

# FLORA OF JOWAI

VOLUME ONE

N. P. BALAKRISHNAN

BOTANICAL SURVEY OF INDIA  
KOLKATA-700035

# FLORA OF JOWAI

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And

Vicinity

MEGHALAYA

A contribution towards a detailed knowledge of the  
Flora of the Northeastern region of India

[ IN TWO VOLUMES ]

**N. P. Balakrishnan**

**VOLUME ONE**



BOTANICAL SURVEY OF INDIA  
P. O. BOTANIC GARDEN  
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## FOREWORD

The Botanical Survey of India has taken up the preparation of Flora of India. It is proposed to bring it out in several series.

The first, the national flora, has already been started and it deals with families and genera for the whole country. It is being brought out in the form of *Fascicles of Flora of India* as and when accounts of families, tribes and large genera are ready. Six fascicles have so far been published ; they deal with the families Coriariaceae, Paeoniaceae, Dilleniaceae, Simaroubaceae, Balanitaceae, Pittosporaceae and part of the families Poaceae and Orchidaceae. Several more fascicles are under printing, editing and preparation.

The second series will deal with census of plants of certain States, with notes on distribution and uses ; it will be called *State Flora Analysis*.

The third series called *District Floras* will have detailed accounts with keys and descriptions of plants of small areas such as one district or a few adjacent districts.

The present District Flora deals with a floristically very rich, but hitherto unexplored region in eastern India. The fact that the region has a unique flora, is substantiated by rich variety, endemism and interesting phytogeographical affinities.

In view of such speciality of the flora more details have been provided for the habitat, other ecological aspects and analysis of flora, and consequently this work has become little larger than the anticipated size of one District Flora. Some photographs of vegetation types have been given. Many species have been illustrated with line drawings. The flora is being presented in two volumes.

The author has preferred to present a new and rather unconventional key to the plant families of the area, based on his personal field and herbarium observations. This is a diversion from usual treatment, but it is hoped it will facilitate in the identification of plants.

This work is an adaptation from the doctoral thesis of the author and was carried out under the supervision of Dr. A. S. Rao, then Regional Botanist, Eastern Circle and now Joint Director, Botanical Survey of India, Howrah.

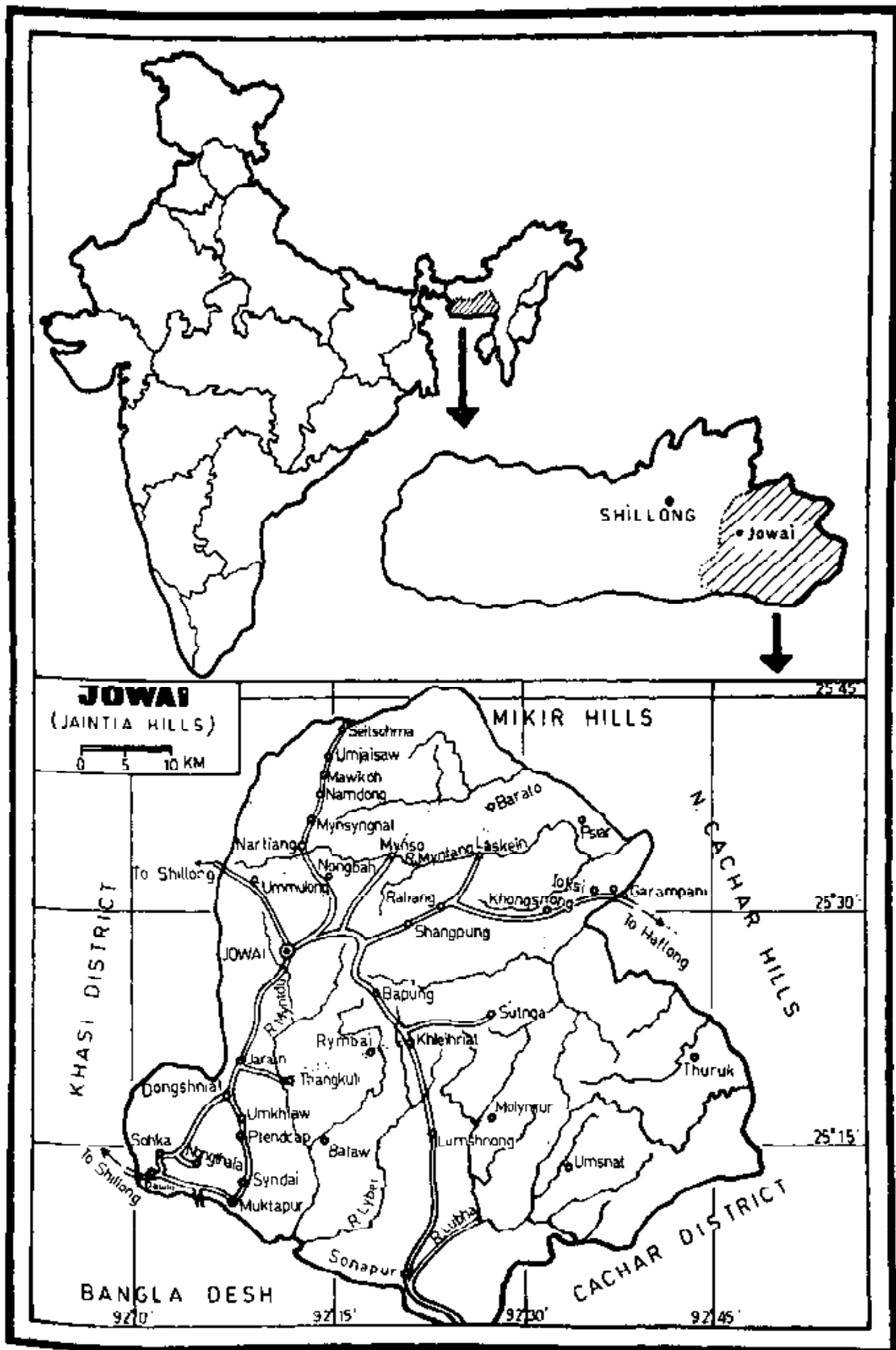
This Flora should help in the identification and study of the plants of many areas in north-eastern India.

Howrah  
February, 1981

S. K. JAIN  
Director  
Botanical Survey of India

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India, Meghalaya and Jowai district, the area of the flora



*Nepenthes khasiana* Hook. f.  
The curious insectivorous Pitcher plant



## INTRODUCTION

The North Eastern region of India, generally referred to as Assam,\* is perhaps the richest and the most interesting floristic region in the country. It still remains floristically incompletely known, though practically all other regions have attained comparatively better floristic familiarity through regional floras of their own. These regional floras, for Bengal (Prain, 1903), Bombay (Cooke, 1903-08), Upper Gangetic Plains (Duthie, 1903-29), Madras (Gamble & Fischer, 1915-36), Bihar and Orissa (Haines, 1922-25), were all inspired (and in most cases used much of the same material) by The Flora of British India (Hooker, 1872-97). This monumental work of Hooker and many of his collaborators was carried out through a span of nearly sixty years and seen through in print during a quarter of a century, with an understanding and assured Government support through all this long span of time and based on innumerable earlier collections of countless enthusiasts—botanists and others—from all corners of the vast subcontinent during a century and half.

