Fl. & Fr.: February-December.

Lungleh, 1100 m, Gage 255 (CAL); Nunswari, Tablabagh, Tlabury, K.P. Singh 94277.

SABIACEAE

(D.K. Singh)

- 1a. Trees; sepals and petals unequal; only 2 stamens fertile . . . 1. *Meliosma*
 1b. Scandent shrubs; sepals and petals equal; all stamens fertile . . . 2. *Sabia*

1. MELIOSMA Blume

- 1a. Leaves simple, ± glabrous; ovary glabrous . . . 1. *M. henryi* ssp. *mannii*
 1b. Leaves compound :
 2a. Leaflets glabrous with domatia in the axils of nerves beneath; ovary pubescent . . . 2.1. *M. pinnata* ssp. *barbulata*
 2b. Leaflets glabrous without domatia; ovary glabrous . . . 2.2. *M. pinnata* ssp. *pinnata*

1. *Meliosma henryi* Diels, Bot. Jahrb. 29: 452. 1900 ssp. *mannii* (Lace) Beus. in Blumea 19: 451. 1971; S.C. Majumdar in N.P. Singh *et al.*, Fl. India 5: 422. 2000. *M. mannii* Lace in Kew Bull. 1915: 113. 1915; Kanjilal *et al.*, Fl. Assam 1: 327. 1936. **Fig. 81.**

Evergreen tree, up to 18 m tall; branchlets terete to ± angular, covered with white, oblong lenticels, sparsely puberulous to glabrous. Leaves simple, alternate, oblong or oblanceolate to obovate-lanceolate, 8-18 x 2-5.5 cm, base acute or attenuate, acuminate to subacute at apex, distantly serrate-toothed along margins or entire towards base, coriaceous, shining above, glabrous, sometimes with feeble domatia in the axils of the nerves beneath; lateral nerves 8-14 pairs; petioles swollen at base, 1-2 cm long. Panicles 10-16 cm long, terminal, branched, ± densely rusty puberulous; flowers ± sessile or short pedicelled, crowded, small, ca 2 mm across, white; sepals 4, unequal, ca 1 mm long, glabrous; margins ciliolate; petals 5, 3 outer glabrous, orbicular, inner petals oblong to lanceolate, 1-2 mm long; ovary glabrous. Drupes ± obovoid, 4-7 mm across, scarlet when ripe, 1-celled, 1-seeded; pericarp fleshy.

Fl. & Fr.: May to January.

Sparsely distributed in the subtropical to subtemperate forests. Phongphui, K.P. Singh 96819.

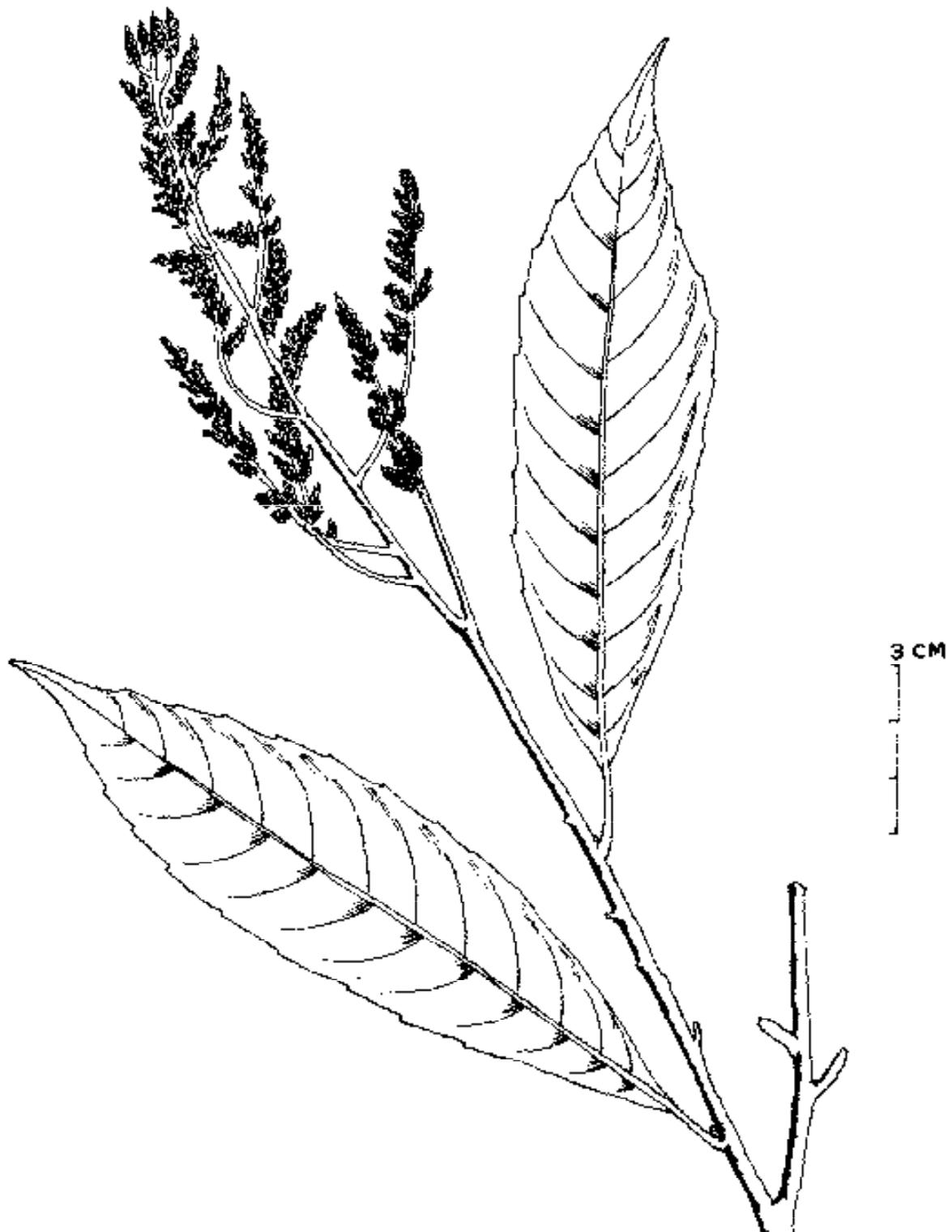


Fig. 81: *Meliosma henryi* Diels ssp. *mannii* (Lace) Beus.

2.1. *Meliosma pinnata* (Roxb.) Maxim. in Bull. Acad. Sci. St. Pt. 12: 64. 1867 ssp. ***barbulata*** (Cufod.) Beus. in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 3: 384. 1981; S.C. Majumdar in N.P. Singh *et al.*, Fl. India 5: 423. 2000. *Meliosma rhoifolia* Maxim. ssp. *barbulata* Cufod. in Oest. Bot. Z. 88: 254. 1939. *Meliosma arnottiana* (Wight) Walp., Rep. Bot. Syst. 1: 423. 1842; Hook.f., Fl. Brit. India 2: 6. 1876; Kanjilal *et al.*, Fl. Assam 1: 329. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 88. 1938. *Theira* (Lakher).

Small to medium sized trees, up to 20 m tall; branchelets terete to slightly canaliculate. Leaves pinnate, 20-45 cm long; leaflets 3-7 pairs, opposite to subopposite, ovate to ovate-oblong or elliptic to oblong or lanceolate, linear-lanceolate, 7-22 x 2-8 cm, base acute to rounded or truncate, acuminate at apex, entire or distantly cuspidate-serrate along margins, chartaceous, usually \pm pubescent, rarely glabrous, often with domatia in the axils of the nerves beneath; lateral nerves 7-10 pairs; petiolules 5-12 mm long. Panicle erect, spreading, ca 30 cm long, much branched, rusty pubescent; flowers minute, creamy white, ca 2 mm across, sessile to subsessile; sepals unequal, glabrous, margins ciliolate; petals glabrous, inner petals sometimes a bit ciliolate at the tips of lobes; ovary densely pubescent. Drupes globose, 3-5 mm across, without sunken ventral pore.

Fl. & Fr.: May-September.

Scarce, in tropical and subtropical evergreen forests. Sherkor, Lorrain (*vide* C.E.C. Fischer, *l.c.*).

Uses : Fruits edible.

2.2. *Meliosma pinnata* (Roxb.) Maxim. in Bull. Acad. Sci. St. Pet. 12: 64. 1867; Hook.f., Fl. Brit. India 2: 6. 1876; S.C. Majumdar in N.P. Singh *et al.*, Fl. India 5: 422. 2000. *Millingtonia pinnata* Roxb., Fl. Ind. 1: 103. 1820. ssp. ***pinnata***

Small to medium trees, up to 15 m tall. Leaves 6-10-jugate; leaflets lanceolate to oblong, upper leaflets \pm obovate-lanceolate, 5.5-13 x 1.5-2.5 cm, base acute, acuminate at apex, serrate and dentate along margins, coriaceous, glabrous, without domatia; lateral nerves ca 15 pairs; petiolules absent or 1-2 mm long. Panicles erect, terminal, 20-25 cm long with

spreading branches, flowers white, minute; sepals ovate, ciliate, glabrous; petals glabrous; ovary glabrous. Fruits glabrous, 3-4 mm across.

Fl. & Fr.: April to September.

Scarcely distributed in tropical hill forests. Lushai hills, *s. num.*, *Prazer* 1890 (CAL).

2. SABIA Colebr.

- 1a. Lofty climbers; nerves oblique, incurved . . . 2. *S. limoniacea*
 1b. Climbing shrubs; nerves horizontal :
 2a. Leaves large, up to 16 x 5.5 cm,
 glaucous beneath; panicles corymbose . . . 1. *S. lanceolata*
 2b. Leaves smaller, up to 10 x 4.5 cm,
 pale-pinkish beneath; panicles racemiform . . . 3. *S. parviflora*

1. *Sabia lanceolata* Colebr. in Trans. Linn. Soc. London 12: 355, t. 14, 1818; Hook.f., *Fl. Brit. India* 2: 2, 1876; Kanjilal *et al.*, *Fl. Assam* 1: 325, 1936; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 33, 1987; S.C. Majumdar in N.P. Singh *et al.*, *Fl. India* 5: 431, 2000.

Evergreen, scandent shrubs; bark dark brown-black, more or less smooth. Leaves bifarious, oblong-lanceolate, ovate-lanceolate or elliptic-lanceolate, 7-16 x 2-5.5 cm, acute or rounded at base, caudate, acuminate at apex, glabrous on both surfaces; lateral nerves 8-12 pairs; petioles 5-15 mm long. Panicles 4-7 cm long, terminal and axillary, occasionally supra-axillary, with corymbosely arranged peduncled cymes; flowers 4-5 mm across, greenish-white, aromatic; sepals broadly ovate, ca 1 mm long; petals ovate-lanceolate, 3-5 mm long. Fruits of 2 drupelets, obovoid, 1-2 cm long, blue when ripe; seeds reniform.

Fl. & Fr.: September-April.

Scarcely distributed in primary forests. Sairang, 670 m, *Deb* 30627; upper Thenzawl, *K.P. Singh* 93934.

2. *Sabia limoniacea* Wallich *ex* Hook. f. & Thomson, *Fl. Ind.* 1: 210, 1855; Hook.f., *Fl. Brit. India* 2: 3, 1876; Kanjilal *et al.*, *Fl. Assam* 1:

326. 1936; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 88. 1938; S.C. Majumdar in N.P. Singh *et al.*, *Fl. India* 5: 432. 2000.

Lofty climbers, up to 10 m tall; bark blackish, smooth. Leaves oblong or ovate-lanceolate, 7-15 x 2-4 cm, base rounded or subacute, acute or acuminate at apex, entire along margins, thickly coriaceous, dark green above, pale-pinkish below, glabrous to sparsely pubescent. Panicles axillary-supra-axillary, racemiform, reddish, 7-13 cm long, glabrous, many-flowered; flowers minute, *ca* 2 mm long; sepals with ciliate margin, broadly ovate; petals elliptic, 1-2.5 mm long. Fruits with 1-2 drupelets, globose, 10-15 mm across, red when ripe.

Fl. & Fr.: November-May.

Rather common in evergreen forests. *Parry* (*vide* C.E.C. Fischer, *l.c.*); Kheitem, *Deb* 31208.

3. *Sabia parviflora* Wallich [Cat. 28, no. 1001, (1829) *nom. nud.*] *ex* Roxb., *Fl. Ind.* 2: 310. 1824; Hook. *f.*, *Fl. Brit. India* 2: 2. 1876; Kanjilal *et al.*, *Fl. Assam* 1: 325. 1936; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 1938; S.C. Majumdar in N.P. Singh *et al.*, *Fl. India* 5: 433. 2000.

Evergreen, scandent shrubs; young branches thinly pubescent. Leaves ovate-oblong or ovate-lanceolate, 5-10 x 1.5-4.5 cm, base rounded, acuminate at apex, coriaceous, wavy along margins, glabrous, pale beneath; lateral nerves 8-10 pairs; petioles 5-10 mm long. Panicles with dichotomous cymes, 7-12-flowered; flowers minute, greenish-yellow; sepals ciliate, ovate, *ca* 1.5 x 1 mm; petals oblong 2-3 x 1 mm. Fruits with 1-2 drupelets, obovoid, oblong or subglobose, 0.5-1 cm across.

Fl. & Fr.: December-August.

Tuipang, 1250 m, *Parry* 475 (*vide* C.E.C. Fischer, *l.c.*).

ANACARDIACEAE

(K.P. Singh)

1a. Leaves simple:

2a. Drupes on a fleshy hypocarp:

- 3a. Stamen 8-10; carpel solitary ...1. *Anacardium*
- 3b. Stamens 5; carpels 3, syncarpous ...7. *Semecarpus*
- 2b. Drupes not on a fleshy hypocarp:
- 4a. Petals enlarging like wing; stamens 5;
drupes sessile ...9. *Swintonia*
- 4b. Petals remain unchanged; stamens variable;
drupes pedicelled :
- 5a. Ovary inferior; fertile stamens 4-54. *Drimycarpus*
- 5b. Ovary superior; fertile stamens 1 or 10:
- 6a. Fertile stamens 1 only; carpel 1-celled;
drupes large, fleshy with fibrous stone ...5. *Mangifera*
- 6b. Fertile stamens 8, carpels 5-6 (one only perfect);
drupes small with bony stone ... 2. *Buchanania*
- 1b. Leaves imparipinnate:
- 7a. Stamens 5; carpels 3 ... 6. *Rhus*
- 7b. Stamens 10; carpels usually 5 :
- 8a. Flowers unisexual; disc 10-lobed ... 3. *Choerospondias*
- 8b. Flowers bisexual; disc 5-lobed ... 8. *Spondias*

1. ANACARDIUM L.

Anacardium occidentale L., Sp. Pl. 383. 1753; Hook. f., Fl. Brit. India 2: 20. 1876; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 33. 1987; Chandra & Mukerjee in N.P. Singh *et al.*, Fl. India 5: 437. 2000.

Small or middle sized trees, 4-10 m tall with oval crown. Leaves crowded at the ends of branchlets, alternate, obovate to oblanceolate, 4-18 x 2-9 cm, base acute to cuneate, obtuse or rounded at apex, entire, coriaceous, glabrous; lateral nerves ca 10 pairs; petioles 5-18 mm long. Panicles terminal or upper axillary, 10-15 cm long, flowers 1-2 cm across, white or yellow with red streaks; calyx lobes 5, ovate-lanceolate, caducous; petals 5, linear-lanceolate; reflexed, imbricate, ca 12 x 2 mm; stamens 8-10; ovary obovoid, unilocular, stigma minute. Drupes 2-3 cm across, reniform, indehiscent, greyish, hard, attached to a fleshy, swollen, obconic, yellow to red receptacle or hypocarp.

Fl. & Fr.: March-August.

It is usually cultivated near villages for edible cotyledons; also seen in wild. Bunglang-Aizawl, *Deb* 31469; Lungleh, *Dutta* 33391.

2. BUCHANANIA Spreng.

Buchanania sessilifolia Blume, Mus. Bot. 1: 185. 1850; Chandra & Mukerjee in N.P. Singh *et al.*, Fl. India 5: 445. 2000. *Buchanania acuminata* Turcz., Bull. Soc. Nat. Mosc. 1: 472. 1858; Hook.f., Fl. Brit. India 2: 24. 1876; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 88. 1938.

Small evergreen trees, up to 10 m tall, all parts glabrous. Leaves obovate or oblanceolate or elliptic-oblong 10-15 x 4-6 cm, base narrowed, abruptly acuminate at apex, glabrous, glossy; petioles absent, rarely up to 1 cm long. Panicles axillary, branched, slender, exceeding the leaves, 15-18 cm long, lax flowered; flowers 2-3 mm across, white; sepals small, orbicular, pubescent; petals erect, oblong, glabrous, ca 2 x 1 mm; stamens 8. Drupes obliquely orbicular, 6-8 mm across, compressed.

Fl. & Fr.: July-August.

In forests along river banks. *s.loc.* 750-810 m, *Wenger* 301, 341 (*vide* C.E.C. Fischer, *l.c.*).

3. CHOEROSPONDIAS Burt.

Choerospondias axillaris (Roxb.) Burt. & Hill. in Ann. Bot. n.s. 1: 254. 1937; Chandra & Mukerjee in N.P. Singh *et al.*, Fl. India 5: 448. 2000. *Spondias axillaris* Roxb., Fl. Ind. 2: 453. 1832; Hook.f., Fl. Brit. India 2: 42. 1876. *Theikhuangchawm* (Lushai).

Large trees, 20-30 m tall. Leaves up to 30 cm long; petioles slender, 5-9 cm long; leaflets 3-7 pairs, shortly petiolulate, ovate-lanceolate, 7-10 x 2.5 cm, obliquely rounded at base, apex acuminate, serrate along margins; petiolules up to 5 mm long. Panicles up to 15 cm long; flowers solitary, ca 6 mm across; sepals acute; petals elliptic, ca 2 mm long, subacute; stamens 10; disc annular, 10-lobed; ovary 5-celled; styles 5, short, erect; stigma capitate. Drupes oblong, up to 3.5 cm long, yellow when ripe.

Fl. & Fr.: February-December.

Dampui, 900 m, *M. Sawmtiana* 107463.

Uses : Fruits edible; wood used in construction.

4. DRIMYCARPUS Hook. f.

Drimycarpus racemosus (Roxb.) Hook. f. in Benth. & Hook. f., Gen. Pl. 1: 424. 1862; Hook. f., Fl. Brit. India 2: 36. 1876; Kanjilal *et al.*, Fl. Assam 1: 337. 1936; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 33. 1987; Chandra & Mukerjee in N.P. Singh *et al.*, Fl. India 5: 454. 2000. *Holigarna racemosa* Roxb. [H. Beng. 22. (1814), *nom. nud.*], Fl. Ind. ed. 2, 2: 82. 1832. *Bombal* (Lushai). **Fig. 82.**

Large, evergreen trees, up to 25 m tall. Leaves lanceolate or oblong-lanceolate, 10-16 x 3-4.5 cm, base cuneate, acuminate at apex, coriaceous, wavy at margins, glabrous, shining above, glaucous beneath; lateral nerves 16-24 pairs; petioles 1-1.5 cm long. Panicles fascicled, axillary, pubescent, shorter than leaves; flowers unisexual, 1-2 mm across, white; male sessile, female on slender puberulous pedicels; calyx 5-lobed, oblong-acute, imbricate; petals 5, ovate, imbricate; stamens 5; ovary inferior, 1-celled. Drupes transversely ovoid-oblong, 1.5-2.5 cm in diam., red when ripe. 1-seeded.

Fl. & Fr.: September-April.

Scarce, in tropical evergreen forests. Changsil hill, *Prazer*, April 1890, *s.num.* (CAL); North Vanlaiphai, *Deb* 31141 (CAL); Lawngtalai, *Deb* 33755 (CAL); Sabual, *D.K. Singh* 99049.

5. MANGIFERA L.

- 1a. Panicles and calyx glabrous; flowers pedicelled;
disc cup shaped; drupes acuminate with protruded tip ... 2. *M. sylvatica*
- 1b. Panicles and calyx puberulous; flowers sessile or sub-sessile;
disc 4-5-lobed; drupes acute or obtuse at tip ... 1. *M. indica*

1. Mangifera indica L., Sp. Pl. 200. 1753; Hook. f., Fl. Brit. India 2: 13. 1876; Kanjilal *et al.*, Fl. Assam 1: 335. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 88. 1938; Chandra & Mukerjee in N.P. Singh *et al.*, Fl. India 5: 466. 2000. *Thei hai* (Lushai).

Large trees, up to 45 m tall with an oval crown. Leaves crowded at the end of branches, oblong-lanceolate or lanceolate-elliptic, 8-30 x 3-8

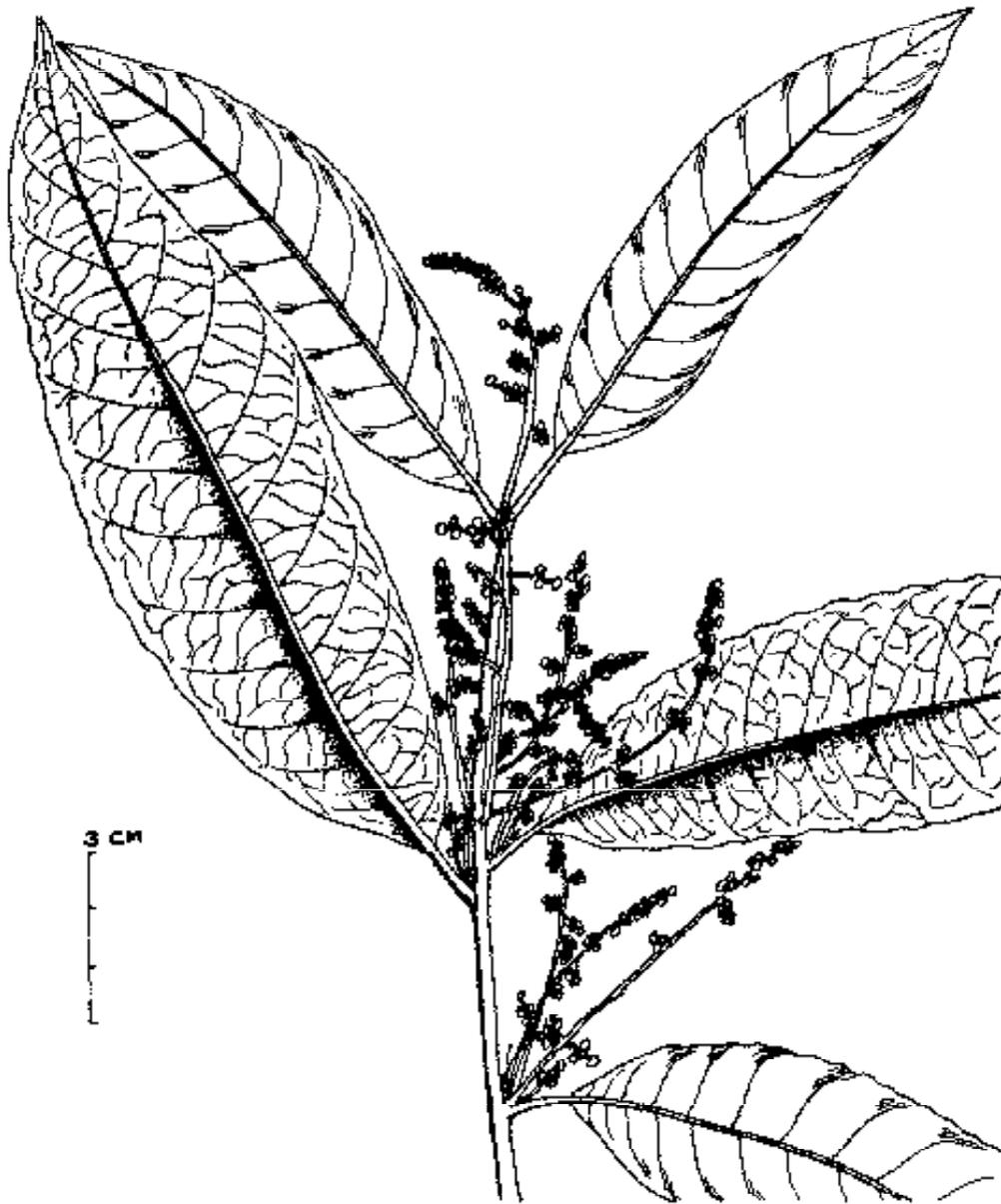


Fig. 82: *Drimycarpus racemosus* (Roxb.) Hook. *f.*

cm, base cuneate, acuminate at apex, undulate along margins, glabrous, coriaceous, dark green, pinkish when young; petioles up to 5 cm long. Panicles over 25 cm long, branched, terminal, pubescent; flowers ca 3.5 mm across, greenish or reddish-yellow, pentamerous; calyx lobes 5, ovate, puberulous; petals 5, oblong-obovate, ca 3 x 1 mm; disc 5-lobed glabrous; stamens 5, 1 fertile, rest sterile; ovary 1-celled, 1-ovuled. Drupes ovoid or ovoid-oblong, 8-12 cm long, with a blunt tip, compressed, fleshy, usually orange-yellow and sweet when ripe, 1-seeded.

Fl. & Fr.: February-July.

Cultivated in the gardens, *Wenger s.loc.* 351. (*vide* C.E.C. Fischer, *l.c.*); Saitual. *M. Sawmliana* 95531.

2. *Mangifera sylvatica* Roxb. [H. Beng. 18.(1814) *nom.nud.*] *ex* Wallich in Roxb., *Fl. Ind.* 2: 428. 1824; Hook. *f.*, *Fl. Brit. India* 2: 15. 1876; Kanjilal *et al.*, *Fl. Assam* 1: 336. 1936; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 88. 1938; Chandra & Mukerjee in N.P. Singh *et al.*, *Fl. India* 5: 469. 2000. *Theih hoi* (Lushai).

Evergreen trees, 20-36 m tall with a dense globose crown. Leaves oblong-lanceolate to elliptic-lanceolate, 6-25 x 1.5-3.5 cm, base acute, acute at apex, entire along margins, shining green above, pale beneath; petioles 2-6.5 cm long. Panicles 5-25 cm long, glabrous; flowers 4-5 mm across, pinkish-white; calyx 5-lobed, glabrous, small; petals 5, linear-lanceolate, ca 4 x 0.8 mm; disc annular with 5-ridges, grooved, villous; fertile stamens solitary; ovary obliquely oval. Drupes ovate, 8-10 x 2-3 cm, obliquely acuminate, often hooked; much compressed, fleshy, yellow when ripe, non fibrous, bitter in taste.

Fl. & Fr.: September-June.

600-1200 m, *Wenger s.loc.* 352, (*vide* C.E.C. Fischer, *l.c.*); Mizo hills. *Dutta* 33995 (CAL).

6. RHUS L.

- 1a. Leaflets glabrous beneath; margins entire; panicles axillary, pendulous; drupes orbicular, shining yellowish-brown ...2. *R. succedanea*
- 1b. Leaflets pubescent beneath; margins crenate-dentate; panicles terminal, straight; drupes subglobose, pinkish when ripe ...1. *R. chitensis*

1. *Rhus chinensis* Miller, Gard. Dict. ed. 8. sub. n. 7. 1768; Chandra & Mukerjee in N.P. Singh *et al.*, Fl. India 5: 486, 2000. *R. semialata* Murray in Comm. Sci. Soc. Goetting 5: 27. t. 3. 1784; Hook. f., Fl. Brit. India 2: 10. 1875; Kanjilal *et al.*, Fl. Assam 1: 331. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 88. 1938. *Khawmhma* (Lushai); *Thohmaw* (Lakhar).

Deciduous, medium sized trees, 6-12 m tall; young parts tomentose. Leaves imparipinnate, 7-13-foliolate. Leaflets sessile, elliptic to ovate or oblong-lanceolate, 4-14 x 2-8 cm, base oblique-rounded; acute or shortly acuminate at apex; crenate-dentate at margins, glabrous above except the nerves; grey tomentose beneath, coriaceous; lateral nerves 10-15 pairs. Panicles 15-30 cm long, terminal and axillary, conical; flowers 2-3 mm across, white or greenish-white, or yellowish. *Male flowers* : sepals ovate, pubescent; petals oblong, ciliate. *Female flowers* : ovary globose, pubescent. Drupes subglobose, 4-5 mm across, compressed, greenish-white, pinkish when ripe, young pubescent.

Fl. & Fr.: July-October.

Common, in evergreen forests on slopes or on roadsides. North Vanlaiphai, 1500 m, *Parry* 387, (*vide* C.E.C. Fischer, *l.c.*); *Leslie* 368 (CAL); Buangpui village, *K.P. Singh* 93818; Tuipui, *K.P. Singh* 94015; Kawlkulh-Hliapui road, *K.P. Singh* 94326; Pulo basti, *K.P. Singh* 94458; Phaileng, *D.K. Singh* 98977; Sangau, 1150 m, *Mao* 107183.

Uses : Fruits edible.

2. *Rhus succedanea* L., Mant. Pl. 2: 221. 1767; Hook. f., Fl. Brit. India 2: 12. 1876; Kanjilal *et al.*, Fl. Assam 1: 332. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 88. 1938; Chandra & Mukerjee in N.P. Singh *et al.*, Fl. India 5: 494, 2000. *Chhimhruk*, *Chimtouk* (Lushai).

Fig. 83.

Deciduous, medium sized trees, up to 20 m tall. Leaves crowded at the end of branchlets, 7-13-foliolate; common petiole 8-25 cm long; leaflets elliptic-oblong or oblong or ovate-lanceolate, 4.5-11 x 1.5-4 cm, base rounded or oblique, acuminate at apex, entire or recurved at margins, glabrous, thinly coriaceous, pinkish brown when young; lateral nerves 12-25 pairs; petiolules 3-8 mm long. Panicles 10-20 cm long, axillary with slender and drooping branches, glabrous; flowers 1.5-2 mm across,

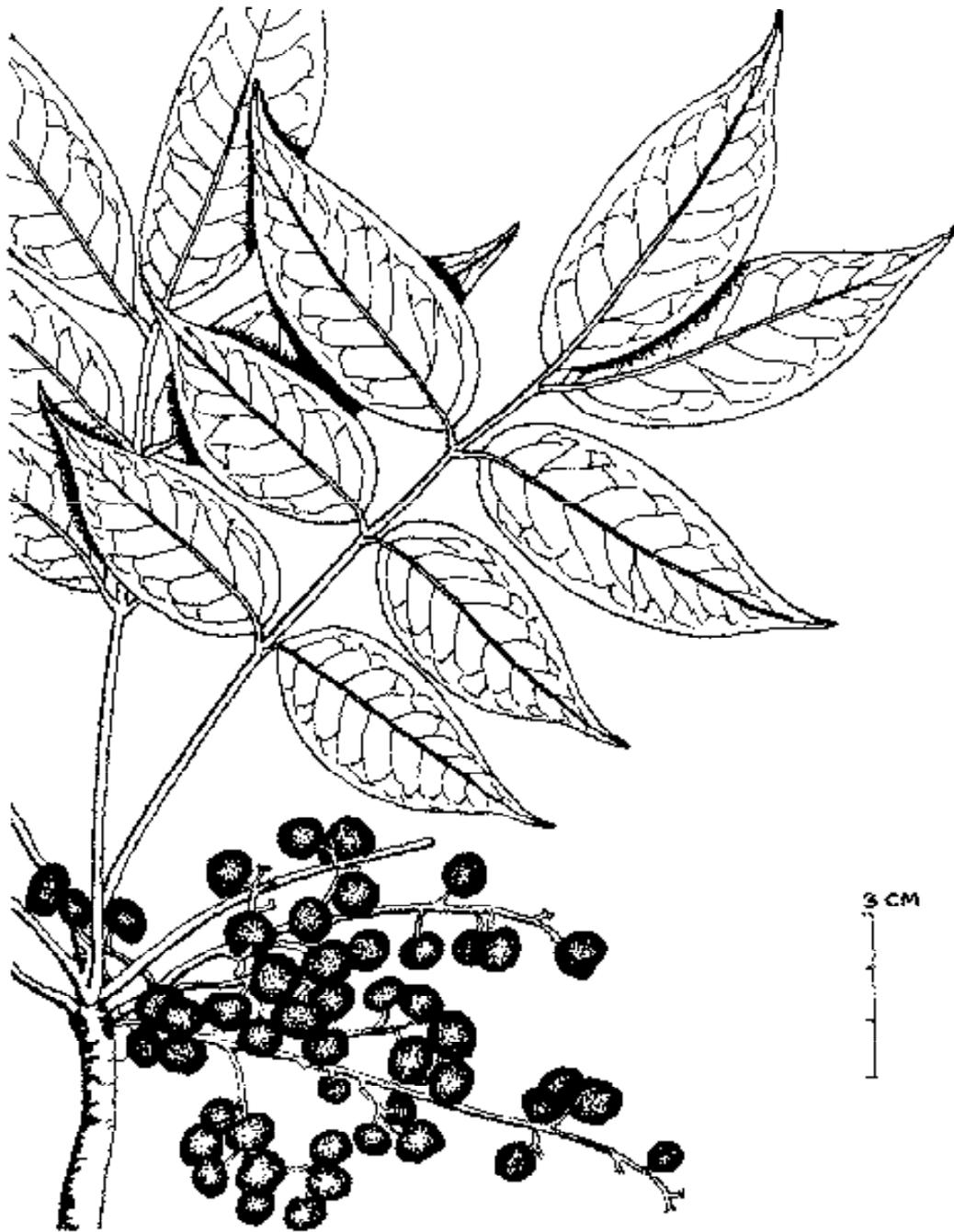


Fig. 83: *Rhus succedanea* L.

greenish-yellow. *Male flowers* : sepals ovate-obtuse; petals oblong; disc 5-lobed. *Female flowers* : ovary conical; stigma globose. Drupes obliquely orbicular, 5-8 mm across, compressed, shining, glabrous, yellowish-brown.

Fl. & Fr.: March-August.

Moderately common in dense forests. Tenchen, Neidown, *Leslie* 198 (CAL); North-Vanlaiphai, *D.K. Singh* 93079; Denlang, *K.P. Singh* 94109; New Champhai, *K.P. Singh* 94584.

7. SEMECARPUS L. f.

Semecarpus anacardium L. f., *Suppl. Pl.*: 182. 1781; *Hook. f.*, *Fl. Brit. India* 2: 30. 1876; *Kanjilal et al.*, *Fl. Assam* 1: 333. 1936; *Chandra & Mukherjee* in *N.P. Singh et al.*, *Fl. India* 5: 500. 2000.

Medium sized, deciduous trees, 10-14 m tall; young parts, petiole and panicle clothed with pale brown pubescence; bark dark brown to blackish-grey, exuding an acrid milky juice. Leaves simple, alternate, crowded at extremities of branches, elliptic-oblong or obovate-oblong, 10-30 x 5-16 cm, base cuneate or rounded, entire along the margins, rounded at apex, coriaceous, ± glabrous above, minutely pubescent beneath; lateral nerves (16-) 17-18 (-20) pairs, stout, raised; petioles 2.5-3.5 cm long, rounded. Panicle terminal, usually shorter than the leaves or rarely equalling, stout, tomentose, 5-15(-28) cm long. Flowers in fascicles on the branches of the panicles. *Male flowers*: ca 2 mm in diam., sessile; calyx obconic, pubescent outside; petals ca 2 x 1 mm, greenish white; stamens ca 2 mm long; filaments subulate; disc. 1 mm in diam. *Female flowers* ca 3 mm in diam.; ovary ca 1.5 in diam.; styles densely hairy. Drupes obliquely ovoid, 1.5-2.5 x 1.5-1.8 cm, glabrous, shining black; hypocarp fleshy, orange-red, 1-2 x 1-1.5 cm, pubescent.

Fl. & Fr.: July-May.

Kolasili- Sairang road, *K.P. Singh & G.P. Sinha* 107526.

8. SPONDIAS L.

Spondias pinnata (L. f.) *Kurz*, *Prelim. Rep. For & Veg. Pegu*, *Append. A* 44, B. 42, 1875; *Chandra & Mukerjee* in *N.P. Singh et al.*, *Fl. India* 5: 507. 2000. *Mangifera pinnata* L. f., *Suppl. Pl.* 156. 1781.

Spondias mangifera Willd., Sp. Pl. 2: 751. 1799; Hook. f., Fl. Brit. India 2: 42. 1876; Kanjilal *et al.*, Fl. Assam 1: 340. 1936; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 88. 1938. *Tawitaw* (Lushai); *Dangko* (Lakher).

Medium sized, deciduous trees. 10-25 m tall with aromatic smell. Leaves 28-43 cm long, imparipinnate; leaflets opposite, usually 3-5 pairs or sometimes more, elliptic-oblong, 5-20 x 3-8 cm, base subacute, abruptly long acuminate at apex, entire along margins, shining, glabrous; lateral nerves 10-30 pairs, joined by a strong submarginal nerve; petiolules 4-6 mm long. Panicles 10-30 cm long, axillary or terminal; flowers 2-3 mm across, pale green or creamy white, bisexual, sweet scented; calyx salver shaped, 5-6-lobed, pubescent; petals 5-6 glabrous; disc 5-lobed, fleshy. Drupes oblong-ovoid, 3-5 cm long, furrowed, greenish-yellow when ripe, 1-5-seeded; pulp acidic, soft, aromatic; stone semiwoody, fibrous.

Fl. & Fr.: February-October.

Common, in mixed forests. Pulo basti, 900-1000 m, K.P. Singh 94455; Teirei, D.K. Singh 99195; Saitual, M. Sawmliana 99268.

9. SWINTONIA Griffith

Swintonia floribunda Griffith, Proc. Linn. Soc. 1: 283. 1846; C.E.C. Fischer in Kew. Bull. 1931. 282. 1931 & in Rec. Bot. Surv. India 12(2): 88. 1938; Chandra & Mukerjee in N.P. Singh *et al.*, Fl. India 5: 509. 2000. *S. griffithii* Kurz, J. As. Soc. Bengal, 39(2): 75. 1970; Hook. f., Fl. Brit. India 2: 26. 1876. *S. helferi* Hook. f., Fl. Brit. India 2: 26. 1876.

Tress, 30-35 m tall. Leaves elliptic or elliptic-lanceolate, 11-18 x 2.5-5 cm, base acute, acuminate at apex, glabrous; petioles 2-4 cm long. Panicles 15-25 cm long, branched, glabrous; flowers bisexual, 3-4 mm across; pedicils 2-4 mm long; male flowers elongate, ca 2.5 x 1.5 mm; calyx lobes ca 1 mm long; petals ovate-oblong, ca 2 x 1 mm, puberulous on both sides; stamens 2-3 mm long; disc elongated; ovary sub conical; style simple with disciform stigma. Drupes oblong, ca 3 x 1.5 cm, glabrous, reddish in colour.

Fl. & Fr.: November-April.

In lowland hill forests. Wenger s. num. (*vide* C.E.C. Fischer. *l.c.*).

MORINGACEAE

(K.P. Singh)

MORINGA Adans

Moringa oleifera Lam., *Encycl. Meth. Bot.* 1: 398. 1785; Uniyal in N.P. Singh *et al.*, *Fl. India* 5: 516. 2000. *M. pterygosperma* Gaertner, *Fruct.* 2: 314. 1791; Hook. *f.*, *Fl. Brit. India* 2: 45. 1876.

Medium trees with soft wood; branches pubescent. Leaves up to 50 cm long; rachis thickened and articulated at base; leaflets 3-11, obovate, up to 2.4 x 1.5 cm; sparsely tomentose above, glabrous beneath; terminal larger than laterals, oblique sided at base, rounded at tip, laterals elliptic. Flowers hermaphrodite, in axillary panicles, ca 2 cm; calyx tube hairy, lobes petaloid, linear-lanceolate, reflexe across; petals white, anterior erect; anthers reflexed; stamens 5, filaments villous at base; anthers dorsifixed; ovary oblong, stipitate, 1-celled; style slender; stigma truncate, perforated; ovules many, biseriate on 3 parietal placentae. Fruit a capsule, elongate, beaked, 9-ribbed when young, 3-angled at maturity; seed many, testa corky, winged.

Fl. & Fr.: Feb.-May/June.

Commonly cultivated in the area.

CONNARACEAE

(D.K. Singh)

- | | |
|------------------------------------------|------------------------|
| 1a. Calyx persistent; follicles sessile | ... 2. <i>Rourea</i> |
| 1b. Calyx deciduous; follicles stipitate | ... 1. <i>Connarus</i> |

1. CONNARUS L.

Connarus paniculatus Roxb., *Fl. Ind.* 3: 139. 1832, Hook. *f.*, *Fl. Brit. India* 2: 52. 1876; Kanjilal *et al.*, *Fl. Assam* 2: 2. 1938; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 88. 1938; Mondal in N.P. Singh *et al.*, *Fl. India* 5: 529. 2000. *Hlulhlu, Hmehkehrep* (Lushai). **Fig. 84.**

Large, woody climbers; bark dark brown-black, rough. Leaves imparipinnate, up to 35 cm long; rachis terete; leaflets 3-7, subpeltate,

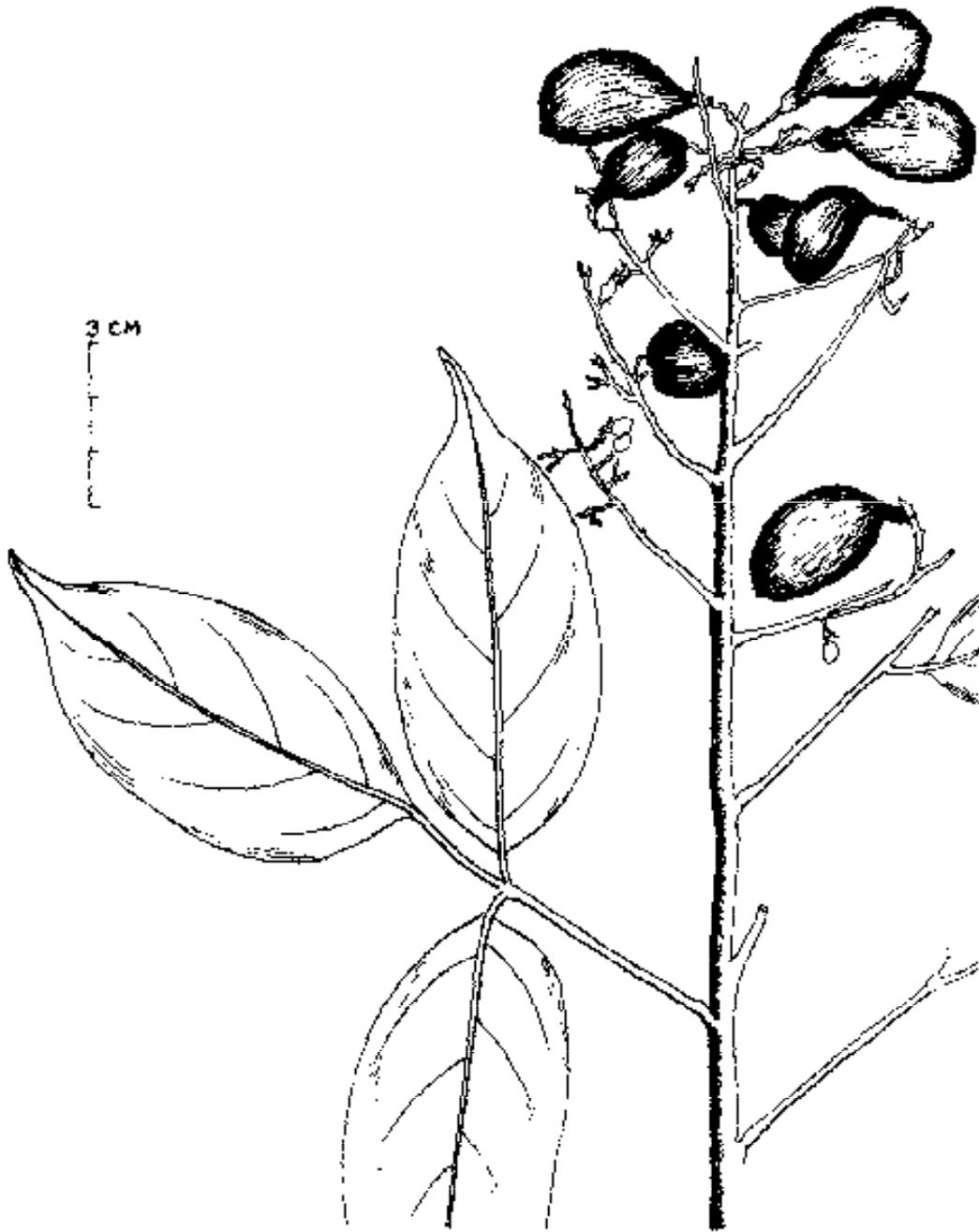


Fig. 84: *Connarus paniculatus* Roxb.

elliptic-oblong, elliptic-ovate or elliptic-lanceolate, 7-15 x 2-5 cm, round or obtuse at base, shortly acuminate, coriaceous, glabrous; petiolules 5 mm long. Panicles 12-30 cm long, terminal, rusty tomentose; flowers white to pinkish-white, 6-7 mm long; sepals linear-oblong, ca 4 mm long, pubescent, thick and persistent; petals linear-oblong, more than twice as long as sepals, densely to sparsely pubescent or tomentose on both sides. Follicles inflated, ovoid, 2.5-4 x ca 2 cm, slightly compressed, obliquely striated outside; seeds arillate.

Fl. & Fr.: October-May.

Fairly common, in mixed evergreen forests at lower elevations. Lungleh 1000 m, *Gage* 27 (CAL); Tepaimukh, *U. Kanjilal* 4780; Hmuifang, *G.K. Deka s.num.* (CAL); Aizawl protected forest, 1050 m, *Deb* 30527; Theiriak, *Deb* 31288; Upper Thenzawl, *K.P. Singh* 93906; Kawnpui, *K.P. Singh* 97030.

2. ROUREA Aubl.

Rourea minor (Gaertner) Leenh. in *Fl. Males.* Ser. 1, 5: 514. 1958; Mondal in *N.P. Singh et al.*, *Fl. India* 5: 538. 2000. *Aegiceras minor* Gaertner, *Fruct.* 1: 216. t. 46. 1788. *Rourea caudata* Planchon in *Linnaca* 23: 419. 1850; Hook. f., *Fl. Brit. India* 2: 48. 1876; Kanjilal *et al.*, *Fl. Assam* 2: 2. 1938. *Pho-Arh* (Lushai).

Large evergreen lianas or climbing shrubs; bark dark brown. Leaves unifoliate to imparipinnate, common petiole terete; leaflets 5-9, rarely up to 13, ± alternate, oblong-lanceolate or ovate-lanceolate, oblanceolate, 6-10 x 1.7-2.6 cm, rounded or obtuse at base, caudate-acuminate at apex, entire along margins, membranous to subcoriaceous, glabrous and shining on both sides; petiolules 3-4 mm long; lateral nerves 4-7 pairs. Panicles axillary or pseudo terminal, up to 10 cm long, many-flowered, glabrous; flowers white, 0.5-1 cm across; calyx lobes ovate-oblong, persistent, 2-3 mm long; petals oblong, 3-5 mm long. Fruits (follicles) obliquely ellipsoid, slightly curved, tapering to a point, 1.8-2.5 x 0.8-1.2 cm; seed solitary, oblong, 1-2 cm long, enveloped by a red aril.

Fl. & Fr.: January-June.

Scarce. Serzawl, alt 1300 m, *M. Sawmliana* 101750.

Uses: Fruits edible.

FABACEAE

(K.P. Singh)

1a. Leaves 1-foliolate or 3-foliolate :

2a. Leaves 1-foliolate :

3a. Bracts and bracteoles large, opposite, concealing the flowers; petioles swollen at both ends ... 13. *Dalhouisia*

3b. Bracts and bracteoles not concealing the flowers or conduplicate; petioles otherwise :

4a. Stipules absent; pods not jointed :

5a. Keeled petal beaked distally; pods 2-many-seeded ... 11. *Crotalaria*

5b. Keeled petal rounded or acute, not beaked distally; pods 1-2-seeded :

6a. Usually unbranched shrubs or undershrubs; leaves less than 1 cm wide ... 18. *Eriosema*6b. Usually branched shrubs; leaves more than 3 cm wide ... 21. *Flemingia*

4b. Stipules present; pods jointed; segments 1-seeded:

7a. Calyx papery with prominent parallel veins ... 3. *Alysicarpus*

7b. Calyx herbaceous or otherwise:

8a. Pod segments folded on top of one another or coiled in a circle; pedicel hooked distally ... 35. *Uraria*8b. Pod segments in a \pm straight line; pedicels not hooked distally ... 15. *Desmodium*

2b. Leaves 3-foliolate:

9a. Leaves digitately 3-foliolate:

10a. Flowers usually pink or purplish; keeled petal unbeaked; pods 1-2-seeded ... 21. *Flemingia*10b. Flowers usually yellow (except *C. khasiana* where it is blue); keeled petal strongly beaked; pods more than 2-seeded ... 11. *Crotalaria*

9b. Leaves pinnately 3-foliolate:

- 11a. Prostrate or erect herbs, shrubs or trees,
never twinning; lateral leaflets \pm symmetrical at base:
- 12a. Shrubs or trees; flowers 2.5-5 cm across,
red or orange:
- 13a. Erect shrubs; stipels subulate; flowers
orange-red; pods oblong containing
one distal seed ... 25. *Melzotropis*
- 13b. Trees.
- 14a. Stipels knobby; flowers red;
pods 2-8-seeded ... 19. *Erythrina*
- 14b. Stipels subulate; flowers orange;
pods 1-seeded ... 6. *Butea*
- 12b. Herbs or shrubs; flowers less than
2 cm across, variously coloured :
- 15a. Stipels absent; pods 1-seeded ... 8. *Campylotropis*
- 15b. Stipels present; pods 2 or more-seeded:
- 16a. Flowers whitish, pink or purple;
pods not grooved between the seeds ... 15. *Desmodium*
- 16b. Flowers yellow or reddish-purple; pods oblong,
obliquely grooved between the seeds:
- 17a. Seeds with a large grooved strophiole ... 5. *Atylosia*
- 17b. Seeds lacking strophiole ... 7. *Cajanus*
- 11b. Woody or herbaceous twinters; lateral leaflets usually
very asymmetric at base (except *Shuteria*), rarely climbing
or suberect (in *Vigna*, *Rhynchosia*, *Spatholobus*):
- 18a. Pedicels borne on short glandular,
tumid on inflorescence axis:
- 19a. Flowers ca 1 cm long, borne in branched
terminal panicles; pods distally 1-seeded
and constricted at base ... 33. *Spatholobus*
- 19b. Flowers more than 1 cm long, borne in axillary
or terminal racemes; pods 2 or more seeded:
- 20a. Flowers 3.0-5.5 cm long; pods 1.5-7.0 cm
broad, \pm terete, coraceous or woody:

- 21a. Petals dark purple; standard petal shorter than wings; pods either constricted between the seeds or covered with irritant hairs ...27. *Mucuna*
- 21b. Petals not dark purple, pink or purplish; standard petals longer than wings; pods neither constricted between the seeds nor covered with irritant hairs:
- 22a. Calyx strongly bilabiate, keel petal \pm straight; pods compressed, glabrous, strongly ribbed along lower suture ...9. *Canavalia*
- 22b. Calyx scarcely bilabiate, keel petal strongly incurved; pods terete, densely brown tomentose ...17. *Dysolobium*
- 20b. Flowers less than 3 cm long; pods 0.5-1.5 cm broad (except *Lablab*); valves thin membranous:
- 23a. Keel petal curled like a circle; pods less than 0.5 cm broad, \pm terete .. 36. *Vigna*
- 23b. Keel petal not curved; pods more than 0.5 cm wide, compressed:
- 24a. Keel hook-shaped; pods 20-30 mm wide, sublunate bearing persistent style base ...23. *Lablab*
- 24b. Keel \pm straight or incurved; pods narrowly oblong, 8-12 mm broad ...28. *Pueraria*
- 18b. Pedicels borne on not tumid inflorescence axis:
- 25a. Leaflets yellowish or reddish, gland dotted beneath (sometimes sparse in *Cajanus* and *Rhynchosia*); flowers yellow:
- 26a. Pods 4-11-seeded; pods not grooved between the seeds ...16. *Dunbaria*
- 26b. Pods 3-9-seeded; pods grooved between the seeds or 2-seeded:
- 27a. Pods 2-seeded; leaflets 9-13 x 4-7 cm ...29. *Rhynchosia*
- 27b. Pods 3-6-seeded; leaflets 2-10 x 1-8 cm:
- 28a. Seeds strophiolate ...5. *Atylosia*
- 28b. Seeds estrophiolate ...7. *Cajanus*
- 25b. Leaflets not gland dotted beneath; flower colour otherwise:

- 29a. Standard petal reflexed with a lamelliform appendage on either side of mid line in lower half ...24. *Macrotyloma*
- 29b. Standard petal without such appendage near the mid line in lower half:
- 30a. Standard petal much exceeding than other petals, placed lower most in flower ...10. *Clitoria*
- 30b. Standard petal not much longer than other petals, placed upper most in flower:
- 31a. Flowers borne solitary on inflorescence axis; claw of wing and keeled petals longer than blade ...31. *Shuteria*
- 31b. Flowers borne in clusters of 3-6 on inflorescence axis; claw of wing and keeled petal shorter than blade ...28. *Pueraria*
- 1b. Leaves simply pinnate:
- 32a. Leaves paripinnate:
- 33a. Twining slender herbs; flowers pinkish ...1. *Abrus*
- 33b. Shrubs; flowers yellow ...30. *Sesbania*
- 32b. Leaves imparipinnate:
- 34a. Herbaceous twiners:
- 35a. Lateral leaflets asymmetric at base; flowers in racemes; standard petal shorter than keel and uppermost in flower; style coiled ...4. *Apios*
- 35b. Lateral leaflets symmetric at base; flowers solitary, axillary; standard petal longer than other petals and lowermost in flower; style \pm straight ...10. *Clitoria*
- 34b. Woody trees or erect - climbing shrubs:
- 36a. Leaflets alternate ...12. *Dalbergia*
- 36b. Leaflets opposite or rarely subopposite:
- 37a. Petioles winged; petals white; pods \pm fleshy, 1-seeded ...20. *Euchresta*
- 37b. Petioles unwinged; petals otherwise; pods not fleshy, 1-12-seeded:

- 38a. Stamens nearly free or rarely connate
at base, pods distinctly disantly
moniliform ...32. *Sophora*
- 38b. Stamens monadelphous or diadelphous :
- 39a. Anthers apiculate; pods linear,
inflated, ± terete ...22. *Indigofera*
- 39b. Anthers obtuse; pods compressed
or if terete then torulose :
- 40a. Leaflets elliptic or oblong, 1-1.5 cm broad,
obliquely parallel veined;
standard petal more than 1.5 cm broad;
pods narrowly oblong, 7-8 mm broad ...34. *Tephrosia*
- 40b. Leaflets elliptic, obovate, 2-7 cm broad,
not parallel veined; standard petal less than
1 cm broad; pods broader:
- 41a. Anthers basifixed; pods dehiscent,
not winged, pubescent ...26. *Milletia*
- 41b. Anthers versatile; pods indehiscent,
winged along one or both sutures, glabrous:
- 42a. Flowers in axillary racemes or panicles
with the nodes often produced into
short branchlets; stamens monadelphous ...14. *Derris*
- 42b. Racemes in ample thyrsoid panicles with
the nodes not produced into branchlets;
stamens diadelphous ...2. *Aganope*

1. ABRUS Adans.

Abrus pulchellus Wallich [Cat. 5819. (1831-32), *nom. nud.*] ex
Thwaites, Enum. Pl. Zeyl. 91. 1859; Baker in Hook. f. Fl. Brit. India 2:
176. 1876; Kanjilal *et al.*, Fl. Assam 2: 62. 1938.

Twining shrubs. Leaves 5-12 cm long, paripinnate; leaflets 12-24,
oblong, 1.5-2.5 x 0.6-1 cm, obtuse and rounded at base and apex, glabrous
above, appressed pubescent beneath; stipels subulate; stipules lanceolate.
Peduncles 5-12 cm long, accrescent; flowers 1-1.2 cm long, pinkish; calyx
3-4 mm long; keeled petal curved and pointed. Pods oblong, 6-10 x 0.8-1
cm, compressed, adpressed pubescent, 8-12-seeded; seeds oblong, ca 5
mm long, compressed, brown.

Fl. & Fr.: September-December.

Scarce, along roadside ridges in moist place. Kawlbkuth-Tuichang. *K.P. Singh* 94447.

2. AGANOPE Miq.

Aganope thyrsiflora (Benth.) Polhill, Kew Bull. 25: 268. 1971. *Millettia thyrsiflora* Benth. in Miq., Pl. Jungh. 249. 1852. *Derris thyrsiflora* (Benth.) Benth., J. Linn. Soc. 4(suppl.): 114. 1860; Baker in Hook. f., Fl. Brit. India 2: 246. 1878; Kanjilal *et al.*, Fl. Assam 2: 113. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89. 1938. *Huthu* (Lushai).

Woody climbers. Leaves 20-35 cm long, glabrous; leaflets 5-9, elliptic to oblong-lanceolate, 5-15 x 3-6 cm, base rounded or cuneate, abruptly acuminate at apex, quite entire along margins, glabrous, coriaceous; lateral nerves 5-9 pairs; petiolules 5-10 mm long. Panicles terminal, up to 40 cm long, with many racemose branches; flowers whitish. Pods flat with narrow wings on both sutures. 4-10 x 1.5-3 cm, thin, glabrous, 1-3-seeded.

Fl. & Fr.: August-January.

Very common in evergreen forests. Valley near fort Lungleh, 900 m, Gage 32 (CAL); Aizawl-Taitaw, Dutta 33226; Sairep, Dutta 33547; Thazawl, *K.P. Singh* 94232; Kawnpui to Hartawki, *D.K. Singh* 93257; North Vanlaiphai *D.K. Singh* 93074; Zowbak, *K.P. Singh* 96719; Sawleng, *K.P. Singh* 97117.

3. ALYSICARPUS Neek ex Desv.

Alysicarpus glumaceus (Vahl) DC., Prodr. 2: 353. 1825. *Hedysarum glumaceum* Vahl, Symb. Bot. 2: 106. 1791. *Alysicarpus rugosus* (Willd.) DC., Prodr. 2: 353. 1825; Baker in Hook. f., Fl. Brit. India 2: 159. 1876.

Fig. 85.

Erect herbs, 15-60 cm high, glabrous. Leaves 1-foliolate; leaflets elliptic or lanceolate, 3-6 x 0.4-1.5 cm, base cuneate, acute at apex, glabrous above, minutely pubescent with hairs on veins; sessile or petiolate; petioles 3-4 mm long specially lower ones; stipules lanceolate, scarious. Racemes terminal and axillary; bracts ovate; calyx papery, deeply divided,



Fig. 85: *Alysicarpus glumaceus* (Vahl) DC.

teeth imbricate at base, parallel veined, ciliate; petals reddish-dark violet. Pods linear, 1.5-2 x 0.2 cm, compressed, transversely constricted into 3-6 elliptic segments, rugose, minutely hairy when young, concealed within accrescent calyx; segments 1-seeded.

Fl. & Fr.: September-November.

Scarce, in open grassy lands in moist places. Hlabung, *K.P. Singh* 94264.

4. APIOS Fabr.

Apios carnea (Wallich) Benth. ex Baker in Hook. *f.*, *Fl. Brit. India* 2: 188. 1876; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 89. 1938. *Cyrtotropis carnea* Wallich [Cat. 5527. (1831-32), *nom. nud.*], *Pl. Asiat. Rar.* 1: 50, t. 62. 1830.

Twining herbs; stems slender. Leaves pinnately 3-7-foliolate; leaflets oblong, 4-10 x 2-5 cm, base cuneate, long acuminate at apex, entire, membranous, opposite, glabrous; petiolules 2-3 mm long. Flowers in long-peduncled flexuose racemes, 2-2.5 cm long, white-purplish; calyx 5-8 mm long, green; lobes unequal; corolla 1.5-2 cm long, much exserted; stamens diadelphous. Pods linear, 10-14 x 0.5-1 cm, compressed, glabrous, 12-14-seeded.

Fl. & Fr.: August-November.

Common in clearing forests. Lushai hills, 750-900 m, *Wenger* 210, (*vide* C.E.C. Fischer, *l.c.*).

5. ATYLOSIA Wight & Arn.

Atylosia burmanica Coll. et Hemsl. in *J. Linn. Soc.* 28: 48. 1891; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 33. 1987.

Climbers. Leaves 3-foliolate; petioles 3-8 cm long; leaflets ovate-rhomboid, lateral ones oblique, 6-14 x 5-9.3 cm, base rounded, acuminate at apex, glabrous above, adpressed pubescent beneath; petiolules up to 10 mm long. Racemes axillary, up to 3 cm long, densely flowered; flowers ca 2.5 cm long, yellow; calyx sub-bilabiate, pubescent, ca 1.5 cm long; lobes deltoid; vexillum obovate-rotund. Pods ca 4 cm long, tomentose.

Fl. & Fr.: October-February.

Sairang, 1980 m, *Deb* 30584.

6. BUTEA Roxb. ex Willd.

Butea monosperma (Lam.) Taub. in Engler & Prantl, *Nat Pflanzenfam.* 3, 3: 365. 1894. *Erythrina monosperma* Lam., *Encycl.* 2: 391. 1786. *Butea frondosa* Roxb. (*Asiat. Res.* 3: 469. 1792) ex Willd., *Sp. Pl.* 3: 917. 1802, *nom. superfl.*; Baker in Hook. *f.*, *Fl. Brit. India* 2: 194. 1876; Kanjilal *et al.*, *Fl. Assam* 2: 73. 1938.

Medium sized trees, up to 20 m tall; young parts softly silky; bark rough, blackish-brown. Leaves large, up to 50 cm long, 3-foliolate, common petiole 12-20 cm long; leaflets obliquely ovate, rhomboid, terminal, broadly obovate, 12-20 x 11-18 cm, cuneate or rounded at base, apex obtuse or emarginate, coriaceous, glabrescent and shining above, silky tomentose beneath; stipules tomentose; lateral nerves 4-7 pairs, arched; petiolules 5-8 mm long. Flowers in dense racemes forming terminal panicles, appearing while almost leafless, 5-7 cm long, bright orange-red, falcate; calyx densely brown, pubescent; petals silvery tomentose outside; standard 4-5 x 1.5 cm, strongly upcurved and beaked. Pods oblong, 10-15 x 3-4 cm, brownish, pubescent containing one distal seed; seeds dark-brown.

Fl. & Fr.: February-August.

Recorded on the basis of J.H. Lalramnghinglova, (*J. Econ. Tax. Bot. Add. Ser.* 12: 448. 1996).

7. CAJANUS DC.

- 1a. Erect shrubs; leaflets elliptic or oblong-lanceolate;
flowers in corymbose cymes ... 1. *C. cajan*
- 1b. Woody climbers; leaflets ovate-rhomboid;
flowers in terminal or axillary racemes ... 2. *C. goensis*

1. *Cajanus cajan* (L.) Millsp., *Field Columb. Mus. Bot.* 2, 53. 1900; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 34. 1987. *Cytisus cajan* L., *Sp. Pl.* 739. 1753. *Cajanus indicus* Spreng., *Syst. Veg.* 3: 248. 1826; Baker in Hook. *f.*, *Fl. Brit. India* 2: 217. 1876; Kanjilal *et al.*, *Fl. Assam* 2: 97. 1938.

Erect shrubs, up to 3 m tall with slender silky branchlets. Leaves 3-foliolate; petioles 1-4 cm long; leaflets narrowly elliptic or oblong-lanceolate, 3.5-8 x 1-2.5 cm, base cuneate, acute or acuminate at apex, entire, densely silky beneath; stipules minute, caducous; lateral nerves 5-6 pairs; petiolules *ca* 2 mm long. Flowers in loose corymbose cymes; calyx gland pubescent; teeth triangular, short; corolla yellow with red veins. Pods acuminate, 4-7 x 0.7-1 cm, torulose, obliquely grooved between the seeds, hirsute, 3-5-seeded; seeds subglobose, 6-7 mm in diam., \pm compressed, brownish-reddish or blackish.

Fl. & Fr.: April-February.

Usually cultivated. North Vanlaphai, *Leslie* 320 (CAL); Sialsuk, *Deb* 30839.

Uses : Seeds are used as pulses and leaves as fodder.

2. *Cajanus goensis* Dalz. in Hook., *J. Bot. Kew Gard. Misc.* 2: 264. 1850. *Atylosia goensis* (Dalz.) Dalz. in *J. Linn. Soc. Bot.* 13: 186. 1873. *Dunbaria barbata* Benth. in *Miq., Pl. Jungh.* 242. 1852. *Atylosia barbata* (Benth.) Baker in Hook. *f., Fl. Brit. India* 2: 216. 1876; Kanjilal *et al.*, *Fl. Assam* 2: 97. 1938; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 33. 1987. *Zawngbete* (Lushai).

Woody climbers with pubescent terete branches. Leaves 3-foliolate; petioles 2-4 cm long; leaflets ovate-rhomboid, 2-10 x 3-8 cm, base broadly rounded or subcordate, acuminate-cuspidate at apex, subcoriaceous, green and hispid above, softly pubescent beneath; petiolules *ca* 2 mm long; stipules subulate, stipels bristle like. Racemes terminal or axillary 7-15 cm long; bracts ovate, densely hairy; calyx greenish-grey, lanceolate; corolla yellowish, *ca* 1.6 cm long. Pods compressed, 4-5 x 1.2 cm, narrowly beaked, spreading, brown, hairy, 5-6-seeded.

Fl. & Fr.: August-February.

Thaithlang, *Dutta* 33929; Thenzawl, *K.P. Singh* 93804, 93942.

8. CAMPYLOTROPIS Bunge

- | | |
|------------------------------|----------------------------|
| 1a. Calyx and pods glabrous | ... 2. <i>C. prainii</i> |
| 1b. Calyx and pods pubescent | ... 1. <i>C. eriocarpa</i> |

1. **Campylotropis eriocarpa** (DC.) Schindler, Fedde Rep. 11: 347. 1912. *Lespedeza eriocarpa* DC., Ann. Sci. Nat. Paris 4: 102. 1825; Baker in Hook. f., Fl. Brit. India 2: 144. 1876; Kanjilal *et al.*, Fl. Assam 2: 34. 1938.

Branched undershrubs, up to 2 m tall; branches angular, pubescent. Leaves 3-foliolate; common petiole 1-3 cm long, adpressed pubescent; leaflets obovate, 1-2.5 x 0.5-1.5 cm, cuneate at base, mucronate at apex, subcoriaceous, glabrous and strongly veined above, grey canescent beneath; petiolules short, pubescent. Racemes axillary; peduncles 5-8 cm long; flowers 1-2 cm long, deep purple; bracts setaceous; calyx densely hairy, 4-6 mm long; teeth linear; corolla 5-8 mm long; keel incurved. Pods oblong, 10-15 mm long, apiculate, pubescent, compressed, 1-seeded.

Fl. & Fr.: September-January.

Common in open places. Blue mountain, *Mao* 107169.

2. **Campylotropis prainii** (Coll. *et* Hemsl.) Schindler in Fedde. Rep. 11: 342. 1912; Deb & Dutta in J. Econ. Tax. Bot. 10(1):35.1987. *Lespedeza prainii* Coll. *et* Hemsl. in J. Linn. Soc. 28: 46. 1891. **Fig. 86.**

Erect shrubs, with puberulous-glabrescent branches. Leaves 3-foliolate, 3.5-6 cm long; petioles hairy, thin, 2.5-3.5 cm long; leaflets 1.2-2.8 x 0.5-1.4 cm, terminal leaflet larger than two laterals, obovate, rotund-apiculate at apex, base cuneate, glabrous above, pale, minutely hairy beneath; petiolules small, *ca* 1 mm long, hairy; stipules 5-6 mm long, persistent. Racemes dense, axillary; flowers 1.5-2 cm long, purple; calyx ovate, glabrous; petals subequal, glabrous. Pods ovate-oblong, 12-15 x 6-7 mm, compressed, glabrous, winged, apiculate at apex, one-seeded; seeds *ca* 5 x 3 mm, brown, compressed, oblong.

Fl. & Fr.: September-October.

Scarce in the area. Champhai-Myanmar border, 900-1500 m *Deb* 32035 (CAL).

9. CANAVALIA DC.

Canavalia ensiformis (L.) DC., Prodr. 2: 404. 1825; Baker in Hook. f., Fl. Brit. India 2: 195. 1876; C.E.C. Fischer in Rec. Bot. Surv. India

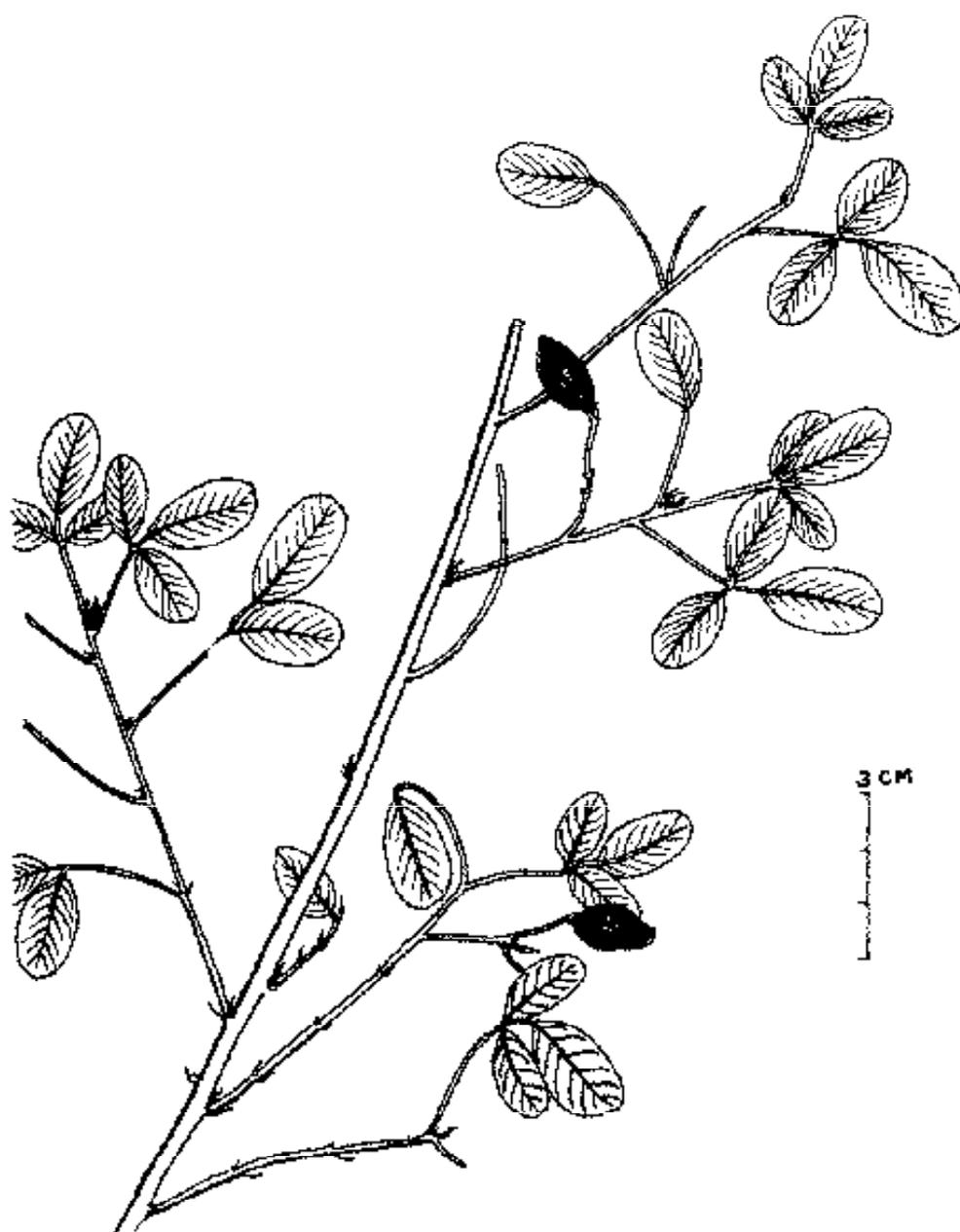


Fig. 86: *Campylotropis prainii* (Coll. et Hemsl.) Schindler

12(2): 89, 1938; Kanjilal *et al.*, Fl. Assam 2: 77, 1938. *Dolichos ensiformis* L., Sp. Pl. 725, 1753.

Large perennial climbers. Leaves 3-foliolate; petioles 3-8 cm long; leaflets ovate, 10-15 (-20) x 5-12 cm, base cuneate or rounded, acuminate at apex, glabrous; lateral leaflets oblique; lateral nerves 6-7, pairs, arched; petiolules 4-6 mm long; stipules ca 5 cm long, lanceolate. Racemes 12-14 cm long, axillary on long peduncles; peduncles terete, 15-20 cm long. Flowers solitary or in pairs, white with purple tinge; calyx 15-18 mm long, 2-lipped, minutely pubescent to glabrescent outside; corolla exserted, 3-6 cm long; petals clawed and auricled at base. Pods 20-25 x 3.5-4.5 cm, oblong, flat with two longitudinal ridges along the upper suture; 6-10-seeded; seeds 25-30 mm long brown or pinkish.

Fl. & Fr.: August-December.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

Uses: Young fruits eaten as vegetable and seeds as pulse.

10. CLITORIA L.

- | | |
|--------------------------------------------------------------------------------------------------|-------------------------|
| 1a. Leaves 3-foliolate; flowers in pairs, bright purple;
pods 1-4-seeded | ...1. <i>C. mariana</i> |
| 1b. Leaves 5-7-foliolate; flowers solitary, bright blue
with orange at base; pods 8-10 seeded | ...2. <i>C. ternata</i> |

1. *Clitoria mariana* L., Sp. Pl. 753, 1753; Baker in Hook. *f.*, Fl. Brit. India 2: 208, 1876; Kanjilal *et al.*, Fl. Assam 2: 86, 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89, 1938. **Fig. 87.**

Scandent undershrubs. Leaves 3-foliolate; common petiole 4-7 cm long; leaflets ovate-elliptic, 4-10 x 1.5-4 cm, base rounded, shortly acuminate-mucronate at apex, glabrous above, pale pubescent beneath; lateral nerves 10-12 pairs; petiolules 2-3 mm long; stipules up to 1 cm long, ovate. Peduncles axillary, 4-5 cm long, usually 2-flowered with a pair of small ovate bracts at the base of calyx and a pair of bracteoles in each flower. Flowers 3-4.5 cm long; calyx tubular, 12-15 mm long, glabrous, membranous; petals bright purple, glabrous, 2.5-4 cm long. Pods linear, 3-4 x 0.7-0.8 cm, compressed, beaked by a persistent style, glabrous, 1-4-seeded; seeds transversely oblong, ca 6 x 3 mm, dark-brown.

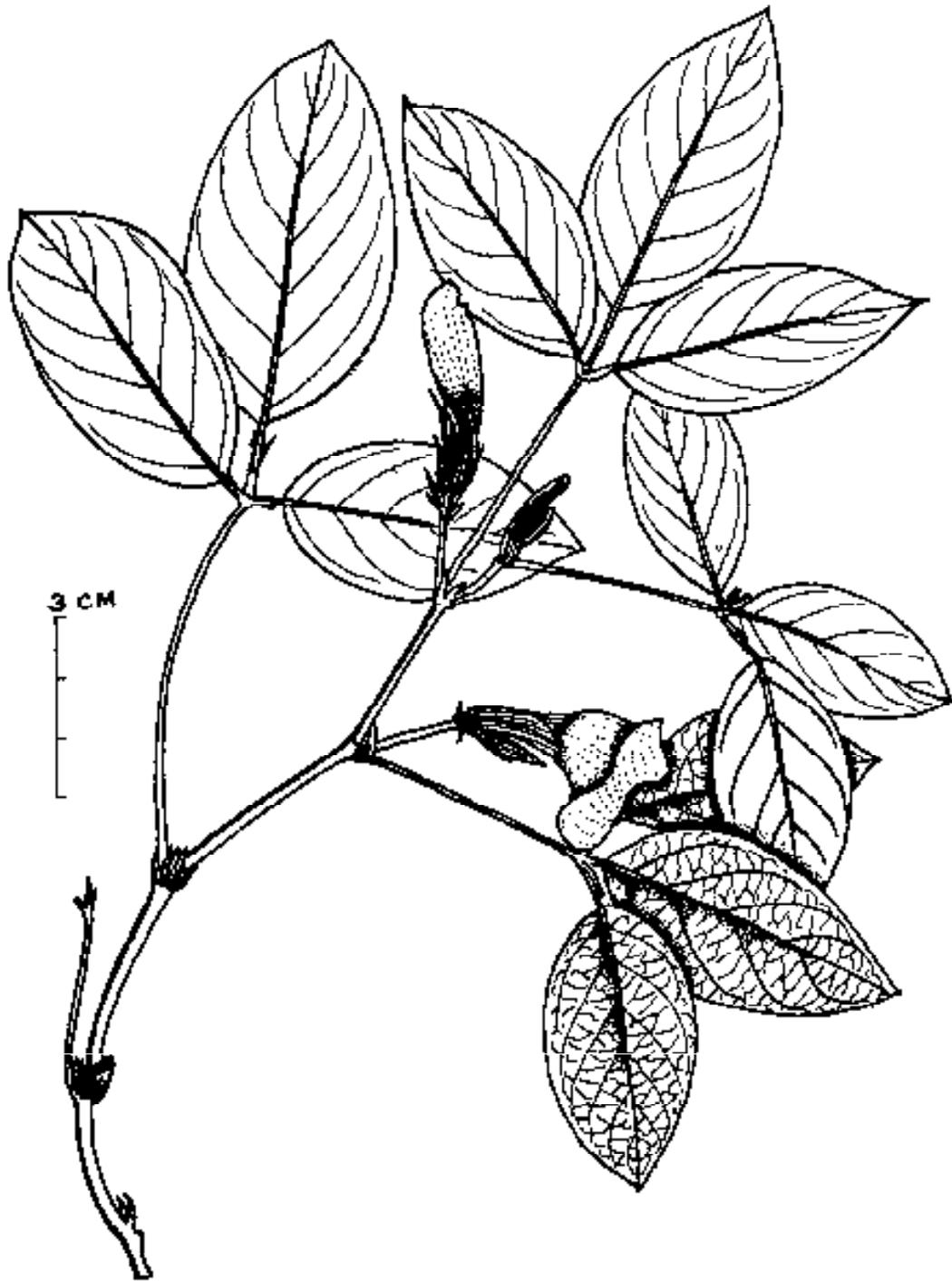


Fig. 87: *Clitoria mariana* L.

Fl. & Fr.: July-October.

Tuisentnar, 1200 m, *Parry 76*, (*vide C.F.C. Fischer, l.c.*); Kawthkullh-Hliapui, *K.P. Singh 94330, 94387*.

2. *Clitoria ternata* L., Sp. Pl. 753. 1753; Baker in Hook. *f.*, Fl. Brit. India 2: 208. 1876; Kanjilal *et al.*, Fl. Assam 2: 87. 1938.

Climbing herbs. Leaves 5-7-foliolate, imparipinnate; petioles 3-6 cm long; leaflets ovate, 2.5-4.5 x 1.5-3.5 cm, base rounded, obtuse or rounded, mucronate at apex, glabrous above, minutely pubescent beneath; petiolules ca 2 mm long; stipules narrowly lanceolate; bracts ovate; bracteoles roundish, obtuse. Flowers solitary, 4.5-5.5 cm long; calyx tube 10-12 mm long with ovate teeth; petals bright blue with orange centre. Pods linear, 8-10 x 0.9-1 cm, compressed with persistent style, minutely hairy, 8-10-seeded; seeds black.

Fl. & Fr.: July-January.

Scarce; cultivated for its decorative flowers. Tablabagh, *K.P. Singh 94284*.

II. CROTALARIA L.

1a. Leaves simple:

2a. Herbs or shrubs, 20-75 (-100) cm high:

3a. Stipules absent; racemes terminal:

4a. Racemes in dense capitate heads;
corolla blue-violet ...7. *C. khasiana*

4b. Racemes of lax flowers,
not in heads; corolla yellow ...1. *C. albida*

3b. Stipules present; racemes usually
leaf opposed or interpetiolar:

5a. Stipules linear lanceolate, decurrent; racemes
3-5-flowered; bracteoles 5-8 mm long;
calyx hairs less than 1.5 mm long ...4. *C. ferruginea*

5b. Stipules ovate-lanceolate, not decurrent;
racemes 3-12-flowered; bracteoles
10-15 mm long; calyx hairs 3-4 mm long ...9. *C. mysorensis*

- 2b. Tall undershrubs or shrubs, 0.75-2 m tall:
- 6a. Branches tetragonous; leaves 10-28 cm long ...12. *C. tetragona*
- 6b. Branches ± terete or sulcate; leaves 3-12 cm long :
- 7a. Pods sessile, pubescent ...6. *C. juncea*
- 7b. Pods distinctly stalked, glabrous:
- 8a. Leaves elliptic-lanceolate with acute-mucronate apex;
bracts linear-lanceolate; corolla not exerted ...8. *C. kurzii*
- 8b. Leaves oblanceolate-oblong with retuse apex;
bracts subulate; corolla much exerted ...11. *C. retusa*
- 1b. Leaves 3-foliolate:
- 9a. Leaflets obovate with obtuse-mucronate apex;
racemes always terminal; pods glabrous ...10. *C. pallida*
- 9b. Leaflets elliptic-oblong to lanceolate;
racemes usually leaf opposed, rarely terminal:
- 10a. Pods compressed, acute at both ends ...3. *C. cytisoides*
- 10b. Pods turgid, acuminate at apex only :
- 11a. Pods ovoid-ellipsoid, pubescent ...5. *C. indobracteata*
- 11b. Pods oblong, glabrous ...2. *C. anagyroides*

1. *Crotalaria albida* Heyne ex Roth, Nov. Pl. Sp. 333. 1821; Baker in Hook. f., Fl. Brit. India 2: 71. 1876; Deb & Dutta in J. Econ. Tax. Bot. 10 (1): 34. 1987.

Herbs, 25-75 cm high with numerous slender, appressed-pubescent branches. Leaves simple, linear-oblong to oblanceolate, 1-2 x 0.3-0.8 cm, base cuneate, obtuse-mucronate at apex, glabrescent above, appressed-pubescent beneath; petioles 2-3 mm long; stipules absent. Racemes terminal, hairy, up to 15 cm long, 5-15-flowered; bracts linear, hairy; flowers 0.8-1.2 cm long, yellow; calyx silky, 7-10 mm long, deeply divided into 5-teeth; standard petal suborbicular, 7-9 x ca 5 mm, sometimes purple streaked. Pods oblong, 1.5-2 x 0.5-0.6 cm, glabrous, apiculate, 5-12-seeded; seeds up to 1 mm across.

Fl. & Fr.: July-December.

On hill slopes. Champhai-Myanmar border, *Deb* 31046; Champhai, *K.P. Singh* 94534; Blue mountain, 1975 m, *Mao* 107121.

2. *Crotalaria anagyroides* Kunth in HBK, Nov. Gen. Sp. 6: 404. 1823. **Fig. 88.**

Shrubs, 1-4 m tall with numerous branches. Leaves 3-foliolate; petioles 3.5-5 cm long; leaflets oblong to lanceolate, 2.5-8 x 0.7-2.5 cm, base cuneate to subacute, subacute or mucronate at apex, glabrous above, puberulous beneath, membranous; petiolules 2-4 mm long; stipules linear, setaceous, 4-6 mm long. Racemes 15-40 cm long, terminal; bracts linear, 8-12 mm long; pedicels 7-9 mm long; calyx 5-lobed, hairy, lanceolate; corolla yellow; standard petal 10-16 mm in diam., yellow with brownish-red streaks. Pods oblong, 2.5-3.5 x 0.7-1.4 cm, brown, nearly glabrous, turgid, with persistent curved style.

Fl. & Fr.: June-December.

Native of tropical America, now naturalized. Sairang, *M. Sawmliana* 95592.

3. *Crotalaria cytisoides* Roxb. [Hort. Beng. 54. (1814), *nom. nud.*] *ex DC.*, Prodr. 2: 131. 1825; *Deb & Dutta* in J. Econ. Tax. Bot. 10(1): 34. 1987. *Priotropis cytisoides* (Roxb. *ex DC.*) *Wight & Arn.*, Prodr. 180. 1834; *Baker* in *Hook. f.*, Fl. Brit. India 2: 65. 1876; *Kanjilal et al.*, Fl. Assam 2: 9. 1938.

Bushy shrubs, up to 5 m tall with densely appressed sericeous stems. Leaves 3-foliolate; petioles 1-4 cm long; leaflets elliptic-oblong to lanceolate, 2-7 x 1-3 cm, base cuneate or attenuate, acute at apex, glabrous above, puberulous beneath, membranous; petiolules ca 2 mm long; lateral nerves 8-10 pairs; stipules absent or minute, subulate. Racemes 8-14 cm long, usually leaf opposed, sometimes terminal, 10-50-flowered; calyx 5-7 mm long, hairy outside; corolla 7-8 mm long, much exserted, yellow with standard and wings purplish-brown. Pods oblong-elliptic, 2.5-4 x 1-1.2 cm, scarcely inflated, acute at both ends, pubescent, 2-8-seeded; seeds ca reniform, 4 x 3 mm, brown.

Fl. & Fr.: May-January.



Fig. 88: *Crotalaria anagyroides* Kunth

Common, in open broad-leaved forests. Champhai, *Deb* 30955; Thaltlang, *Dutta* 33961; *K.P. Singh* 96807; Leite, *Dutta* 34110; North-Vanlaiphai, *D.K. Singh* 99211.

4. *Crotalaria ferruginea* Grah. [in Wallich Cat. 5398. (1831-32), *nom. nud.*] *ex* Benth. in Hook., London J. Bot. 2: 476, 570. 1843; Baker in Hook.f., Fl. Brit. India 2: 68. 1876; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89. 1938; Kanjilal *et al.*, Fl. Assam 2: 12. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 34. 1987.

Erect or ascending herbs or subshrubs, 20-100 cm high; branches brown, pubescent. Leaves simple, elliptic to obovate-oblong, 2-5 x 0.5-2.5 cm, base rounded or cuneate, obtuse, mucronate at apex, appressed brownish, sericeous on both surfaces; stipules 4-8 mm long, ovate-lanceolate. Racemes leaf opposed, 2-10 cm long, laxly 1-5-flowered; bracts linear, 6-8 mm long; calyx *ca* 1 cm long, brown, silky; corolla yellow, standard broadly elliptic. Pods oblong, 1.5-2 x 0.5-0.8 cm, black when mature, glabrous, 20-30-seeded.

Fl. & Fr.: August-December.

Helio hills, N.E. Lungleh, 1110 m, *Gage* 92 (CAL); from Lungleh-Champhai, *Deb* 31074; North-Vanlaiphai, *Deb* 31166; Kawlhkuh-Tuichang, *K.P. Singh* 94439.

5. *Crotalaria indobracteata* Bennet, Indian J. For. 4: 68. 1981. *C. bracteata* Roxb., Fl. Ind. 3: 378. 1832, *non* Schlecht. & Cham. 1830; Baker in Hook.f., Fl. Brit. India 2: 84. 1876.

Shrubs with sparsely pubescent branches. Leaves 3-foliolate; petioles 4-6 cm long; leaflets oblong-lanceolate, 5-8 x 1.5-2.5 cm, base attenuate, acute at apex, membranous, glabrous above, puberulous beneath; petiolules 2-3 mm long; stipules minute, setaceous. Racemes leaf opposed or terminal, densely 20-30 (-50)-flowered; bracts minute, setaceous; flowers yellow; calyx 5-6 mm long, silky with lanceolate teeth; corolla 1-1.2 cm long. Pods ovoid-ellipsoid, *ca* 2.8 x 1 cm, turgid, finely pubescent, brown, 8-10-seeded; seeds reniform.

Fl. & Fr.: April-November.

Scarce, in open places. Bualpui, *K.P. Singh* 93260.

6. *Crotalaria juncea* L., Sp. Pl. 714. 1753; Baker in Hook. f., Fl. Brit. India 2: 79. 1876; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89. 1938; Kanjilal *et al.*, Fl. Assam 2: 14. 1938, *Tumthang* (Lushai).

Tall annual shrubs, up to 2 m with slender, ± terete, appressed pubescent branches. Leaves simple, oblong-elliptic, 4-12 x 0.4-3 cm, base cuneate, obtuse or acute at apex, ferruginous hairy on both surfaces; petioles very short; stipules absent or minute, subulate. Racemes up to 30 cm long, mostly terminal and lateral, laxly 10-20-flowered; flowers ca 2.5 cm long, yellow; calyx divided almost to base into lanceolate teeth, brown-velvety; corolla bright yellow, exserted, glabrous. Pods oblong, ca 2.5-4 x 1 cm, brown velvety with stiff hairs; seeds 10-15, ca 4 mm across, brown.

Fl. & Fr.: December-March.

Usually cultivated in the fields. Darzo, 1200 m, *Parry 604*, (*fide* C.E.C. Fischer, *l.c.*).

Uses: Cultivated as a fibre yielding plant and for green manure; flowers and the fruits are used as vegetables.

7. *Crotalaria khasiana* Baker *ex* Thoth. & Ansari in Bull. Bot. Surv. India 20: 180. 1979. *C. capitata* Benth. *ex* Baker in Hook. f., Fl. Brit. India 2: 74. 1876. *non* Lam., 1790; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89. 1938; Kanjilal *et al.*, Fl. Assam 2: 15. 1938.

Low, sprawling, caespitose shrubs; stems brown, 15-40 cm long, pubescent. Leaves simple, obovate or oblanceolate, 1-3 x 0.4-1 cm, base cuneate, acute at apex, sessile, green and glabrate above, pubescent beneath; stipules absent. Flowers 6-20, in terminal heads or congested racemes; bracts and bracteoles linear, persistent; calyx 10-12 mm long, brown, pubescent; petals blue-violet, glabrous. Pods obovoid, 8-10 x 4-5 mm, sessile, glabrous.

Fl. & Fr.: July-January.

Phongpui, 2100 m, *Parry 577* (*fide* C.E.C. Fischer, *l.c.*).

8. *Crotalaria kurzii* Baker *ex* Kurz in J. As. Soc. Bengal 43: 229. 1974; Baker in Hook. f., Fl. Brit. India 2: 75. 1876; Thoth. & Ansari in

Indian J. For. 2(3): 280. 1979; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 34. 1987.

Undershrubs with terete, sparsely appressed pubescent branches. Leaves simple, elliptic to elliptic-lanceolate, 4-10 x 1.5-3.5 cm, base cuneate, mucronate at apex, glabrous above, appressed pubescent beneath; lateral nerves 5-6 pairs; petioles 3-4 mm long. Racemes axillary and terminal; flowers solitary, ca 1.5 cm long, yellow; bracts 4-5 mm long, linear, setaceous, pubescent; calyx 5-lobed, 2-lipped; teeth linear-lanceolate; corolla not or slightly exserted. Pods stalked, oblong with a persistent beak, 1.5-2 x 0.4-0.6 cm, brown, glabrous; seeds reniform, brownish-black.

Fl. & Fr.: November-February.

Aizawl-Sakaelui, *Leslie* 39 (CAL); Aizawl, *Deka*, s.num.; Aizawl, *Deb* 30648.

9. *Crotalaria mysorensis* Roth., Nov. Pl. Sp. 338. 1821; Baker in Hook. f., Fl. Brit. India 2: 70. 1876; Kanjilal *et al.*, Fl. Assam 2: 12. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 34. 1987.

Erect shrubs, 20-70 cm high with greyish densely tomentose branches. Leaves simple, oblong-elliptic or elliptic-ovate, 1.5-5 x 0.3-2 cm, base and apex obtuse, membranous, gland dotted, sparsely sericeous above and dense below; stipules 4-10 mm long, linear-lanceolate, sericeous. Racemes up to 25 cm long, terminal, laxly 3-12-flowered, densely brown, sericeous; bracts ovate-lanceolate, 1-2 cm long; calyx 1-1.5 cm long, clothed with silky hairs; teeth lanceolate; corolla yellow, slightly exserted. Pods terete-oblong, 2-3 x 0.6-0.7 cm, glabrous, 20-30-seeded; seeds up to 1.5 mm across.

Fl. & Fr.: July-December.

On moist slopes. Vanlaiphai, *Deb* 31166.

10. *Crotalaria pallida* Ait., Hort. Kew 2: 20. 1789. *C. striata* DC., Prodr. 2: 131. 1825; Baker in Hook. f., Fl. Brit. India 2: 84. 1876, excl. syn. *C. laburnoides* Klotz.; Kanjilal *et al.*, Fl. Assam 2: 16. 1938.

Fig. 89.

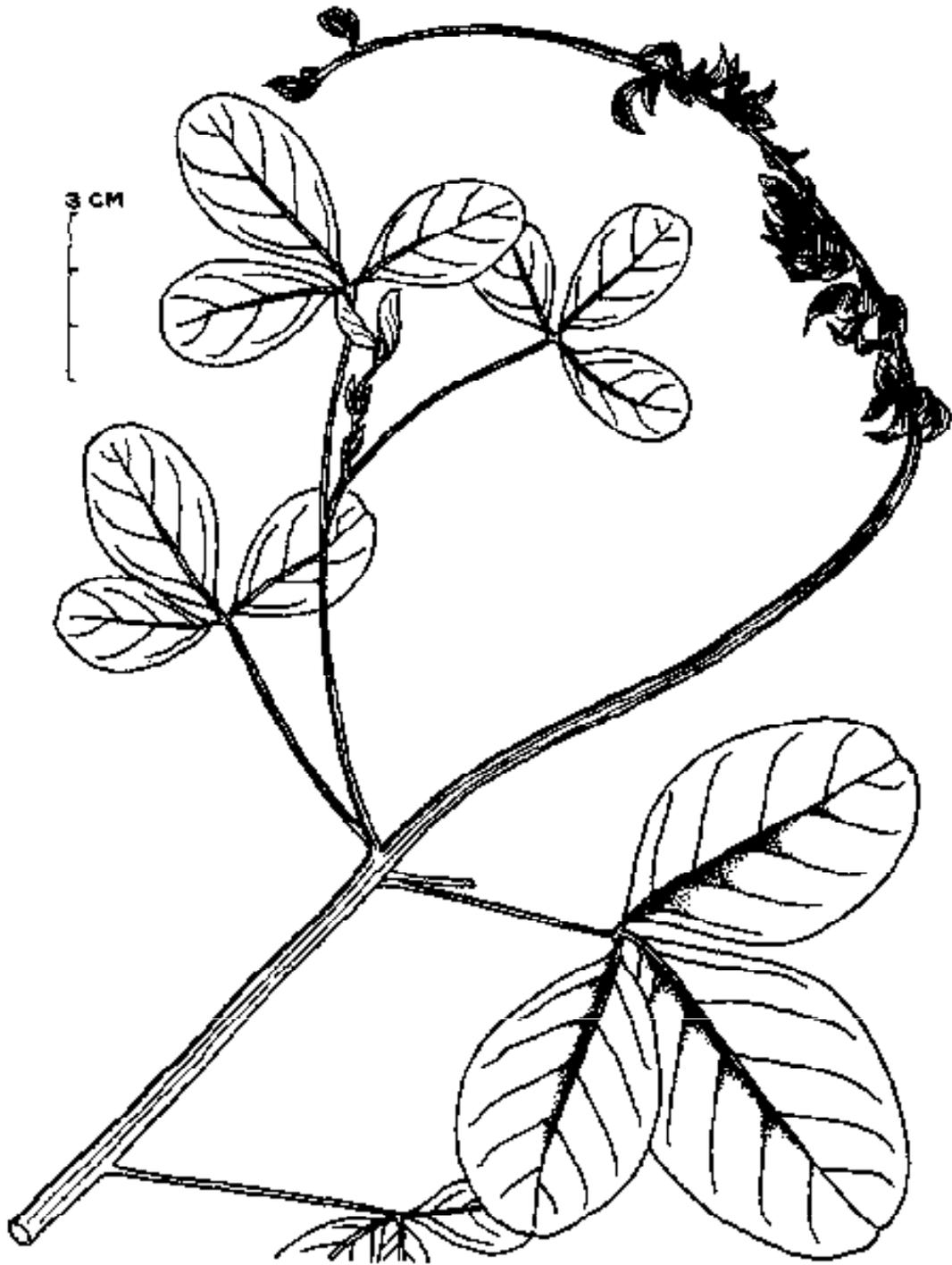


Fig. 89: *Crotalaria pallida* Ait.

Undershrubs, 1-2 m tall with puberulous branches. Leaves 3-foliolate; common petioles 2-5 cm long; leaflets obovate, 3.5-6.5 x 1.5-4 cm, base cuneate-subacute, obtuse-rounded, mucronate at apex, membranous, glabrous above, punctate, glaucous, obscurely hairy beneath; petiolules ca 2 mm long. Racemes up to 30 cm long, terminal and lateral, 20-50 cm long; calyx pubescent, lobes lanceolate; corolla yellow, finally lined with reddish-purple, glabrous; keel falcate. Pods oblong, 4-5 x 0.6-0.7 cm, inflated, glabrescent to glabrous; seeds many, kidney-shaped, ca 3 mm in diam., brownish.

Fl. & Fr.: October-May.

Common, in open moist places on hill slopes. Near Tilthlang, *K.P. Singh* 93988, 96629; Phairuang, *K.P. Singh* 94219; Tuichang, *K.P. Singh* 94247; Sairang, *M. Sawmliana* 95591.

11. *Crotalaria retusa* L., Sp. Pl. 715. 1753; Baker in Hook. *f.*, Fl. Brit. India 2: 75. 1876; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89. 1938.

Erect, robust shrubs, 1-2 m tall with dense pubescent branches. Leaves simple, oblanceolate-oblong, 3-5.5 x 1.5-2 cm, base attenuate, obtuse, apiculate, retuse at apex, glabrous above, pubescent beneath; stipules linear, subulate. Racemes up to 20 cm long, terminal; bracts subulate; flowers ca 2 cm across; calyx puberulous; lobes lanceolate; corolla bright yellow; standard petal orbicular. Pods linear-oblong, 2-4.5 x 1.5 cm, shortly stalked, glabrous, many-seeded.

Fl. & Fr.: November-April.

Koladyne River, 600 m, *Parry* 436 (*vide* C.E.C. Fischer, *l.c.*).

12. *Crotalaria tetragona* Andr., Bot. Rep. 10: t.593. 1810; Baker in Hook. *f.*, Fl. Brit. India 2: 78. 1876; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89. 1938; Kanjilal *et al.*, Fl. Assam 2: 13. 1938. *Tumthang* (Lushai).

Fig. 90.

Shrubs, 1-2 m tall; stems tetragonous, sulcate, pubescent. Leaves alternate, distant, simple, linear or lanceolate, 10-28 x 1-3 cm, base rounded, gradually acuminate at apex, entire along margins, sparsely pilose



Fig. 90: *Crotalaria tetragona* Andr.

above, densely silky pilose beneath; stipules 3-4 mm long, linear-lanceolate; petioles short ca 3 mm long. Racemes simple, 12-22 cm long, 5-10-flowered, bracts setaceous; flowers 1.5-2.8 cm long, yellow, in loose terminal or axillary racemes; calyx 1.5-3 cm long, brown-tomentose; teeth lanceolate, divided up to the base; corolla glabrous, often spotted or streaked, brownish purple outside, little exserted. Pods oblong, 3-5 x 1-1.5 cm, sessile, brown, velvety; seeds 10-20, brown, ca 4 mm across.

Fl. & Fr.: September-December.

Aizawl-Champhai, *Deb* 30905; Kheitung, *Deb* 31199; Hnathial, ca 750 m, *Mao* 107045.

12. DALBERGIA L. f.

1a. Leaflets less than 13:

- 2a. Leaflets 5-9; flowers ca 3 mm long;
stamens 10, monadelphous ... 3. *D. rimosa*
- 2b. Leaflets 7-13; flowers 5-7 mm long;
stamens diadelphous (5+5) ... 5. *D. volubilis*

1b. Leaflets more than 13:

- 3a. Trees ... 1. *D. lanceolaria* var. *assamica*
- 3b. Scandent shrubs:
- 4a. Leaflets 17-25, with rounded base; stamens
diadelphous (5+5); pods 2.5-3 cm broad ... 4. *D. stipulacea*
- 4b. Leaflets 25-41 with oblique base; stamens 9 or 10,
monadelphous; pods 1-1.3 cm broad ... 2. *D. pinnata*

1. *Dalbergia lanceolaria* var. *assamica* (Benth.) Thoth. in Bull. Bot. Surv. India 25: 171. 1985. *D. assamica* Benth. in Miq., Pl. Jungh. 1: 256. 1852; Baker in Hook. f., Fl. Brit. India 2: 235. 1876; Kanjilal *et al.*, Fl. Assam 2: 102. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 34. 1987.

Deciduous trees, 15-25 m tall. Leaves 20-30 cm long; petioles terete; leaflets 13-21, oblong-elliptic, 3-5 x 2-3 cm, base rounded, obtuse or emarginate at apex, glabrous above, appressed pubescent beneath; lateral nerves 10-12 pairs; petioles terete; petiolules 3-5 mm long. Panicles 10-

15 cm long, axillary, pubescent; bracts and bracteoles deciduous; calyx obconic, silky outside with lowest tooth much longer; corolla 5-7 mm long, white or purplish blue, standard orbicular, purple veined with a light green central spot; stamens in two bundles of 5 each. Pods linear-oblong, elliptic, 4-7.5 x 1.5-2 cm, strap shaped, pointed at both ends, glabrous, 1-4-seeded.

Fl. & Fr.: March-January.

Scarce in the area. South Vanlaiphai, *Dutta* 34027.

2. *Dalbergia pinnata* (Lour.) Prain in Ann. R.B.G. Calcutta 10: 48. 1904. *Derris pinnata* Lour., Fl. Cochinch. 432. 1790. *Dalbergia tamarindifolia* Roxb. [Hort. Beng. 53. (1814), *nom. nud.*], Fl. Ind. 3: 233. 1832; Baker in Hook. *f.*, Fl. Brit. India 2: 234. 1876; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89. 1938; Kanjilal *et al.*, Fl. Assam 2: 105. 1938.

Scandent bushy shrubs, 2-12 m tall; young parts \pm pubescent. Leaves 8-18 cm long; common petiole terete; leaflets 25-41, oblong, 1.5-2.5 x 0.5-0.8 cm, base oblique, rounded-emarginate at apex, entire along margins, glabrescent above, slightly pubescent beneath; petiolules very short; stipules lanceolate. Panicles 3-5 cm long, sessile, mostly axillary with corymbose, pubescent, dense branches; flowers 0.5-0.8 cm long, greenish white; bracts ovate or suborbicular; calyx pubescent; corolla 6-7 mm long, white; stamens 9 or 10, united in a single slit sheath. Pods oblong, 4-7 x 1-1.3 cm, glabrous, very flat, red-brown, blunt or little acute, stipitate, 1-3-seeded.

Fl. & Fr.: February-October.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

3. *Dalbergia rimosa* Roxb. [Hort. Beng. 53. (1814), *nom. nud.*], Fl. Ind. 3: 233. 1832; Baker in Hook. *f.*, Fl. Brit. India 2: 232. 1876; Kanjilal *et al.*, Fl. Assam 2: 104. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 34. 1987.

Straggling or climbing shrubs or small trees, up to 8 m tall; branchlets often modified into tendrils. Leaves 12-25 cm long; petioles 5-10 cm long; leaflets 5-9, elliptic, oblong or obovate, 4-10 x 2-5 cm, base subacute or rounded, acute to obtuse, often emarginate at apex, recurved along

margins; lateral nerves 10-15 pairs, prominent beneath; petiolules 2-3 mm long. Panicles terminal or axillary, 10-20 cm long; pedicels 1-2 mm. Flowers very small, ca 0.3 cm long, white, sweet scented; calyx pubescent, teeth subequal, ciliate; corolla dull-white; stamens 10, in one bundle. Pods elliptic, 5-10 x 2-2.5 cm, cuneate at base, sub acute at apex, 1-2-seeded.

Fl. & Fr.: April-November.

Champhai, *Deb* 30911; Lungleh, *Dutta* 33403.

4. *Dalbergia stipulacea* Roxb. (Hort. Beng. 53. (1814), *nom. nud.*), Fl. Ind. 3: 233. 1832; Baker in Hook. *f.*, Fl. Brit. India 2: 237. 1876; Kanjilal *et al.*, Fl. Assam 2: 107. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 34. 1987. *Ching-Ching-dit, Thingbehlawi, Mathizawngtrah, Zaizawh, Ngaihhih* (Lushai). **Fig. 91.**

Scandent shrubs or sprawling trees, up to 10 m tall; young shoots puberulous. Leaves 12-20 cm long; leaflets 17-25, alternate, oblong, 2-3.5 x 0.8-1.3 cm, base rounded or cuneate, obtuse at apex, entire along margins, glabrous above, sparsely hairy beneath in young stages; petiolules 1-3 mm long; stipules oblong, deciduous. Panicles axillary, 8-12 cm long with ascending racemose branches; bracts oblanceolate, 4-8 cm long. Flowers reddish-purple, calyx 5-toothed, lower tooth linear and longer than others, glabrous; corolla reddish-purple, 5-7 mm long; stamens in two sheaths of 5 each. Pods oblong-elliptic, 5-10 x 2.5-3 cm, flat, subacute at base, obtuse at apex, ripening to deep brown, 1-seeded, thickened and rugose over the seed; seeds flat, 15-25 mm across, brown.

Fl. & Fr.: March-November.

Very common, in tropical forests in open and moist places. Kolasib, *B. Godfrey* 563 (CAL); Sialsuk, *Deb* 30860; Champhai, *Deb* 30900; *Dutta* 33832; Mampui-Ngengpui, *K.P. Singh* 92898; Kamthangpui, *K.P. Singh* 93230; Thenzawl, *K.P. Singh* 93864; Kawlhkulkh-Tuichang, *K.P. Singh* 94427; Kaitang, *M. Sawmliana* 95562; Sherchip, *K.P. Singh* 96608; Zawbak, *K.P. Singh* 96724; Darlawn, *K.P. Singh* 97111; Sawleng, *K.P. Singh* 97118; Lungchuan, *D.K. Singh* 99210.

5. *Dalbergia volubilis* Roxb., Pl. Corom. 2: 48, t. 191. 1805 & Fl. Ind. 3: 231. 1832; Baker in Hook. *f.*, Fl. Birt. India 2: 235. 1876; C.F.C.

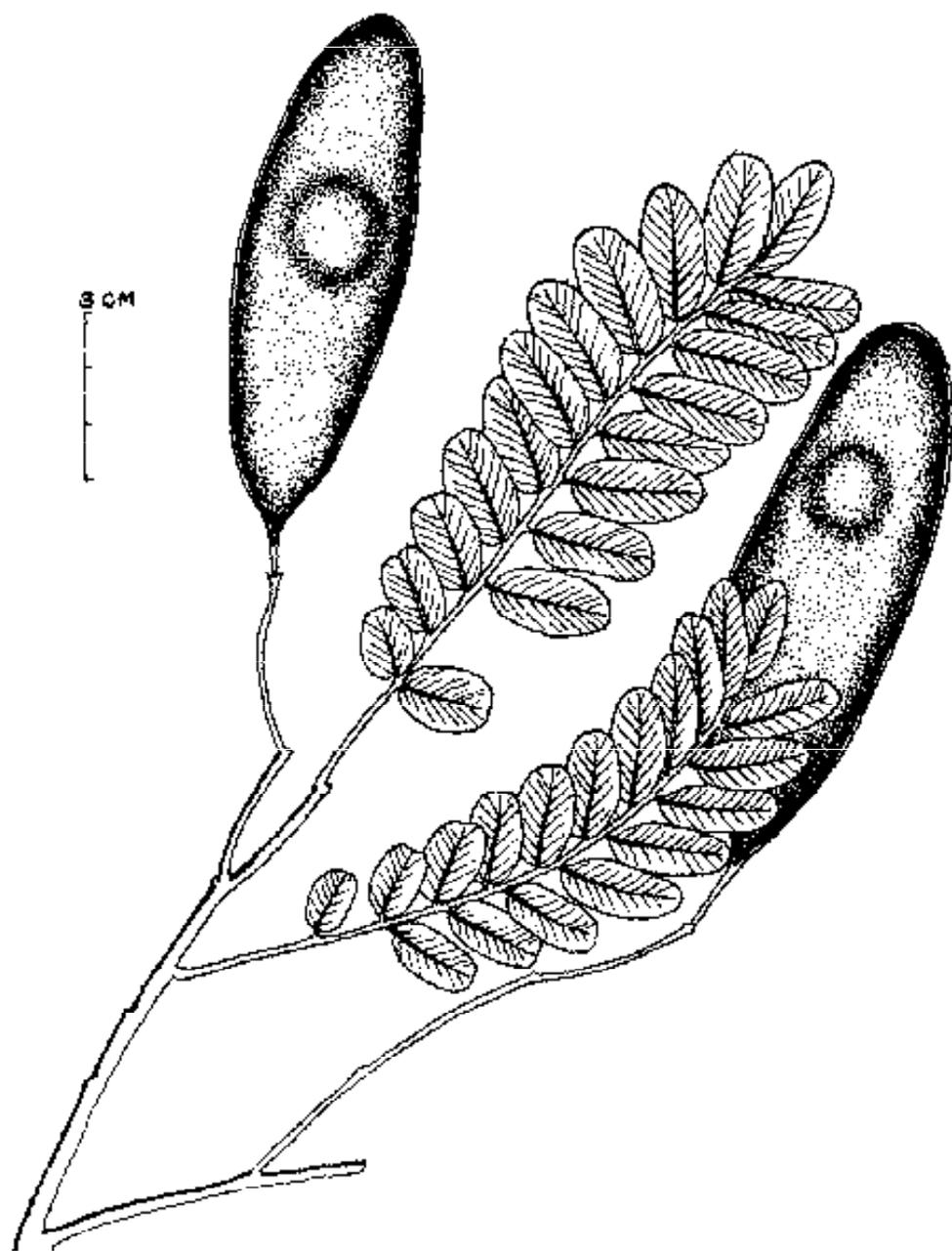


Fig. 91: *Dalbergia stipulacea* Roxb.

Fischer in Rec. Bot. Surv. India 12(2): 89. 1938; Kanjilal *et al.*, Fl. Assam 2: 107. 1938.

Large woody climbing shrubs; branches twisted into spiral hooks. Leaves 10-17 cm long; leaflets 7-13, oblong or obovate-oblong; 3-5 x 1.8-2.5 cm, base cuneate, obtuse, truncate or emarginate at apex, glabrous; lateral nerves numerous; petiolules 2-3 mm long. Panicles 20-30 cm long, terminal and axillary, copious, rusty pubescent with corymbose branches. Flowers 0.5-0.7 cm long, light mauve, bracteate and bracteolate; calyx teeth minute, velvety; corolla pale blue; standard broad; stamens 10, united into 2 sheaths. Pods oblong-elliptic, stalked, 4.0-7.5 x 1.5-2.5 cm, greenish-yellow, glabrous, veined, 1-2-seeded.

Fl. & Fr.: December-June.

Lungleh, 900 m, Gage 196 (CAL).

13. DALHOUSIEA Wallich *ex* Benth.

Dalhouisia bracteata (Roxb.) Grah. *ex* Benth., Ann. Wien. Mus. Nat. 2: 65. 69. 1838; Baker in Hook. *f.*, Fl. Brit. India 2: 248. 1878; Kanjilal *et al.*, Fl. Assam 2: 116. 1938. *Podolyria bracteata* Roxb., Pl. Corom. 3: t. 259. 1820.

Evergreen, woody climbing shrubs; young shoots hairy. Leaves 1-foliolate, simple, ovate to suborbicular or obovate-orbicular, 4-20 x 6-14.5 cm, base rounded or subcordate, shortly mucronate at apex, glabrous on both surfaces; lateral nerves 7-10 pairs; petioles 1.5-5 cm long, swollen at both ends. Flowers in axillary corymbs; peduncles solitary or once or twice bifid; bracts in pairs, like stipules, at the joints of peduncles, rounded, persistent, 0.5-1 cm long; bracteoles larger, up to 1.5 cm long, concealing flowers; flowers 6-8 mm long; calyx hairy outside; corolla white; stamens free, glabrous. Pods turgid, 6-8 x 3-3.5 cm, compressed, tapering at both ends, 1-3-seeded; seeds 2-2.5 cm across, compressed, brown.

Fl. & Fr.: May-January.

Scarce, in evergreen forests. Aizawl, Godfrey 548 (CAL); Kolasib, K.P. Singh 93140.

14. **DERRIS** Lour.

- 1a. Erect trees; pods winged on dorsal suture only ...3. *D. robusta*
- 1b. Woody climbers; pods winged on dorsal and ventral sutures:
- 2a. Nodes of the inflorescence produced into distinct peduncles; pods unknown ...1. *D. lushaiensis*
- 2b. Nodes of the inflorescence not produced into distinct peduncles; pods known and distinctly winged ...2. *D. monticola*

1. *Derris lushaiensis* Thoth, in Bull. Bot. Surv. India 12: 104 (1970) 1972.

Climbing shrubs. Leaves 25-33 cm long; leaflets 11-13, oblong-cuneate, 9-12 x 2.5-3.8 cm, glaucous below; petiolules 5-6 mm long; stipules ovate. Racemes axillary; nodes produced into peduncles. Flowers 1.5-1.6 cm long; calyx puberulous to pubescent, campanulate, 4-toothed; vexillum obovate-oblong, ecallose; wings and keels narrowly oblong; pistil 1-1.5 cm long; ovary hairy; ovules 2-4. Pods not known.

Fl.: March.

South Lushai Hills, Valley near Fort Lungleh, 300- 600 m, *Gage* 23 A-C (CAL: Holotype). Endemic.

2. *Derris monticola* (Kurz) Prain in J. As. Soc. Bengal 66(2): 361. 1897; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89. 1938; Kanjilal *et al.*, Fl. Assam 2: 115. 1938. *Millettia monticola* Kurz in J. As. Soc. Bengal 42: 67. 1873; Baker in Hook. f., Fl. Brit. India 2: 106. 1876.

Climbers; stems rusty tomentose. Leaves 20-27 cm long; leaflets 7-11, oblong, oblanceolate, 6-9 x 2-3 cm, base narrowed or slightly rounded-cuneate, shortly acuminate at apex, glabrous; lateral nerves 6-8 pairs; petiolules 3-4 mm long, puberulous. Racemes axillary, up to 14 cm long; flowers blue or purple, crowded at nodes; bracts ovate, caducous; calyx narrowly campanulate, deltoid with 5 teeth; vexillum 1.2-1.4 cm long; keels auricled near the claw; ovary pubescent. Pods oblong, winged on both the sutures, 2-3-seeded.

Fl. & Fr.: March-September.

Source in the area. Lungleh, 900 m, *Gage* 23 (CAL).

3. *Derris robusta* (Roxb. ex DC.) Benth., J. Linn. Soc. 4(Suppl.) 104. 1860; Baker in Hook. f., Fl. Brit. India 2: 241. 1878; Kanjilal *et al.*, Fl. Assam 2: 111. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987. *Dalbergia robusta* Roxb. [Hort. Beng. 53. (1814), *nom. nud.*] ex DC., Prodr. 2: 417. 1825. *Thing-kha* (Lushai); *Sigoupada*, *Dumusia gas* (Chakma).

Medium, erect trees, 4-20 m tall. Leaves 10-20 cm long; petioles slender; leaflets up to 20, elliptic-oblong, 3-6 x 1.5-2.5 cm, base narrowed and unequal, mucronulate at apex, minutely puberulous on both surfaces; petiolules 2-3 mm long. Racemes axillary, 10-25 cm long; flowers 0.8-1.2 cm long, white, fasciated; calyx golden hairy, campanulate; corolla white; vexillum ovate-orbicular, erect with a faint yellow blotch; pistil 7-8 mm long; ovary silky, pubescent. Pods strap-shaped, 3-8 x 0.5-1 cm, glabrous, reticulately veined, narrowed at both ends, winged along the upper suture. 1-5-seeded; seeds orbicular, \pm 2.5 mm, brown-black, compressed.

Fl. & Fr.: April-October.

Very common, in tropical forests in open places. Hnathial, *K.P. Singh* 93984; Tilthlang, *K.P. Singh* 94085; Tlabung, *K.P. Singh* 94262; Puilobasti road, *K.P. Singh* 94459.