The obvious gap of the lack of a regional flora of Assam was a challenge that was taken up by U. N. Kanjilal, who following Gustav Mann, the first Conservator of Forests of Assam, organised extensive collection of plants from far corners of Assam through the many forest officials and drafted accounts of several families, based on careful field notes, and well-prepared herbarium specimens. The Flora of Assam (Kanjilal et al. 1934-40), however, was seen through print by his son P. C. Kanjilal and others. In view of the professional interest of the different authors, this work has a strong bias towards the woody flora, and includes very little of the herbaceous elements. Further, even otherwise, it remains\* incomplete, without any treatment of the monocots, except a volume on Gramineae (Poaceae) by Bor (Vol. 5). Notwithstanding this, it connotes a landmark in the history of Indian floristic works, in being the pioneer effort of Indian botanists.

One of the earliest account of Assam is that of Buchanan-Hamilton (1820), who published a detailed description of his pioneering expedition to Assam, including some botanical information. Robinson (1841) in his descriptive account of Assam, has provided a chapter on the flora. Roxburgh

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\*Assam as referred to in earlier botanical literature, now consists of several political units. Only the Brahmaputra valley with the N. Cachar and Mikir Hills, forms the present Assam. The old Balipada Frontier and Sadiya Frontier Tracts, which were combined to one administrative unit: the North-Eastern Frontier Agency (NEFA), is now Arunachal Pradesh. The United Khasi & Jaintia Hills with Garo Hills have become Meghalaya. Mizo or Lushai Hills, is now Mizoram. Others are Nagaland, Manipur and Tripura. In view of the intermingled history of botanical exploration in the whole region, the introductory account refers to the entire North Eastern region.

(1820-24 & 1832) in his *Flora Indica*, described many plants (mostly novelties) from Assam, principally from the large Sylhet district (now in Bangladesh), from a study of live plants introduced into the East India Company's Garden at Calcutta (now the Indian Botanic Garden). While Wallich (1820 & 1820-32) presented illustrated detailed description of more Assam plants, Griffith (1848) listed a large number of plants collected in a good cross section of Assam stretching from Sylhet to the Mishmi Hills, traversing through the Khasi and Jaintia Hills and all along the Brahmaputra valley. However, the most interesting account of the flora is that of Hooker, who with Thomson spent more than half a year botanising in the Khasi and Jaintia Hills. Hooker (1854) has made several comparative observations on the flora of these hills with that of Sikkim, where he had earlier spent about 2 years collecting plants. However, his observations predominantly refer to areas in Khasi Hills and with scant consideration to the flora of Jaintia Hills (Jowai).

While the earlier trend of initial accomplishment of large floras followed by treatment for smaller areas, was, perhaps appropriate in those times, it is now clear that for a satisfactory knowledge of our plant resources, it is fitting that small areas should be comprehensively studied first, and all resulting data pooled, reviewed and summarised for the entire country as in the case of *Flora Europaea* (Tutin, et al. 1964 & 1968). Some scattered attempts for such local floras have been made in the past, for the hill resort of Simla (Collett, 1902), for South Indian Hill-tops (Fyson, 1915) and the urban areas of Madras (Mayuranathan, 1929) and Delhi (Maheshwari, 1963). Another attempt, to elucidate a long standing personal experience with plants, is that of Santapau (1953) for Khandala, a hill resort in Maharashtra State. Other attempts are that of Vartak (1966) and Chavan & Oza (1966). (A more recent work (in Meghalaya) is that of Joseph (1968), who made a detailed study of the flora of Nongpoh on the northern slopes of Khasi hills, midway between Shillong and Gauhati.) Still other efforts in the last few years have resulted in publications of Floras covering different areas (see under Literature consulted).

The present work is a contribution, prepared after detailed intensive field studies and collections in the **Jaintia Hills** to assist in the ultimate assembling of all plant inventories and vegetable wealth in a **Flora of India**. The work is called the *Flora of Jowai*, after Jowai, the eastern District of Meghalaya State in N. E. India.

#### AREA AND PHYSIOGRAPHY

THE JAINTIA HILLS subdivision or the general area of this Flora of Jowai comprises of a tract of about 2000 sq. km lying within 92°00' and 92°45' E. longitudes and 25°00' and 25°45' N. latitudes. It is bordered

in the west by Khasi Hills, in the north by Mikir Hills, in the east by Cachar Hills and in the south by the plains of Bangladesh.

The region with altitudes varying from 100 to 1800 m above sea level has a large central plateau—a continuation of the Shillong plateau of Khasi hills—extending from Mawryngkneng in the western border of the district to Raliang in the east and Nartiang-Mynso in the north to Jarain-Khleihriat in the south. Towards the east the plateau gradually descends and disappears into the N. Cachar Hills, but more gently descends in the north to finally merge with the Mikir Hills. In the south, however, the descent is rather abrupt into the plains of Bangladesh. This central plateau forming the main watershed of the region has striking landscapes with round-topped hillocks, rolling smooth grassy Downs running into dark green densely wooded valleys.

The main river in the area is the Myntdu springing in the central ridge near Jowai town and flowing southwards and becoming the Hari river of Bangladesh. The Wah Myntang river arising near Ummulong traverses the northern part of the central plateau through Nartiang and Mynso to finally join the Kopili river, a tributary of Brahmaputra. The Lubha and Kopili rivers in the east, both originate in the hills between Raliang and Sutnga. The former flows southwards through Sonapur to Bangladesh and joins the Surma river. The latter flows northwards through Garampani along the border of Jaintia and N. Cachar Hills and finally joins the Brahmaputra. The Umngot river commencing from near Ummulong flows southwards through a deep gorge on the border between Jaintia and Khasi hills and flows to Bangladesh, finally joining the Kalni river. Apart from these perennial rivers and rivulets, there are innumerable seasonal streams and streamless which swell with a surfeit of water during the rains, cascading and wildly tumbling in water falls and rapids in the rugged hill areas before quieting into sluggishly flowing streams in the plains area. These rivers and streams have rather sharp deep ravines in the southern parts, where the descent is rapid from 1500 to 100 m in about 20-30 km.

The road from Shillong to Silchar enters the Jaintia Hills between Mawryngkneng and Ummulong winding its way along the high ridge of Jowai, the principal town. The picturesque Thadlaskein lake lying beside this road between Ummulong and Jowai is a popular picnic-spot of this area. From Jowai the road to Silchar continues along the ridge eastwards and then turns southeast-wards through Khleihriat to Sonapur, the southeasternmost village of the region on the banks of Lubha river. From here after crossing a magnificent bridge, the road continues to Silchar. Another road branching off from Silchar road between Jowai and Shangpung, runs eastwards via Shangpung, Raliang, Khongsnong and Ioski to Garampani, the easternmost village on the banks of Kopili river and continues to

Haffong. The hot springs at Garampani, which give the village its name, also attract many visitors. Two jeepable roads run northwards, one to Mynso and another through Nartiang to Umjaisaw on the northern border. In Nartiang there are some remarkable ancient, gigantic monoliths or stone slabs, all placed vertically in semicircular design. These are generally raised as memorials of great events and often as monuments to great people. Hooker (1854: p. 320) has sketched these monoliths as seen during his visit in 1851, but unfortunately with the passage of time many of these have fallen leaving a solitary giant which persists, erect amidst the other fallen giants. From Jowai a jeepable road extends southwards to Jarain and from there bifurcates to Dawki and Muktapur, the two villages on the border with Bangladesh. Another jeepable road connects Khleihriat with the village Sutnga, the home of ancient Jaintia Kings. On the northern side of this road are some of the most beautiful and picturesque Downs with gently sloping hillocks rolling down to pockets of primary forests in the valleys and isolated scattered pine groves on the slopes.

#### GEOLOGY AND SOIL

JAINTIA HILLS along with the entire Meghalaya region, is the oldest part of a chain of hills forming the southern boundary of Brahmaputra valley and was once continuous with peninsular India. The theory of continental drift formulated by Wegener (1915) and later elaborated by Du Toit (1937) envisages that in the early part of the Palaeozoic, the southern continents were all joined together in one huge land mass called the 'Gondwanaland' which subsequently drifted apart until Pleistocene, to reach the position they now occupy. A large part of Meghalaya, along with peninsular India, was also part of the Gondwanaland and this has a bearing on the phytogeography of this region. Hooker (1854: p. 325) remarks: 'The geological features of the Khasia are in many respects similar to those of the Vindhya, Kymore, Behar and Rajmahal mountains, that they have been considered by some observers as an eastern prolongation of the great chain, from which they are geologically separated by the delta of Ganges and Burampooter.'

Geomorphological history of the region, summarised by Murthy (1969), shows that during early part of Palaeozoic, the eastern and southeastern parts of Meghalaya became a basin of sedimentation in which are deposited the sandstones and shales of Jaintia series. During the Permo-Carboniferous period these were uplifted and coal-bearing sediments were deposited in south and southeastern parts, where peneplanation resulted in the formation of flat, levelled surfaces. By the end of Jurassic times ( $\pm 150$  million years ago), the southern plateau experienced plateau-volcanism resulting in east-west fissures, now called the 'Dawki tear fault', along which the southern portion sunk and the northern portion rose. The sinking of the southern



**Stones at Nartiang : As Hooker saw it and sketched ( 1854 : p. 320 )**



**Stone Monuments at Nartiang : The present condition with only a solitary giant persisting (see arrow)**

[ To face page 4 ]

part resulted in the advancement of the sea and deposition of Upper Cretaceous formations till about Eocene ( $\pm 60$  million years ago). During lower Miocene ( $\pm 25$  million years ago), the continuation of sedimentation resulted in the areas being uplifted, corrugated, sheared and twisted to an extraordinary extent. During this period the Himalayas also got uplifted. The next great event was the onset of the glacial age during Pleistocene, resulting in a shifting of the preglacial flora of the Himalayas to the south and subsequently during the retreat of the ice, the migration of Malaysian flora to the north.

The rise of the Himalayas from the mediterranean Tethys seabed was an epic event in the geological history of this region. It was spread through a long period from post-Eocene to the end of Tertiary. This phenomenon of uplift is still in progress in the E. Himalayas at a very slow rate and is marked by frequent earthquakes (Mithal, 1968). Being close to E. Himalayas, Meghalaya is a seismic area and short tremors are common. However, widespread havoc was caused by the great earthquake of 12 June 1897, seriously damaging many buildings in most places in Assam. The last earthquake on 15 August 1950, though severe and keenly felt, did not do any great damage in Meghalaya.

The central portion of Meghalaya is a wedge-like obstrusive fragment trapped between Himalayan and Burmese elevatory movements and is made up largely of pre-Cambrian rocks, acutely folded and sharply dipping with an overturn fringe of Mesozoic and Tertiary sediments (Pascoe, 1950). The kernel of the plateau is an ancient mass of gneiss, much intruded by coarse granite. These are exposed in the northern slopes, but are hidden beneath Cretaceous and Tertiary deposits and the Mesozoic trap in the south (Singh, 1989).

The plateau region of Jaintia hills, extending to Mynso-Raliang-Khlehriat, is predominantly composed of metamorphic rocks of very great age and consist of thick series of quartzites and schists with intrusions of granites, dolerites and perodites and thin imbedded bands of argillites. This feature is taken by geologists as evidence to show that the core of Meghalaya is related to peninsular India and was once part of the ancient Gondwanaland, as distinct from the Himalayas and Burma. The southern and south-eastern region composed of 'Jaintia series', consists of pre-Tertiary and Tertiary rocks of limestones lying almost horizontally. Limestones and shales are more pronounced in the Kopili valley, where fossiliferous Cretaceous rocks are also common. On the northern part of the Jaintia Hills, the Cretaceous and overlying beds are nearly horizontal and form small scattered outcrops, but on the southern parts they are thicker and plunge steeply southwards below the tertiaries and into the alluvium of the Surma valley.

The erosional features produced by fluvial action are very important

in landscape-formation. During rainy season, the streams flow with high velocity producing heavy soil erosion in areas of sparse vegetation, the softer rocks wearing away, exposing the harder rocks. Generally, all over Jaintia hills the amount of loose soil is very scanty, except in places where there is dense primary vegetation and in valleys with poor drainage. In the central plateau the soils are mainly lateritic with an assortment of red and brown soils on highlands and black and yellowish soils in the valleys. The soils of the southern region, where there is heavier rainfall, are mostly sandy. In the eastern region, the soils are mainly derived from limestone, often concealed below Bengal alluvium in the river valleys. The brown and red soils derived from the laterite occur in drier zones of the northern slopes. Where the vegetation is dense, as in most of the ravines and their slopes, there is always plenty of humus on the ground, the layer often up to 15-25 cm thick, with many saprophytic fungi and moss. Where the vegetation has been cleared for cultivation on steep slopes, the soil is easily washed away, often exposing bare rocks.