15. DESMODIUM Desveaux

1a. Leaves 1-foliolate:

2a. Petioles winged ...16. *D. triquetrum*

2b. Petioles not winged:

3a. Pods indented only along lower suture ... 3. *D. gangeticum*

3b. Pods indented along both sutures:

4a. Leaves broadly ovate, densely hispid above; calyx teeth narrower-longer; pods 3-6-jointed, densely pubescent with hooked hairs ...17. *D. velutinum*

4b. Leaves narrowly ovate, glabrous above; calyx teeth deltoid; pods 6-10-jointed, \pm glabrous ...10. *D. oblongum*

1b. Leaves 3-foliolate:

- 5a. Inflorescence racemiform; flowers concealed by a pair of leafy orbicular, persistent bracts ...11. *D. pulchellum*
- 5b. Inflorescence umbellate, corymbose, racemose or paniculate; flowers not concealed by leafy bracts; bracts caducous:
- 6a. Stem triquetrous, flowers umbelled:
- 7a. Bracteoles elliptic-oblong; peduncles 1-4 cm long ...1. *D. cephalotoides*
- 7b. Bracteoles linear; peduncles less than 1 cm long ...14. *D. triangulare*
- 6b. Stem usually terete; flowers racemed or paniced:
- 8a. Plants prostrate; leaflets less than 15 mm long:
- 9a. Leaflets obovate; pods undulate only along lower suture ...15. *D. triflorum*
- 9b. Leaflets oblong-ovate or suborbicular; pods undulate along both sutures ...7. *D. microphyllum*
- 8b. Plants erect or suberect; leaflets more than 15 mm long:
- 10a. Pods indented along lower suture only:
- 11a. Lateral leaflets much reduced or wanting; keel petal with short lateral appendages:
- 12a. Terminal leaflets linear-lanceolate to elliptic-ovate; pods short hooked-hairy ... 8. *D. motorium*
- 12b. Terminal leaflets elliptic-obovate; pods long hooked-hairy ...4. *D. gyroides*
- 11b. Lateral leaflets not much reduced though often smaller than terminal leaflets; keel petal unappendaged:
- 13a. Stamens monadelphous; pods 1-3-jointed; joints crescent shaped ...12. *D. repandum*
- 13b. Stamens diadelphous; pods 3-7-jointed; joints not crescent shaped:

- 14a. Pods pubescent with long hooked hairs at sutures only; indentations between pod joints shallow ...5. *D. heterocarpum*
- 14b. Pods pubescent all through with minute hooked hairs; indentations between pod joints deep ...2. *D. concinnum*
- 10b. Pods indented along both sutures:
- 15a. Leaflets sinuate ...13. *D. sequim*
- 15b. Leaflets not sinuate:
- 16a. Inflorescence 15-40 cm long, lax flowered; segments of pod longer than broad ... 6. *D. laxiflorum*
- 16b. Inflorescence 8-15 cm long, dense flowered; segments of pod \neq isodiametric ... 9. *D. multiflorum*

1. *Desmodium cephalotoides* Craib in Kew Bull. 1912: 150. 1912; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987. *Se-be-Hliang* (Lushai).

Perennial, erect herbs or undershrubs with triquetrous branches, densely villous-pubescent. Leaves 3-foliolate; leaflets elliptic-ovate to lanceolate-oblong, 4-12 x 2-5 cm, base cuneate or acute or subrotundate, acuminate or subacute mucronate at apex, entire along margins, chartaceous, glabrous at maturity on both surfaces except nerves; petiolules up to 3 mm long; stipules dry, brown, caducous. Inflorescence axillary, solitary, peduncled in silky-villous umbels; peduncles 3-4 cm long; flowers 1.2-1.3 cm long, whitish; bracts dry, brown, ovate or oblong; bracteoles elliptic-oblong; calyx campanulate, glabrous within; lower middle lobe longest-acuminate; corolla white; stamens monadelphous. Pods 3-5-jointed, 1-1.5 cm long, silky-pubescent.

Fl. & Fr.: June-October.

Aizawl, *Godfrey* 509 (CAL); *s.loc.* *Parry* 16 (CAL); Thalthlang to South Vanlaiphai, *Dutta* 34021; Thalthlang, *Dutta* 33961; Leite, *Dutta* 34110; Pheileng, *K.P. Singh* 97094; Keifang, *M. Sawmliana* 95529, 101733.

2. *Desmodium concinnum* DC., Ann. Sci. Nat. 4: 101. Jan. 1825; Baker in Hook. *f.*, Fl. Brit. India 2: 170. 1876; Kanjilal *et al.*, Fl. Assam 2: 552. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89. 1938.

Shrubs, up to 1.5 m high with slender terete, drooping branches. Leaves 3-foliolate, sulcate, covered with spreading hairs; leaflets elliptic or narrowly obovate, 2-8 x 1-4 cm, base rounded, obtuse or subacute at apex, glabrate above, appressed pubescent beneath; petiolules 5-8 mm long; stipels linear; stipules 10-18 x 2-4 mm, lanceolate; lateral nerves 5-10 pairs, prominent beneath. Racemes elongate, axillary or terminal; bracts ovate-lanceolate, densely silky; calyx 2.5 mm long, campanulate; petals purple or lilac, standard broadly ovate, 4-6 mm broad. Pods 3-4 x 2-3 mm, straight along the upper suture, indented along lower suture; joints 4-6, minutely pubescent with hooked hairs.

Fl. & Fr.: September-December.

In open forests on sunny hill side. Lushai hills, 1500 m, *Wenger 360*, (*vide C.E.C. Fischer, l.c.*).

3. *Desmodium gangeticum* (L.) DC., Prodr. 2: 327. 1825; Baker in Hook. *f.*, Fl. Brit. India 2: 168. 1876; Kanjilal *et al.*, Fl. Assam 2: 55. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89. 1938. *Hedysarum gangeticum* L., Sp. Pl. 746. 1753.

Suberect shrubs, 1-3 m tall; stems angular; branches clothed with adpressed white hairs. Leaves 1-foliolate, herbaceous; leaflet narrowly ovate or elliptic, 5-15 x 3-5 cm, base rounded, acute or acuminate at apex, truncate, glabrous above, puberulous beneath; lateral nerves 8-10 pairs; petioles 1-2.5 cm long. Racemes 15-30 cm long, axillary and terminal, rachis and pedicels puberulous; bracts subulate, 3-6 mm long; calyx small, narrower, ca 0.2 mm, corolla purplish-white. Pods falcate, 1-2.5 x 0.2 cm, deeply indented on lower suture; joints 4-8, clothed with minute hooked hairs.

Fl. & Fr.: August-December.

Valley Jungle, fort Lungleh, 900-1050 m, *Gage 224* (CAL).

4. *Desmodium gyroides* (Roxb. ex Link) DC., Prodr. 2: 326. 1825; Baker in Hook. *f.*, Fl. Brit. India 2: 175. 1876; Kanjilal *et al.*, Fl. Assam 2: 59. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89. 1938. *Hedysarum gyroides* Roxb. [Hort. Beng. 57. (1814), *nom. nud.*] ex Link, Enum. Alt. 2: 247. 1822. Fig. 92.

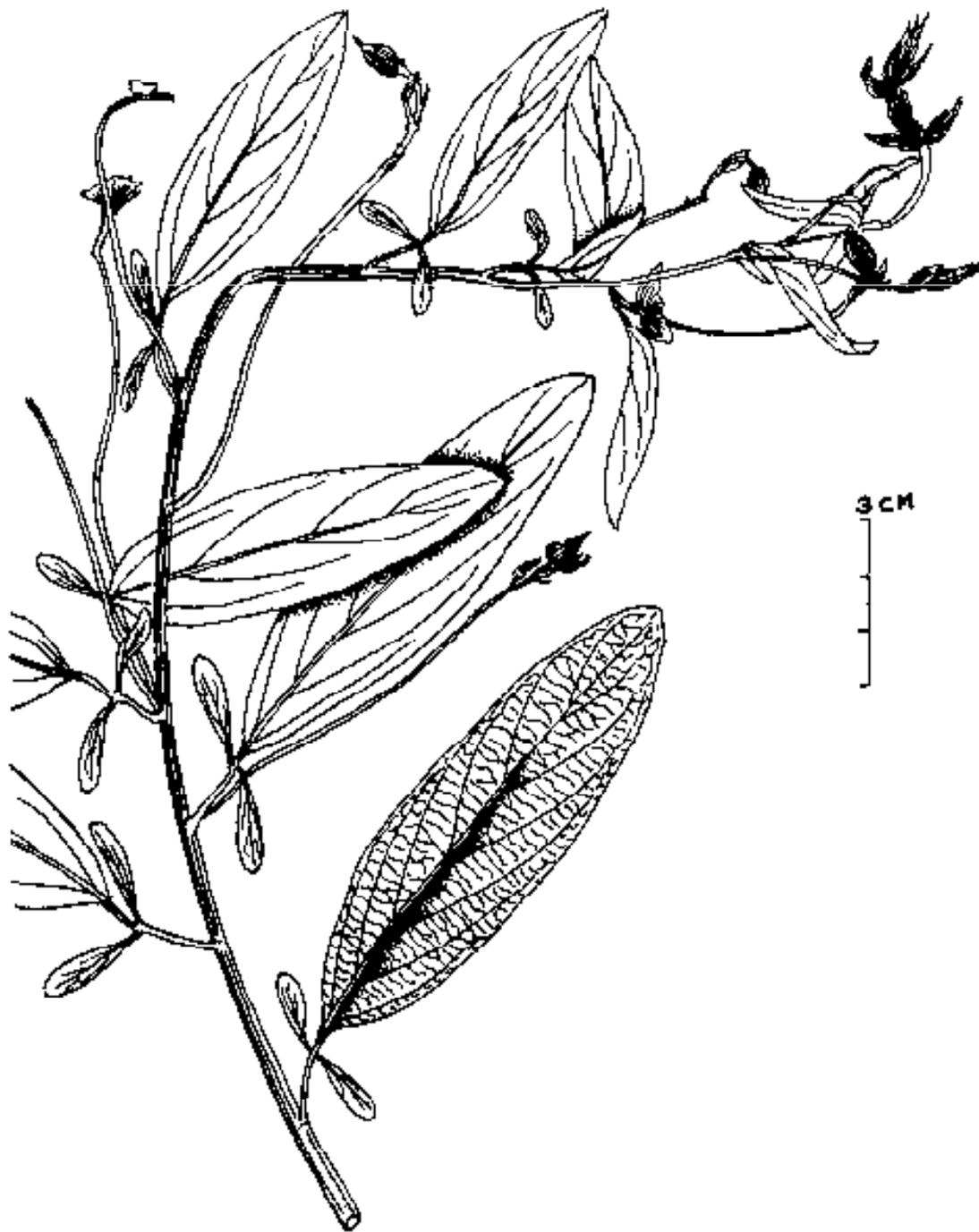


Fig. 92: *Desmodium gyroides* (Roxb. ex Link) DC.

Shrubs, 1-2.5 m tall. Leaves 3-foliolate but sometimes 1-foliolate by suppression; petioles 1.5-3 cm long; terminal leaflets broadly elliptic or obovate, 3-6 x 2-4 cm, base broadly ovate, obtuse or mucronate at apex; lateral nerves 5-7 pairs; lateral leaflets none or when present elliptic, 1-2 x 0.7-1 cm, leaflets thinly pubescent above with minute adpressed hairs, glaucous and \pm densely adpressed hairy beneath; petiolules very short. Racemes 4-16 cm long, terminal or axillary; peduncles whitish-pubescent; bracts ovate, 3-5 mm long; flowers 5-7 mm long; corolla pale pink to purple-pink; pods linear, 2-4 x 0.3-0.5 cm, curved, indented along lower suture, densely long hairy; joints 3-10; seeds black, reniform.

Fl. & Fr.: September-February.

Common, in subtropical forests along the roadside in open places. Aizawl-Sonai, *Leslie* 27 (CAL); Kawihkulh-Tuichang, *K.P. Singh* 94409, 94440; Saithah, *D.K. Singh* 98847; Huathial, 750 m, *Mao* 107042.

5. *Desmodium heterocarpon* (L.) DC., Prodr. 2: 337. 1825. *Hedysarum heterocarpon* L., Sp. Pl. 747. 1753. *Desmodium polycarpum* (Poir.) DC., Prodr. 2: 334. 1825; Baker in Hook. f., Fl. Brit. India 2: 171. 1876. *p.p.*; Kanjilal *et al.*, Fl. Assam 2: 54. 1938. *Berbek* (Lushai).

Ascending herbs or undershrubs, up to 1.5 m tall; branches grey tomentose. Leaves usually 3-foliolate; petioles 1-4 cm long; leaflets elliptic-oblong or obovate, 3-7 x 1-3 cm, base rounded, rounded and notched at apex, glabrous above, appressed greyish pubescent beneath; lateral nerves 7-9 pairs; petiolules small; stipules \pm 10 mm long, lanceolate. Racemes 5-10 cm long, axillary or terminal, elongate, dense; bracts ovate, 7-8 x 3-4 mm, striate, ciliate, acuminate; flowers 5-8 mm long, purplish-pink; calyx glabrous; pods 1.5-3 x 0.2-0.3 cm, indented along the lower suture, upper suture \pm straight, pubescent with hooked hairs along the sutures; joints 3-7, reticulate; dehiscing by lower suture.

Fl. & Fr.: June-November.

Common, in open places along the road side. Bunglang, *Deb* 31434; Thenzaw-Buangpui, *K.P. Singh*; Kawihkulh-Hliapui, *K.P. Singh* 94323; Zote, *K.P. Singh* 94567.

6. *Desmodium laxiflorum* DC., Ann. Sci. Nat. Paris 4: 100. 1825; Baker in Hook. f., Fl. Brit. India 2: 164. 1876; Kanjilal *et al.*, Fl. Assam

2: 48. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 90. 1938.

Fig. 93.

Undershrubs, up to 2 m tall. Leaves 3-foliolate or sometimes 1-foliolate; petioles 2-5 cm long; leaflets ovate-elliptic, 4-15 x 1.5-7.5 cm, terminal larger, lateral ones smaller, base cuneate or rounded, acute or acuminate at apex, puberulous above, appressed densely pubescent beneath, ciliate along the nerves; petiolules ca 2 mm long; stipules triangular, 10-15 x 2-3 mm. Racemes 15-40 cm long, axillary and terminal, lax flowered; flowers fascicled; bracts minute, lanceolate; calyx villous; corolla purplish-pink, 5-7 mm long; standard white with a violet blotch, 3-4 mm wide. Pods falcate, 3-6 x 0.2-0.7 cm, indented along both sutures, densely pubescent with minute hooked hairs; joints 8-10, strongly nerved.

Fl. & Fr.: July-November.

Thenzawl, *K.P. Singh* 93857, 93951; Kawlhkuh-Tuichang, *K.P. Singh* 94403; Puilobasti road, 600-1000 m, *K.P. Singh* 94481; Saithah, *D.K. Singh* 92916; Keitang, *M. Sawmitana* 99253.

7. *Desmodium microphyllum* (Thunb.) DC., Prodr. 2: 337. 1825; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 90. 1938. *Hedysarum microphyllum* Thunb., Fl. Jap. 284. 1784. *Desmodium parvifolium* DC., Ann. Sci. Nat. Paris 4: 100. 1825; Baker in Hook. f., Fl. Brit. India 2: 174. 1876; Kanjilal *et al.*, Fl. Assam 2: 60. 1938.

Prostrate, much branched herbs; branches hairy. Leaves 3-foliolate or sometimes 1-foliolate; leaflets oblong or suborbicular, 2-6(-15) x 1-6 (-10) mm, base rounded or cordate, obtuse or emarginate at apex, glabrous above, sparsely and weakly hairy beneath; stipels minute; stipules ovate, 3-8 x 0.5-1 mm. Racemes few, 1.5-5 cm long, terminal and lateral; calyx 3-3.5 mm long with lanceolate teeth, brown, pilose; corolla 4-5 mm long, purplish-pink, fading to white. Pods oblong, 5-13(-18) x 2-3 mm, undulate along both sutures, dehiscing along lower suture, puberulous in young stages; joints 1-4.

Fl. & Fr.: September-February.

Banks and ridges in open valley. *s.loc.* 1200 m, *Wenger* 426 (*vide* C.E.C. Fischer, *l.c.*).

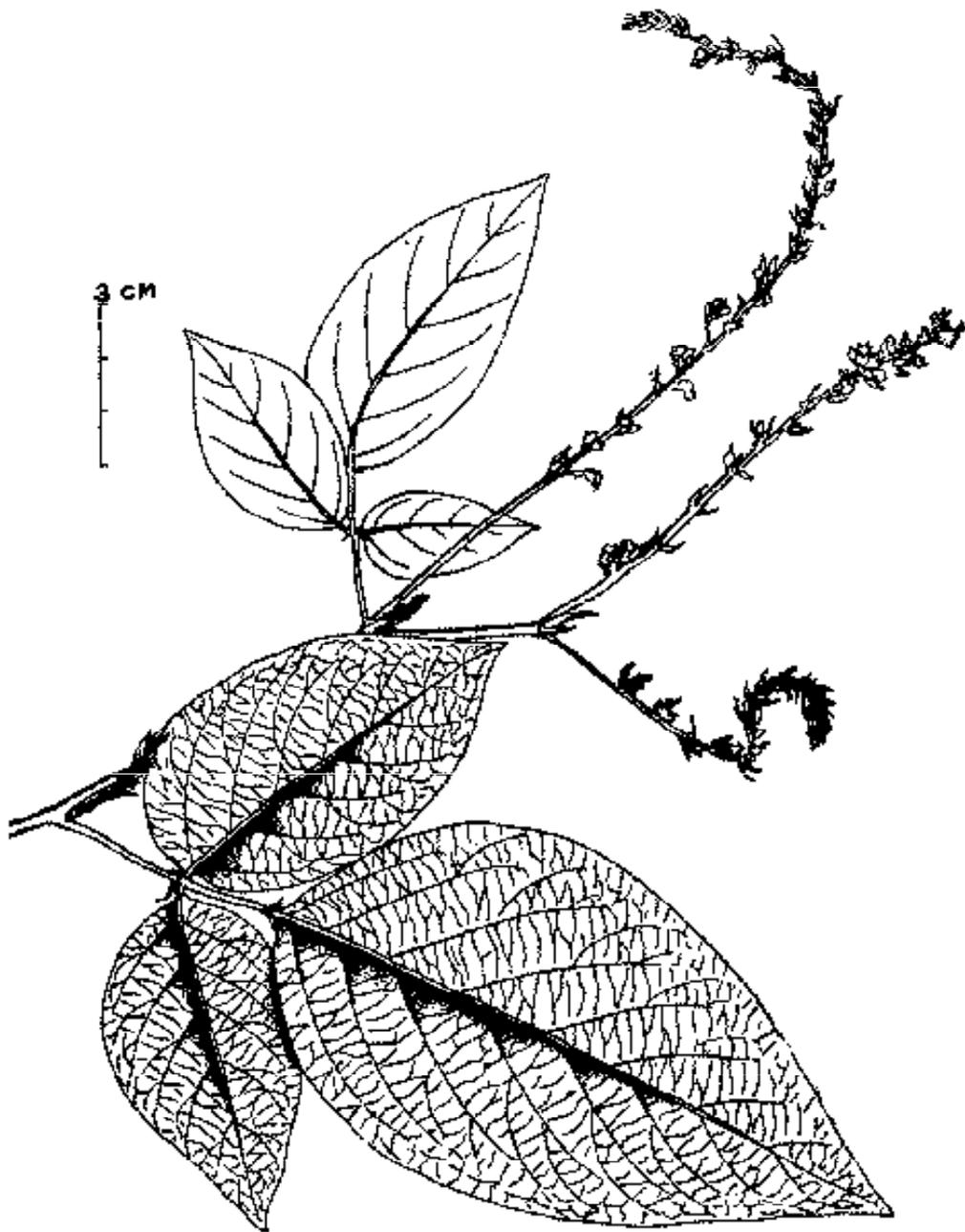


Fig. 93: *Desmodium laxiflorum* DC.

8. *Desmodium motorium* (Houtt.) Merr., J. Arn. Arb. 19: 345. 1938. *Hedysarum motorium* Houtt., Nat. Hist. 2, 10: 246. 1779. *H. gyrans* L. f., Suppl. 332. 1781. *Desmodium gyrans* (L.f.) DC., Prodr. 2: 326. 1825; Baker in Hook. f., Fl. Brit. India 2: 174. 1876; Kanjilal *et al.*, Fl. Assam 2: 58. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89. 1938. *Keuphia* (Lakher). **Fig. 94.**

Undershrubs, up to 3 m tall; branches glabrous. Leaves usually 3-foliolate; petioles 1-2.5 cm long; terminal leaflets large, linear-lanceolate to ovate-oblong, 4-10 x 1-3 cm, base rounded, subacute to obtuse at apex, almost glabrous above, appressed pubescent beneath; lateral leaflets very small when present, linear-oblong, 1-1.5 x 0.2-0.3 cm; petiolules small, ca 1 mm long; stipules ovate-acuminate, 3-15 mm long. Racemes terminal and axillary, 5-12 cm long; bracts ovate; 3-6 mm long; flowers 0.5-0.6 cm long, purple pink to orange or yellow with red stripes. Pods linear, 2-5 x 0.4-0.6 cm, curved, dehiscent and undulating along lower sutures with 5-10 joints, sparsely pubescent with short hooked hairs; seeds elliptic, ca 3 x 2 mm, black.

Fl. & Fr.: October-February.

Common, in evergreen forests. Chhualung, 1500 m, Parry 500 (*vide* C.E.C. Fischer, *l.c.*) Kawhkuh-Tuichang, K.P. Singh 94441; Champhai, K.P. Singh 94533.

9. *Desmodium multiflorum* DC., Ann. Sci. Nat. 4: 101. 1825. *D. floribundum* (D. Don) Sweet ex G. Don., Gen. Syst. 2: 297. 1832; Baker in Hook. f., Fl. Brit. India 2: 167. 1876, *excl. syn. cit.* Spreng.; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987. *Hedysarum floribundum* D. Don, Prodr. Fl. Nepal 224. 1825. *H. sambuense* D. Don, Prodr. Fl. Nepal 243. 1825. *Desmodium sambuense* (D. Don) DC., Prodr. 2: 335. 1825; Kanjilal *et al.*, Fl. Assam 2: 51. 1938.

Shrubs, up to 1.5 m tall with trigonous branches; young parts pubescent. Leaves 3-foliolate, coriaceous; petioles 2-6 cm long; leaflets elliptic or oblong-obovate, 5.5-7 x 2-3.5 cm, base rounded or narrowly obtuse, acute at apex, green and lightly adpressed hairy above, densely hairy beneath; lateral nerves 5-6 pairs; petiolules small; stipules lanceolate, 5-10 mm long. Racemes 8-16 cm long, axillary or terminal, sometimes paniced; calyx funnel-shaped, glabrous; corolla 5-8 mm long, purplish or nearly white. Pods 2-3 x 0.3-0.4 cm, indented along both sutures and dividing into 4-8 elliptic segments, adpressed hairy, reticulately veined.



Fig. 94: *Desmodium motorium* (Houtt.) Merr.

Fl. & Fr.: August-December.

Thalthlang, *Dutta* 33974.

10. *Desmodium oblongum* Wallich [Cat. 5714. (1831-32), *nom. nud.*] *ex Benth.* in *Miq.*, *Pl. Jungh.* 224, 1852; Baker in *Hook. f.*, *Fl. Brit. India* 2: 166, 1876; Kanjilal *et al.*, *Fl. Assam* 2: 61, 1938.

Shrubs, up to 3 m tall. Leaves 1-foliolate, narrowly ovate or elliptic, 5-12 x 2-3.5 cm, base rounded, acute or obtuse at apex, glabrous above, appressed pubescent beneath; petioles up to 1 cm long; stipules lanceolate, 8-10 x 2-3 mm. Flowers in axillary or terminal racemes or panicles; calyx ca 3 mm long, silky; corolla dark blue-purple; pods linear, 2-3.5 x 0.3 cm, curved, indented along both sutures; joints 6-10, ± glabrous.

Fl. & Fr.: August-December.

In open forests on edges of cliffs. *s.loc.*, *s.num.* 1500-1800 m, *Wenger*. (*vide* C.E.C. Fischer, *l.c.*).

11. *Desmodium pulchellum* (L.) Benth., *Fl. Hongk.* 33, 1861; Baker in *Hook. f.*, *Fl. Brit. India* 2: 162, 1876; Kanjilal *et al.*, *Fl. Assam* 2: 47, 1938; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 35, 1987. *Hedysarum pulchellum* L., *Sp. Pl.* 747, 1753. **Fig. 95.**

Shrubs, up to 3 m high. Leaves 3-foliolate; petioles 0.5-1.5 cm long; leaflets elliptic to ovate-oblong, 4-10 x 2-4 cm, terminal leaflet at least twice as large as lateral ones; base rounded, acute at apex, entire to undulate along margins, glabrous above, finely pubescent beneath; lateral nerves 8-10 pairs; petiolules ca 1 mm long. Inflorescence racemiform, axillary or terminal, consisting of series of paired, leafy, elliptic or suborbicular, 1.4-1.8 x 1-1.5 cm bracts placed on 18-40 cm long densely pubescent stalks; flowers 5-8 mm long, in 2-6-flowered fascicles, each being concealed by a pair of bracts; calyx hairy; corolla white or pale yellow. Pods 1-1.5 x 0.2-0.3 cm, brown when ripe, indented along both sutures, pubescent along sutures, otherwise glabrous, 1-3-segmented, apiculate.

Fl. & Fr.: June-December.

Common, along the ridges of the hills. Neidown-Champhai, 900 m, *Leslie* 235 (CAL); Champhai-Lungleh, *Deb* 31065 (CAL); Pailobasti road, *K.P. Singh* 94470.



Fig. 95: *Desmodium pulchellum* (L.) Benth.

12. *Desmodium repandum* (Vahl) DC., Prodr. 2: 334. 1825; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 90. 1938. *Hedysarum repandum* Vahl, Symb. Bot. 2: 334. 1825; Baker in Hook. f., Fl. Brit. India 2: 165. 1876; Kanjilal *et al.*, Fl. Assam 2: 53. 1938.

Herbs or undershrubs, up to 75 cm high; branches pubescent. Leaves 3-foliolate; petioles 2-5 cm long; leaflets suborbicular or oblong-obovate, 2-7 x 3-5 cm, base cuneate, obtuse-acute at apex, wavy along margins, glabrate above, appressed pubescent beneath; petiolules ca 2 mm long; stipules setaceous. Racemes 2-30 cm long, mostly terminal; flowers 2-4 in a cluster, laxly placed; bracts caducous, ovate-lanceolate; calyx ca 2 mm long, pubescent; corolla orange or bright-red. Pods ca 1.5 cm long, indented on lower suture, hooked, pubescent; joints 1.-3, crescent-shaped.

Fl. & Fr.: August-January.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

13. *Desmodium sequax* Wallich, Pl. Asiat. Rar. 2: 46. t. 157. 1831; Baker in Hook. f., Fl. Brit. India 2: 170. 1876; Kanjilal *et al.*, Fl. Assam 2: 49. 1938. *D. stragulatum* Wight & Arn. var. *sinuatum* Miq., Fl. Ind. Bat. 1. 1: 225. 1855. *D. sinuatum* (Miq.) Blume ex Baker in Hook. f., Fl. Brit. India 2: 166. 1876; Kanjilal *et al.*, Fl. Assam 2: 49. 1938. *Chabet* (Lushai). **Fig. 96.**

Shrubs, 1-3 m tall; branches pubescent. Leaves 3-foliolate; petioles 2-4 cm; leaflets rhomboid-ovate, 4-8 x 2-5 cm, terminal large, lateral ones small, base ± rounded or subacute, acuminate or acute at apex, undulate along margins, subcoriaceous, appressed pubescent on both surfaces, grey beneath; lateral nerves 4-5 pairs; petiolules ca 2 mm long; stipules 4-5 mm long, linear. Racemes 5-15 cm long, terminal and axillary, lax flowered; flowers 6-8 mm long; calyx funnel-shaped, hairy outside; corolla purple. Pods 1.5-2.5 x 0.1-0.2 cm, indented along both sutures, densely covered with short hooked hairs; joints 6-10, lentil-shaped.

Fl. & Fr.: September-January.

Common, in grasslands and forest edges. Denlong village, K.P. Singh 94131.

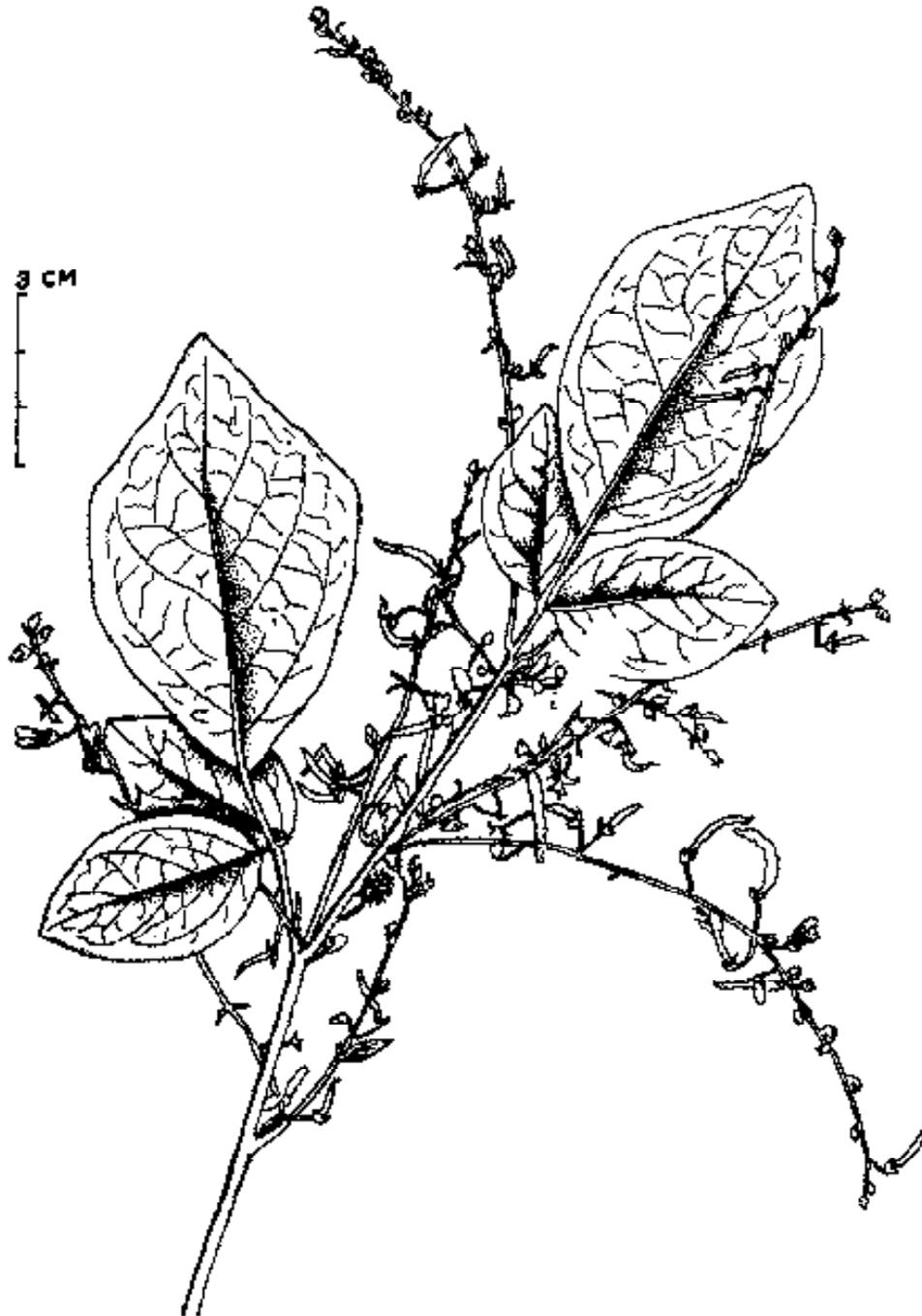


Fig. 96: *Desmodium sequax* Wallich

14. *Desmodium triangulare* (Retz.) Merr., J. Arn. Arb. 23: 170. 1942. *Hedysarum triangulare* Retz., Obs. Bot. 3: 40. 1783. *H. cephalotes* Roxb., Fl. Ind. 3: 360. 1832. *Desmodium cephalotes* (Roxb.) Wallich ex Wight & Arn., Prodr. 224. 1834; Baker in Hook. f., Fl. Brit. India 2: 161. 1876; Kanjilal *et al.*, Fl. Assam 2: 46. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 89. 1938. **Fig. 97.**

Erect shrubs, 0.5-2 m tall; stems triquetrous, appressed with white sericeous hairs when young. Leaves 3-foliolate; leaflets oblong-elliptic to lanceolate, 4-13 x 5-6 cm, acute at both ends, green-glabrous above, densely grey-silky beneath; lateral nerves 10-12 pairs, prominent beneath; petiolules *ca* 2 mm long; stipules narrowly ovate, 8-15 x 3-5 mm, acuminate. Inflorescence axillary, in dense umbels or corymbs; peduncles up to 1 cm long; bracteoles linear, hairy; calyx whitish, sericeous; corolla white or yellowish, 8-10 mm long. Pods linear, 1-2 cm long, breaking up into 2-5 squarish segments; seeds *ca* 2 x 3 mm.

Fl. & Fr.: June-November.

Champhai-Myanmar border, 900-1500 m, *Deb* 31038; South-Vanlaiphai-Darzo, *Dutta* 34051; Puiobasti road, *ca* 900-1000 m, *K.P. Singh* 94479.

15. *Desmodium triflorum* (L.) DC., Prodr. 2: 334. 1825; Baker in Hook. f., Fl. Brit. India 2: 173. 1876; Kanjilal *et al.*, Fl. Assam 2: 60. 1938. *Hedysarum triflorum* L., Sp. Pl. 749. 1753, excl. vars.

Much branched, ± prostrate perennial herbs; branches hairy. Leaves 3-foliolate; petioles 3-7 mm long; leaflets obovate, 4-10 x 3-10 mm, base cuneate, rounded or mucronate or emarginate at apex; glabrous above, weakly hirsute beneath; petiolules *ca* 1 mm long; stipules *ca* 2-3 mm long; flowers 1-5 together, axillary from upper leaves; calyx teeth setaceous; corolla purplish, violet, whitish-violet. Pods oblong, 8-15 x 2-3 mm, often curved, pubescent, undulate along lower suture; joints 2-5, reticulately veined.

Fl. & Fr.: August-December.

Very common, on ground in shady moist open places along the road side. Lawngtalai-Mampui road, *K.P. Singh* 92886; Thenzawl, *K.P. Singh* 93870; Tlabung, *K.P. Singh* 94267; Kawlhkulkh-Hliapui, *K.P. Singh* 94376.



Fig. 97: *Desmodium triangulare* (Retz.) Merr.

16. *Desmodium triquetrum* (L.) DC., Prodr. 2: 326. 1825; Baker in Hook. f., Fl. Brit. India 2: 163. 1876. *p.p.*; Kanjilal *et al.*, Fl. Assam 2: 56. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987. *Hedysarum triquetrum* L., Sp. Pl. 746. 1753. *Zawngbuliang* (Lushai).

Undershrubs, 1-2.5 m tall; branches triquetrous. Leaves 1-foliolate; ovate-oblong or lanceolate, 5-15 x 2-5 cm, base rounded to truncate, acute or shortly acuminate at apex, coriaceous, glabrous or sparsely scaberrulous above, pilose along veins beneath; petioles winged, 1-3 cm long; stipules ovate, 1.5-2 x 0.4-0.6 cm. Racemes or panicles 10-18 cm long, axillary or terminal; bracts linear-lanceolate; 4-5 mm long; calyx 5-6 mm long. Pods strap-shaped, straight to slightly curved, brown when mature, shallowly indented along lower or both sutures; joints 5-8; seeds glossy.

- 1a. Pods pubescent throughout ...16.2. subsp. *triquetrum*
 1b. Pods pubescent only along sutures ..16.1. subsp. *pseudotriquetrum*

16.1. subsp. *pseudotriquetrum* (DC.) Prain in J. As. Soc. Bengal. 6: 263. 1962. *Desmodium pseudotriquetrum* DC., Ann. Sci. Nat. Paris 4: 100, 1825 & Prodr. 2: 326. 1825. *Desmodium triquetrum* (L.) DC., Prodr. 2: 326. 1825, *non auct.*; Baker in Hook. f., Fl. Brit. India 2: 163. 1876, *p.p.* Fig. 98.

Fl. & Fr.: July-December.

Sake-Saitual, Leslie 100 (CAL); Bunglang, Deb 31428; Thenzawl, K.P.Singh 93838; Kawlhkuh-Hliapui, K.P.Singh 94304; Darlawn-Tipaimukh, K.P.Singh 97095.

16.2. subsp. *triquetrum*

Fl. & Fr.: August-March.

Champhai, Deb 30957; Keifang, M. Sawmliana 95595.

17. *Desmodium velutinum* (Willd.) DC., Prodr. 2: 328. 1825; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987. *Hedysarum velutinum* Willd., Sp. Pl. 3: 117. 1803. *Desmodium latifolium* (Roxb.) DC., Prodr. 2: 328. 1825; Baker in Hook. f., Fl. Brit. India 2: 168. 1876; Kanjilal *et al.*, Fl. Assam 2: 56. 1938.



Fig. 98: *Desmodium triquetrum* ssp. *pseudotriquetrum* (DC.) Prain

Shrubs, up to 3 m tall; branches densely tomentose. Leaves 1-foliolate, broadly ovate, 4-7 x 3-4.5 cm, base truncate or cordate, obtuse to subacute at apex, hispid above, densely soft tomentose beneath; petioles 0.5-1 cm long, hairy; stipules subulate, 2-7 x 1-3.5 mm. Racemes 5-15 cm long, axillary or terminal; flowers in fascicles of 2-5, 2-4 mm across; calyx hairy, campanulate; corolla purplish-pink. Pods narrowly oblong, 1.5-2.5 x 0.2-0.3 cm, indented along both sutures, densely pubescent with hooked hairs; joints 3-6.

Fl. & Fr.: September-February.

Scarce, in moist places along road-side forests. Aizawl- Champhai, 1020-1560 m, *Deb* 30918.

16. DUNBARIA Wight & Arn.

Dunbaria podocarpa Kurz in J. As. Soc. Bengal 43(2): 185. 1874; Baker in Hook. *f.*, Fl. Brit. India 2: 218. 1876; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 90. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987.

Climbing herbs, hairy. Leaves 3-foliolate; petioles 1.5-3 cm long; leaflets broadly ovate, 2.5-3 x 1-1.6 cm, base rounded or cuneate, acuminate at apex, entire along margins, puberulous, distinctly gland dotted beneath; petiolules short, 2-3 mm long. Flowers axillary, in pairs, yellow; calyx campanulate, 4-6 mm long, hairy, teeth lanceolate; corolla small, exserted; keel incurved, not beaked. Pods linear, 6-7 x 0.6-0.7 cm, pubescent, compressed, not depressed between the seeds; seeds orbicular.

Fl. & Fr.: September-January.

Scarce in the area. Near fort Lungleh, 900-1200 m, *Gage* 192 (CAL); Aizawl, *Deb* 30642 (CAL).

17. DYSOLOBIUM (Benth.) Prain

Dysolobium grande (Wallich *ex* Benth.) Prain in J. As. Soc. Bengal 66: 427. 1897; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 90. 1938; Kanjilal *et al.*, Fl. Assam 2: 83. 1938. *Phaseolus grandis* Wallich [Cat., 5602. (1831-32), *nom. nud.*] *ex* Benth. in Miq., Pl. Jungh, 239. 1852 in *adnota*. *P. velutinus* Grah. [in Wallich Cat. 5615. (1831-32), *nom. nud.*] *ex* Baker in Hook. *f.*, Fl. Brit. India 2: 204. 1876. *Hruichun* (Lushai).

Woody climbers with densely brown pubescent stems. Leaves 3-foliolate; petioles 10-15 cm long; leaflets ovate or broadly elliptic, 10-18 x 9-10 cm, terminal leaflet larger, lateral ones oblique; base rounded or truncate, acuminate at apex, green and glabrescent above; scabrid along the nerves beneath; petiolules 3-4 mm long; stipels linear-lanceolate, 5-6 mm long, setaceous. Racemes up to 60 cm long, bearing 30-40 flowers; calyx silky with lowest tooth longer than others; petals reddish-purplish; keel beaked, strongly incurved; style filiform, bearded. Pods oblong, 12-20 x 2-3 cm, pointed at both ends, woody, densely brown-velvety outside; channelled along sutures; seeds 8-12.

Fl. & Fr.: July-February.

Aizawl, 900 m, *Parry* 627 (*vide* C.E.C. Fischer *l.c.*).

18. ERIOSEMA (DC.) G. Don

Eriosema himalaicum Ohashi, *J. Jap. Bot.* 41: 96. 1966; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 35. 1987. *E. chinense auct.* non Vogel, *Pl. Meyen.* 31. 1843; Baker in *Hook. f., Fl. Brit. India* 2: 219. 1876, *p.p.*; Kanjilal *et al.*, *Fl. Assam* 2: 94. 1938. Fig. 99.

Erect herbs or undershrubs, 10-70 cm high with densely pubescent stems. Leaves 1-foliolate, linear or oblong, 2-6 x 0.3-0.6 cm, base rounded or cuneate, acute to acuminate at apex, recurved and pilose along margins, green with few adpressed hairs above, densely grey pubescent beneath, midrib brown, pilose; stipules narrowly lanceolate. Flowers axillary, solitary or paired on short peduncles; calyx 5-7 mm long, densely pilose, 5-toothed; petals yellow with purple veins, clawed; standard auricled at base; keel slightly beaked; ovary sessile, 2-ovuled, villous. Pods oblong-elliptic, 7-9 x 5-6 mm, compressed, densely villous, brown, 1-2-seeded; seeds oblong, ca 3 mm long, black.

Fl. & Fr.: July-October, or throughout the year.

Common, in grass lands in open places. *s.loc.*, *Parry* 10 (CAL); Darzo-Leite, *Dutta* 34112; Zote, *K.P. Singh* 94568, 94569.



Fig. 99: *Eriosema himalaicum* Ohashi

19. ERYTHRINA L.

- 1a. Calyx campanulate, truncate or weakly bilabiate, not deeply divided down to the base ...1. *E. arborescens*
- 1b. Calyx spathaceous, not bilabiate, deeply divided dorsally down to the base:
- 2a. Spines whitish; calyx entire at tip; keel petal connate; pods 2-3-seeded ...2. *E. stricta*
- 2b. Spines brown or blackish; calyx 5-toothed at tip; keel petal free; pods 6-8-seeded ...3. *E. variegata*

1. *Erythrina arborescens* Roxb. [Hort. Beng. 53. (1814) *nom. nud.*], Pl. Corom. 3: 14, t. 219. 1811; Baker in Hook. *f.*, Fl. Brit. India 2: 190. 1876; Kanjilal *et al.*, Fl. Assam 2: 72. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 90. 1938. *Nganbawn* (Lushai); *Chiachi* (Lakher).

Trees, 5-15 m tall with few brown spines on the branches. Leaves 3-foliolate; petioles 20-25 cm long; leaflets broadly triangular-ovoid, ovate, 12-20 x 12-20 cm, base broadly cuneate, sharply acuminate at apex, glabrous above, hispidulous along the nerves beneath; lateral nerves 5-7 pairs; petiolules up to 1 cm long; stipules lanceolate. Racemes axillary or terminal, 20-25 cm long; flowers 3-3.5 cm long, bright red; calyx 8-10 mm long, shallowly bilabiate, sparsely pubescent; standard ovate-elliptic, orange-red; keel ovate, triangular, pale green. Pods oblong-ellipsoid, 15-20 x 2-2.5 cm, curved, narrowed at both ends, 4-6-seeded, scarcely constricted between the seeds; seeds oblong, 1.5-2 cm long, reniform.

Fl. & Fr.: August-February.

Bukupi, 900 m, *Parry* 617 (*vide* C.E.C. Fischer, *l.c.*).

2. *Erythrina stricta* Roxb. [Hort. Beng. 53. (1814), *nom. nud.*], Fl. Ind. 3: 251. 1832; Baker in Hook. *f.*, Fl. Brit. India 2: 189. 1876; Kanjilal *et al.*, Fl. Assam 2: 70. 1938. *Phartuah* (Lushai).

Trees, 6-20 m tall with whitish, conical incurved spines on branches. Leaves pinnately 3-foliolate; petioles 12-20 cm long; leaflets ovate, 10-20 x 8-20 cm, base rounded, acute or acuminate at apex, glabrous and shining above, glaucous and minutely hairy along the nerves beneath; lateral nerves 6-8 pairs; petiolules 8-12 mm long; stipules falcate. Racemes 15-18 cm

long, crowded at the end of branchlets; flowers coral red, appearing before leaves; calyx spathaceous, ca 15 mm long, deeply divided dorsally, brown pubescent; standard scarlet, ovate; keel scarious. Pods spindle shaped, 7-12 x 0.5-1.2 cm, sharply pointed, glabrous outside, 1-3-seeded, scarcely constricted; seeds kidney-shaped, oblong, ca 15 mm long, red.

Fl. & Fr.: January to April.

Near fort Lungleh, 900-1200 m. *Gage* 112 (CAL); Sairep village forest, *K.P. Singh* 94130.

3. *Erythrina variegata* L., Herb. Amboin. 10. 1754. *E. indica* Lam., Encycl. 2: 391. 1786; Baker in Hook. *f.*, Fl. Brit. India 2: 188. 1876; C.F.C. Fischer in Rec. Bot. Surv. India 12(2): 90. 1938.

Trees, up to 30 or 40 m tall, spines minute, conical, brown or blackish. Flowers purplish-scarlet; calyx 18-25 mm long with a very oblique mouth, minutely 4-toothed, spathaceous, glabrescent. Pods 15-30 x 1.5 cm, curved, constricted between the seeds, glabrous, 6-8-seeded; seeds oblong, ca 17 mm long, reddish brown or purplish.

Fl. & Fr.: March-September.

Cultivated as hedge plant. Recorded on the basis of C.E.C. Fischer (*l.c.*).

20. EUCHRESTA Bennett

***Euchresta horsfieldii* (Lesch.) Bennett** in Bennett & R. Br., Pl. Jav. Rar. 148. t.31. 1840; Baker in Hook. *f.*, Fl. Brit. India 2: 248. 1876; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987. *Andira horsfieldii* Lesch., Ann. Mus. 16: 481. t.12. 1810.

Low growing, erect shrubs, 0.7-1.5 m high with glabrous branches and leaves. Leaves 3-5-foliolate; leaflets elliptic or oblong, 12-18 x 4-8 cm, base rounded or cuneate, acute or acuminate at apex; stipules small, subulate; petioles narrowly winged. Flowers in terminal or leaf opposed, 4-10 cm long racemes; bracts 2-3 mm long; calyx campanulate, 8-10 mm long, with broadly triangular teeth; petals white, standard not clawed; wing and keel petals clawed. Pods oblong, 10-18 x 8-10 mm, glabrous, purplish black, 1-seeded, rather fleshy.

Fl. & Fr.: May.

North-Vanlaiphai, *Deb* 31155 (CAL).

21. FLEMINGIA Roxb. ex Ait. & Ait. f.

- 1a. Leaves simple; flowers in small cymes, hidden by reniform, suborbicular, strongly reticulate, persistent bracts ...3. *F. strobilifera*
- 1b. Leaves 3-foliolate; flowers in dense spicate or subspicate axillary racemes, not hidden by bracts; bracts caducous:
- 2a. Leaflets elliptic-obovate, 6-9 x 3.0-4.5 cm; petioles 3-7 cm long; stipules 5-10 mm long ...1. *F. macrophylla*
- 2b. Leaflets ovate-lanceolate, 10-26 x 5-12 cm; petioles 7-13 cm long; stipules 4-6 cm long ...2. *F. stricta*

1. *Flemingia macrophylla* (Willd.) O.Kuntze ex Merr., Phillipine J. Sci. Bot. 5: 130. 1910. *Crotalaria macrophylla* Willd., Sp. Pl. 3: 982. 1802. *Flemingia congesta* Roxb. ex Ait. f., Hort. Kew. ed. 2, 4: 349. 1812; Baker in Hook. f., Fl. Birt. India 2: 228. 1876; Kanjilal *et al.*, Fl. Assam 2: 90. 1938. *F. prostrata* Roxb. [Hort. Beng. 56. (1914), *nom. nud.*], Fl. Ind. 3: 338. 1832; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987. *F. latifolia* Benth. in Miq., Pl. Jugn. 246. 1852; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987. *F. congesta* Roxb. ex Ait. f. var. *latifolia* (Benth.) Baker in Hook. f., Fl. Brit. India 2: 229. 1976. *Moghania macrophylla* (Willd.) O.Kuntze, Rev. Gen. Pl. 1: 199. 1981.

Fig. 100.

Shrubs, 1-2 m tall with angular branches, appressed sericeous when young. Leaves 3-foliolate; petioles 3-7 cm long, narrowly winged; leaflets elliptic-obovate or oblong-lanceolate, 6-13 x 3-5.5 cm, base cuneate or rounded, oblique in lateral leaflets, acute or shortly acuminate at apex, glabrescent or ± scabrous above, pubescent along the nerves and gland dotted beneath; petiolules ca 3 mm long; stipules lanceolate, 5-10 mm long. Flowers in axillary, 5-9 cm long racemes or sometimes in terminal panicles; bracts ovate; flowers 1-1.3 cm long, purplish; calyx densely silky, gland dotted; corolla greenish-white with pink stripes. Pods ovoid-ellipsoid, 10-12 x 7-8 mm, turgid, brown, velvety, 2-seeded; seeds black, shiny.

Fl. & Fr.: April-February.



Fig. 100: Flemingia macrophylla (Willd.) O. Kuntze ex Mert.

Common. on slopes in open forests. Neidown, *Leslie* 231 (CAL); Champhai, *Deb* 3088; Champhai-Myanmar border, *Deb* 31039; Panchagram, *Deb* 31482; Thaltlang, *Dutta* 3397; Kawlhkuh-Iliapui, *K.P. Singh* 94398; Kaifang, *M. Sawmliana* 99258; Sangau, 1100 m, *Mao* 107186.

2. *Flemingia stricta* Roxb., *Pl. Corom.* 3: t.248. 1815; Baker in *Hook. f.*, *Fl. Brit. India* 2: 228. 1876; Kanjilal *et al.*, *Fl. Assam* 2: 89. 1938; *Deb & Dutta* in *J. Econ. Tax. Bot.* 10(1): 25. 1987. *Moghania stricta* (Roxb.) O.kuntze, *Rev. Gen. Pl.* 1: 199. 1891.

Shrubs, up to 4 m tall; branches angular, hairy. Leaves 3-foliolate; petioles narrowly winged, 7-13 cm long; leaflets ovate-lanceolate, 10-26 x 5-12 cm, base rounded or cuneate, in laterals oblique, acuminate at apex, subcoriaceous, glabrous or \pm hispid above, pubescent along the nerves and glandular dotted beneath; petiolules 3-5 mm long; stipules 4-6 cm long, lanceolate, silky outside, longitudinally veined. Racemes 8-13 cm long, densely flowered, spicate; bracts caducous, lanceolate; flowers 1-1.3 cm long; calyx tube 2-3 mm long with long teeth; petals purple. Pods ellipsoid, 12-15 x 7-8 mm, glabrescent.

Fl. & Fr.: January-September.

Common, in shady and damp places. Sairang-jengpui, *G.K. Deka s.num.*; Darlak, *Deb* 3422; Aizawl, *Dutta* 30649; Champhai, *K.P. Singh* 94520.

3. *Flemingia strobilifera* (L.) Ait. & Ait. *f.*, *Hort. Kew.* ed. 2, 4: 350. 1812; Baker in *Hook. f.*, *Fl. Brit. India* 2: 227. 1876; Kanjilal *et al.*, *Fl. Assam* 2: 88. 1938. *Hedysarum strobiliferum* L., *Sp. Pl.* 764. 1753. *Flemingia fluminialis* C.B. Clarke *ex Prain* in *J. As. Soc. Bengal* 66: 438. 1897; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 90. 1938. *F. fruticulosa* Wallich [Cat. 5754. (1831-32), *nom. nud.*] *ex Benth.* in *Miq.*, *Pl. Jungh.* 245. 1852.

Shrubs 1-5 m tall with terete \pm hairy branches. Leaves simple, ovate-lanceolate, 7-16 x 3-6.5 cm, base rounded or truncate, acuminate at apex, chartaceous, glabrescent or glabrous above, minute glandular and pubescent beneath; lateral nerves 8-12 pairs; petioles 5-8 mm long, pubescent; stipules lanceolate, 8-10 mm long. Flowers 6-8 mm long, purplish, 1-3, hidden in the axils of reniform or suborbicular membranous,

puberulous bracts, 1.5-2.5 cm across, bracts arranged in terminal and axillary, 7-15 cm long racemes; calyx velvety and gland dotted outside with lanceolate teeth; petals white with purplish lines; glabrous. Pods ellipsoid, 8-10 x 7 mm, finely pubescent, 2-seeded.

Fl. & Fr.: February-May.

Changsai, *Prager, s. num.* 1890 (CAL); *s. loc.*, Parry 8 (CAL); Champhai-Myanmar border, *Deb* 31049.

22. INDIGOFERA L.

- 1a. Pods distinctly curved ...5. *I. suffruticosa*
- 1b. Pods straight:
- 2a. Young shoots densely brown hirsute; leaflets 37-53 ...4. *I. stachyodes*
- 2b. Young shoots glabrous or bearing appressed hairs; leaflets 5-15:
- 3a. Leaflets 5-7, obovate or oblanceolate, 4-10 x 3-4 mm ...3. *I. heterantha*
- 3b. Leaflets 7-15, much larger
- 4a. Leaflets elliptic-oblong or obovate; 30-50 x 15-20 mm; racemes 15-30 cm long ... 2. *I. atropurpurea*
- 4b. Leaflets elliptic-oblong, 15-25 x 6-9 mm; racemes 3-5 cm long ...1. *I. arrecta*

1. *Indigofera arrecta* Hochst ex A. Rich., Tent. Fl. Abyss. 1: 184, 1847.

Erect undershrubs, 1-2 m tall with strigose stems. Leaves 5-10 cm long, 9-15-foliolate; leaflets elliptic-oblong, 1.5-2.5 x 0.6-0.9 cm, base cuneate, obtuse-mucronate at apex, thinly appressed pubescent on both surfaces; petiolules ca 1 mm long, stipules setaceous. Racemes 3-5 cm long, axillary; flowers 3-4 mm long, pink-reddish; calyx campanulate with lanceolate teeth, pubescent. Pods linear, 15-20 x ca 2 mm, straight, beaked, appressed pubescent, 8-seeded, reflexed, usually borne near the base.

Fl. & Fr.: September-November.

Probably cultivated. Thenzawl, *K.P. Singh* 93855.

2. *Indigofera atropurpurea* Buch.-Ham. ex Horm., Hort. Hafn. Suppl. 152. 1819; Baker in Hook. f., Fl. Brit. India 2: 101. 1876; Kanjilal *et al.*, Fl. Assam 2: 20. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987.

Erect shrubs, 1-2 m tall with nearly glabrous branches. Leaves 13-22 cm long, 7-15-foliolate; leaflets elliptic or obovate, oblong, 3-5 x 1.5-2 cm, base rounded or cuneate, obtuse-mucronate at apex, sparsely appressed pubescent on both surfaces; petiolules 2-3 mm long. Racemes 15-30 cm long, axillary; flowers \pm 1 cm long; corolla crimson red or pink. Pods linear, 30-40 x 3 mm, straight, beaked at apex, deflexed, 6-10-seeded; seeds red.

Fl. & Fr.: May-September.

On open hillsides. Aizawl-Champhai road, Deb 30904.

3. *Indigofera heterantha* Wallich [Cat. 54080 A, B, C (1831-32), *nom. nud.*] ex Brandis, For. Fl. N.W.C. India 135. 1874; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987. *I. gerardiana* Wallich [Cat. 5486 (1831-32), *nom. nud.*] ex Baker in Hook. f., Fl. Brit. India 2: 100. 1876. *I. gerardiana* var. *heterantha* Baker, l.c. 100; Kanjilal *et al.*, Fl. Assam 2: 19. 1938.

Erect shrubs, up to 2 m tall; young parts greyish pubescent. Leaves 5-7-foliolate; petioles 3-4 mm long; leaflets obovate or oblanceolate, 4-10 x 3-4 mm, base cuneate, obtuse to mucronate at apex, appressed pubescent on both surfaces; petioles 3-4 mm long; petiolules ca 1 mm long; stipules thin and small. Racemes up to 3 cm long; flowers 8-10 mm long, pink or purple; calyx 2-3 mm long with lanceolate teeth, hairy; standard petal obovate. Pods linear, 20-28 x 2.5 mm, pubescent.

Fl. & Fr.: May-July.

On open hill sides. Vawmbuk-Thaltlang, Dutta 33936; Phongpui, K.P. Singh 96815.

4. *Indigofera stachyodes* Lindl., Bot. Reg. 14: t.14. 1843. *I. dosua* Buch.-Ham. ex D. Don var. *tomentosa* Baker in Hook. f., Fl. Brit. India 2: 102. 1876; Kanjilal *et al.*, Fl. Assam 2: 21. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987. Fig. 101.

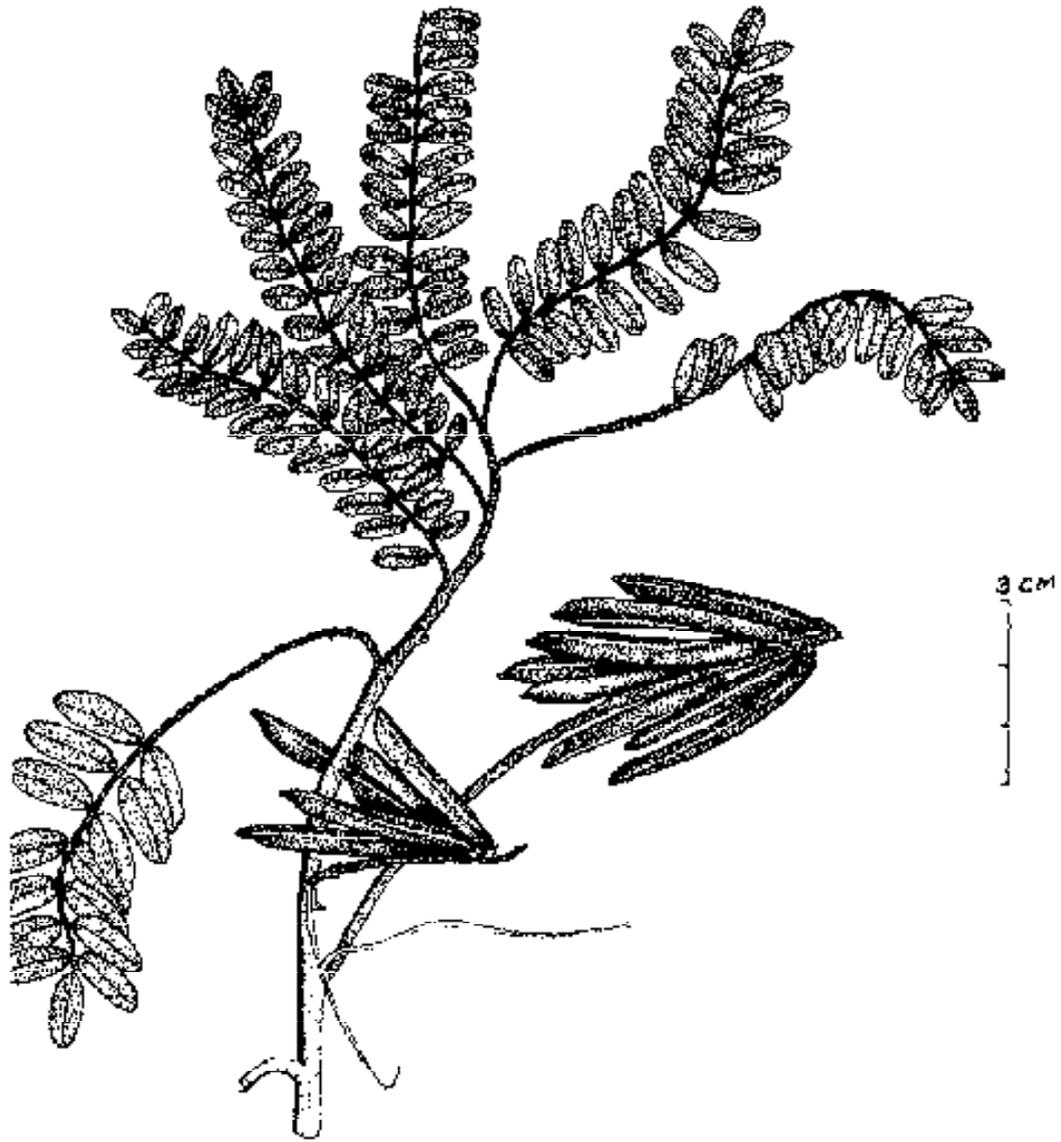


Fig. 101: *Indigofera stachyodes* Lindl.

Shrubs, up to 4 m tall with densely brown hirsute branches. Leaves 8-16 cm long with 37-53 leaflets; leaflets narrowly oblong, 8-25 x 3-7 cm, base rounded or cuneate, acute-mucronate at apex, densely appressed pubescent on both surfaces, sessile to subsessile. Racemes 10-16 cm long, many-flowered; flowers pink or purple, 8-10 mm long. Pods linear, 20-30 x 3-4 mm, straight, shortly beaked, brown when ripe, pubescent, 10-12-seeded, hanging downwards.

Fl. & Fr.: April-September.

On open hill sides. Vawmbuck-Thaltlang, Dutta 33904; Phongpui, K.P. Singh 96817.

5. *Indigofera suffruticosa* Mill., Gard. Dict. ed.8, no.2. 1768.

Small undershrubs, 1-2 m tall with appressed pubescent branches. Leaves 5-9-foliolate, 4-6 cm long; leaflets obovate-oblong, 8-15 x 3-5 mm, base cuneate, obtuse-mucronate at apex, ± glabrous above, appressed pubescent beneath; hairs white, petiolules ca 1 mm long. Racemes 1.5-3 cm long, 10-20-flowered, axillary; flowers reddish-orange. Pods linear-oblong, 10-17 x 2-3 mm, shortly beaked, strongly curved, not torulose, brown, adpressed pubescent, hairs white, 5-8-seeded, deflexed; seeds black, ca 2 mm across.

Fl. & Fr.: September-December.

Probably cultivated in open places. Khawrulian Forest rest house, K.P. Singh 97127.

23. LABLAB Adanson

Lablab purpureus (L.) Sweet, Hort. Brit. ed.1: 481. 1827; Deb & Dutra in J. Econ. Tax. Bot. 10(1): 36. 1987. *Dolichos purpureus* L., Sp. Pl. ed.2: 1021. 1763. *D. lablab* L., Sp. Pl. 725. 1753; Baker in Hook. f., Fl. Brit. India 2: 209. 1876; Kanjilal *et al.*, Fl. Assam 2: 86. 1938.

Large twining herbs with sarmentose branches. Leaves 3-foliolate, 10-30 cm long; petioles up to 10 cm long; leaflets 4-10 x 3-8 cm, terminal one ovate-deltoid; laterals ovate, inequilateral, base truncate or cuneate, acuminate at apex, ciliate along margins, pubescent, 3-5-nerved from base; petiolules 3-4 mm long; stipels triangular; stipules lanceolate. Racemes 15-20 cm long, lax on peduncles; bracts ovate; flowers 1.5-2.5 cm long; calyx

pubescent at mouth, campanulate; corolla white or purple; style incurved, laterally flattened, pubescent on inner side. Pods oblong with persistent style, 5-12 x 2-3 cm, white, pink or purple, glabrous, 5-6-seeded; seeds ellipsoid, 9-12 x 6-9 mm, compressed, black.

Fl. & Fr.: September-January.

Various forms are cultivated in villages for vegetable. Sonai-Sakaehu, Leslie 62 (CAL); North-Vanlaphai, Deb 31174.

24. *Macrotyloma* (Wight & Arn.) Verdc.

Macrotyloma uniflorum (Lam.) Verdc., Kew Bull. 24: 322, 401, 1970. *Dolichos uniflorus* Lam., Encycl. 2: 299. 1786. *Dolichos biflorus* Murray, Syst. Nat. ed. 13: 548. 1774 *p.p.*; Baker in Hook. *f.*, Fl. Brit. India 2: 210. 1876; Kanjilal *et al.*, Fl. Assam 2: 85. 1938.

Twining herbs with hairy stems. Leaves 3-foliolate; petioles 2-3 cm long; terminal leaflets large, ovate-rhomboid, 3-3.5 x 1.3-2 cm, lateral ones elliptic or obovate 2-3.5 x 1.3-2 cm, inequilateral; base rounded, acuminate or obtuse at apex, entire along margins, membranous, pilose or pubescent on both surfaces; petiolules ca 2 mm long; stipules lanceolate. Flowers sessile 1-3 in clusters, independently in the axils of leaves without a common peduncle, 1-2 cm long, yellow; calyx hairy, campanulate; 5-7 mm long; teeth lanceolate, setaceous, much exceeding the tube; corolla 1-3.5 cm long; keel slightly curved. Pods linear, 3-5 x 0.5-1 cm, pubescent with a persistent style, dehiscing along both the sutures, 5-8-seeded; seeds reniform, brownish.

Fl.: January-May; *Fr.*: Throughout the year.

Common in open places. Hauruang, 4 miles from Lungleh, 666 m, Deb 31410; Sawleng, K.P. Singh 97119.

Note: *Dolichos trilobus* L. was recorded by Deb & Dutta (1987) from Mizoram, but the identification of the specimen is erroneous.

25. *MEIZOTROPIS* Voigt

Meizotropis buteiformis Voigt, Hort. Suburb. Calc. 239. 1845 ('*buteaeformis*'). *Butea minor* Buch.-Ham. [in Wallich Cat. 5439 A. (1831-32), *nom. nud.*] *ex* Baker in Hook. *f.*, Fl. Brit. India 2: 195. 1876;

C.E.C. Fischer in, *Rec. Bot. Surv. India* 12(2): 89. 1938; Kanjilal *et al.*, *Fl. Assam* 2: 74. 1938. *Thualthu* (Lushai).

Erect shrubs; young parts covered with grey tomentum. Leaves 3-foliolate; common petioles 10-20 cm long; leaflets obliquely ovate-elliptic, terminal leaflets rhomboid or obovate, 12-40 x 8-28 cm, base rounded or truncate, acute at apex; appressed hairy above and silky tomentose beneath; lateral nerves 7-9 pairs, oblique; petiolules up to 1.5 cm long. Racemes 10-50 cm long; flowers 2.5-4 cm long, deep orange-red; calyx 6-7 mm long, brown pubescent; petals oblong-elliptic, silky tomentose in lower half. Pods oblong, 7-10 x 2-3.5 cm, compressed, wing like, containing one orbicular distal seed, rusty-tomentose; seeds obovate, 1.5-2 cm across, brownish-shiny.

Fl. & Fr.: July-January.

Scarce, in dry open hill sides. Durtlang, 1500 m, *Parry* 304 (*vide* C.E.C. Fischer, *l.c.*); Champhai Myanmar border, *Deb* 31033; North Vanlaiphai, *D.K. Singh* 93085; Kawlhkullh-Tuichang, *K.P. Singh* 94450.

26. MILLETTIA Wight & Arn.

1a. Climbers; racemes paniced:

2a. Leaflets 11-17, pubescent beneath; standard petal glabrous; stamens monadelphous; pods not compressed, glabrous ...3. *M. pachycarpa*

2b. Leaflets 5, glabrous beneath (except nerves); standard petal tomentose outside; stamens diadelphous; pods compressed, densely brown-tomentose:

3a. Standard petal orbicular, auricled ...2. *M. dorwardi*

3b. Standard petal broadly ovate, not auricled ...1. *M. cinerea*

1b. Trees or erect shrubs; racemes simple:

4a. Leaflets 15-21, pubescent beneath; stamens monadelphous ...6. *M. pulchra*

4b. Leaflets 5-7, glabrescent beneath; stamens diadelphous:

5a. Leaflets 5 only, ovate-elliptic, shortly acuminate at apex; flowers blue; fruits linear-oblong ...4. *M. peguensis*

5b. Leaflets 5-7, obovate-oblong, cuspidate at apex; flowers white; fruits piciform ...5. *M. piscidia*

1. *Millettia cinerea* Benth. in Miq., Pl. Jungh. 1: 249. 1852; Baker in Hook. f., Fl. Brit. India 2: 106. 1876; Kanjilal *et al.*, Fl. Assam 2: 28. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 90. 1938. *Ardahepui* (Lushai).

Large, woody climbers. Leaves 14-30 cm long, 5-foliolate; leaflets very variable, elliptic-obovate, 8-12 x 3-5.5 cm, base rounded to obtuse, shortly acuminate at apex, glabrous above, sparsely pubescent on veins beneath; petiolules 4-5 mm long; lateral nerves 7-9 pairs; stipels subulate. Racemes in terminal, 10-20 cm long silky pubescent panicles; flowers ca 1.5 cm across; calyx silky; petals crimson or purplish; standard petal not auricled, silky outside, 7-10 x 2 cm. Pods compressed, brown velvety, constricted between seeds, 1-3-seeded.

Fl. & Fr.: June-December.

Siatsuk, 1500 m, Parry 409 (*vide* C.E.C. Fischer, *l.c.*); North Vanlaiphai, Leslie 340 (CAL).

2. *Millettia dorwardi* Coll. *et* Hemsl. in J. Linn. Soc. 28: 40. 1891; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 36. 1987.

Woody climbers with puberulous branchlets. Leaves 5-foliolate; leaflets ovate-oblong, elliptic to obovate-oblong, 5-11 x 2-5 cm, base rounded or obtuse, apex shortly acuminate, coriaceous, young minutely hairy, otherwise glabrous and reticulate, pale beneath; petioles and petiolules hairy and swollen. Racemes densely paniculate, terminal; calyx 3-4 mm long, pubescent; standard petal biauriculate, orbicular, tomentose; stamens diadelphous. Pods linear, 2-4 x 0.4-0.5 cm, compressed, pointed upwards, densely brown pubescent.

Fl. & Fr.: April-July.

Scarce. Known earlier from Myanmar only. Sairep forest, Dutta 33584.

3. *Millettia pachycarpa* Benth. in Miq., Pl. Jungh. 1: 250. 1852; Baker in Hook. f., Fl. Brit. India 2: 106. 1876; Kanjilal *et al.*, Fl. Assam 2: 27. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 90. 1938. *Rulei* (Lushai).

Tall climbers; young parts brown, velvety. Leaves 30-40 cm long, young ones silvery, 11-17-foliolate; leaflets obovate or oblanceolate, 6-18 x 2.5-6 cm, base cuneate, abruptly acuminate at apex, glabrous above, densely appressed brownish tomentose beneath; petiolules 4-6 mm long; stipules deltoid. Panicles 12-30 cm long, brown velvety; flowers 2-2.5 cm long; calyx densely brown pubescent; corolla pink or light mauve. Pods 6-20 x 3-5 cm, constricted between seeds, 1-3-seeded, woody, rugose, glabrous; seeds reniform, ca 3 x 2.5 cm.

Fl. & Fr.: March-December.

Common, along the road cuttings in open places, Zotethlang, *K.P. Singh* 92816; Kolasib-Builung, *K.P. Singh* 93141; Hnathial-Lungleh road, *K.P. Singh* 94181; Pheileng, *K.P. Singh* 97084.

4. *Millettia peguensis* Ali in Kew Bull, 21: 489. 1968. *M. ovalifolia* Kurz in J. As. Soc. Bengal 42: 68. 1873, excl. syn.; Baker in Hook. f., Fl. Brit. India 2: 107. 1876; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 36. 1987. **Fig. 102.**

Medium trees with glabrous branches. Leaves 10-20 cm long, 7-foliolate; leaflets ovate-elliptic, 4-7 x 1.5-3.5 cm, base rounded, acuminate at apex, chartaceous, glabrous above, glaucescent beneath; lateral nerves 6-8 pairs; petiolules 3-4 mm long. Racemes lax, solitary or several from short young branchlets, 10-18 cm long; flowers 7-8 mm long, blue; calyx purple, glabrous; corolla glabrous. Pods linear-oblong, 5-9 x 1.5 cm, narrower towards base, incurved-pointed, flat, woody, glabrous, 2-3-seeded.

Fl. & Fr.: February-June.

Scarce in the area. Known earlier from Myanmar only. Taitaw, *Dutta* 33215.

5. *Millettia piscidia* Wight, Ic. Pl. Ind. Or. t. 86. 1838; Baker in Hook. f., Fl. Brit. India 2: 107. 1876; Kanjilal *et al.*, Fl. Assam 2: 27. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 90. 1938. *Ruteng* (Lushai).

Medium sized trees, up to 16 m tall. Leaves 10-20 cm long, (3-) 5-7-foliolate; leaflets ovate-oblong or lanceolate, 5-10 x 0.8-1.5 cm, base rounded or obtuse, bluntly caudate-acuminate at apex; glabrous on both sides or glabrous beneath; lateral nerves 6-8 pairs; petiolules 3-4 mm long;



Fig. 102: *Millettia peguensis* Ali

stipules minute, caducous; Racemes lax flowered, up to 10 cm long; flowers 1-1.5 cm long; calyx glabrous; stamens diadelphous. Pods piciform, 6-12 x 2.0-3.5 cm, drooping, compressed, narrowed at both ends, coriaceous, surface smooth to reticulate, 2-4-seeded; seeds oblong, ca 1.8 x 1.2 cm.

Fl. & Fr.: June-December.

Zawbawk, 900 m, *Parry* 390 (*vide* C.E.C. Fischer, *l.c.*).

6. *Millettia pulchra* Kurz in J. As. Soc. Bengal 42: 69. 1873; Baker in Hook. *f.*, Fl. Brit. India 2: 104. 1876; Kanjilal *et al.*, Fl. Assam 2: 25. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 90. 1938.

Shrubs or small trees, 4-10 m tall; young parts tomentose. Leaves 15-25 cm long, 14-21-foliolate; leaflets 2-5 x 1-2 cm, narrow elliptic or elliptic-lanceolate, variable at both ends, sometimes mucronate-obtuse at apex, glabrous above, acute adpressed, silky pubescent and bluish grey beneath; stipules ligulate; petiolules ca 2 mm long; lateral nerves \pm 7 pairs; Racemes axillary, 8-16 cm long; flowers 1.2-1.5 cm long; calyx hairy; corolla reddish-purple; stamens monadelphous. Pods 5-10 x 1-1.5 cm, compressed, pointed above, appressed hairy, usually 2-3-seeded; seeds sub-orbicular, reddish-brown.

Fl. & Fr.: April-December.

Mimbung, *Parry* 160 (*vide* C.E.C. Fischer, *l.c.*); Tilthlang, *K.P. Singh* 96644.

27. MUCUNA Adanson

1a. Pods obliquely plaited on the faces:

2a. Pods winged, 2-4-seeded . . . 2. *M. imbricata*

2b. Pods not winged, 1-seeded . . . 3. *M. monosperma*

1b. Pods not plaited on the faces:

3a. Bracts prominent; calyx lobes linear; pods lacking longitudinal furrows . . . 1. *M. bracteata*

3b. Bracts small; calyx bilipped; pods longitudinally furrowed . . . 4. *M. pruriens*

1. *Mucuna bracteata* DC. ex Kurz in J. As. Soc. Bengal 42: 231. 1873; Baker in Hook. *f.*, Fl. Brit. India 2: 186. 1876; Kanjilal *et al.*, Fl. Assam 2: 68. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 36. 1987. *M. exserta* C.B. Clarke ex C.E.C. Fischer in Kew Bull. 1925: 5. 1925 & in Rec. Bot. Surv. India 12(2): 90. 1938.

Climbers; young parts pubescent. Leaves 3-foliolate; petioles 10-12 cm long; leaflets 5-12 x 5-9 cm, terminal rhomboid, laterals obliquely ovate or deltoid, base rounded, truncate, acute at apex, glabrescent above, appressed pubescent beneath; petiolules 3-4 mm long. Racemes axillary, 15-25 cm long; flowers 3.5-4.5 cm long, blackish-purple; bracts ovate, pubescent with scattered bristles; calyx and corolla covered with scattered bristly hairs, wings much longer than standard; keel exceeding the wings. Pods terete, 7-10 x 1.5-2.5 cm, reddish-brown, tomentose without longitudinal furrows, abruptly recurved at the ends; 5-6-seeded.

Fl. & Fr.: January-May.

Ketunkaw, 600 m, Parry 651 (*vide* C.E.C. Fischer, *l.c.*); Saitualdoth, 900 m, Leslie 152 (CAL); Sialsuk, Deb 30870.

2. *Mucuna imbricata* DC. ex Baker in Hook. *f.*, Fl. Brit. India 2: 185. 1876; Kanjilal *et al.*, Fl. Assam 2: 66. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 90. 1938.

Large, woody climbers with glabrescent branches. Leaves 3-foliolate, 20-40 cm long, petioles 5-10 cm long; leaflets ovate or rhomboid, 10-15 x 4-10 cm, base rounded or cuneate, acute-mucronate at apex; glabrous above, glabrescent beneath; petiolules 4-5 mm long. Racemes 10-20 cm long, laxly 8-10-flowered; bracts broadly ovate, 2.5-3 x 2-2.5 cm long; flowers 5-6 cm long, purple; calyx campanulate, bristly hairy; keel abruptly reflexed. Pods oblong, 8-15 x 5-6 cm, winged at both sutures, obliquely plaited, densely covered with ferruginous bristles, 2-4-seeded; seeds large, flat, purplish streaked with black.

Fl. & Fr.: June-March.

Lungleh, 900 m, Gage 225 (CAL).

3. *Mucuna monosperma* DC. ex Wight. in Hook. Bot. Misc. 2: 346. 1831; Baker in Hook. *f.*, Fl. Brit. India 2: 185. 1876; Kanjilal *et al.*,

Fl. Assam 2: 67. 1938. *Carpopogon monospermum* Roxb., Fl. Ind. 3: 283. 1832.

Large, woody climbers with glabrescent branches. Leaves 3-foliolate; leaflets ovate-oblong, lateral ones very oblique, 7-10 x 5-6 cm, base rounded, abruptly acuminate at apex, sub-coriaceous, glabrous above, ferruginous pubescent beneath; petioles 5-8 cm long; petiolules 5-6 cm long, pubescent. Racemes axillary, 5-10 cm long, corymbosely 6-12-flowered; flowers 4-5 cm long, purple; calyx bowl-shaped, bristly reddish hairy outside and inside; keel slightly longer, greenish. Pods ovate-ovoid, ca 5 x 3 cm, densely reddish brown, bristly tomentose, 1-seeded.

Fl. & Fr.: November-February.

Between Gatermuk-Changsil, *Prazer* 1890, *s.num.* (CAL).

4. *Mucuna pruriens* (L.) DC., Prodr. 2: 405. 1825; Baker in Hook. *f.*, Fl. Brit. India 2:187. 1876; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 36. 1987. *Dolichos pruriens* L. in Stickman, Diss. Herb. Amb. 23. 1754; *Mucuna prurita* Hook., Bot. Mis. 2: 384. 1831 (*nom. super.*); Kanjilal *et al.*, Fl. Assam 2: 69. 1938. *Uitema* (Lushai).

Annual climbers or short lived perennials with silvery pubescent stems in younger stages. Leaves 3-foliolate; leaflets elliptic or ovate, 6-15 x 5-12 cm, rounded at base, obtuse or acute at apex, glabrescent above, silvery appressed pubescent beneath. Racemes 5-20 cm long, 10-20-flowered; bracts and bracteoles small; flowers 3.5-4.5 cm long, dark purple; calyx bilipped, tomentose, intermixed with some brown bristles. Pods S-shaped, turgid, 5-8 x 1.5-2 cm, terete, longitudinally ridged, covered with brown bristles, 5-6-seeded; oblong-ellipsoid, seeds 8-12 x 5-7 mm, blackish, glossy.

Fl. & Fr.: January-December.

Sairep, *Dutta* 33605; Keifang, *M. Sawmliana* 99273.

28. PUERARIA DC.

- 1a. Large climbers; stipules medifixed; calyx deeply toothed, 12-20 mm long; pods brown hirsute ...1. *P. lobata* var. *thomsoni*
- 1b. Sub-scandent shrubs, stipules basifixed; calyx obscurely toothed, 5-6 mm long; pods glabrous ...2. *P. wallichii*

1. *Pueraria lobata* (Willd.) Ohwi, Bull. Tokyo Sci. Mus. 18: 16. 1947. *Dolichos lobatus* Willd., Sp. Pl. 3(2): 1047. 1803. *Pueraria thunbergianus* (Sieb & Zucc.) Benth., J. Linn. Soc. Bot. 9: 122. 1865; Kanjilal *et al.*, Fl. Assam 2: 81. 1938. var. *thomsoni* (Benth.) van. der Maesen, Agric. Univ. Wageningen Pap. 85-1: 58. 1985. *Pueraria thomsoni* Benth. in J. Linn. Soc. Bot. 9: 122. 1865; Baker in Hook. *f.*, Fl. Brit. India 2: 198. 1976; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938. *Kaikuangru*, *Hruiduk* (Lushai).

Large climbers; branches clothed with deflexed brownish hairs. Leaves 3-foliolate; petioles 8-15 cm long, brown-pilose; leaflets simple or 3-lobed, ovate, or ovate-rhomboid, lateral oblique, 10-16 x 7-16 cm, base rounded, shortly acuminate at apex, appressed brownish pubescent on both surfaces; lateral nerves 5-7 pairs; petiolules 5-6 mm long; stipules fixed by the middle, 10-15 mm long, brown, velvety. Racemes simple, 20-40 cm long; flowers slightly scented, 1.8-2.5 cm long, blue or purple; calyx purplish-green, deeply cleft, 12-20 mm long, pubescent. Pods oblong, 8-13 x 1.2 cm, oblong, flat, straight, densely brown, hirsute, 8-12-seeded.

Fl. & Fr.: August-October.

Common. in jhum lands and along the roadside ridges. *Parry s.num.* (CAL); Kwathlit, 900 m, *Parry* 202 (*vide* C.E.C. Fischer, *l.c.*); *s.loc.*, *Dutta* 34044 (CAL); Thenzawl, *K.P. Singh* 93815; Kawlhkuh-Tuichang. *K.P. Singh* 94413; Dampa, *D.K. Singh* 98980.

2. *Pueraria walllichii* DC., Ann. Sci. Nat. 4: 97. 1825; Baker in Hook. *f.*, Fl. Brit. India 2: 198. 1876; Kanjilal *et al.*, Fl. Assam 2: 80. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938.

Semi climbing shrubs with pubescent stems. Leaves 3-foliolate; petioles 8-12 cm long; lateral leaflets obliquely ovate, terminal elliptic or subrhomboid, 5-12 x 6-8 cm, base cuneate or rounded, often oblique acuminate at apex, \pm scabrous and green above, minutely white adpressed pubescent beneath; lateral nerves 6-8 pairs; petiolules 4-5 mm long; stipules linear, basifixed, 5-7 mm long. Racemes axillary, 7-20 cm long, densely flowered, puberulous; calyx obscurely toothed, 5-6 mm long; corolla white or greenish-yellow or white tipped with red; stamens diadelphous. Pods linear, flat, striate, 8-15 x 0.8-1 cm, glabrous, thickened along both sutures, 8-10-seeded; seeds reniform, brown.

Fl. & Fr.: August-January.

S.num., Parry (CAL); Sherkor, 1200 m, Parry 446 (*vide* C.E.C. Fischer, *l.c.*); *s.loc.*, Dutta 33922.

29. RHYNCHOSIA Lour.

Rhynchosia rothii Benth. *ex* Aitch., Cat. Pl. Punj. Sind 50. 1869. *R. sericea* Span., *Linnaea* 15 : 195, 1841, *non* Guill *ex* Hook. & Arn., 1833; Baker in Hook. *f.*, Fl. Brit. India 2: 225. 1876.

Climbing herbs, densely tomentose. Leaves 3-foliolate; petioles 4-6 cm long; leaflets ovate-rhomboid, 9-13 x 4.5-7 cm, laterals oblique, base rounded, acute at apex, densely soft tomentose on both surfaces; petiolules ca 2 mm long. Racemes axillary, many-flowered; bracts silky, lanceolate; calyx densely grey silky; tooth long, lanceolate; corolla purple, standard petal auricled at base. Pods oblong, 1.5-2 x 0.5-0.7 cm, recurved, beaked at tip, densely pubescent, turgid, 2-seeded; seeds 5-6 mm long, ellipsoid, blackish.

Fl. & Fr.: September-January.

Bunglang, Deb 31435-identified earlier as *R. acutissima* Thw.

30. SESBANIA Scop.

Sesbania aculeata Pers. var. **paludosa** (Koxb.) Baker in Hook. *f.*, Fl. Brit. India 2: 115. 1876. *Aeschynomene paludosa* Roxb. [Hort. Beng. 56 (1814), *nom. nud.*], Fl. Ind. 3: 333. 1832. *Sesbania paludosa* (Roxb.) Prain in J. As. Soc. Bengal 66: 82. 1897. *Thinglenbuang* (Lushai).

Annual undershrubs with glabrous, unarmed branches. Leaves 15-26 cm long; leaflets 41-81, linear-oblong, 12-20 x 2-3 mm, base rounded, obtuse-mucronate at apex, glabrous on both surfaces; petiolules ca 1 mm; Racemes axillary, laxly 3-6-flowered; flowers 10-13 mm long, yellow; calyx glabrous; stamens diadelphous. Pods elongated, narrow, straight, 18-24 x 0.2-0.3 cm, not torulose, apically beaked with a persistent style, glabrous; seeds cylindrical, numerous.

Fl. & Fr.: August-November.

Scarce, along the road side. Tuichang new bridge. *K.P. Singh* 94245.

31. SHUTERIA Wight & Arn.

- 1a. Leaflets ovate, cuspidate at apex, 3-veined at base, appressed hairy on both sides, 5-10 mm long; pods 5-7 cm long ...1. *S. hirsuta*
- 1b. Leaflets ovate or obovate-oblong, obtuse-mucronate at apex, pinnately veined at base, hairy beneath only, 3-5 cm long; pods 2-3 cm long ...2. *S. vestita*

1. *Shuteria hirsuta* Baker in Hook. *f.*, Fl. Brit. India 2: 182. 1876. *p.p.*; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 36. 1987.

Stems strongly brown hirsute. Leaflets 5-10 x 3-6 cm, acuminate at apex, 3-veined at base; stipules 8-10 mm long. Racemes elongated; bracts 10-12 mm long, linear-lanceolate; calyx 6-8 mm long; petals blue. Pods 5-7 x 0.3 cm, 12-14-seeded.

Fl. & Fr.: October-December.

Scarce, in subtropical forests. Thaitlang, *Deb* 33960.

2. *Shuteria vestita* (Wallich) Wight & Arn., Prodr. 207. 1834; Baker in Hook. *f.*, Fl. Brit. India 2: 182. 1876; Kanjilal *et al.*, Fl. Assam 2: 63. 1938. *Glycine vestita* Grah. in Wallich Cat. 5512. 1831-32, *nom. nud.* var. *vestita* f. *vestita*. *Shuteria glabrata* Wight & Arn., Prodr. 207. 1834; *Shuteria vestita* (Wallich) Wight & Arn. var. *glabrata* (Wight & Arn.) Baker in Hook. *f.*, Fl. Brit. India 2: 182. 1876; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 36. 1987. *Shuteria involucrata* (Wallich) Wight & Arn. var. *glabrata* (Wight & Arn.) Ohashi, J. Jap. Bot. 50: 305. 1975.

Fig. 103.

Climbers with patently hairy stems. Leaves 3-foliolate; petioles very thin, 3-5 cm long; leaflets ovate or obovate-oblong, 3-5 x 1.5-3.5 cm, base subacute or rounded; obtuse-mucronate at apex, glabrous or glabrescent above, appressed pubescent beneath; petiolules ca 1 mm long, hirsute; stipules 7-8 mm long, lanceolate. Racemes axillary, short and crowded, many-flowered, patently hairy; bracts lanceolate, persistent, 4-5 mm long; bracteoles little smaller; flowers 10-12 mm long; calyx densely pubescent; petals purplish; stamens diadelphous. Pods linear, 2-3 x 0.5-0.6 cm.

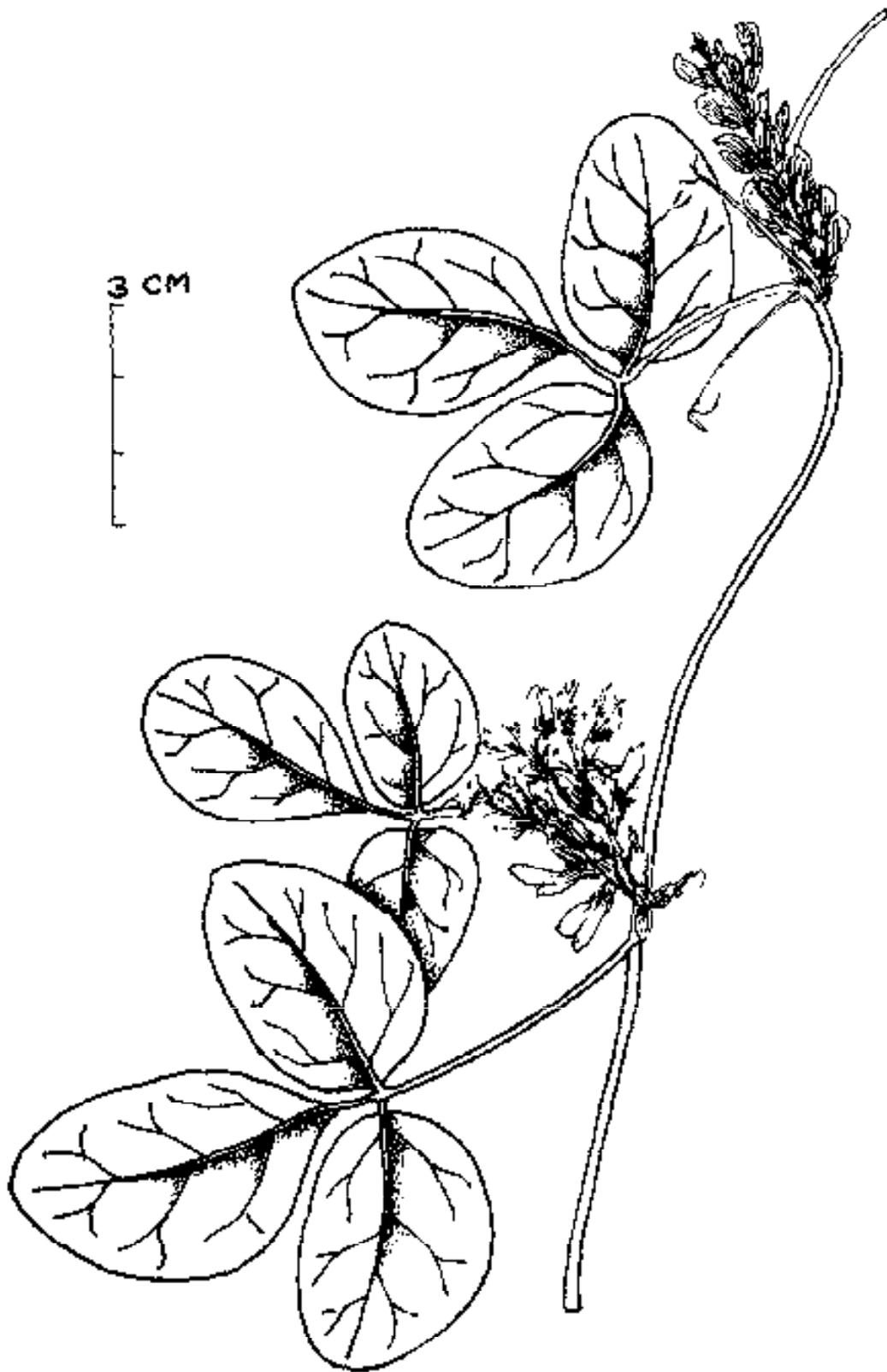


Fig. 103: *Shuteria vestita* (Wallich) Wight & Arn.

compressed, brownish, pubescent, apically beaked, 5-6-seeded; seeds *ca* 3 x 2 mm, shiny, dark brown or mottled.

Fl. & Fr.: November-January.

Common, in subtropical forests or dry places. Neidown, Champhai, Leslie 283 (CAL); Sairang, Deb 30973; South-Vanlaiphai-Darzo, Dutta 34046; K.P.Singh 96969.

32. SOPHORA L.

Sophora wightii Baker in Hook. *f.*, Fl. Brit. India 2: 250. 1878. *S. acuminata* Baker in Hook. *f.*, Fl. Brit. India 2: 250. 1878, *non* Desv., 1814; Kanjilal *et al.*, Fl. Assam 2: 117. 1938. *Sentel* (Lushai).

Erect shrubs or small trees, up to 6 m tall; young parts rusty villous. Leaves imparipinnate, 10-20 cm long; leaflets opposite to rarely subopposite, 7-17, oblong or obovate-oblong, 3-6 x 1.5-2 cm, cuneate or rounded at base, acuminate or obtuse at apex, entire along margins, glabrous above, adpressed hairy beneath, lateral nerves 10-12 pairs; petiolules short *ca* 1 mm long. Flowers in axillary peduncled racemes, white or yellow, 2-2.5 cm long; calyx 10-12 mm, pouched at base; petals white, long clawed, standard obovate, *ca* 15-18 cm long. Pods distantly moniliform, 5-15 cm long, 1-2 seeded, rusty pubescent; seeds ellipsoid, 10-15 x 7-8 mm.

Fl. & Fr.: May-June.

Scarce. *s. loc.* M. Sawmliana 97158.

33. SPATHOLOBUS Hassk.

Spatholobus parviflorus (Roxb. *ex* DC.) O. Kuntze, Rev. Gen. Pl. 1: 205. 1891. *Butea parviflorus* Roxb. [Hort. Beng. 53. (1814), *nom. nud.*] *ex* DC., Prodr. 2: 415. 1825; Deb & Dutta in J. Econ. Tax. Bot. 10: 34. 1987. *B. roxburghii* Benth. in Miq., Pl. Jungh. 238. 1852, *nom. illeg.*; Baker in Hook. *f.*, Fl. Brit. India 2: 193. 1876 *excl. vars. denudatus and platycarpus*; Kanjilal *et al.*, Fl. Assam 2: 75. 1938. *Hruichun*, *Ngnoi-hrui* (Lushai); *Barengeludi* (Chakma). Fig. 104.

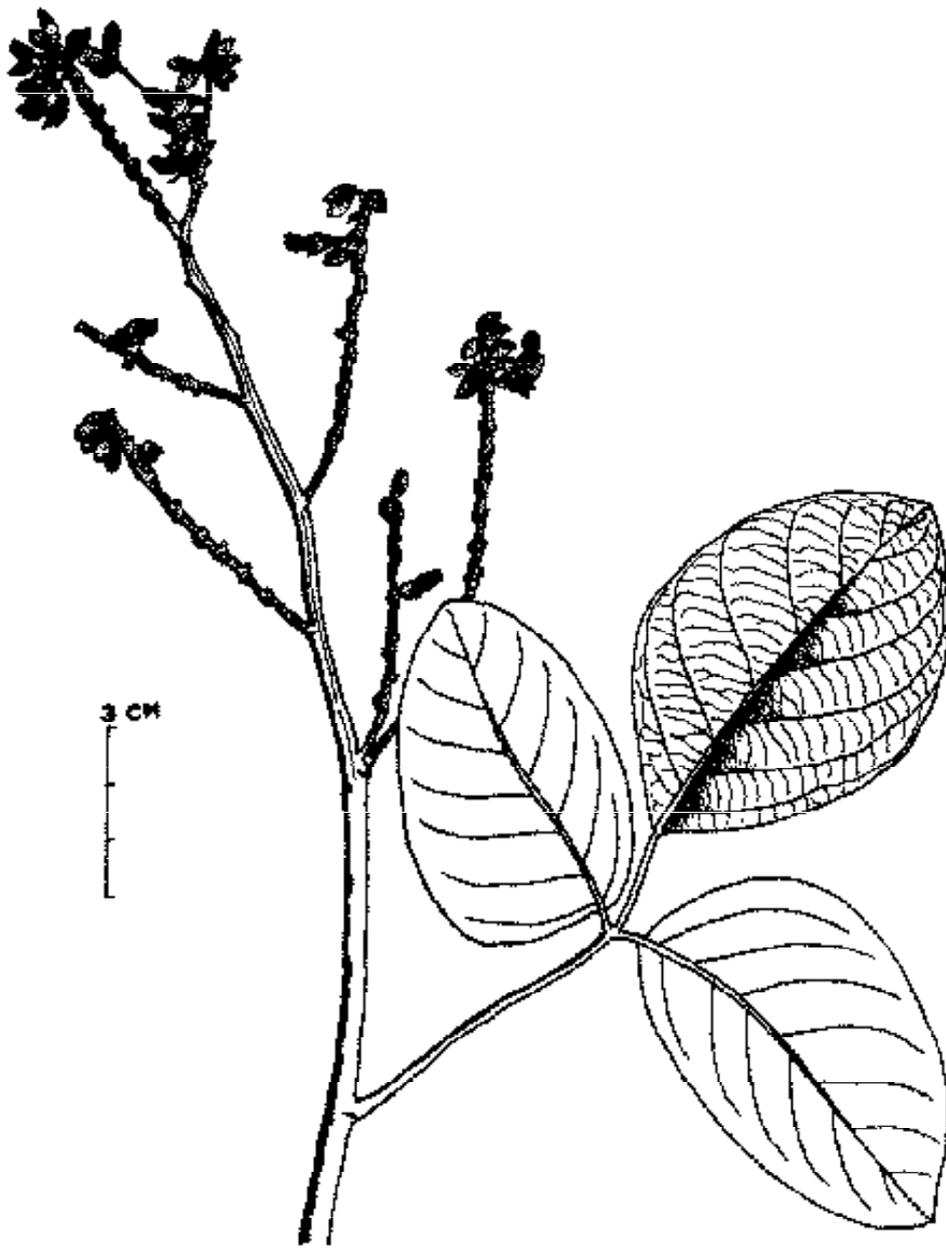


Fig. 104: *Spatholobus parviflorus* (Roxb. ex DC.) O. Kuntze

Large evergreen woody climbers; branches grey pubescent. Leaves 3-foliolate; common petioles 5-20 cm long; leaflets 7-20 x 4-12 cm, terminal leaflet broadly elliptic, ovate-obovoid, lateral leaflets oblique, rhomboid-orbicular; base rounded or cuneate, shortly acuminate at apex; glabrous above, densely silky grey tomentose beneath; lateral nerves 7-10 pairs; petiolules 5-6 mm long. Flowers in terminal, long tomentose panicles; flowers 0.7-1 cm long, creamy-white or reddish; calyx densely pale pubescent; petals subequal. Pods erect, 8.0-10.5 x 1.5-3 cm, coriaceous, flat, wing like, containing one distal side, ± constricted below the seed, densely brown, velvety, dehiscing from apex only.

Fl. & Fr.: August-April.

Rather common, in subtropical slopes. Saitual-Balte, *Leslie* 128 (CAL); Sialsuk, *Deb* 30848; Near Hnathial, *K.P. Singh* 93990; Tlabung, *K.P. Singh* 94259; Puilo basti, *K.P. Singh* 94488, 94491.

34. **TEPIROSIA** Pers.

Tephrosia candida DC., Prodr. 2: 249. 1825; Baker in Hook. *f.*, Fl. Brit. India 2: 111. 1876; Kanjilal *et al.*, Fl. Assam 2: 31. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 36. 1987. Fig. 105.

Shrubs, 2-4 m tall with densely brown, tomentose stems. Leaves 10-20 cm long, imparipinnate; leaflets 11-25, elliptic-oblong, 3-7 x 1-1.5 cm, base cuneate, acute-mucronate at apex, revolute along margins, glabrous or glabrescent above, pale sericeous beneath; lateral nerves numerous; petiolules 2-3 mm long; stipules deltoid, hairy. Racemes terminal or upper axillary, 10-20 cm long; flowers in fascicles of 2-4; calyx campanulate, oblique, hairy; corolla creamy-white, silky outside; standard petal obovate. Pods linear, 7-9.5 x 0.7-0.8 cm, compressed with tipped persistent style, brown sericeous, 10-12-seeded; seeds oblong or ellipsoid, ca 5 x 3 mm, brown.

Fl. & Fr.: August-January.

Common, in open hilly slopes, grasslands and on the ridges, along the road side. Sairang, *Deb* 30579; Panchagram, *Deb* 31478; Bualpui-Kawnpui, *K.P. Singh* 93256; Thenzawl, *K.P. Singh* 93856; Hnathial Forest rest house, down side, *K.P. Singh* 93997; Hnathial-Lungleh road, *K.P. Singh* 94182.



Fig. 105: *Tephrosia candida* DC.

35. URARIA Desv.

- 1a. Upper leaves 3-7-foliolate1. *U. crinita*
 1b. Upper Leaves 1-3-foliolate :
 2a. Leaflets ovate-elliptic, 1-(3) foliolate, glabrous above3. *U. rufescens*
 2b. Leaflets ovate-lanceolate, 3-foliolate, adpressed
 pubescent above2. *U. lacei*

1. **Uraria crinita** (L.) Desv. ex DC., Prodr. 2: 324. 1825; Baker in Hook. f., Fl. Brit. India 2: 155. 1876; Kanjilal *et al.*, Fl. Assam 2: 40. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938. *Hedysarum crinitum* L., Mant. 1: 102. 1767.

Shrubs, up to 2 m tall, Leaves 15-25 cm long, 3-7-foliolate; petioles 6-12 cm long; leaflets oblong, 6-11 x 2-5 cm, base rounded, acute to mucronate at apex; coriaceous, glabrous above and strongly net veined and hairy along the nervules beneath; petiolules ca 2 mm long. Racemes 5-34 cm long, simple, terminal, hairy; bracts ciliate; calyx segments densely plumose; corolla purple. Pods compressed, divided transversely into 4-6 opaque segments, each folded over the other, each segment ca 3 mm across, black, 1-seeded; seeds orbicular.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

2. **Uraria lacei** Craib in Kew Bull. Misc. Inf, 1910: 276. 1910. *U. clarkei* Gagnep. in Lecomte, Fl. Gen. Indo-Chine, 2: 542. 1920; Kanjilal *et al.*, Fl. Assam 2: 42. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938.

Shrubs, up to 1.25 m high with brown, hairy, sulcate stems. Leaves 3-foliolate; leaflets ovate-lanceolate, 10-15 x 4-5 cm, terminal larger, base obtuse mucronate at apex, adpressed pubescent above, pilose beneath specially on nerves. Flowers in terminal panicles, up to 30 cm long; bracts caducous, ovate; calyx lanceolate-acute; corolla dark blue. Pods 6-joined, glabrescent.

Fl. & Fr.: October-December.

70 miles South-East of Lungleh in river bed, 600 m, Wenger 358, (*vide* C.E.C. Fischer, *l.c.*).

3. *Uraria rufescens* (DC.) Schindler, Fedde Rep. 21: 14, 1925. *Desmodium rufescens* DC., in Ann. Sci. Nat. Ser. 1. 4: 101, 1825. *Doodia hamosa* Roxb., Fl. Ind. 3:367, 1832. *Uraria hamosa* Wallich ex Wight & Arn., Prodr. 222, 1834; Baker in Hook. f., Fl. Brit. India 2: 156, 187, 1876.

Fig. 106.

Undershrubs, up to 2 m tall; branches erect, brown hirsute. Leaves 1-3-foliolate; petioles 1-3 cm long; stipules setaceous; leaflet oblong-elliptic to ovate-elliptic, 5-13 x 3-7 cm, broadly rounded at base, acute or obtuse at apex, entire along margins, glabrescent above, pubescent on nerves beneath; lateral nerves 10-18 pairs; stipels setaceous. Racemes paniced, lax, 15-28 cm long, terminal or axillary; bracts silky pubescent, ovate; corolla purplish; standard obovate, 8-12 mm long. Pod segments 5-6, rounded, ca 2 mm across, brown or black, tightly folded on each other.

Fl. & Fr.: August-December.

Scarce, on hill slopes. Hnathial, *Mao* 107043.

36. VIGNA Savi

Vigna pilosa (Willd.) Baker in Hook. f., Fl. Brit. India 2: 207, 1876; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 36, 1987.

Climbing herbs with slender branches. Leaves 3-foliolate; petioles 6-8 cm long; leaflets ovate, lanceolate, 5-11 x 3-6 cm, laterals oblique, base rounded, acuminate at apex, appressed pubescent on both sides; petiolules ca 1 mm long; stipules 0.5 mm long, base rounded. Racemes 5-12 cm long, axillary, 10-20-flowered; bracts and bracteoles minute; calyx silky, 4-5 mm long; corolla reddish; keel incurved. Pods linear, beaked, 5-7 x 0.5-0.7 cm, densely hirsute with spreading hairs, 8-12-seeded; seeds oblong, black.

Fl. & Fr.: July-October.

Hauruang, *Deb* 31369.

CULTIVATED SPECIES

Arachis hypogea L., Sp. Pl. 741, 1753; Baker in Hook. f., Fl. Brit. India 2: 161, 1876.

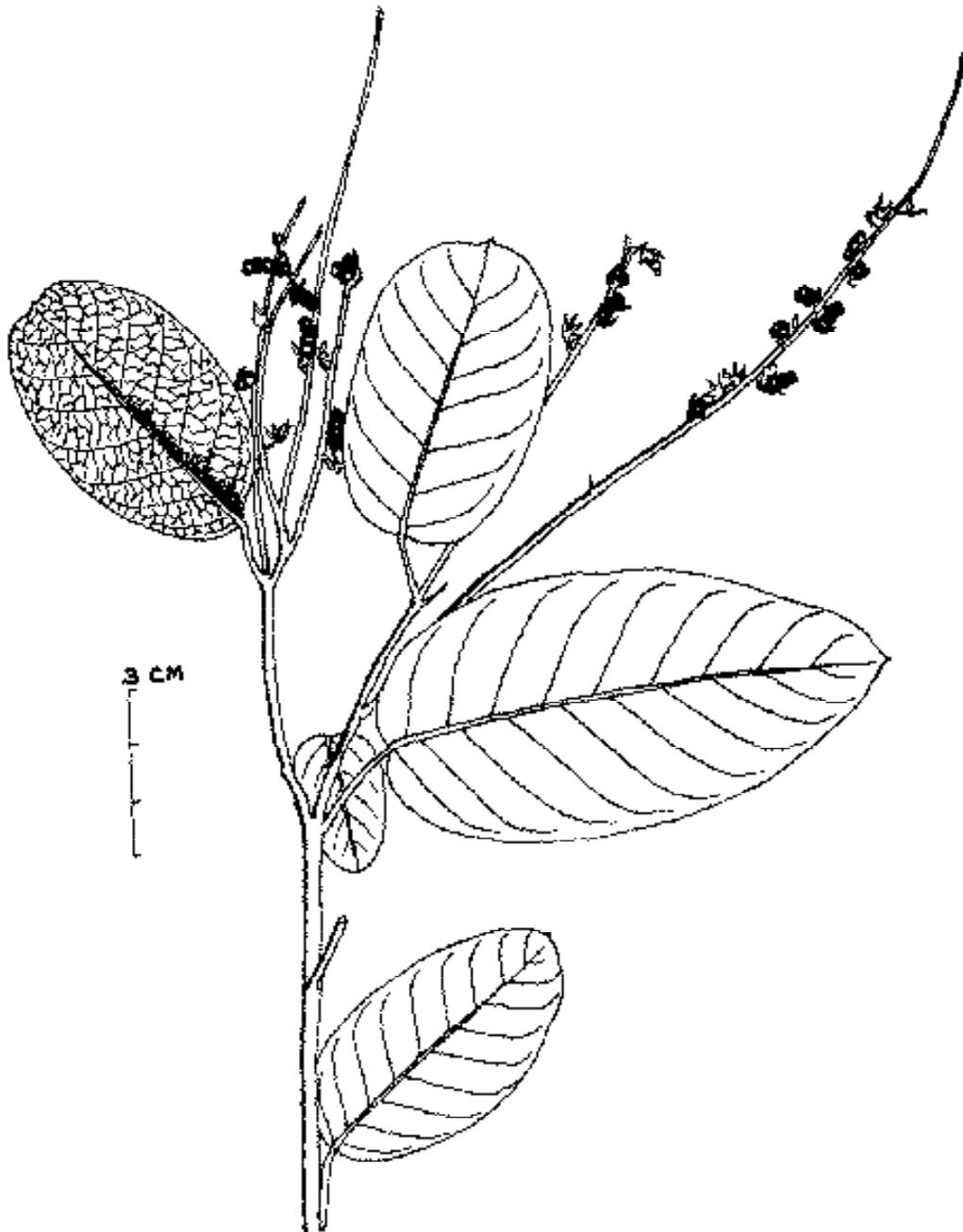


Fig. 106: *Uraria rufescens* (DC.) Schindler

Probably a native of Brazil, widely cultivated.

EXCLUDED TAXA

Canavalia cathartica Thou. in Desv., J. Bot. 1: 81. 1813 ('*Canavalia catharticus*'). *C. ensiformis* (L.) DC. var. *turgida* (Grah. ex Garay) Baker in Hook.f., Fl. Brit. India 2: 196. 1876.

Crotalaria spectabilis Roth., Nov. Pl. Sp. 341. 1821. *C. sericea* Retz., Obs. Bot. 5: 26. 1789, non Burm.f., 1768; Baker in Hook.f., Fl. Brit. India 2: 75. 1876; Kanjilal *et al.*, Fl. Assam 2: 15. 1938. *C. leschenaulti* DC., Prod. 2: 125. 1825; Wight & Arn., Prod. 186. 1834; Baker in Hook.f., Fl. Brit. India 2: 76. 1876.

Mucuna nigricans (Lour.) Steud., Nom. Bot. ed. 2, 2: 163. 1841. *Citta nigricans* DC. ex Baker in Hook.f., Fl. Brit. India 2: 185. 1876. *p.p.*

Uraria picta (Jacq.) Desv. ex DC., Prod. 2: 324. 1825; Baker in Hook.f., Fl. Brit. India 2: 155. 1876. *Hedysarum pictum* Jacq., Coll. Bot. 2: 262. 1788.

CAESALPINIACEAE

(D.K. Singh)

- 1a. Flowers unisexual, in small racemes or panicles ...6. *Gleditsia*
- 1b. Flowers bisexual, in extensive racemes or spikes :
 - 2a. Calyx segment petaloid; petals absent ...8. *Saraca*
 - 2b. Calyx segment not petaloid; petals present :
 - 3a. Leaves unipinnate :
 - 4a. Leaves simple, bilobed ...2. *Bauhinia*
 - 4b. Leaves compound :
 - 5a. Petals 3; stamens 3, monadelphous ...9. *Tamarindus*
 - 5b. Petals 5; stamens more than 3, free :

- 6a. Stamens equal, all perfect; anther cells
dehiscing by longitudinal slits ...7. *Mambou*
- 6b. Stamens unequal, usually 3-5,
reduced to staminodes; anther cells
dehiscing by terminal pores ...4. *Cassia*
- 3b. Leaves bipinnate :
- 7a. Usually woody, armed, climbers or small trees ...3. *Caesalpinia*
- 7b. Unarmed, small to medium trees :
- 8a. Leaflets 5-12 cm long; calyx segments
equal; stamens 5; pods 15-20-seeded ...1. *Acrocarpus*
- 8b. Leaflets 0.5-2 cm long; calyx segments
unequal, stamens 10; pods 20-40-seeded ...5. *Delonix*

1. ACROCARPUS Wight & Arn.

Acrocarpus fraxinifolius Wight & Arn. in Mag. Zool. Bot. 2: 547. 1838; Baker in Hook. *f.*, Fl. Brit. India 2: 292. 1878; Kanjilal *et al.*, Fl. Assam 2: 124. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938.

Large, deciduous, unarmed trees, up to 35 m tall with wide spreading crown; stems sometimes buttressed; bark grey-dark brown, warty; branchlets densely lenticellate; young shoots and inflorescence reddish-brown tomentose. Leaves bipinnate, up to 1 m long; pinnae 15-30 cm long; leaflets 10-12, oblong-ovate or oblong-lanceolate, 5-12 x 1.8-5.5 cm, unequal or cuneate at base, acuminate at apex, subcoriaceous, glabrous; lateral nerves 7-10 pairs; petiolules ca 2 mm long. Racemes simple, dense, ca 30 cm long; flowers ca 2.5 cm long, dull red-orange; calyx 0.8-1 cm long, campanulate, brown pubescent, cleft half way down; lobes 5, equal, lanceolate-ovate, acute; petals 5, linear oblong or oblanceolate, ca 1 cm long, slightly imbricated in bud. Pods 10-13 cm long, winged on the upper suture, 15-20-seeded; seeds compressed.

Fl. & Fr.: February-June.

Parry s. loc. & s. num. (fide C.E.C. Fischer, l.c.).

2. BAUHINIA L.

1a. Large scandent shrubs :

2a. Stem flat or ribbon like, twisted on alternate side ...5. *B. scandens* var. *anguina*

2b. Stem otherwise :

3a. Leaf lobes acute or acuminate :

4a. Leaves glabrous on both surfaces ...2. *B. khasiana*

4b. Leaves pubescent on underside :

5a. Leaves broadly ovate, 20 x 19-21 cm,
cleft 1/2 way down, underside pubescent
throughout ...3.2. *B. ornata*
ssp. *mizoramensis*5b. Leaves ± deltoid, 7-15 x 5-13 cm,
cleft 1/3 way down, underside
pubescent along the nerves ...3.1. *B. ornata* var. *kerrii*

3b. Leaf lobes obtuse or rounded :

6a. Calyx tube ± 1.2 cm long ...1.1. *B. glauca* ssp. *glauca*6b. Calyx tube 1.5-2.5 cm long ...1.2. *B. glauca* ssp. *tenuiflora*

1b. Trees :

7a. Flowers white leafless; buds pentagonous
with 5 longitudinal ridges; fertile stamens 3 ...4. *B. purpurea*7b. Flowers when leafy; buds smooth,
without ridges; fertile stamens 5 ...6. *B. variegata*

1.1. *Bauhinia glauca* (Wallich ex Benth.) Benth., Fl. Hongkong 99. 1861; Baker in Hook. f., Fl. Brit. India 2: 282. 1878; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938. *Phanera glauca* Wallich ex Benth. in Miq. Pl. Jungh. 265. 1852. ssp. *glauca*

Large, cirrhose-pubescent climbers; bark dark or reddish brown; young branches and inflorescence covered with coppery hairs; branchlets slender, with copious tendrils. Leaves cordate, deeply cleft below the middle with obtuse-subacute lobes, 2.5-7.5 x 3-7 cm. Flowers white, in copiously dense, terminal corymbs; bracteoles setaceous, persistent; pedicels slender, erectopatent, 1.2-2.5 cm long; calyx lobes 2-valved, reflexed, thinly silky,

limb 5-7 mm long; petals 0.7-1.5 cm long, clawed, glabrous with undulate margins; fertile stamens 3. Pods thin, glossy, 15-20 x 4-5 cm; 10-12-seeded.

Fl. & Fr.: October-March.

Lungleh, Helio Hill, 1100 m, *Gage* 100 (CAL).

1.2. ssp. tenuiflora (Watt ex C.B. Clarke) K. & S. Larsen, Nat. Hist. Bull. Siam. Soc. 25: 10. 1973. *Bauhinia tenuiflora* Watt ex C.B. Clarke in J. Linn. Soc. 25: 18. 1889; Kanjilal *et al.*, Fl. Assam 2: 146. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12: 91. 1938. *Phanera tenuiflora* (Wallich ex C.B. Clarke) de Wit in Reinwardtia 3: 490. 1956. *Hruivaobe* (Lushai).

Large, scandent shrubs; tendrils simple or forked; leaves 5-8 x 5-7 (-8) cm, sometimes broader than long, suborbicular-truncate, or subcordate at base, cleft up to 1/5-1/4, glabrate above and scattered pubescent along nerves beneath; lobes obtuse at apex, basal nerves 7-9; petioles 2-3 cm long. Flowers white, in lateral and terminal, rusty tomentose corymbs; bracts subulate; bracteoles filiform; pedicels 2.5-5 cm long; calyx lobes lanceolate, limbs 0.7-1 cm long; petals erose with scattered hairs outside, 1.2-1.5 cm long. Pods oblong, 20-25 x 3-5 cm, glabrous, 15-20-seeded; seeds flat.

Fl. & Fr.: August-January.