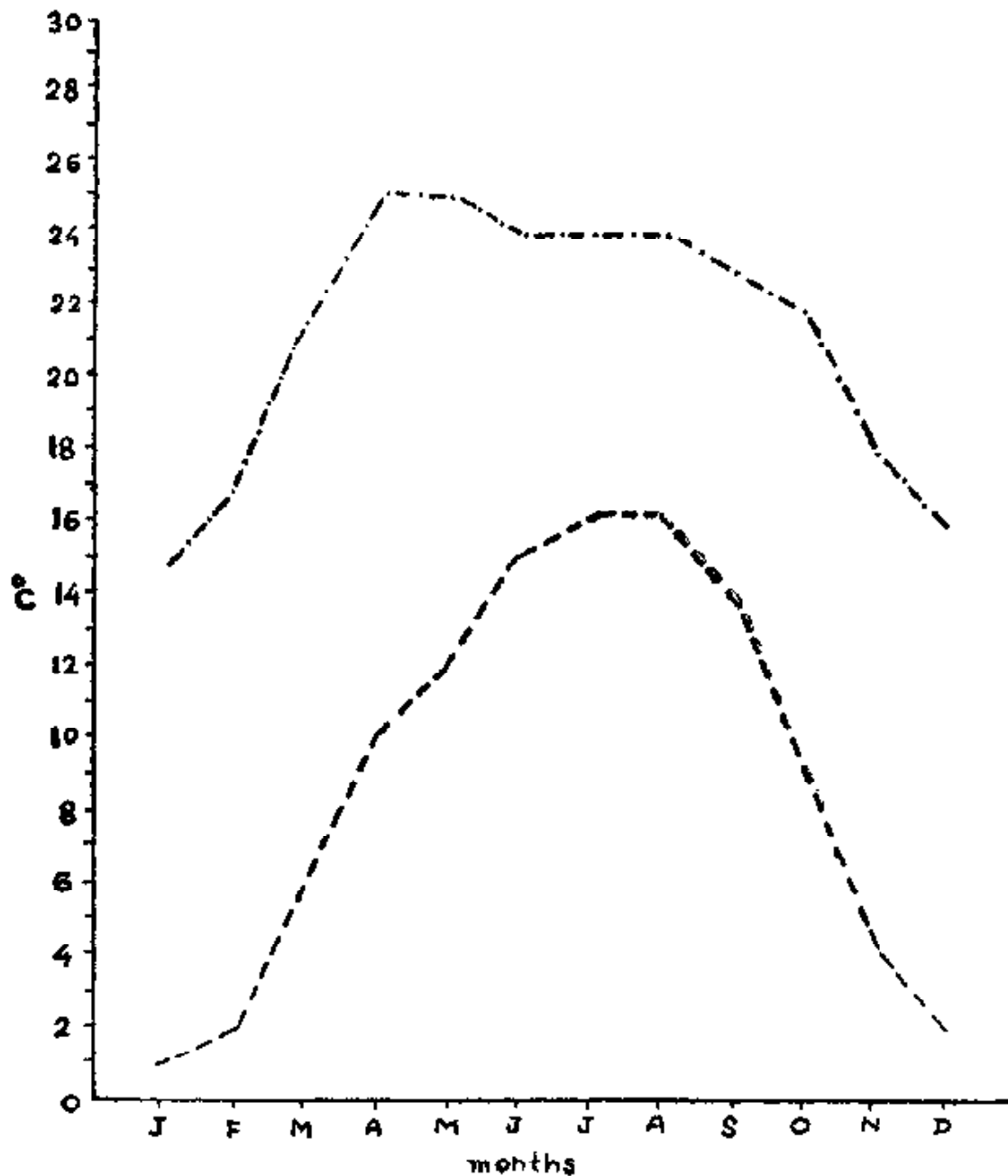
#### CLIMATE

The climate of the area is very mild, with neither too hot summer nor too cold winter, except in the foothills of southern slopes where it is somewhat hotter in summer months. Graph 1 shows average maximum and minimum monthly temperatures for a period of 5 years at Jowai town. During the deep winter in December-January, in the central plateau at altitudes above 1300 m, there is usually ground frost. At low altitudes on the southern slopes, the climate is humid and warm, showing only minor variations in temperature during the year.

Rainfall however, is the most pronounced climatic factor and is fairly distributed throughout all the months. An entirely dry month is rare, except in northern slopes, where February-March are usually dry. Graph 2 shows average monthly rainfall for a period of 5 years at 3 selected areas on the southern slopes (Jarain), the plateau region (Jowai) and the northern slopes (Nartiang).

The summer monsoon or the south-west monsoon sets in during June-July and is usually accompanied by squally winds, and dense mists. Clouds brought in during this period get intercepted by the high central ridge, resulting in heavy precipitation on the southern face of the region. The monsoon, which lasts till September, contributes nearly 75% of annual rainfall in the area. July-August are typical monsoon months experiencing the heaviest downpour, when a rainfall of as much as 150 cm is not unusual. Depressions in the Bay of Bengal, moving northwards cause most of the