Tuipang, 1300 m, *Parry*, 459 (*vide* C.E.C. Fischer, *l.c.*); Lungleh, 1000 m, *Wenger* 6 (CAL); Sialsuk, *Deb* 30836; Kawnpui, *K.P. Singh* 96999; Zawnhawk, *K.P. Singh* 96720.

2. *Bauhinia khasiana* Baker in Hook. *f.*, Fl. Brit. India 2: 281. 1878; Kanjilal *et al.*, Fl. Assam 2: 143. 1938. *Phanera khasiana* (Baker) Thoth. in Bull. Bot. Surv. India 19: 131. 1965.

Cirrhose lianas with deeply fluted stems; branchlets bright rusty, silky pubescent; tendril apices bifid. Leaves cordate-suborbicular, ovate or lanceolate, 7-15 x 4-13 cm, base subcordate-truncate, lobed, 1/4-1/3 way down; lobes divergent, subacute-acuminate at apex, coriaceous, glabrous; 7-9-nerved at base; petioles 5-8 cm long, swollen at both ends. Flowers 1-1.5 cm across, yellowish-red, in 5-12 cm long, corymbose panicles; panicle branches densely covered with ferruginous silky hairs; bracts ovate-lanceolate, caducous; calyx tube subcylindrical, limb irregularly split; petals obovate-ob lanceolate, densely silky outside, reddish brown, pubescent

inside; stamens 3, fertile. Pods shining, reddish-brown, flat, oblong-lanceolate, 12-20 x 3.5-5 cm, often slightly sinuate, 3-7-seeded; seeds ca 2 x 1.5 cm, brown.

Fl. & Fr.: June-December.

Scarce, in the primary forests, Sairep to Tawipui, *Dutta* 33650 (CAL); Sairep, *K.P. Singh* 96717. Endemic to North-eastern region.

3.1. *Bauhinia ornata* Kurz in J. As. Soc. Bengal 42: 72. 1873. var. ***kerrii* (Gagnepain) K. & S. Larsen**, Fl. C.L.V. 18: 208. 1980. *Bauhinia kerrii* Gagnepain in Lecomte, Fl. Gen. I-C, 2: 128. t. 3. 1913. *Phanera rufa* Grah. ex Benth. in Miq., Pl. Jungh. 263. 1852. *Bauhinia rufa* (Grah. ex Benth.) Baker. in Hook. f., Fl. Brit. India 2: 280. 1878. *non* Steud., 1840; Kanjilal *et al.*, Fl. Assam 2: 143. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938.

Large, cirrhose, scandent shrubs, climbing over tall trees; branchlets, petioles, pedicels and calyx densely ferrugino-tomentose. Leaves cordate, 7.5-15 x 5-13 cm, deeply lobed up to 1/3 way down; sinus deltoid; lobes 9-11-nerved, acute or shortly acuminate at tip, pubescent along the nerves beneath, base cordate-subtruncate, petioles 4-9 cm long. Corymbs dense, terminal, subsessile; bracts linear, acuminate, persistent; flowers white; calyx tube 5-8 mm long, slender, cylindrical; limb irregularly split, reflexed; petals broadly spatulate or suborbicular-obovate, 1.2-2 cm long; margins crisped, densely silky outside; fertile stamens 3; ovary densely silky, shortly stipitate.

Fl. & Fr.: January-May.

15 miles S.E. of Lungleh, *Gage* 136 (CAL).

3.2. *Bauhinia ornata* Kurz in J. As. Soc. Bengal 42: 72. 1873. subsp. ***mizoramensis* Bandy., Sharma & Thoth**, in Nord. J. Bot. 12(2): 223. 1992.

Cirrhose, scandent shrubs; branches, inflorescence and floral parts densely pubescent or ferrugino-tomentose. Leaves broadly ovate, 20 x 19-21.5 cm, lobed up to 1/2 way down; lobes cordate at base, subacute at apex, glabrous above, pubescent below. Racemes compound, corymbose, axillary and terminal, ferruginous pubescent; bracts and bracteoles

subulate; flowers whitish; calyx 3-lobed; petals 5, obovate, obtuse, densely ferrugine-pubescent outside; ovary densely pubescent; stigma capitate.

Fl.: March-April.

Mizo Hills, *Dutta* 33793 (CAL). Endemic to Mizoram.

4. *Bauhinia purpurea* L., Sp. Pl. 375. 1753; Baker in Hook. *f.*, Fl. Brit. India 2: 284. 1878; Kanjilal *et al.*, Fl. Assam 2: 141. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938; *Phanera purpurea* (L.) Benth. in Miq., Pl. Jungh. 262. 1852. *Vaube*, *Vau*, *Chawnpui* (Lushai).

Small-medium sized, erect trees, 2-7 m tall; bark ash-dark brown, lenticellate; branchlets moderately stout, glabrescent. Leaves shallowly cordate, 7-15 x 6-13 cm; lobes obtuse-subacute at apex, reaching 1/3-1/2 way down, glaucous above, minutely puberulous on the nerves beneath, 9-11-nerved at base; petioles 3-3.5 cm long, swollen at both ends. Racemes corymboid or paniculate, tomentose; bracts and bracteoles minute, deltoid, tomentose; flowers rose-purple; calyx 2-2.5 cm long, tomentose; limbs spathaceous, splitting into 2 segments; petals oblanceolate, long clawed, reddish; stamens 3, fertile. Pods oblanceolate-subfalcate, 15-25 x 1.5-2 cm, flat, greenish-purple, pubescent along sutures, 12-15-seeded; seeds flattened, smooth, roundish, dark brown.

Fl. & Fr.: September-April.

Common, on road side in mixed forests; also cultivated. Changsai, *Prazer s.loc. s.num.* (CAL); Aizawl, 1200 m, *Parry* 231 (*vide* C.E.C. Fischer, *l.c.*); Selengkawn, *Parry* 231 A. (*vide* C.E.C. Fischer, *l.c.*); Sonai to Sakachin *Leslie* 88(CAL); Kolasib, *D.K. Singh* 93128; Darzo, *K.P. Singh* 94024; Kawlhkuh-Hliapui, *K.P. Singh* 94329; Hnathial, *Mao* 107049.

5. *Bauhinia scandens* L., var. *anguina* (Roxb.) Ohashi, J. Jap. Bot. 63: 159. 1988. *Bauhinia anguina* Roxb., Pl. Corom. 3: 82. t. 285. 1820 & Fl. Ind. 2: 328. 1832; Baker in Hook. *f.*, Fl. Brit. India 2: 284. 1878; Kanjilal *et al.*, Fl. Assam 2: 147. 1938. *Zawngaleilawn*, *Zawngaleilak* (Lushai).

Large, scandent shrubs with zig-zag, flat stems and terete branches; tendrils few, weak, usually one to each twig. Leaves broadly ovate, 4-10

x 4-7.5 cm; base cordate, deeply lobed in young plants or coppice shoots to only slightly notched in old plants, glabrous; basal nerves 5-7; petioles 1-4 cm long. Racemes cylindrical, 5-15 cm long, in axillary and terminal panicles; bracts minute, linear-subulate; flowers very small, white; calyx campanulate, 5-cleft; teeth deltoid; petals obovate-oblongate, clawed, puberulous; fertile stamens 3. Pods flat, obliquely oblong, glabrous, thin, 2.5-4 x 1.5-2.3 cm, indehiscent, narrowly winged along the upper suture, 1-(-2)-seeded.

Fl. & Fr.: May-February.

Common, along the roadside forests. Lushai hills, Changsai, *Prazer s.num.* (CAL); Tipaimukh, *Kanjilal* 4756; Aizawl-Lungleh road, *G.K. Deka* 37766.

6. *Bauhinia variegata* L., Sp. Pl. 375. 1753; Baker in Hook. *f.*, Fl. Brit. India 2: 284. 1878; *Kanjilal et al.*, Fl. Assam 2: 140. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938; *Phanera variegata* (L.), Benth. in Miq., Pl. Jungh. 262. 1852. *Vaofavang* (Lushai).

Small-medium, deciduous trees, 5-10 m tall; bark dark grey-brownish, more or less rough; young branches tomentose. Leaves broadly ovate-suborbicular, 5-15 x 5-12.5 cm, deeply cordate at base, lobed to 1/4-1/3 way down; lobes obtuse or rounded at apex, glabrous and dull green above, glaucous and puberulous along the nerves beneath; 9-15-nerved at base; petioles 2-3.5 cm long. Racemes corymbose, lateral or terminal, grey pubescent; bracts and bracteoles minute, deltoid; flowers white, pink or purple, large, up to 8 cm across; calyx tube grey, pubescent, 2-2.6 cm long; limb ovate-cordate, spathaceous, 5-toothed; petals variegated, oblong or obovate, 4-5 cm long, clawed; stamens 5, fertile. Pods dark brown, flat, subfalcate, 15-30 x 1.5-2.5 cm, lignose, glabrous, 10-15-seeded.

Fl. & Fr.: February-September.

Rather common in mixed forests. Chinchip, 1300 m, *Parry* 119 (*vide* C.E.C. Fischer, *l.c.*).

3. CAESALPINIA L.

- 1a. Trees or erect shrubs; pods flat, not winged ... *A. C. pulcherrima*
 1b. Scandent or straggling shrubs; pods winged on upper suture :

- 2a. Leaflets 3-5 pairs, 4-10 cm long; pods 1-seeded ...1. *C. cucullata*
- 2b. Leaflets 5-11 pairs, 1-2.8 cm long;
pods more than 1-seeded :
- 3a. Leaflets 6-11 pairs, glabrous ... 2. *C. enneaphylla*
- 3b. Leaflets 5-7 pairs, tomentose ...3. *C. hymenocarpa*

1. **Caesalpinia cucullata** Roxb., Fl. Ind. 2: 358. 1832. *Mezoneuron cucullatum* (Roxb.) Wight & Arn., Prodr. 283. 1834; Baker in Hook. f., Fl. Brit. India 2: 258. 1878; Kanjilal *et al.*, Fl. Assam 2: 123. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938.

Large straggling-scrambling shrubs with glabrous prickly branches. Leaves prickly, bipinnate; rachis 15-35 cm long, armed with hooked prickles; exstipulate; pinnae 10-20 cm long; leaflets 3-5 pairs, subopposite, ovate-lanceolate, oblanceolate or elliptic-obovate, 4-10 x 2.5-6 cm, base rounded or cuneate, bluntly acuminate at apex, glabrous, dark green above, glaucous beneath; petiolules 2-3 mm long. Racemes simple or forked, terminal and axillary, 12-18 cm long; flowers bright yellow, 1.5-2.5 cm across; calyx deeply divided, lowest lobe hooded; petals streaked with red, upper deeply 2-lobed; anthers red. Pods obliquely oblong, 7-10 x 2.5-3 cm, reddish brown, with papery wings, 1-seeded.

Fl. & Fr.: October-June.

Common, along the road side forests. Aizawl, 1000 m, Parry 400 (*vide* C.E.C. Fischer, *l.c.*); Hauruang, 2220 m, 4 miles from Lungleh, Deb 31396; Saiha to Bualpui, Dutta 33844 (CAL).

2. **Caesalpinia enneaphylla** Roxb., Fl. Ind. 2: 363. 1832. *Mezoneuron enneaphyllum* (Roxb.) Wight & Arn. ex Benth. in Miq., Pl. Jungh. 258. 1852; Baker in Hook.f., Fl. Brit. India 2: 258. 1878; Kanjilal *et al.*, Fl. Assam 2: 124. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 36. 1987. *Ling-Kharg, Ngardaihling* (Lushai).

Scandent, glabrous shrubs with sharp hooked prickles. Leaf rachis 20-30 cm long, prickly; stipules scale-like, appressed; pinnae 16-20, stalked, 5-7.5 cm long; leaflets opposite, 6-11 pairs, oblong or obovate, 1.5-2 x 0.5-1 cm, unequal at base, obtuse at apex, glabrous, membranous; petiolules 1 mm long. Racemes copiously paniced, up to 30 cm long, pubescent when

young; flowers bright yellow, smaller, up to 1.2 cm across; calyx greenish-yellow, glabrous. Pods 7-15 x 1.5-4 cm, glossy, winged, 3-6-seeded.

Fl. & Fr.: September-February.

Aizawl, 900 m, *G.K. Deka s.num.*; Sairang, 2200 m, *Deb* 30576; Near Tuipui-Darzo road, *K.P. Singh* 94017.

3. **Caesalpinia hymenocarpa** (Prain) Hattink in Reinwardtia. 9: 35. 1974. *Mezoneuron hymenocarpum* Jackson in Ind. Kew. 2: 223. 1895. *nom. nud.*; *Mezoneuron hymenocarpum* Prain in J. As. Soc. Bengal 66: 233, 472. 1897; *Deb & Dutta* in J. Econ. Tax. Bot. 10(1): 36. 1987. *Mezoneuron pubescens auct non* Desf., 1809; Baker in Hook. f., Fl. Brit. India 2: 259. 1878.

Scandent shrubs; branchlets glossy, laxly pubescent or glabrous with recurved prickles. Leaf rachis 20-40 cm long, short tomentose; stipules scale-like, appressed; pinnae 6-10, 5-8 cm long, tomentose; leaflets 5-7 pairs, opposite or alternate, oblong-obovate, 1-2.8 x 0.5-1.6 cm, base unequally cuneate, emarginate at apex, margins smooth or curved, pubescent; petiolules ca 1 mm long. Racemes axillary and terminal, 20-40 cm long, paniced, pubescent; flowers bright yellow; lowest sepal deeply cucullate; petals spreading, coriaceous, clawed with hairy margins. Pods thin, indehiscent, 6-15 x 2-4 cm, longitudinally winged, dull-shining, 3-6-seeded.

Fl. & Fr.: April-November.

Darzo to Leite, *Dutta* 34080 (CAL).

4. **Caesalpinia pulcherrima** (L.) Swartz, Obs. Bot. Pl. Ind. Occ. 166. 1791; Baker in Hook. f., Fl. Brit. India 2: 255. 1878; Kanjilal *et al.*, Fl. Assam 2: 122. 1938. *Poinciana pulcherrima* L., Sp. Pl. 380. 1751.

Glabrous shrubs or small trees, up to 5 m tall; branchlets glossy, unarmed or with a few straight prickles. Leaf rachis 15-30 cm long; stipules subulate, caducous; pinnae 6-9 pairs; leaflets 8-12 pairs, sessile, opposite, obovate-oblong, 1.3-2 x 0.8-1 cm, base obliquely rounded, emarginate, mucronate at apex, glabrous. Racemes quite broad, terminal and axillary; pedicels articulate near top; flowers yellowish orange, up to 4 cm across; calyx glabrous, lowest sepal cucullate; petals 4, subequal,

round, crisped, distinctly clawed. Pods nearly oblong, straight, beaked, flattened, 5-8 x 1-2 cm, 8-10-seeded; seeds \pm rectangular, blackish.

Fl. & Fr.: April-December.

Native of South America, it is usually cultivated as an ornamental tree. Kolasib, 700 m, *D.K. Singh* 93116.

4. CASSIA L.

- 1a. Trees or shrubs; petioles and leaf rachis eglandular :
- 2a. Shrubs; flowers in dense spicate heads;
pods membranous, winged ...1. *C. alata*
- 2b. Trees; flowers in lax or corymbose racemes;
pods not winged :
- 3a. Pods ligulate, flat, not woody ...8. *C. timoriensis*
- 3b. Pods terete, cylindrical, woody :
- 4a. Leaflets 3-8 pairs; flowers yellow in lax racemes ...2. *C. fistula*
- 4b. Leaflets 6-12 pairs; flowers pink in
corymbose racemes ...5. *C. javanica* var. *indo-chinensis*
- 1b. Herbs or shrubs; petioles and leaf rachis glandular
- 5a. Leaflets 25-50 pairs, about 1 mm wide;
pods dehiscent ...4. *C. mimosoides*
- 5b. Leaflets less than 10 pairs, 1-3.5 cm wide;
pods indehiscent or subindehiscent :
- 6a. Leaves with a gland near base of the petiole only :
- 7a. Petioles grooved, leaflets 4-9 pairs;
pods subterete ...7. *C. sophera*
- 7b. Petioles grooved; leaflets 3-5 pairs;
pods compressed ...6. *C. occidentalis*
- 6b. Leaves with glands between the leaflets
- 8a. Flowers in pairs on axillary peduncles;
leaflets 2-3 pairs, obovate, obtuse or
subacute at apex; pods subtetragonous ...9. *C. tora*
- 8b. Flowers in peduncled racemes; leaflets
3-5 pairs, lanceolate, acuminate at apex;
pods cylindric, turgid ...3. *C. floribunda*

1. *Cassia alata* L., Sp. Pl. 378. 1753; Baker in Hook. *f.*, Fl. Brit. India 2: 264. 1878; Kanjilal *et al.*, Fl. Assam 2: 133. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 34. 1987. *Cassia bracteata* L.f., Suppl. 232. 1781. *Senna alata* (L.) Roxb., Fl. Ind. 2: 349. 1832. *Tui-hlo* (Lushai).

Sublignose shrubs, 1-5 m tall; branches thick, finely tomentose; bark greenish or greenish brown. Leaf rachis 25-60 cm long; leaflets 8-12 pairs, larger towards tip, oblong, obovate, 5-15 x 2.5-6 cm, base unequal, mucronate at apex, retuse or rounded, glabrous on both surfaces; lateral nerves 12-15 pairs; petiolules 2-4 mm long; stipules rigid, deltoid, acuminate, base auricled. Racemes spiciform, 15-30 cm long, tomentose; bracts obliquely obovate, caducous; flowers yellow, 2.5-4 cm across. Pods linear, compressed, membranous, 12-15 x 1.5-2.3 cm with crenulate wing on both sides, glabrous, 50 or more seeded; seeds rhombic, flat, ca 10 x 8 mm.

Fl. & Fr.: August-March.

Native of South America, now common in waste, open places. Sialsuk, Deb 30689; Darlak, Deb 3437 (CAL).

Uses : Paste of leaves is used for ringworms.

2. *Cassia fistula* L., Sp. Pl. 377. 1753; Baker in Hook. *f.*, Fl. Brit. India 2: 261. 1878; Kanjilal *et al.*, Fl. Assam 2: 128. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938. *Makpazangkang*, *Ngaingaw* (Lushai).

Medium, erect, glabrous trees, 10-15 m tall; branchlets adpressed pubescent; bark grey, smooth with horizontal wrinkles. Leaf rachis 30-50 cm long, puberulous; leaflets 3-8 pairs, opposite, ovate, elliptic-oblong, 5-15 x 3-7.5 cm, base cuneate or rounded, acute-short acuminate at apex; glabrous, but greyish pubescent beneath at first; petiolules 4-5 mm long; stipules minute, pubescent, deciduous. Racemes axillary, drooping, 20-60 cm long, pubescent when young; bracts and bracteoles subulate, caducous; flowers yellow, 3.5-5 cm across; calyx oblong, obtuse, caducous; petals obovate, obtuse. Pods terete, 30-60 x 2-2.5 cm, indehiscent, glossy, brownish-black, 40-100-seeded.

Fl. & Fr.: April-January.

Cultivated as a decorative tree along the road side; Hnathial, 1000 m, Parry 607 (*vide* C.E.C. Fischer, *l.c.*); Kolasib, 700 m, D.K. Singh 93117; Tilthlang, K.P. Singh 96658.

3. *Cassia floribuda* Cav., Descr. 132. 1802; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 34. 1987. *Cassia laevigata* Willd., Enum. Hort. Berol. 441. 1809; Kanjilal *et al.*, Fl. Assam 2: 132. 1938.

Herbs or shrubs, 1-3 m, with glabrous branches. Leaf rachis 10-18 cm long, with linear gland between all except upper most pair of leaflets; leaflets 3-5 pairs, ovate-elliptic or lanceolate, 3.5-9 x 1-3.5 cm, rounded at base, cuspidate-acuminate at apex, glabrous, under surface pale; lateral nerves 12-15 pairs; petiolules ca 2 mm long; stipules caducous. Racemes corymbose, 4-8.5 cm long; bracts linear, acuminate, caducous; flowers yellow, 2-3 cm across; calyx lobes unequal, oblong; petals broadly obovate. Pods linear-cylindric, 6-8 x 1-1.5 cm, transversely septate, turgid, stipitate at base, 40-55-seeded.

Fl. & Fr.: January-December.

Aizawl protected forest, Deb 30541; Lungleh, Dutta 33448; Champhai, Dutta 92427.

4. *Cassia javanica* L. var. *indochinensis* Gagnepain in Lecomte, Fl. Gen. Indo-Chine 2(2): 158. 1913. *Cassia nodosa* Buch.-Ham *ex* Roxb., Fl. Ind. 2: 336. 1832; Baker in Hook. *f.*, Fl. Brit. India 2: 261. 1878; Kanjilal *et al.*, Fl. Assam 2: 128. 1938.

Small-medium trees, up to 18 m tall, with pubescent shoots; bark dark brown-grey. Leaf rachis 20-25 cm long, pubescent or glabrescent; stipules crescent-shaped, deciduous; leaflets 6-12 pairs, oblong or oblong-lanceolate, 4-7 x 2-2.5 cm, acute oblique at base, bluntly acuminate at apex, glabrous above, minutely pubescent beneath; lateral nerves 12-15 pairs; petiolules 2-3 mm long. Racemes short corymbose, up to 15 cm long, arising from old nodes; bracts silky, lanceolate, persistent; bracteoles minute, pubescent; flowers pink, up to 6 cm across; calyx red, lobes pubescent; petals oblong-obovate, acute. Pods 25-45 cm long, distinctly transversely ribbed.

Fl. & Fr.: April-December.

Bualpui, D.K. Singh 93214; Near Hnathial, K.P. Singh 93989, 96933.

5. *Cassia mimosoides* L., Sp. Pl. 379. 1753; Baker in Hook. *f.*, Fl. Brit. India 2: 266. 1878; Kanjilal *et al.*, Fl. Assam 2: 133. 1938.

Small, diffuse or erect, suffruticose undershrubs with branches finely tomentose; stems 0.3-1.2 m. Leaf rachis 4-10 cm long, slender, with a sessile discoid gland near the lowest leaflets; petioles 2-3 mm long; stipules large, linear subulate with a broad base, persistent; leaflets 25-50 pairs, overlapping, subfalcate-oblong, truncate, 3-8 x 0.8-1.2 mm, acute-obliquely mucronate at apex, membranous, glabrous, rigidly coriaceous, sessile. Racemes axillary, 30-50 cm long; bracts 1 pair, stipulaceous; bracteoles 2, minute; flowers solitary or in pairs, yellow; sepals lanceolate-ovate, acuminate, finely pilose externally; petals elliptic-orbicular. Pods strap-shaped, flat, 1.5-4.5 x 0.25-0.45 cm, rostrate at apex, covered with fine bristles, dehiscent; seeds compressed, obliquely oblong.

Fl. & Fr.: October-November.

Zote, 1700 m, *D.K. Singh* 94546; on way to Hliapui from Kawlhkuth, 1500 m, *D.K. Singh* 94384.

6. *Cassia occidentalis* L., Sp. Pl. 377. 1753; Baker in Hook. *f.*, Fl. Brit. India 2: 262. 1878; Kanjilal *et al.*, Fl. Assam 2: 129. 1938.

Fig. 107.

Foetid, sublignose herbs or undershrubs, 0.5-2.5 m high; branches pubescent. Leaf rachis 12-20 cm long, channelled; petioles 3-6 cm long; stipules obliquely cordate, acuminate, caducous; leaflets 3-5 pairs, ovate-oblong, 3.5-10 x 0.8-3 cm, rounded at base, acute-acuminate at apex, ciliate at margins, glabrous above, minutely glandular-pubescent beneath; lateral nerves 8-10 pairs; petiolules ca 1-2 mm long. Racemes corymbose, axillary or terminal, often forming more or less leafy panicles; bracts thin, ovate-acuminate, caducous; flowers yellow, 1-1.5 cm across; sepals obtuse, glabrous; petals obovate-oblong. Pods subfalcate, compressed, 7-12.5 x 0.6-1 cm, 20-35-seeded.

Fl. & Fr.: May-December.

Lungleh, *Dutta* 33448 (CAL); Zotethlang, *D.K. Singh* 94587; Keifang, *M. Sawmliana* 99257; Tuivawl, *M. Sawmliana* 99263.

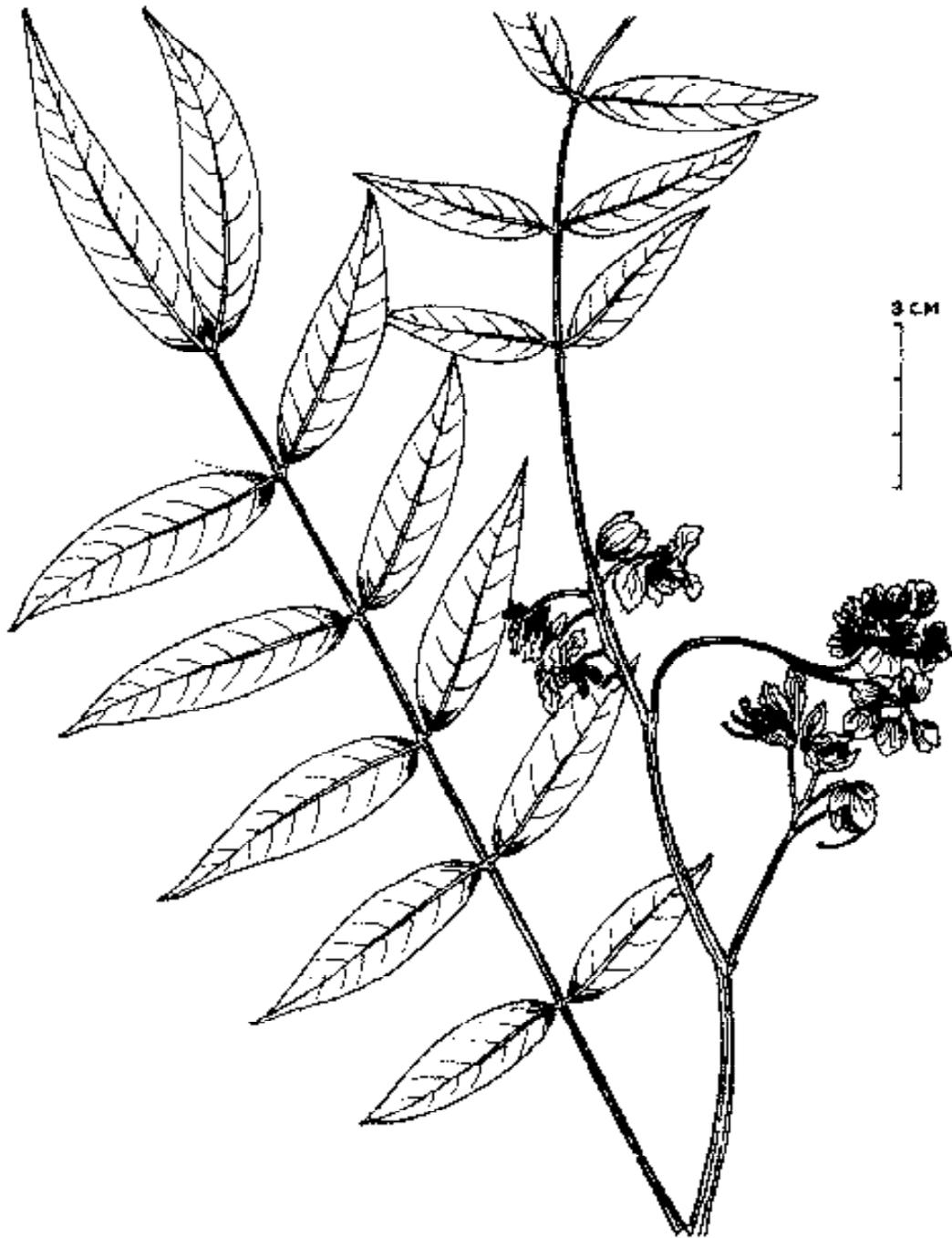


Fig. 107: *Cassia occidentalis* L.

7. *Cassia sophera* L., Sp. Pl. 379. 1753; Baker in Hook. f., Fl. Brit. India 2: 262. 1878; Kanjilal *et al.*, Fl. Assam 2: 130. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938. *Senna sophera* (L.) Roxb., Fl. Ind. 2: 347. 1832. *Senna esculenta* Roxb., Fl. Ind. 2: 346. 1832.

Annual undershrubs, 1-3 m tall, with young parts pubescent. Leaf rachis 10-25 cm long, grooved, having a conical gland at base; petioles 3-4 cm long; leaflets 4-9 (-12) pairs, ovate-narrow lanceolate or oblong-lanceolate, 2.8-7 x 0.6-1.5 cm, unequal at base, acute at apex, glaucous beneath. Racemes corymbose, axillary and terminal, 4-10-flowered, often paniced at the end of branches; bracts green, small, ovate, acute, caducous; flowers yellow, 2.5-3 cm across; calyx lobes elliptic-ovate, pubescent outside; petals oblong-obovate. Pods subterete, 6-12 x 0.5-1 cm, straight or curved, turgid, with more or less thickened sutures, septate, 15-30-seeded; seeds ovate, 4-5 x 3 mm, greyish.

Fl. & Fr.: July-December.

Reported on the basis of C.E.C. Fischer (*l.c.*).

8. *Cassia timoriensis* DC., Prodr. 2: 499. 1825; Baker in Hook. f., Fl. Brit. India 2: 265. 1878; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 34. 1987. *Senna timoriensis* (DC.) Brown & Barneby, Mem. N.Y. Bot. Gard. 35: 98. 1982. Luahmur (Lushai). **Fig. 108.**

Small trees, with slender, finely tomentose branches. Leaf rachis 15-25 cm long; petioles 3-5 cm long; stipules foliaceous, persistent; leaflets 10-18 pairs, oblong, 1.8-4 x 0.5-1 cm, base rounded, obtuse, mucronate at apex, membranous, finely tomentose beneath; lateral nerves 10-12 pairs; petiolules 1 mm long. Racemes corymbose, axillary, paniced; flowers yellow; sepals obtuse, pubescent; petals slightly veined. Pods ligulate, flat, glossy, 11-15 x 1.2-1.5 cm, transversely ribbed, 12-20-seeded.

Fl. & Fr.: May-October.

Zawbawk, 1000 m, Parry 389 (*vide* C.E.C. Fischer, *l.c.*); Near fort Lungleh, Gage 226 (CAL); Hauruang, 2220 m, Deb 31372; Lawngtalai forest camp, D.K. Singh, 92847.



Fig. 108: *Cassia timoriensis* DC.

9. *Cassia tora* L., Sp. Pl. 376. 1753; Baker in Hook. *f.*, Fl. Brit. India 2: 263. 1878; Kanjilal *et al.*, Fl. Assam 2: 131. 1938. *Senna tora* Roxb., Fl. Ind. 2: 340. 1832. Fig. 109.

Annual, foetid herbs or undershrubs, up to 1.2 m high, with young parts pubescent. Leaf rachis 2-6 cm long, puberulous, grooved, with 2 subulate glands between 2 lower pairs of leaflets; petioles 1.5-3 cm long; stipules linear-subulate, caducous; leaflets 2-3 pairs, ovate-elliptic or oblong-obovate, 2.5-10 x 0.6-3 cm, rounded or cuneate at base, acute-acuminate at apex, glabrescent above, pubescent beneath; lateral nerves 6-9 pairs; petiolules *ca* 1 mm long. Flowers yellow, 2-3 cm across, borne in pairs in leaf axils; calyx segments elliptic-ovate, obtuse, glabrate; petals oblong-obovate, conspicuously veined. Pods slender, subtetragonous, 12-20 x 0.4-0.5 cm, 20-30-seeded; seeds rhomboidal, *ca* 4 mm.

Fl. & Fr.: January-December.

Common, in open places inside forests and along the road side. Aizawl, *Leslie* 374 (CAL); Aizawl, *Deb* 30651; Upper Thenzawl, *K.P. Singh* 93919; Kawlkhulh-Hliapui road, *K.P. Singh* 94360; Keifang, *M. Sawmliana* 99256; Hnathial, 750 m, *Mao* 107055.

5. DELONIX Rafin.

Delonix regia (Bojer *ex* Hook.) Rafin., Fl. Tell. 2: 92. 1837. *Poinciana regia* Bojer *ex* Hook. in Bot. Mag. 56: 5, t. 2884. 1829; Baker in Hook. *f.*, Fl. Brit. India 2: 260. 1878.

Large, deciduous trees with spreading crown, 7-15 m tall; bark greyish to dark brown, more or less smooth. Leaves bipinnate, 20-75 cm long; pinnae 5-12 pairs; leaflets 15-20 pairs, caducous, oblong, 5-10 x 2-3 mm, base obliquely rounded, obtuse to subacute at apex, adpressed pubescent or glabrescent beneath; \pm sessile. Racemes corymbose, 15-30 cm long, 8-12-flowered; flowers red, 5-9 cm across; calyx lobes 5, unequal, valvate, green externally, red internally; petals shortly clawed, posterior one white or variegated. Pods large, lignose, laterally compressed, 20-70 x 5 cm, transversely many-seeded; seeds 20-40, oblong, *ca* 2 x 0.7 cm, mottled.

Fl. & Fr.: March-October.

Usually cultivated as ornamental tree. Kolasib 700 m, *D.K. Singh* 93118.

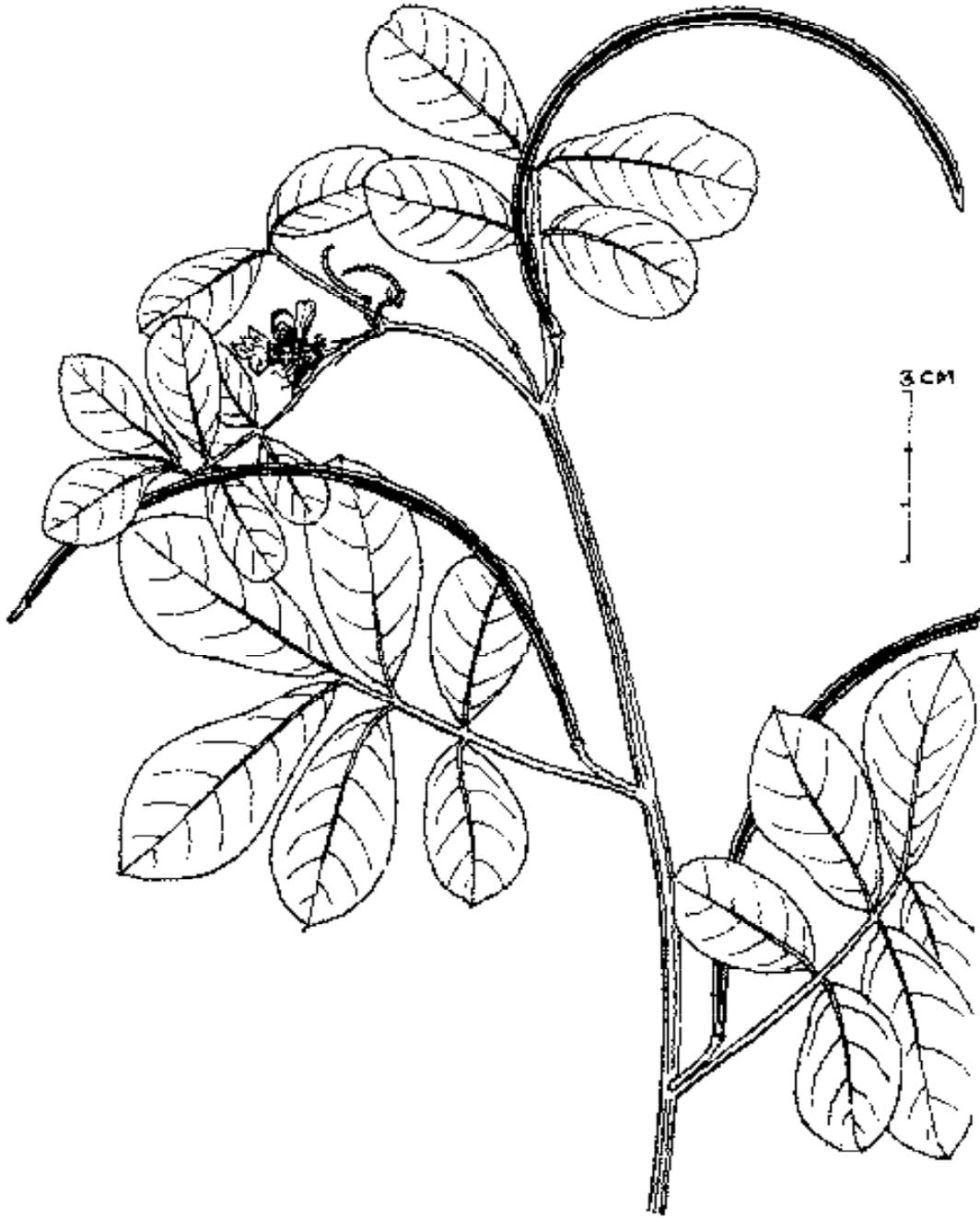


Fig. 109: Cassia tora L.

6. GLEDITSIA L.

Gleditsia assamica Bor. in Indian For. Rec. n.s. Bot. 2: 231. 1941; *G. fera* (Lour.) Merr.; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987 non Merr., 1918. *G. macracantha* Desf.; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 35. 1987 non Desf., 1809. *Hluk-Ral* (Lushai).

Large shrubs or trees, 10-30 m tall; trunks and branches with simple or branched thorns; branchlets terete or grooved, glabrous or pubescent-tomentose; bark prominently lenticellate. Leaves alternate or fascicled, up to 15 cm long, pinnate; lower pinnae often reduced to a leaflet; rachis grooved, tomentose; leaflets 30 or more, alternate-subopposite, oblong-falcate, 2.5-3.5 x 0.5-1 cm, base oblique, obtuse at apex, serrulate-crenate along margins, coriaceous-membranous; stipules minute, caducous. Racemes congested, up to 20 cm long, axillary, from the scars of fallen leaves, few-many-flowered; bracts minute; pedicels up to 4 mm long, adpressed pubescent. Flowers small, greenish; calyx campanulate, up to 3 mm long, 3-5-lobed; lobes oblong-lanceolate, acute, tomentose; petals 5, up to 3 mm long, oblong-ob lanceolate, obtuse, tomentose. Pods dark brown, oblong, falcate, 4-4.5 x 3-4.5 cm, shortly stipitate, flat, leathery, ± indehiscent, 1-many-seeded; seeds compressed, oblong-orbicular.

Fl. & Fr.: February-April (At irregular intervals).

Considerably rare, in tropical forests up to 300 m. Sairep-Tawipui, Dutta 33617; Siatsuk, Deb 30779; Hnathial K.P. Singh 94041; Dampui, 1200 m, *M. Sawmliana s.num* (CAL). Endemic to North-eastern India.

Uses: Fruits are eaten by barking deer.

Note: Based on their collections, Deb & Dutta (*l.c.*) have reported *G. fera* (Lour.) Merr. and *G. macracantha* Desf. from Mizoram. However, as these specimens manifestly compare with that of *G. assamica* Bor., both the species have been treated here under the latter.

7. MANILTOA Scheff.

Maniltoa polyandra (Roxb.) Harms in Engler & Prantl., Nat. Pflanzenfam. 1: 194. 1897. *Cynometra polyandra* Roxb., Pl. Corom. 3: 84. t. 286. 1820 & Fl. Ind. 2: 372. 1832; Baker in Hook. f., Fl. Brit. India 2: 268. 1878; Kanjilal *et al.*, Fl. Assam 2: 134. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 91. 1938. *Kawrhreitha* (Lushai).

Large, evergreen trees, up to 15 m tall, with a compact, oval crown; stems sometimes buttressed towards base; bark grey, fissured; young shoots densely lenticellate. Leaves paripinnate; leaf rachis 5-15 cm long, puberulous; leaflets 2-3 pairs, oblique-oblong, obovate or lanceolate, 3-10 x 1-3.5 cm, base obliquely cuneate, acute-subobtuse at apex, subcoriaceous, glabrous. Corymbs axillary, rusty pubescent, sessile, floriferous to the base; bracts imbricating in buds, deciduous; flowers white, 1-2 cm across; calyx tube very short, 4-lobed; lobes white, obovate-oblong, reflexed; petals 5, linear-oblong, clawed. Pods falcate, oblong, 4-7 x 2-3.5 cm, beaked, lignose, rugose with lenticular dots, 1-seeded.

Fl. & Fr.: March-September.

Reported on the basis of C.E.C. Fischer (*l.c.*).

8. SARACA L.

Saraca asoca (Roxb.) de Wilde, *Blumea* 15: 393. 1968. *Jonesia asoca* Roxb., *Asiat. Res.* 4: 365. 1785. *Saraca indica auct. non L.*, 1767; Baker in Hook. *f.*, *Fl. Brit. India* 2: 271. 1878; Kanjilal *et al.*, *Fl. Assam* 2: 136. 1938; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 92. 1938. *Mawlhui*, *Mualhawih* (Lushai). Fig. 110.

Umbrageous, less branched, medium sized, handsome trees; bark almost black, lenticellate. Leaves paripinnate, sessile-subsessile; rachis 10-25 cm long, glabrous; stipules intrapetiolar, ovate-oblong, scarious, obtuse, ciliolate; leaflets 6-12 pairs, oblong or oblong-lanceolate, 7-22 x 3-8 cm, base slightly unequal to rounded, acute or obtuse at apex, subcoriaceous, glabrous; petiolules up to 1 cm long; lateral nerves 9-12 pairs. Flowers fragrant, orange-scarlet red, 2-3 cm long, in sessile, corymbose, axillary panicles; corymbs 7-10 cm broad; bracteoles ascending, oblong-spathulate; sepals 4, oblong-obovate, subpetaloid; tube elongate; petals absent. Pods oblong, 10-25 x 3.5-5 cm, compressed, glabrous, coriaceous, 4-8-seeded; seeds ellipsoid-oblong, ca 3 cm long.

Fl. & Fr.: April-October.

S.num. & s.loc.: Parry (CAL); between Ridge Camp and Lungsin, 700-800 m, *Gage* 213 (CAL); Kolasib-Bhairavi Road, ca 12 km, *D.K. Singh* 93201; Tipaimukh area, *K.P. Singh* 97096.



Fig. 110: *Saraca asoca* (Roxb.) de Wilde

Uses : Leaves used for preparing hot beeverage like tea. The stem bark is boiled and the water is taken for easy delivery and diuretic.

9. TAMARINDUS L.

Tamarindus indicus L., Sp. Pl. 34, 1753; Baker in Hook. *f.*, Fl. Brit. India 2: 273. 1878; Kanjilal *et al.*, Fl. Assam 2: 135. 1938. *Teng-te-re* (Lushai).

Large, evergreen, unarmed trees, up to 20 m tall; bark dark grey, shallowly fissured. Leaves abruptly pinnate, 5-15 cm long; stipules linear-lanceolate, caducous; leaflets opposite, 12-20 pairs, oblong, or ovate-oblong, 0.6-1.8 x 0.4-0.6 cm, base obliquely cuneate or rounded, notched or mucronate at apex, glabrous. Racemes lax, 10-15-flowered, terminal, up to 10 cm long; bracts naviculate, caducous; flowers yellow or creamy, with reddish tinge; calyx tube turbinate, segments lanceolate, greenish white; petals yellow streaked, red, margins fringed. Pods indehiscent, more or less laterally compressed, oblong, 7-16 x 2.5 cm, 3-10-seeded; seeds ca 2 x 1 cm, compressed.

Fl. & Fr.: April-December.

Usually planted, not very common. Sairang, 600 m, *G.K. Deka* 23233; Kolasib, 700 m, *D.K. Singh* 93136

Uses : Infusion of pulp is taken against diarrhoea. The kernel is effectively used in snake-bite, centepede-bite, etc.

MIMOSACEAE

(D.K. Singh)

1a. Stamens 10 or fewer :

2a. Flowers in elongated spikes ...5. *Entada*

2b. Flowers in heads or racemes :

3a. Prickly, decumbent, subshrubby herbs;
pods separating into 1-seeded segment ...7. *Mimosa*

3b. Unarmed trees or shrubs; pods otherwise :

- 4a. Medium sized trees; heads solitary on drooping long peduncles; stamens monadelphous; flowers dull white or yellow ...8. *Parkia*
- 4b. Small trees; heads 1-2 together on short peduncles; stamens free; flowers white ...6. *Leucaena*
- 1b. Stamens indefinite or more than 10:
- 5a. Stamens free; armed trees or shrubs ...1. *Acacia*
- 5b. Stamens united into a tube at base; unarmed or weakly spinulose trees
- 6a. Trees with weak stipular spines; suture of pods thickened ...4. *Calliandra*
- 6b. Trees without spines; suture of pods not thickened :
- 7a. Pods thin, straight ...2. *Albizia*
- 7b. Pods subwoody, circinate or twisted ...3. *Archidendron*

1. ACACIA Mill.

- 1a. Erect shrubs to medium trees ...2. *A. farnesiana*
- 1b. Scandent or climbing shrubs :
- 2a. Stem fluted; pinnae less than 10 pairs ...1. *A. caesia* var. *subnuda*
- 2b. Stem terete; pinnae more than 10 pairs :
- 3a. Flower heads yellow; branchlets pruinose ...5. *A. pruinescens*
- 3b. Flower heads white or creamy white; branchlets epruinose but puberulous :
- 4a. Gland at or above the middle of petiole; leaflets 6-10 mm long; flowers sessile ...3. *A. megaladena*
- 4b. Gland below the middle of the petiole; leaflets 3-6 mm long; flowers pedicelled ...4. *A. pennata*

1. *Acacia caesia* (L.) Willd., Sp. Pl. 4: 1090. 1806. var. *subnuda* (Craib.) Nielsen in *Adansonia* 2, 19: 348. 1980. *Acacia oxyphylla* Grah. ex Benth. in Hook., London J. Bot. 1: 514. 1842; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 92. 1938. *Acacia intsia* (L.) Willd. var. *oxyphylla* (Grah. ex Benth); Baker in Hook. f., Fl. Brit. India 2: 297. 1878. *Acacia intsia* (L.) Willd. var. *caesia* (L.) Wight & Arn. ex Baker in Hook. f., Fl. Brit. India 2: 297. 1878; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 33.

1987. *Acacia oxyphylla* Grah. ex Benth. var. *subnuda* Craib. Fl. Siam. Enum. 1: 550. 1928.

Large, prickly scandent shrubs with fluted stems; prickles stout, hooked; young parts grey-brown, pubescent. Rachis 10-15 cm long with a flat topped basal gland and another smaller one between uppermost pairs of pinnae; pinnae 6-9 pairs, 5-8 cm long; leaflets 18-25 pairs, oblique or oblong, 5-10 x 2-4 mm, base truncate or rounded; sharply acute. Heads 1-2 together in terminal panicles, 40-50-flowered; bracts up to 0.6 cm long, lanceolate, acute acuminate; bracteoles oblong, more or less glabrous; flowers white. Pods unequally oblong, 10-18 x 1.5-3 cm, dark brown.

Fl. & Fr.: September-April.

Ghatter moikh hills, *Prazer, s.num.* (CAL); Lungleh, 1000 m, *Gage 79* (CAL); Sairang road, *G.K. Deka 2346*; Lungleh, *Dutta 33447* (CAL).

2. *Acacia farnesiana* (L.) Willd., Sp. Pl. 4: 1083. 1806; Baker in Hook. f., Fl. Brit. India 2: 292. 1878; Kanjilal *et al.*, Fl. Assam 2: 154. 1938. *Mimosa farnesiana* L., Sp. Pl. 521. 1753. *Acacia pedunculata* Willd., Sp. Pl. 4: 1084. 1806.

Small, medium thorny trees, up to 7 m tall, and with flexuous branches; bark pale brown, lenticellate; spines stipular, straight, up to 3 cm long; young shoots brown tomentose. Leaf rachis 2-6 cm long, brown, tomentose with a minute circular petiolar gland; pinnae 4-8 pairs, up to 3.5 cm long; leaflets 10-20 pairs, sessile, rigid, oblong, 0.25-0.5 cm long, base obliquely truncate, acute-obtuse at apex, glabrescent. Heads 0.3-0.8 cm across, pedunculate, axillary; peduncles up to 3 cm long, fascicled on minute outgrowths with a ring of minute, ciliate bracts; flowers yellow, fragrant. Pods subcylindrical, 4-8 x 1.2 cm, curved, brown, horizontally finely striate; seeds biserial, many.

Fl. & Fr.: April-September.

A native of tropical America, usually planted. Kawnpui, *D.K. Singh 93030*.

3. *Acacia megaladena* Desv. in J. Bot. 1: 69. 1814; *Acacia pennata* (L.) Willd. var. *arrophula* (D. Don) Baker in Hook. f., Fl. Brit. India 2: 298. 1878; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 92. 1938. *Khangsen* (Lushai); *Maza* (Lakher).

Large, prickly, scandent shrubs; prickles fewer, arranged in 5 rows on young branches. Leaf rachis up to 22 cm long with a large cupular gland and 2-4, smaller interpinnular glands; pinnae 10-20 pairs, 5-8 cm long; leaflets 16-50 pairs, linear-oblong or unequally broad, 6-10 x 0.5-1.5 mm, oblique at base, sharply acute at apex, glabrous, slightly membranous. Heads dull white, up to 1 cm across, 1-4 in terminal, elongated compound panicles. Pods leathery, linear oblong, strap-shaped, 10-18 x 2-4 cm, reddish brown, 8-14-seeded; seeds oblong.

Fl. & Fr.: July-April.

Helio Hill, N.E. Lungleh, 1200 m, *Gage* 106 (CAI).

4. *Acacia pennata* (L.) Willd., Sp. Pl. 4: 1090. 1806; Baker in Hook. f., Fl. Brit. India 2: 297. 1878; Kanjilal *et al.*, Fl. Assam 2: 156. 1938. *Mimosa pennata* L., Sp. Pl. 522. 1753. *Khang, Khangighu, Khang-hu* (Lushai). Fig. 111.

Large, scandent bush or lianas, with recurved prickles and pale brown bark. Leaf rachis 15-20 cm long, with large, cup-like gland on petiole near base, and 1-3 smaller glands between the upper pinnae; pinnae 8-16 pairs, 4-10 cm long; leaflets 40-50 pairs, sessile, linear-oblong, 3-6 x 1 mm, base truncate, asymmetric, acute at apex, glabrous on both sides, coriaceous. Flower heads white or creamy white, 0.8-1 cm across, 1-4 together in terminal, tomentose panicles. Pods stalked, oblong, acute or acuminate at apex, 8-18 x 2-3 cm, glabrous, strap-shaped, borders thickened, 5-10 seeded; seeds oblong, dark brown.

Fl. & Fr.: July-February.

At lower elevations in tropical forests. On way to Champhai from Aizawl, *Deb* 30899; Lawangtalai-Kawlchaw, *K.P. Singh* 92864; Upper Thenzawl, *K.P. Singh* 93924; Tuipui-Darzo road, *K.P. Singh* 94022; Near Sherchip, *K.P. Singh* 96605; Dampa, 500-1200 m, *Mao* 101740.

5. *Acacia pruinescens* Kurz in J. As. Soc. Bengal 45: 298. 1876; Kanjilal *et al.*, Fl. Assam 2: 155. 1938. *Khangpaul* (Lushai).

Large, prickly, scandent shrubs; branches pruinose; prickles recurved. Leaf rachis 12-25 cm long with a large gland above base and smaller ones between the upper 2 or 3 pinnae; stipules deciduous; pinnae 6. 5-10 cm

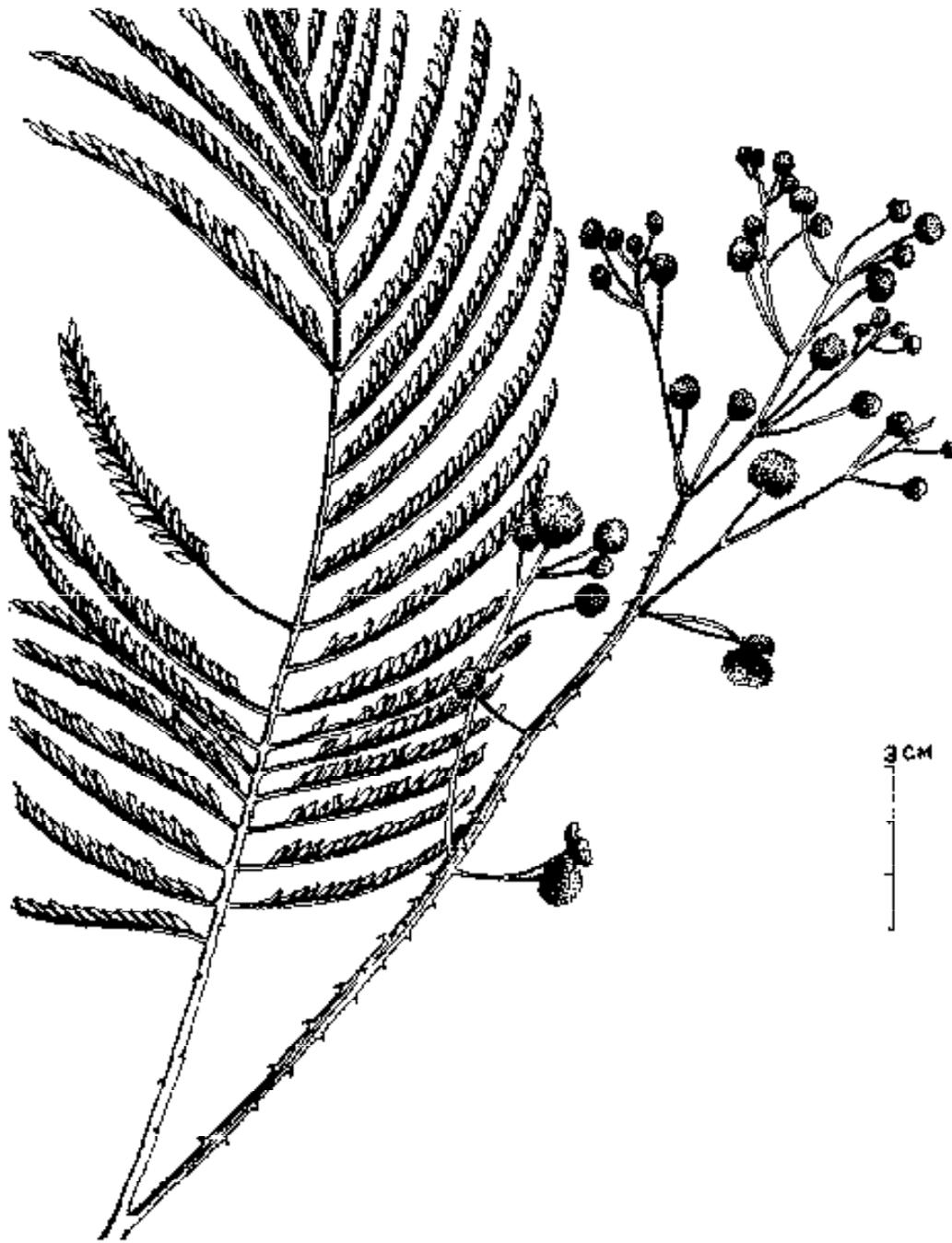


Fig. 111: *Acacia pennata* (L.) Willd.

long, 8-15 pairs; leaflets 40-60 pairs, sessile, linear-oblong, 5-8 x 1 mm, cordate-subcordate or truncate at base, obtuse at apex, glabrous or ciliate at margins, pale beneath. Heads yellow, 0.6-1.2 cm across, in axillary panicles, 20-30-flowered; bracts linear-lanceolate or spatulate, tomentose; calyx campanulate, teeth short, acute, more or less pubescent; corolla lobes lanceolate, puberulous. Pods strap-shaped, contracted at regular intervals, 7-13(18) x 2-3.5 cm, pale brown, 3-8-seeded.

Fl. & Fr.: April-January.

Near Fort Lungleh, 900-1200 m, *Gage* 121 (CAL); Aizawl 900 m, *G.K. Deka* 23238.

2. ALBIZIA Durazzini

- 1a. Stipules large, ovate ...1. *A. chinensis*
- 1b. Stipules small or minute, linear :
 - 2a. Leaflets acuminate at apex, (1-) 2(-3) pairs ...3. *A. lucidior*
 - 2b. Leaflets obtuse at apex, 4-20 pairs :
 - 3a. Flowers in umbels, pedicelled;
pods straw-coloured ...2. *A. lebbeck*
 - 3b. Flowers in panicles, sessile;
pods dark reddish or brown in colour:
 - 4a. Leaflets ovate-oblong, 15-20 mm wide,
mid rib towards lower side; rachis and
calyx glabrous ...5. *A. procera*
 - 4b. Leaflets obliquely-oblong, 2-10 mm wide,
mid rib towards upper side; rachis and
calyx pubescent ...4. *A. odoratissima*

1. *Albizia chinensis* (Osborne) Merr. in Amer. J. Bot. 3: 575. 1916; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 92. 1938; *Mimosa chinensis* Osborne, Degbok Ostind. Resa 233. 1757. *Mimosa stipulata* Roxb., Hort. Beng. 40. 1814. *nom. nud.* *Acacia stipulacea* Roxb. Fl. Ind. 2: 549. 1832. *Albizia stipulata* (Roxb.) Boiv., Encycl. 19. Siecle 2: 33. 1834; Baker in Hook. f., Fl. Brit. India 2: 300. 1878; Kanjilal *et al.*, Fl. Assam 2: 167. 1938. *Vang* (Lushai); *Pava* (Lakher).

Large, handsome trees, 20-25 m tall, with flat, spreading crown; bark dark brown, horizontally wrinkled, lenticellate. Leaf rachis 12.5-30 cm long, with a large gland at base and a few between pinnae, finely tomentose; stipules ovate, 2.5-3 x 1.5-1.8 cm large, obliquely semicordate, acute, persistent; pinnae 5-20 pairs, 5-15 cm long; leaflets subsessile, 20-40 pairs, falcate, or linear-oblong, 5-8 x 1-2 mm, obliquely acute at both ends, membranous, sensitive, finely pubescent and glaucous beneath. Heads 15-25-flowered, in axillary and terminal corymbose or racemed panicles; bracts persistent, stipulaceous, up to 2.5 cm long, cordate, acute, membranous, pubescent; flowers sessile, yellowish or greenish white; calyx tubular, infundibulate; petals ovate-lanceolate, pubescent outside. Pods indehiscent, 7-16 x 1.8-2.5 cm, light brown, thin glabrous, 4-10-seeded.

Fl. & Fr.: April-December.

Near fort Lungleh, 900-1200 m, *Gage* 124 (CAL); Vanjoh, Kapley as Zolse, *Leslie* 294 (CAL); Champhai, 1560 m, *Deb* 30965; Chummliang to Meiboi, *Dutta* 33318; Kolasib, *D.K. Singh* 93152.

2. *Albizia lebbeck* (L.) Benth. in Hook, London J. Bot. 3: 87. 1844; *p.p.* 'lebbek' & in Trans. Linn. Soc. 30: 562. 1875 *p.p.*; Baker in Hook. *f.*, Fl. Brit. India 2: 298. 1878; Kanjilal *et al.*, Fl. Assam 2: 165. 1938. *Mimosa lebbeck* L., Sp. Pl. 516. 1753. *Rumhri*, *Thingri* (Lushai).

Large, deciduous trees, up to 20 m tall with spreading crown; bark grey-brown, irregularly cracked; branches lenticellate; young shoots and inflorescence pubescent. Leaf rachis 7-15 cm long, glandular at base and near the tip; stipules linear, tomentose, caducous; pinnae 2-5 pairs, 5-20 cm long; leaflets 4-10 pairs, oblong-obovate, 2.5-4 x 1.2-2 cm, base unequal, obtuse-emarginate at apex, adpressed pubescent beneath. Heads umbellate, 15-30-flowered, solitary or 3-4, fascicled in upper leaf axils or short innovations, 5-7 cm across; flowers greenish-white, fragrant; bracts linear, tomentose, caducous; calyx ca 3 mm, pubescent; teeth minute; petals short, lanceolate. Pods oblong, 10-30 x 3-4.5 cm, yellowish-brown, finely reticulate, alternately depressed on either side over seeds, 2-12-seeded; suture thickened.

Fl. & Fr.: April-October.

Lushai hills, *Prazer*, *s.num.* (CAL); Hnathial-Lungleh road, *K.P. Singh* 94189; Zawbawk, *K.P. Singh* 96733.

3. *Albizia lucidior* (Steud.) Nielsen in *Adansonia* 1, 19: 222. 1979; *Inga lucidior* Steud., *Nom. Bot.* ed. 2: 810. 1840. *Albizia lucida* (Roxb.) Benth. in Hook., *London J. Bot.* 3: 86. 1844; Baker in Hook. *f.*, *Fl. Brit. India* 2: 299. 1878; Kanjilal *et al.*, *Fl. Assam* 2: 162. 1938. *Mimosa lucida* Roxb., *Fl. Ind.* 3: 544. 1832. *non* Vahl, 1807. *Kamatek*, *Ardahpui* (Lushai).

Medium-sized, evergreen trees, up to 15 m tall with ovate-elongated crown; branches arachnate; bark grey with horizontal wrinkles and lenticles. Leaf rachis 3-8 cm long with a cupular gland slightly above the middle; pinnae 1(-2) pairs, 2.5- 12 cm long, usually with a gland near the tip; leaflets (1-) 2-(-3) pairs, elliptic-oblong or ovate-lanceolate, 4-15 x 2-5 cm, base obliquely cuneate-rounded, acuminate-acute at apex, glabrous, glossy dark green above, pale beneath. Heads in subumbellate, corymbose panicles; bracts and bracteoles minute; flowers dull, white-creamy; calyx campanulate, puberulous, teeth minute; petals lanceolate, silky outside. Pods light green, thin, flat, 10-25 x 1.5-2.5 cm, attenuated at both ends, 4-8-seeded.

Fl. & Fr.: April-October.

Bindameswar (near Tiabung), *K.P. Singh* 94293.

4. *Albizia odoratissima* (L.f.) Benth. in Hook., *London J. Bot.* 3: 88. 1844; Baker in Hook. *f.*, *Fl. Brit. India* 2: 299. 1878; Kanjilal *et al.*, *Fl. Assam* 2: 164. 1938; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 92. 1938. *Mimosa odoratissima* L.f., *Suppl. Pl.* 37. 1781. *Albizia odoratissima* (L.f.) Benth. var. *mollis* Benth. ex Baker in Hook. *f.*, *Fl. Brit. India* 2: 299. 1878. *Kang-tek-nu*, *Karg tek* (Lushai).

Large, deciduous trees, up to 25 m tall with spreading oval crown; bark grey or brownish grey-black, rough; young shoots and inflorescence densely pubescent. Leaf rachis 10-20 cm long with a large gland at base and a few between upper pinnae, finely tomentose; stipules small, deciduous; pinnae 3-5 pairs, 7-15 cm long, puberulous or glabrescent; leaflets 8-20 pairs, sessile, obliquely oblong-obovate, 0.8-2.5 x 0.2-1 cm, obliquely truncate or rounded at base, obtuse at apex, glaucous beneath. Heads ca 12-flowered, up to 3 cm across, solitary or paniced, white or yellowish-white; bracts ovate, acute-acuminate, brown tomentose; flowers sessile, fragrant; calyx small, campanulate, densely pubescent outside; corolla infundibulate, hairy, lobes lanceolate. Pods firm, flexible, 15-20 x 2-3 cm, shortly stipitate, reddish brown, 8-12-seeded; seeds ovoid, compressed, 7-12 x 5-8 mm.

Fl. & Fr.: April-December.

Common in evergreen forests. Hliapui, 1500 m, *D.K. Singh* 94336.

Uses : The bark is used as fish poison.

5. *Albizia procera* (Roxb.) Benth. in Hook., London J. Bot. 3: 89. 1844; Baker in Hook. f., Fl. Brit. India 2: 299. 1878; Kanjilal *et al.*, Fl. Assam 2: 163. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 92. 1938; *Mimosa procera* Roxb., Fl. Corom. 2: 12. t. 121. 1799. *Albizia procera* (Roxb.) Benth. var. *elata* (Roxb.) Baker in Hook. f., Fl. Brit. India 2: 299. 1878. *Zairum*, *Kang tek-pa* (Lushai).

Tall, subdeciduous trees, up to 25 m with branchlets arcuate or drooping; bark yellowish grey, smooth. Leaf rachis glabrous, 25-45 cm long, with a large oblong-oval gland at base; pinnae 2-6 pairs, 12-25 cm long, often with glands between upper 1-2 pairs of leaflets; leaflets 8-20 pairs, sessile, rhomboid-oblong or ovate-oblong, 2.5-6 x 1.5-2.2 cm, base cuneate, obtuse, mucronate at apex, younger ones silvery beneath, adpressed pubescent or glabrous. Heads 1-5 together in large panicles, up to 1.5 cm across; bracts caducous; flowers sessile, dull white; calyx tubular, glabrous outside; petals oblong-lanceolate, pubescent outside; Pods 10-20 x 1.5-2.5 cm, reddish-dark brown, flexible, glabrous, 8-12-seeded.

Fl. & Fr.: June-December.

S.loc., *Parry s.num.*(CAL); Haurunag, 4 km from Lungleh, 666 m, *Deb* 31384.

Uses : The bark is used as fish poison. Poultice of leaves is applied to ulcers.

3. ARCHIDENDRON F.v Muell.

- 1a. Shoots distinctly angular;
pinnae and leaflets more than 4 pairs ...1. *A. clypearia*
- 1b. Shoots terete or slightly angulate;
pinnae and leaflets less than 4 pairs :
 - 2a. Usually shrubs, up to 1.5 m tall; flowers 6-12 mm long ...2. *A. glomeriflorum*
 - 2b. Usually trees, 3-8 m tall; flowers 5-6 mm long ...3. *A. monadelphum*

1. **Archidendron clypearia** (Jack.) Nielsen in *Adansonia* 2, 19: 15. 1979. *Inga clypearia* Jack., *Malay. Misc* 2: 78. 1822. *Pithecolobium clypearia* (Jack.) Benth. in Hook. *London J. Bot.* 3: 298. 1844; Baker in Hook. *f.*, *Fl. Brit. India* 2: 305. 1878; *Pithecolobium montanum* Benth. in Hook., *London J. Bot.* 3: 209. 1844; Baker in Hook. *f.*, *Fl. Brit. India* 2: 305. 1878; Kanjilal *et al.*, *Fl. Assam* 2: 173. 1938; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 92. 1938. *Pithecolobium angulatum* Benth. in Hook., *London J. Bot.* 3: 234. 1844; Baker in Hook. *f.*, *Fl. Brit. India* 2: 306. 1878; Kanjilal *et al.*, *Fl. Assam* 2: 172. 1938; C. E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 92. 1938. *Pithecolobium subcoriaceum* Thw., *Enum. Pl. Zeyl.* 100. 1865; Baker in Hook. *f.*, *Fl. Brit. India* 2: 305. 1878. *Aburema clypearia* (Jack.) Kosterm. in *Bull. Org. Natur. Ord. Indonesia* 20: 42. 1954; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 33. 1987. *Ardahpui Ardah*, *Ardathi* (Lushai); *Awhmangbeupathang*, *Awonabynpa* (Lakher).
Fig. 112.

Small-medium trees, 5-15 m tall with more or less horizontal branching; branchlets sharply angulate; bark dark brown or grey with thin, transverse, lenticular lines. Leaves stipulate, bipinnate with 2-12 pairs of pinnae; common rachis 7-20 cm long, puberulous or glabrous with a large gland near base and at each node; leaflets very variable, 5-12 pairs, gradually larger towards tip, ovate, obovate, trapezoid or rhomboid, 2-15 x 1-5 cm, base more or less cuneate or rounded, obtuse or acute at apex, subcoriaceous, ± puberulous. Heads 1-1.5 cm across, in terminal panicles; panicles with densely pubescent, erecto-patent sulcate branches; bracteoles glandular, minute; flowers yellowish or greenish or greenish-white, 0.5-0.6 cm across; calyx campanulate, puberulous, teeth acute; petals puberulous outside. Pods 10-20 x 1-1.5 cm, spirally twisted, red or yellow outside, sinuate along ventral suture, red within, 8-10-seeded; seeds ellipsoid, 7-10 x 6-9 mm.

Fl. & Fr.: February-December.

Common, in lower hill forests. Thenzawl, 1000 m, *Parry* 428 (CAL); Chapi, 1300 m, *Parry* 499 (CAL); *Lorrain* 27 *s.loc.*: Bunglang, *Deb* 31444; Saiha-Bualpui, *Dutta* 33833; Kolasib- Buileng, 750 m, *D.K. Singh* 93144; South Vanlaiphai, *K.P. Singh*, 96863; Champhai area, *Dutta* 88485.

Uses : Leaves used for dyeing cotton black.

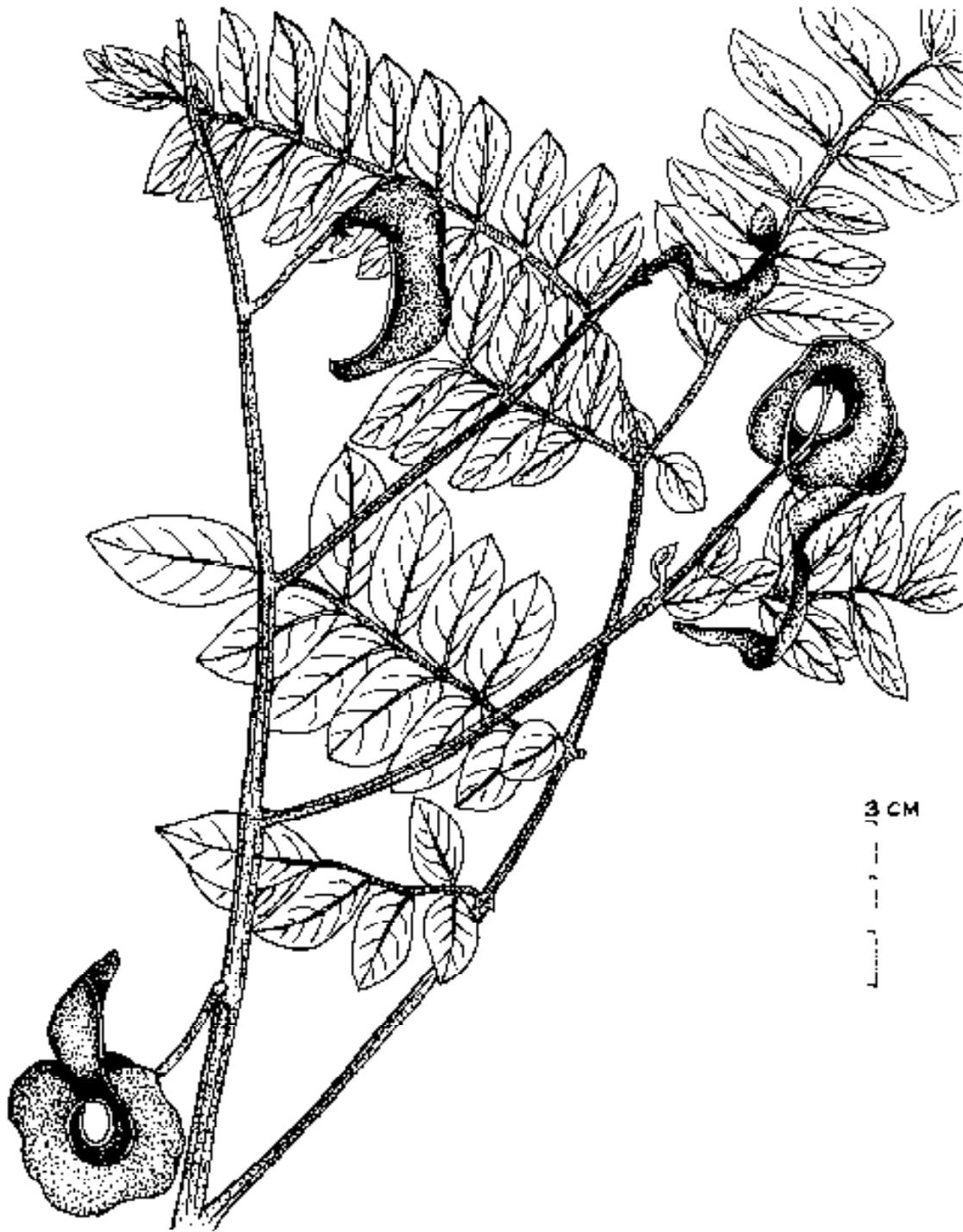


Fig. 112: Archidendron clypearia (Jack.) Nielsen

2. **Archidendron glomeriflorum** (Kurz) Nielsen in *Adansonia* 2, 19: 19, 1979. *Albizia glomeriflora* Kurz in *J. As. Soc. Bengal* 42: 74, 1873; Baker in *Hook. f., Fl. Brit. India* 2: 300, 1878. *Pithecolobium glomeriflorum* (Kurz) Kurz, *For. Fl. Brit. Burma* 1: 430, 1877; Kanjilal *et al.*, *Fl. Assam* 2: 171, 1938; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 36, 1987.

Small shrubs, or rarely small trees, 0.6-1.5 m high; young shoots puberulous; branchlets terete or slightly angulate. Leaves abruptly bipinnate with a single pair of pinnae; pinnae unijugate, 2.5-4 cm long; leaflets 2-3 pairs, obliquely oblong or rhomboid-lanceolate, 2.5-8 x 1-3.5 cm, chartaceous, acuminate at apex, more or less glabrous above, glaucescent beneath, densely pubescent on midrib and nerves. Heads solitary or clustered into axillary racemes and terminal panicles; flowers greenish white, 0.6-1.25 cm long; calyx pubescent; corolla deeply lobed, pubescent. Pods spirally twisted, 15-25 x 1.5-2.5 cm, reddish brown, 5-10-seeded; seeds ellipsoid-oblong, 10-13 x 10 mm, dark brown-blackish, crumpled at surface.

Fl. & Fr.: March-January.

Sialsuk, Deb 30769; North Vanlaiphai, D.K. Singh 99219.

3. **Archidendron monadelphum** (Roxb.) Nielsen in *Adansonia* 2, 19: 21, 1979. *Mimosa monadelpa* Roxb., *Fl. Ind.* 2: 544, 1832. *Pithecolobium bigeminum auct. non* (L.) Mart; Benth. in *Hook., London J. Bot.* 3: 306, 1844; Baker in *Hook. f., Fl. Brit. India* 2: 303, 1878; Kanjilal *et al.*, *Fl. Assam* 2: 170, 1938; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 92, 1938. *Pithecolobium monadelphum* (Roxb.) Kosterm. in *Reinwardtia* 3: 11, 1, 1954; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 36, 1987. *Ardahte* (Lushai).

Small-medium trees, 3-8 m tall; branchlets rounded or terete, brown pubescent; bark grey-pale brown, warty with lenticels; young parts and inflorescence brown pubescent. Leaf rachis 2.5-10 cm long, stout with a raised gland below the lowest pair of pinnae and usually one at the base of each pair of pinnae and leaflets; pinnae 1-2 pairs, 5-12 cm long; leaflets 1-3 pairs on lower pinnae, up to 4 pairs on terminal pinnae, elliptic, oblong-lanceolate or oblanceolate, 3.5-15 x 2-5 cm, acute-obtuse at base, acute or short acuminate at apex, subcoriaceous, glabrous above. Heads 6-10-flowered, in axillary and terminal panicles; flowers 5-6 mm long, creamy

white; calyx brownish, subcampanulate, pubescent, teeth acute; corolla pubescent outside, deeply cleft. Pods once or twice spirally twisted, 7-15 x 1.2-1.8 cm, dehiscing along ventral suture, slightly pubescent, 6-8-seeded; seeds; black, 0.1-1.3 x 0.6-1 cm.

Fl. & Fr.: February-December.

Lushai hills, *Parry s.num.*; Tawipui-Thengfal. *Dutta* 33675.

4. CALLIANDRA Benth.

Calliandra umbrosa (Wallich) Benth. in Trans. Linn. Soc. 30: 537. 1875; Baker in Hook. *f.*, Fl. Brit. India 2: 302. 1878; Kanjilal *et al.*, Fl. Assam 2: 174. 1938. *Inga umbrosa* Wallich, Pl. Asiat. Rar. 2: 23, t. 124. 1831. *Paipui*, *Seng-Ma-Tawk* (Lushai).

Small trees, up to 10 m tall with lenticellate branches. Leaves bipinnate; common petiole 2-3 cm long; stipules spinescent; pinnae one pair, 2-6 cm long with a gland between them; leaflets one pair, terminal, oblong-elliptic, lanceolate, 3-6 x 2-2.5 cm, base oblique, acuminate at apex, glabrous, subcoriaceous; lateral nerves 5-10 pairs; petiolules *ca* 2 mm long with a gland between each pair. Heads globose, 6-8 mm across, on 1-2.2 cm long peduncles; peduncles clustered together on stems or rarely axillary; flowers white or creamy white, sessile, 0.2-0.4 cm across. Pods flat, 8-12 x 2-2.5 cm, 4-9-seeded; seeds compressed.

Fl. & Fr.: January-August.

Not much common. Sairang road, 900 m, *G.K. Deka s.num.*

5. ENTADA Adans

Entada rheedel Spreng., Syst. Veg. 2: 325. 1825. *ssp. rheedelii*. *Entada pursaetha* DC., Prodr. 2: 425. 1825. *Entada scandens auct. non* Benth., 1841; Baker, in Hook. *f.*, Fl. Brit. India 2: 287. 1878; Kanjilal *et al.*, Fl. Assam 2: 149. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 92. 1938. *Entada phaseoloides* (L.) Merr. in Philippine J. Sci. Bot. 9: 86. 1914. *Koy*, *Kawi* (Lushai); *Seuleu* (Lakher).

Gigantic lianas with angled, twisted stems; bark brownish grey or black; branchlets and inflorescence brown tomentose. Leaves bipinnate; rachis

ending into two deciduous tendrils; stipules small, bristle like; pinnae 2 pairs, 5-12.5 cm long; leaflets 2-5 pairs, oblong-obovate or obovate-lanceolate, 2.5-8 x 1.5-4 cm, base oblique, acute or cuneate, obtuse or shortly acuminate at apex, glabrous, dark green shining above, coriaceous. Spikes peduncled, 12-20 cm long, usually in axillary panicles; bracts minute, linear; flowers 0.25-0.3 cm long, greenish to pale yellow or white; calyx campanulate, tomentose outside, teeth 5; petals 5, oblong-lanceolate. Pods oblong-falcate, 30-90 x 7-10 cm; sinuate between seeds, lignose, compressed; seeds discoid, 3.5-5 cm across, lenticular, shining brown.

Fl. & Fr.: March-April (next year).

Common, in tropical deciduous and evergreen forests. Helio Hill, Lungleh, 1200 m, *Gage* 90 (CAL); Sathual, *Leslie* 147 (CAL).

6. LEUCAENA Benth.

Leucaena latisiliqua (L.) Gillis in *Taxon* 23: 190. 1974. *Mimosa latisiliqua* L., *Sp. Pl.* 519. 1753. *Leucaena leucocephala* (Lam.) De Wit. in *Taxon* 10: 54. 1961. *Leucaena glauca* Benth. in Hook., *London J. Bot.* 4: 416. 1845; Baker in Hook. *f.*, *Fl. Brit. India* 2: 290. 1878. *Zawngtahte*, *Vang* (Lushai); *Hugiteidawi*, *Sigonzat*, *Sakuagas* (Chakma).

Low, erect shrubs or small trees, without spines; bark brown, warty, more or less striate. Leaves bipinnate; leaf rachis up to 15 cm long with a oblong cupular gland towards base; pinnae 4-8 pairs, 5-8 cm long; leaflets 10-15 pairs, linear-oblong, or obovate, 5-12 x 2-3 mm, base oblique, acute at apex, membranous, glaucous. Heads 1-2 together, dense, short peduncled, axillary, 1.2-1.8 cm across; flowers white; calyx tubular-campanulate, teeth short; petals oblong, valvate, free, pubescent. Pods straight, glabrous, strap-shaped with acute apex, borne on stalks up to 3 cm long, 10-15 x 0.5-1.2 cm, coriaceous, 15-20-seeded; seeds brown, glossy.

Fl. & Fr.: October-April.

Nunswari (near Tlabung), *K.P. Singh* 94278; Tablabagh, *K.P. Singh* 94283.

Uses : Fruits eaten raw or as chatni.

7. MIMOSA L.

Mimosa pudica L., Sp. Pl. 518. 1753; Baker in Hook. f., Fl. Brit. India 2: 291. 1878; Kanjilal *et al.*, Fl. Assam 2: 152. 1938. *Hlonuar* (Lushai).

Decumbent straggling shrubs or prickly subshrubby herbs, 0.3-1.5 m high, bristly hairs of branchlets and petioles deflexed, those on the rachis ascending. Leaves sensitive, bipinnate; pinnae 2-4, digitate, 2.5-9 cm long; rachis 2-3 cm long; stipules linear-lanceolate with bristly ciliate margins; leaflets 12-20 pairs, oblong, 0.5-1.5 x 0.1-0.3 cm, obliquely rounded at base, subobtusate or acute at apex, margin ciliate with bristles, adpressed bristly beneath. Heads 1-4 fascioled, axillary, 1-1.5 cm across; flowers pink or bluish purple. Pods linear-oblong, constricted, 4-12, developing from each head, 1.5-2.5 x 0.3-0.4 cm with weak bristles on sutures, 3-5-seeded; seeds compressed, ovoid, ca 3 mm, brown.

Fl. & Fr.: May-December.

Thenzawl, *K.P. Singh* 93840; Tlabung, *K.P. Singh* 94260.

Uses : Dried leaf is smoked as cigarette to expel tooth worms. Decoction of whole plant is given for kidney trouble.

8. PARKIA R. Br.

Parkia timoriana (DC.) Merr., Philippine J. Sci. Bot. 5: 33. 1910. *Inga timoriana* DC., Prodr. 2: 422. 1825. *Parkia roxburghii* G. Don, Gen. Syst. 2: 397. 1832; Baker in Hook. f., Fl. Brit. India 2: 289. 1878; Kanjilal *et al.*, Fl. Assam 2: 151. 1938. *Zawngtah, Zongto* (Lushai).

Medium-large, unarmed trees, 12-20 m tall; branches spreading, pubescent; bark light grey or whitish brown; branchlets having raised lenticels. Leaves bipinnate; leaf rachis 30-60 cm long, puberulous or glabrescent with a solitary gland near base; pinnae 8-30 pairs, opposite, 6-10 cm long; leaflets 40-80 pairs, closely set, linear-ligulate or oblique-oblong, 0.4-0.6 x 0.1-0.3 cm, unequally truncate at base, acute at apex, margins puberulous. Heads turbinate-clavate, 4-6 x 1.5-3 cm, on 30-45 cm long peduncles; bracts spatulate, silky pubescent outside; flowers sessile, dull white or yellow, fragrant, tubular, up to 1.5 cm long; calyx

tubular, ca 10 mm long, 5-cleft, teeth tomentose-glabrous; petals subvalvate. Pods flat, slightly twisted, 25-45 x 2.5-4 cm, dark brown.

Fl. & Fr.: September-May.

Cultivated throughout the state. Kolasib-Bukpui, 800 m, *D.K. Singh* 93028; Sialsuk road in upper Thenzawl area, *K.P. Singh* 93902.

Uses : Tender fruits are eaten as vegetable.

CULTIVATED TAXA

*Mimosa invis*a C. Martius *ex* Colla., *Herb. Pedom.* 2: 255. 1834.,
Schrankia brachycarpa Benth. in Hook., *J. London Bot.* 2: 130. 1843.
Duhlo (Lushai).

A native of tropical America, cultivated.

Uses : Roots used for curing calculus.

Recently J.H. Lalramnghinglova (*J. Econ. Tax. Bot. Addl. Ser.* 12: 452. 1996) recorded *Xylia xylocarpa* (Roxb.) Taub. from the state. The plant is of considerable ethno-medicinal significance.

ROSACEAE

(K.P. Singh)

1a. Ovary superior; carpels and fruits exposed:

2a. Herbs or small shrubs; carpels with single ovule only:

3a. Leaves paripinnate, style short ...4. *Potentilla*

3b. Leaves digitately 3-foliolate; style long, straight ...1. *Duchesnea*

2b. Prickly shrubs or unarmed trees; carpels with 2 ovules in each:

4a. Trees; calyx deciduous; carpels solitary ...5. *Prunus*

4b. Prickly shrubs; calyx persistent; carpels more than one ... 8. *Rubus*

1b. Ovary inferior; carpels and fruits enclosed in the fleshy hypanthium:

- 5a. Usually spiny shrubs or climbers; carpels many; fruits small, dry and free within the enlarged fleshy receptacle ...7. *Rosa*
- 5b. Unarmed trees; carpels 1-5; fruits fleshy and fused with fleshy enlarged calyx:
- 6a. Flowers in umbels, fascicles or corymbs; styles 4-56. *Persea*
- 6b. Flowers in racemes or panicles; styles 2-3:
- 7a. Panicles white, woolly to glabrous, not rusty; carpels partially connate; fruits drupaceous, hard ...3. *Photinia*
- 7b. Panicles rusty tomentose; carpels wholly connate; fruits baccate2. *Eriobotrya*

1. DUCHESNEA Smith

Duchesnea indica (Andrews) Focke in Engl. & Prantl., Nat. Pflanzenfam. III. 3: 33. 1888. *Fragaria indica* Andrews, Bot. Rep. t. 479. 1807; Hook. f., Fl. Brit. India 2: 343. 1878; Kanjilal *et al.*, Fl. Assam 2: 203. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 92. 1938. *Potentilla indica* (Andrews) Wolf, Synop., der Mitt. Fl. 6: 661. 1904; Dixit & Panigr., Rosaceae India 4: 133. 1988. *Vaitheihmu* (Lushai). **Fig. 113.**

Silky prostrate pubescent herbs. Leaves digitately 3-foliolate; leaflets obovate, 0.8-3.0 x 0.7-1.5 cm, base cuneate, obtuse at apex, crenate at margins; whitish pilose on both surfaces; petioles 4-7 cm long; petiolules small; stipules leafy, adnate to petioles. Flowers solitary on axillary peduncles, 8-10 mm across; calyx persistent; lobes ovate, 3-5 mm long; petals yellow, obovate. Achenes black, small, oblong, 0.8-1.5 cm across, resting on shiny red conical or subglobose receptacles.

Fl. & Fr.: Throughout the year.

Common, in moist and shady places. Kawnpui-Lungdai, *D.K. Singh* 93038; Jawbawk, *K.P. Singh* 94242; Aizawl, *M. Sawmliana* 95535.

2. ERIBOTRYA Lindley

Eriobotrya bengalensis Hook. f., Fl. Brit. India 2: 371. 1878; Kanjilal *et al.*, Fl. Assam 2: 213. 1938. *Nahalchun* (Lushai). **Fig. 114.**

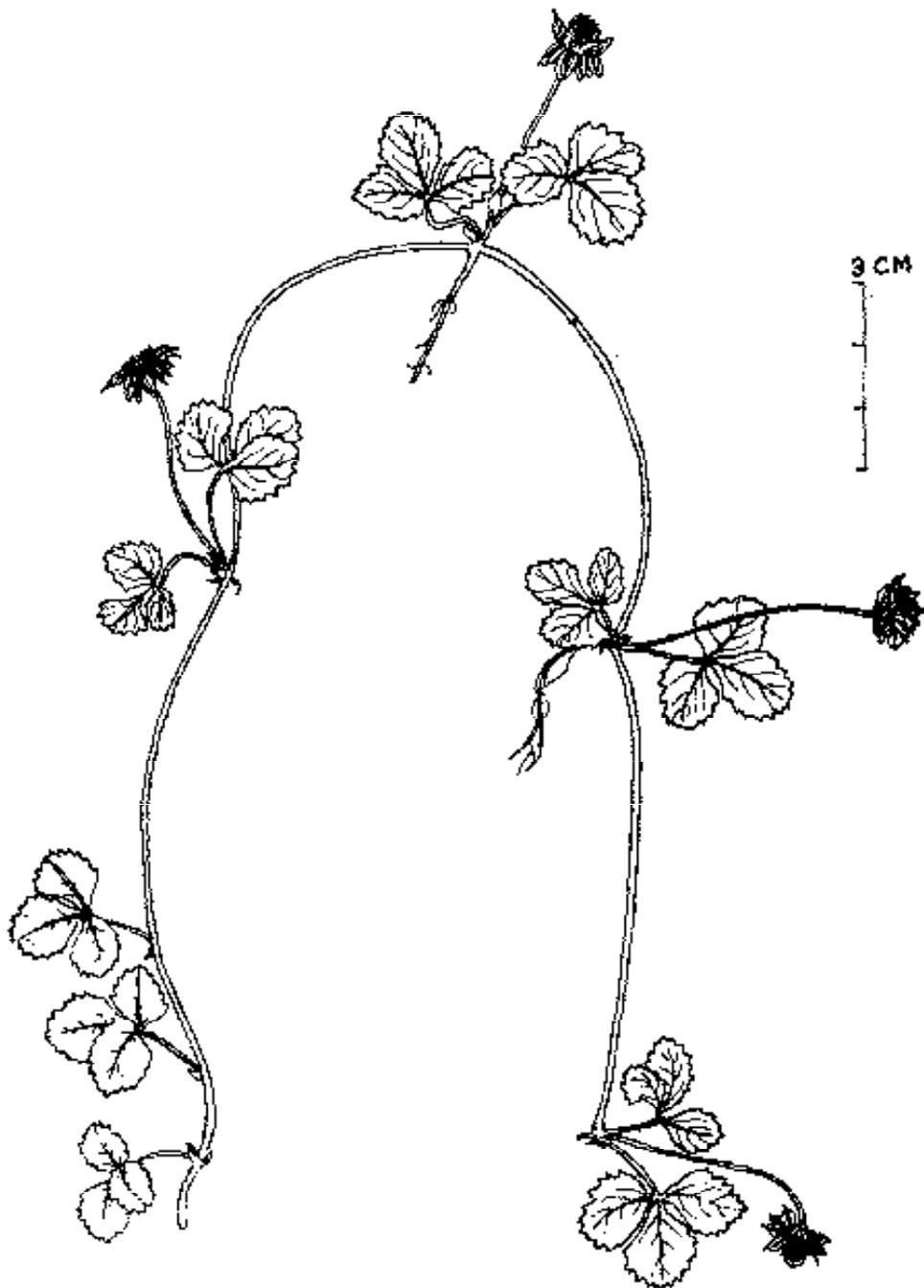


Fig. 113: *Duchesnea indica* (Andrews) Focke



Fig. 114; *Eriobotrya bengalensis* Hook. f.

Trees, up to 25 m tall with young parts brown tomentose. Leaves elliptic or lanceolate, 10-18 x 5-7 cm, base cuneate or attenuate, acuminate at apex, coarsely serrate along margins, coriaceous, glabrous above, slightly puberulous along the nerves beneath; lateral nerves 8-15 pairs; petioles 3-5 cm long. Panicles 8-10 cm long, terminal; flowers ca 1 cm across, white, fragrant; calyx densely pubescent, obconic; petals obovate, 4-5 mm long; ovary hairy; styles 2-3. Pomes ovoid, 1.5-2 x ca 1 cm, glabrous.

Fl. & Fr.: September-April.

S.loc., *Parry s.num.* (CAL); 15 miles S.E. of Lungleh, 900-1200 m, *Gage 155* (CAL); *Theiriat, Deb 31019, 31352* (ASSAM, CAL); *Tuchang, K.P. Singh 94500; Mualpheng, M. Sawmliana 97177.*

3. PHOTINIA Lindl.

Photinia integrifolia Lindl. in *Trans. Linn. Soc. London* 13: 103. 1821; *Hook. f., Fl. Brit. India* 2: 331. 1878; *Kanjilal et al., Fl. Assam* 2: 22. 1938; *C.E.C. Fischer in Rec. Bot. Surv. India* 12(2): 92. 1938.

Evergreen trees, 12-20 m tall with glabrous branches. Leaves elliptic or oblanceolate, 7-14 x 4-7.5 cm, base cuneate, obliquely acuminate at apex; undulate along margins; lateral nerves 8-15 pairs; petioles erect, 10-20 mm long, channelled, base swollen; stipules subulate. Flowers 5-8 mm across, in terminal corymbose panicles, yellowish-white; bracts tricuspidate, woolly; calyx lobes triangular-ovate; petals orbicular. Drupes subglobose, ca 1 cm in diam., yellow to reddish-brown, turning purplish-brown when ripe.

Fl. & Fr.: February-November.

Phongpui, Parry 532 (fide C.E.C. Fischer, l.c.).

4. POTENTILLA L.

- | | |
|---------------------------------------------|----------------------------|
| 1a. Leaves interruptedly imparipinnate | ...2. <i>P. lineata</i> |
| 1b. Leaves digitately 3-5-foliolate: | |
| 2a. Leaflets 15-25 x 10-17 mm, base rounded | ...1. <i>P. gerardiana</i> |
| 2b. Leaflets 4-24 x 3-12 mm, base attenuate | ...3. <i>P. sundaica</i> |

1. *Potentilla gerardiana* Lindl. ex Lehm., Nov. et min. Cogni. Stirp. pugil. 3: 23. 1821. *Potentilla fragarioides* sensu Hooker, f., Fl. Brit. India 2: 350. 1878, excl var. *stolonifera* (Lehm. ex Ledek) Maxim., non L., 1753; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 92. 1938.

Rosette herbs with perennial rootstock, whitish, pilose throughout. Leaves 3-5(-7)-foliolate; upper leaflets obovate-elliptic, 1.5-2.5 x 1-1.7 cm, rounded at base, obtuse at apex, serrate or crenate along margins, minor leaflets 4-7 mm long, leaflets lobed but never pinnatisect; petioles 3-12 cm long, pilose. Flowers 3-6 in loose cymes; calyx lobes ovate, pilose; petals obovate, yellow. Achenes ca 1.5 mm across, glabrous.

Fl. & Fr.: February-May.

Champhai, 1500 m, Parry 187 (fide C.E.C. Fischer, l.c.).

2. *Potentilla lineata* Trevir. ex Reich., Iconogr. Bot. Cent. 1: 7, tab 8, 1824. *Potentilla fulgens* Wallich. ex Lehm. in Acad. Caesa. Leop.-Carol. 23, Supp: 54. 1856; Hook. f., Fl. Brit. India 2: 349. 1878; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 93. 1938; Kanjilal *et al.*, Fl. Assam 2: 204. 1938.

Small, prostrate, erect herbs, up to 1 m high; stems, inflorescence, leaf rachis hairy. Leaves interruptedly imparipinnate, 5-13 cm long; lateral leaflets 4-8 pairs, elliptic or obovate, 0.7-4 x 0.5-2 cm, base rounded, obtuse at apex, serrate along margins, underside silvery white, pubescent; stipules foliaceous, membranous. Flowers yellow, 5-10 mm across, in terminal corymbose panicles; calyx lobes with long spreading hairs; petals obovate, 5-7 mm long, glabrous. Achenes small, smooth on elevated receptacles, ovoid, ca 1 mm.

Fl. & Fr.: May- September.

Phongphui, 2100 m, Parry 570 (fide C.E.C. Fischer, l.c.).

3. *Potentilla sundaica* (Blume) Kuntze, Rev. Gen. 1: 219. 1891. *Fragaria sundaica* Blume, Bijdr. 17: 1106. 1826. *Potentilla kleiniana* Wight, Illustr. Ind. Pl. t. 85. 1831; Hook. f., Fl. Brit. India 2: 359. 1878; Kanjilal *et al.*, Fl. Assam 2: 204. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 93. 1938.

Rosetted herbs with spreading, prostrate, hairy stems, up to 50 cm long. Leaves digitately 3-5-foliolate; leaflets obovate, 0.6-2.4 x 0.3-1.2 cm, base cuneate, apex rounded, obtusely serrate along margins, underside thinly pubescent, ± glabrous above; petioles 2-8 cm long; stipules lanceolate, up to 1.5 cm long, entire or serrate; Flowers 2-5 in terminal cymes; petals yellow; Achenes small, ellipsoid-globose, ca 1 mm, glabrous, wrinkled.

Fl. & Fr.: January-July.

Tuipang, 1200 m, *Parry* 465, (*vide* C.E.C. Fischer, *l.c.*); North-Vanlaphai, *D.K. Singh* 99213.

5. PRUNUS L.

1a. Flowers 1-3, in clusters or fascicles :

2a. Calyx and ovary glabrous ... 1. *P. cerasoides*

2b. Calyx silky tomentose; ovary tomentose ... 3. *P. persica*

1b. Flowers in racemes :

3a. Leaves evergreen, usually entire along margins;
racemes leafless at base ... 4. *P. indulara*

3b. Leaves deciduous, serrate along margins;
racemes leafy at base ... 2. *P. napaulensis*

1. *Prunus cerasoides* D. Don, Prodr. Fl. Nep. 239. 1825; Kanjilal *et al.*, Fl. Assam 2: 180. 1938; *Prunus puddum* (Roxb. ex Ser.) Brandis, For. Fl. Brit. Ind. 194. 1874 *non* Miq., 1855, *nom. illegit.*; Hook. f., Fl. Brit. India 2: 314. 1878; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 93. 1938. *Paivum*, *Tlaizong* (Lushai).

Medium sized, deciduous trees, up to 20 m tall. Leaves ovate-lanceolate or elliptic, 5-11 x 3-4 cm, base rounded or cuneate, acuminate at apex, serrate along margins, glabrous on both surfaces; petioles 1-2 cm long, 4-5-glandular; stipules linear-lanceolate. Flowers 1-3 in corymbs or fascicles, 2.5-3.5 cm across, surrounded at base by three brown, leafy bracts, fading to white; calyx greenish, glabrous, campanulate; petals obovate, spreading. Drupes ellipsoid, 5-8 x 4-6 mm; stone pitted, yellow, often tinged with red.

Fl. & Fr.: October-June.

Sherkor, 900 m. *Parry* 103 (*vide* C.E.C. Fischer, *l.c.*); North-Vanlaiphai, 1500 m, *Parry* 520 (*vide* C.E.C. Fischer, *l.c.*); Aizawl, *Deb* 30633.

2. ***Prunus napaulensis*** (Ser.) Steud., *Nom. Bot.* ed. 2, 2: 403, 1841; *Hook. f.*, *Fl. Brit. India* 2: 316. 1878 *p.p.* ('*nepalensis*'); *Kanjilal et al.*, *Fl. Assam* 2: 178. 1938. *Cerasus napaulensis* Ser. in DC., *Prodr.* 2: 540. 1825.

Medium sized, deciduous trees, 15-20 m tall. Leaves simple, oblong-lanceolate, lanceolate, 6-10 x 2-5 cm, base rounded or acute, acuminate at apex, finely serrate along margins, subcoriaceous, glabrous above, glaucous beneath, finely reticulated; petioles 0.5-1.5 cm long. Racemes 7-10 cm long, axillary; flowers white, 7-8 mm across; calyx turbinate, grey-pubescent, *ca* 4 mm long; petals broadly ovate, *ca* 3 mm long. Drupes globose, 1.5-2 cm across, fleshy; stone smooths.

Fl.: October-November; *Fr.*: August-September.

In primary forests. Mualpheng, *M. Sawmliana* 95573.

Uses : Fruits edible.

3. ***Prunus persica*** (L.) Batsch., *Beytr. & Entw. Pragm. Gesch. Nat-Reiche* 1: 30. 1801; *Hook. f.*, *Fl. Brit. India* 2: 313. 1878; *Kanjilal et al.*, *Fl. Assam* 2: 182. 1938; *Deb & Dutta* in *J. Econ. Tax. Bot.* 10(1): 36. 1987. *Amygdalus persica* L., *Sp. Pl.* 472. 1753.

Shrubs or moderate sized deciduous trees, up to 8 m tall. Leaves narrowly lanceolate to broadly oblanceolate, 8-14 x 3-5 cm, base rounded, acuminate, serrate to serrulate along margins, glabrous at length, puberulous on mid rib beneath; petioles 6-10 mm long, 2-4 glandular near apex; stipules subulate, fimbriate. Flowers pink to white, axillary, solitary or fascicled, 2-2.5 cm across, \pm concealed by bud scales; calyx lobes oblong, silky tomentose outside; petals, obovate, pink. Drupes elliptic-ovoid, 3-6 cm long, succulent, velutinous with red tinged; pyrenes elliptic, rugose, irregularly furrowed and pitted, 3-4 x 2-3 cm.

Fl. & Fr.: January-June.

Kawnpui, *K.P. Singh* 97000.

Uses : Fruits are edible.

4. *Prunus undulata* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal 239. 1825, *Prunus acuminata* (Wallich) D. Dietr., Syn. 3: 42. 1843; Hook. f., Fl. Brit. India 2: 317. 1878; Kanjilal *et al.*, Fl. Assam 2: 181. 1938. *Thei-Ar-Lung* (Lushai). **Fig. 115.**

Evergreen shrubs or small trees, 6-14 m tall with slender branches. Leaves simple, alternate, lanceolate, elliptic-lanceolate, 8-14 x 2-4 cm, base cuneate, long acuminate at apex, usually entire to serrate along margins, glabrous above, undersurface paler with minute black glands; lateral nerves 6-8 pairs; petioles 4-5 mm long. Racemes solitary or in fascicles of 2-3, axillary, rachis 5-8 cm long, glabrous; flowers scented, creamy white, 0.7-1 cm across; calyx ca 1 mm long, broadly triangular pubescent; petals elliptic, ca 2 mm long. Drupes ovoid-ellipsoid, 10-18 x 5-10 mm, fleshy, pointed at apex, purplish black, glabrous; stones smooth.

Fl. & Fr.: October-June.

Frequent, in primary forests. Keifang, *M. Sawmliana* 99259; Mualpheng, 500-1300 m, *M. Sawmliana* 101736.

6. PYRUS L.

Pyrus pashia Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 236. 1825; Hook. f., Fl. Brit. India 2: 374. 1878; Kanjilal *et al.*, Fl. Assam 2: 216. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 93. 1938. *Chalthei* (Lushai).

Medium sized trees, 5-15 m tall; young parts woolly. Leaves ovate or lanceolate, 3.5-6 x 2.5-3 cm, base rounded or shallowly cordate, acuminate at apex, serrulate along margins, sparsely white pubescent at first, glabrous beneath when mature; petioles 2-2.5 cm long; stipules subulate, adnate to petiole in lower half. Flowers in axillary or terminal, 3-8-flowered umbels, 1.5-2 cm across; calyx ovate, brownish-tomentose within; petals white, obovate. Pomes solitary or in twos, ellipsoid, 2-3.5 cm long, glabrous, with white specks, depressed at tip, dark brown when ripe.

Fl. & Fr.: March-January.

Aizawl, 900 m, *Parry* 676 (*vide* C.E.C. Fischer, *l.c.*); Zotethlang, *K.P. Singh* 92821; Champhai, *Deb* 38152, 30952.



Fig. 115: *Prunus undulata* Buch.-Ham. ex D.Don

Uses : Fruits are edible.

7. ROSA L.

- 1a. Flowers solitary, deep red; styles free1. *R. chinensis* var. *semperflorens*
 1b. Flowers in corymbose clusters, white;
 styles united into a column
- 2a. Prickles scattered; petioles and inflorescence
 glandular; styles pubescent2. *R. longicuspis*
 2b. Prickles usually intra-stipular; petioles and
 inflorescence eglandular; styles glabrous3. *R. multiflora*

1. ***Rosa chinensis* Jacq. var. *semperflorens* (Curtis) Koehne**,
 Deutsch, Dendrol.: 281. 1893. *R. semperflorens* Curtis's Bot. Mag. 7: t.
 284. 1794.

Erect shrubs, up to 2-3 m; branches slender, with a few scattered hooked prickles or sometimes unarmed. Leaflets 3-5, ovate-lanceolate, purple 3-4.5 x 1.5-3 cm, base cuneate, acuminate at apex, serrate along margins, coriaceous; stipules flat, glandular; petioles with glandular bristles and hooked prickles, glabrous. Flowers solitary deep red ca 5 cm across; pedicels glandular bristly; hypanthia globular, glabrous; sepals ovate, ca 2-4 mm; petals 2.5-3 x 2.5 cm, flat; stamens many; styles many, exserted. Fruits spherical, ca 15 x 14 mm.

Fl. & Fr.: August-November.

Commonly cultivated. Bunglang Deb 31419; 31420.

2. ***Rosa longicuspis* Bertol.** in Mem Acad. Sci. Bologna 11: 201, t. 13 (Misc. Bot. 21: 15, t. 3). 1861; Hook f., Fl. Brit. India 2: 367. 1878; Kanjilal *et al.*, Fl. Assam 2: 208. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 93. 1938.

Sarmentose, evergreen, climbing shrubs; branches armed with curved prickles. Leaves imparipinnate, 10-15 cm long; leaflets 5-7, oblong-lanceolate, 3-7 x 2-3.5 cm, base rounded, acuminate at apex dentate-serrate along margins, coriaceous, glabrous on both surfaces; petioles glandular and prickly; petiolules short; stipules oblong, glandular, ciliate. Flowers in many-flowered corymbs, white, fragrant, 3-4.5 cm across;

hypanthia obovoid, bristly glandular, tomentose; sepals 2-0.6 cm, tomentose, bristly glandular outside; petals obovate, ca 2 cm long; silky pubescent outside; styles united into a column, pubescent. Fruits subglobose-obovoid, 1-1.4 x 1.2 cm, yellowish-brown to red when ripe.

Fl. & Fr.: April-November.

Phongpui, 2000 m, Parry 139 (*vide* C.E.C. Fischer, *l.c.*); *s.loc.*, *s.num.*, Parry (CAL); Blue Mountain, Mao 107161.

3. *Rosa multiflora* Thunb. in Fl. Japan: 214. 1784; Hook. *f.*, Fl. Brit. India 2: 364. 1878; Kanjilal *et al.*, Fl. Assam 2: 210. 1938.

Climbing, prickly shrubs, 5-7 m high; prickles usually curved; leaflets 7-9, elliptic, upper most pair larger, 2-3.5 x 1-1.5 cm, basal pair smallest, sessile, base rounded, acute at apex, serrate along margins, minutely hairy above, pubescent beneath; petioles and inflorescence eglandular. Flowers in thyrsiform corymbs, 1.5-2 cm across; bracts with dentate margins, eglandular, hairy; hypathium obovoid, eglandular outside, slightly pubescent; sepals 5, ca 1 cm long, pubescent; petals obovate, ca 1.5 cm long; styles connate into a column, glabrous.

Fl. & Fr.: June-July.

Lungleh-Sairep, Dutta 33515.

8. RUBUS L.

1a. Leaves simple, usually palmately lobed or not lobed:

2a. Leaves palmately lobed:

3a. Stems and branches appressed tomentose;
bracts and stipules appressed villous or hairy;
leaf lobes rounded

... 11. *R. rugosus*

3b. Stems and branches patent hairy;
stipules and bracts erecto-patent hairy;
leaf lobes otherwise :

4a. Stems and petioles glandular bristly

... 12. *R. treutleri*

4b. Stems and petioles eglandular :

- 5a. Leaf lobes 3-7, subacute; underside grey tomentose; calyx lobes lanceolate, patently hairy ... 2. *R. alceifolius*
- 5b. Leaf lobes 5, acute; underside pale-brownish tomentose; calyx lobes subacute, silky tomentose but not patently hairy ... 4. *R. himanicus*
- 2b. Leaves not lobed, almost entire :
- 6a. Branches with soft hairs; leaves white pubescent beneath ... 3. *R. assamensis*
- 6b. Branches glabrous; leaves glabrous, not white pubescent on nerves beneath:
- 7a. Flowers in panicles, sessile; bracts linear-oblong, serrate; calyx densely tomentose ... 6. *R. griffithii*
- 7b. Flowers in corymbs, pedicellate; bracts setaceous, glandular; calyx glabrous with pubescent margins ... 1. *R. acuminatus*
- 1b. Leaves pinnately compound:
- 8a. Leaves 5-7-foliolate ... 9. *R. niveus*
- 8b. Leaves 3- or 3-5-foliolate:
- 9a. Leaflets 3-foliolate:
- 10a. Leaflets glabrous on both surfaces ... 8. *R. lucens*
- 10b. Leaflets tomentose beneath :
- 11a. Leaflets ovate, acuminate at apex; white tomentose beneath; flowers pink ... 7. *R. hypargyrus* var. *niveus*
- 11b. Leaflets elliptic or orbicular obtuse at apex, grey tomentose beneath; flowers white ... 5. *R. ellipticus*
- 9b. Leaflets 3-5-foliolate ... 10. *R. rosifolius*

1. *Rubus acuminatus* Smith in Rees, Cyclop. 30: Rubus n.43. 1819; Hook. f., Fl. Brit. India 2: 327. 1878; Kanjilal *et al.*, Fl. Assam 2: 190. 1938; C.E.C. Fischer, Rec. Bot. Surv. India 12(2): 93. 1938. *Theihmu* (Lushai); *Seisah mangpa* (Lakher).

Large, climbing shrubs with glabrous branches; prickles small, curved, mostly on stems. Leaves ovate or ovate-lanceolate, 8-15 x 2-7 cm, base

rounded, caudate-acuminate at apex; serrate along margins, reticulate below, glabrous at maturity, pubescent only on veins beneath; petioles 1-1.5 cm long; stipules subulate. Flowers in short, 5-9 cm long, branched terminal corymbs or panicles, white, 0.5-1.2 cm across; panicles or corymbs 2-8-flowered; bracts subulate; calyx lobes triangular, entire, with pubescent margins; stamens mauve. Fruits of 5-8 large drupelets, scarlet-red, enclosed by calyx.

Fl. & Fr.: August-January.

Zongling, Parry 491 (*vide* C.E.C. Fischer, *l.c.*); *s.loc.*, Parry *s.num.* (CAL).

2. *Rubus alceifolius* Poir. in Lam., *Encycl.* 6: 247. 1804. *R. moluccanus* non L., 1753; Hook. *f.*, *Fl. Brit. India* 2: 330. 1878. *p.p.*; Kanjilal *et al.*, *Fl. Assam* 2: 194. 1938, *p.p.*

Subscandent shrubs; young shoots villous with erecto-patent long hairs; prickles curved or deflexed. Leaves ovate or suborbicular, 3-7-lobed, 5-10 x 3-12 cm; lobes ovate-triangular, acute at apex, closely serrate along margins, glabrous or glabrescent above; velvety grey tomentose beneath; palmately 5-nerved from base; stipules and bracts deeply lobed with erecto-patent hairs. Panicles up to 7 cm long, upper axillary or terminal, patently pilose; flowers *ca* 1.5 cm across, white; calyx lobes ovate, patently villous, 8-12 mm long; petals shorter or equalling the sepals. Fruits globose, 1-1.5 cm across, scarlet-red.

Fl. & Fr.: May-September.

Common, in open places, forest edges and bushes. Upper Thenzawl, K.P. Singh 93927; Serchip, D.K. Singh 93043; Jawbawk, K.P. Singh 94225.

3. *Rubus assamensis* Focke in Bremen, *Abhandl. Nat. Ver.* 4: 197. 1874; Hook. *f.*, *Fl. Brit. India* 2: 328. 1878; Kanjilal *et al.*, *Fl. Assam* 2: 192. 1938; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 93. 1938.

Fig. 116.

Large, bushy, straggling shrubs; young parts hairy; prickles recurved, small. Leaves simple, ovate-oblong or oblong, 5-10 x 3-4 cm, base subcordate, acuminate at apex, unequally toothed along margins, glabrescent

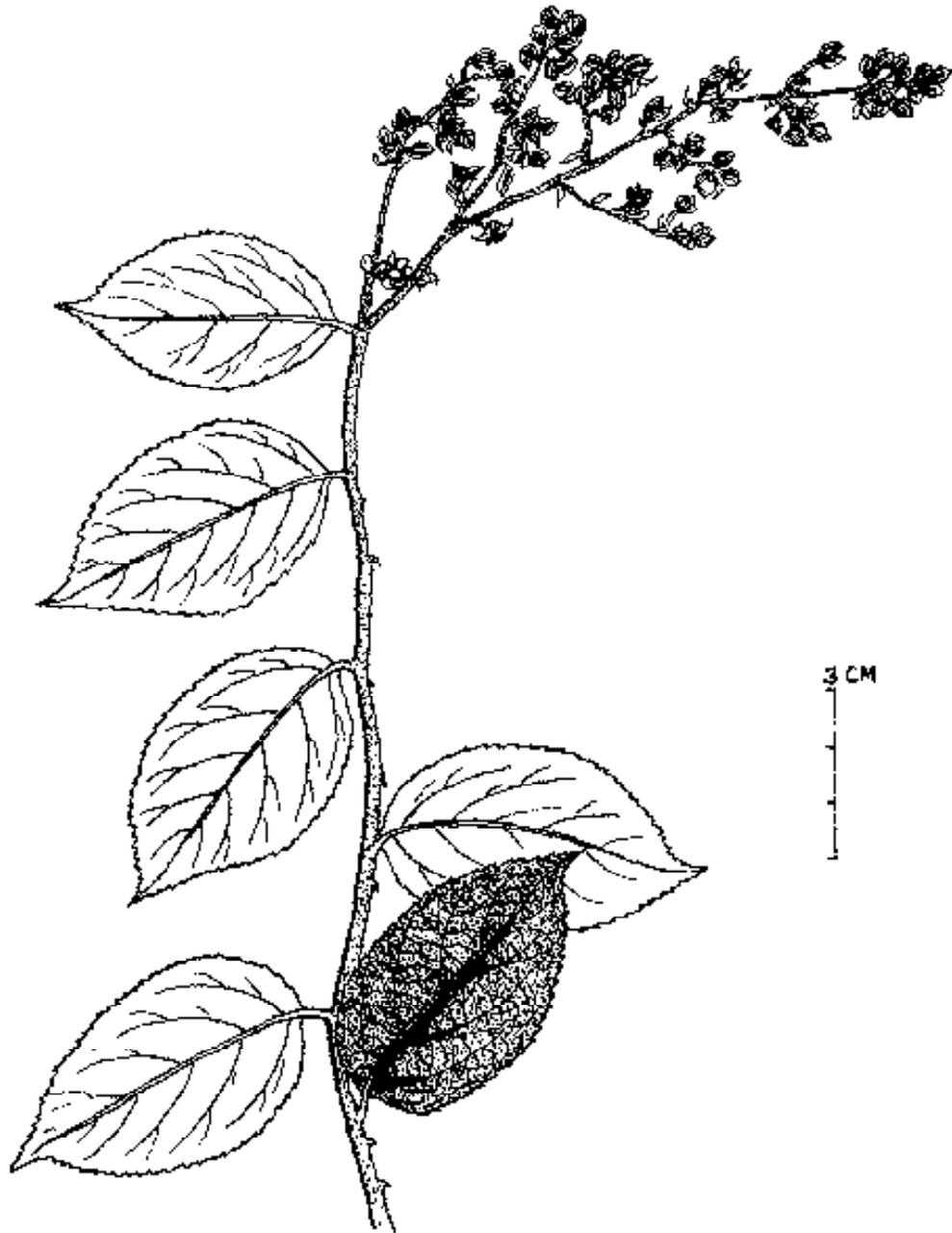


Fig. 116: *Rubus assamensis* Focke

above, white pubescent beneath, nerves covered with spreading hairs; lateral nerves 5-6 pairs; petioles 2-4 mm long, stipules pectinately lobed. Flowers 0.5-1.2 cm across, white, in conical, terminal, upto 20 cm long panicles; bracts subulate; calyx ovate with silky white hairs outside; petals absent. Fruits globose, 5-6 mm across.

Fl. & Fr.: April-August.

Scarce, in humid places. North Vantaiaphai. *D.K. Singh* 93070.

4. **Rubus birmanicus** Hook. f., *Fl. Brit. India* 2: 331. 1878; Kanjilal *et al.*, *Fl. Assam* 2: 196. 1938; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 93. 1938. *Saillinuchnu* (Lushai).

Straggling shrubs; branches bristly hairy; prickles hooked or straight with flattened base. Leaves palmately 5-lobed, base cordate, 5-nerved; 6-12 x 5-12 cm, lobes acute or acuminate at apex, hairy or glabrate above, pale brownish tomentose beneath; petioles 5-8 cm long; stipules and bracts divided into capillary segments. Flowers in large panicles, white; calyx lobes subacute, tomentose; petals orbicular, clawed; stamens and carpels many, glabrous; receptacle villous.

Fl. & Fr.: July-September.

Phongpui, *K.P. Singh* 96762, 96796.

5. **Rubus ellipticus** Smith in Rees, *Cyclop.* 30: Rubus no. 16. 1819; Hook. f., *Fl. Brit. India* 2: 336. 1878; Kanjilal *et al.*, *Fl. Assam* 2: 196. 1938; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 93. 1938. *Hmutau* (Lushai). **Fig. 117.**

Large, straggling, robust shrubs with angled pubescent stems and 3-6 mm long, scattered, deflexed prickles; bristles eglandular. Leaves pinnately 3-foliolate; leaflets broadly obovate, elliptic or orbicular, 3.5-9 x 2.3-7.5 cm, base rounded, obtuse at apex, serrate along margins; glabrous above, densely grey pubescent beneath; petioles 3-5 cm long; petiolules 2-5 cm long; stipules linear. Panicles axillary and terminal; flowers 7-8 mm across, white; calyx bristly; lobes ovate, pubescent; petals obovate. Fruits globose, 10-12 mm across, orange-yellow; drupelets many, crowded.

Fl. & Fr.: February-June.

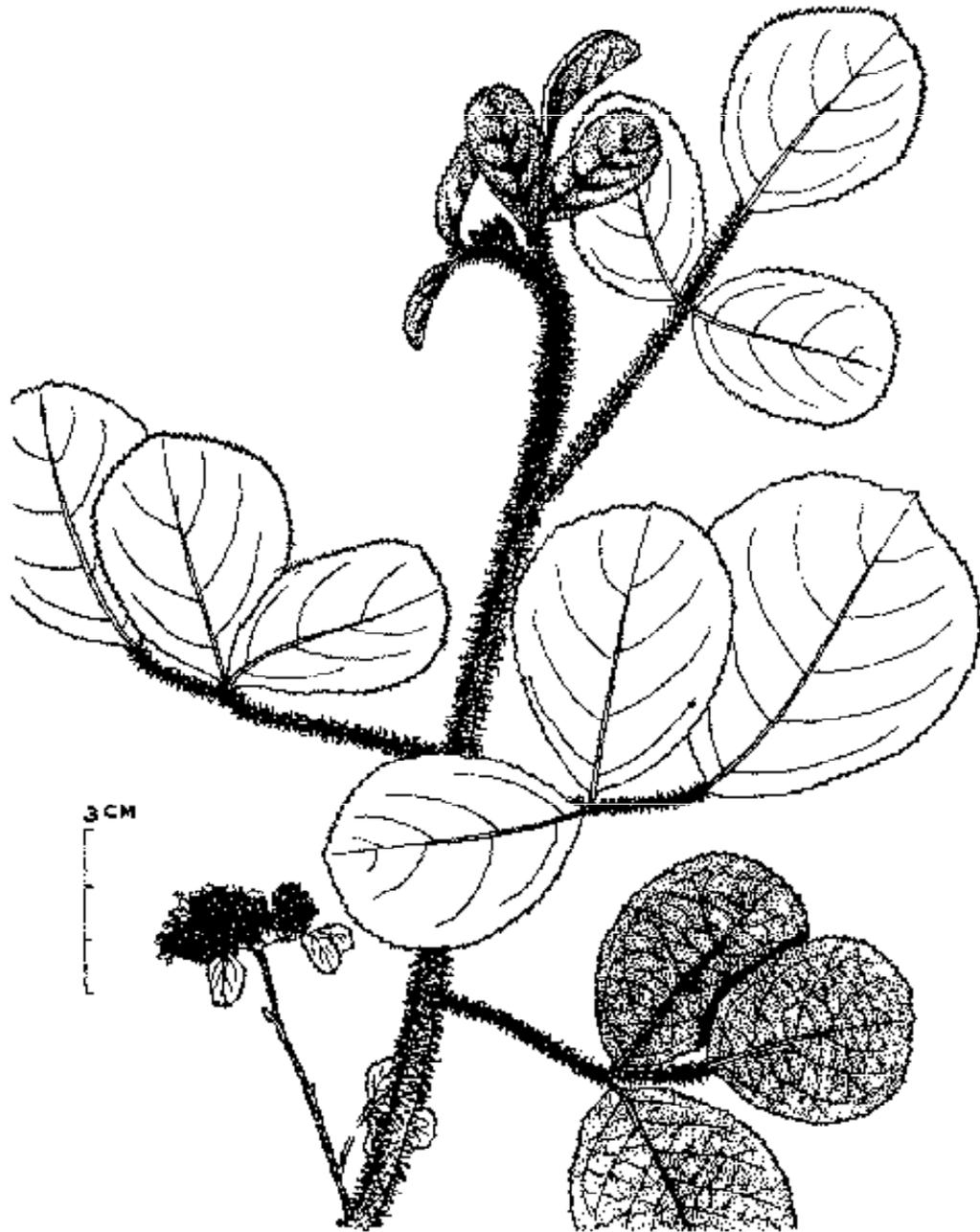


Fig. 117: *Rubus ellipticus* Smith

Common. Near fort Lungleh, *Gage* 62 (CAL); *s.loc.*, *Parry s.nun.* (CAL); Phongpui. *K.P. Singh* 96854.

6. ***Rubus griffithii*** Hook. *f.* in Fl. Brit. India 2: 327. 1878.

Scandent shrubs with glabrous branches; prickles few, scattered, curved. Leaves oblong-lanceolate, 8-12 x 2-6 cm, base rounded, caudate-acuminate at apex, serrate along margins, glabrous at maturity, pubescent only on nerves beneath; petioles very short. Flowers in axillary or terminal, elongated panicles; bracts linear-oblong, serrate; flowers sessile, white; calyx densely appressed tomentose. Fruits globose, scarlet red.

Fl. & Fr.: August-February.

S.loc., *Wenger* 205 (*vide* C.E.C. Fischer, *l.c.*).

7. ***Rubus hypargyrus*** Edgew. var. ***niveus*** (Wallich *ex* G. Don) Hara in J. Jap. Bot. 53: 137. 1978. *R. niveus* Wallich *ex* G. Don, Gen. Syst. 2: 530. 1832; Hook. *f.*, Fl. Brit. India 2: 335. 1878 *non* Thunb., 1813; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 93. 1938.

Scrambling shrubs, 2-3 m high; branches with weak recurved prickles, pubescent, eglandular. Leaves pinnately 3-foliolate; petioles 3-6 cm long; leaflets 3-12 x 24 cm, ovate, base rounded, acuminate at apex, deeply toothed along margins, minutely pubescent above, white tomentose beneath; petiolules 2-3 mm long, terminal, 1-2 cm long; stipules filiform; flowers solitary or 10-12 in axillary or terminal, tomentose racemes. Calyx white with prickles, finely tomentose; petals pink or red, obovate, 4-5 mm long. Fruits *ca* 1 cm across, red or orange; drupelets many, pubescent.

Fl. & Fr.: June-August.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

8. ***Rubus lucens*** Focke in Bremn., Abhandl. Nat. Ver. 4: 199. 1874; Hook. *f.*, Fl. Brit. India 2: 338. 1878; Kanjilal *et al.*, Fl. Assam 2: 197. 1938. *Kaihlet* (Lushai).

Large, stout, scandent shrubs with minute, scattered, recurved prickles; branches angled; young parts puberulous, glabrous when old. Leaves pinnately 3-foliolate, up to 30 cm long; common petioles 7-8 cm long.

prickly; leaflets elliptic, ovate-elliptic or orbicular, terminal larger, 10-11 x 5-6 cm, laterals little smaller, 7-9 x 4-5 cm, base rounded, abruptly acuminate at apex, distantly serrate along margins, coriaceous, glabrous, puberulous on nerves beneath; petiolules of lateral leaflets 4-5 mm long, of terminal leaflet 3-3.5 cm long; lateral nerves 8-10 pairs; stipules linear. Panicles up to 30 cm long, axillary or terminal, corymbose; flowers 6-10 mm across; calyx deeply lobed, tube shorter, 3-5 mm long, pubescent; petals little larger, pink. Fruits enclosed in the calyx, red.

Fl. & Fr.: September-February.

Scarce, in the tropical forests. Upper Thenzawl, *K.P. Singh* 93909.

9. **Rubus niveus** Thunb., Diss. Bot. Med. de Rubo 9(6): 1813. *R. lasciocarpus* Smith in Rees, Cyclop. 30: no. 6. 1815; Hook. f., Fl. Brit. India 2: 339. 1878; Kanjilal *et al.*, Fl. Assam 2: 200. 1938; C.E.C Fischer in Rec. Bot. Surv. India 12(2): 93. 1938. Fig. 118.

Shrubs; branches reddish with white bloom and scattered recurved prickles, eglandular. Leaves 5-7-foliolate; petioles 2-4 cm long; leaflets ovate, lanceolate or elliptic, 3.5-5 x 0.8-2.5 cm, base rounded, acute at apex, serrate along margins, subglabrous with impressed veins above, tomentose with prominent veins beneath; stipules lanceolate. Panicles terminal, corymbose; flowers pink, 6-8 mm across; calyx densely tomentose; petals 4-6 mm long. Fruits red, becoming red when ripe; drupelets pubescent.

Fl. & Fr.: March-August.

Near fort Lungleh, 900-1200 m, *Gage* 58 (CAL); Phongpui, *K.P. Singh* 96763.

10. **Rubus rosifolius** Smith, Ic. Ined. 3: t.60. 1791 '*rosaefolius*'; Hook. f., Fl. Brit. India 2: 341. 1878; Kanjilal *et al.*, Fl. Assam 2: 200. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 93. 1938. *Hmubel*, *Hmutau*, *Hmupa* (Lusahi).

Procumbent shrubs, 1-2 m high, covered with stiff, purple gland-tipped hairs in younger parts only; prickles scattered, straight. Leaves pinnately 3-5-foliolate; petioles 2-4 cm long, prickly; leaflets ovate-lanceolate, 3-4.5 x 1-1.6 cm, base rounded or cuneate, acuminate at apex, doubly serrate along margins, terminal leaflets larger than laterals, glabrate above,

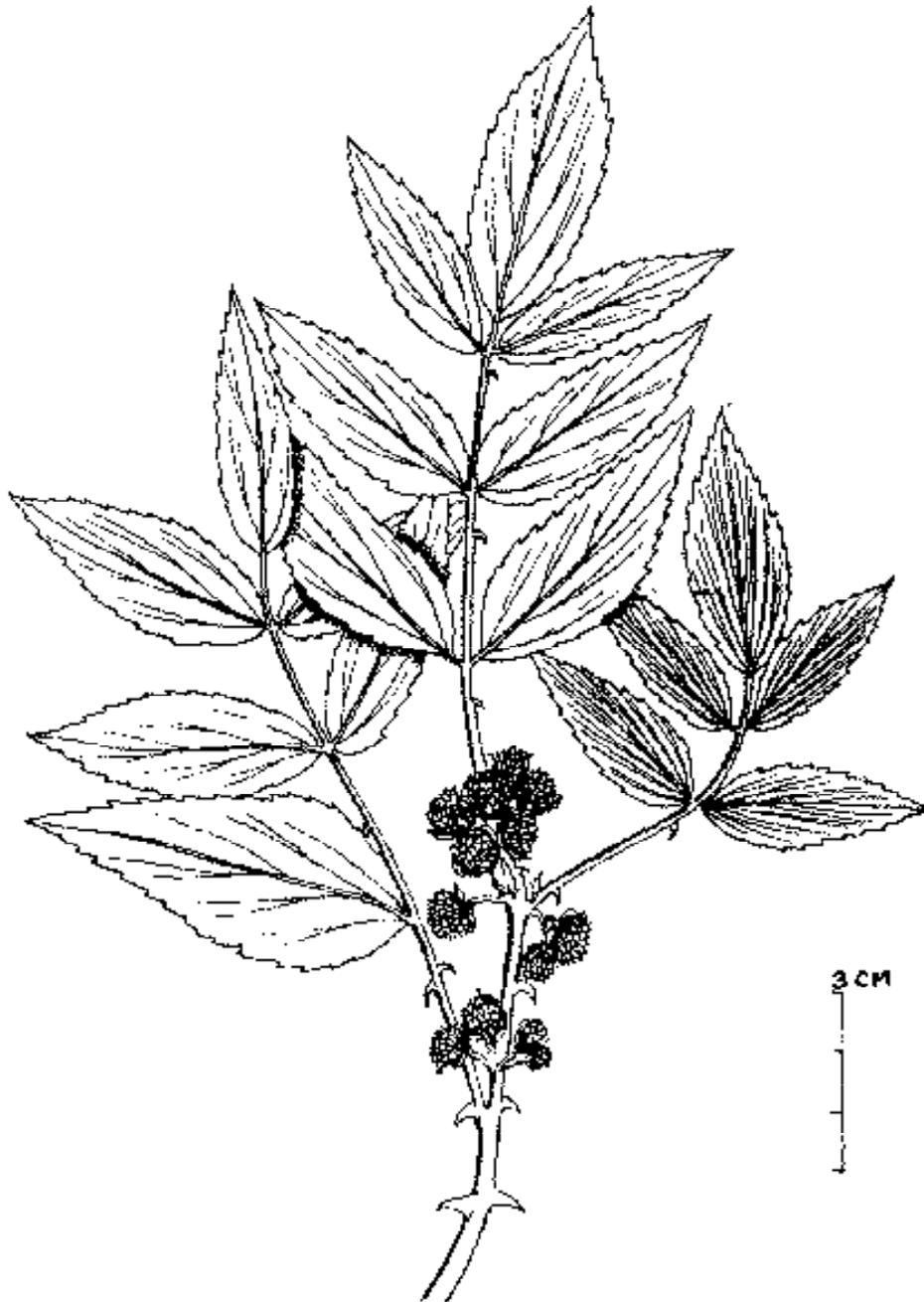


Fig. 118: *Rubus niveus* Thunb.

pubescent with prickles on veins beneath (specially mid rib); petiolules very short; stipules linear. Flowers *ca* 2.5 cm across, white, solitary or in 1-5-flowered panicles; calyx deeply lobed, pubescent and sessile, glandular; petals 10-15 mm long. Fruits oblong to subglobose, 1.5 x 0.8-1.2 cm, scarlet or orange-yellow when ripe.

Fl. & Fr.: January-October.

Common, along the ridges in open moist places. *s.loc.*, Parry *s.num.*, (CAL); Valley near fort Lungleh, 900 m, Gage 30, 51 (CAL); Kawhkuh-Hliapui, K.P. Singh 91318; Phairuang, K.P. Singh 94209; South Vanlaiphai, K.P. Singh 96862.

Uses : Fruits are eaten by tribal people.

11. *Rubus rugosus* Smith in Rees, Cyclop. 30: *Rubus* no. 34. 1819. *R. moluccanus auct non L.*; Hook. *f.*, Fl. Brit. India 2: 330. 1878, *p.p.*; Kanjilal *et al.*, Fl. Assam 2: 194. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 93. 1938.

Large, scrambling shrubs; young parts brownish, tomentose; stems eglandular with short recurved prickles. Leaves 7-12 x 6-10 cm, 3-5-lobed; lobes rounded or subacute, base cordate, crenate-serrate along margins, rugose above, velvety tomentose beneath; stipules small; petioles 4-7 cm long with recurved prickles. Flowers *ca* 1 cm across, terminal or axillary, in dense clusters, creamy-yellow or yellowish white; calyx hairy, minutely toothed at apex. Fruits globose, *ca* 1 cm across, red.

Fl. & Fr.: June-October.

Valley near fort Lungleh, 900-1010 m, Gage 21 (CAL); Zote, K.P. Singh 94549.

12. *Rubus treutleri* Hook. *f.*, Fl. Brit. India 2: 331. 1878; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 93. 1938. Fig. 119.

Scrambling shrubs; branches with densely gland-tipped bristles and scattered prickles. Leaves (3)-5-lobed, suborbicular, 5-17 x 5-12 cm, base cordate, acute at apex, serrate at margins, pubescent above, pilose beneath; petioles 3-5 cm long, covered with gland tipped bristles and scattered

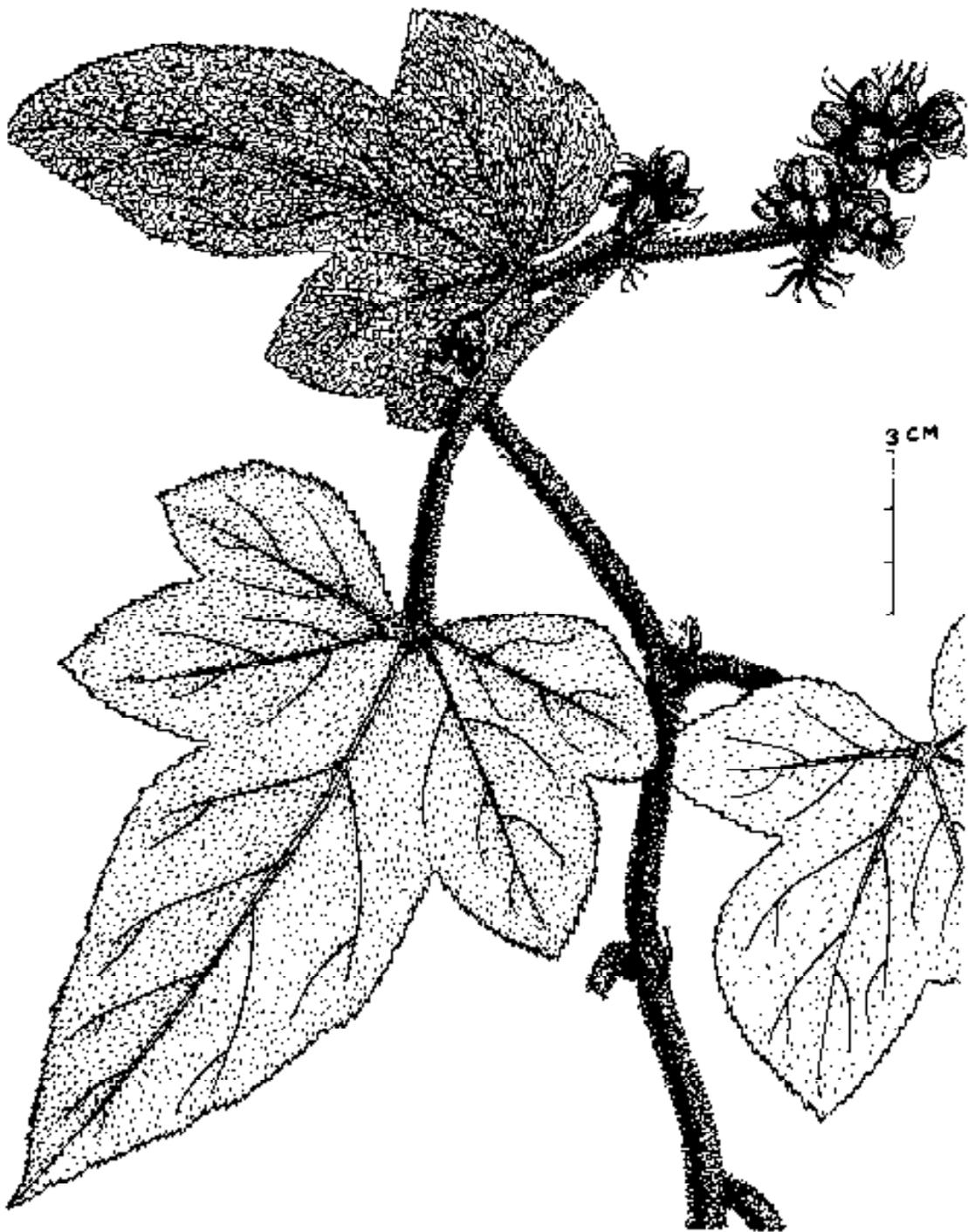


Fig. 119: *Rubus treutleri* Hook. f.

prickles; stipules divided into 4-5 segments. Flowers 3-5, in axillary racemes; calyx tomentose with gland tipped bristles, 3-5-toothed at apex; petals pink or white. Fruits 1.5-2 cm across with many drupelets.

Fl. & Fr.: June-August.

Sairep to Tawipui, *Dutta* 33645.

CULTIVATED TAXA

Pyrus communis L., Sp. Pl. 479. 1753; Hook.f., Fl. Brit. India 2: 374. 1878; Kanjilal *et al.*, Fl. Assam 2: 217. 1938.

Widely cultivated for its fruits.

SAXIFRAGACEAE

(K.P. Singh)

BERGENIA Moench

Bergenia ciliata forma *ligulata* Yeo in Kew Bull. 20: 134. 1966. *Saxifraga ligulata* (Wallich) C.B. Clarke in Hook. f., Fl. Brit. India 2: 398. 1878, non Murr. 1781. *Bergenia ligulata* (Wallich) Engl. in B. Zeit. 26: 840. 1868; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 94. 1938. *Pandamdawi*, *Khamdamdawi* (Lushai).

Perennial herbs with thick rhizomes. Leaves rosetted, suborbicular or broadly obovate, 4-15 x 4-14 cm, base and apex rounded, denticulate-densely ciliate along margins, glabrous on both surfaces, gland-dotted beneath; petioles 2-8 cm long, basal 1-4 cm long, sheathing. Flowers 1-20; calyx 5, cup-shaped 7-10 mm long, green, lobes acute, denticulate near apex; petals 5, obovate, white with pink tinge; stamens 10; ovary semi inferior. Capsules ellipsoid, base surrounded by persistent calyx, ca 1 cm across.

Fl. & Fr.: February-April.

Phongphui, 1800 m, *Parry* 137 (*vide* C.E.C. Fischer, *l.c.*).

HYDRANGEACEAE

(K.P. Singh)

DICHROA Lour.

Dichroa febrifuga Lour., Fl. Cochinch. 301. 1790; C.B. Clarke in Hook. f., Fl. Brit. India 2: 406. 1878; Kanjilal *et al.*, Fl. Assam 2: 228. 1938; C.F.C. Fischer in Rec. Bot. Surv. India 12(2): 94. 1938. *Khawsikdamdawi* (Lushai). **Fig. 120.**

Erect shrubs, 1-3 m tall. Leaves elliptic-oblong, 8-18 x 4-7 cm, base alternate, acuminate at apex, serrate-dentate along margins; sparsely hairy on both sides; petioles 1-3 cm long; lateral nerves 7-9 pairs. Cymes paniculate, terminal, 4-16 cm long. Flowers *ca* 7 mm across, blue; calyx tube adnate to the ovary; petals valvate, becoming reflexed; stamens 10 or 12; ovary inferior, 1-celled. Berries subglobose, 6-8 mm in diam., glossy blue, crowned by persistent calyx lobes. Seeds numerous, small, reticulate.

Fl. & Fr.: July-December.

Sairep-Fawipui, Dutta 33655, 33869.

ITEACEAE

(K.P. Singh)

ITEA L.

Itea macrophylla Wallich in Roxb., Fl. Ind. 2: 419. 1824; Hook. f., Fl. Brit. India 2: 408. 1878; Kanjilal *et al.*, Fl. Assam 2: 230. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 37. 1987. *Phui-thing*, *Thingdawn* (Lushai).

Small trees or shrubs, 5-9 m tall. Leaves alternate, elliptic-oblong or broadly ovate, 10-20 x 6-13 cm, base truncate or rounded, acute or acuminate at apex, glandular-serrate along margins, glabrous; lateral nerves 7-10 pairs; petioles 2-5 cm long. Racemes up to 15 cm long, axillary, mostly from upper leaves, pubescent when young. Flowers white with pink tinge, 3-5 mm across; bracts subulate, caducous; calyx tube puberulous, obconic, 5-lobed, *ca* 2 mm long; petals triangular, closely reflexed, *ca* 3 mm long;



Fig. 120: *Dichroa febrifuga* Lour.

ovary glabrous, lower half sunk in the calyx cup, semi inferior; carpels 2, united above into simple style and stigma, disc glabrous, intrastaminal. Capsules ovate, 0.5-1 cm long, united by styles; seeds caudate at both ends.

Fl. & Fr.: April-January.

Common. Aizawl, *Deb* 30644; Tilthlang, *K.P. Singh* 94060, 96636; Thaltlang-Phongphui *K.P. Singh* 96773; Lungchhuan, *D.K. Singh* 97178; Keifang, *M. Sawmliana* 99274; Darlawn, 1250 m, *M. Sawmliana* 101749.

CRASSULACEAE

(D.K. Singh)

- 1a. Large herbs, up to 2 m tall; petals deeply connate into a tubular corolla ...1. *Kalanchoe*
- 1b. Small to medium sized herbs, rarely up to 1 m high; petals free ...2. *Sedum*

1. KALANCHOE Adans.

- 1a. Plants glandular-pubescent; bracts small, lanceolate ...1. *K. floribunda* var. *glabra*
- 1b. Plants glabrous; bracts linear or foliaceous :
- 2a. Stems fistular; leaves simple, spatulate-oblong; flowers erect or spreading; bracts linear ...2. *K. integra*
- 2b. Stems nonfistular; leaves simple-7-foliate, oblong-elliptic; flowers pendulous; bracts foliaceous ...3. *K. pinnata*

1. ***Kalanchoe floribunda*** Wight & Arn., Prodr. Fl. Ind. Orient. 359. 1834. var. ***glabra*** C.B. Clarke in Hook. f., Fl. Brit. India 2: 415. 1878; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 94. 1938.

Perennial, semisucculent herbs; stems 0.3-1 m high; branchlets glandular-pubescent or glabrescent. Leaves simple, decussate, obovate-elliptic or oblong, 5-8 x 1.5-4 cm, base attenuate, rounded-obtuse at apex, crenate along margins, thick-coriaceous, brownish, pubescent. Cymes in dense panicles, often level-topped, branches glabrous, not racemose; bracts

small lanceolate. Flowers yellowish white; sepals 4, lanceolate; petals 4, lanceolate. Fruits up to 1 cm across.

Fl. & Fr.: November-April.

S. loc., Parry s.num. (*vide* C.E.C. Fischer, *l.c.*).

2. *Kalanchoe integra* (Medik) Kuntze in Rev. Gen. 1: 221. 1891. *Cotyledon integra* Medik., Acta Acad. Theod. Palat. 3: 200. t. 9. 1775. *Kalanchoe spathulata* DC., Pl. Hist. Sec. t. 65. 1811; C.B. Clarke in Hook. f., Fl. Brit. India 2: 414. 1878; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 94. 1938.

Perennial, robust herbs; stems fistular, 0.3-1.2 m tall. Leaves simple, spathulate-oblong or obovate, lanceolate, 7-20 x 2-5 cm, base cuncate, crenate-serrate along margins, glabrous, upper leaves trifoliate; petioles 2-5 cm long. Cymes subcorymbose, flattish, elongate; bracts few, scattered, linear, 0.6-1.2 cm long. Flowers erect, light yellow-pink, fragrant; sepals ca 7 mm long; lobes elongate-triangular, united at base; corolla tube glabrous, ca 1.5 cm long, constricted at middle.

Fl. & Fr.: January-April.

Sairep. 1500 m, Parry 480 (*vide* C.E.C. Fischer, *l.c.*).

3. *Kalanchoe pinnata* (Lam.) Pers., Syn. Pl. 1: 446. 1805. *Cotyledon pinnata* Lam., Encycl. 2: 141. 1786. *Bryophyllum pinnatum* (Lam.) Oken., Allg. Naturgesch. 3: 1966. 1841; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 37. 1987. *B. calycinum* Salisb., Parad. Lond. t. 3. 1805; C.B. Clarke in Hook. f., Fl. Brit. India 2: 413. 1878.

Erect, perennial, semisucculent herbs; stems 0.3-2 m tall, branching at the base, with swollen nodes, glabrous. Leaves decussate, simple or 3-7-foliate, oblong or ovate-elliptic, 7-14 x 3-6 cm, base oblique, obtuse-round at apex, crenate or subincised along margins, thick-coriaceous, glabrous; petioles greenish, 2-5 cm long with purple blotches. Cymes paniced, up to 20 cm long; bracts foliar; bracteoles linear. Flowers 2-3 cm across, pendulous, green-red; calyx tube green with red blotches, 2-3 cm long, puberulous; lobes 4, triangular; corolla octagonal, 3.5-4 cm long, constricted in middle; lobes 4, ovate. Fruits enclosed within persistent papery calyx and corolla, up to 1.5 cm across.

Fl. & Fr.: November-April.

Lungleh-Sairep, *Dutta* 33809.

2. SEDUM L.

Sedum griffithii C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 421. 1878; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 94. 1938.

Weak, succulent herbs; stems 5-10 cm high, glabrous. Cauline leaves linear, 6-20 x 1.5-2 mm, entire, lower ones acuminate, upper ones obtuse. Cymes leafy corymbose. Flowers bisexual, yellow; sepals narrow-oblong, 4-5, 2-4 mm long; petals 4-5, elliptic-lanceolate, ca 5 mm long. Follicles 5, erect; seeds many, obovoid, not compressed.

Fl. & Fr.: November-February.

Phongpui, 2300 m, *Parry* 406 (*vide* C.E.C. Fischer, *l.c.*).

DROSERACEAE

(D.K. Singh)

DROSERA L.

- | | |
|--------------------------------------------------------------------------------------------|---------------------------|
| 1a. Acaulescent herbs; leaves in basal rosette, cuneate-spathulate, stipulate | ...1. <i>D. burmannii</i> |
| 1b. Cauloscent herbs; leaves cauline, alternate, semilunate-orbicular, peltate, estipulate | ...2. <i>D. peltata</i> |

1. *Drosera burmannii* Vahl, Symb. Bot. 3: 50. 1794; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 424. 1878; Kanjilal *et al.*, Fl. Assam 2: 234. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 37. 1987.

Perennial, insectivorous herbs. Leaves radical rosulate, obovate-orbicular, spathulate, 0.5-1 x 0.3-0.6 cm, abruptly narrowed into a flat petiole, reddish green, covered with glandular tentacles above; tentacles elongate, with rounded tip, base attenuate or subtruncate-obtuse; stipules 3-partite, scarious. Racemes 5-20 cm long, many-flowered, with secund-subsecund flowers restricted towards apex. Flowers white, up to 1 cm across, bracteate, often bract-opposed; bracts trilobed, glandular, hairy

outside; sepals 5, oblong-broadly lanceolate; petals 5, oblong-lanceolate, spatulate, clawed, obcordate. Capsules ovoid, 5-valved; seed-coat black, reticulate.

Fl. & Fr.: January-April.

Panchagram, *Deb* 31495.

2. ***Drosera peltata*** Smith *ex* Willd., Sp. Pl. 1: 1546. 1798; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2:424. 1878; Kanjilal *et al.*, Fl. Assam 2: 235. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 94. 1938.

Fig. 121.

Erect, insectivorous herbs, with a basal tuber; stems slender, erect, 8-30 cm high, leafy, glabrous. Leaves dimorphic; radical leaves ephemeral, rosulate; cauline leaves semilunar-deltoid, or suborbicular, 0.25-0.4 x 0.15-0.25 cm, shallowly cupular, brownish green, covered with viscid gland-tipped tentacles above and along margins; tentacles with broader base. Racemes lateral or terminal, up to 5 cm, 2-10-flowered. Flowers white, up to 1 cm across, bracteate; bracts fimbriate at tip, sparsely warted outside; sepals 5, ovate-elliptic, fimbriate, gland dotted; petals 5, obovate-orbicular, spatulate, apex rotund-truncate. Capsules ovoid, 3-5-valved; seed coat black, reticulate.

Fl. & Fr.: May-October.

S. loc., Parry *s.num.*; Thaltlang, *Dutta* 33950.

HAMAMELIDACEAE

(D.K. Singh)

- | | |
|-------------------------------------------------------------|----------------------------|
| 1a. Leaves palmately nerved; ovules many in each cell | ... 1. <i>Exbucklandia</i> |
| 1b. Leaves pinnately nerved; ovules solitary in each cell : | |
| 2a. Petals present | ... 2. <i>Loropetalum</i> |
| 2b. Petals absent | ... 3. <i>Sycopsis</i> |

1. EXBUCKLANDIA R.W. Br.

1. ***Exbucklandia populnea*** (R. Br. *ex* Griffith) R.W. Br. in J. Wash. Acad. Sc. 36: 348. 1946. *Bucklandia populnea* R. Br. *ex* Griffith in As.



Fig. 121: *Drosera peltata* Smith ex Willd.

Res. 19: 94. t. 13-14. 1836; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 429. 1879; Kanjilal *et al.*, Fl. Assam 2: 240. 1938.

Tall trees, up to 25 m; crown narrow-elongated; bark blackish-brown, rough; branchlets green, glabrous. Leaves alternate, broadly ovate-orbicular, 6-20 x 4-15 cm, rounded-obtuse or subcordate at base, acute-acuminate at apex, entire or 3-cuspidate when young, dark glossy green above; petioles 5, 2-4.5 cm long, basal nerves 5-7; lateral nerves 3-4 pairs; stipules 1-2, large, oblong-obovate, rounded at tip. Heads 10-20-flowered, initially enclosed within paired stipules, densely rusty-pubescent, glabrate with age. Flowers sessile; calyx limb 5-lobed; petals linear-spathulate, fleshy. Capsules woody, subglobose; 0.6-1 cm across; upper seed not winged, lowest winged.

Fl. & Fr.: October-February.

Usually cultivated.

2. LOROPETALUM R.Br. ex Reichb.

Loropetalum chinense (R. Br.) Oliver in Trans. Linn. Soc. 23. 459. f. 4. 1862; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 428. 1878; Kanjilal *et al.*, Fl. Assam 2: 238. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 94. 1938. *Hamamelis chinensis* R. Br. in Abel. Narr. Journ. China App. 8: 375. f. 1. 1818.

Large, evergreen shrubs or small trees, 3-12 m tall; bark grey; young branches and inflorescence densely stellate pubescent. Leaves alternate, lanceolate-elliptic or oblong-obovate, 2.5-8 x 1.5-2.5 cm, base rounded or cuneate, acute or acuminate at apex, entire-subentire or denticulate along margins, stellate pubescent on both surfaces; lateral nerves 5-7 pairs; petioles 4-5 mm long; stipules deciduous, linear, membranous. Heads 6-8-flowered, quasiterminal, ebracteate. Flowers white-greenish white, 2.5-3 cm across; calyx limb of 4 valvate lobes; petals 4, linear. Capsules ovoid-obovoid, woody, 0.8-1 cm across, stellate tomentose.

Fl. & Fr.: April-November.

Laliphai, 1500 m, *Parry 176* (*fide* C.E.C. Fischer, *l.c.*).

3. SYCOPSIS Oliver

Sycopsis griffithiana Oliver in Trans. Linn. Soc. 23: 83. 1860; C.B. Clarke in Hook. f., Fl. Brit. India 2: 427. 1878; Kanjilal *et al.*, Fl. Assam 2: 236. 1938. *Mamchawpumte* (Lushai).

Small, branched trees, up to 10 m tall; young parts tomentose. Leaves oblanceolate, obovate-oblong or elliptic, 8-13 x 2.5-5 cm, abruptly acuminate at apex, entire along margins, coriaceous, glabrous; lateral nerves looping; petioles 1-1.5 cm long, pubescent or glabrate. Flowers in short axillary spikes, unisexual. *Male flowers* : calyx small; petals absent. *Female flowers* : calyx 5-lobed, lanceolate, 2-3 mm long, glabrous; petals absent; ovary 2-celled, stellate tomentose. Fruits ellipsoid, 2-2.5 cm long, stellate-tomentose outside; seeds brown, shiny, 8-10 x 3-4 mm.

Fl. & Fr.: July to November.

Scarce. Chamring, 1300 m, *M. Sawmliana s.num.*

Note : The species was reported previously from Meghalaya only.

RHIZOPHORACEAE

(D.K. Singh)

CARALLIA Roxb.

Carallia brachiata (Lour.) Merr. in Philip. J. Sci. 15: 249. 1919. *Dialoma brachiata* Lour., Fl. Cochinch. 296. 1790. *Carallia lucida* Roxb., Pl. Corom. 3: 8. t. 211. 1811; Kanjilal *et al.*, Fl. Assam 2: 241. 1938. *C. integerrima* DC., Prodr. 3: 33. 1828; Henslow in Hook. f., Fl. Brit. India 2: 439. 1878; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 94. 1938. *Theiria* (Lushai); *Theicharapa* (Lakher).

Small-medium sized evergreen trees, 5-15 m tall; crown compact, oval; occasionally buttressed; bark brownish, with faint vertical fissures. Leaves opposite, oblong-obovate or broadly elliptic, 6-18.5 x 3-8.5 cm, base cuneate, abruptly acuminate or obtuse at apex, entire, coriaceous, lateral nerves 10-15 pairs; petioles short, stout margined, 0.5-1 cm long; stipules lanceolate, caducous-deciduous. Cymes axillary, compressed, trichotomous, 1-3 cm across. Flowers sessile, 4-5 mm across, creamy white-greenish

yellow, cymose-capitate; calyx tube minutely bracteate at base; limb 5-8 lobed; lobes erect, valvate; petals 5-8, orbicular. Berries globose, 0.5-1 cm across, pink or red, 1-celled, 1-seeded.

Fl. & Fr.: February-May.

Aizawl, 1000 m, *Parry 644* (*vide C.E.C. Fischer, l.c.*); Lungleh, 1000 m, *Gage 57* (CAL), Lungchhuan, *D.K. Singh 93348*; Thaltlang-Phougphui, *K.P. Singh 96754*.

COMBRETACEAE

(D.K. Singh)

- | | |
|-----------------------------------------------------------------------|----------------------------|
| 1a. Calyx limb persistent | ... 2. <i>Calycopteris</i> |
| 1b. Calyx limb deciduous: | |
| 2a. Scandent or straggling shrubs;
leaves opposite; petals present | ... 3. <i>Combretum</i> |
| 2b. Trees; leaves alternate or subopposite; petals absent: | |
| 3a. Flowers in spikes | ... 4. <i>Terminalia</i> |
| 3b. Flowers in globose heads | ... 1. <i>Anogeissus</i> |

1. ANOGEISSUS (DC.) Guill. & Perr.

Anogeissus acuminatus (Roxb. ex DC.) Guill. & Perr. in *Fl. Seneg.* 1: 280. t. 65. 1833; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 450. 1878; Kanjilal *et al.*, *Fl. Assam* 2: 248. 1938; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 94. 1938; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 37. 1987
Conocarpus acuminata Roxb. ex DC. *Prodt.* 3: 16. 1828. *Zairum* (Lushai). Fig. 122.

Large, elegant, deciduous trees, 20-30 m tall, with usually pendulous branches; bark rough, grey; young branches and inflorescence softly tomentose. Leaves subopposite, distichous, elliptic or oblong to ovate-lanceolate, 2.5-8 x 1.5-3 cm, base rounded-cuneate, acute-acuminate at apex, entire, punctate, glabrescent above; villous-pubescent beneath, petioles short, pubescent, 3-6 mm long. Flowers small, in globose, peduncled heads; solitary or rarely 2, ca 2 cm across; bracts ovate-lanceolate or spatulate, tomentose; bracteoles minute, spatulate, woolly; calyx superior,



Fig. 122: *Anogeissus acuminatus* (Roxb. ex DC.) Guill. & Perr.

5-lobed, ca 3 mm long; tube pubescent; petals absent; stamens 10, in 2 series. Fruits samaroid, 0.5-0.8 cm across, coriaceous, broadly 2-winged, shining, glabrous.

Fl. & Fr.: January-April.

Fairly common in tropical areas. Zawhawk, 600 m, *Parry* 597 (*vide* C.E.C. Fischer, *l.c.*); Lungleh, 1000 m, *Gage* 109 (CAL); Lambabak, Lushai hills, *U. Kanjilal*, 4753; Aizawl, *G.K. Deka*, s.num.; Sairang, 670 m, *Deb* 30569.

2. CALYCOPTERIS Lam.

Calycopteris floribunda (Roxb.) Poiret in Lam., *Encycl. (Suppl.)* 2: 41. 1811 & *Tabl. Encycl.* 2: t. 357. 1793; *Hook. f.*, *Fl. Brit. India* 2: 449. 1878; *Kanjilal et al.*, *Fl. Assam* 2: 257. 1938; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 94. 1938. *Getonia floribunda* Roxb., *Pl. Corom.* t. 87. 1798 & *Fl. Ind.* 2: 428. 1832.

Straggling, scandent shrubs with drooping branches, 2-6 m tall; branchlets densely rusty tomentose; bark irregularly reticulately fissured, brownish grey. Leaves alternate-opposite, elliptic-oblancoolate or oblong, 5-13 x 2.5-4 cm, base obtuse or cuneate, acute or acuminate at apex, chartaceous, rusty tomentose beneath, glabrous above. Panicles terminal or axillary, 15-30 cm long. Flowers ca 3 cm across; bracts foliar, elliptic; calyx lobes 5, creamy, lanceolate-falcate, velvety, punctate; limb 5-fid, persistent and accrescent in fruit; petals absent. Fruits ovoid-ellipsoid, 0.8 x 0.25 cm, 5-ribbed; wings membranous, oblanceolate or obovate.

Fl. & Fr.: January-April.

Demagiri, 150 m, *Gage* s.num. (CAL).

3. COMBRETUM Loeffl.

1a. Flowers pentamerous; fruits 5-winged :

2a. Bracts green; flowers more than 1 cm long;
calyx limb funnel-shaped

... 4. *C. pilosum*

2b. Bracts creamy white; flowers less than 0.5 cm long;
calyx limb cup-shaped

... 6. *C. roxburghii*

- 1b. Flowers tetramerous; fruits 4-winged :
- 3a. Petals shorter than calyx lobes,
usually notched at apex; spikes
simple from fallen leaf axils ... 3. *C. latifolium*
- 3b. Petals equalling or longer than calyx lobes,
not notched at apex; spikes panicleled,
terminal or axillary from upper leaf axils :
- 4a. Fruit surface fibrillar scaly ... 1. *C. flagrocarpum*
- 4b. Fruit surface not fibrillar scaly :
- 5a. Leaf base cordate; petals obovate ... 2. *C. griffithii*
- 5b. Leaf base cuneate; petals linear ... 5. *C. punctatum*
subsp. *squamosum*

1. *Combretum flagrocarpum* C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 455, 1878; Kanjilal *et al.*, Fl. Assam 2: 253, 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 37, 1987.

Large, straggling or scandent shrubs; young parts and inflorescence reddish or brown tomentose, mixed with coppery, peltate scales. Leaves opposite, elliptic to elliptic-oblong or obovate-lanceolate, 0.8-20 x 4-10 cm, base rounded or narrowed, abruptly acuminate at apex, glabrescent with age or pubescent along the nerves, glandular-punctate on both surfaces; petioles 5-7 mm long; lateral nerves 8-12 pairs. Panicles terminal or axillary. Flowers up to 0.6 cm across, yellow; bracteoles linear-spathulate, subsistent; calyx densely covered with scales, teeth erect, triangular; petals broadly obovate, ca 2 mm long, larger than calyx, shortly clawed. Fruits orbicular, 2.5-4 cm across, 4-winged, covered with resinous glands and linear-lanceolate scales.

Fl. & Fr.: April-December.

Common, in evergreen-tropical forests in moist places. Champhai-Lungleh, Deb 31070; Thenzawl, K.P. Singh 93876; Kawlkhulh-Hliapui, D.K. Singh 94414, Tut, on way of Mamit, D.K. Singh 99007.

2. *Combretum griffithii* Heurck & Muell.-Arg. in Heurck, Obs. Bot. 231, 1870. *Combretum dasystachyum* Kurz in J. As. Soc. Bengal 43(2): 187, 1874; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 457, 1878; Kanjilal *et al.*, Fl. Assam 2: 255, 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 94, 1938. **Fig. 123.**



Fig. 123: *Combretum griffithii* Heurck & Muell.-Arg.
a) A flowering; b) A fruiting twig

Large, woody, climbing shrubs; young parts and inflorescence rusty villous or tomentose. Leaves opposite or ternate, oblong-lanceolate, oblanceolate or obovate, rarely elliptic, 7-16 x 3-7 cm, cordate-subcordate at base, acuminate at apex, puberulo-punctate below, glabrous, punctate or dotted above; petioles 5-8 mm long, lateral nerves 7-10 pairs. Panicles terminal-axillary, up to 20 cm long; spikes few, suberect. Flowers pale green-yellow, 3-4 mm across; bracteoles linear, shorter than flowers; calyx densely covered outside with brownish red scales, ca 2 mm long, teeth triangular, acute, erect; petals small, 2-3 mm long, narrow, obovate. Fruits large, 2.5-4 cm long, stipitate, 4-winged, dotted with scattered, small, round glands, yellow-brown to brown.

Fl. & Fr.: March-December.

Common, in tropical forests, Lungleh, 1000 m, *Gage* 187 (CAL); *s.loc.*, *Godfrey* 480 (CAL); Sairang, 660 m, *Deb* 30574; Kolasib-Chummliang, *Dutta* 33300; Sairep forest, *Dutta* 33591; Kawnpui forest, *K.P. Singh* 96979; North Vanlaiphai *D.K. Singh* 93094.

3. *Combretum latifolium* Blume, *Bijdr.* 641, 1825; *Deb & Dutta* in *J. Econ. Tax. Bot.* 10(1): 37, 1987. *C. extensum* D. Don in *Trans. Linn. Soc. London* 15, 414, 1827; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 458, 1878; *Kanjilal et al.*, *Fl. Assam* 2: 255, 1938.

Large, scandent shrubs, more or less glabrous; bark vertically furrowed, dark brown. Leaves opposite-subopposite, broadly orbicular-elliptic, elliptic-oblong or ovate, 10-18 x 5.5-10 cm, base cuneate-attenuate, scaly when young, abruptly acuminate at apex, glabrous on both sides, punctate at maturity; petioles 2-3 cm long; lateral nerves 5-8 pairs. Panicles axillary, up to 15 cm long. Flowers white, tetramerous, 5-8 mm across; calyx teeth acuminate, reflexed, ca 3 mm long, truncate-oblong or obovate, extending into a claw; petals shorter than calyx lobes, notched at apex. Fruits obovoid-subglobose, 3-4.5 cm across, 4-winged, wings scarious.

Fl. & Fr.: November-March.

Champhai, *Deb* 31067.

4. *Combretum pilosum* Roxb., *Fl. Ind.* 2: 231, 1824; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 453, 1878; *Kanjilal et al.*, *Fl. Assam* 2: 251, 1938; *Deb & Dutta* in *J. Econ. Tax. Bot.* 10(1): 37, 1987. **Fig. 124.**

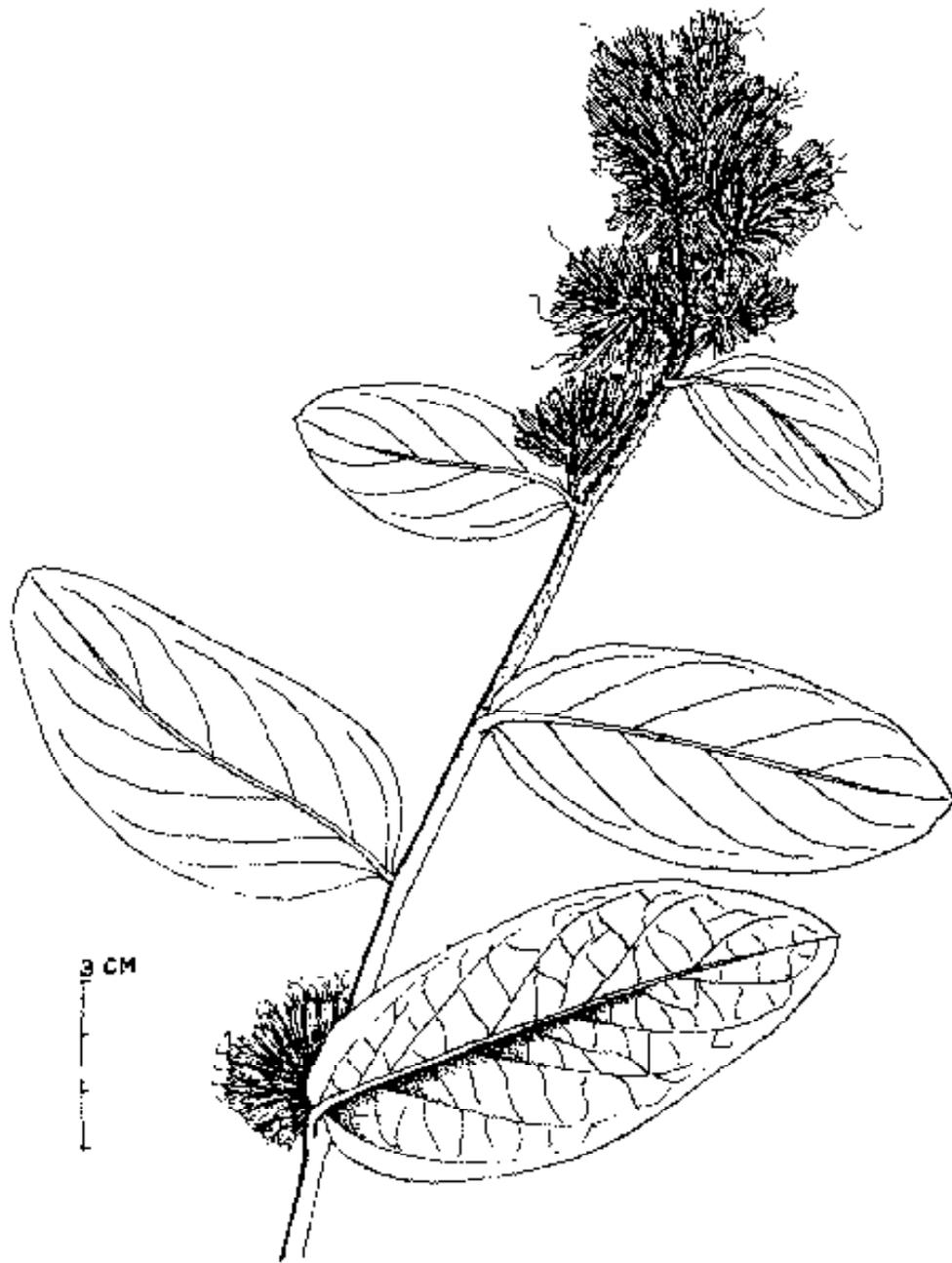


Fig. 124: *Combretum pilosum* Roxb.

Gigantic, scandent shrubs; young parts covered with rusty or brownish spreading hairs. Leaves opposite, oblong-ob lanceolate, oblong-elliptic, 9-15 x 5-6 cm, base cordate-retuse, acuminate at apex, entire, glabrescent above, pubescent on the nerves beneath; petioles 4-5 mm long; lateral nerves 6-8 pairs. Panicles terminal, densely rusty-blackish villous. Flowers white or pink with purple blotch, up to 2 cm long. Bracts greenish; bracteoles linear-lanceolate, persistent, densely pilose; calyx funnel-shaped. limb 8-12 mm long, pubescent; teeth triangular, acuminate, ca 2 mm long; petals exceeding the calyx teeth, oblong-obovate, obtuse, silky pubescent. Fruits elliptic or ovate, up to 2.5 cm long, 5-winged, pubescent or sometimes glabrous.

Fl. & Fr.: January-October.

Panchagram, *Deb* 31475.

5. *Combretum punctatum* Blume, *Bijdr.* 640. 1825, subsp. *squamosum* (Roxb. ex D. Don) Exekk in *Fl. Males.* 4: 539. 1954. *Combretum squamosum* Roxb. ex D. Don in *Trans. Linn. Soc. London* 15. 419. 1827; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 456. 1878; Kanjilal *et al.*, *Fl. Assam* 2: 253. 1938; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 94. 1938. *Lyurei*, *Thlai-riel* (Lushai).

Large, woody, scandent shrubs; bark greyish brown; young parts covered with minute, peltate scales. Leaves opposite, orbicular-elliptic or lanceolate, oblong-obovate, 8-15 x 5-10 cm, base obtuse or cuneate, acuminate-apiculate at apex, entire along margins, glandular-punctate; petioles 1-2 cm long; lateral nerves 5-7 pairs. Panicles axillary-terminal, up to 12 cm long. Flowers whitish-yellow, 2-4 mm across; bracteoles subulate, fugacious; calyx funnel shaped, ca 7 mm long; teeth short, 4, triangular; petals small, spatulate-obovate, tapering into a claw. Fruits ovoid, 2.5-4 cm long, yellow-brown, 4-winged; wings covered with rounded scales.

Fl. & Fr.: October-May.

Common in tropical evergreen forests. Lungleh, *Gage* 110, 111 (CAL); Theiriat, *Deb* 31286; 31333; Lungleh, *Dutta* 33420; Chumliang to Meiboi, *Dutta* 33342; Kolasib-Builung, *D.K. Singh* 93149 (ASSAM); Phairuang, *K.P. Singh* 94206; Darlaw-Ratu, *K.P. Singh* 97113 (ASSAM).

6. *Combretum roxburghii* Spreng., Syst. 2: 331. 1825; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 37. 1987. *Combretum decandrum* Roxb., Pl. Corom. 1: 49. t. 59. 1795 non Jacq., 1760; C.B. Clarke in Hook. f., Fl. Brit. India 2: 452. 1878; Kanjilal *et al*, Fl. Assam 2: 250. 1938. *Koldamhrui* (Lushai).

Gigantic, evergreen, scandent shrubs; young parts and inflorescence brown, silky villous; bark with vertical fissures, reddish brown. Leaves opposite, elliptic, elliptic-lanceolate or obovate-oblong, 7-15 x 3-8 cm, base obtuse or cuncate, abruptly acuminate at apex, more or less glabrous; petioles 5-10 mm long; lateral nerves 6-8 pairs. Spikes dense, up to 7 cm long, arranged in terminal or axillary panicles. Flowers pentamerous, 3-4 mm across, greenish white, brownish-red or purplish brown; bracts large, creamy white, pubescent; bracteoles subpersistent, villous; calyx ca 2 mm long, pubescent, cup-shaped, lobes linear, acuminate; petals 5, pubescent, exceeding the calyx lobes, oblong. Fruits up to 3 cm long, oblong-ovoid, 5-winged, nearly glabrous.

Fl. & Fr.: November-April.

Common, in evergreen tropical forests, Sairang, 670 m, *Deb* 30590; Lungleh; *Dutta* 33384; Darlak, *Deb* 3408.

4. TERMINALIA L.

- | | |
|--------------------------------------------------------------------------------------------------------------|----------------------------|
| 1a. Fruits 2-winged, very small | ...5. <i>T. myriocarpa</i> |
| 1b. Fruits lacking wings, usually large sized : | |
| 2a. Leaves clustered at the end of branches;
spike simple; drupes tomentose, globose: | |
| 2b. Leaves scattered; spikes paniculate;
drupes glabrous, elongate-ellipsoid: | |
| 3a. Leaf petiole 3-6 cm long; drupes globose, tomentose | ...1. <i>T. bellirica</i> |
| 3b. Leaf petioles 0.6-1.8 cm long; drupes ellipsoid,
glabrous | ...2. <i>T. catappa</i> |
| 4a. Petiolar glands distinct; leaves pubescent on
veins below; panicles pubescent; fruits oblong | ...4. <i>T. citrina</i> |
| 4b. Petiolar glands indistinct or absent;
leaves glabrous; panicles rusty tomentose;
fruits subglobose | ...3. <i>T. chebula</i> |

1. **Terminalia bellirica** (Gaertner) Roxb., Pl. Corom. 2: 54. t. 198. 1805 (*Sphalm : bellerica*); C.B. Clarke in Hook. f., Fl. Brit. India 2: 445. 1878; Kanjilal *et al.*, Fl. Assam 2: 243. 1938. *Myrobalanus bellirica* Gaertner, Fruct. 2: 90. t. 97. f. a-d. 1791. *Thingvandawt*, *Tuikuk-reraw*, *Vantai* (Lushai).

Deciduous trees, 25-40 m tall; trunk buttressed at base; young parts rusty tomentose. Leaves whorled at the end of branches, obovate to broadly elliptic, 5-15 x 6-10 cm, base obtusely cuneate, abruptly acuminate at apex, glabrous above, glaucous beneath; petioles 3-6 cm long, usually with the glands; lateral nerves 5-8 pairs. Spikes simple, axillary from new shoots, puberulous, drooping, 6-12 cm long. Flowers yellowish, foetid, smelling, ca 6 mm across; calyx hairy out side, woolly within; limb cup-shaped with 5 teeth. Drupes globose, 2-3 x 2-2.5 cm in diam., grey, tomentose.

Fl. & Fr.: April-December.

Recorded on the basis of state forest department records. Probably grows in mixed forests in dry places.

2. **Terminalia catappa** L., Syst. Nat. ed. 12. 2: 674. 1767; C.B. Clarke in Hook. f., Fl. Brit. India 2: 444. 1878; Kanjilal *et al.*, Fl. Assam 2: 248. 1938. *Vai-um-khal* (Lushai).

Tall trees, up to 27 m; stems often buttressed at base; branches in horizontal whorls. Leaves alternate, clustered at the end of branches, obovate-oblong or obovate 15-25 x 7-12 cm, base narrow-cordate, hairy when young, glabrescent at maturity; midrib with 2 depressions near the base; petioles 0.6-1.8 cm long. Spikes solitary, axillary; flowers white, upper male, lower bisexual; calyx teeth glabrous. Drupes ellipsoid, 2-5 cm long, slightly compressed, glabrous, keeled; endocarp hard.

Fl. & Fr.: February-May.

Recorded on the basis of state forest department records.

3. **Terminalia chebula** Retz. in Obs. Bot. 5: 31. 1788; C.B. Clarke in Hook. f., Fl. Brit. India 2: 446. 1878; Kanjilal *et al.*, Fl. Assam 2: 244. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 37. 1987. *Reraw* (Lushai).

Large, deciduous trees, 20-35 m tall; crown dense, compact; bark blackish-grey, vertically furrowed; young parts rusty pubescent; branchlets white, lenticellate; leaves subopposite-alternate, ovate or elliptic-obovate, 7.18 x 6-8 cm, base rounded, cuneate at base, abruptly acuminate-acute at apex, thin coriaceous, glabrous except the midrib; petioles 1-2 cm long, glands indistinct. Spikes paniced, axillary, 5-7 cm long, rusty pubescent. Flowers yellow-creamy white, 0.4-0.7 cm across, with obnoxious smell; bracts linear, deciduous; calyx villous within, glabrescent outside, 5-lobed, cup-shaped; lobes triangular. Drupes obovoid, subglobose ca 4 x 2.5 cm, glabrous, horned, faintly angled, yellowish-green when ripe.

Fl. & Fr.: May-March.

Not common. Lungleh, *Dutta* 33889.

Uses : Wood is hard and used in furniture making.

4. *Terminalia citrina* (Gaertner) Flem. in *As. Res.* 11: 183. 1810; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 446. 1878; Kanjilal *et al.*, *Fl. Assam* 2: 245. 1938; *Myrobalanus citrina* Gaertner, *Fruct.* 2: 91. t. 97. 1791. *Reraw, Kharuan, Rerora* (Lushai).

Small-large, deciduous trees, often with buttressed stems towards base; bark brown, more or less vertically fissured. Leaves opposite-subopposite, broadly ovate, lanceolate, elliptic or oblong, 4-12 x 1.5-6.5 cm, acuminate or acute at apex, glabrous at maturity, pubescent on nerves beneath, base narrowed into petiole; petioles 1-2 cm long, biglandular; lateral nerves 8-12 pairs. Racemes paniced, terminal and axillary, 7-15 cm long; bracts small, linear-spathulate, silky pubescent, deciduous. Flowers dull white; calyx teeth glabrous outside, villous within. Drupes oblong ellipsoid, slightly clavate, 2.5-4 x 1.5-2 cm, glabrous, obscurely 5-angled.

Fl. & Fr.: June-December.

Recorded on the basis of state forest department records.

5. *Terminalia myriocarpa* Heurck & Muell.-Arg. in *Heurck., Obs. Bot.* 215. 1870; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 448. 1878; Kanjilal *et al.*, *Fl. Assam* 2: 247. 1938; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 37. 1987. *Chorpui, Char* (Lushai). Flg. 125.

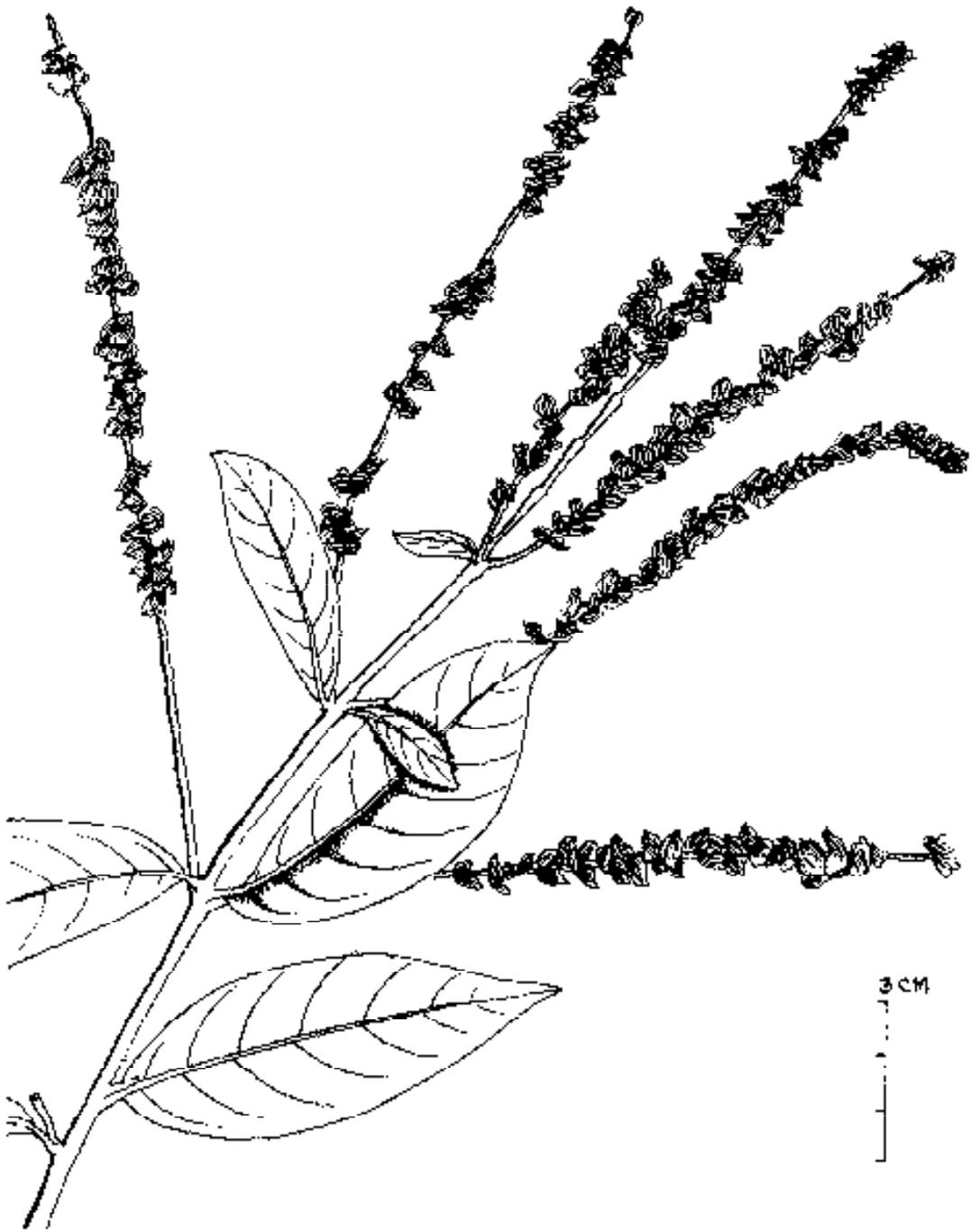


Fig. 125: *Terminalia myriocarpa* Heurck & Muell.-Arg.

Gigantic, evergreen trees, up to 35 m tall, with pendulous branchlets; bark brown-grey, scaly with vertical flakes; young parts and inflorescence rusty pubescent. Leaves oblong-lanceolate or oblong-elliptic, 10-23 x 4-8 cm, base truncate-subcordate, acute or shortly acuminate at apex, denticulate-entire along margins, glabrous above when mature, hairy on the nerves beneath; petioles 5-8 mm long, thick with 2 glands near the tip; lateral nerves subparallel, numerous. Spikes slender, lax, arranged in terminal or upper axillary panicles, up to 25 cm long. Flowers pink-yellow, up to 0.5 cm across; bracteoles lanceolate or deltoid subulate; calyx glabrous outside, pubescent within, teeth erect. Drupes up to 0.5 cm long and 12 mm across, with 2 lateral wings, yellow.

Fl. & Fr.: September-May.

Aizawl, 1050 m, *G.K. Deka* 1; Sialsuk, 1340 m, *Deb* 30693.

Uses : Wood is durable and polishes well, and used in furniture making.

Recently *J.H. Lalramnghinglova* (*J. Econ. Tax. Bot. Addl. ser.* 12: 446, 1996) recorded *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn. from the state. The decoction of its bark is used for washing ulcers and the leaf juice is used for earache.

HERNANDIACEAE

(D.K. Singh)

ILLIGERA Blume

Illigera khasiana C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 461, 1878; *Kanjilal et al., Fl. Assam* 4: 103, 1940; *Deb & Dutta in J. Econ. Tax. Bot.* 10(1): 37, 1987.

Large, scandent shrubs; stems striate, more or less glabrous. Leaves alternate, 3-foliolate; petioles 5-15 cm long, sometimes coiling like tendrils; leaflets oblong, oblong-elliptic, elliptic-lanceolate or oblanceolate, 5-10 x 2-5 cm, base rounded or cordate, acute or short acuminate at apex, glabrous. Panicles terminal and axillary, cymose, up to 25 cm long, drooping, pubescent. Flowers dull-reddish brown, 1-1.5 cm long; bracteole 1, small, ovate or elliptic; tepals in 2 whorls of 5 each, oblong-lanceolate, acuminate; staminodes not petaloid, deeply emarginate. Frutis 1.8-2.5 x 3.5-5 cm, 2-

winged, with a sharp longitudinal ridge on either face; wings brown, glabrous, with transverse striations.

Fl. & Fr.: August-February.

Theiriat, *Deb* 31248; Zotethlang, 1750 m, *D.K. Singh* 92809.

MYRTACEAE

(K.P. Singh)

- 1a. Fruits dry capsular:
- 2a. Flowers in proliferous spikes; petals not calyprate; filaments crimson-red ... 1. *Callistemon*
 - 2b. Flowers not in spikes; petals calyprate; filaments otherwise ... 2. *Eucalyptus*
- 1b. Fruits baccate:
- 3a. Leaves glabrous on both surfaces, often pellucid dotted; calyx not closed in bud; ovary bi-celled ... 4. *Syzygium*
 - 3b. Leaves pubescent beneath; not pellucid dotted; calyx closed in bud; ovary many-celled ... 3. *Psidium*

1. CALLISTEMON R. Br.

Callistemon citrinus (Curtis) Skeels in U.S. Dept. Agri., Bur. Pl. Industr., Bull. 282: 49. 1913; *Metrosideros citrina* Curtis in Bot. Mag. 8: t. 260. 1794; *Callistemon lanceolatus* (Smith) Sweet, Fl. Austr. Sub t. 29. 1828; DC., Prodr. 3: 223. 1828.

Shrubs or small, aromatic, evergreen trees with drooping branches; young parts hairy. Leaves alternate, linear-lanceolate, 2-8 x 0.3-0.6 cm, base narrowed, apex sharply pointed, coriaceous, glabrous at maturity, densely gland dotted; petioles short, 2-3 mm long. Flowers 2-3 cm long along with stamens, in terminal leaf bearing spikes, crimson; calyx campanulate, 4-5 mm long, hairy; lobes 5; petals 5, suborbicular; stamens many, very long, exserted, brightly coloured, free. Capsules woody with truncate apex, 0.5-0.8 cm long.

Fl. & Fr.: Throughout the year.

Native of Australia usually cultivated in the gardens and parks. Phairuang, *K.P. Singh* 94211; Sairep, 1350 m, *Mao* 107014.

2. EUCALYPTUS L. Herit

Eucalyptus maculata Hook., Ic. Pl. t. 619. 1844; Kanjilal *et al.*, Fl. Assam 2: 286. 1938.

Tall trees with whitish or greyish smooth bark. Leaves alternate, linear-lanceolate, 10-18 x 1.5-2.5 cm, falcate; petioles 1-1.5 cm long. Flowers usually in 3-flowered umbels or in panicles; calyx tube 5-8 mm long, adnate to ovary; petals united with calyx lobes to form a hemispherical lid, much shorter than the calyx tube. Fruits ovoid, 10-12 x 8-10 mm.

Fl. & Fr.: January-March.

Common, usually cultivated. Lushai hills, Forest Research Centre, Aizawl, *H. Rama* 49 (Forest Department Herbarium).

3. PSIDIUM L.

Psidium guajava L., Sp. Pl. 470. 1753; Duthie in Hook. *f.*, Fl. Brit. India 2: 468. 1878; Kanjilal *et al.*, Fl. Assam 2: 287. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 37. 1987. *Kollhei* (Lushai).

Small or medium sized trees, up to 10 m tall with pinkish-brown, smooth bark. Leaves opposite, decussate, ovate, oblong or elliptic-oblong, 5-15 x 4-8 cm, base cordate, obtuse or acute at apex, entire along margins, glabrous above, ferruginous-tomentose below; lateral nerves 6-10 pairs; peduncles 1-3-flowered, axillary; flowers greenish-white, 2-4 cm across; calyx urceolate; petals free. Berry yellowish-white, pyriform; seeds many, immersed in pulp.

Fl. & Fr.: March-Dec.

Usually cultivated for its edible fruits. Aizawl-Taitaw, *Dutta* 33216; Kolasib, *K.P. Singh* 93150.

4. SYZYGIUM R. Br. ex Gaertner

1a. Inflorescence usually terminal or upper axillary;

- 2a. Flowers less than 1.5 cm across.
- 3a. Calyx tube elongated, 1.5-1.8 cm long, cylindrical ... 2. *S. claviflorum*
- 3b. Calyx tube short, 4-6 mm long, turbinate or hemispherical:
- 4a. Petals united, calyptrate; berries globose ... 9. *S. oblatum*
- 4b. Petals free, not calyptrate; berries oblong ... 4. *S. densiflorum*
- 2b. Flowers more than 1.5 cm across:
- 5a. Leaves narrowed at both ends ... 6. *S. jambos*
- 5b. Leaves rounded or subcordate or cordate at base:
- 6a. Fruits turbinate, depressed, flattened at both ends ... 1. *S. aqueum*
- 6b. Fruits globose:
- 7a. Leaves 10-25 x 3-7 cm; lateral nerves 15-22 pairs; petioles almost absent or very short; calyx tube 1.2-1.8 cm long ... 5. *S. diospyrifolium*
- 7b. Leaves 15-32 x 4-10 cm; lateral nerves 20-25 pairs; petioles ca 1 cm long; calyx tube 1.5-3 cm long ... 8. *S. megacarpum*
- 1b. Inflorescence usually lateral or from fallen or lower leaf axils:
- 8a. Leaves ternate, narrow-lanceolate; petals 12-16 ... 11. *S. polypetalum*
- 8b. Leaves opposite, broadly lanceolate, oblong-elliptic or obovate; petals usually 4:
- 9a. Flowers ca 1.5 cm across; petals free ... 7. *S. kurzii*
- 9b. Flowers 4-8 mm across; petals calyptrate:
- 10a. Lateral nerves 8-12 pairs; leaves obovate with apiculate apex; fruits globose, up to 1.2 cm long ... 10. *S. operculatum*
var. *obovatum*
- 10b. Lateral nerves numerous; leaves oblong-elliptic with acute apex; fruits oblong, upto 2.5 cm long ... 3. *S. cumini*

1. *Syzygium aqueum* (Burm. f.) Alston in Ann. Royal. Bot. Gard. Paradeniya 11: 204. 1929. *Eugenia aquea* Burm. f. in Fl. Ind. 114. 1768; Duthie in Hook. f., Fl. Brit. India 2: 473. 1878; Kanjilal *et al.*, Fl. Assam 2: 264. 1938.

Evergreen trees, 5-10 m tall with quadrangular or terete branches. Leaves variable, opposite, oblong-lanceolate or ovate-oblong or ovate-lanceolate, 16-20 x 3.5-5 cm, base cordate, subamplexicaul, acuminate at apex, entire along margins, chartaceous to coriaceous, glabrous; lateral nerves 15-20 pairs; petioles hardly differentiated on dorsal side, 1-2 mm long. Inflorescence terminal and axillary, 3-7-flowered. Flowers greenish-white, 2.5-4 cm across, shortly pedicelled; calyx tube 1.5-2 cm long, turbinate-clavate; lobes 4, unequal; petals 4, free, ca 1.2 cm long, rounded. Berries depressed-turbinate, pear-shaped, 1.5-2 x 2.5-3.5 cm, light red or white, flattened at both ends, crowned by calyx lobes, 1-4-seeded; endocarp fleshy, edible.

Fl. & Fr.: March-June.

Probably cultivated as a fruit tree. Aizawl station, 600 m, *Deka* 23459.

2. *Syzygium claviflorum* (Roxb.) Wallich ex Cowan & Cowan, *Trees N. Bengal*, 67, 1929; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 95, 1938. *Eugenia claviflora* Roxb., *Fl. Ind.* 2: 488, 1832; Duthie in *Hook. f., Fl. Brit. India* 2: 484, 1878; Kanjilal *et al.*, *Fl. Assam* 2: 275, 1938. *Lenhmui* (Lushai).

Small to medium sized, evergreen trees, 8-10 m tall. Leaves oblong-lanceolate, 5-18 x 2-5 cm, base acute or cuneate; acuminate at apex, coriaceous, glabrous; lateral nerves numerous; petioles short, 5-6 mm long. Cymes axillary or sometimes from axils of fallen leaves. Flowers sessile, 8-10 mm across; calyx tube cylindrical, 1.5-1.8 cm long; lobes 4-5, subacute; petals 4-5, free, 3-5 mm across, orbicular. Berries 2-4 cm long, ovoid-oblong, bluish when ripe.

Fl. & Fr.: March May.

Mizo hills, *Dutta* 88470.

3. *Syzygium cumini* (L.) Skeels in U.S. Dept. Agr. Bur. Pl. Industr. Bull. 248, 25, 1912; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 37, 1987. *Myrtus cumini* L., *Sp. Pl.* 471, 1753. *Eugenia jambolana* Lamk., *Encycl.* 3: 198, 1789; Duthie in *Hook. f., Fl. Brit. India* 2: 499, 1879; Kanjilal *et al.*, *Fl. Assam* 2: 278, 1938. *Khaw-Reng* (Lushai).

Large, glabrous, evergreen trees, up to 35 m tall with umbrella-shaped crown. Leaves variable in size and shape, decussate, oblong-elliptic, oblanceolate-elliptic, 7-15 x 4-8 cm, base attenuate, acute, subobtuse, abruptly acuminate at apex, glabrous, shining, coriaceous; lateral nerves many; petioles 1-2.5 cm long. Cymes paniced; panicles up to 10 cm long, axillary or lateral below the leaves or rarely terminal, corymbose or pyramidal. Flowers 6-8 mm across, greenish-white, borne in clusters of 3-8 at the end of branches of panicles; calyx tube turbinate, 3-5 mm long, obconic; petals calyptrate, fugaceous. Berries variable in size, up to 2.5 cm long, oblong-ovoid, red, turning purplish-black when ripe, juicy; seeds solitary with thick rounded fleshy cotyledons.

Fl. & Fr.: February-July.

Very common, on the hilly slopes in exposed places. Lawngtalai, Dutta 33757; *s.loc.* Dutta 92469; Kolasib, K.P. Singh 93291; Pheileng, K.P. Singh 97064; Darlawn-Ratu, D.K. Singh 97112; Rualling, M. Swamlina 95536; Darlawn, 1200 m, M. Sawmlina 97179.

4. *Syzygium densiflorum* Wallich *ex* Wight & Arn., Prodr. 329. 1834. *S. arnottianum* Walp, Rep. 2: 180. 1843. *Eugenia arnottiana* (Walp) Wight., Ic. t. 999. 1845; Duthie in Hook. f., Fl. Brit. India 2: 483. 1878; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 37. 1987.

Large trees with spreading crown; branchlets quadrangular. Leaves opposite, elliptic-oblong, 5-8 x 2.5-4 cm, base narrowed, caudate-acuminate at apex, coriaceous, pinkish-red when young, olive green when dry; lateral nerves many; petioles *ca* 1.5 cm long. Flowers in dense, terminal, axillary umbellate cymes, sessile; bracts caducous; calyx tube short, turbinate; lobes 4; petals cream-coloured, distinct; stamens white. Berries oblong, 1.3-1.5 cm long.

Fl. & Fr.: November-June.

Theiriat, Deb 31290 (CAL).

5. *Syzygium diospyrifolium* (Wallich *ex* Duthie) S. N. Mitra, Indian For. 99: 100. 1973. *Eugenia diospyrifolia* Wallich *ex* Duthie in Hook. f., Fl. Brit. India 2: 472. 1878; Kanjilal *et al.*, Fl. Assam 2: 264. 1938. *Jambosa diospyrifolia* (Wallich *ex* Duthie) C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 95. 1938.

Medium sized trees, 10-15 m tall with buttressed base. Leaves oblong-lanceolate or narrowly ovate, 10-25 x 3-7 cm, base subcordate or sub-amplexicaul, acuminate at apex, glabrous, glaucous beneath; lateral nerves 15-22 pairs, prominent beneath; petioles absent or very short. Cymes short, few-flowered, terminal, 2-4 cm long, usually cauliflorous below the leaves; flowers 2-3.5 cm across, white, smelling like apricot; calyx tube 1.2-1.8 cm long, obconic; lobes orbicular, 0.8-1 cm across; petals ovate, orbicular, ca 1 cm across. Berries oblong-subglobose, 2-3.5 cm across.

Fl. & Fr.: August-May.

Thenzawl, Parry 184 (*vide* C.E.C. Fischer, *l.c.*).

6. *Syzygium jambos* (L.) Alston in Trimen., *Handb. Fl. Ceylon* 6: 115, 1931; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 38, 1987. *Eugenia jambosa* L., *Sp. Pl.* 470, 1753; Duthie in *Hook. f., Fl. Brit. India* 2: 474, 1878; Kanjilal *et al.*, *Fl. Assam* 2: 266, 1938. *Jambosa vulgaris* DC., *Prodr.* 3: 286, 1828; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 95, 1938.

Medium sized trees, up to 15 m tall with subglobose crown; branchlets glabrous. Leaves lanceolate or oblong-lanceolate, 11-20 x 2.5-5 cm, cuneate at base, acuminate at apex, entire along margins, thin-coriaceous, glabrous; lateral nerves 15-20 pairs; petioles ca 1 cm long, channelled. Cymes terminal, racemose, ca 10 cm long; flowers 3-6 cm across, white to dull-white; calyx lobes 4, turbinate, ca 1.5 cm long, lobes ovate-orbicular, subequal, obconic, petals 4, obovate, 1.5-1.7 cm long, rounded; concave; stamens many, unequal; ovary bi-celled. Berries globose or pyriform, 2.5-4 cm across, yellowish-white to pink tinged, crowned by the inflexed calyx lobes, yellow or white when ripe; seeds 1-2, grey.

Fl. & Fr.: April-August.

Aizawl, Parry 659 (*vide* C.E.C. Fischer, *l.c.*); Sairep-Tawipui, Dutta 33637; Lawngtalai forest, Dutta 33767.

7. *Syzygium kurzii* (Duthie ex Kurz) Balakr. in *Bull. Bot. Surv. India* 22(1-4): 174, 1980. *Eugenia kurzii* Duthie ex Kurz. in *J. As. Soc. Bengal* 46: 68, 1877 & in *Hook. f., Fl. Brit. India* 2: 478, 1878; Kanjilal *et al.*, *Fl. Assam* 2: 268, 1938. *Partlan* (Lushai).

Medium-large trees, 25-30 m tall with white-pale grey, compressed or subtetragonus branchlets. Leaves broadly lanceolate-elliptic or oblanceolate, 9-20 x 2.5-8 cm, acute-attenuate at base, obtusely acuminate at apex, entire along margins, coriaceous, glabrous, pale beneath, gland dots small; lateral nerves 8-14 pairs; petioles 0.8-2 cm long. Inflorescence 5-flowered, branched or paniced cymes; cymes solitary or fascicled in leaf or fallen leaf axills; flowers white, up to 1.5 cm across; pedicels up to 1.2 cm long; calyx tube clavate-turbinate, 0.7-1 cm long; lobes 4, rounded; petals 4, free, 0.5-0.65 cm long. Berries globose, ca 1.3 cm in diam., smooth, 1-2 seeded, crowned by spreading calyx lobes.

Fl. & Fr.: March-July.

Mamit, 900 m, *M. Sawmliana* 107426.

Uses : Wood used as fuel.

8. *Syzygium megacarpum* (Craib) Rathakr. & Nair in J. Econ. Tax. Bot. 4: 487. 1983. *Eugenia megacarpa* Craib, Fl. Siam. Enum. 1: 652. 1931. *Syzygium macrocarpum* (Roxb.) Bahadur & Gaur in Indian J. For. 1: 349. 1978. *Eugenia macrocarpa* Roxb., Fl. Ind. 2: 497. non Schlecht., 1832; Duthie in Hook. f., Fl. Brit. India 2: 474. 1878; Kanjilal *et al.*, Fl. Assam 2: 263. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 37. 1987.

Medium sized trees, 3-8 m tall with a lax crown. Leaves opposite, 15-32 x 4-10 cm, oblong-lanceolate to elliptic, oblong-elliptic; 15-32 x 4-10 cm, base rounded or cordate, acuminate at apex, coriaceous, glaucous beneath; lateral leaves 20-25 pairs, prominent; petioles short, ca 1 cm long. Cymes subcorymbose, few-flowered, terminal or rarely axillary; flowers subsessile, 4-5 cm across, white, drooping; calyx lobes 4, persistent, unequal, broader than long; tube obconic 1.5-3 cm long; petals free, orbicular, up to 2.5 cm across with broad base; style persistent, exserted. Berries large, subglobose, 2.5-5 cm across, crowned by the inflexed calyx lobes, edible; seeds many.

Fl. & Fr.: March-September.

Common, inside tropical forests. Lungleh, *Dutta* 33418; Kawnpui, *K.P. Singh* 97038; Dampa, *D.K. Singh* 99121.

9. *Syzygium oblatum* (Roxb.) Wallich *ex* Cowan & Cowan, *Trees N. Bengal* 67. 1929. *Eugenia oblata* Roxb., *Fl. Ind.* 2: 493. 1932; Duthie in *Hook. f.*, *Fl. Brit. India* 2: 492. 1878; Kanjilal *et al.*, *Fl. Assam* 2: 280. 1938. **Fig. 126.**

Evergreen trees, 12-30 m tall with an oval crown, branchlets and petioles often reddish. Leaves elliptic-lanceolate or obovate-elliptic or oblong-lanceolate, 6-11 x 3-5 cm, base rounded or acute, cuneate, abruptly caudately acuminate at apex, coriaceous, dark green and shining above at maturity; gland dots distinct; lateral nerves many, inconspicuous; petioles 4-7 mm long. Cymes corymbosely paniced, 2.5-6 cm long, axillary or terminal; flowers 1-1.5 cm across, white; calyx tube 4-6 mm long, truncate; lobes 4 or 5, unequal short; petals calyptrate; stamens white. Berries globose, 1-1.5 cm across, black or reddish purple.

Fl. & Fr.: October-May.

Scarce, in evergreen forests, Lungleh, *Dutta* 33549; Sabual, *D.K. Singh* 99055.

10. *Syzygium operculatum* (Roxb.) Niedenzu in *Plafanzenfamilien* III, 7: 85. 1893. var. *obovatum* (Wallich *ex* Duthie) Gamble, *Fl. Pres. Madras*, 481. 1919; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 95. 1938. *Eugenia obovata* Wallich *ex* Duthie in *Hook. f.*, *Fl. Brit. India* 2: 498. 1878. *Hmuizubel* (Lushai).

Evergreen, glabrous trees, 10-16 m tall, with ± compressed branchlets. Leaves obovate or oblanceolate, 7-13 x 4-9 cm, base acute, ± apiculate at apex, chartaceous, glabrous; lateral nerves 8-12 pairs; petioles 1-2.5 cm long. Panicles very short peduncled or almost sessile; flowers mostly in threes, 4-5 mm across, white, sessile; calyx 3-4 mm long, campanulate, gland dotted; lobes 4; petals calyptrate, suborbicular. Berries globose, 0.6-1.2 cm across, juicy, 1-seeded.

Fl. & Fr.: May to August.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

11. *Syzygium polypetalum* (Wallich *ex* Wight) Merr. & Perry in *Brittonia* 4: 125. 1941. *Eugenia polypetala* Wallich *ex* Wight, *Illustr. Ind. Bot.* 2: 14. 1841; Duthie in *Hook. f.*, *Fl. Brit. India* 2: 472. 1878; Kanjilal

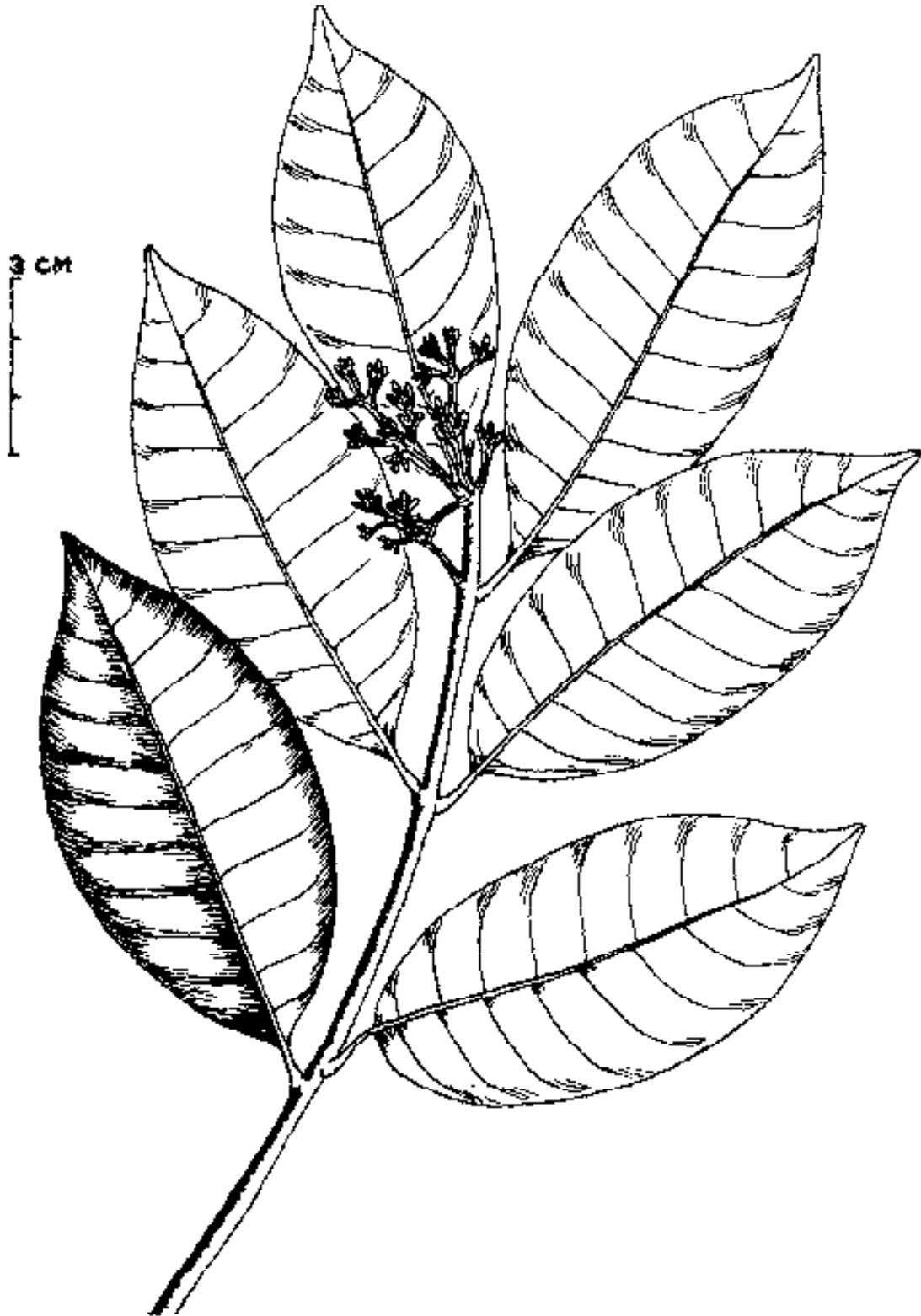


Fig. 126: *Syzygium oblatum* (Roxb.) Wallich ex Cowan & Cowan

et al., Fl. Assam 2: 267. 1938; *Jambosa polypetala* (Wight) Walp.; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 95. 1938. *Tuipui Suthia* (Lushai); *Rabu* (Lakher).

Small trees with lax crown and branching from near the base; branchlets with prominent leaf scars. Leaves ternate or 4 in a whorl, linear-lanceolate or elliptic, oblong-oblongeolate, 10-18 x 1-3 cm, base narrowed, attenuate, acuminate at apex, recurved at margins; lateral nerves 8-12 pairs; petioles short, 2-3 mm long. Cymes umbellate, few-flowered, mostly lateral from the axils of fallen leaves; Flowers 3-4 cm across, white; calyx tube, 1.5-2 cm long, campanulate; lobes 4-6, reddish-brown, ca 1 cm across; petals orbicular, 12-16, free; style long, persistent. Berries subglobose.

Fl. & Fr.: March-July.

Tuivolumkh, Parry 167 (*vide* C.E.C. Fischer, *l.c.*).

LECYTHIDACEAE

(K.P. Singh)

- 1a. Flowers in long pendulous racemes; fruits angular, 1-seeded . . . 1. *Barringtonia*
 1b. Flowers in short spikes; fruits globose, many-seeded . . . 2. *Careya*

1. BARRINGTONIA J.R. & G. Forst.

Barringtonia acutangula (L.) Gaertner, Fruct 2: 97, Pl. 101. 1791; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 508. 1879; Kanjilal *et al.*, Fl. Assam 2: 239. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 25. 1987. *Eugenia acutangula* L., Sp. Pl. 471. 1753.

Small trees, up to 20 m tall. Leaves crowded at the end of the branches, elliptic or obovate to oblanceolate, 7-15 x 2.5-6 cm, base tapering, acute or acuminate at apex; lateral nerves 8-12 pairs; petioles short, 2-4 mm long. Racemes terminal, up to 50 cm long, pendulous, densely flowered, glabrous; bracts oblong; flowers 2-3 cm across; calyx tube funnel-shaped; sepals 4, free, semicircular; petals 4 or 5, 3-5 mm long, adnate to the base, falling early; stamens in whorl, numerous, red, connate below; ovary 2-celled, inferior. Fruits oblong, 2-6 x 1-2.5 cm, bluntly quadrangular, crowned with persistent calyx lobes, 1-seeded.

Fl. & Fr.: March-October.

Reported on the basis of Deb & Dutta (*l.c.*).

2. CAREYA Roxb.

Careya arborea Roxb., Pl. Corom. 3: 14, t. 218. 1811; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 511. 1879; Kanjilal *et al.*, Fl. Assam 2: 288. 1938; C.E.C. Fisher in Rec. Bot. Surv. India 12(2): 95. 1938. *Samaraw* (Lakher).

Deciduous trees, up to 20 m tall with ovoid spreading crown. Leaves crowded at the end of branches, alternate, obovate to oblanceolate, 12-27 x 7-15 cm, base attenuate, cuneate, apex obtuse or rounded, denticulate or crenate at margins, glabrous or shining on both sides; lateral nerves 10-15 pairs; petioles 2-4 cm long, margined or winged upwards. Flowers 6-9 cm across, sessile, white with pinkish tinge, provided with 3 unequal bracts and crowded in terminal, few-flowered stiff spikes; calyx 2-2.5 cm long with campanulate tube; petals 5-7 cm long, elliptic, caducous; stamens many; filaments up to 7 cm long, purple. Berries globose or ovoid 5-8 x 3-4 cm, with persistent calyx and style, greenish-yellow; seeds ca 1 cm in diam., numerous, embedded in fleshy pulp.

Fl. & Fr.: March-August.

S.loc., Parry *s.num.* (*vide* C.E.C. Fischer, *l.c.*).

MELASTOMATACEAE

(K.P. Singh)

- 1a. Leaves pinnatinerved; basal nerves indistinct;
ovary 1-celled, with few ovules; fruits 1-seeded ... 3. *Memecylon*
- 1b. Leaves palmately 3-9-nerved from base;
basal nerves distinct, ovary 2-many-celled
with many ovules; fruits many-seeded:
 - 2a. Flowers 3-merous; stamens 3;
fruit a capsule, dehiscing by valves ... 7. *Sonerila*
 - 2b. Flowers 4-5-merous, stamens twice the
numbers of petals; fruit a berry or if capsule then
dehiscing by pores:

- 3a. Stamens unequal in length:
- 4a. Petals 5; stamens 8, ovary apically glabrous, 4-celled; fruits dry capsular ... 5. *Oxyzona*
- 4b. Petals 4; stamens 10-12; ovary apically bristly hairy or scaly, 5-6-celled; fruits fleshy ... 2. *Melastoma*
- 3b. Stamens equal in length:
- 5a. Erect epiphytic shrubs or small trees; fruits baccate ... 1. *Medinilla*
- 5b. Erect or ascending herbs; fruits dry capsular:
- 6a. Calyx obpyramidal; 4-winged; petals connate in lower part, stamens dorsally appendaged; fruits quadrangular; seeds straight, obovoid ... 6. *Sarcopyramis*
- 6b. Calyx ± tubular, not winged; petals free; stamens not appendaged; fruits terete; seeds curved, falcate ... 4. *Osbeckia*

1. MEDINILLA Gaudich

Medinilla erythrophylla Lindl. in Edw. Bot. Reg. 24(Misc.): 85. 1838. *M. rubicunda* auct non Blume; C.B. Clarke in Hook. f., Fl. Brit. India 2: 547. 1879; Kanjilal *et al.*, Fl. Assam 2: 302. 1938. C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 95. 1938.

Shrubs or small trees, usually epiphytic, up to 5 m high. Leaves elliptic to lanceolate, 6-12 x 2.5-5 cm, base cuneate or narrowed, acuminate at apex; glabrous above, glaucous beneath; petioles 5-10 mm long, scarlet red. Flowers 1.5-2 cm across, pink, in axillary, many-flowered, short peduncled cymes; peduncles 2-5 mm long; calyx ca 3 mm long; tube campanulate-oblong; anthers with short spur petals pink, ovate. Berries globose, 4-6 mm across, black when ripe.

Fl. & Fr.: July-December.

Scarce, in shady moist places. Sairep, K.P. Singh 96678.

2. MELASTOMA L.

- 1a. Leaves thinly pubescent with hairs completely appressed on the upper surface; bracts large, lanceolate, enclosing the buds; calyx lobes glabrous inside ...1. *M. malabathricum*
- 1b. Leaves densely pubescent with hairs free at one end or erect, bracts ovate, not enclosing the buds; calyx lobes ± hairy inside ...2. *M. nepalensis*

1. **Melastoma malabathricum** L., Sp. Pl. 390. 1753. ('*malabathrica*'); C.B. Clarke in Hook. f., Fl. Brit. India 2: 523. 1879; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 38. 1987.

Branched, bushy shrubs, up to 4 m tall; young parts and petioles strigose with scales. Leaves oblong-lanceolate or elliptic-lanceolate, 5-12 x 3-5 cm, base rounded, acute or shortly acuminate at apex, scabrous and appressed hairy above with rows of white cells at base of very short hairs, densely silky or villous beneath, scaly strigose on main nerves; basal nerves 3-5; petioles 8-20 mm long, scaly strigose. Flowers in clusters of 1-8 at the end of branches, 5-6 cm across, purple; bracts large, elliptic or lanceolate, scaly outside; calyx 10-15 mm long, densely silky; lobes ovate, acute; petals large, broadly obovate, 15-25 mm; larger stamens purple, smaller yellow. Fruits 7-10 mm across, subglobose-ovoid, purple, truncate at apex.

Fl. & Fr.: Throughout the year.

Rather common, in open places and along the road side. Panchagam, Deb 30461; Sialsuk, Deb 30751 (both CAL); Tawipui-Thingfal, Dutta 33677.

2. **Melastoma nepalensis** Lodd., Bot. Cab.t. 707. 1833. *M. normale* D. Don. Prodr. Fl. Nep. 220. 1825; C.B. Clarke in Hook. f., Fl. Brit. India 2: 524. 1879; Kanjilal *et al.*, Fl. Assam 2: 298. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 95. 1938. *Liarichipa* (Lakher).

Large shrubs or small trees, up to 6 m tall; branches shaggy with subulate bristles at the nodes. Leaves oblong-lanceolate to ovate-lanceolate, 4-10 x 1.5-3.5 cm; base rounded to acute, short acuminate at apex, pubescent with long appressed hairs above and densely silky or villous

beneath; nerves scaly; basal nerves 3-5; petioles 5-8 mm long. Flowers 4-5 cm across, 3-10 in terminal clusters; bracts ovate; calyx 10-16 mm long; lobes pubescent, ovate lanceolate. Fruits ovoid, 6-8 mm across, pulpy.

Fl. & Fr.: Throughout the year but mainly from May-December.

Very common, in slopes and road cuttings. Aizawl; 900 m, *Parry* 668 (*vide* C.E.C. Fischer, *l.c.*); Near fort Lungleh, 900 m, *Gage* 73 (CAL); North Vanlaiphai, *D.K. Singh* 93066; Kawnpui forest, *K.P. Singh* 96978.

3. MEMECYLON L.

Memecylon celastrinum Kurz, Pegu, Rep. App. Bot. 53: 1875 & Forest Fl. Brit. Burma 1: 515 1877; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 95. 1938. *M. grande* Retz. var. *horsfieldii* Miq. Fl. Ind., Bat. 1: 572, 1856; C.B. Clarke in Hook. f., Fl. Brit. India 2: 558. 1879; Kanjilal *et al.*, Fl. Assam 2: 307. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 95. 1938. *Theikaurak* (Lushai).

Evergreen, small trees, 10-12 m tall. Leaves elliptic-lanceolate to ovate-lanceolate, 7-14 x 4-6 cm, base acute or cuneate, acuminate at apex, glabrous on both surfaces, glossy above; lateral nerves visible beneath; petioles 5-6 mm long. Flowers 1-1.5 mm across, sky-blue, forming poor umbels on 5-15 mm long, compressed, axillary peduncles; calyx white, bell-shaped, ca 1-2 mm long, white; petals ovate, 1-2 mm long. Berries globular, 6-10 mm across, glabrous, 1-seeded with short calyx limb.

Fl. & Fr.: April-November.

Scarce, in tropical forests, *Parry* (*vide* C.E.C. Fischer, *l.c.*); Sabual, *D.K. Singh* 99027.

Note : This species closely resembles *M. cerasiforme* Kurz in almost all the characters except fruits which are larger (10-16 mm) in size.

4. OSBECKIA L.

1a. Usually herbs or undershrubs; flowers capitate;
anthers beaked:

2a. Leaves linear-lanceolate; calyx tube
covered with scales

...2. *O. chinensis*

- 2b. Leaves ovate to elliptic-ovate; calyx tube
not covered with scales ...1. *O. capitata*
- 1b. Usually large branched shrubs; flowers panicled;
anthers attenuate:
- 3a. Calyx tube ± glabrous ...4. *O. rostrata*
- 3b. Calyx tube stellate hairy:
- 4a. Calyx tube densely hairy; capsule neck short
or not exceeding half the length of ovary,
densely hairy, dilated at the top ...5. *O. sikkimensis*
- 4b. Calyx tube sparsely hairy; capsule neck
cylindrical, equaling or exceeding the ovary,
much long than its own breadth, nearly glabrous ...3. *O. crinita*

1. *Osbeckia capitata* Walp., Nov. Act. Acad. Caesp. Leop.-Carol Nat. Cur. 19 Suppl. 1: 331. 1843; C.B. Clarke in Hook. f., Fl. Brit. India 2: 516. 1879; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 38. 1987.

Perennial herbs, up to 50 cm high; branches 4-angled, arising near the base, strigose; hairs ascending, adpressed with bulbous base. Leaves opposite, sessile, ovate to elliptic-ovate, 1.5-2.5 x 0.5-1 cm, base rounded, acute at apex, pubescent on both surfaces; basal nerves 3-7. Flowers capitate on the end of branches, 1.5-2 cm across, pinkish-purple; bracts ovate, 5-7 mm long, ciliate; calyx 8-10 mm long; lobes lanceolate, ca 3 mm long, ciliate; petals ca 10 mm long. Capsules ovoid, 5-8 x 4-5 mm, glabrous.

Fl. & Fr.: June-November.

Darzot- Leite, *Dutta* 34102.

2. *Osbeckia chinensis* L., Sp. Pl. 345. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 2: 515. 1879; Kanjilal *et al.*, Fl. Assam 2: 294. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 95. 1938. *Builukham* (Lushai). Fig. 127.

Weak, erect herbs or undershrubs, up to 60 cm high; branches covered with ascending, adpressed hairs. Leaves opposite, oblong to linear-lanceolate 1.5-3.5 x 0.2-0.6 cm, base rounded to subobtuse, acute at apex, pubescent on both surfaces with adpressed hairs; basal nerves 3-5; petioles

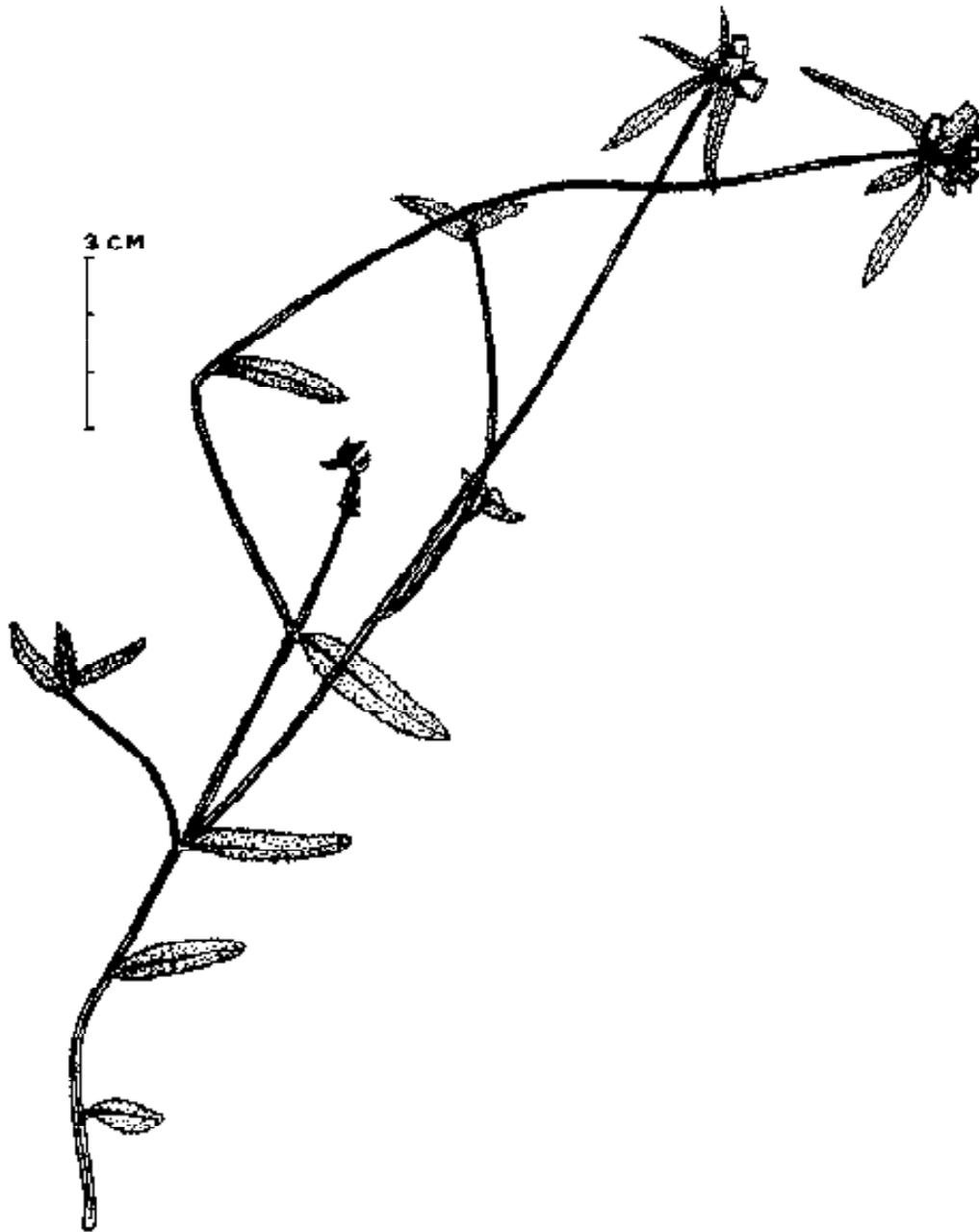


Fig. 127: *Osbeckia chinensis* L.

absent or *ca* 1 mm long. Flowers capitate at the end of branches, 2-2.5 cm across, purple to pink-purple, tetramerous; bracts 4-6 x 2-4 mm, elliptic or ovate; calyx lobes 4, 5-6 x 3 mm; lobes ciliate; petals 10-12 mm long; stamens 8, yellow. Capsules ovoid, 5-6 mm long, glabrous.

Fl. & Fr.: March-October.

Scarce, in open grass lands. Champhai, *Parry* 343 (*vide* C.E.C. Fischer, *l.c.*); Zote, *K.P. Singh* 94551.

3. *Osbeckia crinita* Benth. ex C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 517. 1879; Kanjilal *et al.*, Fl. Assam 2: 292. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 95. 1938. *Builuikhau* (Lushai).

Hirsute shrubs, up to 2.5 m tall; hairs with pinkish, bulbous base. Leaves lanceolate, 7.5-11 x 2.3-3.4 cm, base subcordate, acute to acuminate at apex, hairy on both surfaces with adpressed hairs; basal nerves 5-7; petioles small, 5-10 mm long. Flowers 2-2.5 cm across, purple or pure white, tetramerous (rarely pentamerous) in close corymbs or cymes; bracts ovate, hairy on back; calyx 1 cm long; lobes subulate, stellate-hairy; petals obovate, *ca* 1 cm long; ovary stellate hairy. Capsules ovoid, *ca* 1.2 cm long, suddenly narrowed to a cylindrical neck; neck of the fruit equalling or exceeding the ovary, glabrous.

Fl. & Fr.: July-October.

Near Lungleh, *Parry*, *s.num.* (CAL); Lawngtalai-Kawlechaw, *K.P. Singh* 92861.

4. *Osbeckia rostrata* D. Don, Prodr. Fl. Nep. 221. 1825; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 515. 1879; Kanjilal *et al.*, Fl. Assam 2: 293. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 95. 1938.

Erect shrubs, up to 1.5 m tall. Leaves opposite, lanceolate-ovate, 6-16 x 2-5 cm, base rounded to cuneate, acuminate at apex, glabrous to strigose along the nerves; basal nerves 5; petioles 5-12 mm long. Flowers in terminal, up to 15 cm long, paniced cymes, 3-5 cm across, pinkish-purple, tetramerous; bracts ovate-ciliate, 4-6 x 3-4 mm, calyx 1.5-2 cm long, glabrous or sparsely hairy; lobes 8-10 x 5 mm, ciliate; petals 1.5-2 cm long, ciliate; stamens 8. Capsules cylindrical or ovoid 10-20 x 5.0-3.0 mm, with a narrow neck, glabrous or nearly so.

Fl. & Fr.: July-September.

S.loc., Lorrain s.num. (*fide* C.E.C. Fischer, l.c.).

5. *Osbeckia sikkimensis* Craib. in Notes Royal Bot. Gard. Edinb. 10: 56. 1917. *O. crinita auct. non* Benth.: C.B. Clarke in Hook. f., Fl. Brit. India 2: 517. 1879, p.p. *Knampat* (Lushai). **Fig. 128.**

Shrubs, up to 2.5 m tall; stems covered with spreading rigid hairs. Leaves oblong-lanceolate, 5-12 x 1.5-5 cm, base cuneate, acuminate at apex, hairy on both surfaces; base 5-nerved; petioles 5-15 mm long. Flowers in terminal and upper axillary corymbose cymes, ca 2.5 cm across, rose purple or white; bracts ovate; calyx lobes ca 6 x 1 mm, densely hairy. Capsules ovoid-oblong, 15-20 x 5-6 mm, narrowed into a neck, stellate hairy in basal portion.

Fl. & Fr.: August-March.

Kawlhkullh-Hliapui road, *K.P. Singh* 94334; Zote, *K.P. Singh* 94574; Blue Mountain, 200 m, *Mao* 107153.

J.H. Lalramnghinglova [J. Econ. Tax. Bot. (Addl. ser.) 12: 451. 1996] has reported *Osbeckia stellata* Ker-Gawl. from Sakawrtui-ehhun. The decoction of its leaves is used in toothache.

5. OXYSPORA DC.

- 1a. Young parts fugaceous, stellate, scurfy and deciduously bristly; petioles with a tuft of bristly hairs at the tip; leaves usually 7-nerved, rarely 5-nerved ...1.*O. paniculata*
- 1b. Young parts with spreading hairs; petioles without tuft of hairs at the tip; leaves usually 5-nerved from base .2.*O. vagans*

1. *Oxyspora paniculata* (D. Don) DC., Prodr. 3: 123. 1828; C.B. Clarke in Hook. f., Fl. Brit. India 2: 525. 1879; Kanfilal *et al.*, Fl. Assam 2: 300. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 95. 1938. *Arthrostemma paniculatum* D. Don in Mem. Wern. Nat. Hist. S. 4: 299. 1822. *Khampar* (Lushai). **Fig. 129.**

Shrubs, up to 2 m tall. Leaves opposite, elliptic-broadly lanceolate, 10-12 x 4-8 cm, base rounded to subcordate, acute to acuminate at apex,

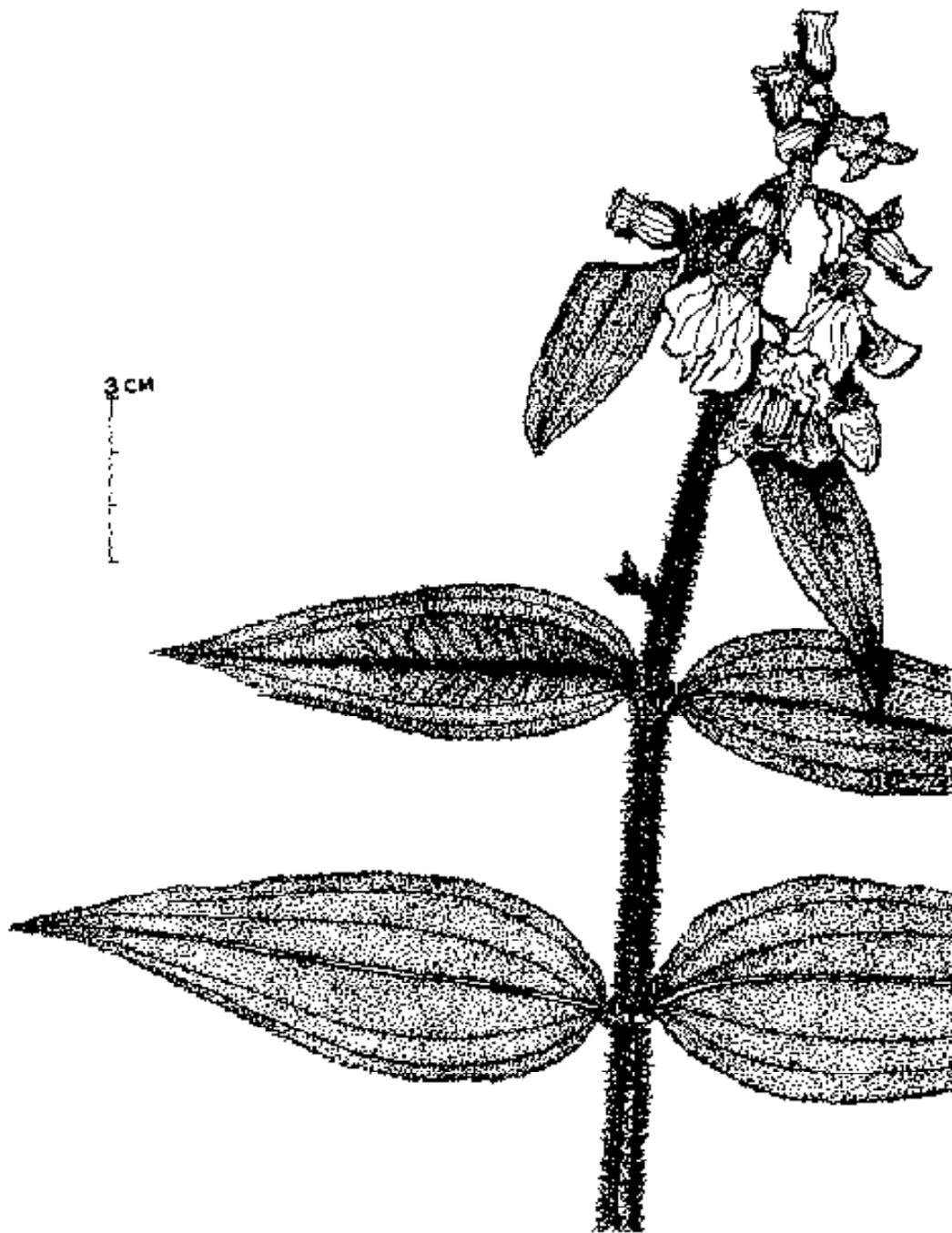


Fig. 128: *Osbeckia sikkimensis* Craib.

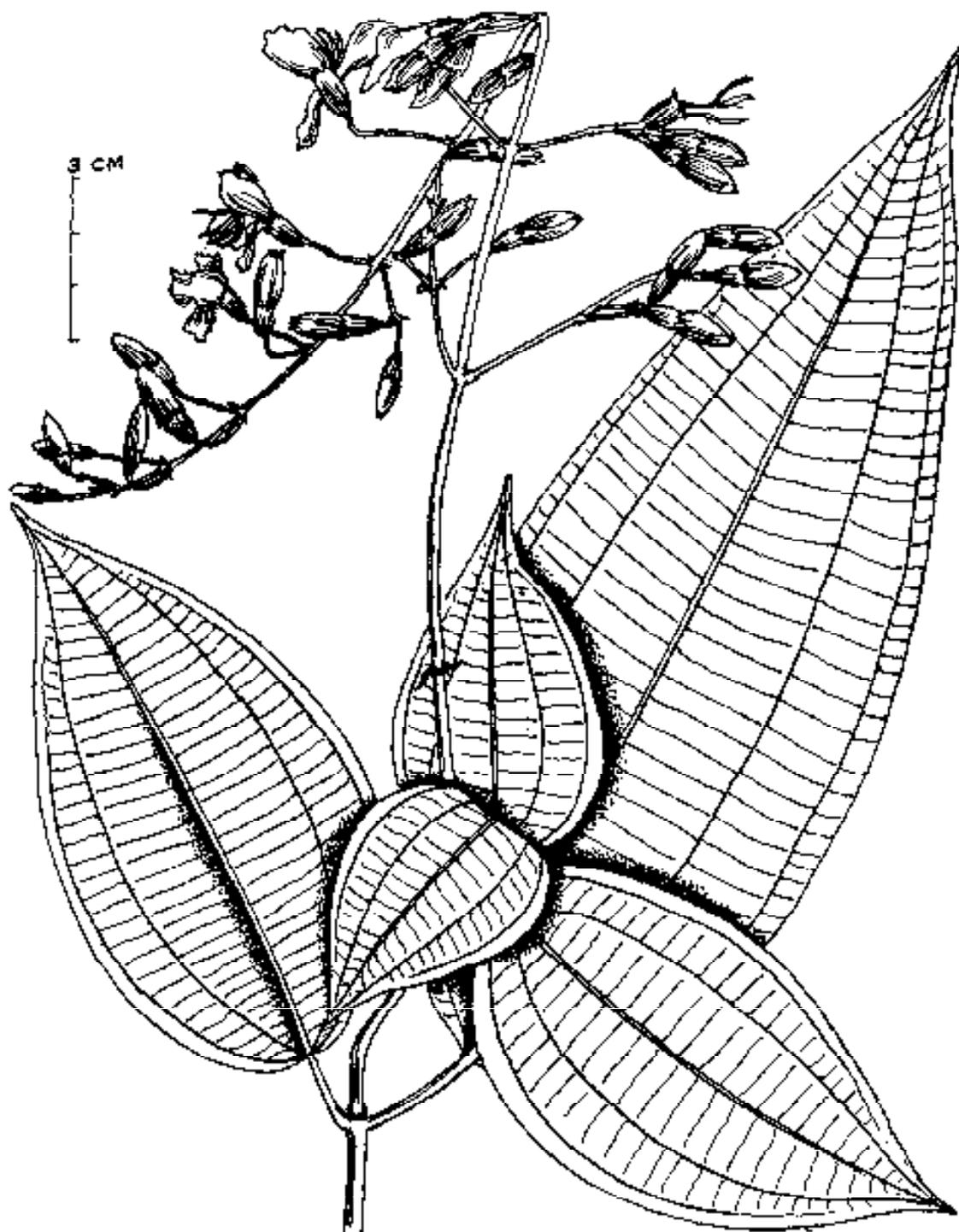


Fig. 129: *Oxyspora paniculata* (D. Don) DC.

glabrescent above, bristly and scurfy along the nerves beneath, membranous; basal nerves 5-7; petioles 2-2.5 cm long. Panicles copious, drooping, 18-26 cm long, branches ending in cymes; flowers with purple pedicels, 10-15 mm across, pink-purple; calyx tube 5-6 mm long; petals ovate, *ca* 7 mm long. Capsules ellipsoid, *ca* 10 mm long, 8-ribbed.