GRAPH : 1

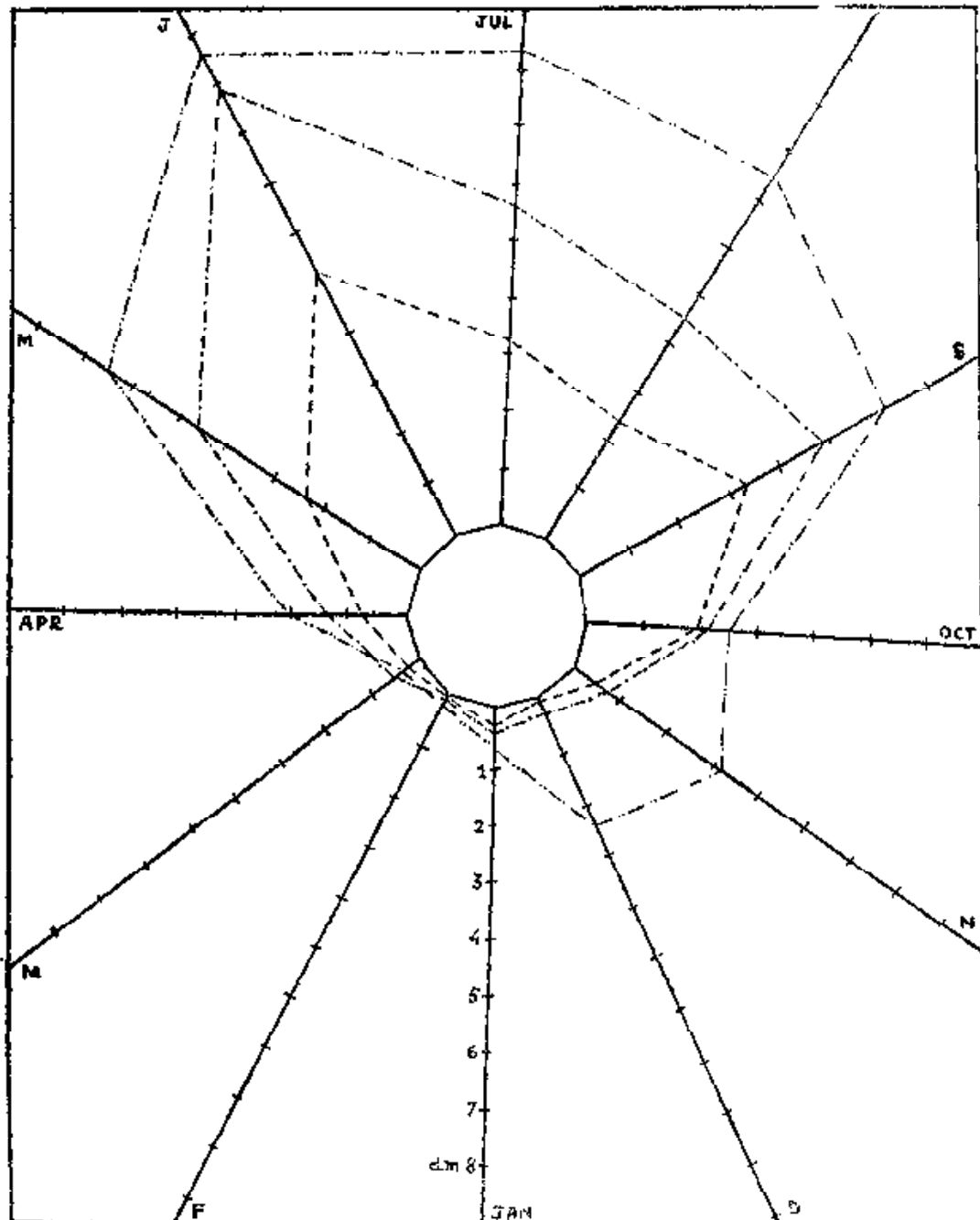


Graph 1 : Maximum (above) and Minimum (below) temperatures at Jowai (monthly average for 1965-70)

rainfall. By the autumn, the southwest monsoon is replaced by north-east monsoon and this continues till January. Depressions at the eastern end of the Himalayas moving southwards and south-westwards cause most of the precipitation in winter. During February-March, a strong southerly wind blows across the tract. April, the intermonsoon period is the hottest and driest, with very little wind-velocity. Destructive storms and cyclones are unknown.



GRAPH :2



Graph 2 : Diversity of Rainfall in Jaintia Hills (average for 1965-70). Outer polygon—Nartiang, middle—Jowai and the inner—Jarain

#### EARLY HISTORY AND COLLECTORS

THE JAINTIA HILL area has a long history of secluded and isolated development, with the people leading a contented life in the mountain fastness amidst forest lands. The people were ruled by a long dynasty of Kings (1500 A.D. onwards), whose reign came to an end in 1895 with the supremacy of the conquering British. The inhabitants are considered to

he of Mongolian origin, tracing their ancestry to a migrant race from China. The 'Jaintia' is progressively derived from T'sintaing or Tsin-tien or Zyn-tien or Synteng (Gait, 1926; Nath, 1948). In the early days the Kingdom stretched to the plains of Sylhet (now in Bangladesh) but later became confined only to the hill area, which, with the adjoining Khasi hills became the administrative unit of United Khasi and Jaintia Hills district of Assam, and quite recently with the adjacent western hill district, the Garo Hills, has become a new state of *Meghalaya* or 'clouds'-abode' in comparison with the relatively younger but mightier Himalayas or 'snow's-abode' in the north.

The Khasi and Jaintia hills have been the favourite plant-hunting grounds of a succession of botanists, horticulturists and hobbyists. Burkill (1965) has furnished full data of all these early plant collectors in the area. The earliest record is that of M. R. SMITH, who held a magisterial post in the Khasi Hills till 1819. He sent out collectors to various parts of southern Khasi and Jaintia hills exclusively for live plants, which were sent to Calcutta Botanic Garden, where Roxburgh cultivated and studied them. In 1826-30, DAVID SCOTT who was the Governor-General's Agent in N. E. India, did some plant collecting in the Khasi hills. STR FRANCIS JENKINS, who was also a Governor-General's Agent in N. E. India, made some collections in the Khasi hills during 1834-35. In 1834, he sent a twig of a *Camellia* to Wallich at Calcutta Botanic Garden, who identified it as the true tea plant, *Camellia theifera* (now *C. sinensis*). This led to the formation of the Assam Delegation, comprising of N. Wallich, W. Griffith (both surgeons, but accomplished botanists) and J. McClelland, a soil chemist, to establish the occurrence of wild tea in Assam and to explore the feasibility of its cultivation. During this expedition in 1837, both GRIFFITH and WALLICH made vigorous collections in the Khasi and Jaintia Hills and then proceeded along the Brahmaputra valley to Upper Assam. Later in 1838, Griffith again visited these hills and made extensive collections. Most of these collections are kept at Kew and Calcutta Herbaria. Subsequently Griffith (1848) published notes on his collections in his 'Itinerary'.

In 1837 J. GIBSON collecting for the Duke of Devonshire, obtained several orchids for cultivation including a new *Dendrobium*, later named *D. gibsonii*. In 1848 T. LOBB visited these hills on behalf of the famous nursery firm of Veitch & Sons, and was travelling with a whole train of heavily loaded men and mules, described by Hooker as 'Lobb's Circus' (Burkill, 1965: p. 85). Among his collections mention may be made of *Agapetes lobbii* from Jaintia Hills.

The largest collection of plants from Khasi and Jaintia hills is that of J. D. HOOKER and T. THOMSON, who spent about 7 months from May

to November 1851, in various parts of these hills. They often sent out 10-18 men daily searching for plants in deep forests. At the end of their expedition they had about 200 men's load of dry and live plants brought to Calcutta. These are mainly deposited in Kew and Calcutta Herbaria, with duplicates distributed to various herbaria in Europe and America.

In 1861, the Kew Collector, R. OLDIAM made a short visit to Khasi hills. The geologist, T. OLDIAM, the zoologist, GODWIN-AUSTEN and the physician, J. FAYER also made stray collections in the area. The pharmacist, O. F. SIMONS made a fairly large collection and among the many novelties collected by him is *Strobilanthes simonsii*.

C. B. CLARKE, a brilliant mathematician by training, switched over to the studies of Indian botany, during his career as lecturer at the Presidency College, Calcutta and later as Inspector of Schools in Assam, made long collection trips to Khasi and Jaintia Hills in 1866, 1872 and 1877. He took all his specimens to Kew but later, duplicates were returned to the Calcutta Herbarium. Sir George King, Superintendent of Calcutta Botanic Garden in 1871-1898 (also first Director of Botanical Survey of India), sent out his plant collector, G. A. GALLATLY to these hills and his collections are mainly deposited in Calcutta and Kew herbaria, with duplicates in Berlin and Manchester.