Fl. & Fr.: Throughout the year but mainly during July-October.

On hill slopes and along the forest edges in shaded places. Tuisenhar, 1200 m, *Parry* 325 (*vide* C.E.C. Fischer, *l.c.*); Phongphui, 1560 m, *Parry* 526 (*vide* C.E.C. Fischer, *l.c.*) Kawlhkuih-Tuichang road, *K.P. Singh* 94443, Ruallung, *M. Sawmliana* 95537; Seling, *M. Sawmliana* 95539; Hnathial, 760 m, *Mao* 107027.

2. ***Oxyspora vagans* (Roxb.) Wallich**, *Pl. Asiat. Rat.*, 1: 78. 1830; excl. var. B.; C.B. Clarke in *Hook. f.*, *Fl. Brit. India* 2: 526. 1879; Kanjilal *et al.*, *Fl. Assam* 2: 300. 1938; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 95. 1938. *Melastoma vagans* Roxb., *Fl. Ind.* 2: 404. 1824.

Shrubs, 1-2 m tall. Leaves opposite, elliptic to ovate-lanceolate, 7-15 x 5-9 cm, base subcordate, acute to acuminate at apex, membranous, glabrous except nerves above; base 5-7-nerved; petioles 1-6 cm long. Panicles terminal. Flowers *ca* 1 cm across, purplish-red; calyx tube *ca* 6 mm long, pubescent with constricted neck; petals *ca* 6 mm long, acuminate. Capsules ellipsoid, 5-6 x 4-5 mm, glabrous, 8-ribbed.

Fl. & Fr.: September-March.

Reported on the basis of C.E.C. Fischer (*l.c.*).

6. SARCOPYRAMIS Wallich

***Sarcopyramis napalensis* Wallich**, *Tent. Fl. Nap.* 32, t. 23 1824; C.B. Clarke in *Hook. f.*, *Fl. Brit. India* 2: 541. 1879; Kanjilal *et al.*, *Fl. Assam* 2: 308. 1938; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 96. 1938.

Erect, weak, glabrous herbs, 13-20 cm high; stems succulent. Leaves grouped near the top of stem, ovate-lanceolate, 2-5 x 1-2.5 cm, base acute, subequal, long acuminate at apex, serrulate along margins, membranous; basal nerves 3; petioles 10-25 mm long. Flowers 10-12 mm across, pink-rose purple, solitary or 2-3-flowered in fascicles, terminal and axillary;

pedicels 2-6 mm long; calyx obpyramidal, 4, 2-3 mm long, glabrous lobes fimbriate; petals ovate; 4, \pm 6 mm long; stamens 8, equal. Capsules ovoid, \pm 7 mm long, quadrangular.

Fl. & Fr.: August-January.

Near springs. Thiak, 1200 m, *Parry 54* (*vide* C.E.C Fisher, *l.c.*); Sialsuk, 1310 m, *Deb 30714*.

7. SONERILA Roxb.

- | | |
|-------------------------------------------------------------------------------------------------|---------------------------|
| 1a. Stemless herbs | ... 1. <i>S. khasiana</i> |
| 1b. Herbs with distinct stem: | |
| 2a. Herbs up to 10 cm high; leaves 1-2.5 cm long;
margins entire; petioles up to 0.5 cm long | ... 3. <i>S. tenera</i> |
| 2b. Herbs 10-20 cm high; margins serrulate and ciliate;
petioles 2.5 cm long | ... 2. <i>S. maculata</i> |

1. *Sonerila khasiana* C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 539. 1879; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 96. 1938. *S. villosa* C.E.C. Fischer in Kew Bull. 1932: 199. 1932. **Fig. 130.**

Small herbs, up to 10 cm high; stem absent. Leaves ovate to oblong-ovate, 1-3 x 0.7-2 cm, base rounded to subcordate; acute to subobtusate at apex, serrulate, ciliate at margins, upper surface scattered, bristly hairy; basal nerves 3-5(-7); petioles 1-4 cm long, hairy; hairs reddish-brown. Peduncles 2.5-9 cm long; flowers 1-1.5 cm across, purple; calyx campanulate, 3-5 mm long, glabrous; petals elliptic, 5-6 mm long. Capsules oblong, ca 4 mm long, funnel-shaped.

Fl. & Fr.: July-February.

On Wet rocks. Lungleh, 64 miles South, 750-1200 m, *Wenger 323* (*vide* C.E.C. Fischer, *l.c.*); Sairep, *K.P. Singh 94180*; Hnathial, 760 m, *Mao 107026*.

2. *Sonerila maculata* Roxb., Fl. Ind. 1: 180. 1820; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 537. 1879; Kanjilal *et al.*, Fl. Assam 2: 304. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 96. 1938. *Thaksenhlo-suak*, *Vangvathlo-chi-khat* (Lushai). **Fig. 131.**

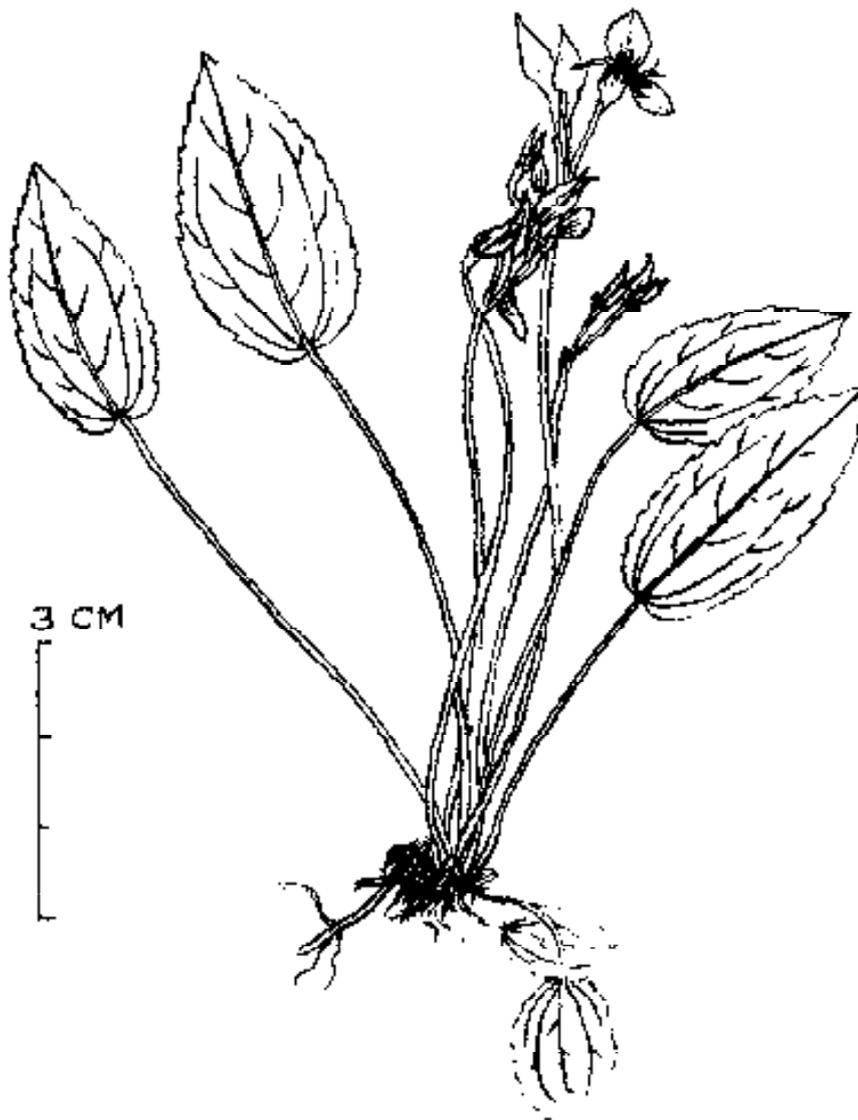


Fig. 130: *Sonerila khasiana* C.B. Clarke

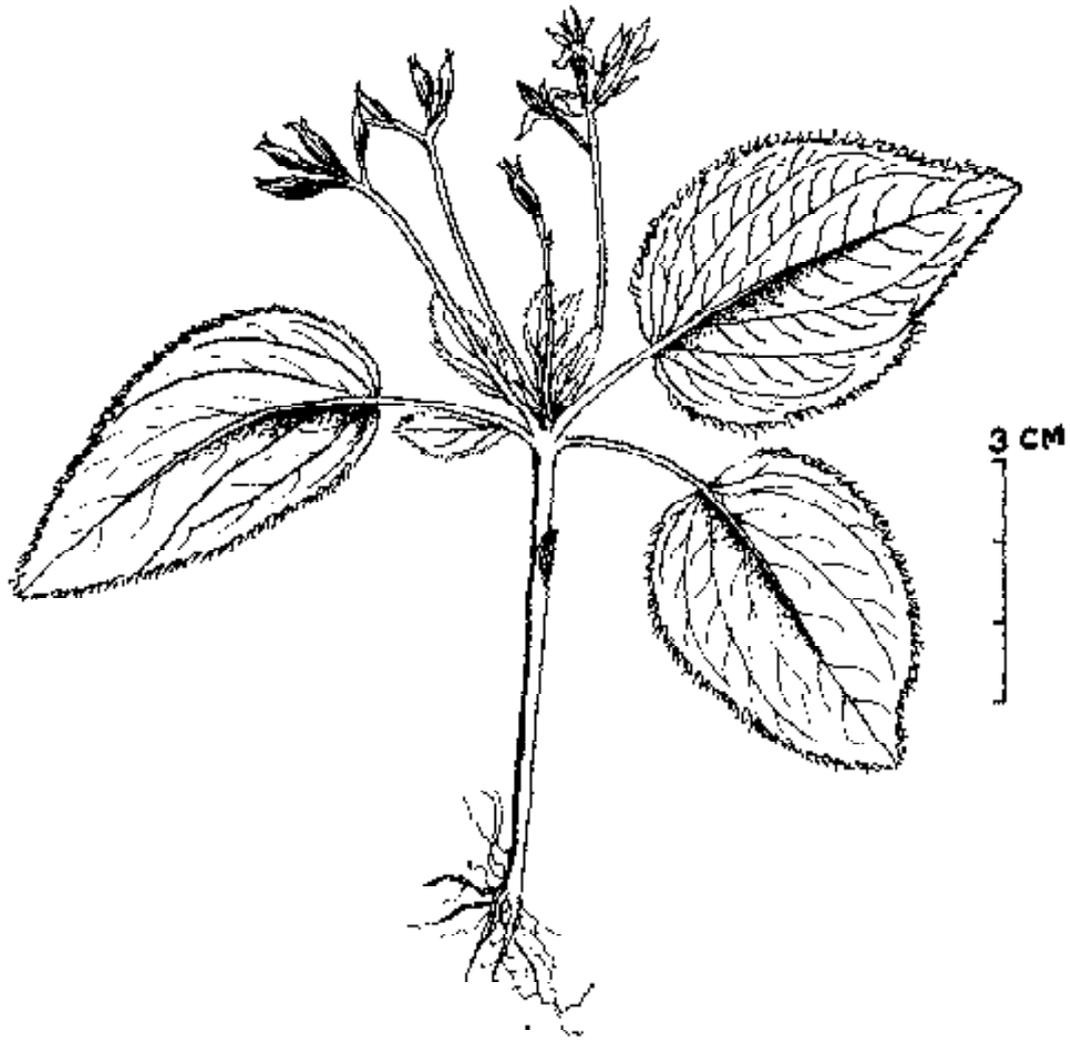


Fig. 131: *Sonerila maculata* Roxb.

Small herbs, 10-20 cm high; stems with spreading hairs. Leaves opposite, ovate to lanceolate, 3.0-10 x 2.0-5.0 cm, base unequal to rounded, acute to attenuate at apex, serrulate and ciliate along margins, both surfaces with spreading hairs, under surface sometimes purple; lateral nerves 4-6 pairs; petioles 2.0-5.0 cm long, hairy. Flowers 3-merous, 10-12 mm across, purple, present in condensed, axillary, scorpioid cymes; calyx tube 3-5 mm long, campanulate, glabrous; petals \pm 7 mm long, elliptic. Capsules 5-7 x 2-4 mm, glabrous, oblong, funnel-shaped.

Fl. & Fr.: September-February.

Very common, on ground in moist places inside forests. Aizawl, 900 m, *Parry* 48, 49, 50, 51 (*vide* C.E.C. Fischer, *l.c.*); Lungleh, *Gage* 259 (CAL); Kheitung, *Deb* 31189; Aizawl to Taitaw; *Dutta*, 33207; Lawngtalai to Kawlchaw, *K.P. Singh* 92876; Denglang track, *K.P. Singh* 94118; Tut, on way to Mamit, *D.K. Singh* 99004; Teirei, 280-1300 m, *M. Sawmliana* 101742.

3. *Sonerila tenera* Royle, *Illustr., Bot. Him.* t. 45, f. 2. 1834 & 215, 1835; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 530. 1879; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 96. 1938.

Weak herbs, up to 10 cm high. Leaves ovate-elliptic, 1-1.2 x 0.7-1.2 cm, base rounded, subacute at apex, nearly entire along margins, membranous, upper surface scarcely hairy; petioles up to 5 mm long. Peduncles 3-5 cm long; flowers 3-merous, pale pink, in axillary and terminal scorpioid spikes; calyx tube funnel-shaped, \pm 5 mm long; petals 3, ovate. Capsules trigonous, \approx 6 mm long, funnel-shaped-obconical, narrowed towards base.

Fl. & Fr.: July-December.

Scarce, occurs in grass edges of dry hill-rice fields. Blue mountain, 80 miles South-East of Lungleh, 900-1200 m, *Wenger* 395 (*vide* C.E.C. Fischer, *l.c.*).

LYTHRACEAE

(K.P. Singh)

1a. Trees or shrubs, calyx thick:

- 2a. Petals absent; flowers minute ...2. *Crypteronia*
- 2b. Petals present, flowers showy:
- 3a. Flowers in terminal or axillary panicles; leaves not gland dotted; calyx tube straight, not coloured; seeds winged above ...4. *Lagerstroemia*
- 3b. Flowers in branched or simple short racemes; leaves black gland dotted beneath; calyx tube curved, scarlet; seeds not winged ...6. *Woodfordia*
- 1b. Small herbs, calyx membranous:
- 4a. Flowers zygomorphic ...3. *Cuphea*
- 4b. Flowers Actinomorphic:
- 5a. Flowers solitary or in spicate or racemose inflorescence; petals present; capsules 2-4-valved ...5. *Rotala*
- 5b. Flowers in axillary cymose inflorescence; petals absent; capsules unilocular ...1. *Ammannia*

1. AMMANNIA L.

Ammannia baccifera L., Sp. Pl. 120. 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 569. 1879; Kanjilal *et al.*, Fl. Assam 2: 316. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 96. 1938.

Annual, erect, glabrous herbs, up to 50 cm high. Leaves opposite or alternate, oblong to narrow-elliptic or oblanceolate, 1.5-4 x 0.3-1 cm, base cuneate, acute at apex, entire at margins; petioles absent. Cymes dichasia, compact; flowers axillary in dense clusters on stem, 4 or 5-merous; calyx tube hemispherical, ca 2 mm long; lobes 4(-5); petals absent. Capsules globose, 1-1.5 mm across, depressed; seeds black, ca 20.

Fl. & Fr.: December-April.

Lungleh, 1200m, Parry 88 (*vide* C.E.C. Fischer, *l.c.*).

2. CRYPTERONIA Blume

Crypteronia paniculata Blume, Bijdr. 1151. 1826; Kanjilal *et al.*, Fl. Assam 2: 314. 1938. *C. glabra* (Wallich) Planchon *ex* Endl., Gen. Pl. Suppl. 4(2): 39. 1847; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 574. 1879.

Trees, 15-20 m tall with fluted stem. Leaves opposite, lanceolate to ovate-lanceolate, 4-12 x 3-5 cm, base acute or tapering, acuminate at apex, entire at margins, glabrous on both surfaces; petioles 5-10 mm long. Panicked racemes branched near the base or fascicled at the end of branches or on nodes, 8-13 cm long; flowers *ca* 2 mm across, greenish-pale; calyx tube cup-shaped, *ca* 1 mm long; lobes 5, triangular; petals absent; stamens 5. Capsules globose, *ca* 0.25 cm across with a persistent style, pubescent; seeds many.

Fl. & Fr.: October-March.

Thingphal, 900 m, *Parry* 443 (*vide* C.E.C. Fischer, *l.c.*); Hauruang, 4 miles from Lungleh, 66 m, *Deb* 31383.

3. CUPHEA P. Browne

Cuphea balsamona Cham. & Schlecht in *Linnaea* 2: 363. 1827.

Small, much branched herbs, up to 30-75 cm high with ascending branches arising slightly above the ground; young parts hairy. Leaves opposite, shortly petioled, elliptic-oblong or \pm obovate, 1-2.5 x 0.5-1 cm, base narrowed, acute at apex, entire along margins, coarse to hairy on both surfaces. Flowers extra axillary, solitary or in small leafy racemes, deep pink, 6-10 mm long; calyx tubular, 3-5 mm long, longitudinally ribbed with short spur at base of posterior side; lobes short; petals 6, oblong-obovate, 2-3 mm long, slightly unequal; stamens 11; style enclosed within calyx. Capsules enclosed by hypanthium, dehiscent on one side; seeds 2-6, \pm rounded, 1-1.5 mm across, flat, brown.

Fl. & Fr.: Throughout the year.

A South American species, naturalized in North-East India. Common in moist and open places, roadside, fields etc. Kolasib, *D.K. Singh* 93299.

4. LAGERSTROEMIA L.

- 1a. Flowers more than 4 cm across; calyx tube ribbed ... 3. *L. speciosa*
 1b. Flowers less than 4 cm across; calyx tube not ribbed.
 2a. Flowers less than 1 cm across; petals white,
 5-6 mm long; fruits ovoid-ellipsoid ... 2. *L. parvifolia*
 2b. Flowers more than 1.5 cm across; petals white or pink
 1-1.5 cm long; fruits obconic ... 1. *L. indica*

1. *Lagerstroemia indica* L., Syst. ed. 10. 1076. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 2: 575. 1879; Kanjilal *et al.*, Fl. Assam 2: 312. 1938.

Shrubs to small trees, up to 10 m tall with greyish white, smooth bark. Leaves subsessile, oblong or obovate, obovate-orbicular, 3-7 x 2-3.5 cm, base cuneate or narrow, subobtusate or subacute at apex, glabrous on both sides at maturity. Panicles subpyramidal, 10-20 cm long puberulous; flowers 2-3 cm across, very attractive, pink, rose or white; calyx not ribbed; petals suborbicular, 1-1.5 cm long, clawed with much crisped margins; claw slender, ca 8 mm long. Capsules obconic, up to 1 cm across.

Fl. & Fr.: May-December

Commonly cultivated as ornamentals.

2. *Lagerstroemia parviflora* Roxb., Pl. Corom. 1: 47, t. 66. 1795; C.B. Clarke in Hook. f., Fl. Brit. India 2: 575. 1879; Kanjilal *et al.*, Fl. Assam 2: 310. 1938.

Deciduous, tall trees, up to 30 m with ash coloured, smooth bark. Leaves ovate, ovate-elliptic or ovate-lanceolate, 3-10.5 x 2-4.5 cm, base rounded; apex acute or acuminate, entire along margins, glabrous above, puberulous along the nerves beneath, coriaceous; lateral nerves 5-7 pairs; petioles 3-7 mm long. Panicles or cymes axillary or terminal, 2-5-flowered, up to 20 cm long; flowers 0.5-0.7 cm across, white, fragrant; calyx not ribbed; tube cupular with 6 teeth; petals 6, 5-6 mm long, clawed; claw ca 2 mm long; limb 3-4 mm long, margins undulate. Capsules 1.5-3.5 cm long, ellipsoid or ovoid; lower portion immersed in the accrescent calyx; seeds with terminal wings.

Fl. & Fr.: April-December.

Commonly cultivated as ornamentals.

3. *Lagerstroemia speciosa* (L.) Pers., Synops. 2: 72. 1806. *Munchausia speciosa* L. in Munch Der Hausv. 1: 357, t. 1770. *L. flos-reginae* Retz., Obs. Bot. 5: 25. 1789; C.B. Clarke in Hook. f., Fl. Brit. India 2: 577. 1879 *p.p.*; Kanjilal *et al.*, Fl. Assam 2: 311. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 96. 1938. *Thladaw*, *Thlado*, *Thingdou* (Lushai); *Patawngpa* (Lakher). **Fig. 132.**

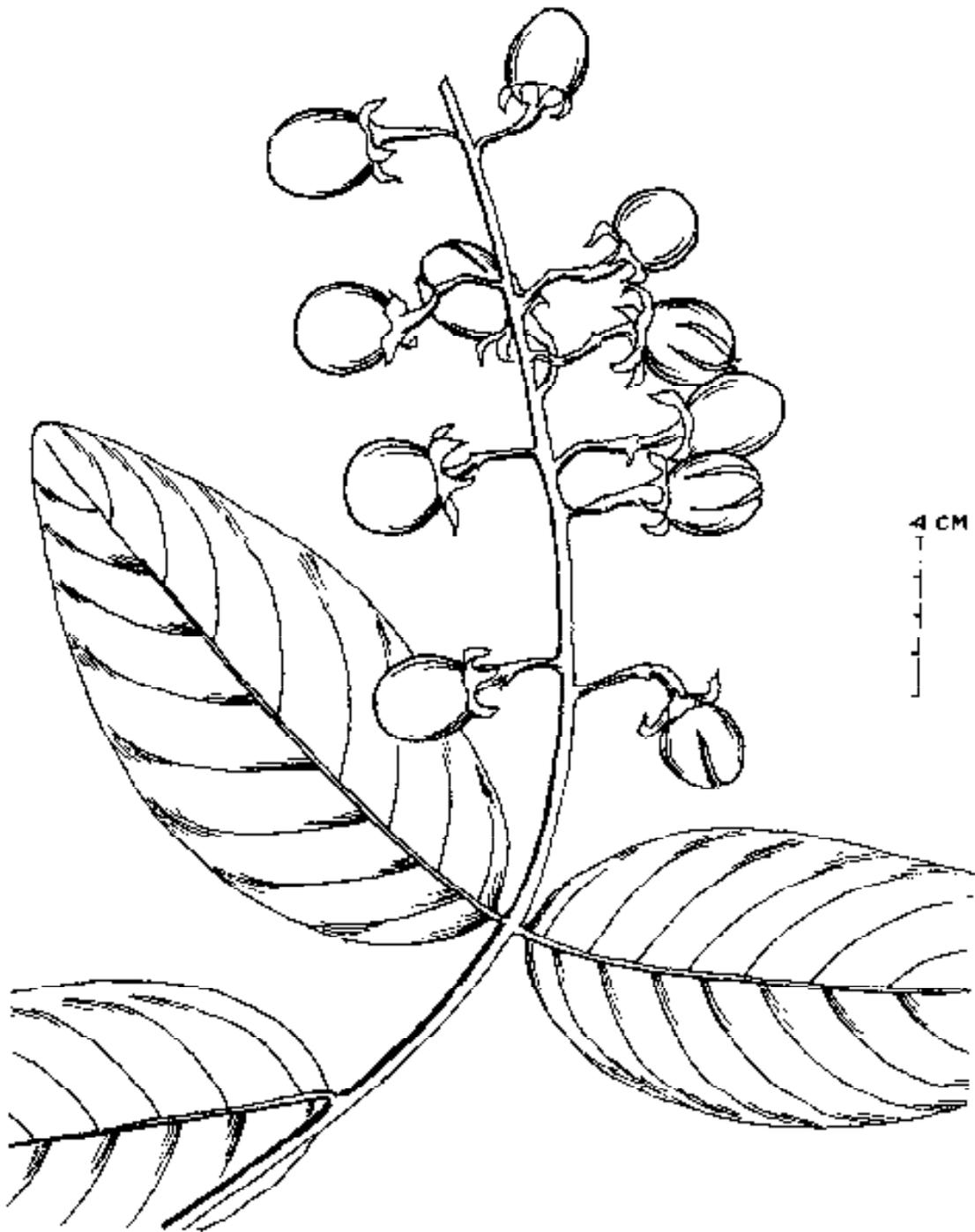


Fig. 132: Lagerstroemia speciosa (L.) Pers.

Trees, 10-18 m tall with grey or pale brown, smooth bark. Leaves elliptic, oblong-elliptic or oblong-lanceolate, 10-20 x 4-8 cm, base rounded or truncate, acuminate at apex, entire along margins, glabrous on both surfaces, nerves prominent beneath; lateral nerves 10-12 pairs; petioles 5-10 mm long. Panicles terminal, up to 25 cm long; flowers 5-8 cm across, mauve-purple; calyx 12-15 mm long, tomentose; calyx tube ribbed with 6 teeth; petals 6-7, 3-4 cm long, crumpled; margin erose; claw 5-7 mm long. Capsules oblong-ovoid, 2-3 cm across, smooth, seated on persistent woody, ribbed calyx tube; seeds *ca* 1.5 cm long, winged.

Fl. & Fr.: June-December.

Sairep forest, *Dutta* 33585; Kolasib, *D.K. Singh* 93147; Thenzawl, *K.P. Singh* 93908; Phairuang, *K.P. Singh* 94200; Hnathial, 780 m, *Mao* 107024.

5. ROTALA L.

- 1a. Leaves cauline, ovate to elliptic; flowers solitary, axillary in many leafy spikes; petals linear, persistent; capsules 2-valved ... 1. *R. indica*
- 1b. Leaves cauline, broadly elliptic or suborbicular; flowers in dense terminal spikes; petals deciduous; capsules 4-valved ... 2. *R. rotundifolia*

1. *Rotala indica* (Willd.) Kochne in Bot. Jahrb. 1: 172. 1880; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 38. 1987. *Peplis indica* Willd., Sp. Pl. 2: 244. 1799. *Ammannia peptoides* Spreng., Syst. 1: 444. 1824; C.B. Clarke in Hook. f., Fl. Brit. India 2: 566. 1879; Kanjilal *et al.*, Fl. Assam 2: 316. 1938.

Annual, creeping or ascending, glabrous herbs, 15-30 cm; stems narrowly winged; branches fleshy, quadrangular. Leaves opposite, larger on main stem, obovate or spatulate, 40-17 x 2-9 cm, base narrowed or subcordate, acute to obtuse-mucronate at apex, sessile. Flowers solitary, axillary in *ca* 4 cm long, lateral spikes, purple; calyx tube campanulate, *ca* 2 mm long, appendages absent; lobes 4, lanceolate; petals 4, obovate, 0.5 mm long. Capsules ellipsoid, *ca* 2 mm long, bivalved, red.

Fl. & Fr.: January-October.

In moist rice fields. Panchagram, *Deb* 31492.

2. *Rotala rotundifolia* (Roxb.) Koehne in Bot. Jahrb. 1: 175. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 96. 1938. *Ammannia rotundifolia* Roxb., Fl. Ind. 1: 446. 1820; C.B. Clarke in Hook. f., Fl. Brit. India 2: 566. 1879, *p.p.*; Kanjilal *et al.*, Fl. Assam 2: 316. 1938. **Fig. 133.**

Perennial, glabrous herbs with creeping stems and many erect branches, 10-25 cm in length. Leaves opposite, sessile, elliptic or suborbicular, 0.5-1 x 0.4-0.9 mm, base rounded to narrow, rounded at apex. Flowers 1.5-2 cm long, in terminal dense leafless spikes, purple, tetramerous; calyx tube campanulate, *ca* 1.5 mm long, appendages absent; lobes 4, *ca* 1 mm long; petals 4, obovate-suborbicular, *ca* 1.5 mm long. Capsules ellipsoid, 4-valved; seeds ellipsoid, brown-yellow, peltate.

Fl. & Fr.: November-May.

Scarce, in marshy land. Thenzawl, 900 m, *Parry* 86 (*vide* C.E.C. Fischer, *l.c.*); Panchagram, *Deb* 31489; Mizo hills, *Dutta* 88447.

6. WOODFORDIA Salisb.

Woodfordia fruticosa (L.) Kurz in J. As. Soc. Bengal 40: 56. 1871; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 96. 1938. *Lythrum fruticosum* L., Syst. ed. 10. 1045. 1759. *Woodfordia floribunda* Salisb., Parad. Lond. t. 42. 1806; C.B. Clarke in Hook. f., Fl. Brit. India 2: 872. 1879.

Shrubs, *ca* 1 m high with spreading long branches and reddish brown bark, young parts hairy with small black glands. Leaves opposite, subsessile, linear-lanceolate, 5.5-10 x 1.5-2.3 cm, base rounded, acuminate at apex, puberulous above, grey, pubescent and gland dotted beneath; lateral nerves 6-12 pairs. Flowers in fascicled axillary racemes, scarlet; calyx tube tubular, 1.0-1.5 cm long, red, oblique at mouth; lobes 6; petals 6, white, small, rarely exceeding the calyx lobes; stamens exserted; filaments red; ovary 2-celled. Capsules ellipsoid, *ca* 1 cm long, enclosed within persistent calyx tube.

Fl. & Fr.: January-May.

Champhai, 1500 m, *Parry* 185 (*vide* C.E.C. Fischer, *l.c.*); *s.loc.*, *Parry*, *s.num.*, (CAL); Vombuk, 1500 m, *Parry* 605 (*vide* C.E.C. Fischer, *l.c.*); 5 km Lungleh-Champhai road, *Deb* 31063.

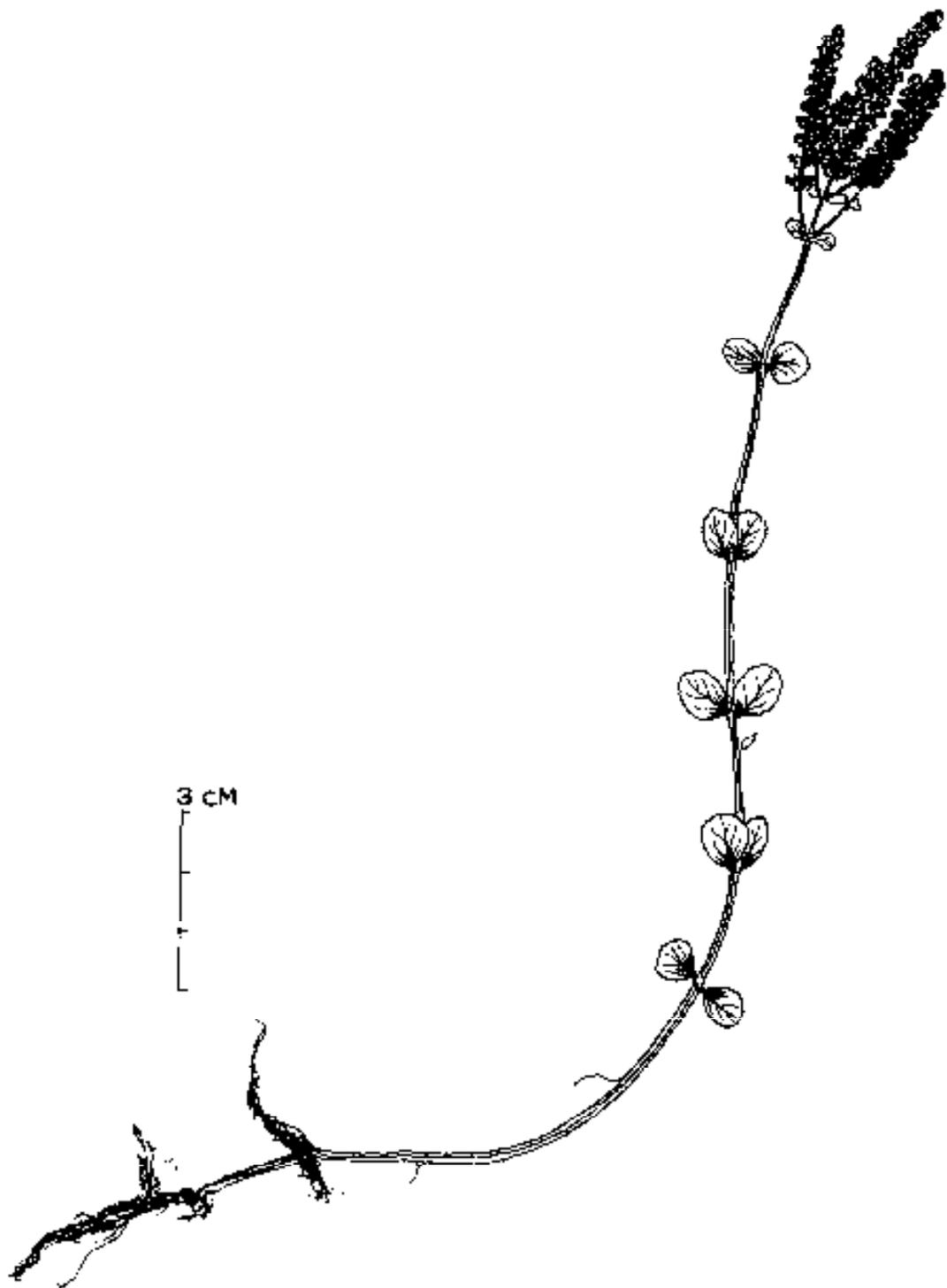


Fig. 133: *Rotala rotundifolia* (Roxb.) Kochne

PUNICACEAE

(K.P. Singh)

PUNICA L.

***Punica granatum* L.**, Sp. Pl. 472. 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 581. 1879. *Theibuhfai* (Lushai).

Shrubs or small trees, up to 5 m tall, branches near the base and often provided with spines. Leaves opposite or clustered, oblong or obovate, 1-5 x 0.5-2 cm, base narrower, apex obtuse or narrower, entire along margins, surface shiny, glabrous on both surfaces. Flowers at the top of the branchlets, orange-red; calyx tube funnel-shaped, 2-3 cm long, coriaceous, red or pale yellow; lobes 5-7, 8-12 mm long, erecto-patent or slightly recurved, thick; petals brightly red, 1.2-1.5 x 1-2 cm, erecto-patent or patent with rounded apex. Berries subglobose, 3-12 cm in diam., red-pink or yellowish-white, crowned by calyx segments; seeds numerous, juicy.

Fl.: Feb-May; *Fr.*: May-June.

Usually cultivated for edible fruits in the gardens or in residential compounds. Sialsuk, *Dutta* 33478.

SONNERATIACEAE

(K.P. Singh)

DUABANGA Buch.-Ham.

***Duabanga grandiflora* (Roxb. ex DC.) Walp.**, Repert. 2: 114. 1843. *Lagerstroemia grandiflora* Roxb. ex DC. in Mem. S. Hist. Nat. Geneve 32: 84. 1826. *Duabanga sonneratioides* Buch.-Ham. in Trans. Linn. Soc. 17: 177. 1835; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 579. 1879; Kanjilal *et al.*, Fl. Assam 2: 312. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 96. 1938, *Zuang* (Lushai); *Azeu* (Lakher).

Tall, evergreen trees, up to 28 m with narrow crown and elongated drooping branches. Leaves opposite, oblong to ovate-oblong, 12-30 x 5-12 cm, base cordate, apex shortly acuminate, entire along margins, glabrous on both surfaces, coriaceous; lateral nerves 20-26 pairs; petioles short,

thick, 0.3-0.5 cm long. Flowers 6-8 cm across, creamy-white, in compound terminal corymbs; calyx 6-8-lobed, cup-shaped; cup 2-3 cm across, persistent, segments 1.3-2 cm long; petals 2.5-3 cm long, falling early, clawed, crumpled; stamens many. Capsules ovoid-globose, 5-7 cm across, glabrous, coriaceous, brownish; seeds minute.

Fl. & Fr.: March to October.

Very common, along roadside in open places. Aizawl; 900 m, *Parry* 642 (*vide* C.E.C. Fischer, *l.c.*); Lungleh, 900 m, *Gage* 72 (CAL); on way to Theiriak, *Deb* 31251; Blue mountain, *Dutta* 33443; Lawngtalai-Kawlechaw, *K.P. Singh* 92850; Kolasib, *D.K. Singh* 93124, *Wadhwa* 96601.

ONAGRACEAE

(K.P. Singh)

- 1a. Petals white or yellow; capsules breaking up irregularly into pieces; seeds not comose ... 2. *Ludwigia*
 1b. Petals purple; capsules narrowly linear, 4-valved; seeds comose ... 1. *Epilobium*

1. EPILOBIUM L.

Epilobium brevifolium D. Don, subsp. ***trichoneurum*** (Hausskn) Raven in Bull. Bot. Brit. Mus. Nat. Hist. Bot. 2: 362. 1962. *Epilobium trichoneuron* Hausskn in Oesterr. Bot. Zeits. 29: 54. 1879; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 96. 1938. *E. hookeri* C.B. Clarke in Hook. f., Fl. Brit. India 2: 585. 1879; Kanjilal *et al.*, Fl. Assam 2: 371. 1938.

Perennial erect herbs or undershrubs, up to 1 m high; upper leaves alternate; lower leaves opposite, elliptic to oblong, lanceolate, 1-3.5 x 0.5-1.5 cm, base cuneate to rounded, subacute at apex, serrulate-dentate along margins, sparsely pubescent specially on nerves; lateral nerves 5-6 pairs; petioles up to 2 mm long. Flowers ± 1 cm across, magenta pink, solitary or in paniced terminal racemes; calyx tube villous; lobes 4, oblong-lanceolate, ca 5 mm long; petals 4, obovate, ca 6 mm long. Capsules linear, 5-7 cm long; seeds numerous, oblong, brown with silky coma.

Fl. & Fr.: September-December.

N. Vanlaiphai, 1500 m, *Parry* 362 (*vide* C.E.C. Fischer, *l.c.*).

2. LUDWIGIA L.

- 1a. Aquatic herbs with floating or creeping stems; petals 5, white ... 1. *L. adscendens*
 1b. Decumbent or erect herbs or undershrubs; petals 4, yellow:
 2a. Seeds dimorphic ... 2. *L. hyssopifolia*
 2b. Seeds not dimorphic:
 3a. Stamens 4; seeds uniseriate ... 4. *L. prostrata*
 3b. Stamens 3; seeds pluriseriate ... 3. *L. octovalvis*

1. **Ludwigia adscendens** (L.) Hara in J. Jap. Bot. 28: 290. 1953. *Jussiaea repens* L., Sp. Pl. 388. 1753; *Ludwigia claveliana* Gomez de la Maza et Molinet in Dicc. Bot. Nom. Vulg. Cub. & Puerto Riquenos 38. 1889; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 25. 1987; C.B. Clarke in Hook. f., Fl. Brit. India 2: 587. 1879.

Aquatic or semiaquatic herbs with profusely branched creeping stems, producing white, spongy, pseudo-pneumatophores at their nodes. Leaves alternate, variable, elliptic-oblong or oblanceolate, 1-5 x 0.5-2 cm, base narrowed, rounded at apex, glabrous on both surfaces; petioles 0.5-1.2 cm long, sparsely pubescent. Flowers axillary, solitary, white; sepals 5, 5-8 x 1.5-2 mm; petals 5, obovate; 8-12 x 5-7 mm; stamens 10. Capsules linear-cylindric, 1-3 x 0.3-0.4 cm, 10-ribbed, thick-walled, pubescent or glabrous; seeds pale brown, uniseriate in each cell, enclosed in a corky segment of the endocarp.

Fl.: Jan.-March; Fr.: Feb.-December.

Reported on the basis of Deb & Dutta (*l.c.*).

2. **Ludwigia hyssopifolia** (G. Don) Excell, Garcia de orta 5: 471-474, t.2. 1957; Raven in Steenis, Fl. Males, 1, 8: 104. 1977. *Jussiaea hyssopifolia* G. Don, Syst. 2: 693. 1832.

Annual herbs, up to 3 m tall, much branched with narrowly winged stems. Leaves alternate, elliptic to lanceolate, 2-5 x 0.5-1.2 cm, base narrowed, acute at apex, glabrous on both surfaces, nerves prominent beneath; petioles short, 3-5 mm long; flowers solitary, yellow; sepals lanceolate, 4, 2-3 x 0.8 mm; petals 4, elliptic; 2-3 x 1-2 mm; stamens 8; pollen grains shed singly. Capsules thin walled, linear, cylindric; 1.5-2 x 0.2

cm, seeds dimorphic; lower seeds uniseriate in each cell of capsule, brown, oblong, embedded in a cube of hard endocarp, cube ca 1 mm across; upper seeds free, pleuriseriate, pale brown, ovoid, little shorter than lower seeds.

Fl. & Fr.: Throughout the year.

Occurs in moist open places. Lawngtalai-Kawlhkuli, *K.P. Singh* 92871.

3. *Ludwigia octovalvis* (Jacq.) Raven in Kew Bull. 15: 476. 1962; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 38. 1987. *Oenothera octovalvis* Jacq., Enum. Syst. Pl. 19. 1760. *Jussiaea suffruticosa* L., Sp. Pl. 388. 1753.; C.B. Clarke in Hook. f., Fl. Brit. India 2: 587. 1879.

Branched herbs or undershrubs, up to 2 m tall. Leaves lanceolate or linear-lanceolate, 2.5 x 0.3-1 cm, base narrowed, apex acute or acuminate, sparsely hairy usually along the nerves beneath; lateral nerves 10-20 pairs, almost sessile. Flowers solitary, axillary, 2-2.5 cm long, tetramerous; calyx tube linear, wholly adnate to the ovary; sepals 4, ovate or lanceolate, 4-6 x ca 1 mm; petals 4, yellow, obovate; 4-5 mm long; stamens 8. Capsules linear-cylindrical, 1.5-2.5 x 0.2-0.4 cm, thin walled, 8-ribbed, ± pubescent; seeds pleuriseriate, reddish brown, grooved.

Fl. & Fr.: Throughout the year.

Panchagram. *Deb* 30464.

4. *Ludwigia prostrata* Roxb. [H. Beng. 11(1814), *nom. nud.*], Fl. Ind. 1: 441. 1820; C.B. Clarke in Hook. f., Fl. Brit. India 2: 588. 1879.

Fig. 134.

Small, prostrate to erect annual herbs, 30-60 cm high, subglabrous. Leaves alternate, elliptic to lanceolate, 1-6 x 0.5-1.5 cm, base narrowed, apex acute, thin glabrous on both surfaces; lateral nerves 8-15 pairs; petioles 2-10 mm long. Flowers axillary, solitary; sepals 4, deltoid, 1-2.5 x 0.5-1 mm, glabrous; petals 4, spatulate, yellow, 1-2.5 x 0.3-0.8 mm; stamens 4. Capsules 4-angled, thin walled, 1-2 x 1 mm, glabrous; seeds uniseriate, ovoid, pale brown.

Fl. & Fr.: October-April.



Fig. 134: *Ludwigia prostrata* Roxb.

Common, in moist places along the roadside. Thenzawl F.R.H. Compound, *K.P. Singh* 93844; Thenzawl-Buangpui road, *K.P. Singh* 93964; Laite, *K.P. Singh* 94090; Kawlhkuh-Tuichang *K.P. Singh* 94442.

TRAPACEAE

(K.P. Singh)

TRAPA L.

Trapa natans L., Sp. Pl. 1: 120. 1753. var. *bispinosa* (Roxb.) Makino in Linuma, Somoku-Dzusetsu ed. 3, 1: 137. 1907; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 25. 1987. *T. bispinosa* Roxb., Pl. Corom. t. 234. 1815; C.B. Clarke in Hook. f., Fl. Brit. India 2: 590. 1879, p.p.; Kanjilal *et al.*, Fl. Assam 2: 319. 1938.

Aquatic, floating, annual herbs with long flexuous stems. Leaves dimorphic; floating leaves in rosette, crowded in upper part of stem, broadly rhomboid, 2-4.5 x 2.5-6.5 cm, crenate-toothed on upper margins, glabrous, green and mottled brown above, densely hairy and reddish-purple beneath; petioles up to 12 cm long, inflated; submersed leaves opposite, pinnately dissected into root like inner segments. Flowers solitary, axillary, white, tetramerous; pedicels incurved at first, afterwards bending down below water; calyx hairy, 2 of the lobes becoming spines in the fruits; lobes lanceolate, acute; petals obovate; stamens 4. Drupes top-shaped, 2.5-3.5 cm across, 2-horned, 1-seeded, brown, ripening under water, surface uneven.

Fl. & Fr.: August-December.

Common, in lakes, ponds and tanks in the areas adjacent to Assam and Bangladesh. Usually cultivated for their edible fruits. Chimmui-pui; Palak lake, 290 m, *Lalramghinglova* 97178.

PASSIFLORACEAE

(K.P. Singh)

- | | |
|----------------------------------------------------|--------------------------|
| 1a. Flowers unisexual; corona absent or indistinct | ... 1. <i>Adenia</i> |
| 1b. Flowers bisexual; corona present, distinct | ... 2. <i>Passiflora</i> |

1. **ADENIA** Forsk

Adenia trilobata (Roxb.) Engl., in Bot. Jahrb. 14: 376. 1891. *Modecca trilobata* Roxb., Fl. Ind. 3: 133. 1832; Masters in Hook. f., Fl. Brit. India 2: 602. 1879; Kanjilal *et al.*, Fl. Assam 2: 323. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 97. 1938.

Large, glabrous climbers with woody base. Leaves palmately 3 or sometimes 5-lobed, distantly situated, 11-16 x 10-16 cm, lobe width 3-6 cm, base cordate or subtruncate, glabrous on both surfaces, biglandular on under surface near the base; main nerves 5-6; lateral nerves 2-5 pairs; petioles 5-8 cm long. Flowers 5-7 mm across, in axillary cymes; peduncles 10-15 cm long, dichotomously branched, terminating in a tendril. *Male flowers*: calyx 5-lobed, campanulate, 1-1.2 cm long; petals 5, smaller than sepals, obovate-oblong; stamens 5. *Female flowers*: sepals and petals same as in male flowers. Capsules oblong, 5-6 x 4 cm, on 1.2-1.5 cm long carpophore, 3-valved, narrowing at both ends; seeds many, reniform, flat, covered with white stony aril.

Fl. & Fr.: June-September.

S.loc. Dutta, 33248; Thenzawl-Chipher village, K.P. Singh 93945.

PASSIFLORA L.

- | | |
|--------------------------------------------|-----------------------------|
| 1a. Leaves simple, ovate elliptic | ... 4. <i>P. nepalensis</i> |
| 1b. Leaves 3-lobed : | |
| 2a. Leaves pubescent on both surfaces | ... 2. <i>P. foetida</i> |
| 2b. Leaves glabrous on both surfaces: | |
| 3a. Bracts with two glands at the base | ... 3. <i>P. incarnata</i> |
| 3b. Bracts without such glands at the base | ... 1. <i>P. edulis</i> |

1. **Passiflora edulis** Sims in Curtis Bot. Mag. 45: t. 1989. 1818; Kanjilal *et al.*, Fl. Assam 2: 323. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 38. 1987. *Sap-thei* (Lushai).

Perennial, woody climbers with glabrous stems. Leaves alternate, 3-lobed up to half of the length or more, 5-10 x 5-10 cm, base somewhat rounded; middle lobe more wider than two lateral lobes obovate or elliptic,

5-10 x 4-8 cm, acute to acuminate at apex, toothed along margins, glabrous on both surfaces; stipules \pm 1 cm long, linear, subulate; petioles 0.8-1.5 cm long, biglandular at apex. Flowers solitary, axillary or in terminal 3-4 cm long peduncles, 6-6.5 cm across; calyx saucer-shaped; lobes oblong, 2-2.5 cm long; petals oblong, 1-2.5 cm long, white or purplish; corona filaments 4 or 5 seriate; stamens 5. Fruits ellipsoid-glandular, 4-6 cm across, dark purple or brown purple, dotted; seeds oval, 5-7 x 3-4 mm, black, reticulate.

Fl. & Fr.: April-July.

Common, usually cultivated in the gardens. Aizawl-Taitaw, *Dutta* 33235; Kolasib, *D.K. Singh* 97161.

2. *Passiflora foetida* L., Sp. Pl. 959. 1753; Kanjilal *et al.*, Fl. Assam 2: 322. 1938. *Saptheisuak* (Lushai).

Climbing or trailing herbs with foetid smell and densely hispid branchlets. Leaves 3-lobed to half way down, suborbicular-ovate, 3-8 x 3-7 cm, base cordate, appressed glandular hairy on both surfaces; lobes acuminate or acute at apex, middle one larger and lateral smaller, 5-nerved at base; margins with gland tipped setaceous hairs; petioles 2-3.5 cm long, eglandular, gland tipped-hairy; stipules subreniform, 5-10 mm long, pinnatisect, glandular-pubescent. Flowers greenish white, up to 4 cm across, solitary, axillary; peduncles 2-3 cm long; calyx tube saucer-shaped, ovate-lanceolate, up to 15 mm long; petals 5, slightly shorter than calyx tube, oblong-lanceolate. Fruit a berry, globose, 2-3 cm across, invested by the epicalyx, yellow or red; seeds ellipsoid, *ca* 4 x 6 mm, pitted.

Fl. & Fr.: October-May.

Scarce in the area. Tuichang, new bridge road, *K.P. Singh* 94244.

3. *Passiflora incarnata* L., Sp. Pl. 959. 1753; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 97. 1938.

Glabrous, tendril climbers with terete stems. Leaves alternate, 3-lobed, 6-12 x 5-10 cm, base cordate, serrate at margins, membranous, glabrous on both sides; basal nerves 3; petioles 5-8 cm long with two glands at apex. Peduncles 6-10 cm long; bracts biglandular at base; flowers 5-7 cm across; calyx tube campanulate; sepals lanceolate-oblong; 2-3 cm long; petals \pm equal to sepals, white or lavender; corona many, purple or pink. Fruits ovoid-globose; 3-5 cm across, seeds ovate, 0.4-0.5 cm long, truncate.

Reported on the basis of C.E.C. Fischer (*l.c.*). A North American species probably cultivated in the gardens.

4. *Passiflora nepalensis* Wallich, Tent. Fl. Nepal, 20, t. 11. 1824; Masters in Hook. *f.*, Fl. Brit. India 2: 600. 1879; Kanjilal *et al.*, Fl. Assam 2: 322. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 97. 1938. *Passiflora geminiflora* D. Don., Prod. Fl. Nepal. 631. 1825.

Glabrous, slender, tendril climbers with angular stems, up to 2.5 m tall. Leaves alternate, ovate to lanceolate, 5-10 x 2 x 4.5 cm, base rounded or subcordate, acute to acuminate at apex, ± entire along margins, glabrous on both surfaces, basal nerves 3-5; lateral nerves 3-5 pairs; petioles 2-5 cm long with two glands. Flowers in axillary cymes, 0.8-1.2 cm across, whitish, cup-shaped; sepals 0.7-0.8 cm long, not horned; petals 0.6-0.7 cm long; corona filiform; stamens 5. Fruits subglobose to globose, 1-1.2 cm across, glabrous, purplish; seeds 10-15, ± 0.2 cm across, obovoid.

Fl. & Fr.: June-September.

Kawhkhulh, 1200 m, *Parry 75* (*vide* C.E.C. Fischer, *l.c.*); Thalthlang to South Vanlaiphai, *Dutta 34007*.

CARICACEAE

(K.P. Singh)

CARICA L.

Carica papaya L., Sp. Pl. 1036. 1753; Masters in Hook. *f.*, Fl. Brit. India 2: 599. 1879; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 97. 1938. *Mata bahla* (Lushai).

A herbaceous tree, 2-6 m tall, with milky latex and sometimes branching above; stem soft. Leaves alternate, spirally arranged, forming a crown above, palmately 5-9-lobed; lobes variously divided; base cordate; long petioled; petioles up to 1.5 m long, fistular. Dioecious; male flowers in long axillary drooping panicles, yellow, sessile; stamens 10, in two series; female flowers 2-3 cm across, yellow, in axillary short clusters; corolla gamopetalous; ovary free, 1-5-celled; ovules many. Fruits large, 1-celled berry, ellipsoid-obovoid, 12-25 x 10-18 cm, ripe ones yellow or orange-yellow; seeds many, black.

Fl. & Fr.: Throughout the year.

Commonly cultivated in Jhum land for edible fruits almost everywhere in Mizoram.

CUCURBITACEAE

(K.P. Singh)

- 1a. Ovules pendulous; flowers usually in panicles; stamens 5 :
- 2a. Leaves simple, not divided into leaflets ... 1. *Actinostemma*
- 2b. Leaves pedately divided into leaflets :
- 3a. Fruits trigonous, obovoid ... 3. *Gomphogyne*
- 3b. Fruits not trigonous, pea-like ... 4. *Gynostemma*
- 1b. Ovules horizontal; flowers not in panicles; stamens usually 3 (except in *Thladiantha*):
- 4a. Petals fimbriate :
- 5a. Leaves coriaceous; racemes rusty tomentose; petal fringes ca 15 cm long; ovules 12, seeds 6 ... 5. *Hodgsonia*
- 5b. Leaves membranous; racemes not rusty tomentose; petal fringes much shorter; ovules and seeds many ... 10. *Trichosanthes*
- 4b. Petals entire :
- 6a. Anther cells flexuose or conduplicate :
- 7a. Stamens inserted at the mouth of the calyx tube; anthers free; tendrils 2-5-fid ... 6. *Luffa*
- 7b. Stamens inserted below the mouth of the calyx tube; anthers \pm cohering; tendrils simple:
- 8a. Calyx with 2-3 scales at its base; male flowers with large bract ... 8. *Momordica*
- 8b. Calyx without scales at base; bracts absent ... 2. *Cucumis*
- 6b. Anther cells straight or curved, not conduplicate:
- 7a. Male racemes stout; flowers 10-15 mm long, bright yellow; stamens 5; stylar disc absent ... 9. *Thladiantha*
- 7b. Male racemes not stout; flowers 1-4 mm long, dull yellow; stamens 3; stylar disc cup-shaped ... 7. *Melothria*

1. ACTINOSTEMMA Griffith

Actinostemma tenerum Griffith, Pl. Cantor. 24, t. 3. 1837; C.B. Clarke in Hook. f., Fl. Brit. India 2: 633. 1879.

Small, climbing herbs, with thin, slender branches. Leaves narrowly ovate to sagittately trilobed, 2-6 x 1-4 cm, emarginate, acuminate at apex, denticulate at margins, upper surface punctate-scabrid, lower surface glabrous; petioles up to ca 1 cm long, thin; tendrils filiform. Flowers small, white, monoecious, in axillary panicles. Male flowers many, 7-12 cm long; sepals 5, subulate, 1-nerved, 4-8 mm long; petals 5, lanceolate-caudate, 4-8 mm long. Female flowers solitary, ca 2 cm long; ovary subglobose, verrucose, 1-celled. Fruits ovoid-conical, 1.5-2 cm long, ca 1 cm thick, half superior, covered with rough points; seeds ovate, compressed, 10-12 x 7-8 mm, reticulate.

Fl. & Fr.: May-October.

Scarce, in dense forests. Kawnpui-Tuichang, *K.P. Singh* 94421.

2. CUCUMIS L.

- | | |
|---------------------|--------------------------|
| 1a. Fruits smooth | ... 2. <i>C. melo</i> |
| 1b. Fruits echinate | ... 1. <i>C. hystrix</i> |

1. **Cucumis hystrix** H. Chakravarty in J. Bombay Nat. Hist. Soc. 50: 896. 1952 & in Rec. Bot. Surv. India 17(1): 110. 1959; Fasc. Fl. India 11: 32. 1982.

Elongated, branched, creeping herbs with angular-sulcate, hirsute stems. Leaves ovate, slightly trilobed, 4-7 x 3.5-6.5 cm, base cordate, acute at apex, margins denticulate, both surfaces hairy; petioles up to 4 cm long; tendrils simple. Fruits oblong, 3-3.5 x 1-1.5 cm, echinate; seeds 3-4 x 2 mm, obovate.

Fl. & Fr.: May-September.

Reported on the basis of H. Chakravarty (*l.c.*).

2. **Cucumis melo** L., Sp. Pl. ed. 1: 1011. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 2: 620. 1879; Kanjilal *et al.*, Fl. Assam 2: 332. 1938.

Robust, prostrate annuals. Leaves orbicular, reniform, 5-angular or moderately 3-7-lobed, base cordate, obtuse at apex, denticulate at margins, villose or subhirsute on both surfaces; tendrils simple. Male flowers in fascicles; peduncles up to 3 cm long; calyx tube narrow, 5-6 mm long, villose; corolla lobes ovate-oblong, ca 2 cm long, yellow; staminal filaments short peduncles. Female flowers up to 2 cm long, hairy. Fruits polymorphous, with smooth surface; seeds white, oblong, 5-8 x 2 mm, compressed, obtuse at ends.

Fl. & Fr.: July-October.

Common on ground in moist places along the road side nullahs in exposed condition. Kolasib, *D.K. Singh* 93143; Thingsat, *K.P. Singh* 97101.

Uses : Fruits edible.

3. GOMPHOGYNE Griffith

Gomphogyne cissiformis Griffith, Pl. Cantor. 26: t. 4, 1837; C.B. Clarke in Hook. f., Fl. Brit. India 2: 632, 1879; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 97, 1938; H. Chakraborty in Fasc. Fl. India 11: 51, 1982.

Weak, climbing herbs with slender branches and glabrous petioles. Leaves pedate, with serrate-dentate, lanceolate leaflets, membranous, acute at apex; petioles up to 5 cm long; middle leaflet 4-5 x 1-3 cm; lateral leaflet shorter; petiolules 2-5 mm long; tendrils 2-5 mm long, glabrous, filiform. Male racemes simple or branched; main rachis 10-30 cm long; calyx lobes up to 1.5 mm long; corolla lobes tri-nerved with entire margin, 2-3 x 1 mm. Female flowers in axillary fascicles or panicles, bracteolate. Fruits truncate, brown, costate, 8-14 x 7-12 cm; seeds sparsely tuberculate, dark-grey, truncate, 7-12 x 3-4 mm.

Fl. & Fr.: September-November.

Climbing over bushes in shady forests. *S.loc.*, *Wenger* 240 (*vide* C.E.C. Fischer, *l.c.*).

4. GYNOSTEMMA Blume

Gynostemma pedata Blume, Bijdr. 23, 1825; C.B. Clarke in Hook. f., Fl. Brit. India 2: 633, 1879; Kanjilal *et al.*, Fl. Assam 2: 331, 1938.

Slender, herbaceous climbers. Leaves pedately 3-7-foliolate; petioles up to 6 cm long; leaflets ovate-oblong, crenate-serrate at margins, acute at apex; middle leaflet 4-12 x 2-4 cm, lateral leaflets smaller, outer most leaflet very short; tendrils sulcate, simple to bifid, \pm puberulous. Flowers dioecious, minute, greenish white; male flowers in panicles; peduncles branched from base to apex; branches divaricate, 5-12 cm long; bracteoles 1-2 mm long; calyx triangular, acute, 0.5 mm long; corolla subulate, up to 2.5 mm long, uninerved, ciliate-denticulate at margins. Frutis globose, *ca* 7-9 mm thick, olive-green, glabrous; seeds compressed-ellipsoid, 2.5-3.5 x 2.5-3 mm, verrucose, yellowish.

Fl. & Fr.: July-October.

Thalthlang to South Vanlaiphai, *Dutta* 34014.

5. HODGSONIA Hook. f. & Thomson

Hodgsonia macrocarpa (Blume) Cogn. in DC., Monog. Phan. 3: 349. 1881. *Trichosanthes macrocarpa* Blume, Bijdr. 935. 1826. *Hodgsonia heteroclita* Hook. f. & Thomson in Prodr. Linn. Soc. 2: 257. 1853; C.B. Clarke in Hook. f., Fl. Brit. India 2: 606. 1879; Kanjilal *et al.*, Fl. Assam 2: 326. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 97. 1938. *Khaum* (Lushai).

Climbing shrubs, with robust, angular, glabrous stems, up to 30 m long. Leaves palmately 3-5-lobed, 15-20 cm across; lobes more or less deep, emarginate at base; acuminate at apex, both surfaces glabrous; petioles 4-7 cm long; tendrils robust, terete, bifid. Flowers tomentose. Male flowers in racemes; peduncles 10-25 cm long, bracteate; bracts fleshy, oblong, lanceolate; calyx tube 8-10 cm long, yellowish, mouth campanulate, lobes 5; corolla *ca* 5 cm long, yellow inside, white outside; lobes 5, 3-nerved, rotate, fimbriate. Female flowers solitary; peduncles short. Fruits reddish-brown, 12-grooved, 7-12 x 10-15 cm; seeds 3-6 pairs, flat, ellipsoid.

Fl. & Fr.: February-August.

Common, in tropical evergreen forests. Helio hills, Lungleh, *Gage* 101 (CAL); Aizwal, *Parry* 234 (*vide* C.E.C. Fischer, *l.c.*); Darzo to Leite, *Dutta* 34078; South Vanlaiphai, *K.P. Singh* 96860; Saithah, *D.K. Singh* 98826.

Uses: Silkworms are fed on the leaves.

6. LUFFA Miller

Luffa cylindrica (L.) M. Roem., Fam. 2: 63. 1846. *Momordica cylindrica* L., Sp. Pl. 1009. 1753. *Luffa aegyptiaca* Miller, Diet. 4: 500. 1785; C.B. Clarke in Hook. f., Fl. Brit. India 2: 614. 1879; Kanjilal *et al.*, Fl. Assam 2: 331. 1938. *Tetol gola* (Chakma).

Extensive climbers. Leaves palmately 5-angled or lobed to various extent, up to 20 cm long, almost equally broad; lobes triangular, acuminate at apex, denticulate along margins, upper surface punctate hairy, lower surface sparsely hairy; petioles 3-10 cm long; tendrils trifid. Flowers bright yellow, monoecious, male and female in the same axils. Male flowers in racemes; peduncles 8-12 cm long; calyx purple, broadly campanulate; lobes oblong-cuneiform, 2-3 x 1 cm, apex round; stamens 3, one unilocular; 2 bilocular, or five unilocular; filaments villous at base. Female flowers solitary, ovary cylindrical, hairy. Fruits fusiform, 15-50 x 5-12 cm, not angular, obtuse, fibrous inside; seeds ovate, 10-12 x 8-9 mm, smooth, usually black; margins slightly winged.

Fl. & Fr.: June-December.

Common, in forests at low elevations. Hauruang, 4 km from Lungleh, 670 m, *Deb* 31396; Tlabung, *K.P. Singh* 94298; Hnathial, 750 m, *Mao* 107036.

Uses: Young fruits eaten as vegetable.

7. MELOTHRIA L.

- | | |
|-----------------------------------------|--------------------------------|
| 1a. Plants dioecious; fruits oblong | ... 1. <i>M. heterophylla</i> |
| 1b. Plants monoecious; fruits globose : | |
| 2a. Leaves scabrous; seeds scrobiculate | ... 2. <i>M. maderaspatana</i> |
| 2b. Leaves glabrous; seeds smooth | ... 3. <i>M. perpusilla</i> |

1. Melothria heterophylla (Lour.) Cogn. in DC., Monogr. Phan. 3: 618. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 97. 1938. *Solena heterophylla* Lour., Fl. Cochinch. 514. 1790. *Zehneria umbellata* Thwaites, Enum. Pl. Zeyl. 125. 1853; C.B. Clarke in Hook. f., Fl. Brit. India 2: 625. 1879; Kanjilal *et al.*, Fl. Assam 2: 331. 1938. *Nauaawimu* (Lushai).

Fig. 135.

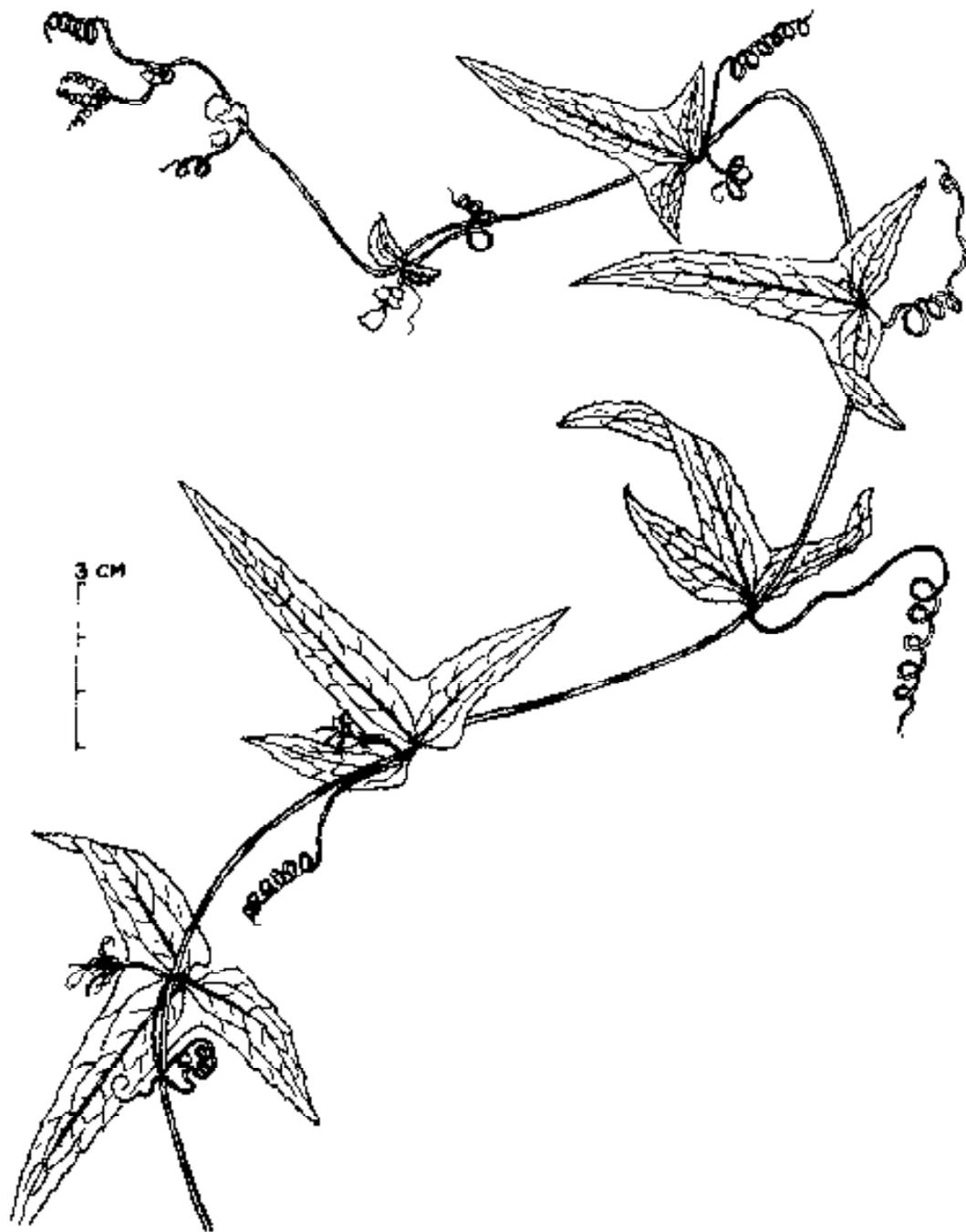


Fig. 135: *Melothria heterophylla* (Lour.) Cogn.

Perennial, scandent herbs, with slender, sulcate and glabrous branches. Leaves polymorphic, with a few minute glands at the base, undivided or trilobed to variously lobed, ovate, suborbicular, oblong or narrowly lanceolate, 5-18 cm long, base emarginate, acuminate at apex, denticulate or rarely entire at margins; tendrils simple. Dioecious. Flowers small, yellowish-white; male flowers fascicled or umbellate; female flowers solitary; calyx tube campanulate, ca 5 x 3 mm, glabrous, subulate; corolla segments 5, ca 1.5 mm long, puberulous. Fruits oblong, 4-5 x 2-2.5 cm, subangular, red; seeds many, subspherical, smooth, 5-7 x 4-5 mm, grey.

Fl. & Fr.: July-January.

Widely distributed in evergreen forests. Lungleh Road, *Godfrey*, 432 (CAL); North Vanlaiphai, *Deb* 31148; *D.K. Singh* 93049; Saiha-Bualpui, *Dutta* 33846; Serchip, *D.K. Singh* 93045; Leite, *K.P. Singh* 94089; Zote, *K.P. Singh* 94573; Thingsat, *K.P. Singh* 97102.

Uses: Roots, leaves and stems are eaten.

2. **Melothria maderaspatana** (L.f.) Cogn. in DC., Monogr. Phan. 3: 623. 1881; *Deb & Dutta* in J. Econ. Tax. Bot. 10(1): 38. 1987. *Bryonia scabrella* L.f., Suppl. 424. 1781. *Mukia scabrella* (L.f.) Arn. in Hook., J. Bot. 3: 276. 1841; C.B. Clarke in Hook., f., Fl. Brit. India 2: 623. 1879 (excl. syn).

Creeping, annual herbs with hispid branches. Leaves ovate, angulate or 3-5-lobed, 3.5-12 x 2.5-10 cm, acute at apex, membranous, denticulate along margins, upper surface scabrous; petioles 2-6 cm long; tendrils slender. Monoecious. Flowers solitary or a few fascicled; male flowers ca 4 mm across, yellow; calyx tube campanulate, ca 2 mm long, villous-hirsute; lobes subulate; corolla 2-4 mm long, yellow, deeply 5-partite; staminal filaments ca 5 mm long; female flowers yellow, calyx and corolla same as that of male. Fruits globose, 5-10 mm across, glabrous, baccate, greenish, yellow to red; seeds grey brown, ovoid-oblong, ca 4 x 2 mm, prominently scrobiculate, compressed.

Fl. & Fr.: June-February.

Rather common in moist places on stones as creeper. Between Sonai and Sakaulim, *Leslie*, 36 (CAL); South Vanlaiphai, *Dutta* 34057.

3. *Melothria perpusilla* (Blume) Cogn. in DC., Monog. Phan. 3: 607. 1881. *Cucurbita perpusilla* Blume., Cat. Hort. Buitenz. 105. 1823. *Zehneria hookeriana* Arn. in Hook., J. Bot. 3: 275. 1841; C.B. Clarke in Hook. f., Fl. Brit. India 2: 624. 1879.

Climbers with slender, sulcate branches. Leaves undivided or rarely 3-5 angular, lobed, ovate-cordate, 2-5.5 x 1.5-2.5 cm, acute at apex, undulate-denticulate along margins, glabrous; petioles 2-3.5 cm long; tendrils slender, glabrous. Monoecious; flowers on long peduncles; peduncles of male flowers, 2-5 cm long, 5-10-flowered; calyx tube, campanulate, ca 1 mm long, teeth recurved; corolla lobes 2-3 mm long, ovate-oblong; female flowers solitary. Fruits globose, 8-10 mm across, finely reticulate; seeds marginal, 3-4 x 2-3 mm, brown, smooth, compressed.

Fl. & Fr.: June-December.

Rather common in evergreen forests. Thenzawl, *K.P. Singh* 93882; Sairep forest, *K.P. Singh* 94153.

8. MOMORDICA L.

1a. Plants monoecious

... 1. *M. charantia*

1b. Plants dioecious

... 2. *M. dioica*

1. *Momordica charantia* L., Sp. Pl. 1009. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 2: 616. 1879; Kanjilal *et al.*, Fl. Assam 2: 330. 1938. *Changkha* (Lushai). **Fig. 136.**

Small, much branched climbers, with puberulous or tomentose stems. Leaves up to 10 cm long and almost equally broad, reniform or suborbicular, both surfaces glabrous, deeply 5-7 lobed; lobes lobulate, sinuate-dentate; petioles up to 6 cm long, thin; tendrils simple, pubescent. Flowers yellow; male flowers solitary; peduncles glabrous; bracts foliaceous, 5-15 mm long, reniform or cordate; corolla slightly irregular, yellow, up to 2 x 1 mm; female flowers bracteate, peduncles 5-10 cm long; ovary fusiform. Fruits oblong, 8-20 cm long, large, muricate-tuberculate, trivalved, dehiscing apically; seeds compressed, ca 12 x 8 mm, tridentate at ends, sculptured on the surface.

Fl. & Fr.: June-October.

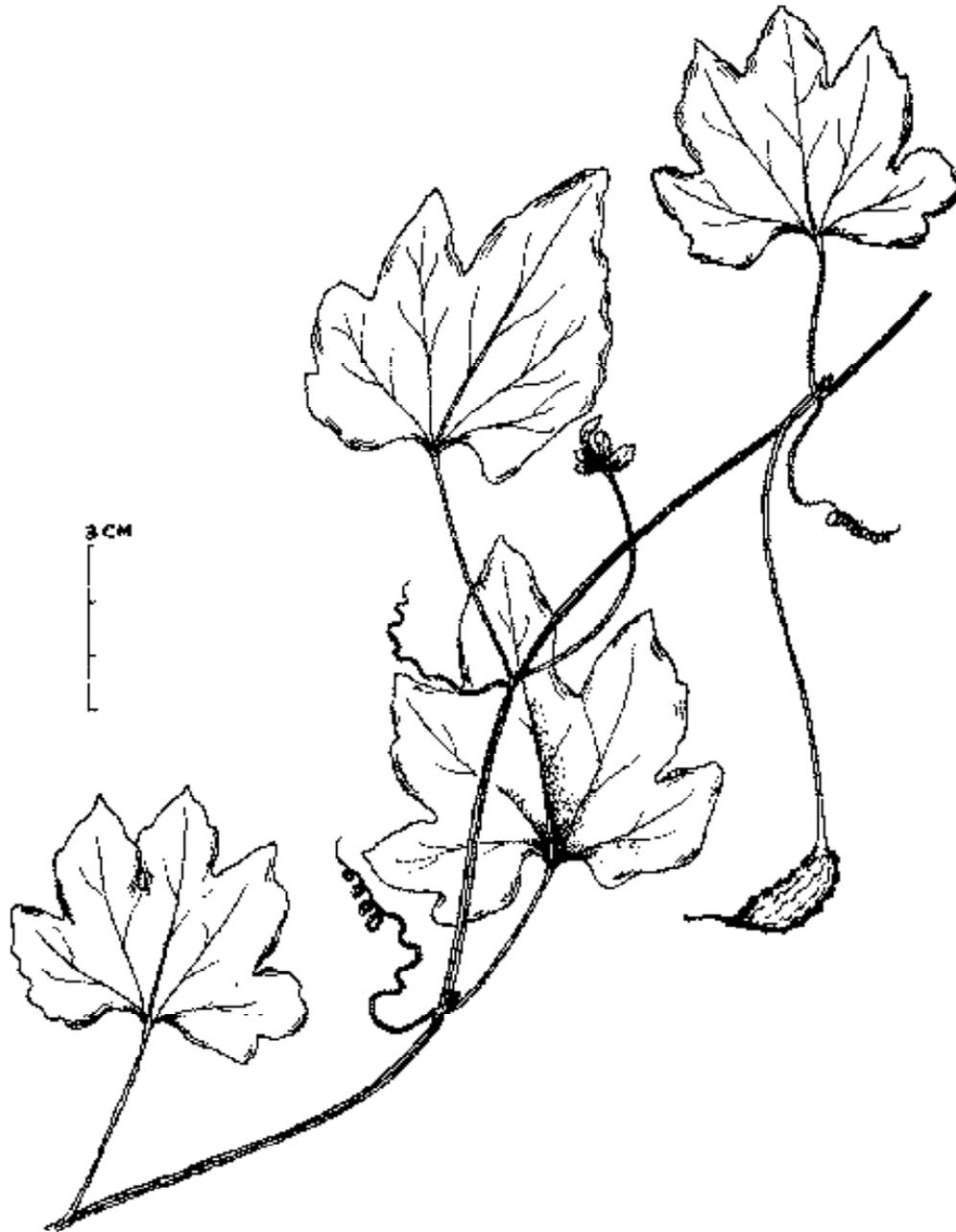


Fig. 136: *Momordica charantia* L.

Moderately common in moist places along road side forests. Thenzawl, near Mat bridge, *K.P. Singh* 93842.

2. *Momordica dioica* Roxb. *ex* Willd., *Sp. Pl.* 4: 605. 1805; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 617. 1879 (excl. syn.); Kanjilal *et al.*, *Fl. Assam* 2: 330. 1938; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 38. 1987.

Perennial climbers, profusely branched with slender stems and tuberous roots. Leaves ovate, 4-10 x 3-8 cm, base emarginate, mucronate at apex, membranous, entire or variously lobed with undulate or denticulate margins; tendrils simple, filiform. Dioecious; male flowers solitary; peduncles 4-12 cm long, bracteate at apex; bracts cuculate, sessile, sometimes ciliated; calyx lobes lanceolate, 5-7 x 2 mm, villous; corolla yellow, 2-3.5 mm long; peduncles in female flowers ebracteate, up to 2.5 cm long; ovary ovoid. Fruits ovoid, 3-5 x 2-3.5 cm, papillose; seeds pale yellow, ovoid, 5-7 x 5-6 mm, emarginate.

Fl. & Fr.: June-October.

Common, in wild and also cultivated. Lawngtalai, *Dutta* 33760; Saiha, *Dutta* 33815; Bilkawthlir, 500-600 m, *K.P. Singh* 93107; Pheileng and Lungshum, *K.P. Singh* 97080.

9. THLADIANTHA Bunge

- 1a. Male racemes bracteate; leaves simple ... 1. *T. cordifolia*
 1b. Male racemes ebracteate; leaves simple to trifoliate ... 2. *T. hookeri*

1. *Thladiantha cordifolia* (Blume) Cogn. in DC., *Monogr. Phan.* 3: 424. 1881. *Luffa cordifolia* Blume, *Bijdr.* 929. 1826. *Thladiantha calcerata* C.B. Clarke in *J. Linn. Soc.* 15: 126. 1876; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 97. 1938. *Thladiantha dubia* *Hook. f., Bot. Mag.* t. 5469. 1864; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 631. 1879. *Kang-mang* (Lushai). **Fig. 137.**

Large climbers, with sulcate, slender, villose stems. Leaves deeply cordate-ovate, undivided, 6-11 x 5-7 cm, subacute to acuminate at apex, denticulate at margins, rough above with cystoliths tipped with sharp points, villous beneath; petioles 4-5 cm long; base 5-nerved; tendrils simple. Flowers yellow, 3-5 cm across; male flowers in racemes with prominent, imbricating, ovate bracts. Calyx tube villous, campanulate, 6-8 mm long; lobes 8-10 mm

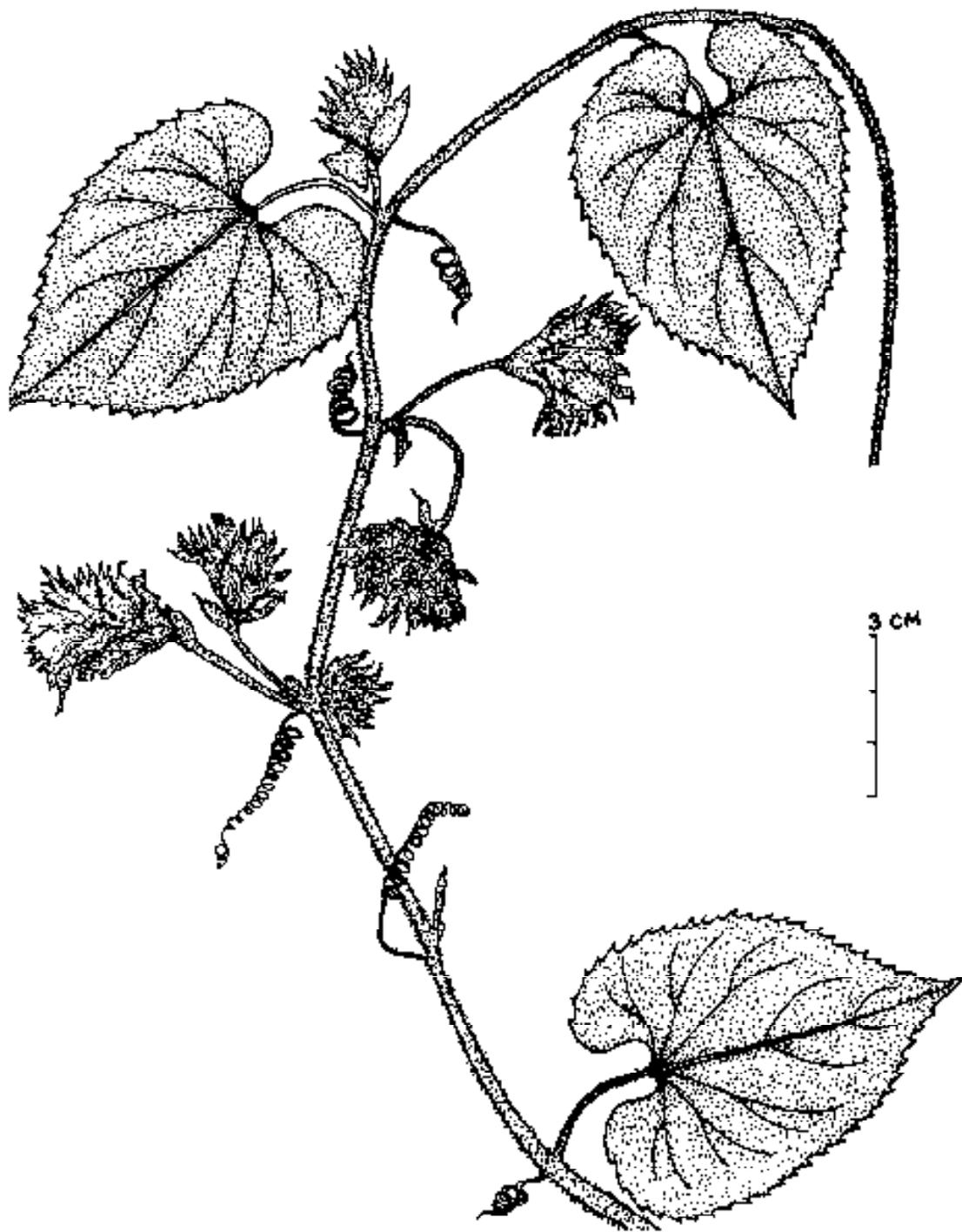


Fig. 137: *Thladiantha cordifolia* (Blume) Cogn.

long, villose; corolla campanulate, with 5-petals, 12-15 mm long; staminal filaments 2-3 mm long; female flowers solitary; ovary oblong, villous. Fruits oblong, 3-4.5 x 2-2.5 cm, longitudinally 12-15-nerved; seeds ovoid, 4-5 x 3 mm, both surfaces rugose.

Fl. & Fr.: May-November.

Common, in moist and shady forests. Between ridge camp and Lungsing, 600-900 m, *Gage* 210 (CAL); Sairang road, *Godfrey* 505 (CAL); Champhai, Myanmar border, *Deb* 31029; Lungleh, *Dutta* 33361; Kawnpui-Hartawki Road, *K.P. Singh*, 93270; South Vanlaiphai, *D.K. Singh* 96864; Lungchhuan, *D.K. Singh* 99124.

2. *Thladiantha hookeri* C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 631. 1879; Kanjilal *et al.*, Fl. Assam 2: 330. 1938; H. Chakravarty, Fasc. Fl. India 11: 103. 1982.

Large climbers, with sulcate-angular, thin branches. Leaves simple or divided, ovate-cordate to digitately tripartite, 7-10 x 2.5-5 cm, acuminate at apex, membranous, margins denticulate, upper surface punctate, lower surface glabrous; petioles thin, 1.5-4 cm long; leaflets lanceolate, middle larger, 5-7 x 2-2.5 cm; lateral ones shorter, asymmetrically auriculate; tendrils simple. Flowers orange yellow; male flowers in racemes; peduncles 2-3 cm long, 4-5-flowered, puberulous; calyx campanulate, tube 3-4 x 2 mm; petals 10-12 x 3.5 mm; female flowers solitary or in few-flowered racemes; ovary oblong, fusiform. Fruits oblong-rounded, 3-3.5 cm; seeds ash coloured, ca 6 x 5 mm, smooth.

Fl. & Fr.: May-July.

Common, in evergreen forests along road sides. Saithah, *D.K. Singh* 98846.

10. TRICHOSANTHES L.

- 1a. Calyx lobes entire ... 1. *T. cordata*
 1b. Calyx lobes dentate or lacinate :
 2a. Undersurface of the leaves glabrous ... 2.2. *T. tricuspidata* var. *tricuspidata*
 2b. Undersurface of the leaves tomentose ... 2.1. *T. tricuspidata* var. *tomentosa*

1. *Trichosanthes cordata* Roxb., Fl. Ind. 3: 703. 1832; C. B. Clarke in Hook. f., Fl. Brit. India 2: 608. 1879; Kanjilal *et al.*, Fl. Assam 2: 328. 1938. *Vanum* (Lushaj). **Fig. 138.**

Extensive climbers with tuberous roots. Leaves broadly cordate-ovate, 7-18 x 7-10 cm, acute at apex; membranous, entire to rarely sublobate, dentate-serrate at margins, petioles 3-6 cm long; tendrils 2-3-fid. Male flowers racemose, 4-8-flowered, orange to pale orange; peduncles stout 10-16 cm long; bracts villous; calyx tube ca 4 x 6 cm, attenuated, villous; corolla 5-lobed, papillose; female flowers subsessile, solitary; calyx and corolla same as in male flowers; ovary oblong. Fruits globose, red, smooth; seeds transversely broad, 10-12 x 4-6 mm, belted at the middle; belt with raised margins.

Fl. & Fr.: June-December.

Common, in moist places in evergreen forests. Thenzawl, K.P. Singh 93847; Leite, K.P. Singh 94096; Phairuang, K.P. Singh 94204; Saithah, D.K. Singh 98849.

2. *Trichosanthes tricuspidata* Lour., Fl. Cochinch. 589. 1790; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 38. 1987. *T. bracteata* (Lamk.) Voigt., Cat. Hort. Calc. 58. 1845. *T. palmata* Roxb., Fl. Ind. 3: 704. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 2: 606. 1879; Kanjilal *et al.*, Fl. Assam 2: 327. 1838.

Extensive climbers, with robust, branched, sulcate stems. Leaves palmately 3-5-lobed, suborbicular, cordate, 5-18 x 6-15 cm, lobes acuminate, denticulate, 3-5-nerved, glabrous or tomentose beneath; petioles 4-8 cm long; tendrils 2-3 fid. Flowers in racemes; peduncles of male flowers 15-30 cm long, 5-10-flowered; bracts villous; calyx tube ca 4.5 cm long, attenuated; corolla 5-lobed, papillose; staminal filaments 1-2 mm long; female flowers axillary, solitary; bracts fimbriate. Fruits globose, small, red with 10 longitudinal orange streaks; seeds ca 12 x 6 mm, ovate-oblong, both surfaces smooth.

2.1. var. *tomentosa* (Heyne ex C.B. Clarke) Kumari in Fl. Tamil Nadu 1: 174. 1983. *T. palmata* var. *tomentosa* Heyne ex C.B. Clarke in Hook. f., Fl. Brit. India 2: 607. 1879.

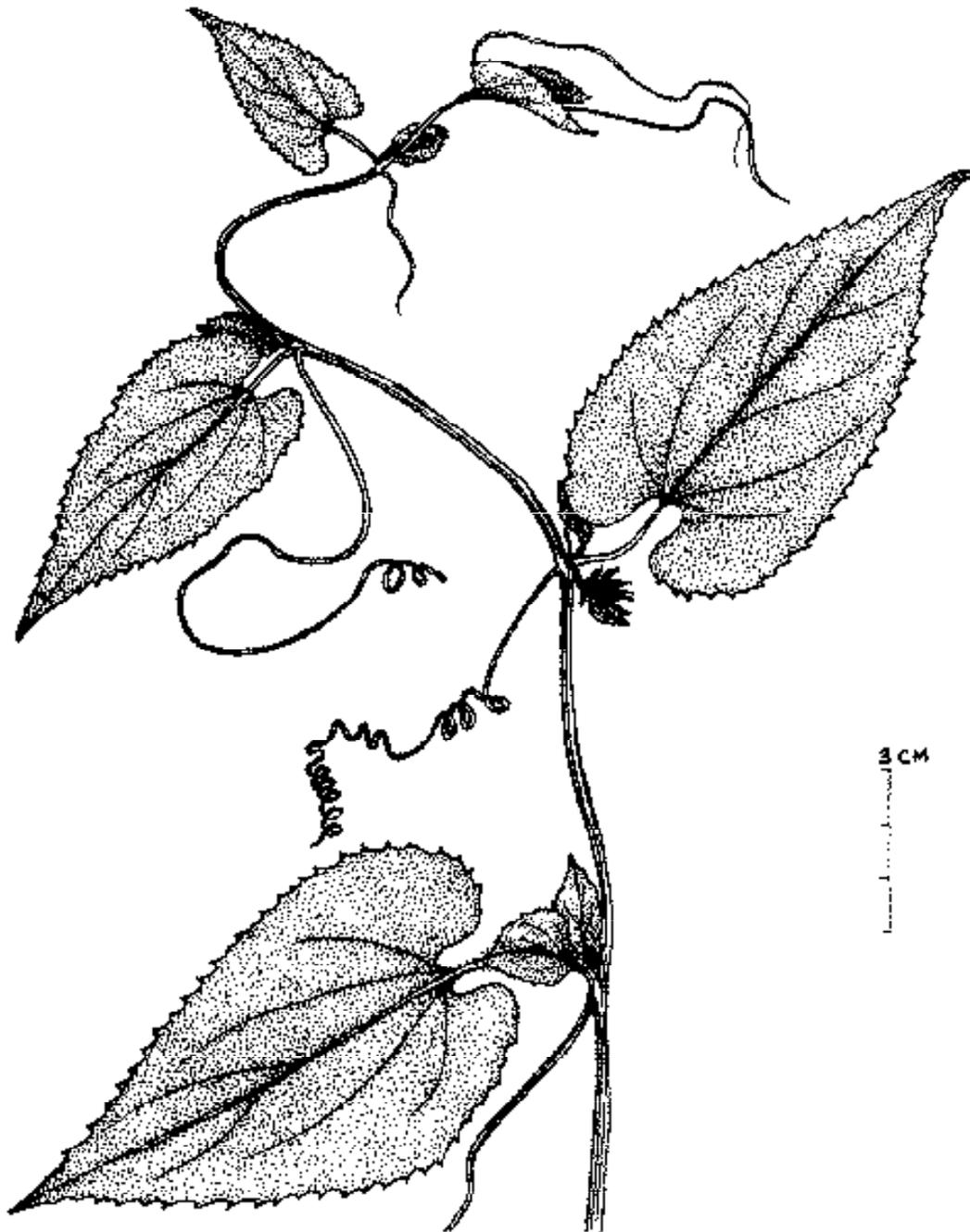


Fig. 138: *Trichosanthes cordata* Roxb.

Fl. & Fr.: June-October.

Inside deep, shady forests. Champhai, *K.P. Singh* 94539.

2.2. var. **tricuspidata**

Fl. & Fr.: July-December.

Very common throughout the state. Lungleh, *Dutta* 33458; Tawipui, *Dutta* 33633; Rieng, *D.K. Singh* 92964; Denglong forest, *K.P. Singh* 94139.

CULTIVATED SPECIES

1. **Benincasa hispida** (Thunb.) Cogn. in DC., *Monogr. Phan.* 3: 513. 1881. *Cucurbita hispida* Thunb., *Fl. Jap.* 322. 1874. *Benincasa cerifera* Savi, *Bibl. Ital.* 9: 158. 1818; C.B. Clarke in *Hook.f.*, *Fl. Brit. India* 2: 616. 1879.

Cultivated for vegetables in Jhum fields at lower elevations.

2. **Cucumis sativus** L., *Sp. Pl.* 1012. 1753; C.B. Clarke in *Hook.f.*, *Fl. Brit. India* 2: 620. 1879. Vern. : *Khira* (Hindi)

Cultivated in Jhum fallows at lower elevations.

3. **Cucumis sativa** L. var. **sikkimensis** *Hook.f.*, *Bot. Mag.* t. 6205. 1864; C.B. Clarke in *Hook.f.*, *Fl. Brit. India* 2: 620. 1879.

4. **Cucurbita moschata** (Duch. ex Lam.) Duch. ex Poir., *Dict. Sci. Nat.* 8: 234. 1818; C.B. Clarke in *Hook.f.*, *Fl. Brit. India* 2: 622. 1879. *C. pepo* var. *moschata* Duch. ex Lam., *Encycl.* 2: 152. 1786.

Cultivated at lower elevations.

5. **Cucurbita pepo** L., *Sp. Pl.* 1010. 1753; C.B. Clarke in *Hook.f.*, *Fl. Brit. India* 2: 622. 1879; Kanjilal *et al.*, *Fl. Assam* 2: 332. 1938.

Grown in gardens, at lower elevations. Fruits are eaten as vegetable.

6. **Lagenaria siceraria** (Molina) Standl. in *Publ. Field. Mus. Nat. Hist. Chicago Bor. Sur.* 3: 435. 1930. *Cucurbita siceraria* Molina, *Sagg.*

Storia. Nat. Chile. 133. 1782. *Lagenaria vulgaris* Seringe in Mem. Soc. Phys. Hist. Nat. Geneva. 3(1): 25. 1825; C.B. Clarke in Hook. f., Fl. Brit. India 2: 613. 1879.

Cultivated in Jhum fields at lower elevations.

7. *Luffa acutangula* (L.) Roxb., Hort. Beng. 70: 1814; Kanjilal *et al.*, Fl. Assam 2: 331. 1938. *Cucumis acutangula* L., Sp. Pl. 1: 1011. 1753.

Cultivated in Jhum fields at lower elevations.

8. *Sechium edule* (Jacq.) Sw., Fl. Ind. Occ. 2: 1150. 1800; Kanjilal *et al.*, Fl. Assam 2: 332. 1938. *Sieyer edulis* Jacq., Enum. Fl. Corib. 32. 1760. Vern : *Squash*.

Cultivated in large quantities near Siphir. One of the common vegetables in Mizoram, it has single viviparous seed.

9. *Trichosanthes anguina* L., Sp. Pl. 1008. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 2: 610. 1879.

BEGONIACEAE

(K. Dilip Kumar)

BEGONIA L.

1a. Ovary 4-celled; capsules quadrangular, pyramidal, wingless12. *B. roxburghii*

1b. Ovary 2-3-celled; capsules 2-3-winged:

2a. Leaf margin shallowly to deeply incised lobed:

3a. Flowers pinkish white; leaves 10.2-25 x 5.7-14 cm, sometimes with variegated blotches, pilose on upper surface, pubescent on the veins beneath8. *B. palmata*

3b. Flowers rose to bright red; leaves large, 20-21 x 11-55 cm, deep green, not variegated, scarcely hairy above, glabrous beneath13. *B. sikkimensis*

2b. Leaf margin unlobed:

4a. Plants acaulescent:

- 5a. Leaves variegated, middle of the leaf irregularly very brilliantly silvery white; inflorescences numerous1. *B. rex*
- 5b. Leaves not variegated; inflorescence few :
- 6a. Female flower's tepals 5 to 62. *B. beddomei*
- 6b. Female flower's tepals 3 to 4:
- 7a. Leaves equally cordate at base3. *B. dioica*
- 7b. Leaves obliquely cordate at base7. *B. obversa*
- 4b. Plants caulescent:
- 8a. Inflorescence on racemes5. *B. lushaiensis*
- 8b. Inflorescence on cymes or dichotomous cymes:
- 9a. Stems wiry; inflorescence weak14. *B. surculigera*
- 9b. Stems short or elongated; inflorescence not weak:
- 10a. Leaf margin double serrate:
- 11a. Inflorescence repeatedly dichotomous, many-flowered9. *B. pedunculosa*
- 11b. Inflorescence dichotomous cyme, usually few to many-flowered:
- 12a. Plants rough, short bristly hairy; leaves markedly symmetric10. *B. picta*
- 12b. Plants nearly glabrous; leaves asymmetric15. *B. wattii*
- 10b. Leaf margin wavy in outline, unequally serrate to entire:
- 13a. Stem, leaves, flowers and ovary glabrous:
- 14a. Leaves very shallowly cordate to almost rounded at base4. *B. hatacoa*
- 14b. Leaves strongly unequally cordate at base6. *B. megaptera*
- 13b. Stem, leaves, flowers and ovary not glabrous:

- 15a. Stem densely pubescent; leaf lamina symmetric, denticulate to entire along the margins; petioles hispid; inflorescence densely pubescent ...15. *B. thomsonii*
- 15b. Stem sparsely pubescent; leaf lamina asymmetric, shallowly lobed to entire along the margins; petioles densely pubescent; inflorescence sparsely pilose ...1. *B. annulata*

1. ***Begonia annulata*** Koch, Bertiner Allg. Garten. 1: 76. 1837; *Begonia griffithii* Hook., Bot. Mag. 83: t. 4984. 1857; C.B. Clarke in Hook. f., Fl. Brit. Ind. 2: 647. 1879. *Begonia barbata* Wallich ex DC., Prodr. 15. 1: 348. 1864; C.B. Clarke in Hook. f., Fl. Brit. India 2: 646. 1879; C.E.C. Fischer in Rec. Bot. Surv. India, 12(2): 97. 1938. *Lalruangadarnawna* (Lushai).

Rootstocks rhizomatous; rhizomes horizontal, jointed, 6-7 cm long, covered with scale leaves. Leaves asymmetric, opposite, broadly elliptic to ovate, 10-20 (-25) x 8-11 cm, base cordate to strongly cordate, apex acute to acuminate, incised to entire along the margins with broad lobes, puberulous to pubescent on both surfaces; petioles equal to the length of leaves, 5-15 cm long, densely pubescent. Inflorescence ramiflorous, contracted, few flowered; bracts persistent. *Male flowers*: pedicels glabrous, 1-2 cm long, tepals 2 + 2, pubescent outside, outer larger, elliptic, inner smaller, elliptic-lanceolate; stamens numerous, monadelphous at base. *Female flowers*: tepals 5, outer pubescent, inner gradually smaller; ovary shaggy, 2-celled, 3-winged. Capsules dehiscent by an elliptic line round the face, 1-2.5 cm (including wings); seeds ellipsoid, brown.

Fl. & Fr.: August-March.

Common, in moist places. South Lushai hills, between ridge camp and Lungleh, 608-912 m, *Gage* 233 (CAL); South Lushai hills, near Fort Lungleh, 608-912 m, *Gage* 232 (CAL); Lushai hills, *Parry* 16 (CAL); Between Lingsim and Lungleh, South Lushai hills, 608-912 m, *Gage*, *s.num.* (ISLM); Lungleh, 912 m, *Gage* 232 (MH).

2. ***Begonia beddomei*** Hook. f., Bot. Mag. 110: t. 6767. 1884. *Tonzaul*, *Lalruangadarnawna* (Lushai).

Acaulescent herbs; rootstock tuberous. Leaves asymmetric, radical, medium to large in size, chartaceous, ovate, 9-15 x 13-15 cm, base unequally cordate, apex acuminate to broadly acuminate, serrate to dentate-ciliate

along margins, wavy in outline, upper surface very pale green to deep green with white spots, sparsely pubescent; petioles 5.5-13.5 cm long, pubescent; stipules persistent. Inflorescence dichotomous cyme, once dichotomous, spreading in appearance; peduncles ca 11.5 cm long, glabrous; flowers pale pink. *Male flowers*: tepals 2 + 2, yellow on drying, outer ovate to elliptic, inner elliptic; stamens numerous, monadelphous. *Female flowers*: tepals 5-6, sometimes 8; styles 3; stigma twistedly lobed; ovary 3-angled, 2-celled. Capsules red in colour, 3-winged; wings elliptic to ovate, one large, ca 3.2 x 2 cm, other two smaller, ca 3 x 10 mm.

Fl. & Fr.: August-October.

Ramlaitu, 912 m, *Parry* 306 (CAL).

3. *Begonia dioica* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 223. 1825. *Begonia tenella*, D. Don, Prodr. Fl. Nepal 223. 1825. *Begonia amoena* Wallich [Cat. 3682, (1831) *nom. nud.*] ex DC., Prodr. 15, 1: 327. 1864; C.B. Clarke in Hook. f., Fl. Brit. India 2: 642. 1879; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 97. 1938. *Seikhthur* (Lushai); *Seimakhupa* (Lakher).

Acaulescent, tuberous herbs. Leaves symmetric, ovate to transversely ovate, 6-10 x 3-5 cm, base nearly equally cordate, apex acute to acuminate, transparent when dry, crenate to serrate along margins, glabrous on both surfaces; petioles 4.5-9.5 (-17) cm long. Inflorescence on scape, glabrous, 6-21 cm long; cymes usually few to many-flowered in bunch. Bracts ovate-oblong, caudicous. *Male flowers*: tepals 2 + 2, outer large, ovate, ca 1.5 x 1 cm, glabrous, the 2 inner elliptic, ca 2.7 x 5 mm, glabrous; stamens shortly monadelphous; anthers obovate; connatives obscure. *Female flowers*: tepals 2 + 1, outer large, inner smaller, lateral; ovary glabrous, 3-celled; styles 3, nearly separate at the tip into curved branches; stigma twisted. Capsules obovoid, 4-10 x ca 6 mm, 3-winged, nearly equal, upper margin of the wing horizontal.

Fl. & Fr.: July-September.

Hmuifung, 1500 m, *Parry* 45, 46, 47 (*vide* C.E.C. Fischer, *l.c.*); 60 miles South of Lunleh, 1350 m, *Wenger* 320, 60 (*vide* C.E.C. Fischer, *l.c.*).

4. *Begonia hatacoa* Ham. ex D. Don, Prodr. Fl. Nepal 223. 1825. *Begonia rubrovenia* Hook., Bot. Mag. 79: t. 4689. 1853; C.B. Clarke in

Hook. f., Fl. Brit. India 2: 645. 1879; C.E.C. Fischer in Rec. Surv. India 12(2): 98. 1938. Fig. 139.

Perennial, caulescent herbs, 30-40 cm high; rootstock rhizomatous, subwoody; stems terete, brownish red, branched, glabrous. Leaves \pm asymmetric, ovate to elliptic, 12-18(-25) x 3.7-8 cm, base very shallowly cordate to almost rounded, apex acuminate, unequally serrate to entire along margins, membranous or less transparent when dry, upper surface glabrous; petioles glabrous 1.2-5.3 cm; stipules persistent. Inflorescence peduncled; peduncles axillary, 9-17 cm long, glabrous, bearing a few flowers terminally; bracts persistent. *Male flowers*: tepals 2 + 2, outer small, ca 10 x 5 mm, glabrous, pinkish to whitish; stamens free, numerous, very shortly monadelphous. *Female flowers*: tepals 2 + 3, outer larger, inner gradually smaller, white; styles 2, united at base; stigma tortuous; ovary glabrous, 2-celled. Capsules ca 3 x 1.5 cm (inclusive of the larger wing, 2.5 x 1.2 cm,) other 2 wings narrow, papery, often recurved in fruit; seeds narrowly ellipsoid.

Fl. & Fr.: June-November.

Lungleh, 1216 m, Parry 90 (*vide* C.E.C. Fischer, *l.c.*); Sairang road, Godfrey 504 (CAL). Saithah, D.K. Singh 92945.

5. *Begonia lushaiensis* C.E.C. Fischer, Kew Bull. Misc. Inform. 273. 1928 & in Rec. Bot. Surv. India 12(2): 98. 1938. *Sukhupthur* (Lushai); *Seimakhupa* (Lakher).

Caulescent herbs; stems 20-30 cm long, sparsely puberulous, succulent. Leaves asymmetric, alternate, ovate to elliptic, 4-6 x 2.3-6 cm, base unequally subcordate, acuminate to caudate at apex, serrate to sinuate dentate along margins, veins puberulous above, prominent, densely pubescent, beneath; petioles of upper leaves 0.5-1.2 cm long, of lower leaves 2-4 cm long, pubescent; stipules 2, adnate, lanceolate. Inflorescence racemose, contracted, small to medium; flowers bright pink; bracts 2, opposite, pubescent, ovate-lanceolate; male flowers blooming at the top of inflorescence and female flowers below. *Male flowers*: bracts enclosing flowers in bud condition, upper surface densely pubescent; tepals 2, broadly elliptic; stamens 12-18, monadelphous; anthers oblong to elliptic, connective obscure. *Female flowers*: tepals 3 + 2, the 3 larger rounded to elliptic, ca 2 x 1 cm; ovary elliptic-oblong, 3-winged with one larger wing and 2 smaller wings, 3-loculed; styles 3, connate at base, upper divided into three; stigma



Fig. 139: *Begonia hatacoa* Ham. ex D. Don

lunate. Larger wing of capsules *ca* 1 x 7 mm, smaller wing 1.2 x 0.5 cm; seeds ellipsoid, brown.

Fl. & Fr.: July-September.

Lushai hills 1300 m, *Parry, s.num.* (*vide* C.E.C. Fischer, *l.c.*); Thenzawl, *K.P. Singh* 93883; Thenzawl-Serchip road, *K.P. Singh* 93898.

6. *Begonia megaptera* DC. in *Ann. Sci. Nat. Bot.* 4. 11: 134. 1859; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 646. 1879; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 98. 1938.

Rhizomatous, caulescent herbs; stems erect, branched, glabrous, pale green; 12- 60 cm long when well developed. Leaves ovate to broadly ovate, 11-16 x 7-12 cm, base strongly unequally cordate, apex acuminate, shallowly lobed to entire or undulate along margins; glabrous on both surfaces, petioles unusually glabrous, 4-11 cm long, stipules 2, persistent. Inflorescence peduncled; peduncles axillary or terminal, elongated, glabrous, 11-18 cm long; cymes not very many-flowered, 1 to 2 times dichotomous; bracts large, oblong, deciduous. Flowers large, pinkish white. *Male flowers*: tepals 2 + 2, outer large, ovate, *ca* 10 x 8 mm, inner small, elliptic, 7 x 4 mm, pink; stamens \pm 50, monadelphous; anthers obovoid, connectives obscure. *Female flowers*: tepals 5, nearly equal in size, white; styles 2, connate at base with long tortuous branches; ovary glabrous, 2-celled. Capsules becoming inverted, 3-winged, *ca* 2.9 x 1 cm (including the larger wing 2 x 1.2 cm), smaller wing 3 mm and often recurved in fruit, the broad wing decurrent, upper edge concave; seeds ellipsoid to ovoid.

Fl. & Fr.: April-December.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

7. *Begonia obversa* C.B. Clarke in *Linna. Soc. Bot.* 25: 26 t. 12. 1890.

Acaulescent herbs with rhizomatous rootstock. Leaves asymmetric, radical, one or more leaves arising from rhizome, ovate, *ca* 20 x 15 cm, base obliquely deeply cordate, apex acuminate, minutely serrate to dentate, ciliate along the margins, densely pubescent; petioles highly elongated, \pm 30 cm long, densely pubescent to tomentose. Inflorescence peduncled; peduncle

6-8 cm long. Male flowers with 4 tepals; ovary 2-loculed. Capsules subquadrate, one wing narrow, dehiscing laterally.

Fl. & Fr.: October-December.

In moist shady places, Zotethlang, *K.P. Singh*, 94594.

8. *Begonia palmata* D. Don, Prodr. Fl. Nepal 223. 1825. *Begonia laciniata* Roxb., Fl. Ind. 3: 649. 1832; C.B. Clarke in Hook. f., Fl. Brit. India, 2: 645. 1879; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 98. 1938. *Sukhupthur* (Lushai); *Seimakhupa* (Lakher). **Fig. 140.**

Rhizomatous herbs, creeping; stems hard, brown-red, first erect then procumbent, jointed, more or less brown tomentose, 14-40 cm long. Leaves asymmetric, broadly ovate to transversely ovate, 10.2-25 x 5.7-14 cm, base very shallowly cordate to obliquely cordate, acutely lobed, incised up to half of the leaf; lobes laciniate, ca 3 cm long, variegated, chartaceous, scabrous to pilose on upper surface and pubescent on the veins beneath; petioles pink, pubescent to tomentose, 4.2-16 (-25) cm long; stipules persistent. Inflorescence peduncled; peduncle axillary, puberulous or tomentose, 4.2-16 cm long; cymes usually few-flowered. Flowers pink to white-purple; bracts persistent. *Male flowers*: tepals white purple, 2+2, outer long, elliptic, inner narrowly obovate; stamens 50 to numerous, in a globose mass; filaments nearly free. *Female flowers*: tepals 4-5, inner gradually smaller, elliptic; styles 2, divided from the base into 2, much twisted branches; ovary 2-celled, pubescent. Capsules with one larger wing and two narrow wings, 2-2.5 x 1.2-1.9 cm (including larger wing 1.5 x 1 cm), small wings often recurved in fruit; seeds ellipsoid to obovoid.

Fl. & Fr.: August-September.

Common, in moist places. Sairep forest, *K.P. Singh* 94144, 94151; Near Hliapui, *K.P. Singh* 94306.

9. *Begonia pedunculosa* Wallich, Pl. As. Rar. 1: 82. t. 97. 1830; C.B. Clarke in Hook. f., Fl. Brit. India 2: 639. 1879; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 98. 1938.

Caulescent, subwoody herbs, 25-30 cm high with tuberous or elongated rootstocks; stems erect, somewhat flexuose, often branched, succulent, puberulous, distichous, sometimes bulbiferous in leaf axils above. Leaves

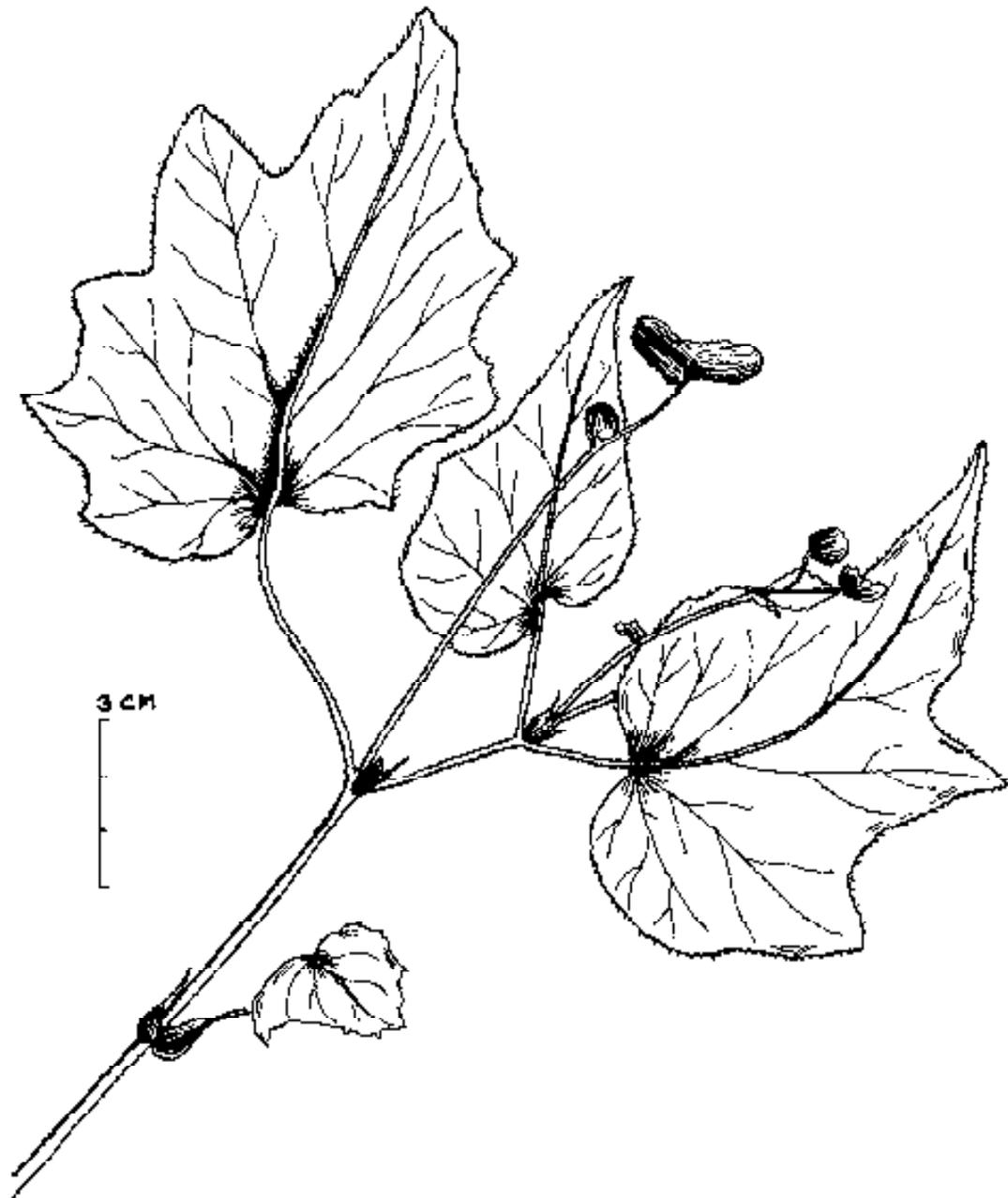


Fig. 140: *Begonia palmata* D. Don

asymmetric, ovate-lanceolate to oblong-lanceolate, 3.9-10 x 1-3.5 cm. base unequally cordate, acuminate at apex, transparent when dry, double serrate to finely serrate-dentate along the margins, upper surface scarcely pubescent; petioles 0.4-3 cm long, puberulous or sparsely pubescent; stipules persistent. Inflorescence peduncled; peduncles both axillary and terminal; cymes usually many-flowered, repeatedly dichotomous; bracts persistent, ovate, ciliate. *Male flowers*: tepals 2 + 2, 2 outer *ca* 10 x 9 mm, inner *ca* 10 x 7 mm; stamens yellow, 10-25. *Female flowers*: tepals 4-5 persistent, inner smaller; ovary 3-celled; styles 3, nearly separate at the tip into curved branches, stigma capitate. Capsules 3-winged, *ca* 7 x 4 mm, one ascending wing, 2 smaller wings; seeds short, ellipsoid.

Fl. & Fr.: June-November.

Lumtui, 600 m, *Parry 43,44 (fide C.E.C. Fischer, l.c.)*.

10. *Begonia picta* Smith, *Exot. Bot.* 2: 81, t. 101. 1805; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 638. 1879; C.E.C. Fischer in *Rec. Bot. Surv. India*, 12(2): 98. 1938; Kanjilal *et al.*, *Fl. Assam* 2: 334. 1938.

Caulescent, tuberous herbs; body rough with short bristly hairs; stems erect, herbaceous, often branched, glabrous or obscurely pubescent. Leaves markedly symmetric, often variegated, ovate, 3-15 x 2.5-11.6 cm, base \pm equally cordate, apex acuminate, doubly finely serrate along the margins; petioles hairy, 2-7.5 cm long. Inflorescence peduncled; peduncles both axillary and terminal, densely pubescent; cymes usually many-flowered; bracts persistent. *Male flowers*: tepals 2 + 2, outer pubescent, ovate, inner obovate, pubescent to glabrous; stamens \pm 50, forming a globose mass. *Female flowers*: tepals 5, outer large pubescent, inner one smaller in size; styles 3, nearly separate, divided halfway into two branches; stigma covered with hairy papillae; ovary densely pubescent, 3-celled, 3-winged. Capsules large, usually pubescent, one wing larger, other two wings smaller; seeds light brown, ovoid or round.

Fl. & Fr.: January-December.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

11. *Begonia rex* Putzeys, *Fl. Serres Jard. Eur.* 2: 141, t. 1255, 1256. 1857; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 647. 1879; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 98. 1938. *Lalruangadarnawna* (Lushai).

Acaulescent herbs; rhizomes short, thick. Leaves large, unequally cordate, 25-28 x 20 cm, base deeply two lobed, acuminate at apex, sinuate or coarsely dentate along the margins; petioles round, longer than leaf, 4-15 (-30) cm long, sparsely white hairy to densely pilose; stipules sprinkled with long, woolly, white hairs outside. Inflorescence numerous, scarcely rise above the leaf; peduncles round, glabrous, 10-23 cm long, almost erect; cymes few-flowered, twice dichotomous; flowers large, rose coloured, glabrous. *Male flowers*: tepals 2 + 2, outer ovate, inner elliptic, narrow below the middle; stamens 60-80, united at the base. *Female flowers*: tepals 5, the 3 outer ones half narrow as those of the male flowers; styles bifid, glabrous; stigma short, twisted, papillae band spirally twisted, continuous below. Capsules 3-winged, 2 wings narrow, parallel to the capsule; seeds ellipsoid to ovoid.