While all these collections were either for introduction of exotics into English gardens or for a general knowledge of the flora, organised efforts to make collections for a detailed knowledge of the flora of Assam was that of GUSTAV MANN, who began collecting for Brandis, during the period 1863-81, while he was Conservator of Forests in Assam. He collected extensively throughout Assam and particularly in the Khasi and Jaintia hills and most of his specimens are deposited in the Forest Herbarium of Botanical Survey of India (ASSAM), with duplicates in Kew and Calcutta. Following the footsteps of Mann, U. N. KANJILAL, during his forest service in Assam (1906-1928) made extensive collections in the Khasi and Jaintia hills. His collections include plants from all corners of the then Assam province including Sylhet. He observed and kept detailed field notes which are an invaluable contribution to the knowledge of Assam plants. This careful professional effort was nurtured and encouraged by the enlightened administrative authority of Sir Archdale Earle, who had realised the dire need for a systematic plant inventory of this floristically rich region. While still working on the manuscript, Kanjilal died on 25 October 1928, before even the first volume of his Flora of Assam came out of the press. Subsequently, his son P. C. Kanjilal, also a forest officer, was invited to continue the work. He also made large collections from

various parts of Assam. He and his colleagues, A. Das, C. Purkayastha, and R. N. De edited and continued the publication of the Flora of Assam.

In 1936, N. L. Bor, during his tenure as Botanical Forest Officer of Assam, made extensive collections in the Khasi and Jaintia hills and as a political officer, also in Aka and Naga hills. His particular interest was in grasses, leading him to write up the Gramineae for the Flora of Assam (Vol. 5). From 1937 to 1948, R. N. De, M. M. SRINIVASAN and M. L. SAIKIA, all Sylviculturists, also made substantial collections for the Forest Herbarium. Among the other staff of the Assam Forest Herbarium particularly engaged in collection of plant specimens, special mention should be made of S. R. SHARMA (1930-40) and the self-taught botanist G. K. DEKA (1930-68), who made extensive collections and added, perhaps one of the largest collection of plants from Khasi and Jaintia hills to the Forest Herbarium.

In 1956, with the reorganisation of the Botanical Survey of India, the Eastern Circle station was set up at Shillong, to which the Assam Forest Herbarium was transferred on 8 August, 1956. Since then various officers of the new set up, R. S. RAO, G. PANIGRAHI, D. B. DEB, A. S. RAO and others have periodically visited areas of Jaintia hills (as also other parts of Assam) and collected considerable material enriching the Kanjilal Herbarium of Botanical Survey of India, Eastern Circle, Shillong (ASSAM).

#### VEGETATION TYPES

Assam's vegetation and ecology is rather broadly known through the accounts of Kanjilal (1934), Champion (1936), Rowntree (1954), Puri (1960), R. S. Rao and Panigrahi (1961), Rajkhowa (1961), Legris (1963) and A. S. Rao (1968 & 1974). However, references particularly to the vegetation of the Khasi and Jaintia hills are scanty. Hooker (1954) has given picturesque word-portraits of the vegetation in these hills, but these are scattered, and laborious effort is involved in piecing together the full spread of his vegetation picture. Recently A. S. Rao (1968) has sketched a summary account of the vegetation of the Khasi and Jaintia hills, but here again the slant is towards the Khasi hills area. The present study of the Jaintia hills flora has made it possible to obtain a more intimate glimpse of the vegetation and its various forms in the Jowai district.

The classification of vegetation types, especially with regard to the tropical areas is in an unsatisfactory state, mainly due to the floristic complexity and variations in botanical composition, even within a small area. Champion's classification of vegetation types (l.c.), as also those of Puri (l.c.), are more general than specific, pertaining to the entire Indian subcontinent. Its inadequacy is felt when a small area is taken up. Rao & Panigrahi (l.c.)

classified the vegetation types of the entire N. E. India including Bihar and Orissa, on the basis of altitude and latitude. However, the data available to them were only from certain selected areas in the vast N. E. India. Rajkhowa (l.c.) made a re-evaluation of the forest types of Assam with modifications of Champion's classification, the emphasis being mainly to the plains of Assam and very little of Meghalaya. The voluminous work of Legris (l.c.) dealing with Indian vegetation contains meagre data on Meghalaya.

According to Gomez-Pompa (1967), the term '*Tropical Rain Forest*' first coined by Schimper (1903) and later used by many authors including Richards (1952), has no real meaning, as it is too broad, encompassing tropical evergreen, semievergreen as well as subtropical evergreen and semi-evergreen forests.

The classification presented here is mainly based on altitude and rainfall and includes four major vegetational zones, as given in table 1 below.

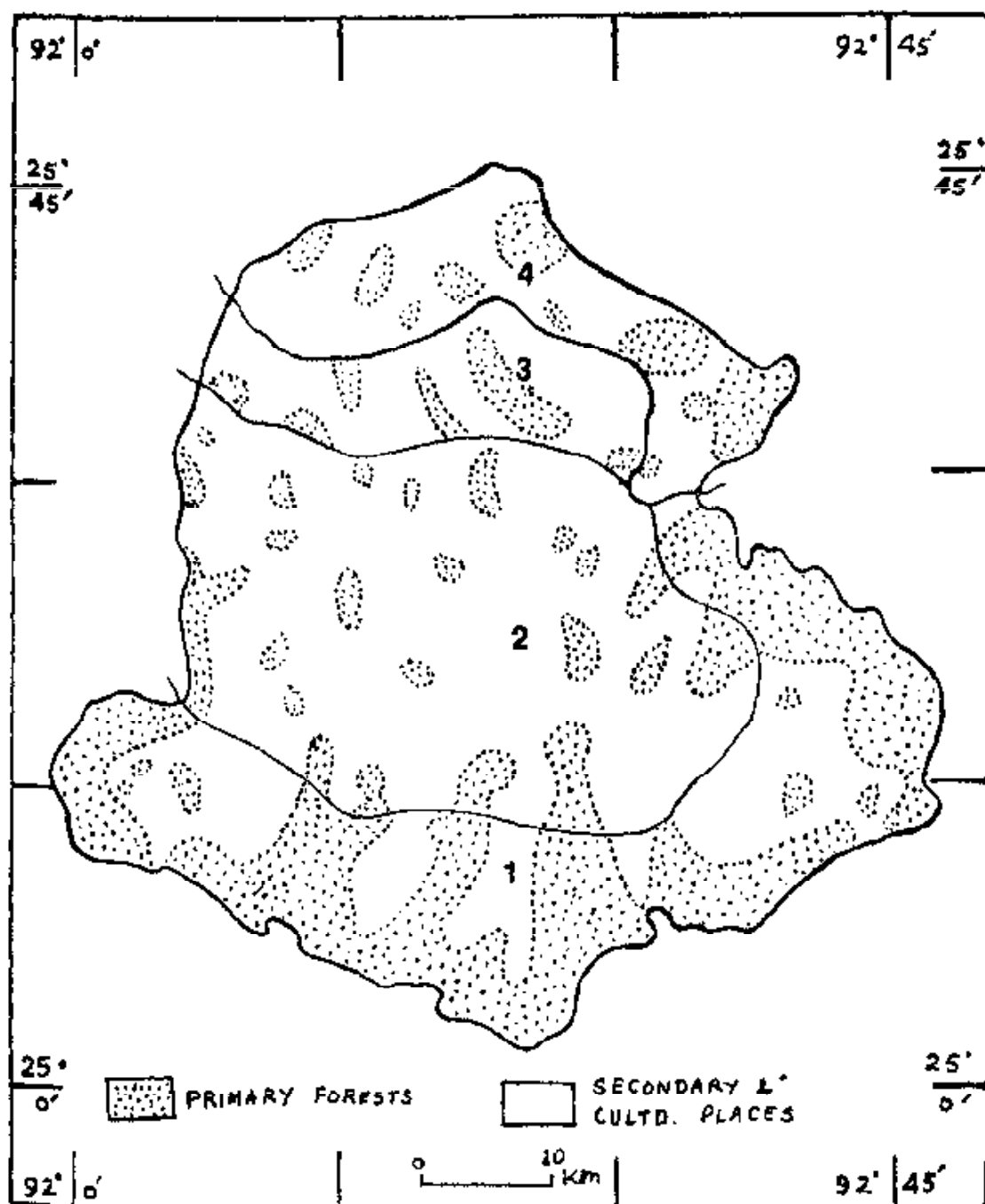
TABLE I : MAJOR VEGETATIONAL ZONES

Climatic Zone	Altitude in metres	Annual rainfall in cms	Vegetational Zones
Tropical	100-1200	300-500	Tropical Evergreen
		150-300	Tropical Semievergreen
Subtropical	1200-1800	300-500	Subtropical Evergreen
		150-300	Subtropical Semievergreen

#### A. Primary Vegetation

(1) *Tropical Evergreen Zone*: Tropical evergreen vegetation occurs in most of the southern and southeastern slopes of Jaintia hills, up to an altitude of 1200 m above sea level. This zone receives heavy rainfall of 300 to 500 cm per year and the relative humidity is usually above 80%. Winter is mild, followed by a comparatively dry season from February to April. The sloping area ensures quick drainage. Human interference is much less than in the northern zones, with people staying away from this unhealthy hot humid zone occupied by impenetrable forests infested with wild animals.

The vegetation in this area seems to be a climatic climax with a profusion of well-scattered species. Some of the component trees may shed their leaves individually each year, but no tree remains completely leafless for any part of the year. One striking feature of these tropical forests is

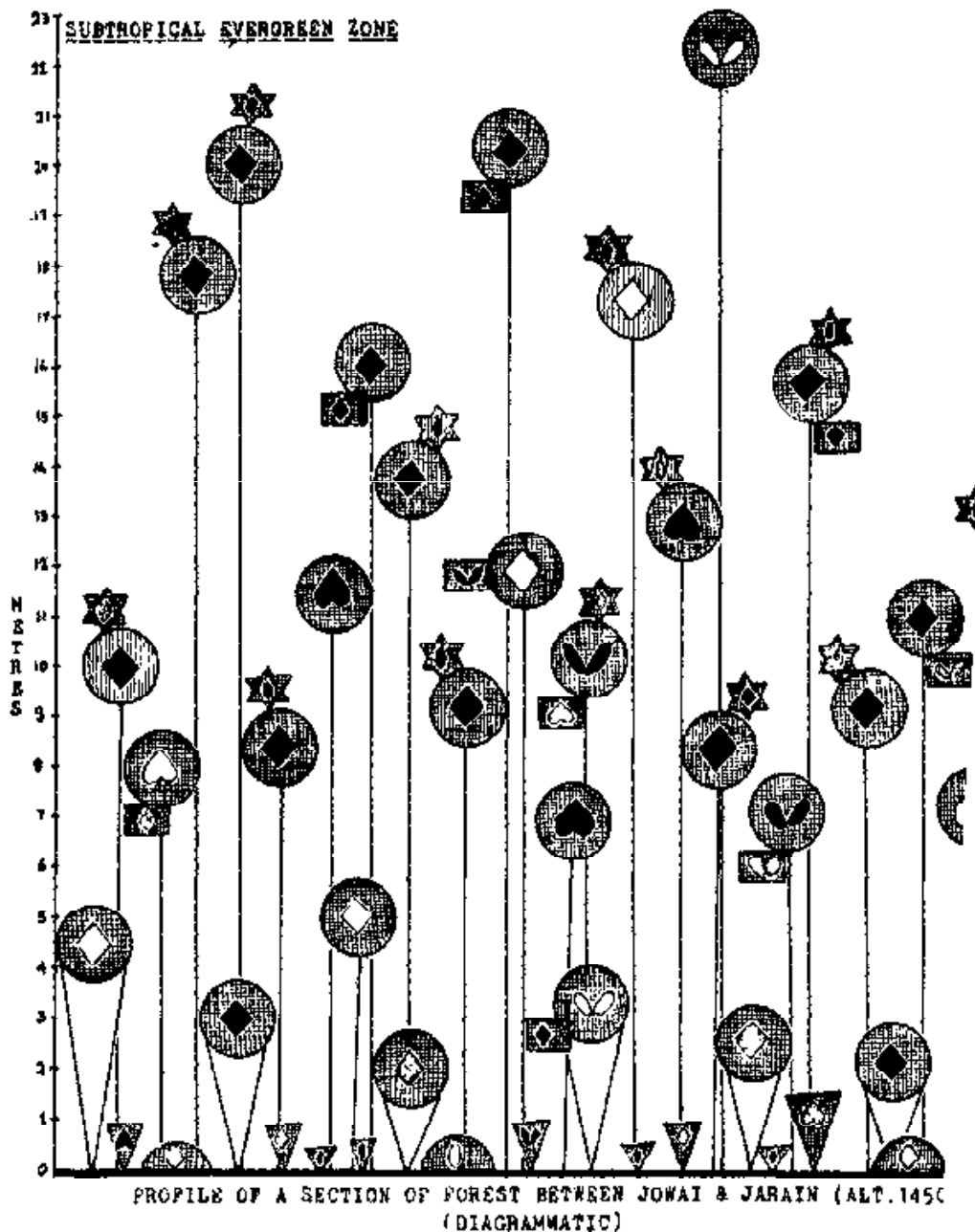


Vegetation map of Jaintia Hills

1. Tropical Evergreen. 2. Subtropical Evergreen. 3. Subtropical Semievergreen.  
4. Tropical Semievergreen.

the extremely mixed dominance, so that no single tree species can be marked as dominant. The tree strata usually exhibit 2 to 3 storeys which are imperceptible to a casual look, owing to the fact that species of all gradations are commonly present. The roof of these forests formed by the upper canopy of tallest trees has usually an irregular profile and rarely forms a continuous layer. The dormant buds are usually small and un-

protected. Smooth bark, plank buttresses and large glossy thick le; are characteristics of the trees of this area.