Fl. & Fr.: March-December.

Thenzawl, 1200 m, Parry 253a (*vide* C.E.C. Fischer, *l.c.*).

12. *Begonia roxburghii* Miq. in DC., Prodr. 15. 1: 398. 1864; C.B. Clarke in Hook. f., Fl. Brit. India 2: 635. 1879; Kanjilal *et al.*, Fl. Assam 2: 33. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 98. 1938. *Diploclinium roxburghii* Miq., Fl. Ind. Bot. 1: 692. 1856. *Sukhupthur* (Lushai).

Caulescent herbs with subterranean stout rhizome; stems erect with red streaks, often branched. Leaves opposite, asymmetrical, broadly ovate, 9-17.5(-23) x 5.2-13.5 cm, base unequally cordate to strongly cordate, apex acuminate, obscurely serrate along the margins, minutely pubescent on both surfaces on veins, densely pubescent in young leaves; petioles 2.5-6 cm long; stipules persistent or macrescent. Inflorescence peduncled; peduncles axillary, glabrous, red or pink; cymes usually few-flowered, 3 or more times dichotomous; bracts persistent. *Male flowers*: tepals 2 + 2, outer white, deeply concave, almost hemispherical in outline, inner somewhat narrow, white, concave with semirevolute margins; stamens \pm 50, clustered in a subglobose bundle. *Female flowers*: densely covered with minute, brown, glandular hairs; tepals 4 to 5, on dorsal surface densely covered with minute hairs, the outer tepals irregularly oval in shape, inner tepals oval-oblong; styles 4, 2-fid nearly from the base forming continuous spiral bands; stigma branched, stigmatic papillae make a continuous helical band with several turns; ovary quadrangular, pyramidal, 4-celled, fleshy, wingless and minutely horned at the angles; placentae twice divided; seeds ovoid to round.

Fl. & Fr.: August-February.

Rather common, in moist places. Kawthlir, 1800 m, *Parry* 186 (*vide* C.E.C. Fischer, *l.c.*); Hmuifang, 1500 m, *Parry* 264 (*vide* C.E.C. Fischer, *l.c.*); Tilthlang, *K.P. Singh* 94062.

13. *Begonia sikkinensis* A. DC. in *Ann. Sci. Nat. Bot.* 4. 11: 134. 1859 & *Prodr.* 15. 1: 349. 1864; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 646. 1879; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 98. 1938. *Lalruangadarnawna* (Lushai).

Rootstocks rhizomatous; stems 15-20(-45) cm long, erect, often branched, hard, green in colour, glabrous. Leaves asymmetric, ovate to broadly ovate to suborbicular in outline, 20-21 x 11-55 cm, base shallowly cordate, transparent when dry, deeply incised into irregular lobes, sometimes divided almost up to the base; lobes ca 10 cm long, apex acuminate, serrate to dentate along the margins, upper surface scarcely hairy, lower surface glabrous; petioles 5.5-10 cm long, glabrous; stipules 2, persistent, inflorescence peduncled; peduncles both axillary and terminal, glabrous, ca 15 cm long; cymes usually few-flowered, dichotomous. *Male flowers*: tepals 2 + 2, 2 outer ovate, inner smaller, elliptic; stamens \pm 50, monadelphous. *Female flowers*: tepals 5, inner bright red, gradually smaller; styles 2, connate at base, bifid, branches tortuous; ovary glabrous, 2-celled. Capsules 3-winged, often recurved in fruit, the broad wing much decurrent with its upper edge concave; seeds ovoid to round.

Fl. & Fr.: August-November.

North Vanlaiphai, 1500 m, *Parry* 253 (*vide* C.E.C. Fischer, *l.c.*).

14. *Begonia surculigera* Kurz in *Flora* 54: 296. 1871; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 640. 1879; *Begonia wengeri* C.E.C. Fischer in *Kew Bull. Misc. Inform.* 200. 1932 & in *Rec. Bot. Surv. India* 12(2): 98. 1938.

Herbs with nodular rootstock and fibrous, wiry adventitious roots; stems 10-25 cm long, weak, glabrous or glandular-pubescent, sometimes rooting at lower nodes. Leaves alternate, ovate, obliquely cordate, apex acute or shortly acuminate, crenate-dentate along margins; petioles ca 1.1 cm long; stipules small, ovate, glabrous. Inflorescence peduncled, in terminal, dichotomous cymes; peduncles 4.5-7 cm long, dentate, weak, dichotomously

branched, sometimes glandular-pubescent, flowers small, white, sometimes with pinkish tinge; bracts small, persistent. *Male flowers*: tepals 2 + 2, outer free, broadly ovate, inner smaller than the outer tepals, narrowly ovate; stamens 8-13, monadelphous; anther obovoid. *Female flowers*: tepals 5, united at the base, unequal, 3 larger, broader, obovate, 2 narrower, lanceolate; ovary glabrous, 3-celled; styles 3, radiating from the base, stigma lunate. Capsules glabrous; wings 3, subequal, 2 ovate-lanceolate, 1 oblong, slightly shorter; seeds small, ellipsoid.

Fl. & Fr.: August.

Six miles from Sairang road, Lushai hills, *Godfrey* 503 (CAL).

Note: *Begonia surculigera* Kurz and *Begonia wengeri* C.E.C. Fischer were treated as distinct species in the literature. However, the critical investigation on the type specimen of *B. wengeri* revealed it to be conspecific with *B. surculigera* in almost all the characters. Hence the former is merged with latter.

15. *Begonia thomsonii* A. DC. in Ann. Sci. Nat. Bot. 4. 11: 135. 1859 & Prodr. 15: 348. 1864; C.B. Clarke in Hook. f., Fl. Brit. India 2: 647. 1879; Kanjilal *et al.*, Fl. Assam 2: 334. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 98. 1938. Fig. 141.

Caulescent, rhizomatous herbs; stems short, subwoody, covered with scale leaves, densely pubescent. Leaves symmetric, ovate, 7-19 x 5.5-9 cm, base obliquely cordate, acuminate at apex, denticulate to entire along margins, puberulous to pubescent on both the surfaces; petioles hispid, 3-12 (-20) cm long; stipules persistent. Inflorescence peduncled; peduncles both axillary and terminal, hairy, 4-6 cm long; cymes usually few-flowered, medium sized, densely pubescent; bracts present. *Male flowers*: tepals 2 + 2, the 2 outer ovate, the 2 inner narrowly obovate; stamens \pm 50, scarcely monadelphous. *Female flowers*: outer tepals pubescent, inner gradually smaller; ovary 2-celled. Capsules recurved in fruit with a decurrent wing, dehiscing by four lines on either side of the two narrow wings; seeds ellipsoid to ovoid, brown.

Fl. & Fr.: August-October.

Scarce, in moist places. Tipaimukh area near Bridge, *K.P. Singh* 97124.

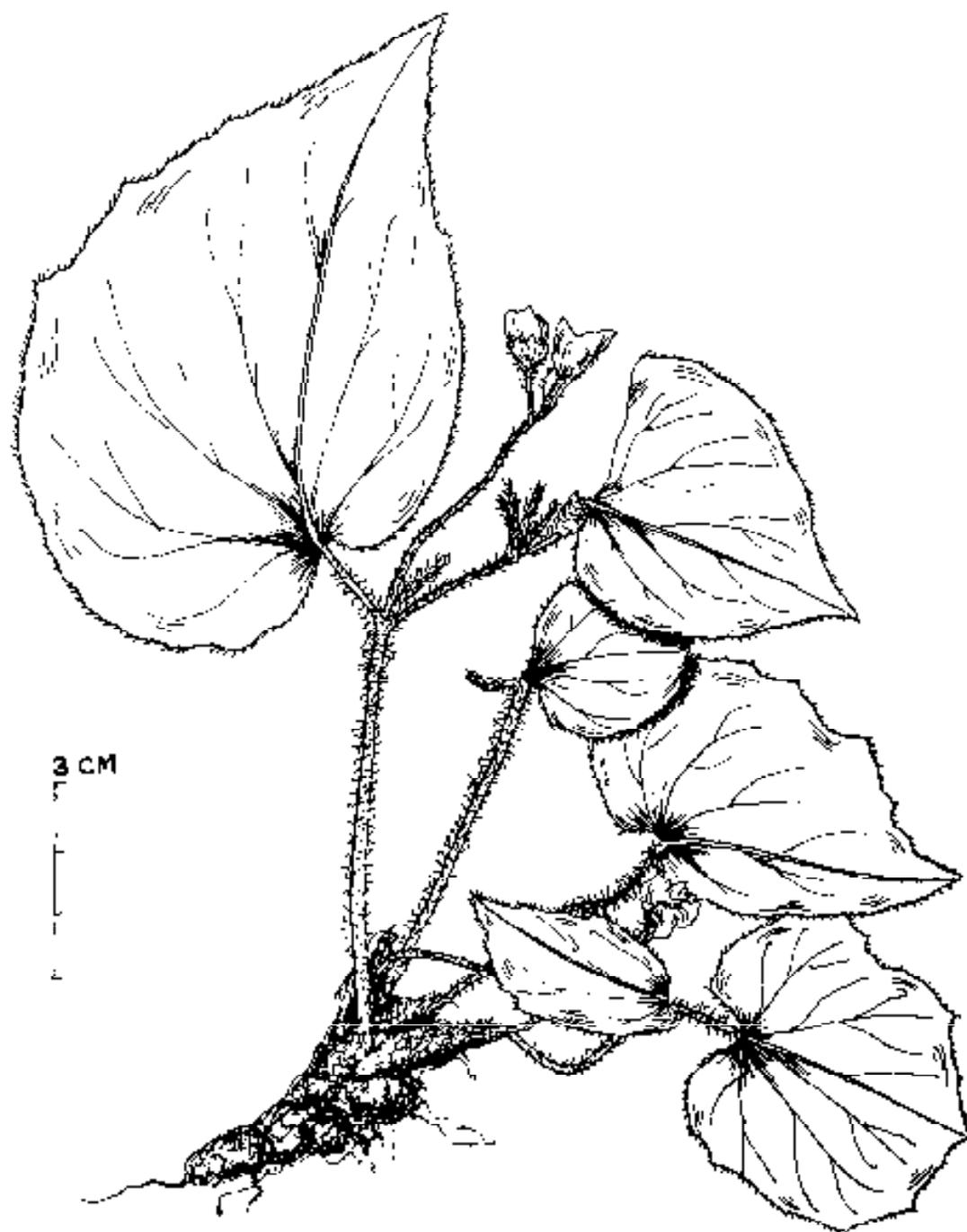


Fig. 141: *Begonia thomsonii* A. DC.

16. *Begonia wattii* C.B. Clarke in Journ. Linn. Soc. Bot. 25: 26. t. 11. 1890; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 98. 1938.

Rhizomatous herbs, 10-15 cm high, puberulous; rhizomes short. Leaves large, ovate, cordate, 6-10 x 5-8 cm, apex acute, double serrate along margins; petioles 9-14 cm long. Flowers both axillary and terminal, rose coloured. *Male flowers*: tepals 2 + 2, outer large, ovate rotundate, inner small, obovate. *Female flowers*: tepals 3 + 1, the 3 largers, 1 smaller, elliptic. Capsules 3-winged, pubescent; wings one larger and two smaller, 2-loculed, placentas bifid.

Fl. & Fr.: September-October.

Common, in moist places, *s.loc.*, Parry 699, 700 (*vide* C.E.C. Fischer, *l.c.*); Lawngtalai-Kawichaw, K.P. Singh 92853.

Recently J.H. Lalrannghinglova (Ethnobotany 11: 59. 1999) reported *Begonia inflata* C.B. Clarke as the new ethnobotanical record from the state. The suspension of the plant, boiled with *Engelhardtia spicata* Leschen. *ex* Blume, is taken to cure piles and dysentery.

MOLLUGINACEAE

(K.P. Singh)

- 1a. Flowers in axillary fascicles; seeds appendaged with a white thread curved round them ...1. *Glinus*
 1b. Flowers in terminal cymes; seeds not appendaged ... 2. *Mollugo*

1. GLINUS L.

- 1a. Stellate hairy herbs ...1. *G. lotoides*
 1b. Glabrous herbs ... 2. *G. oppositifolia*

1. *Glinus lotoides* L., Sp. Pl. 463. 1753. *Mollugo hirta* Thunb., Prodr. Fl. Cap.: 120. 1794; C.B. Clarke in Hook. f., Fl. Brit. India 2: 662. 1879.

Annual herbs, stellately hairy, prostrate, 15-70 cm long, greyish green. Leaves opposite or falsely whorled, almost orbicular or obovate, 1-2 x 0.6-1 cm, base cuneate, obtuse or apiculate at apex. Flowers in axillary clusters,

subsessile, 1-6 together; sepals 5-8 mm long, acute, with many white hairs, often woolly; petals absent. stamens 5-many. Capsules 5-valved, shorter than sepals, ovoid; seeds tuberculate, brown, strophiodate, ca 8 mm long.

Fl. & Fr.: Throughout the year.

Not very common, Nawlzawl, *Deb* 3429 (CAL).

2. ***Glinus oppositifolia*** (L.) A. DC. in Bull Herb. Boiss. ser. 2, 1: 552, 1901. *Mollugo oppositifolia* L., Sp. Pl. 89. 1753; Kanjilal *et al.*, Fl. Assam 2: 338. 1938. *M. spergula* L., Syst. ed. 10. 881. 1759; C.B. Clarke in Hook.f., Fl. Brit. India 2: 662. 1879. *Bak-kha-te* (Lushai). **Fig. 142.**

Erect or ascending, much branched, annual herbs, sometimes prostrate, up to 40 cm long. Leaves opposite or in false whorls of 3-5 of which usually 2 larger than others, oblong-obovate, spatulate, 1-2.5 x 0.3-0.5 cm, base tapering, acute or cuspidate at apex, glabrous, subsessile. Flowers white, in axillary fascicles of 2-5, long pedicellate, ca 7 mm long; sepals 5, obtuse at tips, 3-5 mm long, glabrous; petals absent. Capsules ellipsoid, little shorter than sepals, 3-4 x 2 mm, 3-4-valved; seeds many, subreniform.

Fl. & Fr.: Throughout the year.

In rice fields and ditches. Teirei, 250 m, *M. Sawmliana* 101741.

2. MOLLUGO L.

Mollugo pentaphylla L., Sp. Pl. 89. 1753; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 98. 1938. *Mollugo stricta* L., Sp. Pl. ed. 2. 131. 1762; C.B. Clarke in Hook.f., Fl. Brit. India 2: 663. 1879; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 98. 1938. *M. pentaphylla* var. *stricta* (L.) Hochr. in Candollea 2: 356. 1925. **Fig. 143.**

Annual herbs, main branches erect or prostrate; stems 10-25 cm long with profusely branched, glabrous branchlets. Leaves in false whorls of 3-9, lower ones rosulate, upper linear-lanceolate or obovate or elliptic, 1-4.5 x 0.2-1 cm, base cuneate, acute at apex, entire along margins, apiculate; petioles up to 2 mm long. Cymes leaf opposed or terminal, polychasial, up to 5 cm long. Flowers white or pale, ca 2 mm across; sepals 5, elliptic, ovate-oblong, ca 2 mm long, white or whitish; petals absent; stamens 3.



Fig. 142: *Glinus oppositifolia* (L.) A. DC.



Fig. 143: *Mollugo pentaphylla* L.

Capsules oblong, faintly 3-lobed; seeds 15-20, estrophiolate, dark brown, reniform, prominently granulate.

Fl. & Fr.: Throughout the year.

S.loc., Parry s.num. (CAL); Mizo hills, *Dutta* 33270.

APIACEAE

(D.K. Singh)

- 1a. Flowers in capitate heads; leaves spinous toothed ...4. *Eryngium*
- 1b. Flowers in simple or compound umbels :
 - 2a. Umbels simple :
 - 3a. Slender to stout, erect herbs; leaves compound, 3-5 partite ...9. *Santicula*
 - 3b. Low creeping herbs; leaves undivided :
 - 4a. Leaf bases sheathing; mericarps 7-9-ribbed ...2. *Centella*
 - 4b. Leaf bases not sheathing; mericarps 3-ribbed ...6. *Hydrocotyle*
 - 2b. Umbels compound :
 - 5a. Leaves simple with entire margins, linear-lanceolate or broadly ovate ...1. *Bupleurum*
 - 5b. Leaves simple or compound, variously divided when simple :
 - 6a. Plants marshy; fruits with corky ridges; calyx teeth prominent ...7. *Oenanthe*
 - 6b. Plants not marshy; fruits with ridges corky or not corky; calyx teeth prominent or not prominent :
 - 7a. Secondary ridges of fruits prominent; fruits hirsute or setose ...3. *Daucus*
 - 7b. Secondary ridges of fruits inconspicuous; fruits glabrous or pubescent:
 - 8a. Fruits laterally compressed, obscurely winged; vittae 2-3 at maturity ...8. *Pimpinella*
 - 8b. Fruits \pm dorsally compressed or strongly flattened :

- 9a. Fruits with all the ridges equally or unequally winged, globose or subquadrate ... 10. *Selinum*
- 9b. Fruits with dorsal ridges filiform or obsolete; lateral ridges broadly winged, obovate ... 5. *Heracleum*

1. BUPLEURUM L.

Bupleurum hamiltonii Balakr. in J. Bombay Nat. Hist. Soc. 63: 328. 1966. *Bupleurum tenue* Buch.-Ham. ex D. Don., Prodr. Fl. Nep. 182. 1825 (non Salisb.); C.B. Clarke in Hook. f., Fl. Brit. India 2: 677. 1879; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 98. 1938. *B. mucronatum* Wight & Arn., Prodr. Fl. Ind. Orient. 370. 1834 non Brouss. ex Spreng., 1820; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 38. 1987.

Erect, perennial herbs, 30-90 cm high, with a thick root stock; stems usually solitary or several, sometimes profusely branched upwards. Leaves linear, lanceolate-oblong, 5-13 x 0.2-1.5 cm, narrowed at the base, subobtuse, mucronate at apex. Umbels terminal, 3-8-rayed; flowers white-yellow; bracts 1-4, lanceolate or obovate-lanceolate; bracteoles 4-5, obovate-lanceolate, exceeding the umbellules; calyx teeth absent; petals with strongly incurved tips. Fruits broadly oblong, yellowish brown, subcompressed, with prominent primary ribs, furrows 1-vittate.

Fl. & Fr.: June-January.

Sherkor (?), *Lorrain s.num.* (Fide C.E.C. Fischer, l.c.); North Vanlaiphai, Deb 31152 -Identified and published as *B. mucronatum* Wight & Arn. by Deb & Dutta (l.c.). Reidentified on sheet as *B. hamiltonii* Balakr. by Dr. P.K. Mukherjee.

2. CENTELLA L.

Centella asiatica (L.) Urban in Mart. Fl. Bras. 11: 287, t. 78. f. 1. 1879. *Hydrocotyle asiatica* L., Sp. Pl. 234. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 2: 669. 1879; Kanjilal *et al.*, Fl. Assam 2: 340. 1938. *Bakkhate*, *Phungthlangra*, *Lambak* (Lushai). **Fig. 144.**

Prostrate herbs, with perennial rootstock; stems creeping, rooting at nodes, puberulous. Leaves in rosettes, orbicular-reniform, 1.2-5 cm across, base cordate puberulous, crenate-dentate or lobulate along margins, petioles

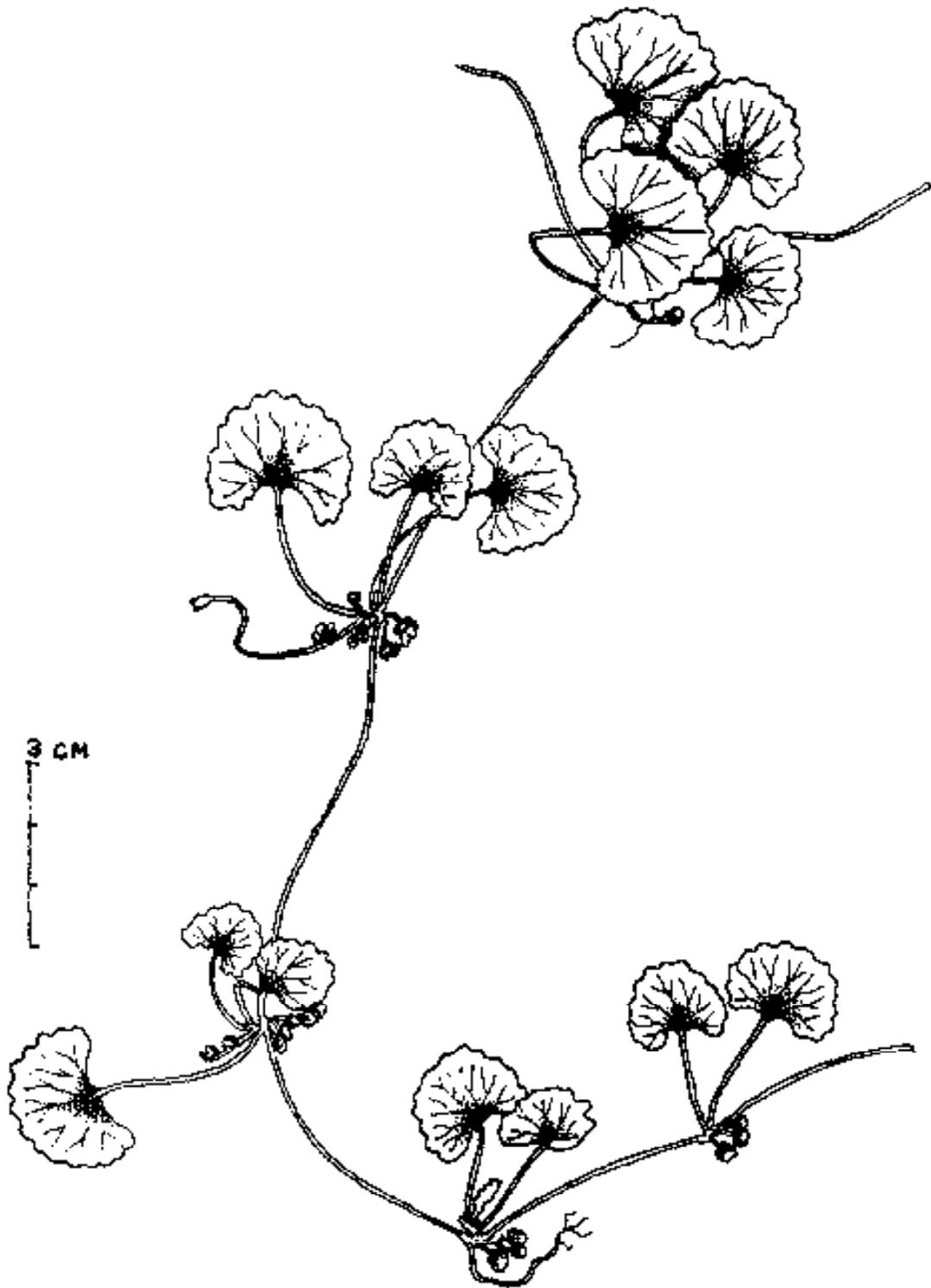


Fig. 144: *Centella asiatica* (L.) Urban

1-15 cm long. Umbels 1-several at a node with 2, ovate-lanceolate bracts; flowers purplish red, 3-5 per umbel, subsessile or sessile; calyx lobes 5, triangular; petals 5, ovate, acute or obtuse, imbricate. Fruits laterally compressed, dorsal ribs 7-9, with the secondary ridges as prominent as the primary, vittae absent; mericarps ca 2 x 2-3 mm.

Fl. & Fr.: April-November.

Common, in moist places under shade. North Vanlaiphai; *D.K. Singh* 93312; Kawnpui, *K.P. Singh* 97011; Phongpui, *K.P. Singh* 96846.

Uses: Plant extract used for treating anaemia and stomach ailments.

3. DAUCUS L.

Daucus carota L., Sp. Pl. 1: 242. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 2: 718. 1879; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 37. 1987.

Annual, hispid herbs; stems 0.3-1.2 m. Leaves 2-3 pinnate; pinnae pinnatifid, ultimate segments small, ca 1 mm wide, narrow-lanceolate with acute apex. Umbels compound; rays numerous, outer rays connivent; bracts numerous; pinnate; bracteoles numerous, 3-fid, simple; calyx teeth small; petals white, obovate, retuse, outer often radiant. Fruits elliptic, terete or ± dorsally compressed, ridges prominent, bristly; bristles of secondary ridges as broad as the fruit, 1-vittate.

Fl. & Fr.: December-May.

Cultivated. Vawmbuk to Thalthlang, *Dutta* 33931.

4. ERYNGIUM L.

Eryngium foetidum L., Sp. Pl. 1: 232. 1753; Kanjilal *et al.*, Fl. Assam 2: 340. 1738; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 99. 1938. *Bakhur, Bakhawr* (Lushai). **Fig. 145.**

Diffused, perennial, foetid herbs, with fusiform roots; stems dichotomously branched, deeply striate. Leaves simple, oblanceolate-spathulate, 5-10 x 0.6-2.5 cm, spinous-toothed at margins, alternate at base; floral leaves palmatifid. Flowers white, in oblong-cylindrical umbels;



Fig. 145: *Eryngium foetidum* L.

bracts spinulose, stellate-pubescent; calyx teeth rigid, acute; petals white. Fruits ellipsoid.

Fl. & Fr.: May-February.

Lawngtlai-Kawichaw, *D.K. Singh* 92837; Kolasib, 750 m, *D.K. Singh* 93120; Tilthlang, *K.P. Singh* 94097.

5. HERACLEUM L.

- 1a. Leaflets thickly white tomentose, 5-15 cm long;
rays 10-40; fruits 5-11 x 3-6 mm ...2. *H. candicans*
- 1b. Leaflets not white tomentose but hairy, 2.5-8 cm long;
rays 6-12; fruits 5-6 x 4-5 mm ...1. *H. burmanicum*

1. *Heracleum burmanicum* Kurz in *J. As. Soc. Beng.* 2: 309. 1872; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 714. 1879; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 99. 1938.

Erect herbs; stems 0.6-1.2 m, villous. Lower leaves 1-2 pinnate, pubescent, upper leaves 3-partite; leaflets cordate, ovate-lanceolate 2.5-8 cm long, serrate. Umbels compound; rays 6-12, up to 4 cm long; bracts 5-8, lanceolate; bracteoles 5-10. Flowers white; calyx-teeth small, linear; petals obovate, emarginate, 2-fid. Fruits obovate, 5-6 x 4-5 mm; ridges 2-vittate.

Fl. & Fr.: July-January.

Phongpui, 1500 m, Parry 527 (*vide* C.E.C. Fischer, *l.c.*).

2. *Heracleum candicans* Wallich *ex DC.*, *Prodr.* 4: 192. 1830; C.B. Clarke in *Hook. f., Fl. Brit. India* 2: 714. 1879; Kanjilal *et al.*, *Fl. Assam* 2: 343. 1938.

Erect herbs; stems 0.6-2 m tall, hollow, almost glabrous. Leaves bipinnate; leaflets 5-15 x 4-8 cm, obtusely lobed, crenate-serrate at margins, thickly white tomentose or villous on both surfaces. Umbels compound; rays 10-40, up to 10 cm across; bracts 1-3, 5-10 mm long, linear or absent; bracteoles ca 5 mm long, linear. Flowers white; calyx teeth linear; petioles obovate. Fruits obovate, pale brown, compound, 5-11 x 3-6 mm, bifid; ridges 2-vittate.

Fl. & Fr.: July-December.

Mizo hills, Thaltlang, *Dutta* 33943.

6. HYDROCOTYLE L.

Hydrocotyle javanica Thunb., Diss. Hydroc. p. 3. no. 17. p. 6. f. 2. 1798; C.B. Clarke in Hook.f., Fl. Brit. India 2: 667. 1879; Kanjilal *et al.*, Fl. Assam 2: 239. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 99. 1938. *Hlovoidawr* (Lushai).

Prostrate, perennial herbs; stems succulent, rooting at nodes; branchlets erect, flexuous, pubescent. Leaves simple, rotund-cordate, reniform, 2.5-7.5 cm across, crenate, subentire or 7-8-lobed, glabrous; petioles 12-18 cm long, laxly pubescent; stipules broadly ovate. Umbels many-flowered, simple, terminal or leaf-opposed; bracts minute, scattered along the pedicels, ovate-lanceolate; bracteoles numerous. Flowers *ca* 1 mm across; calyx teeth minute; petals 5, entire, greenish-white, lanceolate-valvate. Fruits orbicular-broadly ovoid, reticulate-rugose, laterally compressed; vittae absent; mericarps *ca* 1 x 1 mm, reddish-brown.

Fl. & Fr.: November-April.

Very common inside forests and along road side nallas, in moist places under shade. Phongpui, 2300 m, *Parry* 143 (CAL); Linchong-Demagiri, 150-950 m, *Gage* 234 (CAL); Kolasib, *Godfrey*, 542 (CAL); Sairep, *K.P. Singh* 94147; Tiltlang, *K.P. Singh* 94076, 94184; Kawnpui forest, *K.P. Singh* 96992; South Vanlaphai, *D.K. Singh* 96889, 96890; Saithah, *D.K. Singh* 98845; Rulchawn, *M. Sawmliana* 99283.

7. OENANTHE L.

Oenanthe javanica (Blume) DC., Prodr. 4: 138. 1830. ssp. *stolonifera* (Wallich ex DC.) Murata. in Acta Phyt. Geobot. 25: 105, t. 2. f. 3. 1973. *Oenanthe stolonifera* Wallich ex DC., Prodr. 4: 138. 1830; C.B. Clarke in Hook.f., Fl. Brit. India 2: 696. 1879; Kanjilal *et al.*, Fl. Assam 2: 341. 1938. *Sium javanicum* Blume, Bijdr. 15: 881. 1826. *Oenanthe benghalensis* (DC.) Benth. & Hook.f., Gen. Pl. 1: 906. 1867; C.B. Clarke in Hook.f., Fl. Brit. India 2: 696. 1879. *O. thomsonii* C.B. Clarke in Hook.f., Fl. Brit. India 2: 697. 1879.

Perennial, marshy, stoloniferous, glabrous herbs; stems up to 1 m long, decumbent, finely striate, often floating. Leaves 1-2 pinnate or trifoliate; petioles 4-10 cm long; leaflets elliptic-lanceolate or rhomboid, 1.5-3 x 0.6-1.5 cm, acute at apex, serrate-lobed along margins. Umbels terminal or leaf-opposed, compound; peduncles 10-20 cm long; rays 4-30, 1.2-4 cm long. Flowers white; calyx-teeth small; petals emarginate. Fruits subquadrate-ellipsoid; lateral ridges large, 1-vittate.

Fl. & Fr.: August-February.

Hliapui, 1400 m, *K.P. Singh* 94337, 94390.

8. PIMPINELLA L.

Pimpinella diversifolia DC., Prodr. 4: 122. 1830; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 688. 1879; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 99. 1938.

Erect, annual-perennial herbs, up to 1.5 m high; stems distally corymbose; branches villous, subtomentose, or scarcely pubescent. Leaves 3-5-foliate; leaflets linear-laciniate or subpinnatifid, 2.5-7.5 x 1.2-2.5 cm, serrate or laciniate, base cordate. Umbels 6-12-rayed; bracts linear, 1-2, or sometimes absent; bracteoles 8-3, or absent. Flowers greenish white; petals retuse. Fruits ovoid, laterally compressed, hispidulous, papillose-rugose, or glabrescent; ridges obscure, 2-3 vittate.

Fl. & Fr.: July-October.

Champhai, 1500 m, *Parry*, 24 (*vide* C.E.C. Fischer, *l.c.*).

9. SANICULA L.

Sanicula elata Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 183. 1825. *Sanicula europaea* C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 670. 1879. *non* L., 1753; *Kanjilal et al.*, Fl. Assam 2: 340. 1938; *Deb & Dutta* in J. Econ. Tax. Bot. 10(1): 39. 1987.

Erect, perennial herbs, 0.3-1 m high, with more or less creeping rhizomes. Leaves palmately 3-5-partite or lobed, orbicular, 4-8 cm long, 5-12 cm across, glabrous, mucronate-serrate at margins; petioles 2.5-18 cm long. Umbels irregularly compound, rays few, divaricate; bracteoles linear.

Flowers white; calyx teeth lanceolate; petals emarginate. Fruits echinate, ovoid, ca 3 mm long, slightly compressed laterally, densely covered with hooked bristles; ribs obscure, 1-vittate.

Fl. & Fr.: November-March.

Thaithlang, *Dutta* 33907, 33932.

10. SELINUM L. (*nom. cons.*)

Selinum striatum Wallich ex C.B. Clarke in Hook. f., Fl. Brit. India 2: 699. 1879; Kanjilal *et al.*, Fl. Assam 2: 342. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 39. 1987. *Lescriptium striatum* Wallich, Cat. 583. 1828. *nom. nud.*

Perennial, branched herbs; stems 0.3-1.2 m, glabrous, frequently with many withered fibres at the base. Leaves oblong-lanceolate, or ovate, 10-20 cm, 3-4 pinnate; leaflets 1-2 pinnatifid, narrow, linear-lanceolate; petioles 1-12 cm long. Umbels axillary, compound, rays 10-15, glabrous or obscurely pubescent; bracts 4-6, linear; bracteoles 4-8, linear, laxly serrate. Flowers white; calyx teeth linear, oblong, twice as long as broad. Fruits 2-3 mm across, subquadrate, dorsally compressed; ridges subequally winged, 1-vittate.

Fl. & Fr.: June-December.

Along the forest edges in shady places. Leite, *Dutta* 34107.

ARALIACEAE

(D.K. Singh)

- 1a. Leaves pinnately compound; petals \pm imbricate in bud1. *Aralia*
- 1b. Leaves simple, palmately lobed or digitately compound; petals valvate in bud :
 - 2a. Ovary 2-celled :
 - 3a. Unarmed shrubs; pedicels distinctly articulate4. *Macropanax*
 - 3b. Prickly shrubs; pedicels inarticulate2. *Brassaiopsis*
 - 2b. Ovary 5-12-celled :

- 4a. Leaves digitately compound5. *Schefflera*
- 4b. Leaves simple or palmately lobed :
- 5a. Unarmed, climbing shrubs; leaves simple or 3-5 angled; ovary 5 celled3. *Hedera*
- 5b. Armed, erect shrubs or trees; leaves palmately lobed; ovary 7-12-celled6. *Trevesia*

I. ARALIA L.

- 1a. Plant parts glabrous2. *A. foliosa* var. *sikkimensis*
- 1b. Plant parts scabrid-brown tomentose :
- 2a. Leaves pilose-hairy on both surfaces; panicles ebracteate, up to 45 cm long1. *A. armata*
- 2b. Leaves scabrid above, brown tomentose below; panicles bracteate, up to 1.5 m long3. *A. thomsonii*

1. *Aralia armata* (G. Don) Seem. in J. Bot. 6: 134. 1868; C.B. Clarke in Hook. f., Fl. Brit. India 2: 723. 1879; Kanjilal *et al.*, Fl. Assam 2: 345. 1938; *Panax armatus* G. Don, Gen. Syst. 3: 386. 1834. *Chimchawk* (Lushai).

Prickly shrubs or small trees, 4-7 m tall. Leaves very large, 3-4 pinnate; rachis prickly, with a pair of leaflets at each division; leaflets ovate-lanceolate, 7-12 x 1.5-5 cm, rounded or cordate at base, acuminate at apex, bristly serrulate along margins, pilose or hairy on both the surfaces; petioles hairy, short. Umbels in terminal panicles; panicles up to 45 cm long, upper part pubescent; bracts usually absent. Flowers whitish or greenish yellow, 2-3 mm across. Fruits subglobose, ca 4-5 x 3 mm, conspicuously 5-angled, glabrous, purplish-black when ripe.

Fl. & Fr.: September-February.

Not very common, in evergreen forests in open places. Denlang, K.P. Singh 94110; Kawlhkullh-Thichang road, D.K. Singh 94402.

2. *Aralia foliosa* Seem. in J. Bot. 6: 134. 1868. var. *sikkimensis* C.B. Clarke in Hook. f., Fl. Brit. India 2: 723. 1879; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 99. 1938. *Chimchawk* (Lushai); *Chichupa* (Lakher).

Large, lax, prickly shrubs or small trees; branches more or less glabrous; prickles short, strong, spreading. Leaves large, up to 1.5 m long, pinnately

decompound, with a pair of leaflets at each division of rachis; rachis glabrous; prickles 0.8-1 cm; leaflets on ultimate pinnules, 5-9, oblong, or ovate-lanceolate, 5-8 x 2.5-3.5 cm, base cordate rounded, caudate-acuminate, or acuminate at apex, serrulate along margins, glabrous, with needled spines at base; lateral petioles up to 2 mm long. Panicles very large, 0.6-1.2 m long; bracts narrow-oblong, or oblong-lanceolate, persistent, membranaceous. Flowers creamy-greenish, ca 3 mm across; calyx glabrous, with distinct teeth; petals valvate, ovate. Fruits with 5-ridges, 2-3 mm long.

Fl. & Fr.: January-December.

Sairep, 1500 m, *Parry* 476 (*vide* C.E.C. Fischer, l.c.); Darzo, 1500 m, *Parry* 594 (*vide* C.E.C. Fischer, l.c.).

3. *Aralia thomsonii* Seem. in J. Bot. 6: 134. 1868; C.B. Clarke in Hook.f., Fl. Brit. India 2: 723. 1879; Kanjilal *et al.*, Fl. Assam 2: 345. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 99. 1938. *Chimchawkhmulmi* (Lushai); *Chichupa* (Lakher).

Large, prickly, usually unbranched shrubs, up to 5 m tall, softly villous, or fulvus tomentose; bark brownish; prickles short, strong, weaker on pinnae. Leaves large, 1-2 m long, 2-3 pinnate, with a pair of leaflets at each node of rachis; ultimate pinnules 5-9-foliate; leaflets elliptic-ovate, or ovate lanceolate, 5-10 x 1.5-4 cm, base rounded subcordate, acuminate at apex, obscurely serrulate along margins, scabrid above, tomentose beneath. Panicles compound, 30-45 cm long or sometimes equalling the length of leaves, tomentose; umbels 15-20-flowered; bracts ovate-lanceolate, tomentose. Flowers greenish-yellow, 2-2.5 mm across; pedicels up to 1 cm long; calyx glabrescent, with distinct teeth; petals ovate. Fruits globose, ca 4 x 3 mm, deeply 5-ribbed.

Fl. & Fr.: February-September.

Rather common in evergreen forests. Lawngtalai, *Dutta* 33777.

2. BRASSAIOPSIS Decne & Planchon

Brassaiopsis glomerulata (Blume) Regel, Gartener Fl. 12: 275. t. 411. 1863. *Aralia glomerulata* Blume, Bijdr. 872. 1826. *Brassaiopsis speciosa* Decne. & Planchon, Rev. Hort. Ser. 4, 3: 106. 1854; C.B. Clarke

in Hook. *f.*, Fl. Brit. India 2: 737. 1879; Kanjilal *et al.*, Fl. Assam 2: 358. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 99. 1938.

Small trees, 3-10 m tall; young parts prickled, rusty stellate-tomentose; bark grey or greyish brown; prickles blunt. Leaves digitate, with 5-8 leaflets; leaflets elliptic-lanceolate, or oblong, ovate-lanceolate, 10-20 x 3-8 cm, base rounded or acute, acute-short acuminate at apex, entire or obscurely serrate along margins, stellate-tomentose above, glabrescent beneath; petiolules up to 5 cm long. Panicles large, terminal, 20-30 cm long, rusty-tomentose; umbels compound; bracts oblong-lanceolate, persistent. Flowers small, 4-5 mm across, white, stellate tomentose. Fruits globose or subglobose, 0.5-0.8 cm across, crowned by the disk and persistent stylar column.

Fl. & Fr.: August-May.

In evergreen forests, 15 miles S.E. of Lungleh, *Gage* 156 (CAL); Lungleh to Sairep, *Dutta* 33510.

3. HEDERA L.

Hedera nepalensis K. Koch, Hort. Dendr. 284. 1853. *H. helix sensu* C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 739. 1879, *non* L., 1753; Kanjilal *et al.*, Fl. Assam 2: 355. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 99. 1938.

Large, evergreen, scandent shrubs, adhering to large tree trunks by means of extra axillary rootlets, unarmed; bark slightly rough, white-pale brown; young parts and inflorescence tomentose. Leaves simple, alterante, polymorphic, ovate-elliptic, elliptic-lanceolate, linear-lanceolate or cordate-ovate, 7-10 x 3-8 cm, base cuneate-subcordate, acute or shortly caudate-acuminate at apex, entire or palmate-subpinnatifid, glabrous; petioles up to 8 cm long. Panicles terminal, subcorymbose or shortly ovate; umbels globose; bracts triangular. Flowers yellowish green, *ca* 5 mm across; calyx obscurely toothed-truncate; petals triangular, valvate, with a ridge inside. Fruits globose, 6-8 mm across, fleshy, yellow, 3-5-seeded.

Fl. & Fr.: September-May.

Phongpui, 2300 m & North Vanlaiphai, 1500 m, *Parry* 133 (*vide* C.E.C. Fischer, *l.c.*).

4. MACROPANAX Miq.

- 1a. Leaflets denticulate or serrulate; panicles rusty stellate-tomentose; calyx tube campanulate 1. *M. dispermus*
- 1b. Leaflets entire or subentire; panicles glabrous; calyx tube infundibulate 2. *M. undulatus*

1. *Macropanax dispermus* (Blume) O. Ktze., Rev. Gen. 271. 1891. *Aralia disperma* Blume, Bijdr. 872. 1826. *Macropanax oreophilum* Miq., Fl. India Bot. 1(1): 764. 1855; C.B. Clarke in Hook. f., Fl. Brit. India 2: 738. 1879; Kanjilal *et al.*, Fl. Assam 2: 362. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 99. 1938. *Phuanbek* (Lushai).

Large, evergreen, often subscandent shrubs or small trees, up to 9 m high; bark grey, warty; branchlets lenticellate. Leaves digitate, 3-5 foliate; common petiole 12-35 cm long, with dilated and stem clasping base; leaflets elliptic-lanceolate or oblong, 7-15 x 2.5-5 cm, base rounded or acute, acuminate at apex, denticulate or serrulate along margins, glabrous; petiolules 0.5-6 cm long; lateral nerves 5-8 pairs. Panicles terminal, compound, rusty tomentose, up to 30 cm long, branches spreading; umbels rounded; bracts small, narrow-lanceolate, acuminate, caducous. Flowers greenish yellow, ca 3 mm across; calyx teeth 5; petals 5, valvate. Fruits ovoid, 5-6 x 4 mm, crowned by persistent styler column.

Fl. & Fr.: August-March.

Common, in evergreen forests. Aizawl, 1000 m, Parry 660 (*vide* C.E.C. Fischer, *l.c.*); North Vanlaiphai, Deb 31082, 31142; Lawngtalai forests, Dutta 33758; Thaltlang, Dutta 33964; Blue Mountain, 1950 m, Mao 107159.

2. *Macropanax undulatus* (Wallich ex G. Don) Seem. in J. Bot. 2: 294. 1864; C.B. Clarke in Hook. f., Fl. Brit. India 2: 738. 1879; Kanjilal *et al.*, Fl. Assam 2: 362. 1938; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 39. 1987. *Hedera undulata* Wallich ex G. Don, Gen. Syst. 3: 394. 1834. *Phuanberk*, *Phumber* (Lushai).

Small trees, 10-15 m tall; bark blackish brown, smooth or nearly so. Leaves digitate, 3-5 foliate; common petiole 8-27 cm long; leaflets lanceolate, elliptic or ovate-oblong, 2.5-18 x 1.6-6 cm, base rounded or cuneate, acuminate at apex, entire along margins, coriaceous, glabrous on both surfaces. Panicles terminal, up to 30 cm long, glabrous, compound; bracts

triangular, caducous. Flowers greenish-yellow, *ca* 4 mm across; 4-7 x 3 mm; calyx teeth small; petals deciduous. Fruits ellipsoid-ovoid, 4-7 x 3 mm, crowned with persistent, bilobed stylar column.

Fl. & Fr.: July-February.

Common, in evergreen forests. Sialsuk, *Deb* 30690; Upper Thenzawl, *K.P. Singh* 93921; Denglang, *K.P. Singh* 94111; Pheileng, *K.P. Singh* 97087.

5. SCHEFFLERA J.R. & G. Forst.

- 1a. Styles connate; umbels more than 50-flowered; fruits crowned by cylindric column2. *S. hypoleuca*
- 1b. Styles none; umbels up to 30-flowered; fruits crowned by a conical disk :
- 2a. Bark shining grey; leaflets 17-20 cm long1. *S. clarkeana*
- 2b. Bark white-pale brown; leaflets 7-10 cm long3. *S. venulosa*

1. *Schefflera clarkeana* Craib, *Fl. Siam. Exult.* 1: 797. 1931; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 99. 1938. *Heptapleurum venulosum* var. *macrophylla* C.B. Clarke in *Hook. f., Brit. India* 2: 730. 1879.

Large, straggling or climbing shrubs, or semi-epiphytic trees; bark grey, shining. Leaves digitate, 3-7 foliate; common petiole 12-35 cm long, terete; leaflets lanceolate or elliptic-lanceolate, 17-20 x 2-8 cm, subacute or rounded at base, acuminate at apex, entire along margins, glabrous; petiolules up to 2.5 cm long; lateral nerves up to 7 pairs, conspicuous on both surfaces, more prominent on lower surface. Panicles terminal, branched; bracts ovate, caducous, woolly. Flowers up to 8 mm across, in few-flowered umbellules; calyx truncate; petals 5, oblong-obovate. Fruits globose, up to 8 mm across, 5-ridged.

Fl. & Fr.: January-September.

Common, in tropical evergreen forests. Lungleh, 1000 m, *Gage* 175 (*vide* C.E.C. Fischer, *l.c.*); Sialsuk, *Deb* 30739; Sairep forest, *Dutta* 33335.

2. *Schefflera hypoleuca* (Kurz) Harms, in *Engl. & Prantl., Pflanzenfam.* 3(8): 38. 1894; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 99. 1938. *Heptapleurum hypoleucum* Kurz, *For. Fl. Brit. Burma* 1: 539.

1877; C.B. Clarke in Hook. f., Fl. Brit. India 2: 728. 1879; Kanjilal *et al.*, Fl. Assam 2: 350. 1938.

Small-medium, branched trees, 7-12 m tall, with compact crown; bark brown-grey; young parts and inflorescence with deciduous, rusty stellate scurf. Leaves digitate, 5-7 foliate; common petiole 30-70 cm long, with swollen base; leaflets polymorphic, 4-8, oblong or elliptic-ovate, 12-27 x 4-9 cm, acute, distantly serrate along margins, base rounded, under surface with deciduous stellate hairs; petiolules 3-15 cm long; lateral nerves 8-14 pairs. Panicles terminal or axillary, subcorymbose, patently branched, 25-50 cm long; bracts shortly ovate, acuminate, brown felted. Flowers greenish white, *ca* 5 mm across; calyx truncate; petals 5, reflexed, oblong-acute, covered with dense white stellate wool outside. Fruits globose-subglobose, *ca* 4 mm across, obtusely 5-ribbed, crowned by a cylindrical column.

Fl. & Fr.: October-April.

Morchra, 1500 m, *Parry* 104; Phongpui, 2000 m, *Parry* 148 (*vide* C.E.C. Fischer, *l.c.*).

3. *Schefflera venulosa* (Wight & Arn.) Harms in Engl. & Prantl., Pflanzenfam. 3(8): 39. 1894; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 99. 1938. *Paratropia venulosa* Wight & Arn., Prodr. 1: 377. 1834. *Heptapleurum venulosum* (Wight & Arn.) Seem in J. Bot. 3: 80. 1865; C.B. Clarke in Hook. f., Fl. Brit. India 2: 729. 1879; Kanjilal *et al.*, Fl. Assam 2: 353. 1938. *Kelbuh* (Lushai); *Sakhitibu* (Lakher).

Small, glabrous, woody, scandent shrubs, often epiphytic; bark white-pale brown, conspicuously lenticellate. Leaves digitate, 5-7 foliate; common petiole 10-30 cm long, terete; leaflets oblanceolate, elliptic or oblong-elliptic, 7-10 x 2.5-7 cm, base subacute or rounded, acute-acuminate at apex, entire along margins, glabrous; petiolules 2.5 cm long; lateral nerves 5-7 pairs. Panicles terminal, highly branched, up to 25 cm long, deciduously tomentose; bracts large, ovate, caducous. Flowers white or yellowish-green, 4-5 mm across; calyx truncate; petals 5, obovate-oblong. Fruits globose, *ca* 5 mm across, fleshy, 5-ridged, crowned by a conical disk.

Fl. & Fr.: January-September.

Rather common in evergreen forests. Mawmangtlang, 1500 m, *Parry* 511 (*vide* C.E.C. Fischer, *l.c.*); Kolasib-Bualpui, *D.K. Singh* 93241; North Vanlaphai, *D.K. Singh* 93076; Tilthlang, *K.P. Singh* 96634.

6. TREVESIA Vis.

Trevesia palmata (Roxb.) Vis. in Mem. Acad. Torin. 2, 4: 262. 1842; C.B. Clarke in Hook. f., Fl. Brit. India 2: 732. 1879; Kanjilal *et al.*, Fl. Assam 2: 363. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 99. 1938. *Gastonia palmata* Roxb., Fl. Ind. 2: 407. 1824. *Vombal*, *Kawhtebel* (Lushai); *Ahloko* (Lakher).

Small, unbranched trees or large shrubs, 3-6 m tall, armed with small prickles; bark brown; branchlets rusty pubescent and very prickly. Leaves large, orbicular-reniform, 25-60 cm across, palmatifid or palmatisect into 7-9 lobes, truncate-subcordate at base; lobes oblong or oblong-elliptic, serrate, often irregularly lobed, glabrous; petioles 18-40 cm long. Panicles terminal, large, up to 45 cm long, deciduously rusty tomentose, branches more or less dichotomous; bracts oblong, usually deciduous. Flowers creamy white, 8-11 mm across; calyx rusty pubescent outside, limb free, undulate or irregularly dentate; petals 8-12, fleshy, valvate, reflexed. Fruits subglobose-ovoid, ca 1 cm across, glabrous, ribs inconspicuous, crowned by the persistent style.

Fl. & Fr.: January-May.

Morchra, 1500 m, *Parry* 105, Darzo, 1500 m, *Parry* 595 (*fide* C.E.C. Fischer, *l.c.*); Demagiri, 150 m, *Gage* 222 (CAL); *s.loc.* Lorrain 50 (CAL); Changsil, *Prazer* (*fide* C.E.C. Fischer, *l.c.*) *s.num.* (CAL).

CORNACEAE

(K.P. Singh)

CORNUS L.

Cornus capitata Wallich *ex* Roxb., Fl. Ind. 1: 434. 1820; C.B. Clarke in Hook. f., Fl. Brit. India 2: 754. 1879; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 99. 1938; Mathew in Nayar *et al.* Fasc. Fl. India 19: 22. 1988. *Benthamidia capitata* (Wallich) Hara in J. Arnold Arbor. 29: 115. t. 4a, 1948.

Trees, up to 10 m tall. Leaves crowded apically on the branchlets, elliptic, 7-12 x 3-4 cm, narrowed at both ends, coriaceous, entire, thinly pubescent with adpressed hairs above, glabrous below; petioles channelled.

Flowers sessile, ca 2 mm across, in terminal, closely packed, globose heads, petaloid, yellowish-white; calyx lobes 4, rounded; petals 4, oblong. Drupes coalescing into a red succulent, globose head, 2-3 cm across, yellow when young, reddish when ripe; stones hard, compressed.

Fl. & Fr.: April-December.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

Uses: Fruits edible.

Note: Specimen 107462, recently collected by M. Sawmliana from Luangpawl (alt. 950 m), has been wrongly identified as *Cornus paniculata* Buch.-Ham. ex D. Don.

ALANGIACEAE

(K.P. Singh)

ALANGIUM Lam.

Alangium chinense (Lour.) Harms in Ber. Deutseh. Bot. Ges. 15: 24. 1897; Mathew in Nayar *et al.*, Fasc. Fl. India 19: 3. 1988. *Stylidium chinense* Lour., Fl. Cochinch. 1: 221. 1790. *Marlea begoniifolia* Roxb., Pl. Corom. 3: 80, t. 283. 1820; C.B. Clarke in Hook. *f.*, Fl. Brit. India 2: 743. 1879. *p.p.* *Alangium begoniifolium* Baillon., Hist. Pl. 6: 270. 1876; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 99. 1938; Kanjilal *et al.*, Fl. Assam 2: 369. 1938. *Hnahbial* (Lushai).

Trees, up to 18 m tall with horizontally spreading branches. Leaves very variable, alternate, bifarious, 8-18 x 8-16 cm, orbicular to broadly oblong, base truncate, subequal, acuminate at apex, entire along margins, dark green above, pale beneath, glabrous when mature, hairy along the nerves beneath; petioles 2-3.5 (4) cm long; basal nerves 4-6; lateral nerves up to 4 pairs. Flowers in axillary, dichotomously branched peduncled cymes, white or creamy, 1.5-2.5 cm long; calyx toothed, scattered hairy; pubescent; petals 6-8, strap-shaped, puberulous; filaments covered with long silky hairs; ovary 2-celled. Drupes ca 1.3 cm across, ovoid, dark purple when ripe, slightly ribbed; ovules 1 in each cell.

Fl. & Fr.: April-October.

Common in moist, shady places. North Vanlaiphai, *D.K. Singh* 93056; Bualpai-Hartawki road, *D.K. Singh* 93266; Sairep forest, *K.P. Singh* 96669; Phongphui, *K.P. Singh* 96756; Kawnpui village, *K.P. Singh* 96972.

NYSSACEAE

(K.P. Singh)

NYSSA L.

Nyssa javanica (Blume) Wanger in Engl. & Prantl., Pflanzentr. IV, 220a, Heft. 41: 15. 1909; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 39. 1987; Mathew in Nayar *et al.*, Fasc. Fl. India 19: 234. 1988. *Agathisanthes javanica* Blume, Bijdr. 644. 1825. *Nyssa sessiliflora* Hook. f. & Thomson in Benth & Hook. f., Gen. Pl. 1: 952. 1867; C.B. Clarke in Hook. f., Fl. Brit. India 2: 747. 1879; Kanjilal *et al.*, Fl. Assam 2: 371. 1938.

Large trees, up to 40 m tall, young parts silky. Leaves alternate, crowded apically, elliptic-ovate or oblong-lanceolate, 10-15 x 3-8 cm, cuneate at base, apex acuminate, entire, glabrescent above, glabrous and thinly pubescent beneath; petioles 2-5 cm long. Flowers unisexual, sessile, axillary, collected together in dense globose, pedunculate heads. *Male heads*: calyx 5-toothed; petals 5, silky pubescent outside; stamens 10, disc fleshy, grooved. *Female heads*: calyx campanulate, 4-5-toothed; petals 4-5; ovary 1-celled; style with 2 divergent or curled branches. Drupes ellipsoid, 10-12 x 5-6 mm, greenish yellow, glabrous, purple when ripe, apex pointed.

Fl. & Fr.: April-December.

Tilthlang, *Dutta* 33766.

CAPRIFOLIACEAE

(P. Bujarbarua & K.P. Singh)

- | | |
|---------------------------------------------|------------------------|
| 1a. Flowers zygomorphic; fruits many-seeded |1. <i>Lonicera</i> |
| 1b. Flowers actinomorphic; fruits 1-seeded | |
| 2a. Leaves imparipinnate | ...2. <i>Sambucus</i> |
| 2b. Leaves simple |3. <i>Viburnum</i> |

1. LONICERA L.

Lonicera macrantha (D. Don) Spreng., Syst. Veg. 4(2): 82. 1827. *Caprifolium macranthum* D. Don, Prodr. Fl. Nepal. 140. 1825. *Lonicera japonica* L., Sp. Pl. 173. 1753, *auct non* Thunb.; Wallich in Roxb., Fl. Ind. 2: 174. 1824; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 100. 1938. *Lonicera macrantha* (D. Don) DC., Prodr. 4: 333. 1830; C.B. Clarke in Hook f., Fl. Brit. India 3: 10. 1880; Kanjilal *et al.*, Fl. Assam 3: 8. 1939. *Leihruisen* (Lushai).

Climbing shrubs; young parts silky villous. Leaves opposite, oblong, oblong-lanceolate, ovate-elliptic, 3-7 x 1.5-3 cm, cordate at base, shortly acuminate at apex, entire along margins, coriaceous, rugose above, villous beneath and along midrib above. Flowers in dense terminal panicles, 4-6 cm long, pale yellow or yellowish-white; calyx lobes linear, with long hairs; corolla bilabiate, glabrous outside; style purplish. Berries fleshy ovoid, ellipsoid, narrowed at tip.

Fl. & Fr.: April-October

Naosel, 750 m, Parry 12 (*vide* C.E.C. Fischer, *l.c.*).

2. SAMBUCUS L.

Sambucus adnata Wallich [Cat. no. 482 (1829), *nom. nud.*] ex DC., Prodr. 4: 322. 1830; C.B. Clarke in Hook. f., Fl. Brit. India 3: 3. 1880; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 39. 1987.

Shrubs, upto 2 m high, Leaves 30 cm long; Leaflets 5-9, oblong-lanceolate, 8-12 cm long. Corymbs leafy at base, puberulous; corolla white, campanulate. Drupes globose.

Scarce. Sairep, Dutta 33588.

3. VIBURNUM L.

- | | |
|----------------------------------------------------------------|----------------------------|
| 1a. Leaves 3-nerved at base | ... 2. <i>V. foetidum</i> |
| 1b. Leaves penninerved | |
| 2a. Leaves dentate; corolla rotate; lobes spreading | ... 3. <i>V. mullaha</i> |
| 2b. Leaves entire; corolla tubular; lobes short, not spreading | ... 1. <i>V. coriaceum</i> |

1. *Viburnum coriaceum* Blume, Bijdr. 656. 1826; C.B. Clarke in Hook f., Brit. India 3:5. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 100. 1938. *V. cylindricum sensu* Rehder in Sargent, Trees and Shrubs 12: 112. 1908; non D. Don, 1825, Kanjilal *et al.*, Fl. Assam 3:4. 1939. *Lalruanga hna* huzut (Lushai).

Shrubs or small trees, up to 10 m tall, Leaves opposite, oblong-lanceolate, 9-13 x 2.5-4.5 cm, acute to cuneate at base, long acuminate at apex, entire along margins, coriaceous, glabrous above, hairy at nerves axils beneath; lateral nerves 3-5 pairs; petioles 1.2-1.8 cm long. Flowers in corymbs. scented, white; calyx tube glabrous; lobes indistinct; corolla tubular, erect; anther exerted. Drupes compressed, ellipsoid, 3-4 x 3 mm, black, acute as apex; seeds 2-grooved dorsally.

Fl. & Fr.: October-December.

Scarce, in primary forests on hill slopes. North Vanlaiphai Parry 386 (*vide* C.E.C. Fischer, *l.c.*); Sangau, 1150 m, Mao 107179.

2. *Viburnum foetidum* Wallich., Pl. As. Rar. 1: 49. t. 61. 1831; C.B. Clarke in Hook f., Fl. Brit. India 3: 4. 1880; Kanjilal *et al.*, Fl. Assam 3: 3. 1939; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 39. 1987.

Shrubs or small trees, up to 5 m tall; young parts stellate-hairy. Leaves rhomboid or elliptic-lanceolate, 2.5-7 x 1.5-3 cm, base cuneate, acute-mucronate at apex, dentate along margins, glabrous above, pubescent on the nerves beneath; lateral nerves 3-4 pairs; petioles 0.5-1.5 cm, stellate pubescent, Flowers in compound pedunculate umbels, creamy white; calyx tube glabrous with minute teeth; corolla short, rotate. Drupes scarlet-red, ca 5 x 4 mm; seeds dorsally 2-grooved, ventrally 3-grooved.

Fl. & Fr.: June-December.

In primary forests. Vawmbuk-Thaitlang, 1100 m, Dutta 33919.

3. *Viburnum mullaha* Buch.-Ham. ex D. Don., Prodr. Fl. Nep. 141. 1825. *V. stellulatum* Wallich [Cat. 15. no. 463. (1829). *nom nud*] ex DC., Prodr. 4: 327. 1830; Wallich, Pl. As. Rar. 2: 54. t. 169. 1831; C.B. Clarke in Hook f., Fl. Brit. India 3: 4. 1880. *Vawng-Ser* (Lushai).

Large, aromatic shrubs; young shoots puberulous. Leaves opposite, elliptic to oblong, lanceolate, 4-12 x 2-6 cm, cuneate or rounded at base, acuminate at apex, dentate along margins, entire towards base, glabrous except on the nerves beneath; lateral nerves 3-5 pairs; petioles 1-1.5 cm long, minutely pubescent. Flowers in terminal, subglobose corymbs; calyx tube minutely hairy; lobes ovate, 2-3 mm long; corolla white, rotate; lobes pubescent inside, 3-4 mm long; stigma capitate. Drupes 4-5 x 4 mm, rounded oblong, yellow to red-purplish when ripe; seeds 2-grooved on both faces.

Fl. & Fr.: April-June.

Scarce. Mualmam-ram, 650 m, *M. Sawmliana* 101747; Darlawn, 1250 m, *M. Sawmliana*, 101748.

Uses: Young leaves are added in cooked vegetable or used as spices.

RUBIACEAE

(Papia Roy Choudhury)

- 1a. Flowers unisexual ... 30. *Prismatomeris*
- 1b. Flowers bisexual:
 - 2a. Flowers in globose heads; trees or large shrubs:
 - 3a. Ovules solitary in each cell ... 18. *Morinda*
 - 3b. Ovules many in each cell:
 - 4a. Woody climbers ... 38. *Uncaria*
 - 4b. Trees or erect shrubs:
 - 5a. Corolla imbricate or twisted in bud ... 24. *Neolamarckia*
 - 5b. Corolla valvate in bud:
 - 6a. Seeds winged ... 16. *Metadina*
 - 6b. Seeds not winged:
 - 7a. Calyx truncate; seeds winged ... 17. *Mitragyna*
 - 7b. Calyx cupular; seeds tailed ... 9. *Haldina*
 - 2b. Flowers not in globose heads, if heads then undershrubs or herbs:

- 8a. Ovules many in each cell:
- 9a. Few flowers with petaloid sepals19. *Mussaenda*
- 9b. Sepals not petaloid :
- 10a. Ovules 4-10 in each cell11. *Ilyptianthera*
- 10b. Ovules numerous in each cell:
- 11a. Fruits capsule :
- 12a. Plants epiphytic23. *Hymenopogon*
- 12b. Plants not epiphytic:
- 13a. Corolla lobes imbricate:
- 14a. Stamens exserted39. *Wendlandia*
- 14b. Stamens inserted15. *Luculia*
- 13b. Corolla lobes valvate:
- 15a. Flowers tetramerous:
- 16a. Seeds planoconvex with ventral cavity22. *Neanotis*
- 16b. Seeds without ventral cavity:
- 17a. Capsules compressed1. *Anotis*
- 17b. Capsules not compressed ... 10. *Hedyotis*
- 15b. Flowers pentamerous :
- 18a. Seeds obliquely oblong36. *Silvianthus*
- 18b. Seeds not oblique :
- 19a. Capsules dehiscent above by one valve2. *Argostemma*
- 19b. Capsules dehiscent above by two valves ...26. *Ophiorrhiza*
- 11b. Fruits berry :
- 20a. Seeds minute :

- 21a. Inflorescence panicle of cymes20. *Mycetia*
 21b. Inflorescence capitate or umbellate cyme21. *Myrioneuron*
- 20b. Seeds large :
- 22a. Ovary 1-celled:
- 23a. Seeds many8. *Gardenia*
 23b. Seeds 827. *Oxyceros*
- 22b. Ovary 1 or 2- celled :
- 24a. Fruits black or yellow when ripe33. *Randia*
 24b. Fruits blackish-purple when ripe6. *Fagerlindia*
- 8b. Ovules solitary in each cell:
- 25a. Seeds attached with the septum :
- 26a. Stipules present37. *Spermacoce*
 26b. Stipules absent7. *Galium*
- 25b. Seeds not attached with the septum:
- 27a. Corolla lobes twisted in bud:
- 28a. Flowers in corymbs:
- 29a. Bracts coriaceous ... 12. *Ixora*
 29b. Bracts membranous29. *Pavetta*
- 28b. Flowers solitary or in axillary fascicles:
- 30a. Calyx lobes regular 25. *Nostolachma*
 30b. Calyx lobes irregular :
- 31a. Flowers many in fascicles5. *Coffea*
 31b. Flowers solitary or 1-3 together31. *Psilanthus*
- 27b. Corolla lobes valvate in bud:
- 32a. Herbs:
- 33a. Fruits with purple juice34. *Rubia*
 33b. Fruits without purple juice13. *Knoxia*
- 32b. Shrubs or trees:

34a. Plants foetid:

35a. Woody climbers ... 28. *Paederia*

35b. Not climbers:

36a. Ovary 4-9-celled ...14. *Lasianthus*36b. Ovary 2-celled ...35. *Saprosma*

34b. Plants not foetid:

37a. Seeds not ventrally concave3. *Canthium*

37b. Seeds ventrally concave:

38a. Stipules bifid ...4. *Chasalia*38b. Stipules entire32. *Psychotria*

1. ANOTIS DC.

Anotis wightiana Hook. f., Fl. Brit. India 3: 75. 1880; C.E.C. Fisher in Rec. Bot. Surv. India 12 (2): 100. 1938; Kanjilal *et al.*, Fl. Assam 3: 40. 1939.

Diffuse, perennial herbs. Leaves sessile, ovate, 0.2-1 x 0.4-0.7 cm, apex acute, base acute or rounded; lateral nerves obscure. Flowers shortly pedicelled; capitate cymes on axillary branchlets; calyx tube short; lobes 4, recurved or erect; corolla pinkish-white, tubular; lobes 4; stamens 4, adnate to mouth of corolla; ovary 2-celled; stigma 2-4, linear. Capsules laterally compressed, orbicular, 2-4-celled, indehiscent; seeds rugose when dry.

Fl. & Fr.: September-December.

Theiriat, *Deb* 31268; North Vanlaipai, *D.K. Singh* 97166.

2. ARGOSTEMMA Wallich

1a. Leaves elliptic orbicular ...2. *A. sarmentosum*

1b. Leaves lanceolate or ovate-lanceolate :

2a. Corolla 0.2-0.3 cm long3. *A. verticillatum*2b. Corolla lobes 0.5 cm long ...1. *A. fragile*

1. **Argostemma fragile** Geddes, in Kew Bull. 1927: 166. 1927; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 100 1938; Kanjilal *et al.*, Fl. Assam 3: 36. 1939.

Delicate, small herbs. Leaves 4 on a node, ovate-lanceolate, 3-5 x 1-1.3 cm, membranous, base cuneate, apex acuminate; stipules 4, verticillate, 0.2-0.3 cm long. Flowers in pedunculate terminal umbels; calyx tube 0.4-0.5 cm long, apically 5-lobed; lobes triangular; corolla white; lobes 5, valvate; strameans 5; anthers large; ovary 2-celled. styles filiform, 0.3-0.4 cm long; stigma capitate.

Fl. & Fr.: September-January.

Lushai hills, 600-1000 m, Wenger 221a (*vide* C.E.C. Fischer, *l.c.*).

2. **Argostemma sarmentosum** Wallich in Roxb., Fl. Ind. 2: 324. 1824; Hook. *f.*, Fl. Brit. India 3: 42. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 100. 1938; Kanjilal *et al.*, Fl. Assam 3: 36. 1939.

Small, delicate herbs. Leaves sessile or shortly petiolate, opposite or whorled, unequal in size, elliptic-orbicular, obtuse at both the ends, pubescent; stipules minute. Flowers in pedunculate, terminal umbels; bracts ovate; calyx tube short, pubescent; lobes 5, ovate; stamens 4; ovary 2-celled; ovules many in each cell; style filiform; stigma capitate. Capsules 2-celled; seeds minute.

Fl. & Fr.: August-September.

Growing on wet rocks. Lushai hills, 600-1200 m, Wenger 220, 222 (*vide* C.E.C. Fischer, *l.c.*)

3. **Argostemma verticillatum** Wallich in Roxb., Fl. Ind. 2: 325. 1824; Hook. *f.*, Fl. Brit. India 3: 43. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 100. 1938; Kanjilal *et al.*, Fl. Assam 3: 36. 1939.

Delicate herbs. Leaves 4 in a whorl, sessile, lanceolate, 7-10 x 0.8-1.8 cm, base oblique, apex acuminate, glabrous, margins unequal. Flowers in umbels, 0.6-0.8 cm in diam.; corolla 0.7-0.9 cm long, tube 0.5-0.7 cm. Capsules 2-celled; seeds minute.

Fl. & Fr.: November-March.

Growing on tree trunks and wet rocks in shady forests. Leite, *Parry* 279 (*vide* C.E.C. Fischer, *l.c.*); Lushai hills, 950-1200 m, *Wenger* 221, 268 (*vide* C.E.C. Fischer, *l.c.*); 60 miles South of Lungleh, 1050 m, *Wenger* 317, (*vide* C.E.C. Fischer, *l.c.*).

3. CANTHIUM Lam.

- 1a. Leaves 8-15 cm long, base cuneate ...1. *C. glabrum*
 1b. Leaves 2-7 cm long, base acute or rounded ...2. *C. gracilipes*

1. *Canthium glabrum* Blume, *Bijdr.* 967. 1827; Hook. *f.*, *Fl. Brit. India* 3: 133. 1880; Kanjilal *et al.*, *Fl. Assam* 3: 65. 1939.

Medium sized trees; branchlets decussate, irregularly fluted. Leaves opposite, elliptic, ovate-oblong or oblong-lanceolate, 8-10 x 3-4 cm, base cuneate, apex obtuse or abruptly acuminate, coriaceous, glabrous on both surfaces, glossy above, paler beneath; lateral nerves 5-7 pairs, gland pitted or not; petioles 0.3-0.5 cm long; stipules subulate, base wide. Flowers on shortly peduncled cymes; calyx 1-1.3 cm long, glabrous; corolla white, tubular; tubes subglobose, apically 5-lobed, ovary 2-celled; ovules 1 in each cell; stigma mitriform, notched. Fruits globose, 1-1.5 cm in diam.; pyrenes triangular, keeled, smooth.

Fl. & Fr.: July-March.

Kawnpui, *K.P. Singh* 97033; Dampui, 920 m, *M. Sawmliana* 107445.

Uses: Fruits edible; wood used as firewood.

2. *Canthium gracilipes* Kurz. in *J. As. Soc. Bengal* 2: 314. 1872; Hook. *f.*, *Brit. India* 3: 134. 1880; Kanjilal *et al.*, *Fl. Assam* 3: 65. 1939; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 39. 1987.

Scrambling shrubs; young shoots pubescent. Leaves elliptic, ovate or oblong-lanceolate, 2.5-6 x 1-2.5 cm, base acute or rounded, apex acuminate, membranous, glabrous, nerves puberulous on lower surfaces; lateral nerves 5-7 pairs; petioles 0.2-0.3 cm long; stipules subulate, pubescent. Flowers tetramerous, solitary or in pairs on capillary pubescent pedicels; calyx teeth subulate, glabrous. Fruits bluish-black, sinuate at apex.

Fl. & Fr.: April-November.

Lawngtalai-Saiha, *Dutta* 33799.

4. CHASALIA Comm. ex Poiret

- 1a. Shrubs; calyx blackish green1. *C. curviflora* var. *ophioxyloides*
 1b. Trees; calyx whitish-red at the apex of lobes2. *C. lushaiensis*

1. Chasalia curviflora (Wallich) Thwaites var. **ophioxyloides** (Wallich) Deb & Krishna in Bull. Bot. Surv. India 24 (1-4): 221. 1982. *Psychotria ophioxyloides* Wallich in Roxb., Fl. Ind. 2: 167. 1824. *Chasalia curviflora* Wallich ex Kurz, For. Fl. Brit. Burma 2: 114. 1877; Kanjilal *et al.*, Fl. Assam 3: 86. 1939. *Chasalia ambigua* Wight & Arn., Prodr. 433. 1834; C.E.C. Fischer in Rec. Bot. Surv India 12(2): 100. 1938.

Shrubs or undershrubs, up to 2 m tall. Leaves obovate-oblongate, 10-18 x 2.5-5 cm, base cuneate, apex acuminate, margins recurved, midrib glabrous beneath; petioles 1-3 cm long; stipules ovate, bifid. Panicles 4-5 cm long, lax to dense-flowered; flowers pinkish-white; calyx short, 5-lobed; corolla tubular, curved, throat yellow; stamens included, in shorter stamens filaments 0.2-0.3 cm long, longer excluded, 0.31-0.4 cm long. Fruits globose, 0.5-0.9 cm in diam.

Fl. & Fr.: March-September.

Mizo hills, *Dutta* 33658, 33659, 30768; Saithah, *D.K. Singh* 92917.

2. Chasalia lushaiensis (C.E.C. Fischer) C.E.C. Fischer in Kew Bull. 1931: 282. 1931; Kanjilal *et al.*, Fl. Assam 3: 87. 1937; Deb & Krishna in Bull. Bot. Surv. India 24 (1-4): 224. 1982; *Gaertnera lushaiensis* C.E.C. Fischer in Kew. Bull. 1928: 141. 1928.

Small trees; branches terete. Leaves elliptic-lanceolate, 12-30 x 3-7 cm, falcate, membranous, glabrous, base attenuate, apex acuminate; petiole 1-2 cm long; stipules connate at base. Flowers small in pedunculate dense heads; bracts cuspidate, ovate; calyx lobes 5, triangular, apex acute; corolla curved, slightly longer than calyx lobes; stamens inserted; anthers linear; ovary 2-lobed; stigma bifid. Fruits subglobose, didymous, glabrous.

Fl. & Fr.: May-December.

Tawkzawl, *Parry* 180; (*vide* C.E.C. Fischer, *l.c.*). Endemic, known only by type.

5. COFFEA L.

Coffea arabica L., Sp. Pl. 172. 1753; Hook. f., Fl. Brit. India 3: 153. 1880; Kanjilal *et al.*, Fl. Assam 3: 74. 1939; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 39. 1987.

Shrub; branches spreading. Leaves bifarious, elliptic to ovate-oblong, 10-12 x 3-4.5 cm, base narrowed, apex acuminate, glabrous on both surfaces; lateral nerves 10-12 pairs, nerves gland pitted; petioles 1-1.5 cm long; stipules lanceolate, cuspidate. Flowers axillary; bracts many, foliaceous; calyx limb truncate; corolla white, funnel-shaped. Drupe oblong, purple when ripe.

Fl. & Fr.: March-December.

Cultivated. Sialsuk to Aizawl, Deb 30868, 38357, 38358; Saithah, D.K. Singh 98844; Sabual, D.K. Singh 99028.

Use: Source of commercial coffee beans.

6. FAGERLINDIA Tirvengadam

Fagerlindia fasciculata (Roxb.) Tirvengadam in Nord. J. Bot. 3: 458. 1938. *Posoqueria fasciculata* Roxb., Fl. Ind. 2: 568. 1824. *Randia fasciculata* (Roxb.) DC., Prodr. 4: 386. 1830; Hook. f., Fl. Brit. India 3: 109. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 102. 1938. Kanjilal *et al.*, Fl. Assam 3: 59. 1939. *Oxyceros fasciculata* (Roxb.) Yamazaki in J. Jap. Bot. 45 (11): 340. 1970. *Chhawntan* (Lushai).

Shrubs; stems spinous. Leaves fascicled, oblong-lanceolate, elliptic or ovate, 2-17 x 0.4-0.8 cm, base rounded, apex acute or acuminate, membranous, glabrous; lateral nerves 9-11 pairs; petioles 0.4-1.3 cm long; stipules lanceolate. Cymes terminal or axillary. Flowers 3 together; calyx lobes linear, deciduous; corolla tube slender; lobes broad, oblong, apiculate, hairy at base. Berry blackish purple, globose, 0.3-0.5 cm in diam.; seeds numerous, angular.

Fl. & Fr.: March-May.

S.loc., Parry s. num (CAL); Saithah, D.K. Singh 92918; Kawnpui forest, K.P. Singh 96973; Teirei, D.K. Singh 99194.

7. GALIUM L.

- 1a. Leaf margins and midrib bristly1. *G. asperifolium*
 1b. Leaf margins and midrib not bristly2. *G. elegans*

1. **Galium asperifolium** Wallich in Roxb., Fl. Ind. 1: 381, 1820. *G. mollugo sensu* Hook. f., Fl. Brit. India 3: 207, 1881, non L., 1753; Kanjilal *et al.*, Fl. Assam 3: 95, 1939; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 39, 1987.

Perennial, scandent herbs; stems 4-angled, recurved bristles on angles. Leaves whorled, elliptic or linear lanceolate, 1-3.2 x 0.3 x 0.4 cm, apex acute or slightly acuminate; margins recurved, margins and midrib bristly. Flowers in lax panicle or cymes. Fruits globose.

Fl. & Fr.: June-November.

Thalthlang, Dutta 33905.

2. **Galium elegans** Wallich *ex* Roxb., Fl. Ind. 1: 382, 1820. *G. rotundifolium sensu* Hook. f., Fl. Brit. India 3: 204, 1881, non L., 1753; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 100, 1938; Kanjilal *et al.*, Fl. Assam 3: 94, 1939.

Perennial, diffused herbs; branchlets 4-angled. Leaves whorled, ovate or elliptic, sessile, 0.8-2 x 0.4-0.8 cm, apex acute, mucronate, subcoriaceous, hispid; basal nerves 3. Flowers minute, tetramerous in terminal cymes; corolla greenish-white; stamens on corolla tube; ovary 2-celled; style bifid; stigma capitate. Fruits dry, hispid, hooked hairy; seeds ventrally grooved.

Fl. & Fr.: November-February.

In exposed places. Sailam 5000 ft., Parry 175; Blue Mountain, 1500-2000 m, Wenger 367 (*vide* C.E.C. Fischer, *l.c.*) Phongphui, K.P. Singh 96793.

8. GARDENIA Ellis.

- 1a. Leaves entire; lateral nerves 5-6 pairs;
flowers dimorphic, sessile1. *G. campanulata*
 1b. Leaves crenate towards apex; lateral nerves 11-13 pairs;
flowers not dimorphic, short-pedicelled2. *G. coronaria*

1. **Gardinia campanulata** Roxb., Fl. Ind. 1: 710. 1820; Hook. f., Fl. Brit. India 3: 118. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 100. 1938; Kanjilal *et al.*, Fl. Assam 3: 54. 1939.

Large shrubs or small trees; branches reduced, spinescent. Leaves obovate or elliptic-lanceolate, 2-10 x 1.5-5 cm, base narrowed, apex acute-acuminate, entire, membranous; lateral nerves 5-6 pairs; petioles 0.5-1.5 cm; stipules free, triangular. Flowers dimorphic; male flowers fascicled; hermaphrodite flowers solitary, sessile; calyx of male flowers uniform, that of hermaphrodite flowers campanulate; corolla campanulate, tube 0.6-0.8 cm. Fruits ellipsoid-subglobose, faintly 5-ridged, 0.8-3 cm.

Fl. & Fr.: March-November.

S.loc., Parry s. num (CAL).

Gardenia coronaria Buch. -Ham. in Syme's Embassy Ava 3, ed. 2: 307. t. 22. 1800; Hook. f., Fl. Brit. India 3: 117. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 100. 1938; Kanjilal *et al.*, Fl. Assam 3: 55. 1939.

Deciduous trees or shrubs; buds resinous. Leaves obovate, 7-16 x 3-7 cm, base narrowed, apex acuminate, margins crenate forwards apex, glabrous; petioles 0.8-1 cm long; stipules connate; lateral nerves 11-13 pairs. Flowers solitary, axillary; calyx tube 2-3 cm long; split on one side up to middle; corolla fragrant, white; tube 6-7 cm long, apically 5-lobed; ovary 1-celled; stigma 5-lobed; ovules many. Fruits ellipsoid, ribbed, 2-3 x 0.8-1 cm.

Fl. & Fr.: April-June.

S.loc. Wenger 6 (CAL).

9. HALDINA Ridsdale

Haldina cordifolia (Roxb.) Ridsdale in Blumea 24: 361. 1978. *Nauclea cordifolia* Roxb., Pl. Corom: t. 53. 1796 & Fl. Ind. 1: 514. 1820. *Adina cordifolia* (Roxb.) Hook. f. ex Brandis, Forest Fl. N.W. India t. 33. 1874; Hook. f., Fl. Brit. India 3: 24. 1880; Kanjilal *et al.*, Fl. Assam 3: 20. 1939. *Lungkhup* (Lushai).

Trees. Leaves cordate to orbicular, 10-15 x 12-19 cm, chartaceous, apex abruptly acuminate, base cordate, puberulous along nerves above, pubescent below; lateral nerves 8-10 pairs; stipules interpetiolar, foliaceous, caducous. Flowers on subsessile, globose heads; bracts ovate to sub-orbicular; bracteoles linear-subulate; calyx cupular, obscurely 5-angled, apically unequal, 5 lobed; corolla creamish, 3-3.5 cm long, funnel-shaped, glabrous within; stamens 5; ovary 2-locular; ovules 3-5 on apical placentae. Capsule 0.3-0.4 cm; seeds elongate, tailed above.

Fl. & Fr.: June-October.

Mizo hills, *Deb* 31954.

10. HEDYOTIS L.

1a. Fruits indehiscent:

- | | |
|----------------------|------------------------------|
| 2a. Cymes sessile | ... 1. <i>H. auricularia</i> |
| 2b. Cymes peduncled: | |
| 3a. Peduncles short | ... 2. <i>H. costata</i> |
| 3b. Peduncles long | ... 4. <i>H. insularis</i> |

1b. Fruits dehiscent:

- | | |
|-----------------------------------------|-------------------------------|
| 4a. Fruits dehiscing septically: | |
| 5a. Plants climbing | ... 6. <i>H. scandens</i> |
| 5b. Plants erect or decumbent | ... 5. <i>H. merguensis</i> |
| 4b. Fruits dehiscing loculicidally: | |
| 6a. Leaves lanceolate | ... 8. <i>H. verticillata</i> |
| 6a. Leaves linear or linear-lanceolate: | |
| 7a. Leaves linear-lanceolate | ... 7. <i>H. tenelliflora</i> |
| 7b. Leaves linear | ... 3. <i>H. diffusa</i> |

1. *Hedyotis auricularia* L., Sp. Pl. 101. 1753; Hook. *f.*, Fl. Brit. India 3: 58. 1880.

Decumbent, profusely branched herbs. Leaves subsessile to shortly petiolate, ovate or ovate lanceolate, 1-4.5 x 4-5 cm, base cuneate, apex

acute, glabrous, scabridulous near margins; nerves pubescent beneath, lateral nervs 3-4 pairs; stipules membranous, hispid, slightly ciliate. Flowers pedicellate, in axillary cyme, heterostylous; calyx tube ovoid, hirsute, apically 4-toothed, ovate, margins ciliate; corolla greenish yellow, tube campanulate, 0.1-0.2 cm long, pilose inside, round in short styled flowers, apically 4-lobed; lobes ovate-oblong, hairy; ovary 2-celled; ovules numerous. Capsules globose, indehiscent, hairy with persistent calyx teeth; seeds numerous, angular.

Fl. & Fr.: March-December.

Puilo basti, *K.P. Singh* 94465; Tilthlang, *K.P. Singh* 96639; Denlang, *K.P. Singh* 94123.

2. *Hedyotis costata* (Roxb.) Kurz in J. As. Soc. Bengal 45(2): 135. 1876 & 46(2): 135. 1877; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 39. 1987. *Spermacoce costata* Roxb., Fl. Ind. 1: 376. 1820. *Hedyotis vestita* R. Br. ex G. Don, Gen. Syst. 3: 526. 1834; Hook. f., Fl. Brit. India 3: 58. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 101. 1938; Kanjilal *et al.*, Fl. Assam 3: 38. 1939.

Decumbent herbs; branches subterete or quadrangular, yellowish. Leaves elliptic-lanceolate, 3-4.5 x 0.3-0.7 cm, apex acuminate, margins scabrid, yellowish green, villous; lateral nerves 5-7 pairs, stipules membranous, hispid, processes subulate. Flowers many in axillary cymes, shortly pedicelled; calyx hispid, tube ovoid, lobes subulate; corolla lilac, bell-shaped, hairy within; lobes 4, oblong, hispid outside; stamens 4, inserted; ovary 2-locular; ovules numerous; stigma bifid, papillose. Capsules globose, ca 0.2 cm diam; seeds few.

Fl. & Fr.: August-February.

In open places in old jhums, 1000 m, *Parry s.num.* (CAL); *s.loc.*, *Wenger* 271 (*vide* C.E.C. Fischer, *l.c.*).

3. *Hedyotis diffusa* Willd., Sp. Pl. 1: 566. 1797; *Oldenlandia diffusa* (Willd.) Roxb., Fl. Ind. 1: 444. 1820; Hook. f., Fl. Brit. India 3: 65. 1880.

Diffuse herbs, rooting from lower nodes, terete; stems glabrous. Leaves sessile, linear or linear-lanceolate, 2-3 x 0.2-0.5 cm, base

narrowed, apex acute, margins recurved, nerves not prominent; stipules laciniate, scabrid. Flowers solitary or in pairs, axillary, sessile or shortly pedicelled; calyx 4-toothed, subulate, ciliate; corolla pinkish-white, 4-lobed, glabrous; stamens 4 at corolla mouth; anthers linear; ovary 2-celled. Capsules didymous within calyx; seeds angular, minute.

Fl. & Fr.: June-February.

North Vanlaiphai, *D.K. Singh* 97169.

4. *Hedyotis insularis* (Spreng.) Deb & Dutta in *Taxon* 32(2): 285. 1983. *Spermacoce insularis* Spreng., *Syst.* 404. 1825. *Hedyotis glabra* (Roxb.) Miq., *Fl. Ind. Bot.* 2: 183. 1857; Hook. f., *Fl. Brit. India* 3: 59. 1880. *nom. superfl.*; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 39. 1987.

Diffuse undershrubs; stems hispid on the grooves. Leaves subsessile, ovate-lanceolate or linear-lanceolate, 2-9 (13) x 0.5-3 cm, base narrowed, apex acuminate, membranous, glabrous above; nerves pubescent beneath; lateral nerves 5-7 pairs; stipules short with long spinous processes. Flowers in paniced cymes on axillary peduncles; calyx teeth 4; corolla tube campanulate, hairy within, apically 4-lobed; stamens 4, filaments as long as the corolla lobes; anthers oblong; ovary 2-locular; ovules many; stigma 2-lobed, papillate. Fruits globose, glabrous, indehiscent; seeds numerous.

Fl. & Fr.: June-January.

Aizawl, *Godfrey* 550 (CAL); Lushai hills, *Deb* 30671.

5. *Hedyotis merguensis* Hook. f., *Gen. Pl.* 2: 57. 1873. *H. connata* Wallich ex Hook. f., *Fl. Brit. India* 3: 62. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 100. 1938.

Decumbent herbs, base woody; branches quadrangular, pubescent. Leaves oblong or linear oblong, 5-10 x 1.5-3.5 cm, apex acute; nerves puberulous beneath; stipules connate with recurved bristles. Flowers in terminal, capitate, sessile cymes surrounded by stipular bracteoles and by base of upper leaves; calyx 4-lobed, 0.6-0.9 cm long; lobes lanceolate, apex acute, margins ciliate; corolla blue, tubular, 4-lobed; tube 1-1.2 cm long, wide and hairy above; lobes with 3-5 spinous appendages on dorsal side; stamens 4, included; ovary 2-celled; ovules numerous; stigma bifid. Capsules ellipsoid, 0.4-0.5 x 0.3-0.4 cm; seeds angular.

Fl. & Fr.: March-September.

Aizawl, 900 m, *Parry 232* (*vide* C.E.C. Fischer, *l.c.*). Chandrapur reserve, *Deb* 1107; Bualpui-Vawnabuk, *Dutta* 33884.

6. ***Hedyotis scandens*** Roxb. [*Hort. Beng.* 10. (1814), *nom. nud.*], *Fl. Ind.* 1: 364. 1820; *Hook. f.*, *Fl. Brit. India* 3: 57. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 100. 1938. *Oldenlandia scandens* (Roxb.) O. Kuntze, *Rev. Gen. Pl.* 1: 292. 1891. Fig. 146.

Shrubby climbers; young shoots pubescent. Leaves elliptic-lanceolate, 4-11 x 1.5-2.8 cm, apex acuminate, margins undulate, glabrous; nerves 4-6 pairs, paler beneath; stipules connate truncate, bicuspidate ciliate, 0.2-0.3 cm long. Flowers on axillary or terminal trichotomous subcorymbs; calyx tube wide at mouth; lobes 4, oblong; corolla white, 4-lobed, hairy inside; stamens 4; ovary 2-celled; ovules many; styles hairy; stigma bifid. Capsules obovoid, 2-celled, septically dehiscent; seeds planoconvex, numerous.

Fl. & Fr.: December-July.

Lungleh, 900 m, *Gage 48* (*vide* C.E.C. Fischer, *l.c.*); Sonai to Sakallin *Leslie 67* (CAL); Lawngtalai-Kawlichaw, *D.K. Singh 92845*; Kawlhkulh-Tuichang, *D.K. Singh 94423*; Saithah, *D.K. Singh 98815*; Kawlhkulh-Hliapui, *K.P. Singh 94313*; Thenzawl-Buangpui road, *K.P. Singh 93826*; Lushai hills, *Deb 30557*; Keifang, *K.P. Singh 99255*.

7. ***Hedyotis tenelliflora*** Blume, *Bijdr.* 971. 1826; *Hook. f.*, *Fl. Brit. India* 3: 60. 1880; *Kanjilal et al.*, *Fl. Assam* 3: 38. 1939. *H. pinifolia* Wallich *ex* G. Don, *Gen. Syst.* 3: 525. 1834; *Hook. f.*, *Fl. Brit. India* 3: 60. 1880; *Deb & Dutta* in *J. Econ. Tax. Bot.* 10(1): 39. 1987.

Diffuse herbs; stems woody at base, 4-angled, glabrous. Leaves sessile, linear-lanceolate, 2-4.5 x 0.3-0.8 cm, apex acuminate, margins revolute; 1-nerved; stipules long ciliate. Flowers 2-6 in axillary clusters, sessile or sub-sessile; calyx teeth ovate-triangular, rigid; corolla white, 1-2 mm long. Capsules ovoid, 2-3 mm in diam., glabrous with persistent calyx teeth.

Fl. & Fr.: June- August.



Fig. 146: *Hedyotis scandens* Roxb.

Lushai hills, *Deb* 30962; Tuipui-Darzo Road, *K.P. Singh* 94045, 94793; Mizo hills, *Dutta* 33831; Champhai, *Deb* 30962.

8. ***Hedyotis verticillata*** (L.) Lam., Tab. Encycl. 1: 271. 1792; *Deb* & *Dutta* in *J. Econ. Tax. Bot.* 10(1): 39. 1987. *Oldenlandia verticillata* L., Mant. 1: 40. 1767. *Hedyotis hispida* Rezt., Obs. 4: 23. 1786; Roxb., *Fl. Ind.* 1: 368. 1820; Hook. f., *Fl. Brit. India* 3: 60. 1880.

Diffuse herbs; stems terete, hispid. Leaves sessile lanceolate, 3-7 x 0.5-1.2 cm, margins recurved, bristly hairy, pale hispid or glabrous beneath, nerve 1; stipules ciliate. Flowers 2-6 in axillary clusters; calyx hispid, slightly tubular; lobes triangular; corolla white, 0.4-0.6 cm long. Capsules ovoid, hispid.

Fl. & Fr.: May- September.

Kawthkuh-Hiapui, *K.P. Singh* 94344; Mizo hills, *Dutta* 33912 (CAL); Lushai hills, *Deb* 31442.

11. HYMENOPOGON Wallich

Hymenopogon parasiticus Wallich in Roxb., *Fl. Ind.* 2: 157. 1824; Hook. f., *Fl. Brit. India* 3: 34. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 101. 1938; Kanjilal *et al.*, *Fl. Assam* 3: 25. 1939. *Neohymenopogon parasiticus* (Wallich) Bennet in *Indian For.* 107: 436. 1981.

Epiphytic shrubs. Leaves oblanceolate, elliptic or ovate-lanceolate, 7-18 x 2-6.8 cm, base attenuate, apex acuminate or acute, puberulose; lateral nerves 18-20 pairs; petioles 0.4-1 cm long; stipules ovate, apex acute. Flowers in trichotomous corymbs, 5-8 cm in diam.; bracts white, stalked; calyx tube linear, lobes ovate; corolla white, 3-4.7 cm long, lobes spreading. Capsules 1-2 cm long, oblong-ellipsoid, membranous.

Fl. & Fr.: June-October.

Hmuifang, 1600 m, *Parry* 254 (*vide* C.E.C. Fischer, *l.c.*); *s. loc.*, 1200-1500 m, *Wenger* 223, 224 (*vide* C.E.C. Fischer, *l.c.*).

12. **HYPTIANThERA** Wight & Arn.

Hyptianthera stricta (Roxb.) Wight & Arn., Prodr. Fl. Pen. Ind. Or. 399. 1834; Hook. f., Fl. Brit. India 3: 121. 1880; Kanjilal *et al.*, Fl. Assam 3: 61. 1939; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 39. 1938. *Randia stricta* Roxb., Fl. Ind. 2: 145. 1824.

Shrubs. Leaves linear-lanceolate or elliptic-oblong, 4-10 x 1.5-4.5 cm, margins undulate, base rounded or cuneate, apex caudate-acuminate, glabrous; lateral nerves 6-7 pairs, hairy beneath when young; petioles 0.8-1.2 cm long; stipules caudate, acuminate, persistent. Flowers sessile in axillary dense cymes; bracts minute, ciliate; calyx shortly tubular; lobes ovate, apex acute, hairy within; corolla tubular; lobes 4-5; anthers 4-5, sessile; ovary 2-celled; ovules 4-10 in each cell; stigma bifid, white, brush like. Berries 0.4-0.5 cm in diam., globose, black when ripe; seeds angular, compressed.

Fl. & Fr.: February-May.

Sairang, *Deb* 30597; Lawngtlai, *Dutta* 33375; Lungleh-Sairep, *Dutta* 33497; Tipaimukh, *Kanjilal* 4783; Hnathial-Thuichang river, *K.P. Singh* 96910; Kawnpui, *K.P. Singh* 97021 Sabeal, *K.P. Singh* 99032.

13. **IXORA** L.

1a. Calyx teeth longer than ovary:

2a. Petioles 0.2-0.3 cm long ...1. *I. acuminata*

2b. Petioles 0.5-1.2 cm long ...3. *I. subsessilis*

1b. Calyx teeth shorter or same as ovary:

3a. Leaves 14-32 cm long ...2. *I. roxburghii*

3b. Leaves 8-16 cm long ...4. *I. undulata*

1. ***Ixora acuminata*** Roxb., Hort. Beng. 10. 1814 & Fl. Ind. 1: 383. 1820; Hook. f., Fl. Brit. India 3: 137. 1880; Kanjilal *et al.*, Fl. Assam 3: 68. 1939; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 40. 1937.

Small shrubs; branchlets ribbed. Leaves elliptic or elliptic-oblong, 8-17 x 8.5-10 cm, base rounded, apex acuminate, coriaceous, glabrous above,

tomentose beneath; lateral nerves 10-12 pairs, hairy on both surfaces; petioles 1-1.5 cm long; floral pair of leaves ovate or obovate, sessile, base rounded. Flowers on peduncled, bracteate, pubescent cymes; calyx teeth shorter than ovary, puberulose; corolla white, glabrous, tube 1.8-2 cm long, slender, lobes 4, notched; ovary ovoid; stigma bifid. Fruits red, ellipsoid, 0.3-0.5 cm in diam.; crowned by calyx limb; seed ventrally concave.

Fl. & Fr.: May-October.

Bunglang, *Deb* 31453; Sairang, *Deb* 30568; Bualpui, *D.K. Singh* 93029.

2. *Ixora roxburghii* Balakr., *Fl. Jowai* 1: 232. 1981. *I. villosa* Roxb., *Fl. Ind.* 1: 383. 1820, *non* Poir. 1789; Hook. *f.*, *Fl. Brit. India* 3: 144. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 101. 1938; Kanjilal *et al.* *Fl. Assam* 3: 69. 1939.

Shrubs; branchlets pubescent. Leaves obovate or elliptic, 14-32 x 8-12 cm, base cuneate, apex acuminate, coriaceous, glabrous above, tomentose beneath; lateral nerves 10-12 pairs; petioles 0.3-0.4 cm long; stipules tomentose. Flowers on pedunculate, bracteate cymes; corolla white, glabrous, tube slender, 0.2-0.4 cm wide, notched; style exerted. Fruits red, 0.4-0.5 cm in diam., crowned by calyx limb; seeds concave ventrally.

Fl. & Fr.: April-August.

Lungleh, ca 1000 m, *Gage* 236 (*vide* C.E.C. Fischer, *l.c.*).

3. *Ixora subsessilis* Wallich *ex* G. Don, *Gen. Syst.* 3: 573. 1834; Hook. *f.*, *Fl. Brit. India* 3: 139. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 101. 1938; Kanjilal *et al.*, *Fl. Assam* 3: 68. 1939.

Shrubs. Leaves elliptic-lanceolate or oblanceolate, 6-8 x 1.2-3.5 cm, base acute, apex acuminate, subcoriaceous, glabrous; lateral nerves obscure; petioles 0.3-1.5 cm long; stipules sheathing, cuspidate, geniculate. Flowers in terminal, subsessile cymes; peduncles geniculate; calyx red, longer than ovary; corolla red, gradually turned into white, tube 0.8-1 cm long; lobes 4, lanceolate, reflexed. Fruits crowned with calyx teeth; seeds 1 or 2, concave.

Fl. & Fr.: November-April.

Chekawn ca 1000 m, *Parry* 379 (*vide* C.E.C. Fischer, *l.c.*); 15 miles South East of Lungleh, *Gage* 145 (CAL); *s.loc.*, *Parry s.num* (CAL); Changail, *Prater s.num* (CAL); Lawngtalai, *K.P. Singh* 96927; Kawnpui, *K.P. Singh* 97027; Thaldang, *B.M. Wadhwa & K.P. Singh* 96832, 99832.

4. *Ixora undulata* Roxb., Fl. Ind. 1: 385. 1820; Hook. f., Fl. Brit. India 3: 147. 1880; Kanjilal *et al.*, Fl. Assam 3: 71. 1939; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 40. 1987.

Large shrubs. Leaves elliptic-lanceolate, 8-16 x 4-8.5 cm, acute or obtuse at both ends, margins undulate, membranous, glabrous, shining; lateral nerves 24-30 pairs; petioles 1-1.2 cm long; stipules marginate with long cusp. Flowers in peduncled, bracteate cymes; bracts and bracteoles persistent; calyx glabrous; corolla pinkish, tube slender, 1-1.3 cm long, lobes as long or slightly shorter than tube; stigma recurved. Fruits ellipsoid, purplish; seeds plano-convex.

Fl. & Fr.: April-September.

Lungleh, *Dutta* 33367; Lawngtalai, *K.P. Singh* 96896; Phellawn forest, *K.P. Singh* 97032.

14. KNOXIA L.

- | | |
|--------------------------------------|------------------------------|
| 1a. Stems with 2 lines of pubescence | ... 1. <i>K. roxburghii</i> |
| 1b. Stems pubescent throughout | ... 2. <i>K. sumatrensis</i> |

1. *Knoxia roxburghii* (Spreng.) M.A. Rau in Bull. Bot. Surv. India 10 (Suppl. 2): 40. 1969. *Spermacoce roxburghii* Spreng., Syst. 1: 404. 1824. *Knoxia brachycarpa* R. Br. ex Hook. f., Fl. Brit. India 3: 130. 1880. C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 101. 1938. *K. microcarpa* Kurz in J. As. Soc. Bengal 46 (2): 138. 1877. *K. laevis* (Roxb.) DC., Prodr. 4: 570. 1830.

Herbs. Leaves sessile, linear-oblong, 4-9 x 0.5-1 cm, apex obtuse, margins hairy, coming down to stem; stipules pubescent. Flowers in capitate cymes; one calyx lobes longer, obtuse; corolla white, throat villous. Fruits angled, shortly pedicelled.

Fl. & Fr.: October-January.

Champhai ca 1500 m, Parry 339 (*vide* C.E.C. Fischer, *l.c.*).

2. *Knoxia sumatrensis* (Retz.) DC., Prodr. 4: 569. 1830. *Spermacoce sumantrensis* Retz., Obs 4: 23. 1786. *Knoxia corymbosa* Willd., Sp. Pl. 1: 582. 1797; Hook. f., Fl. Brit. India 3: 128. 1880. C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 101. 1938; Kanjilal *et al.*, Fl. Assam 3: 63. 1939.

Erect herbs. Leaves linear-lanceolate or lanceolate, 4-8.5 x 1-2.4 cm, base cuneate, apex acuminate, greyish pubescent; lateral nerves 7-9 pairs; petioles 0.5-0.8 cm long, pubescent; stipules connate at base, 3-5, bristly hairy. Flowers in corymbose cymes; calyx tube persistent, apically 4-lobed, 1 longer; corolla white, lobes 4; stamens 4, inserted; ovary 2-celled; ovules 1 in each cell. Fruit mericarps 4-angled.

Fl. & Fr.: August-January.

Lushai hills, Parry s.num (CAL); Puiilo basti road, K.P. Singh 94471; Kawnpui, K.P. Singh 97019; Thenzawl F.R.II., K.P. Singh 93953; Kawlhkulh, K.P. Singh 94383.

15. LASIANTHUS Jack

- | | |
|-----------------------------|-----------------------------|
| 1a. Cymes peduncled |1. <i>L. hiermannii</i> |
| 1b. Cymes sessile: | |
| 2a. Fruits brownish black |4. <i>L. tubiferus</i> |
| 2b. Fruits bluish: | |
| 3a. Fruits with 6 pyrenes |2. <i>L. hookeri</i> |
| 3b. Fruits with 4-5 pyrenes |3. <i>L. lucidus</i> |

1. *Lasianthus hiermannii* King *ex* Hook. f., Fl. Brit. India 3: 190. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 101. 1938; Kanjilal *et al.*, Fl. Assam 3: 90. 1939.

Undershrubs. Leaves sessile, elliptic-lanceolate, 7-10.7 x 1.8-3.2 cm, base acute, apex long acuminate; lateral nerves 5-7 pairs, hairy below; stipules linear-subulate; bracts 0.1-0.2 cm long. Flowers in peduncled cymes; corolla blue. Fruits pale blue, subglobose, 1-1.2 cm in diam.

Fl. & Fr.: January-December.

Lailen, 300 m, *Parry* 361 (*vide* C.E.C. Fischer, *l.c.*); Teirei, *D.K. Singh* 99193; Chhikhallang, *D.K. Singh* 99144; Saithah, *D.K. Singh* 98938.

2. ***Lasianthus hookeri*** C.B. Clarke *ex* Hook. *f.*, *Fl. Brit. India* 3: 184. 1880; *Kanjilal et al.*, *Fl. Assam* 3: 92 1939; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 40. 1987.

Shrubs. Leaves elliptic to oblong-lanceolate, 8-18 x 2-3.5 cm, base acute or rounded, apex acute, margins undulate, ciliate, chartaceous, glabrous above, strigose below; lateral nerves 5-7 pairs, petioles 0.5-0.7 cm long. Flowers sessile, axillary in cymes; corolla white, tube hairy. Fruits globose, 0.2-0.3 cm in diam., blue; seeds 6.

Fl. & Fr.: March- December.

North Vanlaiphai, *Deb* 31154.

3. ***Lasianthus lucidus*** Blume, *Bijdr.* 997. 1826; Hook. *f.*, *Fl. Brit. India* 3: 184. 1880; C.E.E. Fischer in *Rec. Bot. Surv. India* 12(2): 101. 1938; *Kanjilal et al.*, *Fl. Assam* 3: 91. 1939.

Evergreen shrubs. Leaves elliptic or lanceolate, 5-7.5 x 2.3-5 cm, base cuneate, apex acute, margins undulate, slightly coriaceous, rough and hairy beneath; lateral nerves 5-6 pairs, Petioles 0.6-1 cm long. Flowers in axillary clusters, sessile; bracts orbicular, 0.2-0.3 cm wide, shining inside; calyx cup-shaped, lobes lanceolate; corolla white, villous inside. Fruits deep blue, 0.4-0.8 cm in diam.; seeds 5.

Fl. & Fr.: May-December.

Siata, ca 1300 m, *Parry* 544 (CAL); Sialsuk, *Deb* 30720; Tawipui, *Dutta* 33632.

4. ***Lasianthus tubiferus*** Hook. *f.*, *Fl. Brit. India* 3: 183. 1880; *Kanjilal et al.*, *Fl. Assam* 3: 91. 1939; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 40. 1987.

Shrubs; stem brown felted. Leaves elliptic or elliptic-lanceolate, 4.5-11 x 2-3.7 cm, base cuneate, apex acute or acuminate, margins undulate, slightly coriaceous, hairy beneath; lateral nerves 5-6 pairs; petioles 0.7-1

cm long; stipules triangular. Flowers sessile in axillary clusters; bracts orbicular, shining inside; corolla purplish white, throat villous. Fruits subglobose, 0.5-0.8 cm in diam., brownish yellow when ripe, juice yellow; seeds 5, yellow.

Fl. & Fr.: May-December.

Sialsuk, *Deb* 30720; Tawipui, *Dutta* 33632.

16. LUCULIA Sweet

- 1a. Tubercles absent at the base of corolla lobes ... 1. *L. gratissima*
 1b. Tubercles present at the base of corolla lobes ... 2. *L. pinceana*

1. *Luculia gratissima* (Wallich) Sweet., *Brit. Fl. Gard.* t. 145. 1826; *Hook. f., Fl. Brit. India* 3: 36. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 101. 1938. *Cinchona gratissima* Wallich in *Roxb., Fl. Ind.* 2: 154. 1824. *Mussaenda luculia* Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 139. 1825. *nom. illegit.*

Shrubs. Leaves oblanceolate, lanceolate or elliptic-lanceolate, 12-18 x 4-8 cm, base cuneate, apex acuminate, membranous, pubescent beneath or not; nerves 9-12 pairs; petioles short. Flowers pale-pink, in terminal, many-flowered corymbs, odorous, 12-14 cm in diam.; calyx tube 0.5-0.7 cm long, lobes 5, longer than tube, glabrous or pubescent; corolla salver-shaped, tube 2-3 cm long. Capsules obovoid.

Fl. & Fr.: September-April.

Sialsuk, 1500 m, *Parry* 417 (*vide* C.E.C. Fischer, *l.c.*).

2. *Luculia pinceana* Hook. in *Curtis Bot. Mag.* ser. 3. 1: t. 4132. 1845; *Hook. f., Fl. Brit. India* 3: 37. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 101. 1938; Kanjilal *et al.*, *Fl. Assam* 3: 30. 1939.

Fig. 147.

Trees or shrubs. Leaves oblanceolate, elliptic, 8-14 x 2-4.5 cm, base cuneate, apex acuminate, glabrous above, slightly pubescent beneath; lateral nerves 11-16 pairs; petioles 1-1.3 cm long. Flowers in axillary or terminal pedicelled corymbs, odorous; calyx lobes spatulate, apex brownish red within; corolla whitish pink, hypocrateriform, interposed tubercles at

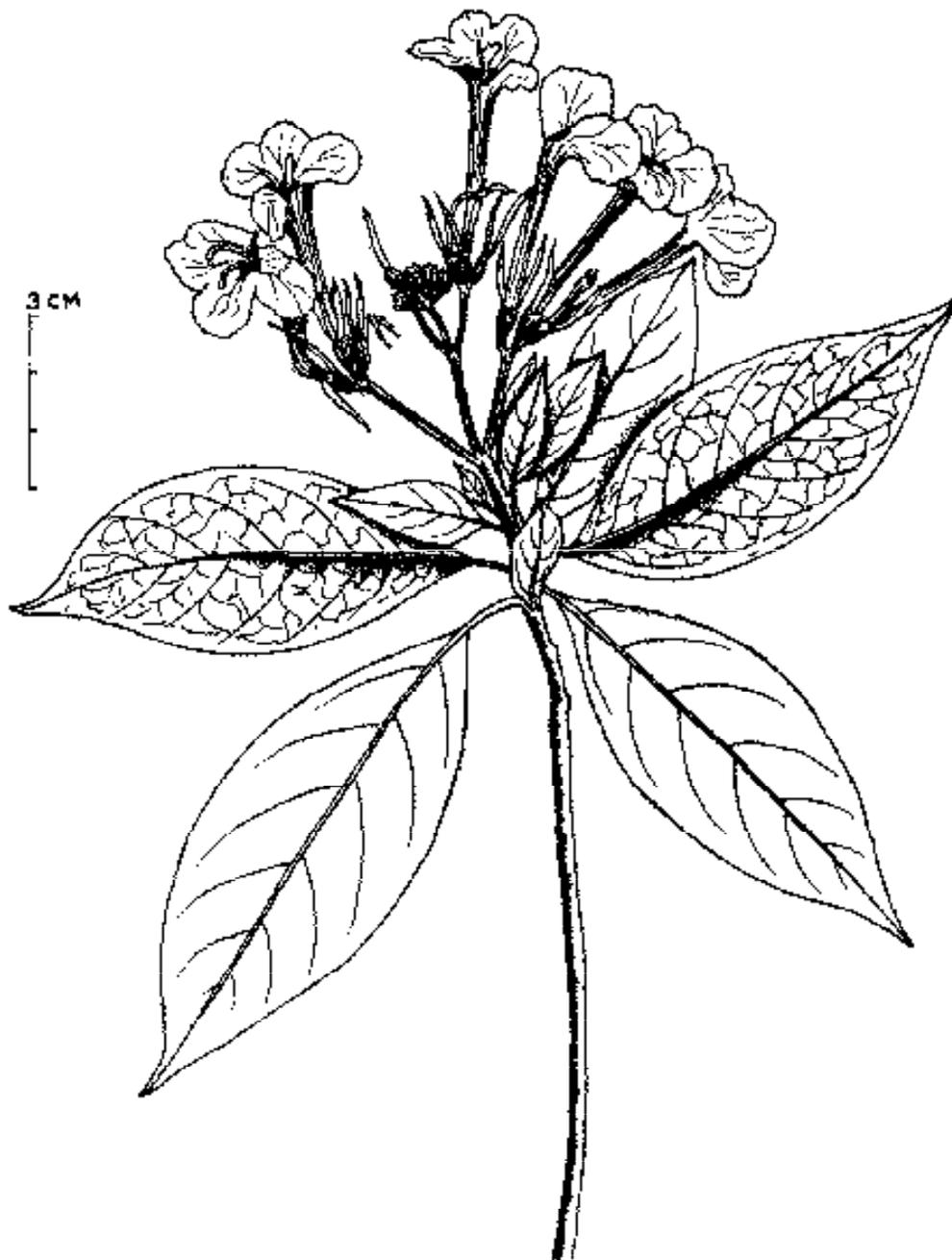


Fig. 147: *Luculia pinceana* Hook.

sinuses; stamens 5; ovary 2-celled; stigma 2, linear. Capsules obovoid, 1-2.2 cm long; seeds numerous, minute.

Fl. & Fr.: August-April.

Blue mountain, 1950 m, *Mao* 107167.

17. METADINA Bakh f.

Metadina trichotoma (Zoll. & Mor.) Bakh. f. in *Taxon* 19: 472. 1970; Ridsdale in *Blumea* 24: 350. 1978. *Nauclea trichotoma* Zoll. & Mor., *Syst. Verz.* 61. 1846. *Adina polycephala* Benth., *Fl. Hong Kong* 146. 1861; Hook. f., *Fl. Brit. India* 3: 25. 1880, C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 100. 1938; Kanjilal *et al.*, *Fl. Assam* 3: 21. 1939.

Trees, up to 15 m tall. Leaves lanceolate to elliptic-oblong, 10-12 x 2-5.5 cm, apex acuminate, base cuneate, glabrous below, glaucous above; lateral nerves 7-10 pairs; petioles 0.3-1 cm long. Heads 0.4-0.5 cm in diam., pedunculate in trichotomously branched panicles; peduncles and pedicels glabrous or puberulose; calyx tubular, pubescent, lobes oblong, obtuse; corolla tubular, 0.2-0.3 cm long; lobes 4-5, ovate, persistent; ovary 2-celled; style exerted; stigma clavate. Capsules obovoid, crowned by calyx limb; seeds minute, minutely winged.

Fl. & Fr.: October - April.

Thingphal 1200 m, *Parry* 441 (*vide* C.E.C. Fischer, *l.c.*); Tawkzawl, 600 m, *Parry* 182 (CAL). Tepaimukh, *Kanjilal* 4770; Sialsuk, *Deb* 30752, 30719; Aizawl, *Deb* 30897.

18. MITRAGYNA Korth.

Mitragyna rotundifolia (Roxb.) O. Kuntze, *Rev. Gen. Pl.* 289. 1891; Kanjilal *et al.*, *Fl. Assam* 3: 16. 1939. *Nauclea rotundifolia* Roxb., *Fl. Ind.* 1: 516. 1820. *N. diversifolia* Wallich ex G. Don, *Gen. Syst.* 3: 467. 1837; *Mitragyna diversifolia* Havil in *J. Linn. Soc. Bot.* 33. 71. 1897; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 101. 1938. *Stephegyne diversifolia* (Wallich ex G. Don) Hook. f., *Fl. Brit. India* 3: 26. 1880. *Lungkhup, Thinglung*, (Lushai).

Deciduous trees, Leaves orbicular, obovate-elliptic, 8-12 x 5-9 cm, base rounded or subcordate, apex obtusely acuminate, slightly hairy beneath; lateral nerves 5-7 pairs; petioles 1.2-3 cm long; stipules obovate. Flowers in axillary, bracteate, paniced heads; bracteoles glabrous, margins apically hirsute; calyx tube obconic, lobes obscure, margins hirsute; corolla white, 0.2-0.3 cm long. Fruits ribbed; seeds winged.

Fl. & Fr.: September-January.

Darzo, 1500 m, *Parry* 593 (*vide* C.E.C. Fischer, *l.c.*); Tlabung, *K.P. Singh* 94269; Puilo basti road, *K.P. Singh* 94489; Kawnpui-Hartawki, *K.P. Singh* 93264; Phaileng, *D.K. Singh* 98969; Chikha, *M. Sawmliana* 101724.

19. MORINDA L.

Morinda angustifolia Roxb., *Pl. Corom.* 3(2); t. 237. 1815; Hook. *f.*, *Fl. Brit. India* 3: 156. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 101. 1938; Kanjilal *et al.*, *Fl. Assam* 3: 79. 1939. *Kawrpel, Lum* (Lushai).

Shrubs, Leaves oblanceolate, 10-20 x 3-9 cm, base cuneate, apex acuminate; lateral nerves 4-10 pairs; petioles 0.5-2.5 cm long. Flowers in axillary, pedunculate heads; calyx truncate; corolla salver-shaped, 2-2.2 cm long, greenish-white. Drupes turbinate, 2-2.3 cm in diam.

Fl. & Fr.: March - October.

Lungleh, 900 m, *Gage* 39 (*vide* C.E.C. Fischer, *l.c.*); Mizo hills, *Dutta* 33304, 33715; Serchip, *K.P. Singh* 96614; Kawnpui, *K.P. Singh* 97045, 96958, Lawngtalai, *K.P. Singh* 94032, Hnathial, *K.P. Singh* 93996, Ngengpui, *D.K. Singh* 92890; Lungchuan, *D.K. Singh* 97165.

20. MUSSAENDA L.

1a. Calyx lobes deciduous:

2a. Lateral nerves 5-6 pairs

....1. *M. glabra*

2b. Lateral nerves 7-12 pairs

....2. *M. macrophylla*

1b. Calyx lobes persistent.

- 3a. Leaves brown hairy on the nerves above4. *M. parryorum*
 3b. Leaves not brown hairy on the nerves above:
 4a. Berry arcolate; leaves strigose hairy5. *M. ruzburghii*
 4b. Berry not arcolate; leaves glabrous3. *M. macrophylla* f. *grandisepala*

1. **Mussaenda glabra** Vahl, Symb. 3: 38. 1794; Hook. f., Fl. Brit. India 3: 90. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 101. 1938; Kanjilal *et al.*, Fl. Assam 3: 44. 1939. *Vakep* (Lushai).

Climbing shrubs, 10-14 m high. Leaves elliptic or oblong-lanceolate, 5-15 x 2.8-4 cm, base acute, apex acuminate, coriaceous; lateral nerves 5-6 pairs, glabrous or puberulose; petiole 0.6-1.2 cm long. Flowers in terminal puberulose cymes; calyx campanulate, lobes subulate, deciduous; petaloid segments white, venation green, stalk 2-3 cm long; corolla pubescent. Berries globose-ellipsoid, glabrous, 0.8-1 x 0.5-0.6 cm, pointed at apex abruptly, black.

Fl. & Fr.: March-December.

Lower slopes of the hills. Lungleh 900 m, Gage 186 (*vide* C.E.C. Fischer, *l.c.*); Lushai hills, *Prazer*, s. *num* (CAL); Chhinchip, 1300 m, *Parry* (*vide* C.E.C. Fischer, *l.c.*) Aizawl, *Godfrey* 547 (CAL); Sialsuk, *Deb* 30761; Kheitum, *Deb* 31187; North Vanlaiphai, *K.P. Singh* 97168; Pheileng, *K.P. Singh* 97062, *Deb* 31086; Thenzawl-Bnangpui road, *K.P. Singh* 93835, Kawlhkullh-Hliapui road, *D.K. Singh* 94316; Tuilukkawn, *D.K. Singh* 99102;

2. **Mussaenda macrophylla** Wallich in Roxb., Fl. Ind. 2: 228. 1824; Hook. f., Fl. Brit. India 3: 89. 1880. C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 101. 1938; Kanjilal *et al.*, Fl. Assam 3: 45. 1939. *M. hispida* D. Don, Prodr. Fl. Nep. 139. 1825. *Vakep* (Lushai).

Shrubs, shoots villous. Leaves elliptic, 4-12 x 2.2-5 cm, base acute, apex acuminate, cuspidate, membranous; lateral nerves 7-10 pairs; petioles 1-2 cm long; stipules recurved. Flowers in terminal corymbose cymes; calyx elliptic, hairy, petaloid, segments deciduous, nerves parallel; corolla orange, tube hirsute, lobes orbicular, throat villous. Berry globose, slightly hairy, 1-1.3 cm in diam.

Fl. & Fr.: July-February.

Lungleh 900 m, *Gage 277*. (CAL). Lawngtalai, *K.P. Singh 96900*; Tilthlang, *K.P. Singh 96640, 96639*; Saithah, *D.K. Singh 98851*; Lawngtalai-Kawlichaw, *D.K. Singh 92867*; Bilkawathlir-Kolasib, *D.K. Singh 911*.

2.1. *Mussaenda macrophylla* Wallich *f. grandisepala* Jayaweera in *J. Arnold Arb.* 44: 246. 1963. *M. pentasaemia* C.E.C. Fischer in *Kew Bull.* 1928: 275. 1928 & in *Rec. Bot. Surv. India* 12(2): 101. 1938; Kanjilal *et al.*, *Fl. Assam* 3: 48. 1939. *Vakep* (Lushai).

Shrubs; branches terete, pilose, young shoots villous. Leaves elliptic or ovate, sub equal, 6-13 x 3-7 cm, base attenuate, decurrent, apex acute or acuminate, margins subundulate, pilose on both surfaces, lateral nerves 9-12 pairs; petioles 0.5-1 cm long; stipules ovate, apex acute, bifid, brownish villous. Flowers in terminal, bracteate cymes; rachis villous; bracts lanceolate, 1-1.3 cm long, bifid; calyx obscure; petaloid segments white, elliptic-lanceolate; corolla brownish yellow, tube cylindrical, yellow pilose; lobes 5, rounded, setose outside, glabrous inside. Fruits oblong, baccate, 0.6-0.8 cm long; seeds sub orbicular, minute.

Fl. & Fr.: July-November.

Hnathial, 100 m, *Parry 275* (*vide* C.E.C. Fischer, *l.c.*).

3. *Mussaenda parryorum* C.E.C. Fischer in *Kew Bull.* 1928: 274. 1928 & in *Rec. Bot. Surv. India* 12(2): 101. 1938; Kanjilal *et al.*, *Fl. Assam* 3: 47. 1939. *Vakephrui* (Lushai).

Shrubs. Leaves elliptic, 6-12 x 4-6 cm, base attenuate, apex acuminate, young leaves tomentose; lateral nerves 7-9 pairs, brownish pubescent above; petioles 0.2-1 cm long, brownish pubescent; stipules triangular, bifid at apex. Flowers in diffused sessile cymes; bracts 2; bracteoles 3, linear, brown pubescent; calyx lobes 5 or 6, brownish pubescent; petaloid calyx segment white, elliptic, 7-nerved; corolla yellow, tube cylindrical, hairy outside, glabrous inside. Fruits baccate, black, brown pubescent.

Fl. & Fr.: July-October.

North Vanlaiphaj, 900 m, *Parry 359* (*vide* C.E.C. Fischer, *l.c.*).
Endemic.

4. *Mussaenda roxburghii* Hook. f., Fl. Brit. India 3: 87. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 101. 1938; Kanjilal *et al.*, Fl. Assam 3: 46. 1939. *Naolungkamchal*, *Vakep* (Lushai).

Shrubs. Leaves elliptic or elliptic-lanceolate, 5-18 x 3-7 cm, base acute, apex acuminate, membranous, setulose above, midrib strigose hairy beneath; lateral nerves 8-14 pairs; petioles 0.3-2 cm long; stipules lanceolate, triangular. Flowers in dense corymbose cymes; calyx lobes filiform; petaloid, calyx segments white; stalk 1-4 cm long; corolla orange to yellow inside, tube greenish-white, strigose. Berry oblong to ellipsoid, areolate above with setaceous calyx lobes.

Fl. & Fr.: June-January.

Zawbawk-Lungleh, 600-900 m, *Parry 276* (*fide* C.E.C. Fischer, *l.c.*); Tilthlang, *K.P. Singh 94079*; Hnathial, *K.P. Singh 94027*; Manpui-Ngengpui, *D.K. Singh 93311*.

21. MYCETIA Reinw.

- 1a. Shrubs; lateral nerves 10-12 pairs1. *M. longifolia*
 1b. Undershrubs; lateral nerves 15-20 pairs2. *M. mukerjiana*

1. *Mycetia longifolia* (Wallich) O. Kuntze, Rev. Gen. 289. 1891; Kanjilal *et al.*, Fl. Assam 3: 49. 1939; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 40. 1987. *Rondeletia longifolia* Wallich in Roxb., Fl. Ind. 2: 137. 1824. *Adenosacme longifolia* (Wallich) Roxb., Fl. Ind. 2: 318. 1824; Hook. f., Fl. Brit. India 3: 95. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 100. 1938. *Vatezuk* (Lushai); *Khunsa* (Riang).

Shrubs; young shoots pubescent. Leaves elliptic, 8-20 x 2-5.5 cm, base acute, apex long acuminate, hairy on both surfaces; nerves 10-12 pairs; petioles 0.7-1 cm long; stipules oblong-lanceolate, apex acute. Flowers in pedicelled, terminal or axillary cymes; bracts glandular; calyx tube globose, lobes 4-6, persistent; corolla yellow, tubular, 1.2-2 cm long, lobes 4-6, triangular; stamens 4-6, ovary 2-celled; ovules numerous. Berries white, globose, 0.6-0.8 cm in diam.

Fl. & Fr.: August-November.

15 miles South-East of Lungleh, *Gage* 150 (CAL); Rieng, *D.K. Singh* 92953; Aizawl, *Deb* 30522; Lawngtalai, *Dutta* 33728; Saiha, *Dutta* 33829.

2. *Mycetia mukerjiana* Deb & Dutta in Indian For. 91(1): 272. 1965 & in J. Econ. Tax. Bot. 10(1): 40. 1987.

Undershrubs; stems terete. Leaves elliptic, 25-27.5 x 7.5-9 cm, base attenuate, apex acuminate, membranous, glabrous; petioles 2-3 cm long; lateral nerves 15-20 pairs; stipules interpetiolar oblong, apex obtuse, glabrous, 0.8-0.9 x 0.7-0.8 cm. Flowers solitary, pedunculate, bracteate; calyx tube hemispheric, lobes 5, persistent, chartaceous; corolla yellow, fleshy, tube longer than lobes, hispidulose outside, long pubescent within; stamens 5, epipetalous; carpels 2; ovules many in each cell. Berries hemispheric; seeds angular, minute.

Fl. & Fr.: July-November.

Sairep forest, *Dutta* 33539.

22. MYRIONEURON R. Br. ex Hook. f.

Myrioneuron nutans Kurz, For. Fl. Brit. Burma 2: 55. 1877; Hook. f., Fl. Brit. India 3: 96. 1880; Kanjilal *et al.*, Fl. Assam 3: 50. 1939; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 40. 1987.

Shrubs. Leaves obovate-elliptic, 10-24 x 5-14 cm, base cuneate, apex acute or acuminate, slightly scabrid beneath; lateral nerves 15-20 pairs; stipules oblong-lanceolate. Flowers in pedunculate corymbose cymes, axillary in the uppermost leaf; bracts lanceolate; calyx lobes subulate, persistent, longer than corolla; corolla white, tubular, lobes hispid; ovary 2-celled; stigma 2, linear-oblong. Berries white, 0.2-0.3 cm in diam.; seeds black, angular, minute.

Fl. & Fr.: October-February.

Aizawl, *Godfrey* 540 (CAL); Aizawl, *Deb* 30675.

23. NEANOTIS W. Lewis

- | | |
|-----------------------------------|---------------------------|
| 1a. Plants rooting from nodes |2. <i>N. hirsuta</i> |
| 1b. Plants not rooting from nodes |1. <i>N. calycina</i> |

1. *Neanotis calycina* (Wallich ex Hook. f.) Lewis in Ann. Miss. Bot. Gard. 53: 37. 1966. *Anotis calycina* Wallich ex Hook. f., Fl. Brit. India 3: 73. 1880. **Fig. 148.**

Erect herbs. Leaves ovate-lanceolate, 1.5-3 x 0.7-1.5 cm, apex acute, ciliate; petioles 0.2-0.7 cm long; stipules with lateral bristles. Cymes axillary or terminal, peduncled, few-flowered; corolla pinkish white. Capsules didymous, exceeding minute calyx teeth; seeds many.

Fl. & Fr.: June-October.

Jawbawk, K.P. Singh 94239.

2. *Neanotis hirsuta* (L.f.) W. Lewis in Ann. Miss. Bot. gard. 53: 38. 1966. *Oldenlandia hirsuta* L.f., Suppl. Pl. 127. 1781. *Hedyotis stipulata* R. Br. ex Hook. f., Fl. Brit. India 3: 63. 1880; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 39. 1987.

Diffuse herbs; rooting from nodes. Leaves ovate, 1-1.5 x 0.8-1.2 cm, base truncate to rounded, apex acute, membranous, nerves not prominent; petioles 0.3-0.4 cm long; stipules bristled. Flowers in axillary, sessile or peduncled cymes; calyx lobes lanceolate, recurved, longer than fruits; corolla whitish pink, glabrous; ovary 3-celled. Capsules globose, indehiscent.

Fl. & Fr.: June-September.

Darzo, Dutta 34065.

24. NEOLAMARCKIA Bosser

Neolamarckia cadamba (Roxb.) Bosser in Bull. Mus. Nation. Hist. Nat. B. Adansonia 247. 1984. *Nauclea cadamba* Roxb., Fl. Ind. 2: 121. 1824. *Anthocephalus chinensis* (Lam.) A. Rich. ex Walp., Report. 2: 491. 1843. *Cephalanthus chinensis* Lam., Encycl. 1: 678. 1785. *Anthocephalus indicus* A. Rich in Mem. S. Hist. Nat. Paris 5: 238. 1834 *nom. illegit.* *A. cadamba* Roxb. in Miq., Fl. Ind. Bot. 2: 135. 1856; Hook. f., Fl. Brit. India 3: 23. 1880; Kanjilal *et al.*, Fl. Assam 3: 18. 1939. *Banphur* (Mizo).

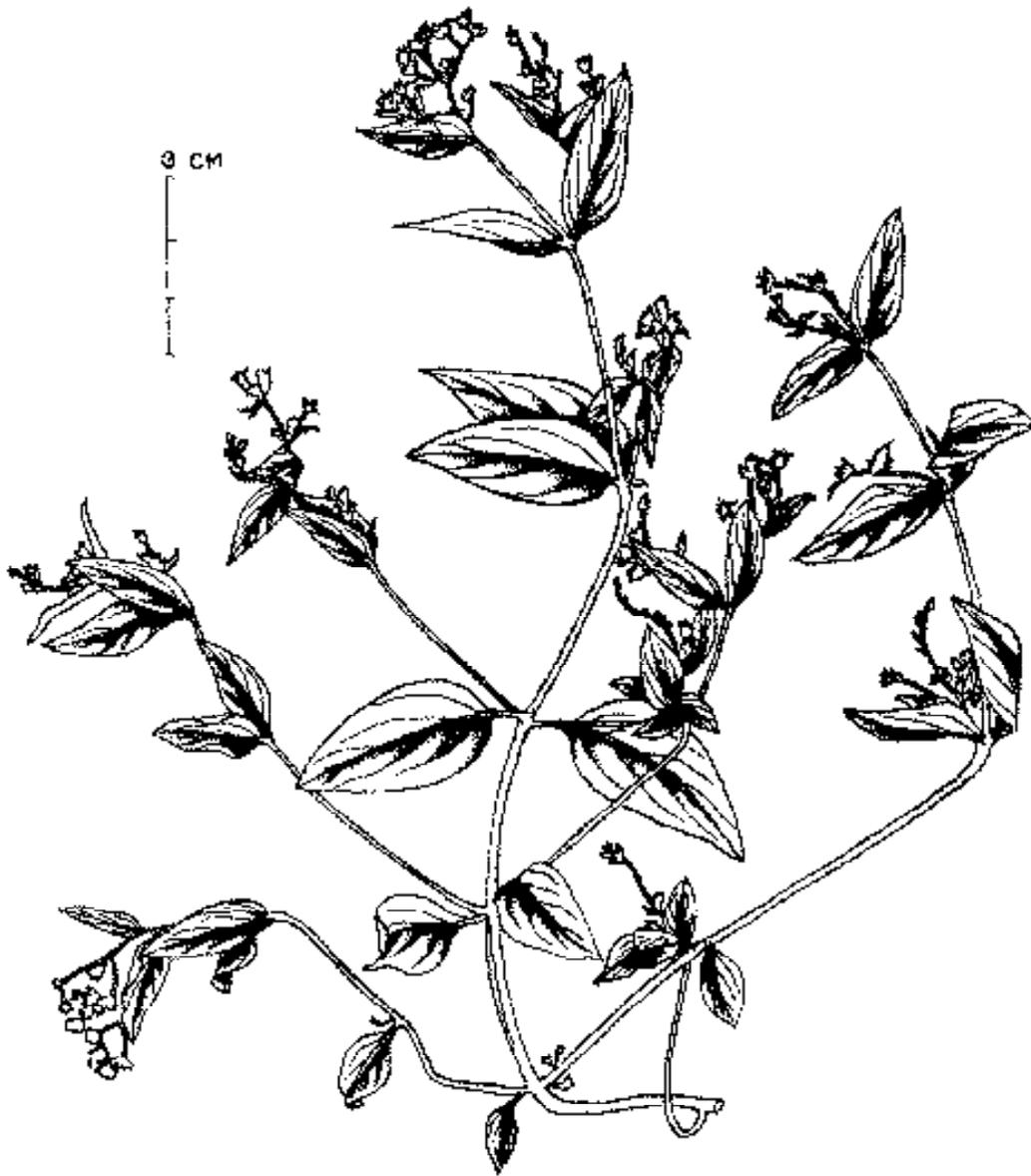


Fig. 148: *Neanotis calycina* (Wallich ex Hook. f.) W. Lewis

Trees, 35-40 m tall; branches horizontal; young shoots lenticellate. Leaves ovate, oblong-elliptic or ovate-lanceolate, 17-19 x 8-10.5 cm, apex shortly acuminate, base shortly cuneate, rounded or obtuse, margins undulate or entire; petioles 3-4 cm long. Flowers in heads 4-5.5 cm in diam.; calyx tubular; corolla tubular, 0.7-1 cm long, yellow or reddish orange; lobes 5, oblong; stamens 5, inserted; ovary 4-celled above, 2-celled below; style exerted, ovules many in each cell. Pseudocarps fleshy, orange-red, 6-7 in diam.; seeds minute, angular.

Fl. & Fr.: December-October.

Lawngtalai-Kawlchaw, *D.K. Singh* 92834; Dampa, *D.K. Singh* 99119.

25. NOSTOLACHMA T. Durand

Nostolachma khasiana (Korth) Deb *et* Lahiri in *Bull. Bot. Surv. Ind.* 17: 152, 1978; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 39, 1987. *Lachnostoma khasiana* Korth in *Nederl. Kruidk Arch.* 2: 202, 1851. *Coffea khasiana* Hook. *f.*, *Fl. Brit. India* 3: 154, 1880; Kanjilal *et al.*, *Fl. Assam* 3: 74, 1939. *Chep-Ngul* (Lushai).

Suberect shrubs; young shoots pubescent. Leaves oblong or elliptic-lanceolate, 8-9 x 0.5-3 cm, apex caudate-acuminate, glabrous on both the surfaces; nerves 6-8 pairs, oblique, pubescent below; petioles 5-6 cm long, pilose; stipules subulate. Flowers in capitate cymes; bracts and bracteoles ovate, opposite, connate below; calyx 4-lobed; corolla orange, throat villous; lobes 4, triangular; ovary 2-celled; ovules 1 in each cell. Drupes ellipsoid, 0.6-0.7 cm in diam.; seeds ventrally concave.

Fl. & Fr.: August-December.

Theiriati, *Deb* 30868; Tawipui, *Dutta* 33641; Darlak, *Deb* 3425; Darlaven, *M. Sawmliana* 101725.

26. OPHIORRHIZA L.

1a. Bracteoles absent; if present caducous:

2a. Shrubs

...3. *O. ochroleuca*

2b. Herbs:

- 3a. Cymes leaf opposed4. *O. oppositifolia*
 3b. Cymes not leaf opposed:
 4a. Leaves whitish beneath7. *O. rugosa* var. *argentea*
 4b. Leaves not whitish beneath2. *O. mungos*
- 1b. Bracteoles present:
 5a. Plants glabrous8. *O. succirubra*
 5b. Plants pubescent:
 6a. Stipules bifid:
 7a. Corolla lobe with a spur at back6. *O. repens*
 7b. Corolla lobe without spur9. *O. treutleri*
 6b. Stipules entire:
 8a. Plants erect1. *O. fasciculata*
 8b. Plants creeping5. *O. pauciflora*

1. *Ophiorrhiza fasciculata* D. Don, Prodr. Fl. Nepal 136. 1825; Hook. f., Fl. Brit. India 3: 83. 1880; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 40. 1987.

Erect herbs; stems woody at base, pubescent above. Leaves elliptic or oblong-lanceolate, 5-14 x 2-4.5 cm, base obliquely acute, apex acuminate, glabrous on both surfaces; lateral nerves 10-12 pairs; petioles 1-2 cm long. Flowers in axillary or terminal cymes; corolla white, 1-1.5 cm long. Capsules brownish pink, pubescent.

Fl. & Fr.: March-August.

Lungleh, Dutta 33501; Sairep, Dutta 33540.

2. *Ophiorrhiza mungos* L., Sp. Pl. 150. 1753; Hook. f., Fl. Brit. India 3: 77. 1880; Kanjilal *et al.*, Fl. Assam 3: 42. 1939; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 40. 1987.

Erect herbs. Leaves elliptic or elliptic-lanceolate, 3.5-15 x 2-2.6 cm, base attenuate, apex acuminate; lateral nerves 8-15 pairs; stipules caducous, triangular, truncate or cuspidate. Flowers in subumbellate cymes; corolla white, glabrous outside, pubescent within; stamens 5; ovary 2-

locular; ovules many in each cell. Capsules obovate; seeds many, brown, angular.

Fl. & Fr.: July-September.

South Vanlaphai, *Dutta* 34006; Saiha, *Dutta* 33807; Mizo hills, *Dutta* 34006.

3. ***Ophiorrhiza ochroleuca*** Hook. *f.*, *Fl. Brit. India* 3: 78. 1880; Kanjilal *et al.*, *Fl. Assam* 3: 42. 1939. Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 40. 1987.

Undershrubs, glabrous. Leaves elliptic or elliptic-lanceolate, 6-12 x 2-6 cm, base acute, apex acuminate, glabrous; lateral nerves 10-15 pairs; petioles 1-2 cm long; stipules lanceolate, bifid. Flowers in axillary or terminal cymes; peduncles short; calyx lobes minute; corolla tubular, lobes recurved, 5, puberulose inside; stamens 5, inserted; ovary 2-celled. Capsules coriaceous, compressed, glabrous; seeds numerous, angular, minute.

Fl. & Fr.: March-September.

Kheitung, *Deb* 31214, 31220, 31235.

4. ***Ophiorrhiza oppositiflora*** Hook. *f.*, *Fl. Brit. India* 3: 80. 1880; Kanjilal *et al.*, *Fl. Assam* 3: 42. 1939. Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 40. 1987.

Herbs; stems rigid, scabrid. Leaves ovate-lanceolate, 4-12 x 1.5-2.5 cm, base acute, apex acuminate; lateral nerves 10-12 pairs; petioles slender, 1-1.5 cm long; stipules subulate. Flowers opposite in the leaf axils, or terminal, pedunculate, bracteate cyme; calyx lobes lanceolate, apex obtuse; corolla white with purple tinge, lobes oblong, obtuse, keeled.

Fl. & Fr.: May-September.

Kheitung, *Deb* 31235; Kawanpui forest, *K.P. Singh* 96956, 97032.

5. ***Ophiorrhiza pauciflora*** Hook. *f.*, *Fl. Brit. India* 3: 84. 1880; Kanjilal *et al.*, *Fl. Assam* 3: 43. 1939.

Creeping herbs. Leaves ovate, 1-2 x 1-1.5 cm, apex obtuse or sub-acute, slightly hairy or not; nerves pubescent beneath. Flowers few in axillary or bracteate cymes; bracteoles linear, ciliate persistent; calyx teeth lanceolate, apex obtuse, pubescent; corolla funnel-shaped, tubes glabrous, lobes hispid outside.

Fl. & Fr.: July-September.

Sairep, *K.P. Singh* 96705.

6. ***Ophiorrhiza repens*** (Wallich ex G. Don). Bennet in Indian For. 108 (4): 302. 1983; Deb & Dutta in J. Econ. Tax. Bot, 10(1): 40. 1987. *Mussaenda repens* Wallich ex G. Don, Gen. Syst, 3: 491. 184, 1830. *Ophiorrhiza calcarata* Hook. f., Fl. Brit. India 3: 84. 1880; Kanjilal *et al.*, Fl. Assam 3: 43. 1939.

Herbs; stems creeping. Leaves elliptic-lanceolate, 5-9 x 1.5-4.2 cm, base attenuate, apex acute or obtuse; lateral nerves pubescent beneath, 7-8 pairs; stipules lanceolate, bifid. Flowers in bracteate cymes, 8-20-flowered; calyx lobes lanceolate; corolla pink or white, tube hairy, lobes erect, shorter than dorsal spur; spur recurved, glabrous within, hispid outside.

Fl. & Fr.: August-March.

Siaisuk, *Deb* 30771; Bualpui - Saiha road, *K.P. Singh* 96901; Kawnpui forest, *K.P. Singh* 96971; Lawngtalai-Kawlchaw, *D.K. Singh* 92875.

7. ***Ophiorrhiza rugosa*** Wallich in Roxb., Fl. Ind. 2: 547. 1824. var. ***argentea*** (Wallich ex Hook. f.) Deb *et* Mondal in Bull. Bot. Surv. India 24: 228. 1983. *O. harrisiana* Heyne ex Wight & Arn. var. ***argentea*** Wallich ex Hook. f., Fl. Brit. India 3: 78. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 102. 1938. *Lamba* (Lushai).

Erect herbs; stems puberulose. Leaves lanceolate, 3-7 x 1-2.8 cm, base acute, apex acute to acuminate, glabrous above, whitish beneath; lateral nerves 4-7 pairs; petioles 0.5-1 cm long; stipules subulate, toothed. Flowers in short pedicelled, bracteolate, contracted glabrescent or puberulose cymes; calyx lobes 5, subulate, puberulose; corolla white or pinkish white, glabrous outside, pubescent inside, lobes 5, ovate, acute;

stamens 5 at base of corolla tube; inserted; ovary 2-celled; ovules numerous in each cell. Capsules reniform, compressed.

Fl. & Fr.: April-August.

S.loc. Parry. 30 (CAL); Lungleh, 900 m. *Gage*. 188 (*vide* C.E.C. Fischer, *l.c.*); Kawanpui forest, *K.P. Singh* 96968, 94759, 94791.

8. *Ophiorrhiza succirubra* King ex Hook. f., *Fl. Brit. India* 3: 82. 1880; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 40. 1987. **Fig. 149.**

Erect herbs; stems woody at base. Leaves elliptic or oblong-lanceolate, 4-7 x 2-4.8 cm, base acute, apex acuminate, reddish beneath; lateral nerves 10-13 pairs; petioles 1-2 cm long; stipules linear. Flowers in cymes; calyx persistent; corolla white, 0.7-0.8 cm long. Capsules puberulose.

Fl. & Fr.: August-March.

Chumliang-Meibei, *Deb* 33327; Tawipui, *Dutta* 33639; Saiha, *Dutta* 33809; Tilthlang, *K.P. Singh* 96641A; Phairuang, *K.P. Singh* 94221; Hnathial, *K.P. Singh* 94038, 94426.

9. *Ophiorrhiza treutleri* Hook. f., *Fl. Brit. India* 3: 83. 1880; Kanjilal *et al.*, *Fl. Assam* 3: 42. 1939; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 40. 1987. **Fig. 150.**

Stout pubescent herbs, 30 cm high. Leaves elliptic ovate or lanceolate, 4-9 x 1.8-4 cm, base attenuate, apex acuminate, slightly pubescent on both surfaces; stipules persistent, lanceolate, entire. Flowers in hirsute pedunculate, bracteolate, entire or bifid cymes; bracteoles linear, hispid, persistent; corolla white, funnel-shaped, hirsute outside, glabrous within. Capsules pubescent.

Fl. & Fr.: March-September.

Vawmbuk-Thalthlang, *Dutta* 33914; Tilthlang, *K.P. Singh* 94073.

27. OXYCEROS Lour.

***Oxyceros logiflora* (Lam.) Yamazaki** in *Jap. J. Bot.* 45: 339, 1970. *Randia longiflora* Lam., *Encycl.* 3: 26. 1789; Hook. f., *Fl. Brit. India* 3:

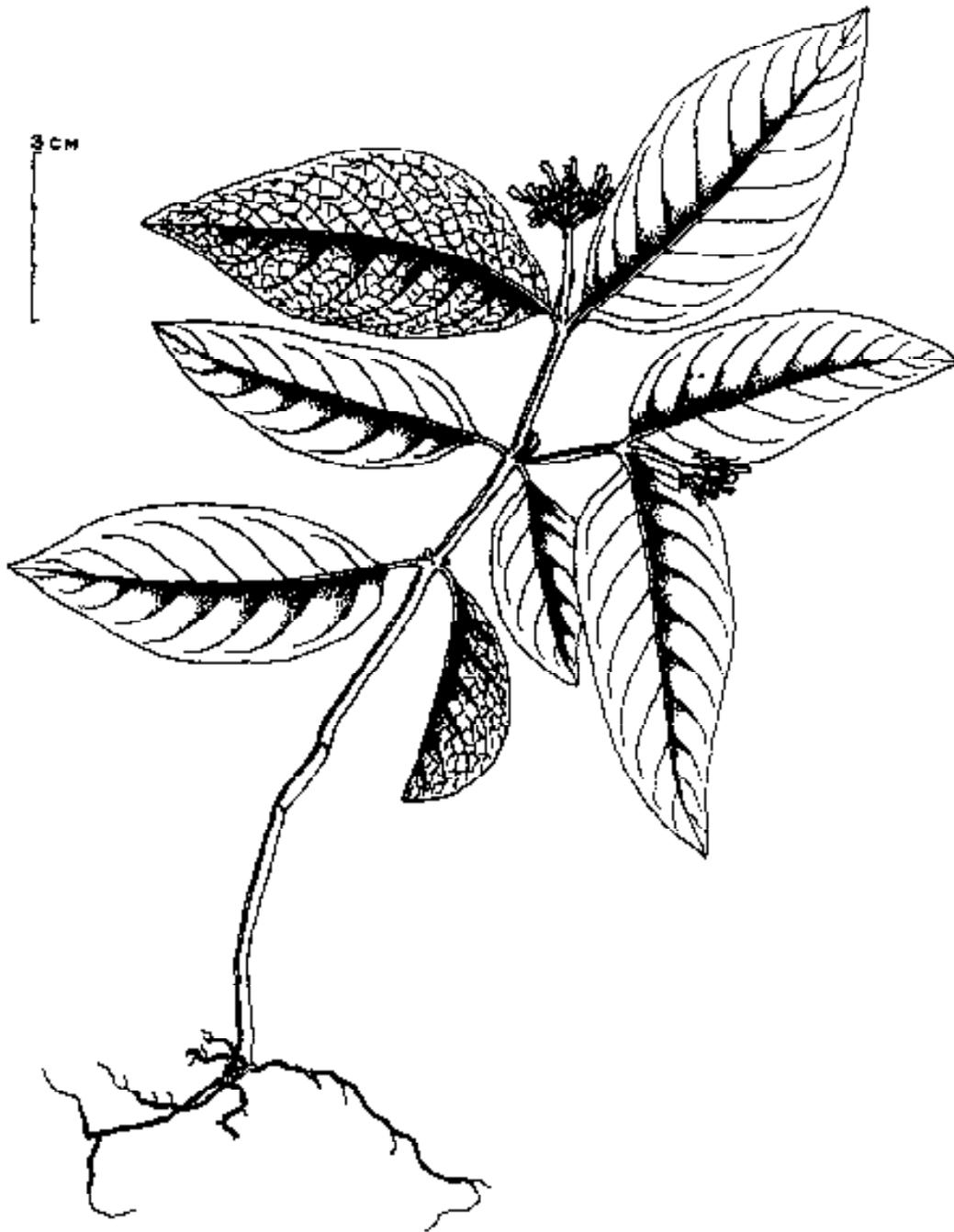


Fig. 149: *Ophiorrhiza succirubra* King ex Hook. f.



Fig. 150: *Ophiorrhiza treutleri* Hook. f.

111. 1880 *p.p.*: C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 102. 1938; Kanjilal *et al.*, Fl. Assam 3: 58. 1939.

Shrubby climbers; stems spinous; spines recurved. Leaves ovate-elliptic, 4-16 x 2-6 cm, coriaceous, glands axillary at nerves beneath; peduncles short. Flowers in trichotomous bracteate cymes; calyx glabrous, lobes wide at base; corolla white, tube slightly longer than lobes; stigma 2-fid. Berries globose, 0.8-1.3 cm in diam., slightly ribbed; seeds rugose.

Fl. & Fr.: April-January.

Between Ridge Camp and Lungsin, *Gage* 235 (*vide* C.E.C. Fischer, *lc.*); *Wenger* 3 (CAL); *Lengti*, *Prazer s. num* (CAL). *Riang*, *D.K. Singh* 98993; *Sabual*, *D.K. Singh* 99024; *Chhikhatlang*, *D.K. Singh* 99144; *Teirei*, *D.K. Singh* 99193.

28. PAEDERIA L.

- | | |
|---------------------------------------------|-----------------------------|
| 1a. Pyrenes not separating from carpophore |3. <i>P. scandens</i> |
| 1b. Pyrenes separating from carpophore: | |
| 2a. Leaves white, villous tomentose beneath |2. <i>P. lanuginosa</i> |
| 2b. Leaves glabrous beneath |1. <i>P. foetida</i> |

1. ***Paederia foetida*** L., Mant. 1: 52. 1767; Hook. f., Fl. Brit. India 3: 195. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 102. 1938; Kanjilal *et al.*, Fl. Assam 3: 77. 1939. *Veikma* (Lakher); *Voihuihrui* (Lushai).

Shrubby climbers, foetid when crushed. Leaves elliptic-ovate or lanceolate, 4-8 x 2-4 cm, base rounded or subcordate, apex acuminate, membranous, glabrous; lateral nerves 4-7 pairs; petioles 2-6 cm long. Flowers in axillary and terminal panicles; calyx campanulate, apically 5-lobed; lobes triangular; corolla funnel-shaped, glandular hairy within. Fruits reddish, ellipsoid; seeds compressed.

Fl. & Fr.: October-April.

Upper Thenzawl, *K.P. Singh* 93904; Kawlhkuh-Hliapui, *K.P. Singh* 94377; Tilthlang, *K.P. Singh* 94065, 94745; Kawichaw, *D.K. Singh* 92830.

2. *Paederia lanuginosa* Wallich, Pl. As. Rar. 2: 165. 1831; Hook. f., Fl. Brit. India 3: 196. 1881.

Large twinning shrubs; young parts tomentose. Leaves opposite, cordate-ovate to ovate-lanceolate, 6-9 x 4.5-8 cm, base cordate, apex acuminate to acute, margins entire, membranous, scabrous above, densely white, villous-tomentose beneath; lateral nerves 7-8 pairs; petioles 2-3 cm long, tomentose. Panicles trichotomously branched, 4-12 cm long, axillary or terminal, villous or pubescent. Flowers dull purple; calyx villous, teeth short; corolla funnel-shaped, crimson, pilose inside; lobes trilobulate. Capsules ovoid-oblong, brown, 1-1.3 x 6-7 cm, crowned by calyx teeth; seeds 2, black, compressed, rounded to slightly oblong, 0.6-0.7 x 0.4-0.5 cm, white hairy on both the surfaces.

Fl. & Fr.: June-March.

Tuipui-Darzo road, *K.P. Singh* 96939 A,B.

3. *Paederia scandens* (Lour.) Merr. in Contr. Arn. Arb. 8: 163. 1934; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 40. 1987. *Gentiana scandens* Lour., Fl. Cochinch. 1: 171. 1790. *Paederia tomentosa* Blume, Bijdr. 3: 968. 1826; Hook. f., Fl. Brit. India 3: 197. 1881. *Vawihuihhruai* (Lushai)

Shrubby twiners. Leaves ovate or lanceolate, 4-9 x 2.3-6 cm, base rounded or cordate, apex acute, glabrous or slightly hairy on both surfaces; petioles 2-7 cm long. Flowers in axillary panicle; branches shorter and ultimate scorpioid; calyx teeth very short; corolla infundibulate. Fruits subglobose, 0.1-0.2 cm in diam., glabrescent.

Fl. & Fr.: April-January.

Sairep, *Dutta* 33586.

29. PAVETTA L.

- | | |
|------------------------------------------------------------------|-----------------------------|
| 1a. Flowers in capitate cymes; lateral nerves
7-9 pairs | ...2. <i>P. subcapitata</i> |
| 1b. Flowers in corymbose panicles; lateral nerves
10-15 pairs | ...1. <i>P. indica</i> |

1. *Pavetta indica* L., Sp. Pl. 110. 1753; Hook. f., Fl. Brit. India 3: 150. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 102. 1938; Kanjilal *et al.*, Fl. Assam 3: 72. 1939.

Shrubs. Leaves elliptic-ovate or oblanceolate, (1-) 5.5- (2-) 25 x 0.7-12.5 cm, base acute, apex acute or acuminate, subcoriaceous, pubescent or glabrous; lateral nerves 10-15 pairs; petioles 0.8-3 cm long; stipules ovate, apex acute. Flowers in terminal or axillary corymbose panicles; calyx truncate or slightly 4-lobed, pubescent; corolla white, fragrant, salver-shaped, tube long, slender, greenish white; stamens 4, near throat; anthers exserted; style exserted. Fruits globose-subglobose, 0.4-0.8 cm in diam., greenish black, polished, 2-seeded.

Fl. & Fr.: December-January.

Lungleh, *Gage* 82, 176 (CAL); Tiltlang, *K.P. Singh* 99641 B, North-Vanlaphai, *D.K. Singh* 97171; Champhai to Burma border, *Deb* 31016; Kawnpui, *K.P. Singh* 97032.

- 1a. Fruits black when ripe, globose, 0.7-0.8 cm in diam.1.1. var. *glabrescence*
 1b. Fruits greenish purple, subglobose, 0.4-0.6 cm in diam.1.2. var. *tomentosa*

1.1. var. *glabrescence* (Kurz) Deb & Rout in J. Bombay Nat. Hist. Soc. 89 (3): 351. 1992. *Ixora tomentosa* Roxb. var. *glabrescence* Kurz, For. Fl. Brit. Burma 2: 19. 1877. *Pavetta indica* L. var. *polyantha* Hook. f., Fl. Brit. India 3: 150. 1880. *Pavetta neglecta* Bremek. in Fedde. Report. 37: 92. 1934; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 102. 1939.

Fl. & Fr.: June-November.

In shady forests, 1050 m. *Wenger* 214 (*vide* C.E.C. Fischer. *l.c.*).

1.2. var. *tomentosa* (Roxb. ex Smith) Hook. f., Fl. Brit. India 3: 150. 1880; Deb & Rout in J. Bombay Nat. Hist. Soc. 89(3): 349. 1992. *P. tomentosa* Roxb. ex Smith in Rees. Cyclop. 26. 1819; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 40. 1987. *Thainurual* (Lushai).

Fl. & Fr.: March-October.

Champhai-Burma border, *Deb*, 31016; Saitang, *Deb* 30571; Pheileng, *K.P. Singh*, 97073; Puiilo basti, *D.K. Singh* 94482; Keifeng, 1100 m, *M. Sawmliana* 99272.

2. Pavetta subcapitata Hook. f., Fl. Brit. India 3: 150. 1880; Kanjilal *et al.*, Fl. Assam 3: 73. 1939; Deb. & Dutta in J. Econ. Tax. Bot. 10(1): 40. 1987.

Shrubs. Leaves elliptic-lanceolate, oblong-lanceolate or elliptic-obovate, 4-15 x 2-5.5 cm, base cuneate, apex acuminate; lateral nerves 7-9 pairs; petioles 0.6-2.5 cm long. Flowers in terminal, sessile, capitate cymes; calyx lobes very short, pubescent; corolla white, 3-4 cm long, tube narrow, lobes spreading. Fruits globose, 0.6-0.7 cm in diam.

Fl. & Fr.: May-February.

Sairep, Dutta 33603.

30. PRISMATOMERIS Thwaites

Prismatomeris tetrandra (Roxb.) K. Schum. in Engler & Prantl, Pflanzenfam. 4(4): 138. 1891. *Coffea tetrandra* Roxb., Fl. Ind. 2: 193. 1824. *Prismatomeris albidiflora* Thwaites in Kew. J. Bot. 8: 268. t. 7A. 1856; Hook. f., Fl. Brit. India 3: 159. 1880; Kanjilal *et al.*, Fl. Assam 3: 80. 1939. *Zung-Eng, Telenga mai-suok* (Lushai).

Shrubs. Leaves elliptic-lanceolate, 6.5-12 x 1.5-4.8 cm, base cuneate, apex acuminate, lateral nerves 6-9 pairs; petioles 0.5-1 cm long; stipules cuspidate. Flowers unisexual in axillary fasciculate cymes; calyx cup-shaped, truncate; corolla white, fragrant, tube 1.8-2.5 cm long, lobes pubescent; anthers linear; stigma bifid. Fruits globose, purplish black.

Fl. & Fr.: May-January.

Dampa, D.K. Singh 98994; Chhikhatlang, D.K. Singh 99146; Teirei, D.K. Singh 99192; Dampa, M. Sawmliana 101723;

31. PSILANTHUS Hook. f.

Psilanthus bengalensis (Roxb.) Leroy in Ass. Sci. Internet, Cafe. 9e Colloque 481. 1980. *Coffea bengalensis* Roxb. [Hort. Beng. 15. (1814), *nom. nud.*] Fl. Ind. 2: 194. 1824; Hook. f., Fl. Brit. India 3: 153. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 100. 1938; Kanjilal *et al.*, Fl. Assam 3: 75. 1939. *Pararsi* (Lushai).

Deciduous shrubs; branches spreading. Leaves variable, elliptic or broadly ovate, 5-9 x 2.5-5.5 cm, base narrowed, apex acute, membranous, glabrous on both surfaces, nerves slightly hairy beneath, 10-15 pairs; petioles 2-3 cm long; stipules setaceous, persistent. Flowers fragrant, axillary or at the ends of branchlets; calyx truncate, apically toothed; corolla white, salver-shaped; tube twisted in bud. Drupes subglobose or ovoid, black; seeds grooved.

Fl. & Fr.: February-December.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

32. PSYCHOTRIA L.

1a. Intramarginal nerves conspicuous:

- | | |
|----------------------------|----------------------------|
| 2a. Calyx lobes linear |1. <i>P. calocarpa</i> |
| 2b. Calyx lobes triangular |7. <i>P. thomsonii</i> |

1b. Intramarginal nerves not conspicuous:

3a. Pyrenes planoconvex:

- | | |
|-----------------------------------------------|------------------------------|
| 4a. Pyrenes with T-shaped groove ventrally |5. <i>P. silhetensis</i> |
| 4b. Pyrenes without T-shaped groove ventrally |4. <i>P. montana</i> |

3b. Pyrenes not planoconvex:

- | | |
|-----------------------------------|--------------------------------|
| 5a. Pyrenes with 1 dorsal ridge |6. <i>P. symplacifolia</i> |
| 5b. Pyrenes with 4 dorsal ridges: | |
| 6a. Leaves chartaceous |3. <i>P. fulva</i> |
| 6b. Leaves membranous |2. <i>P. erratica</i> |

1. *Psychotria calocarpa* Kurz in J. As. Soc. Bengal 41(2): 315. 1872; Hook. *f.*, Fl. Brit. India 3: 173. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 102. 1938; Kanjilal *et al.*, Fl. Assam 3: 83. 1939; Deb & Gang., J. Econ. Tax. Bot. Add. Ser. 7: 131. 1989.

Undershrubs; young shoots puberulose. Leaves elliptic-lanceolate, ovate or oblong, 15-21 x 3.5-9 cm, base narrowed, apex acuminate, coriaceous, glabrous above, puberulose beneath; lateral nerves 11-13 pairs; petioles 1-2 cm long; stipules bicleft, hyaline, caducous. Flowers in axillary or terminal, peduncled, umbellate cymes; calyx 4-lobed, ciliate; corolla red,

tubes short, throat villous. Fruits yellow to red when ripe; pyrenes obscurely 4-ribbed dorsally.

Fl. & Fr.: March-February.

Morchra, 1500 m, *Parry* 96 (*vide* C.E.C. Fischer, *l.c.*); Thingphal, 1200 m, *Parry* 442 (*vide* C.E.C. Fischer, *l.c.*); Changsil, *Prazer s. num* (CAL); 15 miles South East of Lungleh, *Gage* 169. (CAL); Mualpheng, *M. Sawmliana* 95571.

2. *Psychotria erratica* Hook. *f.*, *Fl. Brit. India* 3: 168. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 102. 1938; Kanjilal *et al.*, *Fl. Assam* 3: 84. 1939; Deb & Gang. *J. Econ. Tax. Bot. Add. Ser.* 7: 92. 1989.

Shrubs, blaze pale red. Leaves lanceolate or elliptic-lanceolate, 4-14 x 2-5 cm, base narrowed, apex acuminate, membranous, glabrous; lateral nerves 10-14 pairs; petioles 0.5-0.9 cm long; stipules bifid, recurved. Flowers sessile or not, in axillary or terminal, trichotomously branched cymes; calyx lobes longer than tube; corolla hairy within. Fruits globose, reddish-yellow; seeds undulate.

Fl. & Fr.: April-January.

Keifang, *M. Sawmliana* 99276.

3. *Psychotria fulva* Buch.-Ham. *ex* Hook. *f.*, *Fl. Brit. India* 3: 169. 1880; Kanjilal *et al.*, *Fl. Assam* 3: 85. 1939; Deb & Gang., *J. Econ. Tax. Bot. Add. Ser.* 7: 103. 1989. *P. fulva* Hook. *f.*, var. *monticola* Hook. *f.*, *Fl. Brit. India* 3: 169. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 102. 1939.

Shrubs. Leaves opposite-decussate, elliptic, oblong or ovate, 11-25 x 6-12 cm, base acute, apex acuminate, chartaceous, glabrous, slightly glabrescent beneath; lateral nerves 14-18 pairs; petioles 2-2.5 cm long. Flowers in axillary or subterminal, peduncled, capitate cymes; calyx lobes lanceolate, persistent; corolla tube short, throat villous. Fruits ellipsoid, 0.5-0.7 cm long, yellow to red when ripe.

Fl. & Fr.: January-December.

Saithah, *D.K. Singh* 92923; Sialsuk, *Deb* 30727.

4. *Psychotria montana* Blume, Bijdr. 960. 1826; Hook *f.*, Fl. Brit. India 3: 174. 1880; Kanjilal *et al.*, Fl. Assam 3: 84. 1839; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 40. 1987; Deb & Gang., J. Econ. Tax. Bot. Add. Ser. 7: 148. 1989.

Evergreen herbs. Leaves elliptic or oblong-lanceolate, 6-16 x 2-6 cm, base attenuate, apex acuminate, membranous, glabrous; lateral nerves 7-9 pairs; petioles 1-3 cm long. Flowers in terminal or axillary, subcorymbiform cymes; calyx obscurely lobed; corolla white, throat-bearded. Fruits ovoid-oblong, red.

Fl. & Fr.: May-January.

Sialsuk, Deb 30727.

5. *Psychotria silhetensis* Hook. *f.*, Fl. Brit. India 3: 174. 1880; Kanjilal *et al.*, Fl. Assam 3: 84. 1939; Deb & Gang. J. Econ. Tax. Bot. Add. Ser. 7: 144. 1989.

Shrubs; branchlets stout. Leaves elliptic-oblong, ovate or obovate, 13-35 x 4-16 cm, base cuneate or attenuate, apex acute or acuminate, coriaceous, glabrous above, puberulose or glabrous beneath; lateral nerves 14-22 pairs; petiole stout, 1-cm long, puberulose; stipules ovate-oblong, 1-2.5 x 0.5-1 cm, villous beneath. Flowers on terminal or axillary, pedicellate corymbose cymes; calyx cupular or obconic, 1.5-2 x 2-2.5 mm, puberulose, apically 5 toothed; corolla 1.5 - 3 mm long, greenish brown or white, throat velutinous within; lobes 5, ovate-lanceolate or ovate-elliptic, slightly inflexed, glabrous or warty above; stamens 5, inserted. Fruits ovoid, stalked, 0.8-1.3 x 5-56 cm, warty or glabrous above.

Fl. & Frs.: May-February

Lushai hills, J.C. Prazer *s.num.* (CAL).

6. *Psychotria symplocifolia* Kurz, For. Fl. Brit. Burma 2: 11. 1877; Hook. *f.*, Fl. Brit. India 3: 172. 1880; Kanjilal *et al.*, Fl. Assam 3: 85. 1839; Deb & Dutta in J. Econ. Tax. Bot. 10(1): 40. 1987; Deb & Gang. in J. Econ. Tax. Bot. Add. Ser. 7: 126. 1989.

Herbs. Leaves lanceolate, elliptic or elliptic-obovate, 6-3 x 1-3.5 cm, base acute, apex acuminate, coriaceous, glabrous; lateral nerves 10 pairs, gland pitted at the axil of nerves; petioles 0.3-0.8 cm long; stipules obovate, apex slender, subulate. Flowers in terminal, pedunculate, trichotomous cymes; calyx lobes minute or obscure; corolla throat villous. Fruit black when ripe.

Fl. & Fr.: June-December.

Teirei, *D.K. Singh* 99191; Sialsuk, 1340 m, *Deb* 30710, 30765.

7. *Psychotria thomsonii* Hook. *f.*, *Fl. Brit. India* 3: 173. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 102. 1938; Kanjilal *et al.*, *Fl. Assam* 3: 83. 1939; Deb & Gang., *J. Econ. Tax. Bot. Add. Ser.* 7: 142. 1989. **Fig. 151.**

Herbs or undershrubs; stems greenish white. Leaves narrowly elliptic, 8-12 x 1-2 cm, base cuneate, apex acuminate, serrulate, subcoriaceous, glabrous, midrib pubescent; lateral nerves joined by intermarginal vein; petioles 0.6-0.8 cm long; stipules 0.6-0.9 cm long, membranous. Flowers in terminal cymes; corolla red. Fruits ellipsoid, 1-1.2 x 0.2-0.4 cm, narrowed at both ends.

Fl. & Fr.: September-October.

Siachhung, 600 m, *Parry* 510 (*vide* C.E.C. Fischer, *l.c.*).

33. RANDIA L.

1a. Plants unarmed

2a. Corolla yellow4. *R. wallichii*

2b. Corolla white 2. *R. racemosa*

1b. Plants armed:

3a. Leaves pubescent3. *R. spinosa*

3b. Leaves glabrous1. *R. griffithii*

1. *Randia griffithii* Hook. *f.*, *Fl. Brit. India* 3: 112. 1880; Kanjilal *et al.*, *Fl. Assam* 3: 58. 1939; Deb & Dutta in *J. Econ. Taxon. Bot.* 10(1): 40. 1987.



Fig. 151: *Psychotria thomsonii* Hook. f.

Trees. Leaves ovate, 4.8-10 x 1.5-3.7 cm, base obtuse, apex acute, glabrous; lateral nerves 6-8 pairs; petioles 0.3-0.8 cm long. Flowers in axillary or terminal cymes; calyx lobes dilated, toothed; corolla whitish yellow. Berries globose, 0.8-1 cm in diam., black.

Fl. & Fr.: March-December.

Sialsuk, Deb 30709, 30753.

2. **Randia racemosa** (Cav.) F. Vill., *Novis. App.* 1880. *Stylacoryne racemosa* Cav., *lc.* 3: 46. t. 368. 1797. *R. Densiflora* Benth., *Fl. Hongk.* 155, 1861; *Hook. f.*, *Fl. Brit. India* 3: 112. 1880; Kanjilal *et al.*, *Fl. Assam* 3: 60. 1939.

Trees; branchlets quadrangular, opposite. Leaves elliptic-oblong, 7-16 x 2-7.5 cm, apex acuminate, coriaceous, glabrous; lateral nerves 5-7 on either half; petioles 0.5-1.2 cm long; stipules triangular, apex acuminate, deciduous. Flowers on leaf opposed, scorpioid cymes; calyx pubescent, teeth 5, linear, deciduous; corolla pale yellow, tube short, throat hairy, lobes 5, oblong; anthers sessile; stigma fusiform, slightly exserted. Berries deep purple to black, globose, 0.4-0.6 cm in diam.

Fl. & Fr.: March-July.

Changsil, towards East on Thvarmah road. *J.C. Prazer, s.num.* (CAL).

3. **Randia spinosa** (Thunb.) Poir., *Encycl. Suppl.* 2: 829. 1812. *Gardenia spinosa* Thunb., *Dict. Gard.* 7. 1780. *Randia dumetorum* (Retz.) Lam., *Illustr.* 1(2): 227. 1792; *Hook. f.*, *Fl. Brit. India* 3: 110. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 102. 1938; Kanjilal *et al.*, *Fl. Assam* 3: 59. 1939. *Sazukthei* (Lushai).

Shrubs; spines axillary, hard. Leaves oblong-obovate or spatulate, 2-4.5 x 1-2.2 cm, base acute, apex acute, pubescent; lateral nerves 5-7 pairs; petioles 0.3-0.8 cm long; stipules ovate, apex acuminate. Flowers solitary or 2-3 together on short branches; calyx tube campanulate, 0.4-0.7 cm long, strigose; lobes ovate, spatulate; corolla fragrant, whitish yellow, silky hairy, tube as long as calyx; lobes ovate or oblong, spreading; stigma fusiform. Berries subglobose, 0.7-1 cm in diam., yellow.

Fl. & Fr.: April-January.

Recorded on the basis of C.E.C. Fischer (*l.c.*).

4. ***Randia wallichii*** Hook. *f.*, Fl. Brit. India 3: 113. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 102. 1938; Kanjilal *et al.*, Fl. Assam 3: 60. 1939.

Trees. Leaves elliptic-obovate, 4-20 x 1-6 cm, base narrowed into petiole, apex acuminate, coriaceous; lateral nerves 10-12 pairs; stipules enclosing buds, coriaceous, caducous. Flowers in leaf opposed or axillary cymes; calyx turbinate, lobes minute; corolla yellow salver-shaped; anthers at sinuses of corolla lobes. Berries globose; seeds many, peltate.

Fl. & Fr.: July-January.

Tawkzawl, 600 m, Parry 182 (*vide* C.E.C. Fischer, *l.c.*). Sailsuk, Deb 30752, 30719; Aizawl, Deb 30897.

34. RUBIA L.

- 1a. Leaves not sessile1. *R. cordifolia*
 1b. Leaves sessile2. *R. sikkimensis*

1. ***Rubia cordifolia*** L., Sp. Pl. 397. 1753; Hook. *f.*, Fl. Brit. India 3: 202. 1881; Kanjilal *et al.*, Fl. Assam 3: 94. 1939. Deb & Dutta in J. Econ. Tax. Bot. 10(1): 41. 1987.

Climbers. Leaves ovate, ovate-lanceolate, 1-7.5 x 0.8-2.5 cm, base rounded or subcordate, apex acuminate, hispid above, margins slightly prickly or not; lateral nerves 5-7 pairs; petioles 4-5 cm long. Flowers in terminal, umbellate, paniced cymes; calyx tube globose, lobes obsolete; corolla greenish yellow, hispid, tube short, lobes spreading; stamens adnate to the corolla tube; ovary 2-celled; ovules solitary in each cell. Fruits globose, 0.2-0.4 cm in diam., deep purple, with purple juice.

Fl. & Fr.: June-December.

Thaitlang, Dutta 33926.

2. *Rubia sikkimensis* Kurz in J. As. Soc. 2: 188. 1874; Hook. f., Fl. Brit. India 3: 203. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 102. 1938. *Hruisen* (Lushai).

Woody climbers; branches scabrid. Leaves 4 in a whorl, sessile, elliptic or ovate-lanceolate, 6-13 x 2-5 cm, base acute or rounded, apex acute or acuminate, scabrid, or pubescent beneath; lateral nerves 3-5 from base. Flowers in large paniced cymes; corolla lobes subulate; anthers globose. Fruits globose, 1-1.2 cm in diam., black.

Fl. & Fr.: March-May.

Aizawl, ca 1000 m, *Parry* 641 (*vide* C.E.C. Fischer, l.c.); Aizawl, *Godfrey* 625 (CAL); Mizo hills, *Deb* 31022 (CAL).

35. SAPROSMA Blume

Saprosma ternatum (Wallich) Hook. f. in Benth. & Hook. f., Gen. Pl. 2: 131. 1873 & Fl. Brit. India 3: 193. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 102. 1938; *Kanjilal et al.*, Fl. Assam 3: 88. 1939. *Paederia ternata* Wallich in Roxb., Fl. Ind. 2: 520. 1824.

Shrubs. Leaves whorled, variable, oblanceolate to elliptic, 7-9 x 2-4 cm, base cuneate, apex acuminate, glabrous; lateral nerves 7-8 pairs, nerves scaberulose beneath; petioles 0.4-0.8 cm long; stipules lanceolate, apex pointed. Flowers recurved in trichotomous or corymbosely fasciculate cymes; calyx truncate, lobes 4-6; corolla white, tube funnel-shaped, lobes 4; stamens 4 on corolla throat; ovary 2-celled; ovules solitary in each cell. Drupes black.

Fl. & Fr.: May-December.

Sairep, *K.P. Singh* 96702; Phelawn forest, *K.P. Singh* 97039; Saithah, *D.K. Singh* 98942, 98949.

36. SILVIANTHUS Hook. f.

Silvianthus bracteatus Hook. f., Ic. Pl. t. 1048 & Fl. Brit. India 3:86. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 102. 1938; *Kanjilal et al.*, Fl. Assam 3: 43. 1939.

Shrubs; young shoots scabrid with reddish brown hair. Leaves elliptic-obovate or lanceolate, 8-17 x 4-11 cm, base acute, apex acuminate, margins toothed, membranous, glabrous; lateral nerves 10-12 pairs; petioles 1.4-3 cm long; stipules membranous. Flowers in axillary or terminal, bracteate cymes; calyx purple, accrescent, lobes 5; corolla white, funnel-shaped, tube hairy inside, lobes short, reflexed; stamens 2; anthers linear-oblong; ovary 2-celled; stigma spindle-shaped. Capsules globose, 0.4-0.6 cm in diam.; seeds black, apex obliquely truncate.

Fl. & Fr.: May-October.

Recorded on the basis of C.E.C. Fischer (*l.c.*):

37. SPERMACOCE L.

- 1a. Stems hispid; seeds brown1. *S. hispida*
 1b. Stems glabrous; seeds black2. *S. ocymoides*

1. *Spermacoce hispida* L., Sp. Pl. 102. 1753; Hook. *f.*, Fl. Brit. India 3: 200. 1881; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 41. 1987. *Spermacoce articularis* L. *f.*, Suppl. 119. 1781. *Borreria hispida* (L.) K. Schum in Engler & Prantl., *Planzenfam.* 4(4): 144. 1891, *non* Spruce ex K. Schum, 1888; Kanjilal *et al.*, Fl. Assam 3: 93. 1939.

Procumbent herbs; stems hispid. Leaves sessile, obovate, elliptic or oblong, 1.3-3.5 x 1-1.5 cm, apex acute, coriaceous, scabrid above; lateral nerves 5-6 pairs; stipules cupular, bristly hispid. Flowers whorled; bracteoles filiform. calyx tube short, lobes linear-lanceolate; corolla white, tube dilated upwards; lobes 4; stamens 4; ovary 2-celled. Capsules hispid; seeds brown glossy.

Fl. & Fr.: July-December.

Leite, Dutta 34103; Thenzawl, K.P. Singh 93849; Kawlhkullh-Hliapui, K.P. Singh 94356, 94373. Keifang, M. Swamliana 99254.

2. *Spermacoce ocymoides* Burm. *f.*, Fl. Ind. 34. t. 13. f. 1. 1768; Hook. *f.*, Fl. Brit. India 3: 200. 1881; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 41. 1987. *Borreria ocymoides* (Burm. *f.*) DC., Prodr. 4: 544. 1830.

Erect herbs; stems glabrous. Leaves ovate or elliptic, 2-5 x 0.8-1.2 cm, apex acute or acuminate, glabrous or scabrid above, margins scabrid;

nerves pubescent beneath; petioles 0.1-0.2 cm long; stipules bristly. Flowers in bracteate heads; bracteoles filiform; calyx lobes 4, unequal; corolla white, tube dilated above, throat pubescent, lobes 4; stamens 4; ovary 2-celled; ovule 1 in each cell. Fruits with 2 mericarps, dehiscent ventrally; seeds oblong, black, granulate.

Fl. & Fr.: July-December.

Bunglang, *Deb* 31449.

38. UNCARIA Schreber

1a. Lateral nerves 6-8 pairs:

2a. Leaf apex opaque, acuminate ...1. *U. homomalla*

2b. Leaf apex not opaque, acute ...3. *U. macrophylla*

1b. Lateral nerves 4-6 pairs:

3a. Corolla lobes silky hairy ...4. *U. sessilifructus*

3b. Corolla lobes glabrous ...2. *U. laevigata*

1. *Uncaria homomalla* Miq., *Fl. Ind. Bat.* 2: 343. 1856; Hook. *f.*, *Fl. Brit. India* 3: 30. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 102. 1938.

Climbing shrubs. Leaves ovate-lanceolate, 6-8 x 2-3 cm, base rounded, apex opaque acuminate, pubescent above; lateral nerves 6-8 pairs, 1-1.3 cm long; stipules 2-lobed. Flowers in axillary pedunculate panicles; bracts obtuse; calyx tube funnel-shaped, lobes minute; corolla 1-1.4 cm long, pubescent. Capsules sessile or not.

Fl. & Fr.: March-July.

Lungleh, ca 1000 m, *Gage* 28 (*vide* C.E.C. Fischer, *l.c.*).

2. *Uncaria laevigata* Wallich in Roxb., *Fl. Ind.* 2: 132. 1824; Hook. *f.*, *Fl. Brit. India* 3: 30. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 102. 1938. *Ralsamkuai* (Lushai).

Climbing shrubs. Leaves elliptic-lanceolate, glabrous on both surfaces; lateral nerves 5-6 pairs; stipules bifid. Flowers in axillary or terminal

peduncled panicles; bracts obtuse; calyx slightly lobed; corolla glabrous. Capsules sessile.

Fl. & Fr.: October-February.

Langleh, 900 m, *Wenger* 386 (*vide* C.E.C. Fischer, *l.c.*).

3. *Uncaria macrophylla* Wallich in Roxb., *Fl. Ind.* 2: 132. 1824; Hook. *f.*, *Fl. Brit. India* 3: 32. 1880; Kanjilal *et al.*, *Fl. Assam* 3: 23. 1939; Deb & Dutta in *J. Econ. Tax. Bot.* 10(1): 41. 1987. **Fig. 152.**

Woody climbers; young shoots rusty tomentose. Leaves ovate-lanceolate or elliptic, 9-17 x 4-7.6 cm, base subcordate, rounded, apex acute; lateral nerves 6-8 pairs; petioles 0.2-0.7 cm long. Flowers in axillary and terminal, pedunculate, bracteate heads; calyx lobes linear; corolla hirsute outside. Capsules spindle-shaped, stalked.

Fl. & Fr.: December-February.

Kheitum, *Deb* 31196.

4. *Uncaria sessilifructus* Roxb., *Fl. Ind.* 2: 130. 1824; Hook. *f.*, *Fl. Brit. India* 3: 30. 1880; C.E.C. Fischer in *Rec. Bot. Surv. India* 12(2): 103. 1938; Kanjilal *et al.*, *Fl. Assam* 3: 24. 1939. *Ralsamkuai* (Lushai). **Fig. 153.**

Climbers; young shoots red. Leaves elliptic, 5-7 x 3-4.5 cm, base rounded, apex acuminate, coriaceous, glabrous; lateral nerves 4-5 pairs; petioles 1-1.5 cm long. Flowers in axillary and terminal, pedunculate bracteate heads; calyx lobes minute, rounded; corolla yellow, tube slender, lobes silky.

Fl. & Fr.: March-April.

Lungle, 900 m *Gage* 18, 223 (CAL); Mizo hills, *Dutta* 33383; North Vanaiphai, *Deb* 31079; Champhai-Khawzoi, *K.P. Singh* 92861; Mampui-Ngengpui, *K.P. Singh* 92897; Kawlhkuih-Hliapui, *D.K. Singh* 94324.

Note: *Uncaria crinita* Desv. has also been recorded by C.E.C. Fischer (1938), but no specimen or literature pertaining to this species is available. The specimen, ought to have been collected and deposited in CAL (Fischer, *l.c.*), could not be located.

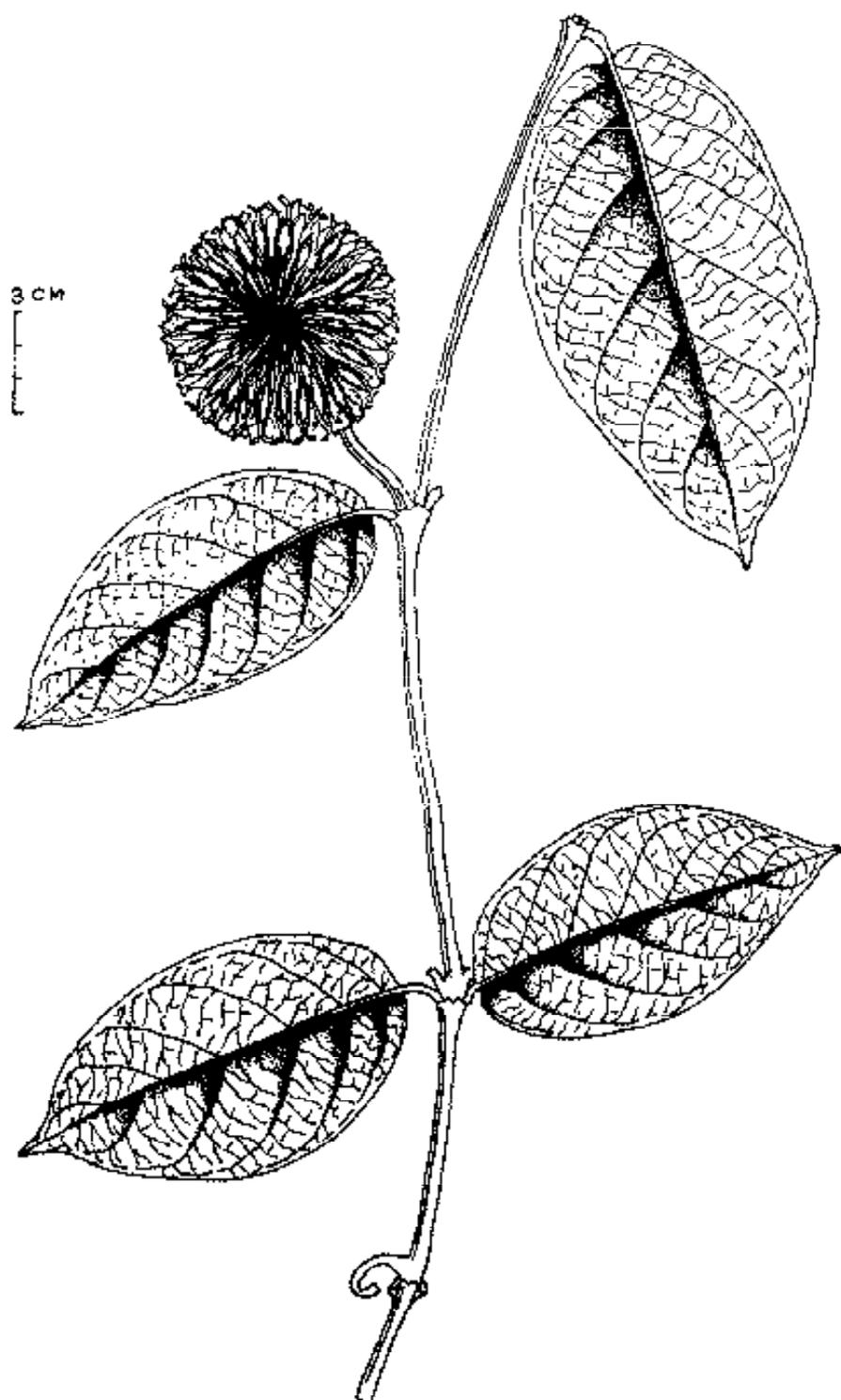


Fig. 152: *Uncaria macrophylla* Wallich

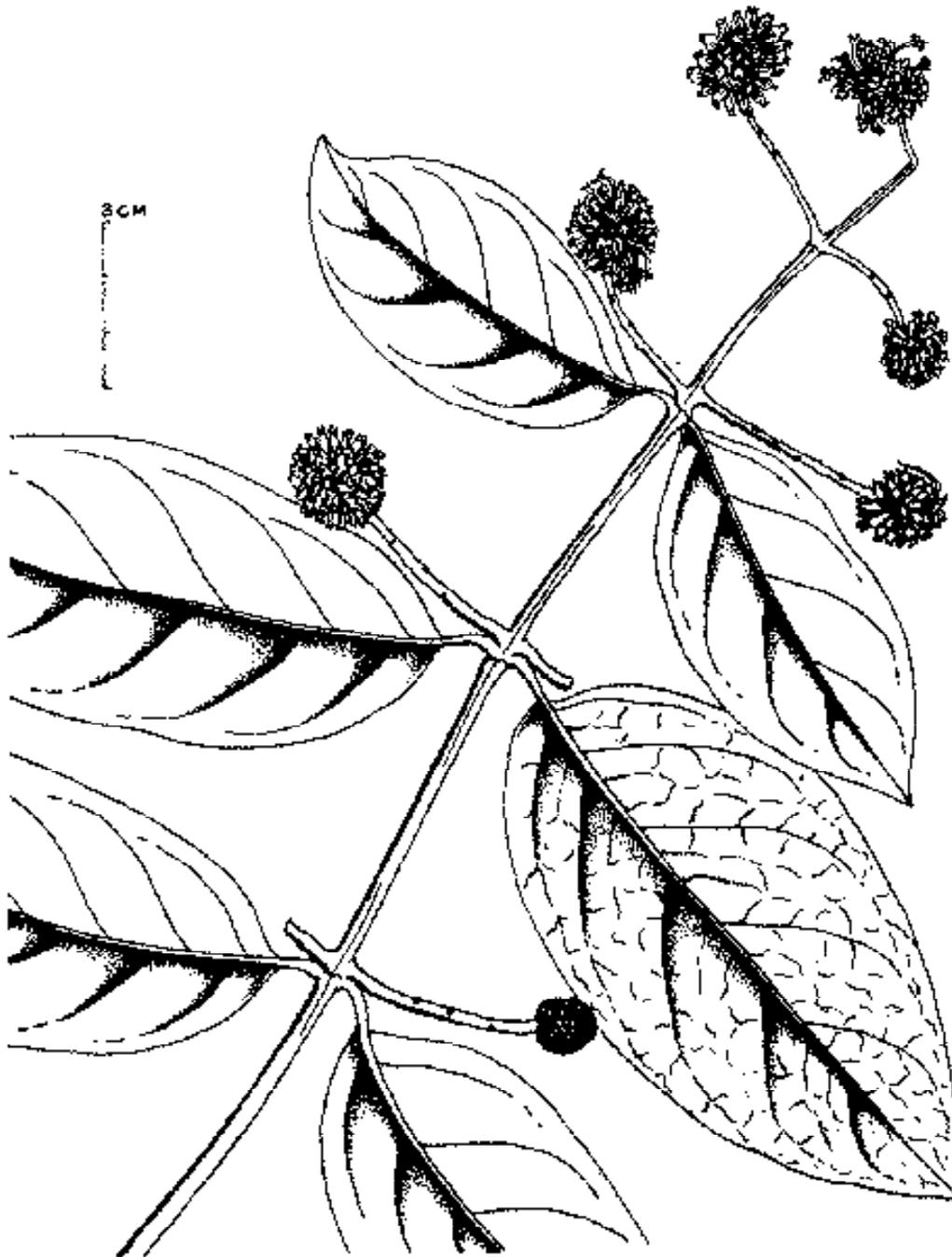


Fig. 153: *Uncaria sessilifructus* Roxb.

39. WENDLANDIA Bartling ex DC.

- 1a. Lateral leaf nerves up to 202. *W. grandis*
 1b. Lateral leaf nerves up to 12:
 2a. Corolla tube less than twice the length of lobes4. *W. wallichii*
 2b. Corolla tube twice the length of lobes:
 3a. Calyx hairy3. *W. tinctoria* var. *orientalis*
 3b. Calyx glabrous1. *W. coriacea*

1. *Wendlandia coriacea* DC., Prodr. 4: 412. 1830; Hook. f., Fl. Brit. India 3: 39. 1880; Kanjilal *et al.*, Fl. Assam 3: 35. 1939.

Evergreen trees or shrubs. Leaves lanceolate, 6-8 x 1.7-2.5 cm, base acute, apex acuminate, coriaceous; lateral nerves 8-12 on either half; petioles 0.4-1.2 cm long; stipules pointed, spiny. Flowers sessile, in many-flowered, pyramidal panicles; calyx tube globose, lobes as long as tube, unequal; corolla tube slender, lobes oblong. Capsules globose, seeds minute.

Fl. & Fr.: September-February.

Mizo hills, Dutta 88404; North-Vanlaipahi, D.K. Singh 93060.

2. *Wendlandia grandis* (Hook. f.) Cowan in Notes Roy. Bot. Gard. Edin. 16: 261. t. 233. f.6. 1932; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 103. 1938; Kanjilal *et al.*, Fl. Assam 3: 36. 1939. *W. tinctoria* (Roxb.) DC. var. *grandis* Hook. f., Fl. Brit. India 3: 38. 1880.

Evergreen trees. Leaves ovate-elliptic, 6-8 x 3-4 cm, base cuneate, apex acuminate, glabrous above, pubescent beneath; lateral nerves 8-10 pairs; stipules with flattened appendages, triangular, interpetiolar. Flowers in fascicles, sessile; calyx puberulose, lobes triangular, apex obtuse; corolla white, tube 0.3-0.4 cm long, pilose within at mid region; lobes ovate; style 2-lobed, exserted.

Fl. & Fr.: January-May.

Bunglang, Deb 31466; Hauruang, Deb 31407 (CAL); Near Sherchip, B.M. Wadhwa 96606; Chhinchip, 1500 m, Parry 601 (*vide* C.E.C. Fischer, l.c.); 7 miles from Changsie, Prazer s.num. (CAL).

3. *Wendlandia tinctoria* (Roxb.) DC. subsp. *orientalis* Cowan in Notes Roy. Bot. Gard. Edin. 16: 268. 1932; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 102. 1938. *W. glabrata sensu* Hook. f., Fl. Brit. India 3: 39. 1880. *p.p.*, non DC., 1830.

Shrubs. Leaves elliptic ovate or obovate, 8-16 x 4-8 cm, base acute, apex acuminate, pubescent beneath or not; lateral nerves pubescent beneath, 6-7 pairs; petioles 1-1.5 cm long; calyx glabrous, lobes minute; corolla white, tube slender.

Fl. & Fr.: March-September.

Lungleh, 900 m, *Gage* 34 (CAL); Kawnpuit village forest, *K.P. Singh* 96991; Sangau I.B., *K.P. Singh* 96830.

4. *Wendlandia wallichii* Wight & Arn., Prodr. Fl. Pen. India Or. 1: 402. 1834; Hook. f., Fl. Brit. India 3: 38. 1880; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 103. 1938; Kanjilal *et al.*, Fl. Assam 3: 33. 1939.

Fig. 154.

Trees. Leaves elliptic-lanceolate, 7.5-16 x 2-5.6 cm, base cuneate, apex acute, coriaceous, glabrous; lateral nerves 10-12 pairs; petioles 0.4-1.2 cm long; stipules brown, ovate, apex acute, caducous. Flowers fragrant, in pedicelled panicles; pedicells hairy; calyx lobes deltoid, apex acute, glabrous; corolla white, tube 3 times longer than calyx; stamens sessile; anthers near throat. Capsules globose.

Fl. & Fr.: September-February.

Champhai, 1500 m, *Parry* 354 (*fide* C.E.C. Fischer, *l.c.*). Sairep orchid sanctuary, 1350 m, *Mao*; Zotethlang, *D.K. Singh* 92808; Denglang, *K.P. Singh* 94127.

Recently, J.H. Lalramnghinglova (Ethnobotany 11: 63. 1999), reported *Tarena odorata* (Roxb.) Robins as new ethno-medicinal plant record from the state.



Fig. 154: *Wendlandia wallichii* Wight & Arn.

DIPSACACEAE

(K.P. Singh)

DIPSACUS L.

Dipsacus asper DC., Prodr. 4: 646. 1830; C.B. Clarke in Hook. f., Fl. Brit. India 3: 218. 1881; Kanjilal *et al.*, Fl. Assam 3: 98. 1938; C.E.C. Fischer in Rec. Bot. Surv. India 12(2): 103. 1938.

Erect, prickly, perennial herbs, up to 2 m tall. Leaves simple or lower ones pinnatifid, lanceolate to ovate-lanceolate, 8-22 x 2-7 cm, base connate, acute to acuminate at apex, hairy above, scabrous beneath. Flowers in cymose-subglobose heads, creamy-white or light purple. Heads terminal, solitary or many, 1-3 cm across; peduncles up to 30 cm long; bracteoles ciliate, obovate-lanceolate. Achenes 8-ribbed, crowned and enveloped by an epicalyx.

Fl. & Fr.: September-December.

Champhai, 1500 m, *Parry 347 (fide C.E.C. Fischer, l.c.)*.

ASTERACEAE

(D.K. Singh)

- 1a. Plants with milky latex; corolla of disc florets ligulate :
- 2a. Florets always yellow :
- 3a. Radical leaves petioled; involucrel bracts
2-3-seriate; achenes narrowed into a stout beak ... 50. *Youngia*
- 3b. Radical leaves sessile; involucrel bracts
multi-seriate; achenes without beak ... 43. *Sonchus*
- 2b. Florets pale, blue or reddish :
- 4a. Stems usually paniculately branched;
involucrel bracts multi-seriate,
bracts bristly hairy; florets pale-blue ... 13. *Cicerbita*
- 4b. Stems usually solitary; involucrel bracts 1-3-seriate,
bracts glabrous or hispid; florets dull red, bluish,
whitish or purple :

- 5a. Outer involucrel bracts ovate, oblanceolate or linear-oblong; florets dull red; achenes with a prominent beak ...31. *Lactuca*
- 5b. Outer involucrel bracts ovate-lanceolate; florets whitish, bluish or purple; achenes without beak ... 38. *Prenanthes*
- 1b. Plants without milky latex; corolla of disc florets not ligulate :
- 6a. Heads with true rays :
- 7a. Disc florets usually bilabiate :
- 8a. Shrubs or small trees ... 33. *Leucomeris*
- 8b. Scapigerous or subscapigerous herbs :
- 9a. Heads homogamous, racemed; involucrel bracts many-seriate ... 3. *Ainsliaea*
- 9b. Heads heterogamous, solitary; involucrel bracts 2-seriate ... 37. *Piloselloides*
- 7b. Disc florets usually tubular, not bilabiate :
- 10a. Plants strongly aromatic; leaves pinnatifid, entire or dissected; involucrel bracts imbricate, dry, scarious :
- 11a. Heads numerous, in racemes, panicles or corymbs ... 6. *Artemisia*
- 11b. Heads solitary :
- 12a. Leaves toothed or lobed; heads sessile or subsessile ... 12. *Centipeda*
- 12b. Leaves pinnatifid; heads peduncled ... 17. *Cotula*
- 10b. Plants not strongly aromatic; involucrel bracts not as above:
- 13a. Receptacles with paleaceous bracts or bristles; anthers not tailed:
- 14a. Leaves usually opposite; pappus comprising scales, awns or rigid bristles :
- 15a. Heads dioecious :

- 16a. Involucral bracts of male flowers laterally connate; involucre in fruits forming vase-like conceptacle, spinose or tuberculate near apex ... 4. *Ambrosia*
- 16b. Involucral bracts of male flowers free; involucre in fruits with glochidiate spines ... 49. *Xanthium*
- 15b. Heads monoecious :
- 17a. Leaves deeply divided or pinnatifid :
- 18a. Achenes beaked ... 16. *Cosmos*
- 18b. Achenes not beaked ... 7. *Bidens*
- 17b. Leaves simple or pinnately compound :
- 19a. Achenes of disc florets dorsally compressed or angular; pappus present or absent :
- 20a. Achenes with lacerated awn-like appendages or 2, strigose apical awns ... 44. *Synedrella*
- 20b. Achenes with 8-20 fimbriate, ciliate or lacinate scales ... 26. *Galinsoga*
- 19b. Achenes of disc florets rounded or laterally compressed; pappus absent or of two scales :
- 21a. Outer involucral bracts clavate; inner bracts enclosing the achenes ... 41. *Siegesbeckia*
- 21b. Outer involucral bracts not clavate; inner bracts not enclosing the achenes :
- 22a. Leaves usually alternate; involucral bracts 2-5-seriate ... 46. *Tithonia*
- 22b. Leaves opposite; involucral bracts 1-2-seriate :
- 23a. Anther base sagittate :
- 24a. Leaves pubescent with verrucose hairs; ray florets 2-3-seriate ... 21. *Eclipta*
- 24b. Leaves hispid; ray florets several ... 48. *Wedelia*
- 23b. Anther base entire, truncate or obtuse :
- 25a. Heads radiate; involucre broadly ovoid or subglobose; anther base obtuse ... 8. *Blainvillea*

- 25b. Heads radiate-discoid; involucre
campanulate; anther base truncate ... 42. *Spilanthes*
- 14b. Leaves usually alternate;
pappus setose or of capillary bristles :
- 26a. Ray florets absent :
- 27a. Receptacles flat; achenes with
thickened margins ... 20. *Dicrocephala*
- 27b. Receptacles conical or convex;
achenes without thickened margins ... 19. *Cyathocline*
- 26b. Ray florets present :
- 28a. Pappus short, paleaceous, caducous or absent ... 36. *Myriactis*
- 28b. Pappus long, hairy, persistent :
- 29a. Heads radiate; ligules longer than involucre ... 24. *Erigeron*
- 29b. Heads discoid or with indistinct ray florets;
ligule more or less as long as involucre :
- 30a. Usually erect herbs ... 15. *Conyza*
- 30b. Scandent or erect shrubs ... 34. *Microglossa*
- 13b. Receptacles naked :
- 31a. Involucral bracts 1-3-seriate; more or less equal,
not imbricate :
- 32a. Ray florets white, yellow or orange coloured;
pappus absent ... 11. *Calendula*
- 32b. Ray florets usually yellow or orange coloured;
pappus comprising numerous soft,
capillary bristles :
- 33a. Anther base with tailed auricles ... 45. *Synotis*
- 33b. Anther base sagittate or obtuse :
- 34a. Heads heterogamous ... 40. *Senecio*
- 34b. Heads homogamous :
- 35a. Heads ebracteolate; florets blue,
pink or purple ... 23. *Emilia*
- 35b. Heads bracteolate;
florets yellow-beck red :

- 36a. Annuals; receptacles convex, naked ... 18. *Crassocephalum*
- 36b. Perennials; receptacles flat, pitted ... 28. *Gynura*
- 31b. Involucral bracts many-seriate, unequal, imbricate :
- 37a. Leaves usually radical, upper alternate; heads radiate; receptacles flat or tumid, pitted or areolate ... 30. *Inula*
- 37b. Leaves alternate; heads disciform; receptacles flat, naked or pitted :
- 38a. Anther base sagittate or 2-lobed; auricle not tailed :
- 39a. Stems grooved; leaves deeply incised; florets golden yellow ... 10. *Blumeopsis*
- 39b. Stems winged; leaves almost entire; florets purple ... 32. *Laggera*
- 38b. Anther base always sagittate; auricle tailed:
- 40a. Leaves usually toothed or lobed; involucral bracts soft or herbaceous; achenes angled, ribbed ... 9. *Blumea*
- 40b. Leaves quite entire; involucral bracts scarious, inner with petaloid limb; achenes not ribbed :
- 41a. Hermaphrodite florets sterile; styles subcapitate or 2-lobed ... 5. *Anaphalis*
- 41b. Hermaphrodite florets fertile; styles truncate or capitate ... 27. *Gnaphalium*
- 6b. Heads without true rays :
- 42a. Leaves and bracts spinose; corolla of outer disc florets larger, much like ray florets; involucral bracts multi-seriate :
- 43a. Receptacles densely bristly or paleaceous; anthers tailed at base :
- 44a. Leaves armed ... 14. *Cirsium*
- 44b. Leaves unarmed :
- 45a. All leaves petioled; involucral bracts hoary; receptacular bristles shorter than pappus ... 39. *Saussurea*
- 45b. Cauline leaves sessile; involucral bracts glabrous; receptacular bristles longer than pappus ... 29. *Hemistepta*

- 43b. Receptacles naked; anthers not tailed :
- 46a. Herbs; leaves radical; heads
many in glomerules, 2-4-flowered ... 22. *Elephantopus*
- 46b. Herbs, shrubs or trees; leaves alternate;
heads corymbose or paniced, many-flowered ... 47. *Vernonia*
- 42b. Leaves and bracts not spinose;
corolla of outer disc florets not enlarged,
not like ray florets; involucrel bracts 1-seriate :
- 47a. Twiners; involucrel bracts 3-5 ... 35. *Mikunia*
- 47b. Erect herbs or shrubs; involucrel
bracts more than 5 :
- 48a. Achenes smooth, tuberculate or muricate ... 1. *Adenostemma*
- 48b. Achenes glabrous or hairy on the ribs :
- 49a. Pappus comprising 4-5 scales or
clavate hairs ... 2. *Ageratum*
- 49b. Pappus comprising 10 or more
capillary hairs ... 25. *Eupatorium*

1. ADENOSTEMMA J.R. & G. Forst.

Adenostemma lavenia (L.) O. Kuntze, Rev. Gen. Pl. 1: 304. 1891; Uniyal in Hajra *et al.*, Fl. India 12: 346. 1995. *Verbesina lavenia* L., Sp. Pl. 902. 1753. var. **lavenia**. *A. viscosum* J.R. & G. Forst., Char. Gen. 90. 1776. *Adenostemma viscosum* var. *lavenia* Hook.f., Fl. Brit. India 3: 242. 1881, pp. *Vailenblo* (Lushai).

Erect-rarely decumbent, annual or perennial herbs, up to 1 m; plants glabrous below, viscidly pubescent above. Leaves opposite-alternate, sessile or petiolate, elliptic-deltoid, or oblong-ovate, 2.5-14 x 1.5-7.5 cm, rounded or attenuate at base, acute-acuminate at apex, margins serrate. Heads in terminal, corymbose panicles, 80 or more-flowered, 0.4-1 x 0.5-0.7 cm. Involucrel bracts 2-seriate, oblong, acute or obtuse, connate at base, glabrous, glandular or scabrous. Flowers white. Achenes laxly triangulate, glandular-tuberculate; pappus clavate.

Fl. & Fr.: March-January.

Sairep, *K.P. Singh* 94134; Champhai, 1600 m, *D.K. Singh* 94535; Phaileng, *K.P. Singh* 97057.

2. AGERATUM L.

Ageratum conyzoides L., Sp. Pl. 839. 1753; Hook.f., Fl. Brit. India 3: 243. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 103. 1938; Uniyal in Hajra *et al.*, Fl. India 12: 348. 1995. *Vailenblo* (Lushai).

Hispidate, aromatic annual herbs; stems up to 1.5 m tall, with finely striate, subterete branches. Leaves opposite, or alternate above, petioled, broadly triangulate or ovate-rhomboid, 2.5-7 x 1.5-5.5 cm, subacute-obtuse, base subtruncate or acute, margins crenate-serrate pilose above, glandular punctate beneath. Heads 0.4-0.8 cm across, clustered in axillary and terminal corymbose panicles. Involucral bracts 2-3-seriate, elliptic-lanceolate, minutely pubescent. Florets white, purple or bluish. Achenes 5-angled, blackish brown; pappus 5-awned, sometimes serrate below.

Fl. & Fr.: October-April.

Common in open wastelands. About 24 km South-east of Lungleh, ca 1000 m, *Gage* 165 (CAL); *Wenger*, s. loc. 418 (*vide* C.E.C. Fischer, *l.c.*); Lungleh-Hauruang, *Deb*, 31406. Tilthlang, *K.P. Singh* 94067, 94069; Sairep, *K.P. Singh* 94164.

3. AINSLIAEA DC.

Ainsliaea latifolia (D. Don) Sch.-Bip. in Pollichia 18, 19: 190. 1861; Rao in Hajra *et al.*, Fl. India 13: 167. 1995. *Liatris latifolia* D. Don, Prodr. Fl. Nepal. 189. 1825. *Ainsliaea pteropoda* DC., Prodr. 7: 14. 1838, Hook.f., Fl. Brit. India 3: 388. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 103. 1938. **Fig. 155.**

Scapigerous, perennial herbs, 0.3-1.5 m tall; stems erect. Leaves radical, alternate, petioled or sessile, cordate-ovate 3-8 x 2-5 cm, acute, base narrowed, margins sparsely serrate, white tomentose beneath; petiole broadly winged. Heads up to 1.5 cm across, fascicled in a spike or racemed panicles. Involucral bracts multi-seriate, linear-lanceolate, acute, reddish green. Florets pinkish-blue. Achenes oblanceolate, 10-ribbed, silky; pappus pale-brown.

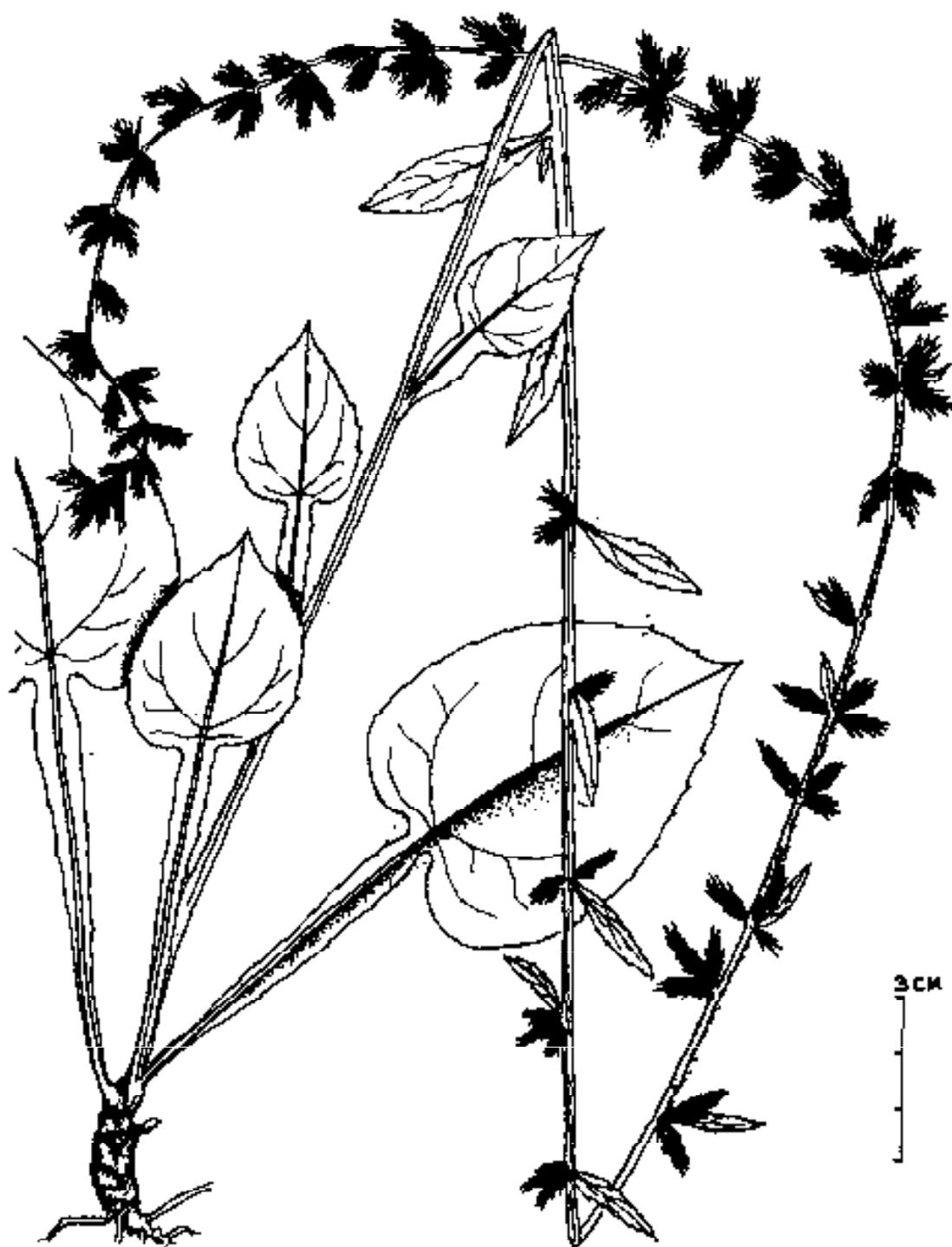


Fig. 155: *Ainsliaea latifolia* (D. Don) Sch.-Bip

Fl. & Fr.: March-August.

Common in moist places in *Quercus* forests. Tuipang 1600 m, *Parry* 474 (*vide* C.E.C. Fischer, *l.c.*), Blue Mountains, 1200-2100 m, *Wenger* 377, 419 (*vide* C.E.C. Fischer, *l.c.*); Blue Mountains, *Mao* 10130.

4. AMBROSIA L.

Ambrosia artemisifolia L., Sp. Pl. 988. 1753; Chowdhery in Hajra *et al.*, Fl. India 12: 363. 1995.

Small shrubs, up to 2 m; stems often reddish, finely striate, white pubescent. Leaves alternate in the upper part, opposite in lower part; lower ones oblong-ovate, 3-15 x 1.5-6 cm, pinnately lobed, upper ones elliptic-lanceolate, acute, entire, pubescent beneath. Heads in leafy, paniced racemes, buds white, with pungent smell. Involucral bracts 1-seriate, ovate-triangular, hairy. Achenes ovoid or topshaped, brown; pappus of simple hairs.

Fl. & Fr.: October-December.

Champhai, 1500 m, *D.K. Singh* 94519.

5. ANAPHALIS DC.

- | | |
|---------------------------------------------------------------------------|-------------------------|
| 1a. Plant parts covered with white, silky wool. Leaves broadly elliptical | ... 1. <i>A. adnata</i> |
| 1b. Plant parts glandular-pubescent. Leaves linear-lanceolate | ... 2. <i>A. busua</i> |

1. *Anaphalis adnata* DC., Prodr. 6: 274. 1838; Hook.f., Fl. Brit. India 3: 282. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 103. 1838; Pant in Hajra *et al.*, Fl. India 13: 53. 1995.

Stout, woolly herbs or undershrubs; stems simple 0.6-1.2 m. Leaves alternate, suberect, oblong-lanceolate or subspathulate, obovate, 2-10, 0.5-2 cm, obtuse-acute, base semiamplexicaul, entire, coriaceous. Heads 0.6-1 cm across, in axillary or terminal clusters or corymbs. Involucral bracts multi-seriate, suborbicular-ovate, obtuse, scarious, inner with a petaloid limb. Florets pale-white or light yellow. Achenes minute, black; pappus white.

Fl. & Fr.: May-February.

Common in shady places. Champhai, 1600 m, *Parry* 351 (CAL); Lushai Hills, *Dutta* 33902; Pharphek, *B.M. Wadhwa & K.P. Singh* 96836; Sairep, *K.P. Singh* 94166.

2. *Anaphalis busua* (Buch.-Ham. ex D. Don) DC., Prodr. 6: 275. 1838; Pant in Hajra *et al.*, Fl. India 13: 57. 1995. *Gnaphalium busuum* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 173. 1825. *Anaphalis araneosa* DC., Prodr. 6: 275. 1838; Hook.f., Fl. Brit. India 3: 283. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 103. 1938.

Annual herbs or sometimes undershrubs; stems up to 1.5 m tall, erect, often much branched, more or less winged. Leaves suberect-spreading, alternate, sessile, linear-lanceolate, 2.5-7 x 0.15-0.8 cm, acute, base narrowed, semiaplexicaul or auricled, sometimes decurrent, margins recurved, cottony or puberulous beneath. Heads up to 1 cm across, in terminal, corymbose panicles. Involucral bracts multiseriate, elliptic-oblong, obtuse, apices reddish. Florets yellowish white. Achenes up to 0.5 mm long; pappus white.

Fl. & Fr.: August-November.

Common on shady slopes. *Wenger s.loc.* 1600 m, 374 (*vide* C.E.C. Fischer, *l.c.*).

6. ARTEMISIA L.

Artemisia nilagirica (C.B. Clarke) Pamp., Nuovo. Giorn. Bot. Ital. n.s. 33: 452. 1926; Naithani in Hajra *et al.*, Fl. India 12: 36. 1995. *A. vulgaris* var. *nilagirica* C.B. Clarke, Comp. Ind. 162. 1876. *Artemisia vulgaris* (*auct. pl. non* L. 1753); Hook.f., Fl. Brit. India 3: 325. 1881. *p.p.*; C.E.C. Fischer in Rec. Bot. Surv. India 12: 103. 1938. *Sai* (Lushai).

Perennial, aromatic herbs or undershrubs, up to 1.5 m; stems erect or ascending, often branched, rooting at base. Leaves alternate, sessile, plnnati-parite or bipinnate, up to 18 cm long, with the segments oblong-lanceolate, entire, sparsely hairy or glabrous above, densely white woolly beneath. Heads sessile, up to 0.4 cm, solitary or fascicled in terminal, spiciform, racemed panicles. Involucral bracts few, ovate-oblong, obtuse,

densely lanate, scarious margined. Achenes oblong-ellipsoid, up to 1.2 mm long, glabrous, finely striate.

Fl. & Fr.: January-April.

Phongpui, 2000 m, *Parry* 656 (*vide* C.E.C. Fischer, *l.c.*); Blue mountain, alt 1950 m, *Mao* 107166 (ASSAM).

7. BIDENS L.

- 1a. Leaves bipinnately compound; involueral bracts 3-seriate ... 1. *B. bipinnata*
 1b. Leaves trifoliolate; involueral bracts 1-seriate ... 2. *B. pillosa*

1. ***Bidens bipinnata* L.**, Sp. Pl. 832. 1753; Chowdhery in Hajra *et al.*, Fl. India 12: 367. 1995. *Bidens pillosa* var. *bipinnata* Hook.f., Fl. Brit. India 3: 309. 1881.

Highly variable, erect, pilose-pubescent, annual herbs, 15-60 cm; stems obscurely striate. Leaves opposite, bipinnately compound, 3-10 cm long, segments linear-lanceolate, or ovate, acute, margins entire or distantly toothed. Heads solitary, on 5-25 cm long, axillary peduncles. Involueral bracts 3-seriate, outer small, ligulate; inner oblong-triangular or ovate, with scarious margins. Florets white, yellow. Achenes black, up to 1.5 cm long, slender, topped with 2-4, filamentous, spinescent awns; pappus 2-3 mm long, retrorsely bristly.

Fl. & Fr.: Throughout the year.

Champhai, 1500 m, *D.K. Singh* 94787.

2. ***Bidens pillosa* L.**, Sp. Pl. 832. 1753; C.E.C. Fischer in Rec. Bot. Surv. India 12: 103 1938; Chowdhery in Hajra *et al.*, India 12: 372. 1995. *Bidens chinensis* (*non* Willd.): Hook.f., Fl. Brit. India 3: 309. 1881. *Paccho* (Lakher).

Highly variable, erect, glabrous-pubescent annual herbs or undershrubs; stems 15-60 (-100) cm, with finely striate, angulate branches. Leaves opposite, petioled, trifoliolate, lobes broadly ovate-lanceolate or elliptic, 1.5-7.5 x 0.5-2 cm, acute, obtuse, margins crenate, surface glabrous or puberulous. Heads solitary, up to 1.3 cm across, on long, unequal

peduncles. Involucral bracts 1-seriate, ligulate-spathulate. Ray florets white. Disc-florets yellowish brown. Achenes linear, subtetragonate, 2-3 setose; pappus stout, spinescent, with recurved hooks.

Fl. & Fr.: April-November.

Helio Hill, Lungleh, 1200 m, *Gage* 86 (CAL); Thenzawl, *K.P. Singh* 93853; North Vanlaiphai, *D.K. Singh* 93302.

Leaves lavished by horses.

8. BLAINVILLEA Cass.

Blainvillea acmella (L.) Phillipson in *Blumea* 6: 350. 1950; Chowdhery in Hajra *et al.*, *Fl. India* 12: 377. 1995. *Verbesina acmella* L., *Sp. Pl.* 901. 1753. *Blainvillea latifolia* (L.f.) DC. *ex* Wight, *Contrib. Bot. Ind.* 71. 1834; Hook.f., *Fl. Brit. India* 3: 305. 1881.

Rigid, scabrous, annual herbs, 30-60 (-120) cm high; branches opposite-alternate, terete. Leaves opposite or distally alternate, petioled, ovate-lanceolate or rhomboid-ovate, 5-9 x 4-5 cm, base cuneate, acute-acuminate at apex, margins crenate-serrate, sparsely hairy. Heads peduncled, axillary and terminal, up to 1 cm across, radiate-subdisciform. Involucral bracts 2-3-seriate; outer ovate; inner oblong. Flowers pale yellow. Achenes cuneate-truncate, dorsally compressed, 3-4-angled; pappus of 2-5, unequal bristles.

Fl. & Fr.: September-February.

Tilthiang, *K.P. Singh* 94071. Scarce.

9. BLUMEA DC.

1a. Herbs; pappus always white :

2a. Stems simple or branched from base

3a. Corolla lobes glabrous

4a. Plants strongly smelling like camphor
or turpentine; stems runcinate, glandular ... 6. *B. lacera*

4b. Plants nonaromatic; stems tomentose-villous ... 5. *B. hieraciifolia*

- 3b. Corolla lobes glandular or pubescent
- 5a. Leaves lyrate-pinnatifid, grey pubescent on both the surface; corolla lobes pubescent ... 4. *B. fistulosa*
- 5b. Leaves entire-dentate, villous-pubescent beneath; corolla lobes glandular ... 2. *B. clarkei*
- 2b. Stems corymbosely or paniculately branched above:
- 6a. Radical leaves incised-pinnatifid or lyrate. Involucral bracts linear-lanceolate, dorsally villous; corolla lobes pubescent ... 7. *B. laciniata*
- 6b. Radical leaves sinuate-dentate. Involucral bracts slender, ciliate; corolla lobes glandular ... 9. *B. membranacea*
- 1b. Undershrubs or shrubs; pappus white, pale or red:
- 7a. Stems rambling or scandent, pappus white ... 10. *B. riparia*
- 7b. Stems erect; pappus pale or red :
- 8a. Plants glabrous or puberulous; petioles appendaged; corolla lobes papillate; pappus pale ... 8. *B. lanceolaria*
- 8b. Plants woolly tomentose or white pelted; petioles lyrate lobed, lacinate or appendaged; corolla lobes glandular or hairy; pappus red:
- 9a. Plants strongly aromatic, woolly tomentose; petioles lyrate lobed; corolla lobes glandular ... 1. *B. balsamifera*
- 9b. Plants nonaromatic, white pelted; petiole lacinate or appendaged; corolla lobes hairy ... 3. *B. densiflora*

1. *Blumea balsamifera* (L.) DC., Prodr. 5: 447. 1836; Hook.f., Fl. Brit. India 3: 270. 1831; C.E.C. Fischer, in Rec. Bot. Surv. India 12: 104. 1938; Kumar in Hajra *et al.*, Fl. India 13: 118. 1995.

Large, short-lived, aromatic, tomentose-woolly shrubs, 1-4 m tall; stems erect, repeatedly corymbosely branched above. Cauline leaves petioled, ovate-oblong, or lanceolate, 8-20 x 2-12.5 cm, acuminate at both ends, margins serrulate, villous on both the surfaces; petiole lyrate lobed. Heads 0.6-0.8 cm across, in sessile or peduncled, terminal, corymbose, panicles. Involucral bracts 2-seriate; outer ovate, acute, slightly pubescent; inner linear-elongate, ciliate-pilose. Florets yellow. Achenes cylindrical, 10-ribbed, pilose; pappus dull-white to reddish.

Fl. & Fr.: January-May.

Along Karnaphuli River, 1600 m, *Gage s.nam.*

2. *Blumea clarkei* Hook.f., Fl. Brit. India 3: 267. 1881; Kumar in Hajra *et al.*, Fl. India 13: 121. 1995. *Blumea malabarica* Hook.f., Fl. Brit. India 3: 267. 1881. *Tlangnuan* (Lushai).

Perennial, pubescent herbs, 0.6-2 m tall; stems simple, flexuous, erect or climbing, terete. Leaves short petioled, membranous, lanceolate, or obovate-oblongate, 4-16 x 1-4 cm, acute-apiculate, margins distantly serrate-dentate, with mucronate teeth, villous-pubescent beneath. Heads 1-1.5 cm across, sessile or peduncled in axillary clusters, forming narrow, elongate spikes. Involucral bracts slender, linear-lanceolate, purple tipped with ciliate margins and apices, dorsally pubescent. Florets yellow. Achenes strongly ribbed, obscurely silky or glabrate; pappus white.

Fl. & Fr.: January-April.

Lushai Hills, *Godfrey* 649 (CAL).

3. *Blumea densiflora* DC., Prodr. 5: 446. 1836; Hook.f., Fl. Brit. India 3: 269. 1881; C.E.C. Fischer in Rec. Bot. Survey of India 12: 104. 1938; Kumar in Hajra *et al.*, Fl. India 13: 122. 1995.

Erect, annual herbs or undershrubs, 0.75-1.8 m tall; stems stout, angulate, striate, white pelted. Leaves petioled, elliptic-lanceolate, 15-45 x 2.5-5 cm, acute, margins serrate or pinnatifid, puberulous above, white felted beneath; petioles lacinate or sometimes appendiculate. Heads up to 0.6 cm across, sessile, in white felted or tomentose rounded clusters or panicles. Involucral bracts rigid, 2-3-riate, narrow-lanceolate; outer villous; inner pilose-ciliate. Florets yellow. Achenes cylindrical, 10-ribbed, pubescent; pappus red.

Fl. & Fr.: November-April.

Common along the road sides. Helio Hill, N.E. of Lungleh, 1200 m, *Gage* 98 (CAL); Sialsuk-Aizawl Road; *Deb* 30825; Sialsuk, *Deb* 30820.

4. *Blumea fistulosa* (Roxb.) Kurz in J. As. Soc. Bengal 46: 187. 1877; Kumar in Hajra *et al.*, Fl. India 13: 124. 1995. *Conyza fistulosa*

Roxb., Fl. Ind. 3: 429. 1832. *Blumea glomerata* DC. in Wight, Contrib. Bot. Ind. 15. 1834; Hook.f., Fl. Brit. India 3: 262. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 104. 1938. *Blumea nodiflora* Hook.f., Fl. Brit. India 3: 262. 1981.

Pubescent or velutinous annual herbs, 0.3-1.2 m tall; stems erect, slender, striate. Lower leaves petioled, elliptic-obovate, oblong-lanceolate, or oblanceolate, 3-15 x 0.5-5 cm, margins serrate or lyrate-pinnatifid; upper leaves sessile, oblong, margins incised, grey pubescent on both the surface. Heads up to 0.6 cm across, sessile, axillary clusters all along the branches. Involucral bracts spreading, subulate-lanceolate, purplish, grey villous, scarious margined. Florets yellow. Achenes, 8-10 ribbed, pilose or glabrous; pappus white.

Fl. & Fr.: January-May.

Darzo, 1600 m, Parry 504 (*vide* C.E.C. Fischer, *l.c.*); *s.loc.* Wenger 408, 411 (*vide* C.E.C. Fischer, *l.c.*).

5. *Blumea hieracifolia* (D. Don) DC. in Wight, Contrib. Bot. Ind. 15. 1834; Hook.f., Fl. Brit. India 3: 263. 1881; Kumar in Hajra *et al.*, Fl. India 13: 125. 1995. *Erigeron hieracifolium* D. Don, Prodr. Fl. Nepal. 172. 1825. *Blumea sericans* Hook.f., Fl. Brit. India 3: 262. 1881. var. ***hieracifolia***.

Small, medium, tomentose-villosus herbs, 15-55 cm; stems erect, laxly striate. Lower leaves petioled, elliptic-oblong, or obovate, 3-16 x 0.5-5.5 cm, margins serrate-dentate, surface villous-pilose above, white or brown villous beneath; upper leaves sessile, obovate-oblong, almost entire. Heads 1-1.8 cm across, in axillary and terminal clusters. Involucral bracts purple, lanceolate, acuminate, densely villous outside. Florets purple. Achenes narrow-oblong, 8-10 ribbed, pilose; pappus white.

Fl. & Fr.: April-August.

S. loc., Wenger, 1300 m, 412 (*vide* C.E.C. Fischer, *l.c.*).

5.1. var. *macrostachya* (DC.) Hook.f., Fl. Brit. India 3: 263. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 104. 1938; Kumar in Hajra *et al.*, Fl. India 13: 126. 1995. *Blumea macrostachya* DC., Prodr. 5: 442. 1836.

Stems up to 2.5 m tall, robust, paniculately branched above. Leaves mostly cauline, surface with yellowish-brown spreading hairs beneath. Heads strictly in large, terminal clusters.

Fl. & Fr.: February-May.

Common along the ridges on roadside. North Vanlaiphai, 1600 m, D.K. Singh 93071.

6. ***Blumea lacera*** (Burm.f.) DC. in Wight, Contrib. Bot. Ind. 14. 1834; Hook.f., Fl. Brit. India 3: 263. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 104. 1938; Kumar in Hajra *et al.*, Fl. India 13: 128. 1995. *Conyza lacera* Burm.f., Fl. Ind. 180. t. 59. f.1. 1768.

Slender, villous, glandular or incanus herbs, with strong camphor or turpentine like aroma; stem erect, 0.3-1 m high, branched. Lower leaves petioled, deeply incised or lyrate lobed; upper leaves sessile, elliptic or obovate, 2.5-15 x 1-5 cm, obtuse, margins serrate-dentate or sinuate lobed, narrowed at base, pubescent or pilose or densely villous on both the surface. Heads 0.6-0.8 cm across, solitary or few clustered into short, upper axillary cymes or terminal, spiciform panicles, sometimes corymbose. Involucral bracts narrow, acuminate, hairy or glabrescent. Florets yellow. Achenes shortly oblong, 4-angled, glabrate, pappus white.

Fl. & Fr.: December-April.

Helio Hill, Lungleh, 1200 m, Gage 89 (CAL).

7. ***Blumea laciniata*** (Roxb.) DC., Prodr. 5: 436. 1836; Hook.f., Fl. Brit. India 3: 264. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 104. 1938; Kumar in Hajra *et al.*, Fl. India 13: 128. 1995. *Conyza laciniata* Roxb., Fl. Ind. 3: 428. 1832.

Stout, pubescent or laxily tomentose herbs or shrubs 0.2-1.5 (-5) m tall; stems erect, corymbosely or paniculately branched above. Leaves radical and cauline, 3.5-25 x 1-12 cm; lower leaves petioled, elliptical-oblong, narrowed into petiole, incised-pinnatifid or lyrate; upper ones sessile, oblong-ovate, obtuse or acute, margins distantly dentate, attenuate at base, villous or pubescent on both the surface. Heads up to 0.8 cm across, fascicled in large, dense terminal panicles. Involucral bracts linear-

lanceolate, acuminate, purplish, dorsally villous. Florets yellow. Achenes elongate, 8-10-ribbed, silky; pappus white.

Fl. & Fr.: February-June.

S. loc., Wenger, 1300 m, 413 (*vide* C.E.C. Fischer, *l.c.*).

8. *Blumea lanceolaria* (Roxb.) Druce, Rep. Bot. Exch. Club. Brit. Isles 4: 609. 1917; Kumar in Hajra *et al.*, Fl. India 13: 130. 1995. *Conyza lanceolaria* Roxb., Fl. Ind. 3: 432. 1832. *Blumea myriocephala* DC., Prodr. 5: 445. 1836; Hook.f., Fl. Brit. India 3: 269. 1881. **Fig. 156.**

Large undershrubs or shrubs; stems hollow, branched above. Cauline leaves petioled, oblong-lanceolate or oblanceolate, 5-30 x 0.6-8 cm, acuminate at both ends, margins minutely serrate-dentate, glabrous or rugose above, glabrous or puberulous below; petiole appendaged. Heads up to 1 cm across, sessile or peduncled, in terminal panicles. Involucral bracts 2-seriate; outer ovate-lanceolate; inner lanceolate with scarious margins. Florets yellow; corolla lobes papillate. Achenes oblong, ribbed, pubescent; pappus pale.

Fl. & Fr.: February-April.

Phuldungsei, 800-1200 m, *M. Sawmliana* 99297.

9. *Blumea membranacea* DC., Prodr. 5: 440. 1836; Hook.f., Fl. Brit. India 3: 265. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 104. 1938; Kumar in Hajra *et al.*, Fl. India 13: 134. 1995.

Pubescent and glandular herbs, up to 1.5 m tall; stems erect, slender, much branched. Leaves large, membranous; lower ones petioled, oblong-elliptical, ovate-lanceolate or obovate, 3.5-15 x 1.5-6 cm, margins irregularly or sinuate-dentate or lyrate-lobed, upper ones smaller, sessile, oblong, elliptic, serrate, villous or pubescent on both the surfaces. Heads up to 0.6 cm across, clustered in terminal panicles, with the branches of panicles glandular and clothed with spreading hairs. Involucral bracts slender, ciliolate. Florets yellow. Achenes 8-10-ribbed, with spreading hairs; pappus white.

Fl. & Fr.: February-May.



Fig. 156: *Blumea lanceolaria* (Roxb.) Druce

Common along roadsides and clearings. South Lushai Hills, 700-1300 m, *Wenger* 405, 406 (*vide* C.E.C. Fischer, *l.c.*).

10. *Blumea riparia* (Blume) DC., *Prodr.* 5: 444. 1836; Kumar in Hajra *et al.*, *Fl. India* 13: 141. 1995. *Conyza riparia* Blume. *Bijdr.* 899. 1826, *non* H.B.K. *Blumea chinensis* DC., *Prodr.* 5: 444. 1836. Hook.f., *Fl. Brit. India* 3: 268. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 104. 1938.

Scandent or scrambling, glabrous shrubs, up to 2 m tall; stems sulcate, with terete, grooved branches. Leaves short petioled, oblong-lanceolate, or elliptical-obovate, 2-12 x 0.8-4.5 cm, short acuminate, margins denticulate, acute or rounded at base, coriaceous, surfaces glabrate and faintly coloured on maturity. Heads 0.8-1.5 cm across, clustered in terminal and axillary paniculate racemes. Involucral bracts multiseriate; inner narrow-oblong, obtuse, chartaceous; outer obovate, pubescent. Florets yellow. Achenes cylindrical, 10-ribbed, pilose; pappus white, scabrous.

Fl. & Fr.: February-October.

S.loc., *Parry*, *s.num* (*vide* C.E.C. Fischer, *l.c.*).

10. BLUMEOPSIS Gagnepain

Blumeopsis flava (DC.) Gagnepain in *Bull. Mus. Hist. Nat. Paris* 26: 76, 1920; Kumar in Hajra *et al.*, *Fl. India* 13: 145. 1995. *Blumea flava* DC., *Prodr.* 5: 439. 1836. *Laggera flava* (DC.) Benth. in *Gen. Pl.* 2: 290. 1873; Hook.f., *Fl. Brit. India* 3: 270. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 105. 1938.

Erect, glabrous or pubescent annual herbs; stems 45-75 cm high, simple or corymbosely branched above, grooved. Leaves radical and alternate, ovate-lanceolate, obovate or spatulate, 2.5-6 x 0.5-3 cm, obtuse-mucronate, base oblong-cordate or semiamplexicaul, margins sharply denticulate, surface tomentose. Heads up to 1 cm across, in axillary and terminal panicle cymes. Involucral bracts multiseriate, chartaceous, glabrous or puberulous, outer ovate-oblong, more or less obtuse. Florets bright golden yellow. Achenes minute, cylindrical, 10-ribbed, subglabrate; pappus white.

Fl. & Fr.: November-March.

Common along roadsides and in forest clearings. *Wenger s.loc.*, 700-1350 m 404 (*vide* C.F.C. Fischer, *l.c.*).

11. CALENDULA L.

Calendula officinalis L., Sp. Pl. 921. 1753; Hook.f., Fl. Brit. India 3: 357. 1881; Deb & Dutta in J. Econ. Tax. Bot. 10: 41. 1987; Rao in Hajra *et al.*, Fl. India 12: 148. 1995.

Erect, annual, hispidate-pubescent herbs; stems 30-45 cm high, corymbosey branched above. Leaves alternate; lower leaves spatulate; upper elliptic-lanceolate, 2-8 x 0.3-2.5 cm, acute-obtuse, cordate or amplexicaul at base, margins entire or sinuate-dentate, both the surfaces hispidate. Heads solitary, up to 5 cm across, terminal. Involucral bracts multiseriate, linear-ovate, acuminate. Florets yellow or purplish yellow. Achenes naviculate, muricate on dorsal surface; pappus absent.

Fl. & Fr.: December-April.

Cultivated as an ornamental plant. Lungleh, Dutta 33449.

12. CENTIPEDA Lour.

Centipeda minima (L.) A. Br. & Aschers., Ind. Sem. Fl. Berol. App. 6. 1867; Deb & Dutta in J. Econ. Tax. Bot. 10: 41. 1987; Naithani in Hajra *et al.*, Fl. India 12: 48. 1995. *Artemisia minima* L., Sp. Pl. 849. 1753. *Centipeda orbicularis* Lour., Fl. Cochinch. 493. 1790; Hook.f., Fl. Brit. India 3: 317. 1881.

Annual, prostrate, glabrous or sparsely woolly herbs; branches slender, excessively numerous, 7-12 cm high. Leaves alternate, obovate-oblong, or sometimes more or less obtriangulate, 0.25-1.5 x 0.25-0.5 cm, acute or subtruncate, base narrowed, margins irregularly toothed, sparsely woolly beneath. Heads sessile, globose, 0.25-0.4 cm across, solitary, axillary. Involucral bracts 2-seriate, rotundate, glabrous. Florets pale green to yellow. Achenes terete or slightly striate, with few, erect, minute hairs; pappus absent.

Fl. & Fr.: February-August.

In moist places. Darzo, Dutta 34067.

13. CICERBITA Wallroth

Cicerbita macrorhiza (Royle) Beauv. in Bull. Soc. Bot. Geneve, ser 2, 2: 1204. 1910; Mangain & Rao in Hajra *et al.*, Fl. India 12: 272. 1995. *Mulgedium macrorhizum* Royle, Illustr. Bot. Himal. 251. t. 61. f. 1. 1835. *Lactuca macrorhiza* (Royle) Hook.f., Fl. Brit. India 3: 408. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 105. 1938.

Sparsely villous or glabrous herbs; stems 8-90 cm high, soft, terete, branched above, with erect or decumbent branches. Leaves excessively variable, short petioled; cauline leaves pinnatifid, 10-25 x 1.5-4.5 cm, lobes ovate-orbicular; upper leaves sometimes entire, with simple or dilated winged petiole having entire-dentate auricle. Heads 6-16-flowered, 1-1.8 cm across, on pendulous peduncles in terminal, paniculate cymes. Involucral bracts 2-seriate; outer smaller, lanceolate; inner up to 8, subequal, narrowly oblong. Florets pale-blue. Achenes narrow-elliptic, compressed, 5-ribbed on either face, blackish; pappus deciduous, 2-seriate, inner silky white, outer yellowish, numerous, united.

Fl. & Fr.: December-March.

Common in rock crevices. Blue Mountains, 2100 m, Wenger 378 (*vide* C.E.C. Fischer, *l.c.*).

14. CIRSIUM Mill.

- 1a. Plants glabrous or glabrescent ... 2. *C. shansiense*
- 1b. Plants villous or cottony :
 - 2a. Outer involucral bracts with acicular tips; the rest aristate or acuminate ... 1. *C. interpositum*
 - 2b. Involucral bracts all spinulose ... 3. *C. vertum*

1. *Cirsium interpositum* Petrak in Feddes Rep. 43: 283. 1838; Hajra in Hajra *et al.*, Fl. India 12: 170 1995. *Cnicus griffithii* Hook.f., Fl. Brit. India 3: 363. 1881.

Erect, robust thistles; stems cottony. Cauline leaves sessile, pinnatifid; lobes lanceolate, acute, spinescent, setulose above, white tomentose below. Heads larger, up to 5 cm across, fascicled, glabrous. Involucral bracts imbricate, glabrous; outer outermost bracts shorter with acicular apices;

inner wavy, acuminate or aristate. Florets purplish, up to 3 cm long. Achenes oblong, compressed, up to 5 mm long; pappus up to 2.5 cm long.

Fl. & Fr.: June-September.

On open hill slopes. Phongpui, ca 1980 m, Mao 107151.

Uses: Leaves and seeds edible.

2. *Cirsium shansiense* Petrak in Mitt., Thuring. Bot. Ver. n.f. 1: 176. 1943; Hajra in Hajra *et al.*, Fl. India 12: 170. 1995. *Cnicus sinensis* Gard. & Champ. in Hook., Kew Jour. 1323. 1849; Hook.f., Fl. Brit. India 3: 364. 1881. *Cirsium sinensis* Gard. et Champ.; C.E.C. Fischer in Rec. Bot. Surv. India 12: 104. 1938. *Lenhling* (Lushai).

Erect, glabrous or glabrescent thistles, 0.9-2.4 m tall; stems striate, simple or fastigately branched above, with erect, slender branches. Leaves sessile, lanceolate, or linear-oblong, 2.5-8 x 1-3 cm, sinuately lobed or pinnatifid, margins ciliated or spinescent, subdecurent at base, scaberulous or smooth above, white tomentose beneath. Heads solitary, long-peduncled, up to 2.5 cm across. Involucral bracts numerous, adpressed, oblong-lanceolate, obtuse, with spinulose tips; inner linear, with inflexed acute tips. Florets purple. Achenes minute; pappus with clavellulate apices.

Fl. & Fr.: September-December.

Tuisenhar, 1300 m, Parry 328 (*vide* C.E.C. Fischer, *l.c.*).

3. *Cirsium verutum* (D. Don) Spreng., Syst. Veg. 3: 370. 1826; Deb & Dutta in J. Econ. Tax. Bot. 10: 41. 1987; Hajra in Hajra *et al.*, Fl. India 12: 171. 1995. *Cirsium involucratum* DC., Prodr. 6: 639. 1838; C.E.C. Fischer in Rec. Bot. Surv. India 12: 104. 1938. *Cnicus verulus* D. Don, Prodr. Fl. Nepal. 167. 1825. *Cnicus argyracanthus* (DC.) C.B. Clarke, Comp. Ind. 218. 1876; Hook.f., Fl. Brit. India 3: 362. 1881. *C. involucratum* DC., Prodr. 6: 639. 1838; Hook.f., Fl. Brit. India 3: 362. 1881.

Erect, tall, stout thistles, 1-2.5 m tall; stems villous, branched above. Leaves radical, pinnatifid up to the middle or base, upto 30 cm long, with distant lobes; lobes lanceolate-laciniate; cauline leaves sessile, ovate-

lanceolate, up to 15 cm long, sinuate-pinnatifid, auricled or amplexicaul at base, spinous-setulose above, white tomentose beneath. Heads large, 2.5-6.5 cm across, solitary or fascicled, inclined. Involucral bracts narrow, spinescent, glabrous inner most linear, acuminate. Florets purple or whitish pink. Achenes oblong-obovoid, obtuse margined; pappus brown or almost white, with nonclavellulate apex.

Fl. & Fr.: August-May.

Hmuifang, 1600 m, *Parry 291* (*vide* C.E.C. Fischer, *l.c.*); Phongpui, 2000 m, *Parry 557* (*vide* C.E.C. Fischer, *l.c.*); Thalthlang, *Dutta 33963*.

15. CONYZA Less.

1a. Leaves obovate-spathulate, or oblong :

- | | |
|------------------------------------------------------------------------|---------------------------|
| 2a. Plants glabrous, villous or woolly.
Involucral bracts 1-seriate | ... 3. <i>C. japonica</i> |
| 2b. Plants hoary-pubescent.
Involucral bracts more than 1-seriate | ... 5. <i>C. stricta</i> |

1b. Leaves linear-lanceolate :

- | | |
|--------------------------------------------------------------------------------------------|------------------------------|
| 3a. Plants up to 1.8 m. Achenes obovate-lanceolate,
usually minutely pilose; pappus red | ... 4. <i>C. leucantha</i> |
| 3b. Plants up to 1 m. Achenes narrow-oblong, glabrous;
pappus straw-yellow or white : | |
| 4a. Leaves sessile, surface setulose-scabrous;
pappus straw yellow | ... 1. <i>C. bonariensis</i> |
| 4b. Leaves petioled, surface villous-pilose;
pappus white | ... 2. <i>C. canadensis</i> |

1. *Conyza bonariensis* (L.) Cronq. in Bull. Torrey Bot. Club 70: 632. 1943; Hajra in Hajra *et al.*, Fl. India 13: 121. 1995. *Erigeron bonariensis* L., Sp. Pl. 863. 1753; Deb & Dutta in J. Econ. Tax. Bot. 10: 41. 1987. *E. linifolius* Willd., Sp. Pl. 3: 1955. 1803; Hook.f., Fl. Brit. India 3: 254. 1881; Deb & Dutta in J. Econ. Tax. Bot. 10: 41. 1987. *Buar-zen* (Lushai).

Profusely branched, hirsute herbs; stems erect, up to 1 m high, stout, with small branches. Leaves sessile, alternate, linear-oblong or lanceolate, 2.5-11 x 0.2-1 cm, acute to subacute, with entire or coarsely dentate

margins, surface setulose-scabrous. Heads 0.5-1 cm across, in terminal or axillary racemes or corymbs. Involucral bracts 2-3 seriate; outer smaller, narrow-lanceolate, acuminate, with scarious margins. Florets light yellow. Achenes minute, narrow-oblong, compressed, glabrous; pappus 1-seriate, straw yellow or dull white.

Fl. & Fr.: February-September.

Common in shady places. Lungleh, *Dutta* 33468; Saiha, *Dutta* 33812; North Vanlaiphai, *Deb* 31161; Bualpui, *D.K. Singh* 93282; North Vanlaiphai, 1600 m, *D.K. Singh* 93048; Dampa, *D.K. Singh* 98979; Lallen, *D.K. Singh*, 98820; Darlawn, 1200 m, *M. Sawmliana* 101752.

2. *Conyza canadensis* (L.) Cronq. in *Bull. Torrey Bot. Club* 70: 632. 1943; Hajra in Hajra *et al.*, *Fl. India* 12: 105. 1995. *Erigeron canadensis* L., *Sp. Pl.* 863. 1753; Hook.f., *Fl. Brit. India* 3: 254. 1881.

Fig. 157.

Annual pubescent, hirsute or glabrous herbs; stems 0.15-1 m high, slender, highly branched, with erect branches. Leaves petioled, alternate, linear or linear-lanceolate, 1-3.5 x 0.5-0.8 cm, obtuse, margins more or less entire or finely dentate, surface villous-pilose. Heads small, 0.4-0.6 cm across, in elongated, branched, leafy panicles. Involucral bracts 2-3-seriate, outer smaller, narrow, acuminate, with more or less scarious margins, dorsally pubescent. Florets pink. Achenes narrow-oblong, compressed, more or less glabrous; pappus 1-seriate, white or dull white.

Fl. & Fr.: May-October.

In open places along roadsides. Bilkawthlir-Kolasib, 550 m, *D.K. Singh* 93110.

3. *Conyza japonica* (Thunb.) Less. *ex DC.*, *Prodr.* 5: 382. 1836; Hook.f., *Fl. Brit. India* 3: 258. 1881; Deb & Dutta in *J. Econ. Tax. Bot.* 10: 41. 1987; Hajra in Hajra *et al.*, *Fl. India* 12: 105. 1995. *Erigeron japonicum* Thunb., *Fl. Jap.* 312. 1784.

Erect, annual or biennial herbs; stems 15-30 cm high, simple, usually unbranched. Leaves sessile, in basal rosettes, few cauline, elongate-elliptical, oblong-lanceolate, or obovate-spathulate, 2-70.5 x 0.5-2 cm, acute or obtuse, margins crenate-serrate, cuneate or semiamplexicaul at base,

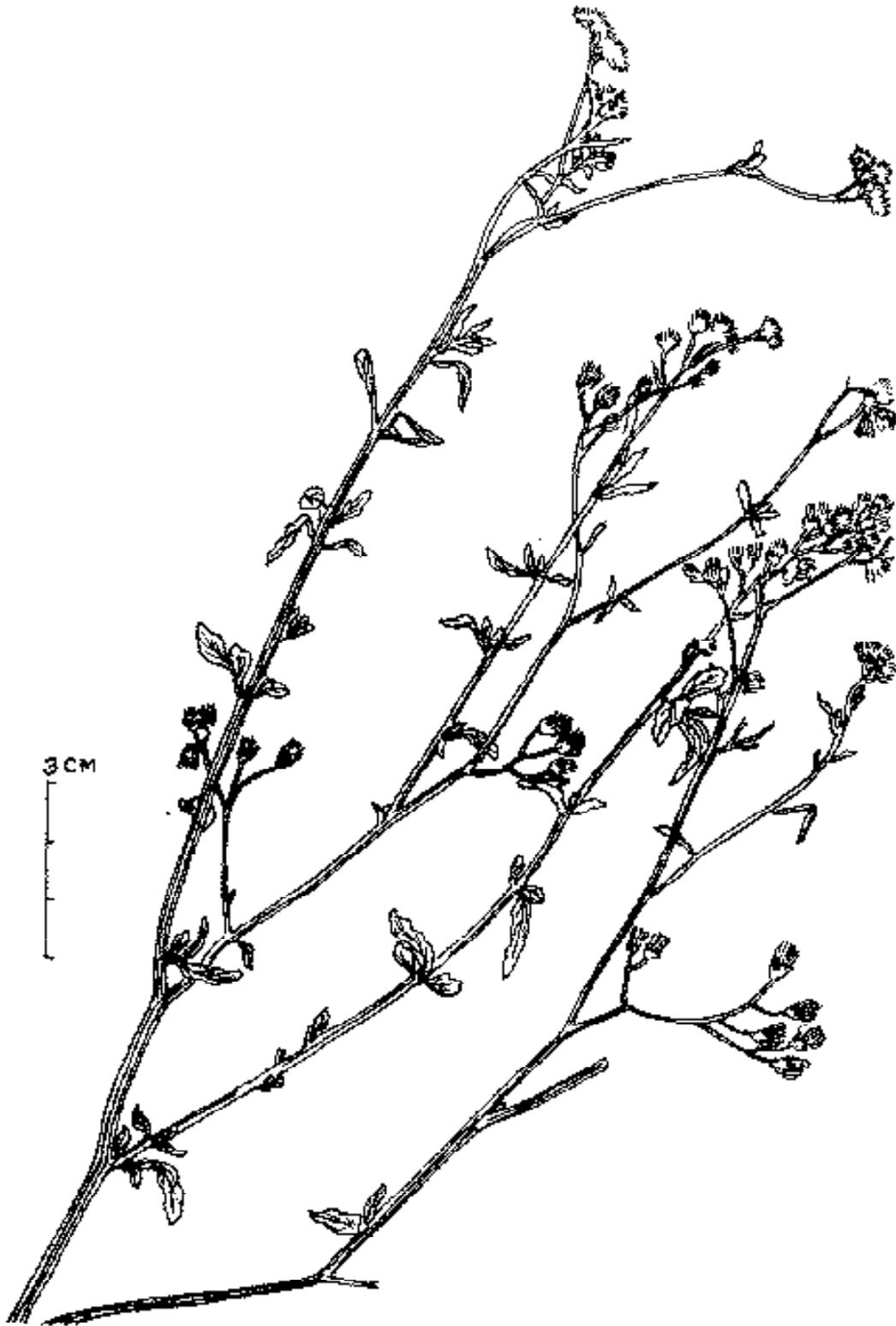


Fig. 157: *Conyza canadensis* (L.) Cronq.

villous beneath. Heads up to 0.8 cm across, densely glomerate in terminal panicles. Involucral bracts narrow-lanceolate, with scarious margins, dorsally villous or pubescent. Florets white. Achenes compressed, narrow, obovate-lanceolate, nearly glabrous or minutely pilose; pappus 1-seriate, small, reddish brown.

Fl. & Fr.: April-October.

South Vanlaphai, *Dutta* 34992.

4. *Conyza leucantha* (D. Don) Ludlow & Raven. in *Kew Bull.* 17: 71. 1963; Hajra in Hajra *et al.*, *Fl. India* 12: 105. 1995. *Erigeron leucanthus* D. Don, *Prodr. Fl. Nepal.* 171. 1825. *Conyza viscidula* Wallich *ex DC.*, *Prodr.* 5: 383. 1836; Hook.f., *Fl. Brit. India* 3: 258. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 104. 1938. *Buar*, *Buarchhea* (Lushai).

Tall, annual herbs, 0.6-1.8 m, with conspicuously striate, viscid, puberulous, branched stems. Leaves sessile-subsessile, narrow-lanceolate, 3-8 x 1-2.5 cm, acute-acuminate at both ends, margins serrulate, surface puberulous-viscidulous. Heads up to 0.8 cm across, glomerate in large terminal and upper axillary panicles. Involucral bracts 10-15, more or less 2-seriate, lanceolate, acuminate, margins scarious, puberulous outside. Florets pink. Achenes compressed, narrow, obovate-lanceolate, glabrous or minutely pilose; pappus red, 1-seriate.

Fl. & Fr.: January-March.

Common in dry places. *Zongling*, 1300 m, Parry 494 (*vide* C.E.C. Fischer, *l.c.*); Aizawl protected forest, *Deb* 30538; Aizawl, *Deb* 30661; Aizawl-Sibutlung road, *G.K. Debu* 5240.

5. *Conyza stricta* Willd., *Sp. Pl.* 3: 1922. 1803; Hook.f., *Fl. Brit. India* 3: 258. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 104. 1938; Hajra in Hajra *et al.*, *Fl. India* 12: 108. 1995.

Hoary or scaberulously pubescent herbs; stems erect, 30-60 cm high, simple or fastigately branched, with the branches corymbose above. Leaves linear-oblong to obovate-spathulate, subacute-obtuse, attenuate at base, margins entire, dentate or pinnatifid, surface velutinous or pubescent. Heads minute, ca 0.3 cm across, numerous, in peduncled corymbs. Involucral bracts more or less 2-seriate, subequal, narrow-lanceolate, acuminate,

dorsally pubescent. Achenes narrowly elliptical, compressed, puberulous; pappus 1-seriate, red.

Fl. & Fr.: April-October.

Helio Hill, Lungleh, 1200 m, Gage 88 (CAL).

16. COSMOS Cav.

Cosmos bipinnatus Cav., Icon. 1: 10. t. 14. 1791; Deb & Dutta in J. Econ. Taxon. Bot. 10: 41. 1987.

Glabrous-pubescent, slender annual herbs; stems 0.9-3 m tall, angulate, with more or less cupular nodes. Leaves opposite, petioled, 2-8 x 1.5-5 cm, bipinnately dissected, lobes elliptic, linear-lanceolate or filiform, with entire margins. Heads 2-8 cm across, terminal on 2-3 times branched stalks. Involucral bracts 1-seriate, subulate, ligulate-lanceolate, acute-acuminate. Ray florets pinkish purple. Disc florets yellowish white. Achenes linear, costate, with an abrupt beak, glabrescent; pappus 2-4, retrorsely barbed.

Fl. & Fr.: November-March.

Cultivated as an ornamental. Lungleh, Dutta 33474.

17. COTULA L.

Cotula hemisphaerica (Roxb.) Wallich ex C.B. Clarke, Comp. Ind. 150. 1876; Hook.f., Fl. Brit. India 3: 316. 1881; Deb & Dutta in J. Econ. Tax. Bot. 10: 41. 1987; Naitani in Hajra *et al.*, Fl. India 12: 54. 1995. *Artemisia hemisphaerica* Roxb., Fl. Ind. ed. 2, 3: 422. 1832.

Erect, glabrous-villous, annual herbs; stems 15-20 cm high, striate, purplish tinged, rooting at lower nodes. Leaves alternate, sessile, pinnatisect, or simple above, 1-7.5 cm long, lobes linear, linear-lanceolate, aristate or with 1-2 spinules towards apex, surface glabrous. Heads globose-subglobose, up to 0.6 cm across, solitary on axillary or terminal peduncles. Involucral bracts 1-2-seriate, oblong, obtuse, slightly connate at base, glabrous. Florets yellow. Achenes angled, minute, without wings, glandular-pubescent; pappus short, auriculate or often absent.

Fl. & Fr.: September-February.

Panchagram. *Deb* 30463.

18. CRASSOCEPHALUM Moench.

Crassocephalum crepidioides (Benth.) S. Moore in *J. Bot.* 1: 211. 1912; Mathur in Hajra *et al.*, *Fl. India* 13: 201. 1995. *Gynura crepidioides* Benth. in Hook.f., *Fl. Niger.* 438. 1849; Deb & Dutta in *J. Econ. Tax. Bot.* 10: 42. 1987. *Buarankasa, Buar* (Lushai). **Fig. 158.**

Erect, annual herbs, 0.3-1.2 m high; stems sparingly branched, striate-angulate. Leaves alternate, elliptic-oblong or obovate, 4-15 x 0.6-5.5 cm, acute-acuminate, conspicuously tapering at base, margins irregularly pinnatifid, or dentate, glabrous. Heads drooping, 0.5-1.5 cm, in terminal corymbs. Involucral bracts 2-seriate, linear-oblong, with scarious margins. Florets reddish-yellow. Achenes minute, linear-oblong, ribbed; pappus white, cottony.

Fl. & Fr.: May-December.

Common in moist places along roadsides, Saiha-Bualpui, *Dutta* 33852; Bilkawthlir-Kolasib, 550 m. *D.K. Singh* 93112; Tilthlang, *K.P. Singh* 94068; Thazawl, *K.P. Singh* 94231; Thalthlang, *K.P. Singh* 96764.

Uses: Leaves eaten as vegetables.

19. CYATHOCLINE Cass.

Cyathocline purpurea (Buch.-Ham. ex D. Don) O. Kuntze, *Rev. Gen. Pl.* 1: 333. 1891; Hajra in Hajra *et al.*, *Fl. India* 12: 111. 1995. *Tanacetum purpureum* Buch.-Ham. ex D. Don, *Prodr. Fl. Nepal.* 181. 1825. *Cyathocline lyrata* Cass. in *Ann. Sci. Nat. Ser. 1.* 17. 420. 1829; Hook.f., *Fl. Brit. India* 3: 246. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 104. 1938. *Dicrocephala minutiflora* Vaniot. in *Bull. Acad. Internat. Geogr. Bot.* 12: 242. 1903; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 104. 1938.

Erect or procumbent, aromatic, annual herbs; stems up to 60 cm high, scabrous or pubescent, slender, sulcate, often reddish-purple tinged. Leaves alternate, sessile; lower obovate-lanceolate; upper lyrate-pinnatisect, 2-14 cm long; lobes oblong 0.5-2.5 x 0.2-1.5 cm, serrate-dentate or lobed, surface viscidly glandular-pubescent. Heads globose-subglobose, up to 0.8



Fig. 158: *Crassocephalum crepidioides* (Benth.) S. Moore

cm across, in terminal, rounded corymbose panicles. Involucral bracts 2-seriate, linear-lanceolate, acute, with ciliated or pilose margins. Florets rose-purple. Achenes minute, oblong, smooth, brownish; pappus absent.

Fl. & Fr.: September - February.

Along the Koladyne river, ca 700 m, Parry, 583 (*vide* C.E.C. Fischer, *l.c.*); *s.loc.*, Parry *s.nun.* (CAL).

20. DICHROCEPHALA L' Herit. *ex* DC.

Dichrocephala integrifolia (L.f.) O. Kuntze, *Rev. Gen. Pl.* 1: 333. 1891; Hajra *et al.*, *Fl. India* 12: 114. 1995. *Hippia integrifolia* L.f., *Suppl. Sp. Pl.* 389. 1781. *Dichrocephala latifolia* DC. in Wight, *Contrib. Bot. Ind.* 11. 1834; Hook.f., *Fl. Brit. India* 3: 245. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 104. 1938. *Awsi charu*; *Vawkektumtial* (Lakher).

Annual, erect or decumbent, glabrous-pilose, aromatic herbs, 30-60 cm high. Leaves obovate-lyrate, or pinnatifid, 2-8 x 0.4-3.5 cm, subacute at apex, margins irregularly dentate-crenate or serrate, puberulous or pilose on both surfaces. Heads very small, up to 0.5 cm across, in terminal, racemose panicles. Involucral bracts 2-seriate, ovate, margins fimbriate. Florets yellowish-purple, gland-dotted. Achenes compressed, smooth; pappus absent.

Fl. & Fr.: May-February.

S. loc., 350-1300 m, Wenger 423 (*vide* C.E.C. Fischer, *l.c.*); *s.loc.*, Wenger, *s.n.* (CAL); Aizawl, Godfrey 518 (CAL); Theiriat, Deb 31261; North Vanlaiphai 1600 m, D.K. Singh 93310.

21. ECLIPTA L. *nom. cons.*

Eclipta prostrata (L.) L., *Mant. Pl.* 2: 286. 1771; Chowdhery in Hajra *et al.*, *Fl. India* 12: 381. 1995. *Verbesina prostrata* L., *Sp. Pl.* 902. 1753. *Eclipta alba* (L.) Hassk., *Pl. Jav. Rar.* 528. 1848; Hook.f., *Fl. Brit. India* 3: 304. 1881; Deb & Dutta in *J. Econ. Tax. Bot.* 10: 41. 1987.

Strigosely hirsute annual herbs; stems erect or procumbent, 15-60 cm high, branched, rooting at lower nodes. Leaves opposite, short-petioled, linear, elliptic, or oblong-lanceolate, 2.5-10 x 0.5-2.5 cm, acute-acuminate,

base cuneate, margins subdentate. Heads subglobose, 0.5-2 cm across, solitary or in pairs, axillary and terminal. Involucral bracts 2-seriate, herbaceous, ovate, obtuse-acute, outer large, broad. Florets white, or yellow. Achenes narrow, triquetrous more or less laterally compressed, verrucose; pappus obsolete or 2, aristate.

Fl. & Fr.: August-December.

In open shady places. Kolasib, *Dutta* 33255; Leite, *Dutta* 34097; Kolasib-Builung, *D.K. Singh* 93161.

22. ELEPHANTOPUS L.

Elephantopus scaber L., Sp. Pl. 814. 1753; Hook.f., Fl. Brit. India 3: 242. 1881; Uniyal in Hajra *et al.*, Fl. India 13: 333. 1995. **Fig. 159.**

Rigid, scabrous, perennial, rosetted herbs, 20-40 cm high, once or twice dichotomously branched. Radical leaves rosetted as base, sessile, obovate-lanceolate, or obovate-oblong, oblanceolate, 3.5-16 x 0.8-4 cm, short acuminate, base cuneate-attenuate, margin serrate; cauline leaves alternate, few, undersurface pale-brown tomentose. Heads solitary, glomerate, up to 2 cm across, terminal on 2.5-8 cm long peduncles, each subtended by 3-8 cordate, foliaceous, conduplicate, bracts. Involucral bracts 4-seriate; outer subulate; inner lanceolate. Florets pink-purple. Achenes truncate, 10-ribbed, pilose; pappus 1-seriate, white, comprising 4-5 bristles.

Fl. & Fr.: May-October.

Common in open places. Tlabung, 150 m, *K.P. Singh* 94302; Taichang-Hnathial, *K.P. Singh* 96915.

23. EMILIA Cass.

- 1a. Plants small; leaves alternate, entire ... 1. *E. scabra*
 1b. Plants large; leaves both radical and alternate,
 lyrate-pinnatifid ... 2. *E. sonchifolia*

1. *Emilia scabra* DC., Prodr. 6: 303. 1838; C.E.C. Fischer in Rec. Bot. Surv. India 12: 104. 1938; Mathur in Hajra *et al.*, Fl. India 13: 211. 1995. *E. sonchifolia* (L.) DC. var. *scabra* (DC.) Hook.f., Fl. Brit. India 3: 336. 1881.



Fig. 159: *Elephantopus scaber* L.

Annual herbs, 15-45 cm high. Leaves alternate, clavate-spathulate, or broadly ovate, 3-9 x 1.5-3.5 cm, sometimes elliptic-lanceolate, 2.5-7 x 0.7-1.5 cm, acute-obtuse, base stem clasping, entire, scaberulous beneath. Heads 0.7-1.8 cm long, often solitary, terminal. Involucral bracts 1-seriate, oblong, acute. Florets pinkish-purple. Achenes truncate, 5-gonate, straw coloured; pappus soft-white.

Fl. & Fr.: February-August.

In open clearings, along roadsides and in river beds. *s.loc.*, 350-1300 m, *Wenger*, 420 (*vide C.E.C. Fischer, l.c.*).

2. ***Emilia sonchifolia*** (L.) DC. in Wight, *Contrib. Bot. Ind.* 24. 1834; *Hook.f.*, *Fl. Brit. India* 3: 336. 1881; Deb & Dutta in *J. Econ. Tax. Bot.* 10: 41. 1987; Mathur in Hajra *et al.*, *Fl. India* 13: 212. 1995. *Cacalia sonchifolia* L., *Sp. Pl.* 1835. 1753.

Slender, puberulous or scabrid, spreading annual herbs, up to 1 m high; stems often branched at base. Leaves radical and alternate, slightly petioled, obovate, 3-8.5 x 1-6 cm, dentate or lyrate-pinnatifid, upper leaves oblong-lanceolate, sparsely dentate, amplexicaule or auricled at base. Heads up to 1.2 cm, in lax corymbs. Involucral bracts linear-oblong, acute, connate at base. Florets pinkish-yellowish. Achenes small, 5-angled; pappus conspicuous, soft, white.

Fl. & Fr.: November-February.

In wastelands and along the roadsides. Sairep-Tawipui, *Dutta* 33616.

24. ERIGERON L.

- 1a. Inflorescence a corymbiform panicle ... 1. *E. annuus*
 1b. Inflorescence solitary or few, in axillary panicles ... 2. *E. pusillum*

1. ***Erigeron annuus*** (L.) Pers., *Syn. Pl.* 2: 431. 1807; Hajra in Hajra *et al.*, *Fl. India* 12: 120. 1995. *Aster annuus* L., *Sp. Pl.* 875. 1753.

Erect, annual, sparsely hirsute herbs, 30-55 cm high. Leaves broadly ovate or obovate towards base, 2-5 x 1-2.5 cm, dentate or subentire towards apex; cauline leaves ovate-lanceolate. Heads 0.5-1 cm across, in corymbiform panicles. Ray florets white. Disc florets yellow. Achenes minutely pubescent; pappus comprising minute scales and hairs.

Fl. & Fr.: May-September.

Tilthlang, *K.P. Singh* 96653.

2. *Erigeron pusillum* Nutt., Gen. 2: 148. 1818; Hajra in Hajra *et al.*, Fl. India 12: 123. 1995.

Erect, slender herbs, 20-55 cm high, with smooth, glabrescent stems. Leaves sessile, alternate, linear-lanceolate, or elliptic-lanceolate, 3-5 x 0.2-8 cm, acute, cuneate at base, margins entire or 1-2 toothed, villous on both the surfaces. Heads 0.5-0.8 cm across, 30-40-flowered, in terminal and upper axillary panicles. Involucral bracts 2-seriate, linear-oblong, acute, with scarious margins, outer smaller. Florets white. Achenes minute, truncate; pappus dull-white, hairs long.

Fl. & Fr.: April-June.

In open grasslands. Kolasib-Builung, *D.K. Singh* 93163; North Vanlaiphai, 1600 m, *D.K. Singh* 97173.

25. EUPATORIUM L.

- | | |
|-------------------------------------------------------------------------|------------------------------|
| 1a. Achenes with shining glands | ... 2. <i>E. nodiflorum</i> |
| 1b. Achenes without glands : | |
| 2a. Herbs; stems, petioles and bracts glandular hairy; achenes glabrous | ... 1. <i>E. adenophorum</i> |
| 2b. Undershrubs; stems villose-pubescent; achenes hairy on the ribs | ... 3. <i>E. odoratum</i> |

1. *Eupatorium adenophorum* Spreng., Syst. Veg. 3. 420. 1826; Uniyal in Hajra *et al.*, Fl. India 12: 350. 1995. *Ageratina adenophora* (Spreng.) King & Robinson in Phytologia 20: 204. 1970. *Tiangsam* (Lushai).

Highly branched viscid, herbs or undershrubs, up to 2 m tall; stems slightly striate, puberulous. Leaves opposite, subsessile, ovate-triangular, or rhomboid, 2-8 x 0.5-4 cm, base cuneate, narrowed, acute-acuminate at apex, margins dentate, pubescent on both the surfaces. Heads in dense axillary and terminal corymbs, 0.4-0.6 cm. Involucral bracts 3-seriate, outer oblong-spathulate, with glandular hairs, inner oblong-lanceolate, or ovate. Flowers white. Achenes 0.25-0.4 cm long, conspicuously 5-angled, black; pappus hairs dirty white.

Fl. & Fr.: April-October.

Common in shady places. Zawbak, *K.P. Singh* 94236; Hnathial, *K.P. Singh* 94012.

2. *Eupatorium nodiflorum* Wallich *ex DC.*, Prodr. 5: 179. 1836; Uniyal in Hajra *et al.*, Fl. India 12: 353. 1995. *Eupatorium cannabinum sensu* Hook.f., Fl. Brit. India 3: 243. 1881. *p.p. non L.*, 1753; C.E.C. Fischer in Rec. Bot. Surv. India 12: 104. 1938; Kanjilal *et al.*, Fl. Assam 3: 108. 1939.

Coarse, perennial herbs; stems erect, 25-90 cm high, sparsely branched, puberulous or pubescent. Leaves opposite, or sometimes alterante, ovate-elliptic, elliptic-lanceolate, 2-12 x 0.8-2.5 cm, acute or cuneate at base, acute-acuminate, margins coarsely serrate, pubescent along the nerves beneath. Heads 5-flowered, up to 0.6 cm across, in dense terminal corymbs. Involucral bracts 3-seriate, 6-8, oblong-lanceolate, glabrous or pubescent, reddish. Florets purplish white. Achenes truncate, 5-ribbed, black; pappus filiform, rigid, white.

Fl. & Fr.: September-December.

Champhai, 1600 m, *Parry* 345 (*fide* C.E.C. Fischer, *l.c.*); Lushai Hills, *Parry s.num.* (CAL).

3. *Eupatorium odoratum* L., Syst. Nat. ed. 10. 1205. 1759; Hook.f., Fl. Brit. India 3: 244. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 105. 1938; Uniyal in Hajra *et al.*, Fl. India 12: 354. 1995. *Chromolaena odorata* (L.) King & Robinson in Phytologia 20: 204. 1970. *Thangsam*, *Tlangsamhlo*, *Vawkpuithal* (Lushai); *Tlasapa* (Lakher).

Erect or straggling, aromatic undershrubs, 1.5-3 m tall; stems repeatedly branched, villose-pubescent, with angulate branches. Leaves opposite, petioled, triangulate-ovate, deltoid, or ovate-lanceolate, 3.5-12 x 2-6 cm, acute-long acuminate, cuneate at base, margins irregularly dentate-serrate or sometimes entire, pubescent beneath. Heads more or less cylindrical, up to 1.5 cm long, 20-30-flowered, in terminal, usually trichotomous corymbs. Involucral bracts multi-seriate, ovate-lanceolate, acute or obtuse. Florets whitish purple, odorous. Achenes small, narrow-oblong, 5-angled, blackish; pappus stiff, white.

Fl. & Fr.: September-March.

Common, in open places and along the forest fringe. Saza, 700 m, Parry 434 (*vide* C.E.C. Fischer, *l.c.*); Lushai Hills, Parry, *s. num.* (CAL); *s. loc.*, 1300 m, Wenger, 425 (*vide* C.E.C. Fischer, *l.c.*); Kheitum, Deb 31194, Zotethlang, 1700 m, K.P. Singh & D.K. Singh 94586.

Uses: Leaf extract used as antiseptic for healing wounds.

26. GALINSOGA Ruiz *et* Pavon.

Galinsoga parviflora Cav., *l.c. et* Deser. Pl. 3: 41. t. 281. 1795; Hook.f., *Fl. Brit. India* 3: 311. 1881; Deb & Dutta in *J. Econ. Taxon. Bot.* 10: 41. 1987; Chowdhery in Hajra *et al.*, *Fl. India* 12: 388. 1995.

Weak, hispid-glabrous annual herbs; stems erect, 20-40 cm high. Leaves opposite, petioled, oblong-ovate, or ovate-lanceolate, 1-5 x 0.4-1.4 cm, acute-obtuse, base acute or cuneate, margins more or less entire or sub-serrate, membranous. Heads up to 0.8 cm across, solitary, axillary and terminal. Involucral bracts 1-2-seriate, broadly ovate-elliptic, subacute, striate. Florets pink purple-yellowish. Achenes ovate, angled, dorsally compressed; pappus scales long.

Fl. & Fr.: June-December.

Common, in exposed or partially shady places. Sairep, Dutta 33503; Kolasib, D.K. Singh 93004; Zotethlang, 1700 m, K.P. Singh & D.K. Singh 94599; Aizawl, M. Sawmliana 95545.

27. GNAPHALIUM L.

Gnaphalium luteo-album L., *Sp. Pl.* 851. 1753; Hook.f., *Fl. Brit. India* 3: 288. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 105. 1938; Deb & Dutta in *J. Econ. Tax. Bot.* 10: 41. 1987; Pant in Hajra *et al.*, *Fl. India* 13: 87. 1995. *Alarypa* (Lakher).

Erect, densely woolly or pubescent annual herbs, 10-30 cm high; stems branching both from base and above, with ascending branches. Leaves alternate, oblong-spathulate; upper leaves lanceolate, 2-5 x 0.2-0.8 cm,

obtuse, narrowed at base, margins more or less entire, glaucous pubescent on both the surfaces. Heads campanulate, up to 0.5 cm, clustered in terminal or axillary corymbs or fascicles. Involucral bracts multi-seriate, oblong-elliptic, obtuse, shining yellow-brownish. Florets bright yellow, with pinkish apices. Achenes brown, tubercled or with minute curved bristles; pappus yellowish.

Fl. & Fr.: February-October.

Common, in forest clearings, roadsides and gardens. About 24 km South-east of Lungleh, *Gage s.num.* (*vide* C.E.C. Fischer, *l.c.*); *s.loc.*, *Wenger* 407 (*vide* C.E.C. Fischer, *l.c.*); North Vanlaiphai, *Deb* 31147.

Uses : Flowers and leaves edible.

28. GYNURA Cass.

- 1a. Involucral bracts villous-pubescent ... 3. *G. nepalensis*
- 1b. Involucral bracts glabrous :
 - 2a. Petiole base dilated-auricled, surface puberulous ... 1. *G. auriculata* var. *puberula*
 - 2b. Petiole base narrow-auricled, surface glabrous:
 - 3a. Succulent herbs; leaves alternate-spiral; achenes glabrous ... 2. *G. bicolor*
 - 3b. Small shrubs; leaves subradical; achenes villous ... 4. *G. pseudochina*

1. *Gynura auriculata* DC. var. *puberula* C.B. Clarke, Comp. Ind. 172. 1876; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 105. 1938. *Buar* (Lushai).

Herbs; stems 0.3-1 m high, suffrutescent towards base; branches elongated, somewhat devoid of leaves, with corymbiferous apices. Leaves elliptic or oblong-obovate, 5-12 x 1.5-4 cm, petioled, pubescent-pilose on both surfaces; petiole base dilated-auricled, sparsely dentate. Heads in puberulous-pilose peduncled corymbs. Involucral bracts glabrous. Florets orange coloured. Achenes ribbed, glabrous or minutely papilose in between the ribs.

Fl. & Fr.: September-December.

S.loc., *Parry s.num.* (CAL).

2. *Gynura bicolor* (Roxb. ex Willd.) DC., Prodr. 6: 299. 1938; Mathur in Hajra *et al.*, Fl. India 13: 218. 1995. *Cacalia bicolor* Roxb. ex Willd., Sp. Pl. 3: 1731. 1804. *Gynura angulosa* DC., Prodr. 6: 298. 1838; Hook.f., Fl. Brit. India 3: 334. 1881. *Buar* (Lushai). **Fig. 160.**

Succulent, erect herbs, up to 3 m tall; stems striate-furrowed, corymbosely branched, glabrous. Leaves sessile, alternate-spiral, oblong-obovate, oblanceolate, 8-30 x 2.5-7 cm, acute-acuminate, contracted or auricled at base, margins irregularly dentate, surface not smooth. Heads 1-2.5 cm long, in large, terminal leafy panicles. Involucral bracts 1-seriate, linear-lanceolate, 0.8-1.2 cm long, margins scarious. Florets orange-red. Achenes narrow, many-ribbed, glabrous; pappus hairs white, multi-seriate.

Fl. & Fr.: May-October.

North Vanlaiphai, 1600 m, *D.K. Singh* 97174; Phongpui, 2100 m, *B.M. Wadhwa & K.P. Singh* 96800; Kawlhkullh-Hliapui, *K.P. Singh & D.K. Singh* 94366; Keifang, 1200 m, *M. Sawmliana* 99286; Blue mountain, 950 m, *Mao* 107158.

3. *Gynura nepalensis* DC., Prodr. 6: 300. 1838; Hook.f., Fl. Brit. India 3: 333. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 105. 1938; Mathur in Hajra *et al.*, Fl. India 13: 221. 1995. *Buar*, *Khamvailho* (Lushai).

Annual or perennial, suffrutescent herbs or undershrubs; stems 1-2 m tall, corymbosely branched above, vilose-pubescent. Leaves alternate, petioled, oblong-ovate, upper sometimes elliptic-lanceolate, 4.5-20 x 2-5.5 cm, acuminate, at both ends, margins serrate-dentate; petiole dilated-auricled at base, both surface puberulous. Heads 1.6-2.5 cm across, in axillary and terminal racemed panicles. Involucral bracts 1-seriate, oblong, acuminate, vilose-pubescent, margins scarious. Florets yellow. Achenes glabrous or minutely papillose in between the ribs; pappus white.

Fl. & Fr.: January-June.

Sherkor, 1300 m, *Parry* 456 (*vide* C.E.C. Fischer, *l.c.*); Aizawl, 1000 m, *Parry* 646 (*vide* C.E.C. Fischer, *l.c.*); Aizawl, 1000 m, *G.K. Deka* 23341.

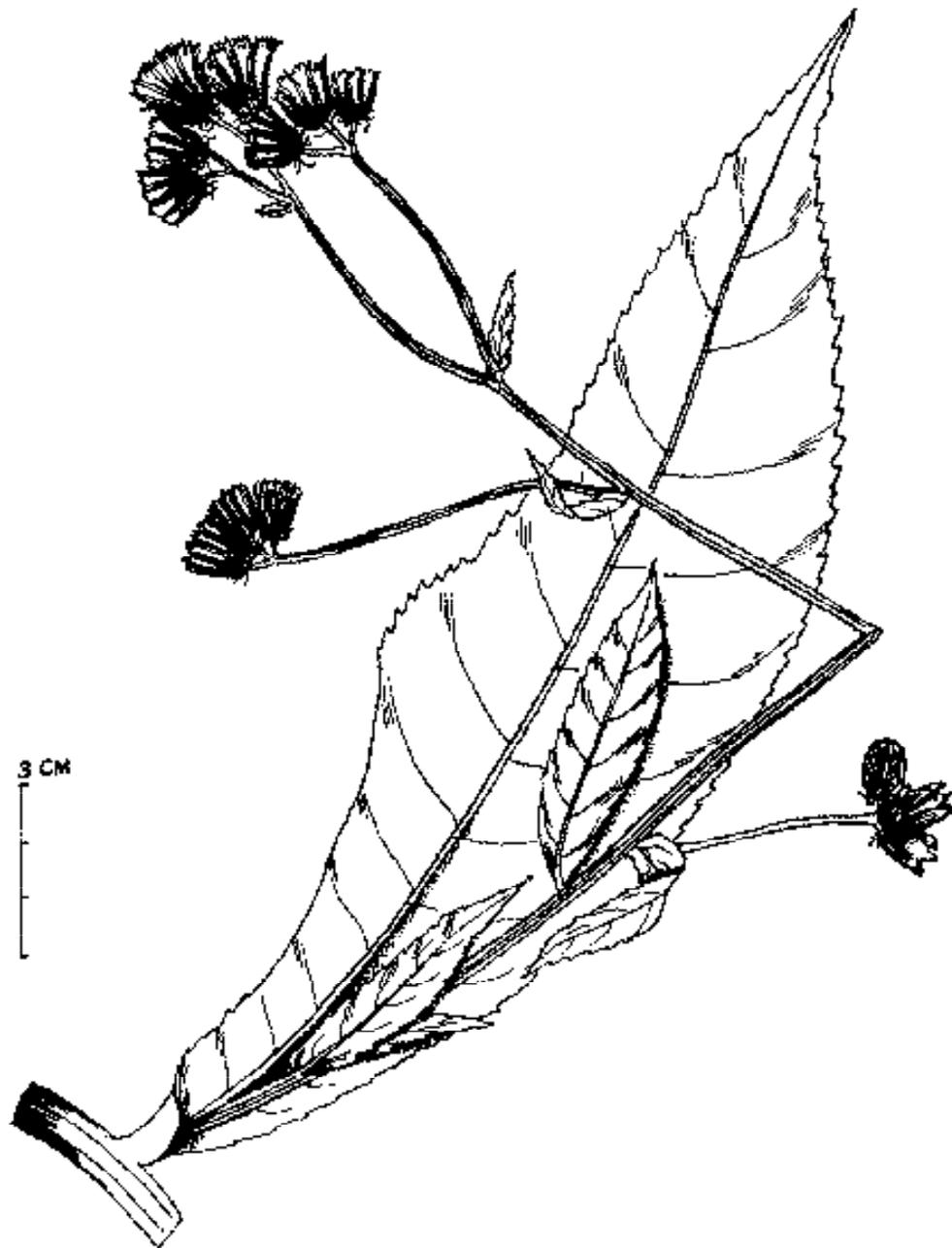


Fig. 160: *Gynura bicolor* (Roxb. ex Willd.) DC.

4. *Gynura pseudochina* (L.) DC., Prodr. 6: 299. 1838; Hook f., Fl. Brit. India 3: 334. 1881; Mathur in Hajra *et al.*, Fl. India 13: 223. 1995. *Senecio pseudochina* L., Sp. Pl. 867. 1753.

Small, glabrous or pubescent shrubs, with tuberous roots; stems finely striate, 30-90 cm high, distally corymbosely branched. Leaves subradical, oblong-elliptical, 5-18 x 2-4.5 cm, long acuminate, base angustate, margins sinuate-subpinnatifid, spinescent, pubescent on both surface. Heads 1-1.5 cm long, in terminal, corymbose panicles. Involucral bracts 1-seriate, 0.6-1.5 cm long, oblong-lanceolate, glabrous. Florets yellow. Achenes fusiform, many-ribbed, slightly villous; pappus white, multi-seriate.

Fl. & Fr.: April-October.

In moist, shady places. Lawngtlai-Kawichaw, D.K. Singh 92860. Scarce.

29. HEMISTEPTA Bunge ex C.E.C. Fischer et Mey

Hemistepta lyrata Bunge ex C.E.C. Fischer et Mey in Index Sem. Hort. Bot. Petrop. 2: 38. 1835; Hajra in Hajra *et al.*, Fl. India 12: 181. 1995. *Saussurea affinis* Spreng. ex DC., Prodr. 6: 540. 1838; Hook f., Fl. Brit. India 3: 373. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 106. 1938.

Villous or pubescent annual herbs; stems 0.3-2.5 m tall, grooved, corymbosely branched above. Leaves lyrate-pinnatifid; upper ones sinuate-lobed, sometimes entire, 10-20 cm long; radical leaves petioled; cauline sessile, may or may not be pubescent above, white tomentose below. Heads long peduncled, up to 2.5 cm across, in corymbose panicles. Involucral bracts multiseriate, glabrate; outer ovate, obtuse; inner linear-lanceolate, acuminate. Florets pale-red. Achenes obovoid, 10-ribbed, glabrous; pappus hairs slender, uniseriate, white, plumose.

Fl. & Fr.: September-February.

Blue Mountains (Phongpui), Wenger 376, 422 (*vide* C.E.C. Fischer, *l.c.*).

30. INULA L.

- 1a. Herbs; involucrel bracts narrow, outer most narrow, foliaceous ... 3. *I. nervosa*
- 1b. Shrubs or undershrubs; involucrel bracts linear-subulate, outer gradually smaller :
- 2a. Heads panicled or racemed ... 4. *I. rubricaulis*
- 2b. Heads corymbose or solitary :
- 3a. Leaves alternate; pappus dirty white ... 1. *I. cappa*
- 3b. Leaves spirally arranged; pappus pale-brown ... 2. *I. eupatorioides*

1. *Inula cappa* (Buch.-Ham. ex D. Don) DC., Prodr. 5: 469. 1836; Hook.f., Fl. Brit. India 3: 295. 1881; Deb & Dutta in J. Econ. Tax. Bot. 10: 42. 1987; Kumar in Hajra *et al.*, Fl. India 13: 13. 1995. *Conyza cappa* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 176. 1825.

Stout, woolly undershrubs or shrubs; stems 1-2.5 m tall, corymbosely branched, with very stout branches. Leaves alternate, oblong, narrowly elliptic or elliptic-lanceolate, 5-15 x 1.5-5 cm, acute-subacute, base acute or rounded, margins distantly cuspidate-serrate, upper surface pubescent with adpressed mammillate hairs, undersurface silky villous or woolly. Heads up to 1 cm across, in much branched, terminal and axillary corymbs. Involucrel bracts multi-seriate, linear-lanceolate. Florets deep yellow. Achenes minute, ribbed, silky; pappus dull white, plumose.

Fl. & Fr.: August-February.

Common along the roadsides. Aizawl-Champhai, 1500 m, *Deb* 30890; Champhai-Zote, 1650 m, *K.P. Singh & D.K. Singh* 94578.

2. *Inula eupatorioides* DC., Prodr. 5: 469. 1836; Hook.f., Fl. Brit. India 3: 295. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 105. 1938; Kumar in Hajra *et al.*, Fl. India 13: 17. 1995. **Fig. 161.**

Stout, woolly shrubs; stems up to 3 m tall, with stout, pubescent branches. Leaves spirally arranged, shortly petioled, lanceolate or elliptic-oblong, 3.5-25 x 1.2-7.5 cm, acuminate, base acute or rounded, margins irregularly dentate, scaberulous above, pubescent beneath. Heads up to 0.8 cm across, numerous in terminal or upper axillary corymbs. Involucrel bracts multiseriate, subulate, tomentose. Florets bright yellow. Achenes

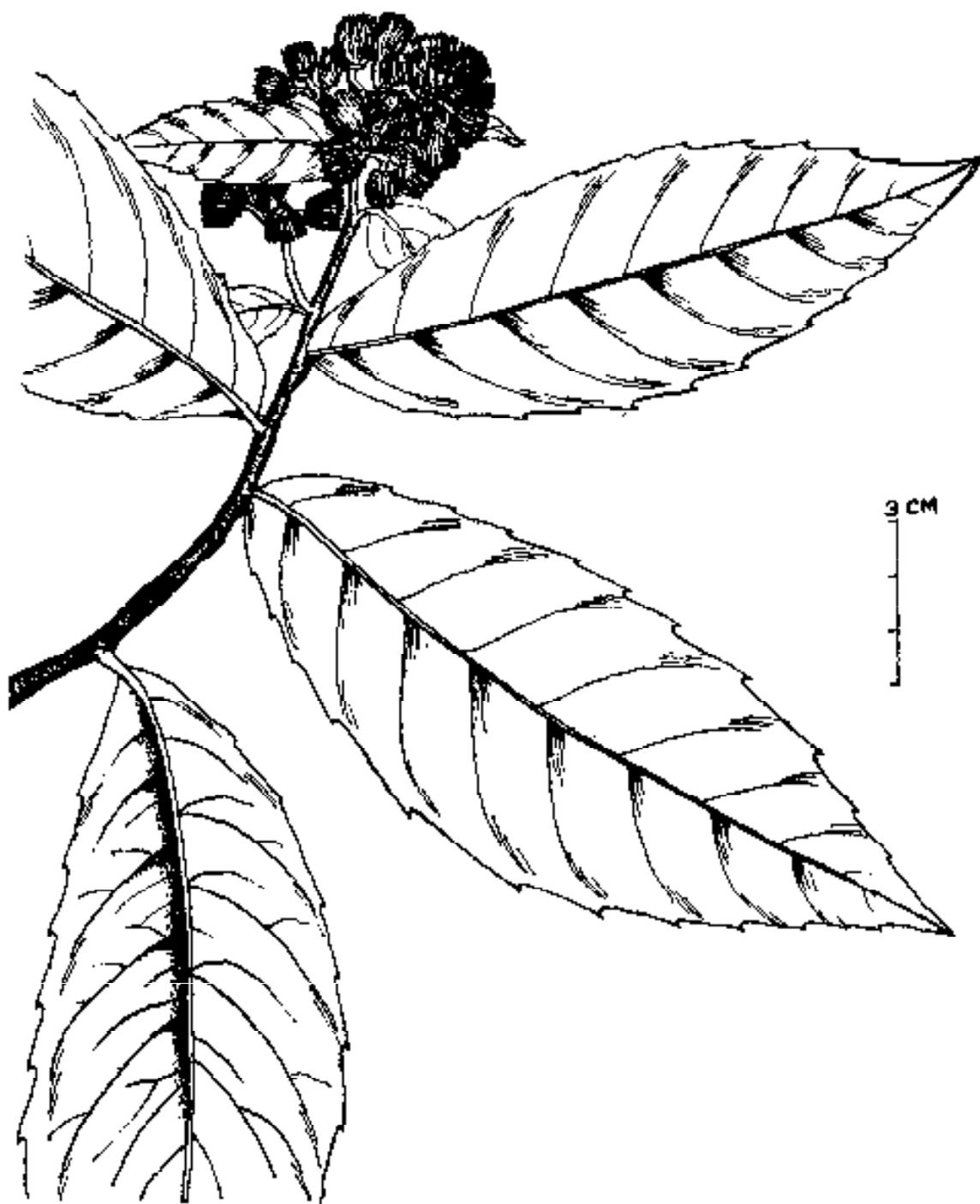


Fig. 161: *Inula eupatorioides* DC.

narrowly oblong, adpressed silky-pubescent; pappus straw yellow or reddish with brown tinge, plumose.

Fl. & Fr.: November-March.

Sialsuk, 1600 m, *Parry 427* (*vide* C.E.C. Fischer, *l.c.*); Blue mountain ca 1975 m, *Mao 107122*.

3. *Inula nervosa* Wallich ex DC., *Prodr.* 5: 471. 1836; Hook.f., *Fl. Brit. India* 3: 293. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 105. 1938; Kumar in Hajra *et al.*, *Fl. India* 13: 20. 1995. *Inula nervosa* var. *purpurascens* Hook.f., *Fl. Brit. India* 3: 293. 1881.

Perennial, pubescent-hirsute or villous and glandular herbs; stems 0.3-0.9 m high, erect, simple-branched, flexuous. Leaves sessile-subsessile, lanceolate-elliptic, 5-10 x 1.8-4 cm, acute at both ends, margins denticulate, scaberulous or scabrid above; nerves subparallel with the margins. Heads 1.8-2.5 cm across, solitary or corymbose, long peduncled. Involucral bracts linear-lanceolate, ciliate-pilose, erect or recurved; outermost foliaceous. Florets yellow. Achenes narrowly oblong, silky; pappus dull white, straw yellow or reddish.

Fl. & Fr.: October-April.

Common on grassy slopes. About 96 km South-east of Lungleh (Blue Mountains, 2100 m), *Wenger 375* (*vide* C.E.C. Fischer, *l.c.*).

4. *Inula rubricaulis* (DC.) C.B. Clarke, *Comp. Ind.* 126. 1876; Hook.f., *Fl. Brit. India* 3: 296. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 105. 1938; Kumar in Hajra *et al.*, *Fl. India* 13: 25. 1995. *Amphiraphis rubricaulis* DC., *Prodr.* 5: 343. 1836.

Glabrous shrubs; stems 0.75-2 m tall, erect, more or less striated, with long, slender, flexuous branches. Leaves sessile-subsessile, elliptic-lanceolate, 8-15 x 2.5-4 cm, acuminate, attenuate at base, margins serrate-denticulate, membranous, nerves almost parallel with the margins, glabrous, or minutely punctate. Heads up to 1.8 cm across, 3-5 together in axillary racemes. Involucral bracts green or purplish, subulate or linear-lanceolate, acuminate-aristate. Florets shining yellow. Achenes narrowly oblong, slender, silky; pappus white, hairs not thickened at tips.

Fl. & Fr.: February-May.

S.loc., Parry, s. num. (CAL).

31. LACTUCA L.

Lactuca graciliflora DC., Prodr. 7: 139. 1838; Hook.f., Fl. Brit. India 3: 406. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 105. 1938; Mangain & Rao in Hajra *et al.*, Fl. India 12: 289. 1995.

Stem, glabrous or villous, annual-biennial herbs; stems 0.45-1.5 m tall, erect, sometimes stout at base, paniculately branched above. Leaves radical and alternate, 5-10 x 3.5-6 cm; lower leaves petioled, pinnate or lyrate-pinnatifid, terminal lobes, large, triangulate-ovate or deltoid, base cordate, hastate or truncate, margins serrate; upper leaves ovate-lanceolate. Heads 3-4-flowered, narrow, 0.6-1 cm long, pendulous, in large, open panicles. Involucral bracts few-seriate, minute, oblong; inner 5-6, with dilated tips. Florets dull red. Achenes oblong-ob lanceolate, obscurely ribbed, brown; pappus dirty white, deciduous.

Fl. & Fr.: August-November.

Common on moist, shady slopes. Aizawl, 1000 m. *Parry* 407 (*vide* C.E.C. Fischer, *l.c.*).

32. LAGGERA Sch.-Bip. ex Koch

- 1a. Plants conspicuously hairy;
cauline wings entire; leaves dentate ... 1. *L. alata*
- 1b. Plants glabrous or puberulous;
cauline wings deeply dissected; leaves lyrate-pinnatifid ... 2. *L. crispata*

1. **Laggera alata** (D. Don) Sch.-Bip. ex Oliver in Trans. L. Soc. 29: 94. 1873; Hook.f., Fl. Brit. India 3: 271. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 105. 1938; Kumar in Hajra *et al.*, Fl. India 13: 148. 1995. *Erigeron alatum* D. Don, Prodr. Fl. Nepal. 171. 1825. *Buar* (Lushai).

Stout herbs; stems robust, up to 1 m high, much branched, pubescent or tomentose, with entire wings. Leaves alternate, oblong to subovate, sessile, 2.5-9 x 0.5-2 cm, more or less obtuse, base decurrent, margins

dentate, surfaces hispid or puberulous. Heads axillary, on winged peduncles or in terminal racemes, solitary or gemminate, 0.6-1.8 cm across, drooping. Involucral bracts multiseriate; outer oblong, acute, slightly pubescent; inner rigid, chartaceous, glabrous. Florets purplish. Achenes cylindrical, 10-striate, pilose; pappus white.

Fl. & Fr.: August-January.

Champhai, 1600 m, *Parry* 344; Zongling, 1300 m, *Parry* 495 (*vide* C.E.C. Fischer, *l.c.*); *s. loc.* 500-1300 m, *Wenger*. 403, 414 (*vide* C.E.C. Fischer, *l.c.*).

2. *Laggera crispata* (Vahl.) Hepper & Wood in *Kew Bull.* 38: 83. 1983; Kumar in Hajra *et al.*, *Fl. India* 13: 151. 1995. *Conyza crispata* Vahl., *Symb. Bot.* 1: 71. 1790. *Laggera pterodonta* (DC.) Sch.-Bip. *ex* Oliver in *Trans. Linn. Soc.* 29: 94. 1873; Hook.f., *Fl. Brit. India* 3: 271. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 106. 1938.

Slender, much branched, glabrous or puberulous herbs, 0.6-1.5 m tall; stems with deeply lobed or dissected wings. Leaves alternate, sessile, oblanceolate, 6-19.5 x 1-5.5 cm, lyrate-pinnatifid, base decurrent, surface glabrous or puberulous. Heads up to 2 cm across, in axillary leafy panicles. Involucral bracts multiseriate, glabrous, rigid, outer smaller, inner elongated. Florets purple-pale mauve. Achenes cylindrical, 10-costate, pilose; pappus white.

Fl. & Fr.: December-May.

About 24 km South-east of Lungleh, *Gage* 151 (CAL); Aizawl, 1150 m, *Deb* 30553.

33. LEUCOMERIS D. Don

Leucomeris decora Kurz in *J. As. Soc. Bengal* 41(2): 317. 1872; Hook.f., *Fl. Brit. India* 3: 387. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 106. 1938; Rao in Hajra *et al.*, *Fl. India* 13: 182. 1995.

Small, deciduous trees, with young shoots tomentose. Leaves alternate, elliptic-lanceolate, 10-18 x 2.5-5 cm, acuminate, base unequal, membranous, glabrous on maturity. Heads more or less sessile, densely crowded in terminal, almost round corymbs. Involucral bracts multiseriate, ovate-

lanceolate, coriaceous; inner nearly flat, woolly towards base. Florets white, up to 2.5 cm long, fragrant. Achenes oblong, densely villous; pappus reddish.

Fl. & Fr.: February-November.

In dry deciduous forests. Chakang, 1600 m, *Parry* 122 (*vide* C.E.C. Fischer, *l.c.*). Rare.

34. MICROGLOSSA DC.

Microglossa pyrifolia (Lamk.) O. Kuntze, *Rev. Gen. Pl.* 1: 353. 1891; Hajra in Hajra *et al.*, *Fl. India* 12: 133. 1995. *Conyza pyrifolia* Lamk., *Encycl.* 2: 89. 1786. *Microglossa volubilis* DC., *Prodr.* 5: 320. 1836; Hook.f., *Fl. Brit. India* 3: 257. 1881; Deb & Dutta in *J. Econ. Tax. Bot.* 10: 42. 1987.

Rambling shrubs, up to 3 m, with grooved, brown-pubescent branches. Leaves alternate, petioled, elliptic-ovate, 2-8 x 0.8-4 cm, acuminate, quite entire or obscurely serrate, glabrous above, finely pubescent beneath. Heads up to 0.8 cm across, clustered on the branches of corymbs. Involucral bracts multi-seriate, lanceolate, unequal; outer short, with scarious margins. Florets yellow-whitish. Achenes 4-angled, slightly compressed; pappus reddish, soft, fine, silky.

Fl. & Fr.: September-March.

Champhai, Deb 30915; North Vanlaiphai, Deb 31168; Aizawl-Sibutalung, G.K. Deka 39404.

35. MIKANIA Willd.

1. ***Mikania micrantha*** Kunth. in H.B.K., *Nov. Gen. Pl.* 4: 134. 1820; Deb & Dutta in *J. Econ. Tax. Bot.* 10: 42. 1987; Uniyal in Hajra *et al.*, *Fl. India* 12: 357. 1995. *Mikania scandens sensu* C.B. Clarke, *Comp. Ind.* 34. 1876, *non* Willd.; Hook.f., *Fl. Brit. India* 3: 244. 1881. *Japan Hlo* (Lakher).

Glabrous or puberulous, extensive, slender twiners. Leaves long petioled, ovate-triangular, 3-8.5 x 1-3.5 cm, acuminate, cordate-hastate at base, margins subentire-crenate, or angulate-dentate, sparsely pubescent.

Heads 4-flowered, 0.3-0.6 cm, in dense, terminal or upper axillary corymbs. Involucral bracts 4, lanceolate. Florets creamy white. Achenes truncate, blackish-brown, glabrous or glandular; pappus reddish, 1-2-seriate.

Fl. & Fr.: October-March.

Common, in open places, along forest fringe. Hauruang, *Deb* 31359; Lawngtlai-Kawlehaw, *K.P. Singh & D.K. Singh* 92846.

Uses: Locally used for curing malaria, diarrhoea and for healing wounds.

36. MYRIACTIS Less.

- 1a. Heads up to 6 mm diam.; bracts erect ... 1. *M. nepalensis*
 1b. Heads up to 10 mm diam.; bracts reflexed ... 2. *M. wallichii*

1. *Myriactis nepalensis* Less. in *Linnaea* 6: 128. t. 2. 1831; *Hook.f.*, *Fl. Brit. India* 3: 247. 1881; *Deb & Dutta* in *J. Econ. Tax. Bot.* 10: 42. 1987; *Hajra* in *Hajra et al.*, *Fl. India* 12: 134. 1995.

Erect, branched, glabrous, villous or hispid herbs, 0.25-0.6 m high. Leaves alternate, ovate-lanceolate or oblong-obovate, 2.5-8 x 0.5-3.5 cm, acute, base attenuate, margins coarsely serrate, surfaces glabrous or villous. Heads globose-subglobose, up to 1 cm across, in leafy panicles. Involucral bracts 3-5-seriate, acute, reflexed at length. Flowers yellow. Achenes umbonate, compressed; pappus absent.

Fl. & Fr.: August-November.

Thalthiang, *Dutta* 33965.

2. *Myriactis wallichii* Less. in *Linnaea* 6: 129. 1831; *Hook.f.*, *Fl. Brit. India* 3: 247. 1881. *Hajra* in *Hajra et al.*, *Fl. India* 12: 135. 1995

Erect, slender, sparsely hairy herbs, up to 40 cm high; stems ribbed. Leaves alternate, elliptic-lanceolate, 1.5-6.5 x 1-2.5 cm, acute, attenuate at base, margins unequally serrate, hispidulous on both the surfaces; petiole narrowly winged, up to 4 cm long; upper leaves sessile. Heads subglobose, up to 0.6 cm across, in terminal and axillary panicles. Involucral bracts 3-5-seriate, erect. Flowers elliptic-linear, yellow. Achenes flat, smooth; pappus absent.

Fl. & Fr. : June-August.

In open places, Phongpui ca 1970 m, Mao 107160.

37. PILOSELLOIDES (Less.) C. Jeffrey

Piloselloides hirsuta (Forssk.) C. Jeffrey in Kew Bull. 21: 218. 1967; Rao in Hajra *et al.*, Fl. India 13: 184. 1995. *Arnica hirsuta* Forssk., Fl. Aegypt. Arab. 151. 1775. *Gerbera piloselloides* (L.) Cass., Dict. Sci. Nat. 18: 461. 1820; Hook.f., Fl. Brit. India 3: 389. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 105. 1938. **Fig. 162.**

Acaulescent, annual herbs, up to 1 m with thick, silky villose rootstock. Leaves radical, short petioled, obovate-elliptic, or oblong-obovate, 5-13 x 2.5-5 cm, obtuse-emarginate, base narrowed, quite entire, glabrous or sparsely hairy above, white pubescent beneath. Heads solitary up to 3 cm, on long, ebracteate, villous scape. Involucral bracts 2-seriate, narrow-oblong, acute, cottony. Florets mauve-white. Achenes narrow-elongate, 5-gonate, scaly, with a long, slender beak; pappus reddish.

Fl. & Fr.: February-June.

In humid and shady places, and along the "side of marshy valley among tall reeds and gasses". Champhai, 1600 m, Parry 161 (*vide* C.E.C. Fischer, *l.c.*), about 70 km South-east of Lungleh, 1300 m, Wenger 442 (*vide* C.E.C. Fischer, *l.c.*); North Vanlaphai, 1600 m, D.K. Singh 93084.

38. PRENANTHES L.

Prenanthes khasiana C.B. Clarke, Comp. Ind. 273. 1876; Rao & Mangain in Hajra *et al.*, Fl. India 12: 315. 1995.

Tall, annual or biennial herbs, up to 1.2 m tall, with stout rootstock. Leaves variable, long petioled, deltoid, oblong or ovate-cordate, 7-10 x 2.5-5.5 cm; upper leaves more or less lanceolate. Heads cylindrical, up to 1.5 x 0.2 cm, drooping, in terminal panicles. Involucral bracts 2-3-seriate; outer ovate-lanceolate; inner linear-lanceolate. Florets bluish purple. Achenes oblanceolate, compressed, truncate or rounded at apex; pappus dull white or pale.

Fl. & Fr.: September-November.

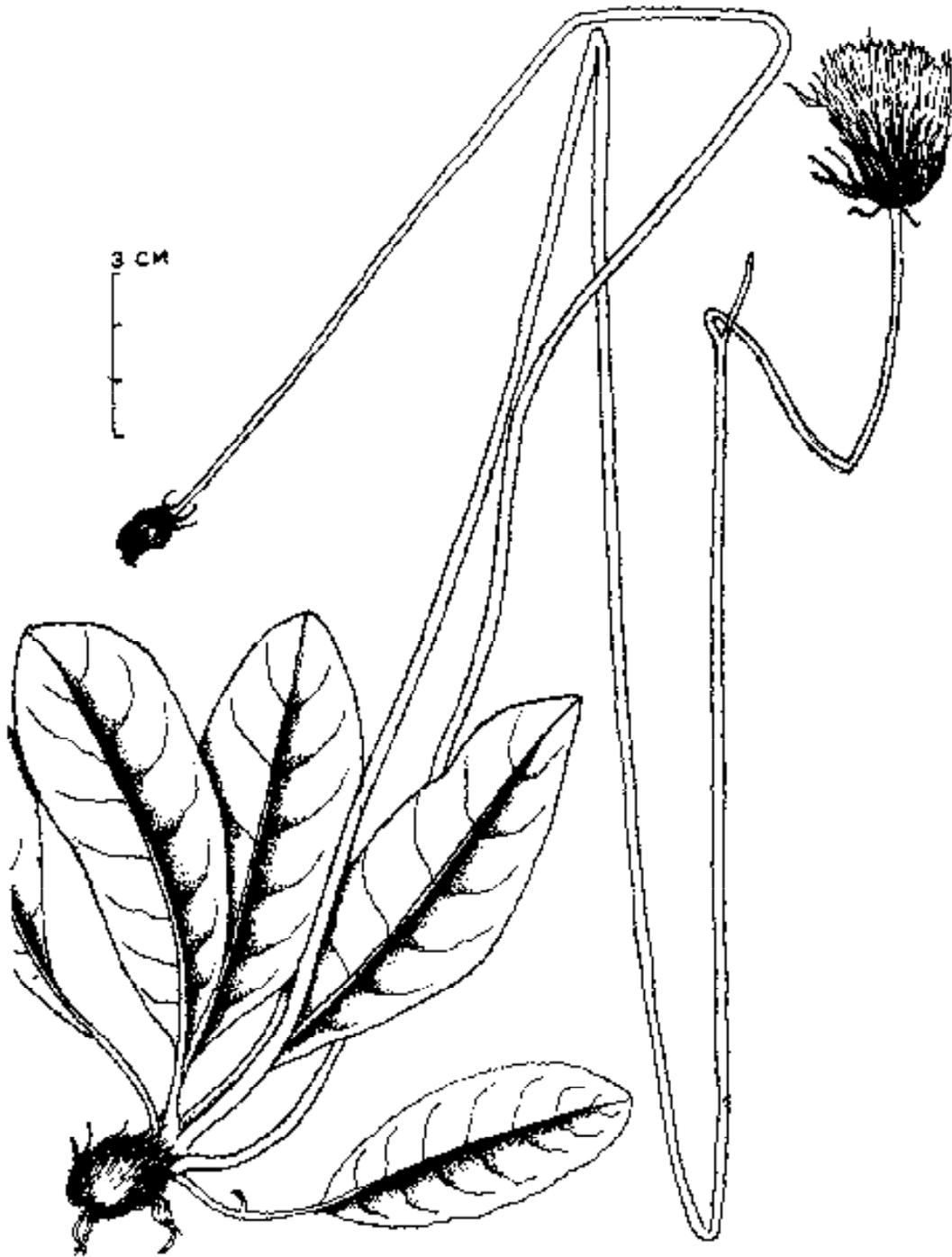


Fig. 162: *Piloselloides hirsuta* (Forssk.) C. Jeffrey

In open grasslands and forest floor. Phongphui, ca 1950, *Mao* 107156.

39. SAUSSUREA DC.

Saussurea deltoidea (DC.) Sch.-Bip. in *Linnaea* 19: 331. 1846; Hook.f., *Fl. Brit. India* 3: 374. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 106. 1938; Hajra in Hajra *et al.*, *Fl. India* 12: 197. 1995. *Aplotaxis deltoidea* DC., *Prodr.* 6: 541. 1838. **Fig. 163.**

Large herbs; stems 1-2.4 m tall, grooved, villous or tomentose, corymbosely branched towards apex. Leaves petioled, alternate, 5-45 x 2.5-25 cm; lower leaves lyrate-pinnatifid, with the terminal lobe deltoid-hastate; cauline leaves ovate-lanceolate, margins serrate-sinuate toothed, punctate-scabrid or araneose above, white tomentose beneath. Heads solitary, 1.5-4 cm across, in terminal leafy panicles. Involucral bracts multi-seriate, appressed, elliptic-lanceolate, woolly-pubescent, apices and margins purple, turning black. Florets whitish-yellow. Achenes oblong, 4-5-angled, smooth, scaly or tubercled; pappus plumose, uniseriate, dirty white.

Fl. & Fr.: November-May.

S.loc., Wenger 409 (*fide* C.E.C. Fischer, *l.c.*); Phongpui, *B.M. Wadhwa & K.P. Singh* 96844; Blue mountain, 1970 m, *Mao* 107134.

40. SENECIO L.

- 1a. Scandent undershrubs;
leaves ovate-hastate; pappus white ... 1. *S. wightianus*
- 1b. Erect herbs; leaves linear or elliptic-oblong;
pappus yellowish-reddish ... 2. *S. wightii*

1. **Senecio wightianus** DC. *ex* Wight, *Contrib. Bot. Ind.* 22. 1834; Mathur in Hajra *et al.*, *Fl. India* 13: 280. 1995. *S. scandens* Buch.-Ham. *ex* D. Don, *Prodr. Fl. Nepal.* 178. 1825; Hook.f., *Fl. Brit. India* 3: 352. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 106. 1938.

Gregarious climbers, 1.5-5 m, with pubescent young parts. Leaves ovate-hastate or sometimes lanceolate, 3-11 x 1.5-4 cm, acuminate, base acute or obtuse, margins crenate-dentate, surface sparsely villous; petiole auricled. Heads more or less oblong, up to 1.2 cm, in lax, divaricate, axillary corymbs. Involucral bracts 10-12, linear oblong, acute. Florets yellow.



Fig. 163: *Saussurea deltoidea* (DC.) Sch.-Bip.

Achenes 4-angled or ribbed, outer ribs compressed, curved, hairy or glabrous; pappus white.

Fl. & Fr.: October - May.

Common, in degraded forests, climbing over bushes. *S. loc.*, 1200-1500 m, *Wenger 424* (*vide* C.E.C. Fischer, *l.c.*); Phongpui, 2100 m, *B.M. Wadhwa & K.P. Singh 96805*; Mualpheng, ca 500 m, *M. Sawmliana 101737*.

2. *Senecio wightii* (DC.) Benth. & Hook.f., *Gen. Pl.* 2: 248. 1873; Mathur in Hajra *et al.*, *Fl. India* 13: 283. 1995. *Doronicum wightii* DC. in Wight, *Contrib. Bot. Ind.* 23. 1834. *Senecio saxatilis* Wallich *ex* Hook.f., *Fl. Brit. India* 3: 344. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 106. 1938.

Glabrous or minutely villous, weak perennial herbs; stems erect, 20-60 cm high, laxly corymbosely branched above. Leaves sessile, with auricled base, linear-oblong or elliptic-oblong, 8-15 x 0.5-1.2 cm, acute-acuminate, margins serrate. Heads up to 2 cm across, in lax, terminal, paniculate corymbs. Involucral bracts 12-16, oblong-lanceolate, acute. Florets yellow. Achenes elongate-oblong, striated, glabrous; pappus reddish.

Fl. & Fr.: September-March.

Common in marshy places. Champhai, 1600 m, *Parry 342* (*vide* C.E.C. Fischer, *l.c.*); Champhai-Zote, 1650 m, *K.P. Singh & D.K. Singh 94581*.

41. SIEGESBECKIA L.

Siegesbeckia orientalis L., *Sp. Pl.* 900. 1753; Hook.f., *Fl. Brit. India* 3: 304. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12. 106. 1938; Chowdhery in Hajra *et al.*, *Fl. India* 12: 407. 1995.

Large, erect, coarse, annual herbs; stems up to 1.5 m tall, branched, glandular-pubescent. Leaves opposite, ovate-elliptic or triangular, 2.5-12 x 0.5-3.5 cm, acute-acuminate, base cuneate, decurrent, margins crenate-irregularly dentate. Heads small, peduncled, in leafy corymbose panicles. Involucral bracts 2-seriate; outer 5, spatulate, viscid-glandular; inner 6, naviculate. Florets yellow. Achenes oblong-ovoid, glabrous, not compressed, often incurved, obtuse; pappus absent.

Fl. & Fr.: September-April.

Common in exposed places. About 24 km South-east of Lungleh, Gage 162 (CAL); Champhai, 1600 m, *K.P.Singh & D.K. Singh* 94512.

42. SONCHUS L.

Sonchus wightianus DC., Prodr. 7: 187. 1838. subsp. *wightianus*; Mangain & Rao in Hajra *et al.*, Fl. India 12: 322. 1995. *S. arvensis* auct. non L.; Hook.f., Fl. Brit. India 3: 414. 1881, p.p.; C.E.C. Fischer in Rec. Bot. Surv. India 12: 106. 1938. *Buar* (Lushai).

Tall, erect, milky, annual herbs, up to 2 m tall, with creeping rootstock; stems corymbosely branched, glabrous. Leaves alternate, sessile, lanceolate-runcinate, 5-18 x 0.5-3 cm, acute-spinose, base semi-amplexicaul, auricled-cordate, margins spinous-toothed, glabrous on both the surfaces. Heads solitary, 1-1.7 cm long, in terminal racemed or corymbose panicles. Involucral bracts multi-seriate; outer small, oblong-subulate. Florets yellow. Achenes narrow, slightly compressed, ribs transversely muricate; pappus hairs white, multi-seriate.

Fl. & Fr.: February-June.

Common on moist and shady slopes, often on rocks under constantly dripping water. *S. loc.*, Wenger 446 (*vide* C.E.C. Fischer, *l.c.*); North Vanlaiphai, 1600 m, *D.K. Singh* 93051; Kawnpui, 750 m, *D.K. Singh* 93275; Tilthlang, *B.M. Wadhwa & K.P. Singh* 96648.

43. SPILANTHES Jacq.

- | | |
|---------------------------------------------|-----------------------------|
| 1a. Pappus absent | ... 1. <i>S. calva</i> |
| 1b. Pappus present | |
| 2a. Leaves ovate-cordate; heads solitary | ... 2. <i>S. oleracea</i> |
| 2b. Leaves ovate-elliptic; heads paniculate | ... 3. <i>S. paniculate</i> |

1. *Spilanthes calva* DC. in Wight, Contrib. Bot. Ind. 19. 1834; Chowdhery in Hajra *et al.*, Fl. India 12: 419. 1995. *S. acmella* var. *calva* (DC.) C.B. Clarke, Comp. Ind. 138. 1876. *S. acmella sensu* Hook.f., Fl. Brit. India 3: 307. 1881, non L. Flg. 164.

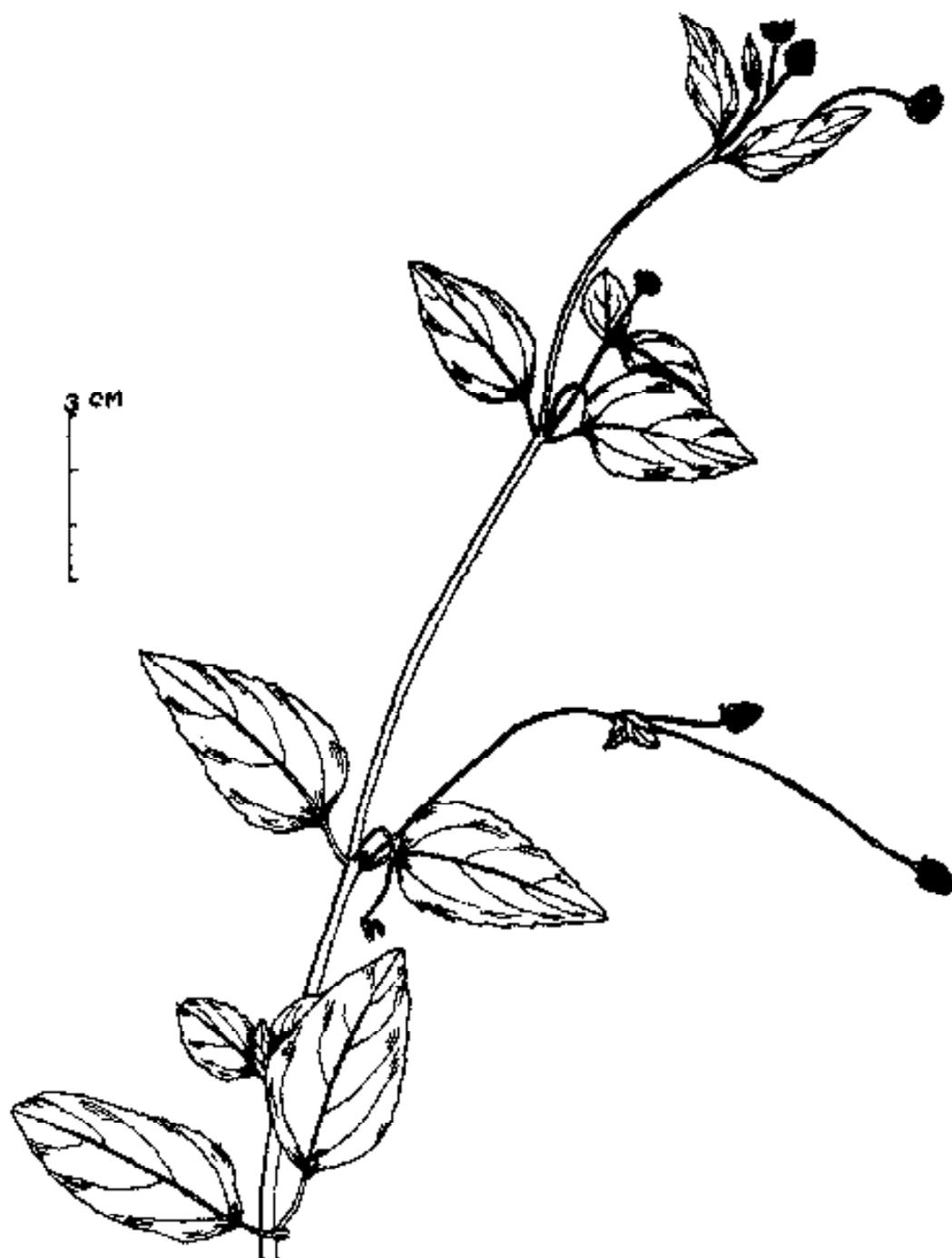


Fig. 164: *Spilanthes calva* DC.

Erect or ascending herbs; stems sparsely pubescent, up to 45 cm high. Leaves ovate-lanceolate, 2.5-8 x 1-3 cm, acute or obtuse, margins crenate-serrate or entire; petioles up to 2 cm long. Heads subsolitary, globose, or subglobose, up to 8 x 10 cm. Involucral bracts uniseriate, sparsely pubescent. Florets yellow or whitish. Achenes more or less smooth, dark brown; pappus absent.

Fl. & Fr.: September-April.

Common in open, moist places. Kiefang, *M. Sawmliana* 95583; Hnathial, 750 m, *Mao* 107028.

2. *Spilanthus oleracea* L., *Syst. Nat.* ed. 12, 2: 534. 1767; Chowdhery in Hajra *et al.*, *Fl. India* 12: 410. 1995. *Spilanthus acmella* var. *oleracea* C.B. Clarke, *Comp. Ind.* 138. 1876; Hook.f., *Fl. Brit. India* 3: 307. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 106. 1938. *Ansate, Angkhasa* (Lushai). Fig. 165.

Annual herbs up to 40 cm high; stems erect, branched, more or less succulent. Leaves opposite, petioled, ovate-lanceolate or ovate-cordate, 2-5 x 0.8-3 cm, acute-obtuse, base cuneate-truncate, margins crenate-serrate or more or less entire, glabrous. Heads solitary, ovate-triangular, 0.4-1.2 cm long, axillary or terminal. Involucral bracts 2-seriate, ovate-elliptic, margins dentate. Florets mustard yellow. Achenes triquetrous, compressed, margined; pappus with 1-2 bristles.

Fl. & Fr.: February-October.

Common in moist places. Sherkor, 1250 m, *Parry* 585 (*vide* C.E.C. Fischer, *l.c.*); Bilkawthlir-Kolasib, 550 m, *D.K. Singh* 93108; Phairuang, *K.P. Singh* 94213; Hnathial, *K.P. Singh* 96923.

Uses: Leaves eaten as vegetable, and also used as feed for pigs.

3. *Spilanthus paniculata* Wallich *ex* DC., *Prodr.* 5: 625. 1836; Chowdhery in Hajra *et al.*, *Fl. India* 12: 410. 1995. *Spilanthus acmella* var. *paniculata* (DC.) C.B. Clarke, *Comp. Ind.* 139. 1876; Hook.f. *Fl. Brit. India* 3: 307. 1881. *Artukhawn* (Lushai).

Small, annual herbs, up to 60 cm high, rooting at basal nodes. Leaves opposite, ovate or ovate-elliptic, 1.5-6 x 0.3-2.5 cm, acute, base narrowed,

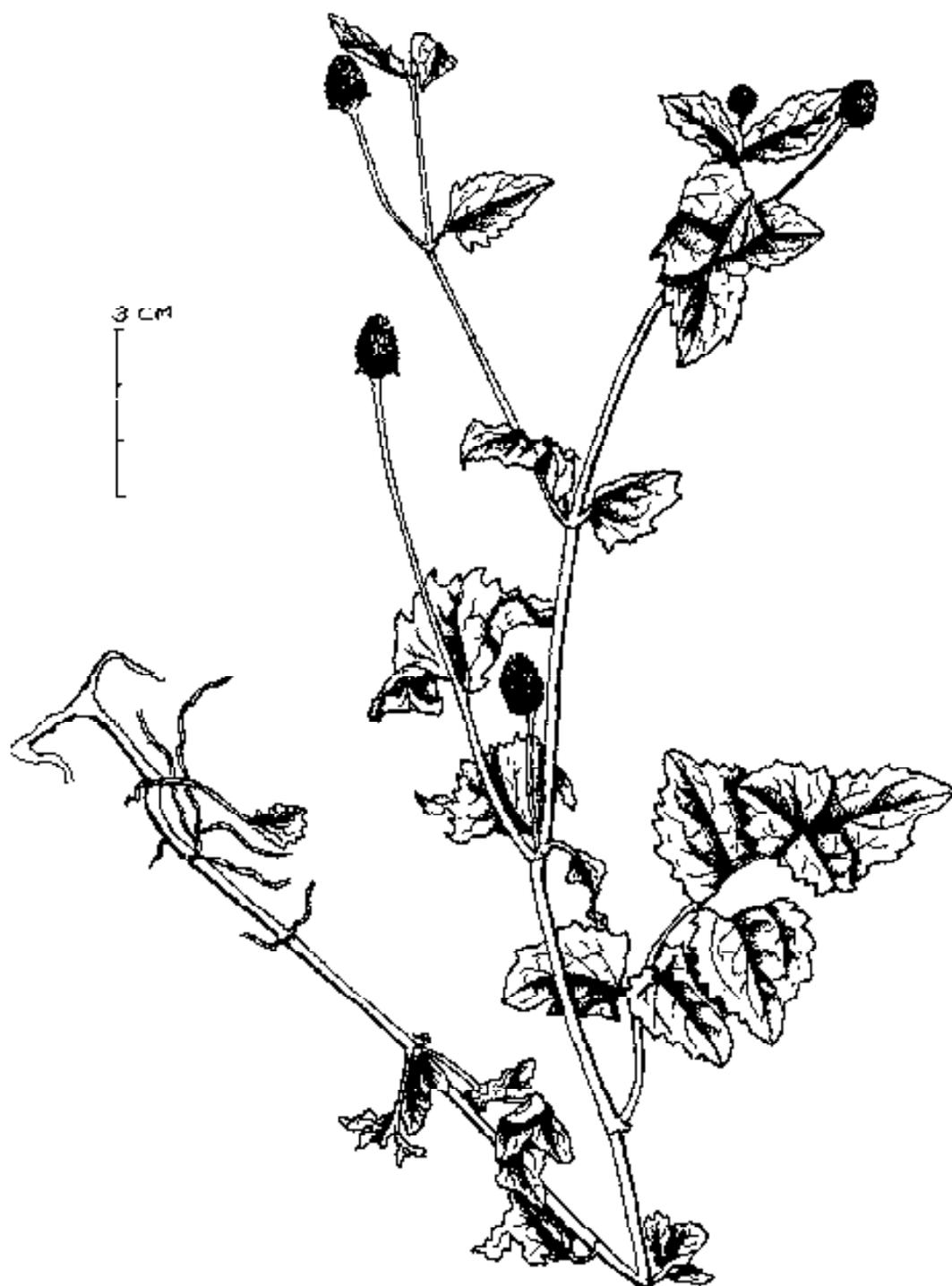


Fig. 165: *Spilanthes oleracea* L.

margins crenate-serrate, glabrous. Heads up to 0.8 cm across, conico-ovate, in axillary or terminal, leafy panicles; peduncles 2-12 cm long. Involucral bracts 2-seriate, up to 12, oblong-elliptic, obtuse-truncate. Florets yellow. Achenes verrucose, glabrous, strongly margined; pappus comprising 1-2 bristles.

Fl. & Fr.: March-December.

Common in moist places along roadsides. Kawlchaw, *D.K. Singh* 92831; Thenzawl, *K.P. Singh* 93851; Lungshun, *K.P. Singh* 97100; Kiefang, *M. Sawmliana* 99281.

Uses: Stem and leaves used as vegetable.

44. SYNEDRELLA Gaertner, *nom. cons.*

Synedrella nodiflora (L.) Gaertner, *Fruct. Sem.* 2: 456. t. 171. f. 7. 1791; *Hook.f.*, *Fl. Brit. India* 3: 308. 1881; Chowdhery in *Hajra et al.*, *Fl. India* 12: 413. 1995. *Verbesina nodiflora* L., *Cent. Pl.* 1: 28. 1755.

Erect, dichotomously branched, pubescent herbs, 10-50 cm high; stems shallowly furrowed. Leaves opposite, petioled, ovate or elliptic, 2-8 x 0.8-2.5 cm, acute, base narrowed, margins crenate-serrate, scaberulous. Heads small, 0.8-1 cm across, solitary, axillary or in angles of bifurcation, sessile or on 0.5-4.5 cm long peduncles. Involucral bracts 2-seriate; outer foliaceous. Florets yellow. Achenes 0.4-0.5 cm, dorsally compressed, 2-winged; wings lacerated; pappus comprising 2-3, stout spines.

Fl. & Fr.: June-December.

On moist, shady ridges inside deep forests. Lungchhuan- North Vanlaiphai, 1750 m, *D.K. Singh* 97175.

45. SYNOTIS (C.B. Clarke) C. Jeffrey & Y.L. Chen

- 1a. Heads more than 12-flowered ... 1. *S. cappa*
- 1b. Heads up to 12-flowered :
 - 2a. Undershrubs; leaves elliptic or elliptic-lanceolate;
all flowers tubular ... 2. *S. lushaiensis*
 - 2b. Woody climbers; leaves elliptic or oblong-lanceolate;
all flowers ligulate ... 3. *S. triligulata*

1. **Synotis cappa** (Buch.-Ham. ex D. Don) C. Jeffrey & Y.L. Chen in Kew Bull. 39(2): 319. 1984; Mathur in Hajra *et al.*, Fl. India 13: 291. 1995. *Senecio cappa* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 179. 1825. *Senecio densiflorus* Wallich ex DC., Prodr. 6: 369. 1838; Hook.f., Fl. Brit. India 3: 355. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 106. 1938.

Undershrubs, 1-1.8 m tall; stems suffruticose, white felted. Leaves short petioled, elliptic-lanceolate or ovate, 12-25 x 2.5-8 cm, acuminate, margins doubly serrate, teeth sometimes hooked, clothed with stiff hairs above, white felted beneath. Heads campanulate, up to 0.6 cm long, many-flowered, in axillary and terminal corymbose panicles. Involucral bracts 8-12, linear-oblong, acute, whitish-grey, villous-tomentose. Florets yellow. Achenes oblong, obscurely 5-plated, glabrous; pappus white.

Fl. & Fr.: December-April.

In degraded forests. *S. loc.*, 1300 m, Wenger 421 (*vide* C.E.C. Fischer, *l.c.*).

2. **Synotis lushaiensis** (C.E.C. Fischer) C. Jeffrey & Y.L. Chen in Kew Bull. 39(2): 288. 1984; Mathur in Hajra *et al.*, Fl. India 13: 295. 1995. *Senecio lushaiensis* C.E.C. Fischer in Kew Bull. 1929: 6. 1929 & in Rec. Bot. Surv. India 12: 106. 1938.

Undershrubs; branches thin, striated, clothed with short hairs. Leaves petioled, elliptic-lanceolate or elliptic, 6-10 x 2-3 cm, acute-acuminate, margins serrated, with reddish stiff hairs along nerves. Heads 7-10-flowered, up to 0.8 cm across, in axillary, corymbose panicles, peduncles capitate. Involucral bracts 8, linear-lanceolate, subacute-obtuse. Florets bright yellow. Achenes cylindrical, 5-ribbed, glabrous; pappus white, rostrate.

Fl. & Fr.: January-February.

Phongpui, 2300 m, Parry 574 (*vide* C.E.C. Fischer, *l.c.*). Endemic.

3. **Synotis triligulata** (Buch.-Ham. ex D. Don) C. Jeffrey & Y.L. Chen in Kew Bull. 39(2): 329. 1984; Mathur in Hajra *et al.*, Fl. India 13: 301. 1995. *Senecio triligulatus* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal.

178. 1825; Hook. f., Fl. Brit. India 3: 356. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12. 106. 1938.

Glabrous, woody climbers; stems and branches long, slender, distally angulated. Leaves petioled, ovate-lanceolate or elliptic, 6-18 x 2-5.5 cm, acute-acuminate, base caudate-acuminate, margins serrated, membranous. Heads up to 0.6 cm long, few-flowered, in axillary and terminal highly branched rounded corymbs. Involucral bracts 5-8, linear-oblong, obtuse or acute, glabrous. Florets yellow. Achenes glabrous; pappus white or slightly dingy.

Fl. & Fr.: January-April.

Phongpui, 2000 m, Parry 84 (*vide* C.E.C. Fischer, *l.c.*); Sialsuk-Aizawl, Deb 30843.

46. TITHONIA Desf. ex A. Juss.

Tithonia rotundifolia (Miller) S.F. Blake in Contrib. Gray Herb. n.s. 52: 41. 1917; Deb & Dutta in J. Econ. Tax. Bot. 10: 42. 1987; Chowdhery in Hajra *et al.*, Fl. India 12: 416. 1995. *Tagetes rotundifolia* Miller, Gard. Dict. ed. 8. *Tagetes* 4. 1768. Fig. 166.

Herbs or large undershrubs, 1.5-2.5 m tall. Leaves broadly ovate-rotundate, 7-25 x 4-20 cm, acuminate, base narrowed-cuneate, margins crenate or lobed, pubescent on veins. Heads radiate, solitary, 5-8 cm across, terminal. Involucral bracts 2-seriate, ovate-oblong, acute or acuminate. Ray florets bright yellow. Disc florets dull yellow. Achenes compressed, tomentose; pappus fimbriate.

Fl. & Fr.: September-February.

Common along roadsides. Sairep, Dutta 33488; Siphir, K.P. Singh 97132.

47. VERNONIA Schreber.

1a. Plants herbaceous :

2a. Leaves sessile; heads large, up to 2.5 cm diam.;
30-50-flowered

... 8. *V. squarrosa*



Fig. 166: *Tithonia rotundifolia* (Miller) S.F. Blake

- 2b. Leaves petioled; heads smaller,
up to 1.2 cm diam., up to 20-flowered only
- 3a. Plants pubescent; leaves lanceolate or spatulate;
heads 18-20-flowered; achenes terete;
pappus white or dull white ... 2. *V. cinerea*
- 3b. Plants puberulous or scabrid; leaves elliptic or
obovate; heads 6-12-flowered; achenes glandular;
pappus white or red ... 6. *V. saligna*
- 1b. Plants undershrubs, shrubs or trees:
- 4a. Climbers ... 10. *V. vagans*
- 4b. Erect shrubs or small trees:
- 5a. Plants completely glabrous ... 1. *V. blanda*
- 5b. Plants tomentose-pubescent :
- 6a. Small trees ... 11. *V. volkamerifolia*
- 6b. Undershrubs or shrubs :
- 7a. Stem stout, pubescent-tomentose,
corymbosely branched above :
- 8a. Leaves petioled, scabrid above,
villous-subtomentose below;
heads 3-8-flowered; involucre bracts
few-seriate, small; flowers pale-blue;
achenes glandular-pilose ... 3. *V. divergens*
- 8b. Leaves subsessile, glabrous above, pubescent
along nerve beneath; heads 30-50-flowered;
involucre bracts multi-seriate, foliaceous;
flowers purple; achenes densely, silky ... 9. *V. subsessilis*
- 7b. Stems slender, simple or sparingly branched from below :
- 9a. Stem grooved; leaves elliptic-falcate;
pappus hairs barbellate ... 5. *V. parryae*
- 9b. Stems terete; leaves oblong or elliptic-lanceolate;
pappus hairs simple :
- 10a. Leaves puberulous on both the surfaces;
heads 8-10-flowered; achenes pilose-pubescent;
pappus red ... 4. *V. extensa*
- 10b. Leaves scabrid above, villous-pubescent beneath;
heads 35-flowered; achenes glabrous or glandular;
pappus white or dull white ... 7. *V. siphietensis*

1. **Vernonia blanda** DC., Prodr. 5: 32. 1836; Hook.f., Fl. Brit. India 3: 241. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 106. 1938; Uniyal in Hajra *et al.*, Fl. India 13: 361. 1995. **Fig. 167.**

Rambling, scandent shrubs, with glabrous, slender branches. Leaves petioled, alternate, elliptic or ovate-lanceolate, 4.5-12 x 1-4.5 cm, acuminate, margins entire, acuminate-acute at base, surface glabrous. Heads up to 25-flowered, oblong, 0.5-1 cm, in terminal, elongated, branched panicles. Involucral bracts multi-seriate, imbricate, linear-oblong, acute, puberulous outside. Florets purple or dull yellow. Achenes pubescent, 10-ribbed; pappus red.

Fl. & Fr.: December-March.

Darzo, 1600 m, Parry 585 (*vide* C.E.C. Fischer, *l.c.*); Jungle Valley forest, Lungleh, 1000 m; Gage 13 (CAL); Theiriol, Deb 31287.

2. **Vernonia cinerea** (L.) Less. in Linnaea 4: 291. 1829; Hook.f., Fl. Brit. India 3: 233. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 106. 1938; Uniyal in Hajra *et al.*, Fl. India 13: 367. 1995. *Conyza cinerea* L., Sp. Pl. 862. 1753.

Erect, perennial, pubescent herbs, 0.15-1 m high; stems slender, grooved. Leaves petioled, alternate, elliptic-lanceolate or spatulate, 2-7 x 0.5-1.2 cm, acute or obtuse, margins subdentate, membranous or somewhat coriaceous. Heads 18-20-flowered, up to 8 cm across, in loose, terminal corymbs. Involucral bracts 4-seriate, linear-lanceolate, acuminate, with bristly apices. Florets pink-purple. Achenes terete; pappus white or dull-white.

Fl. & Fr.: February-December.

Common along roadsides. *S. loc.*, 800-1300 m, Wenger 417 (CAL); *s. loc.*, Lorrain *s. num.* (*vide* C.E.C. Fischer, *l.c.*); Lushai Hills, Dutta 34010 (CAL), 33877.

3. **Vernonia divergens** (Roxb.) Edgew. in J. As. Soc. Bengal 21: 172. 1853; Hook.f., Fl. Brit. India 3: 234. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 106. 1938; Uniyal in Hajra *et al.*, Fl. India 13: 370. 1995. *Eupatorium divergens* Roxb., Fl. Ind. 3: 414. 1832.



Fig. 167: Vernonia blanda DC.

Stout, pubescent-tomentose or scabrid shrubs or undershrubs; stems erect, 1-1.5 m tall, corymbosely branched above. Leaves petioled, highly variable, ovate, elliptic-lanceolate or rhomboid, 3.5-13 x 2-10 cm, acute, cuneate at base, margins serrate, scabrid above, villous, pubescent or subtomentose below. Heads 3-8-flowered, up to 0.6 cm across, in dense, much branched, corymbose panicles. Involucral bracts few-seriate, small, oblong-ovate, slightly pubescent, tips greenish. Florets pale-blue. Achenes 10-ribbed, glandular-pilose or glabrous; pappus red or brownish, with scabrid hairs.

Fl. & Fr.: November-February.

Lushai Hills, *Parry, s. num.* (CAL).

4. *Vernonia extensa* DC., *Prodr.* 5: 33, 1836; Hook.f., *Fl. Brit. India* 3: 238, 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 106, 1938; Uniyal in Hajra *et al.*, *Fl. India* 13: 370, 1995.

Erect, pubescent shrubs or undershrubs; stems 1.5-2.5 m tall, sparingly branched from below. Leaves short petioled, oblong-lanceolate, 12-25 x 5-7.5 cm, acuminate, attenuate at base, margins serrate, puberulous on both the surface. Heads larger, oblong, up to 1.5 cm, 8-10-flowered, in terminal, loosely corymbose panicles. Involucral bracts few, linear-oblong, obtuse, glabrous. Florets bright mauve. Achenes 10-ribbed, pilose-pubescent; pappus reddish, with outer setae smaller.

Fl. & Fr.: December-March.

In degraded forests. Phongpui, 2000 m, *Parry 556* (*vide* C.E.C. Fischer, *l.c.*); Lushai Hills, *Parry S. num.* (CAL); *s. loc.*, 1000-1300 m *Wenger 416* (*vide* C.E.C. Fischer, *l.c.*).

5. *Vernonia parryae* C.E.C. Fischer in *Kew Bull.* 1929: 6, 1929 & in *Rec. Bot. Surv. India* 12: 106, 1938; Uniyal in Hajra *et al.*, *Fl. India* 13: 367, 1995.

Undershrubs, with thin, sulcate, fulvous pubescent branches. Leaves short petioled, linear-elliptic, or sometimes falcate, 8-20 x 1.5-3 cm, acuminate, narrowed at base, margins minutely dentate. Heads 20-flowered, up to 12 cm across, in axillary corymbs. Involucral bracts

numerous, with scarious margins. Florets mauve-purple. Achenes thin, ribbed, with white hairs; pappus white, barbellate.

Fl. & Fr.: January.

Vombuk, 1600 m, *Parry 507* (*vide* C.E.C. Fischer, *l.c.*). Endemic, rare.

6. ***Vernonia saligna*** DC., *Prodr.* 5: 33, 1836; *Hook.f.*, *Fl. Brit. India* 3: 235, 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 107, 1938; Uniyal in Hajra *et al.*, *Fl. India* 13: 383, 1995.

Coarse, variable, suffrutescent herbs; stems 0.5-2.5 m tall, striate, puberulous or pubescent, corymbosely branched above. Leaves short petioled, elliptic-oblong or obovate, 7-15 x 1.2-6.5 cm, acute-acuminate, acute or cuneate at base, margins coarsely serrate, more or less glabrous above, puberulous or pubescent, glandular-punctate beneath. Heads 6-12-flowered, 0.5-1.2 cm across, in terminal, rounded corymbs. Involucral bracts purple, few-seriate, oblong, acute-acuminate, with scarious margins. Florets mauve-purple. Achenes 10-ribbed, glandular in between the ribs; pappus white or red, outer slightly setose, deciduous.

Fl. & Fr.: December-March.

S. loc., 900-1200 m, *Wenger 304* (*vide* C.E.C. Fischer, *l.c.*); Sialsuk-Aizawl, *Deb 30828*; Kolasib, 750 m, *D.K. Singh 93173*.

7. ***Vernonia silhetensis*** (DC.) Kerr., *Fl. Stam.* 2: 243, 1936; Uniyal in Hajra *et al.*, *Fl. India* 13: 387, 1995. *Decaneuron silhetense* DC., *Prodr.* 5: 67, 1836. *Vernonia bracteata* C.B. Clarke, *Comp. Ind.* 17, 1876; *Hook.f.*, *Fl. Brit. India* 3: 232, 1881. **Fig. 168.**

Small, rigid, sparingly branched undershrubs, 0.3-1.2 m high; branches terete or laxly striate, scaberulous. Leaves alternate, shortly petioled, elliptic-lanceolate or obovate, 3-7.5 x 1.5-2.5 cm, acute, base attenuate, margins remotely serrate, scabrid above, villous or pubescent beneath. Heads up to 35-flowered, solitary or few in terminal corymbs, 1.5-2 cm across. Involucral bracts multi-seriate, oblong-elliptic, aristate-acute. Florets deep purple. Achenes glandular between the ribs; pappus white or dull white.

Fl. & Fr.: May-October.

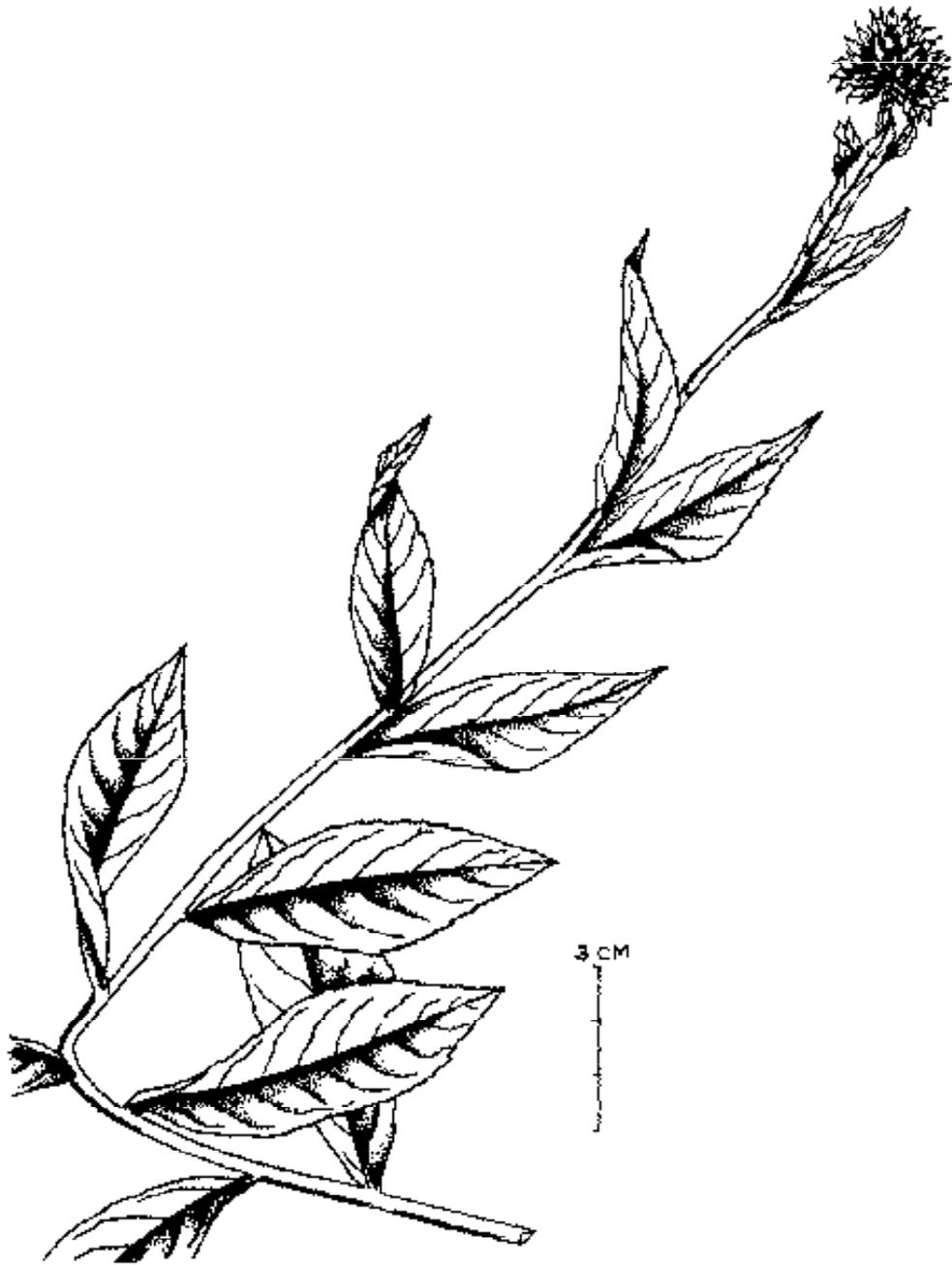


Fig. 168: *Vernonia silhetensis* (DC.) Kerr.

In open shady places. Puilobasti, *K.P. Singh & D.K. Singh* 94486.

8. *Vernonia squarrosa* (D. Don) Less. in *Linnaea* 6: 627. 1831; Uniyal in Hajra *et al.*, *Fl. India* 13: 387. 1995. *Acilepis squarrosa* D. Don, *Prodr. Fl. Nepal.* 169. 1825. *Vernonia teres* Wallich *ex* DC., *Prodr.* 5: 15. 1836; Hook.f., *Fl. Brit. India* 3: 229. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 107. 1938.

Rigid, scabrid herbs; stems 30-60 cm high, erect, simple, terete. Leaves sessile, obovate-elliptic, or oblong-lanceolate, 5-12.5 x 2.5-5 cm, acute, rounded or acute at base, margins denticulate, scabrid on both the surfaces, pubescent along the nerves beneath. Heads large, 30-50-flowered, up to 2.5 cm across, solitary and axillary, sometimes 2-3 grouped in terminal panicles. Involucral bracts multi-seriate; outer smaller, oblong, subulate-lanceolate, squarrose, sparsely pubescent. Florets purple. Achenes 10-ribbed, silky; pappus yellowish red, with short, deciduous outer hairs.

Fl. & Fr.: October-December.

Champhai, 1300 m, *Parry* 349 (*vide* C.E.C. Fischer, *l.c.*).

9. *Vernonia subsessilis* DC., *Prodr.* 5: 62. 1836; Hook.f., *Fl. Brit. India* 3: 230. 1881; C.E.C. Fischer in *Rec. Bot. Surv. India* 12: 107. 1938; Uniyal in Hajra *et al.*, *Fl. India* 13: 388. 1995. *Vernonia subsessilis* DC. var. *bracteolata* Hook.f., *Fl. Brit. India* 3: 230. 1881.

Stout, pubescent-tomentose shrubs or undershrubs; stems 1-1.5 m, corymbosely branched above, leaves subsessile, obovate-lanceolate or lanceolate, 10-30 x 2.5-10 cm, acute or acuminate, cuneate or acute at base, margins serrate-dentate, glabrous above, pubescent along the nerves beneath. Heads 30-50-flowered, up to 1.8 cm across, in terminal, leafy corymbs. Involucral bracts multi-seriate, foliaceous; outer linear-subulate; inner narrow, erect, acute, acicular at apex. Florets purple. Achenes obscurely 10-ribbed, dense silky; pappus reddish, outer numerous, subpaliaceous, persistent.

Fl. & Fr.: November-March.

Zongling, 1300 m, *Parry* 493 (*vide* C.E.C. Fischer, *l.c.*).

10. *Vernonia vagans* Wallich *ex* DC., Prodr. 5: 32. 1836; Uniyal in Hajra *et al.*, Fl. India 13: 391. 1995. *Vernonia scandens* DC., Prodr. 5: 32. 1836; Hook.f., Fl. Brit. India 3: 241. 1881; C.E.C. Fischer in Rec. Bot. Surv. India 12: 107. 1938.

Rambling, woody climbers, with terete-striate, angulate, sparsely pubescent branches. Leaves petioled, elliptic-lanceolate, ovate 5-10 x 2.5-6 cm, acute, cuneate or acute at base, margins quite entire, glabrous or sparsely puberulous on both the surfaces. Heads 5-10-flowered, 0.8-1.5 cm across, in terminal, leafy panicles. Involucral bracts few-seriate, linear-lanceolate or ovate, acute, obtuse, glabrous outside, with scarious margins. Florets white. Achenes 10-ribbed, compressed, glandular-pilose or glabrous; pappus red, outer hairs few, paleaceous, deciduous.

Fl. & Fr.: December-March.

S. loc., Parry, *s. num.* (CAL).

11. *Vernonia volkameriaefolia* DC., Prodr. 5: 32. 1836; Hook.f., Fl. Brit. India 3: 240. 1881; Deb & Dutta in J. Econ. Tax. Bot. 10: 42. 1987; Uniyal in Hajra *et al.*, Fl. India 13: 393. 1995. *Thungnuan*, *Tlakazangzawh* (Lushai).

Small trees or shrubs, up to 6 m tall, with brown pubescent shoot and leaves. Leaves petioled, obovate, obovate-oblong, or oblanceolate, 10-25 x 2-10 cm, acute or acuminate, base narrowed, margins more or less entire or sinuate-dentate, glabrous or glabrescent above, tomentose-hairy beneath. Heads numerous, 3-10-flowered, 1-1.5 cm, in terminal, cymose panicles. Involucral bracts few-seriate; inner oblong-ovate, obtuse or acute, glabrous or puberulous. Florets pink or purplish. Achenes 10-ribbed, pilose-glandular; pappus filiform, white, persistent.

Fl. & Fr.: December-May.

North Lushai Hills, Godfrey 464 (CAL); Siatsuk, Deb 30741; Aizawl-Champhai, Deb 30916; Phongpui, 2100 m, B.M. Wadhwa & K.P. Singh 96801.

48. WEDELIA N.J. Jacquem

Wedelia montana var. **wallichii** (Less.) H. Koyama in Acta Phytotax. Genbot. 34: 171. 1985; Chowdhery in Hajra *et al.*, Fl. India 12: 424. 1995. *W. wallichii* Less. in Linnaea 6: 162. 1831; Hook.f., Fl. Brit. India 3: 307. 1881; Deb & Dutta in J. Econ. Tax. Bot. 10: 42. 1987.

Slender, scabrid or pubescent, procumbent or scandent, obnoxious herbs; stems (15-) 30-80 cm high, dichotomously branched. Leaves opposite, petiolate, ovate-lanceolate, 4-18 x 0.5-7.5 cm, acute, base narrow-cuneate, margins serrate, surface pubescent. Heads solitary, up to 1.2 cm across, in terminal corymbs. Involucral bracts 2-seriate; outer ovate, subacute, inner subulate, acute. Florets yellow. Achenes obovoid, compressed or more or less 3-angled, with slightly contracted apices; pappus scaly or in toothed ciliate ring.

Fl. & Fr.: April-December.

Lawngtlai, Dutta 33737; Bualpui, Dutta 33585; Thalthlang, Dutta 34003.

49. XANTHIUM L.

Xanthium indicum Koenig in Roxb., Fl. Ind. 3: 601. 1832; Chowdhery in Hajra *et al.*, Fl. India 12: 427. 1995. *Xanthium strumarium* L., Sp. Pl. 987. 1753; Hook.f. Fl. Brit. India 3: 303. 1881; Deb & Dutta in J. Econ. Tax. Bot. 10: 42. 1987. *Chabet* (Lushai); *Bawr lengera* (Chakma).

Coarse, annual herbs or undershrubs; stems hispid-strigose, slightly angulated. Leaves alternate, petioled, broadly ovate-triangulate, or cordate-orbicular, 3.5-16 x 4.5-16, acute, margins lobed and dentate, base cuneate, scabrid or hispid. Heads solitary or clustered in terminal and axillary racemes. Fruiting involucre ovoid-oblong, covered with hooked spines. Bracts 1-2-seriate, narrow. Achenes enclosed within the hardened cells of utricle; pappus absent.

Fl. & Fr.: September-May.

Common in open wastelands. Sairang, 670 m, Deb 30629; Thenzawl, K.P. Singh 93970; Tinchang, K.P. Singh 94246; Zotethlang, 1800 m, D.K. Singh 94557.

50. **YOUNGLIA** Cass.

Youngia japonica (L.) DC., Prodr. 7: 194. 1838; Deb & Dutta in J. Econ. Tax. Bot. 10: 42. 1987; Mangain & Rao in Hajra *et al.*, Fl. India 12: 329. 1995. *Prenanthes japonica* L., Mant. Pl. 107. 1767. *Crepis japonica* Benth., Fl. Hongk. 194. 1861; Hook.f., Fl. Brit. India 3: 395. 1881.

Glabrous or puberulous annual herbs, 15-75 cm high; stems hollow, simple or branched. Leaves rosulate; radical leaves obovate, 5-15 cm long, margins lyrate-runcinate, sinuate or pinnatifid, membranous, glabrous or pubescent-pilose. Flowering shoots 1-numerous from roots, 15-45 cm, corymbosely branched. Heads 0.4-0.6 cm across. Involucral bracts 2-seriate; inner 8, narrow-oblong, more or less uniseriate; outer few, small. Florets dull white-yellow. Achenes oblong, striated, reddish brown, ribs smooth; pappus white, small.

Fl. & Fr.: Throughout the year.

On shady slopes or moist sandy soils. Durze, Dutta 34070; Phongpui, B.M. Wadhwa & K.P. Singh 96813.

CULTIVATED TAXA

Hellanthus annuus L., Sp. Pl. 904. 1753.

A native of North America; extensively cultivated as an ornamental as well as for healthy edible oil.

Tagetes erecta L., Sp. Pl. 887. 1753. *Derhken* (Lushai).

A native of Mexico, widely cultivated for ornamental flowers.

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