Explanation to graphic symbols (Symbols after Danscren, 1957)

- |               |                          |                     |                        |                     |         |  |
|---------------|--------------------------|---------------------|------------------------|---------------------|---------|--|
| I. HABIT:     | TREES                    | SHRUBS              | HERBS                  | FERNS & MOSES       | CULMITS |  |
| II. FUNCTION: | SEMIEVERGREEN            | EVERGREEN           | IIIa. LEAVES: Shape-   | GRANINOID or        |         |  |
|               | MEDIUM or SMALL          | BROAD (> 8 cm.)     | COMPOUND               | IIIb. LEAVES: Textu |         |  |
|               | MEMBRANOUS or HERBACEOUS | SUCCULENT or FLESHY | CORIACEOUS or LEATHERY |                     |         |  |

The outstanding component species of the upper storey are: *Vitex pinnata*, *V. peduncularis*, *Terminalia bellirica*, *T. citrina*, *Gynocardia odorata*, *Talauma hodgsonii*, *Polyalthia cerasoides*, *Elacocarpus rugosus*, *E. tectorius*, *Xerospermum glabratum*, *Castanopsis armata*, *Spondias pinnata* and *Chisocheton paniculatus*. The next lower storey usually forms a continuous layer and is composed of trees 10-20 m high. The usual species of this layer are *Syzygium grande*, *S. tetragonum*, *Garcinia paniculata*, *G. pedunculata*, *Ficus racemosa*, *Sapium baccatum*, *Heritiera macrophylla*, *Sterculia hamiltonii*, *Aporosa dioica* and *Pterospermum lancifolium*. The trees of the lowest storey are 5-10 m high and the main ones are: *Premna bengalensis*, *Canthium dicoccum*, *Carallia brachiata*, *Grewia disperma*, *Vernonia arborea*, *Trevesia palmata*, *Milium roxburghiana*, *Phoebe lanceolata*, *Syzygium formosum*, *Actephila excelsa*, *Hibiscus macrophyllus*, *Picrasma javanica* and *Pinanga gracilis*.

Below the third storey of trees is a layer of tall shrubs, 1-5 m high, which often merges with the smaller trees layer. Among the innumerable species of this layer, mention may be made of *Leea edgeworthii*, *Abroma augusta*, *Desmos chinensis*, *Boehmeria macrophylla*, *Lasianthus hookeri*, *Ficus hispida*, *Ixora roxburghii*, *Dracaena spicata*, *Ardisia paniculata*, *Hypertanthera stricta*, *Wallichia densiflora* and species of *Pandanus* and *Allophylus*.

Although sunlight is directly on the upper-most canopy, this is soon filtered off by the successive tree canopies and a sort of gloom prevails inside the forests. Nevertheless, there is a dense herbaceous ground layer, with *Hedyotis auricularia*, *Ophiorrhiza nutans*, *Hygrophila salicifolia*, *Phrynium pubinerve*, *Alpinia allughas*, *Spiradiclis cylindrica*, *Begonia thomsonii* and *Caulokaempferia linearis*. There are also numerous species of ferns, Selaginellas and fungi. Along streams, water-falls and moist marshy places, *Impatiens tripetala*, *I. laevigata* and *Floscopa scandens* grow gregariously in large populations. On wet rocks and boulders in fairly sunny places, *Elatostema rupestre*, associated with *Peperomia pellucida*, grow profusely.

A few species of large lianas like *Ampelocissus latifolia*, *Cayratia pedata*, *Phanera khasiana* and *Entada phaseoloides* can be seen in these forests, usually climbing up to the topmost canopy of trees. The large-fruited *Hodgsonia macrocarpa* climb extensively in deep forests here and there. A few species of smaller lianas occur which are more or less scandent woody shrubs, spreading over smaller trees and bushes. Among them the common ones are *Combretum latifolium*, *Dalbergia stipulacea*, *Connarus paniculatus*, *Sphenodesme pentandra*, *Euonymus attenuatus*, *Millettia caudata*, *Capparis assamica*, *Fissistigma wallichii* and *Derris trifoliata* as also many species of prickly *Calamus*.

Among the less woody climbers which are often gregarious in forest



borders and in fairly sunny forest openings the outstanding species are *Thunbergia grandiflora*, *Ichnocarpus affinis*, *Gymnema tingens*, *Gouania tiliaefolia*, *Adenia trilobata* and *Dioscorea hispida*. *Piper thomsonii*, *Raphidophora grandis* and *Hoya griffithii* are also very common, climbing over trees, by their roots.



**Tropical Evergreen Zone: *Impatiens laevigata* along stream-sides, near Sohka**

The epiphytic flora is not rich as compared to the subtropical zones. Most of them are ferns, Selaginellas and Lycopodiums. Among the flowering plants, which are by no means gregarious or abundant, mention may be made of *Aeschynanthes acuminatus* and *Peperomia pellucida*. Amongst the rather scarce epiphytic orchids are *Vanda teres*, *Dendrobium sulcatum*, *Agrostophyllum khasianum*, *Luisia teretifolia* and *Acampe ochracea*. Lichens and mosses are also common, though not abundant.

(2) *Tropical Semievergreen Zone*: Tropical semievergreen forests occupy the north-eastern and the northern slopes of the tract, up to 1200 m above sea level. This zone receives lesser rainfall (150-300 cm per year) with a dry period of 2-3 months from February to April. Humidity may be high during monsoon but much less during the rest of the year. Winter is comparatively cooler. Being a sloping region, this tract has good drainage. Human interference is evident and consequently the area occupied by primary forests is much less than in the evergreen zone.

There are fewer number of species in these forests than in the evergreen zone. While most of the trees are evergreen, there are a few species like *Careya arborea*, *Dillenia pentagyna* and *Callicarpa arborea* which shed their leaves during dry season, giving a semievergreen appearance. The barks of the trees tend to be thick and plank buttresses are rare.

Trees of these forests are easily recognised to be 1 or 2 storeys. Those of the upper storey are 20-30 m high and the common ones among these are *Elaeocarpus floribundus*, *Dillenia pentagyna*, *D. indica*, *Hovenia acerba*, *Rauermachera gigantea*, *Lithocarpus fenestrata*, *Alcimandra cathcartii* and *Albizia lebbek*. The second storey of trees are between 10-20 m high and seems to be richer in species. The common trees of this layer are: *Micromelum integerrimum*, *Garcinia lancifolia*, *Celastrus championii*, *Sapindus rarak*, *Meliosma wallichii*, *Symplocos paniculata*, *Rhus chinensis*, *Diospyros malabarica*, *Dalbergia assamica*, *Bridelia monoica*, *Litsea glutinosa*, *Ficus semi-cordata*, *F. hirta*, *Oroxylum indicum* and occasionally *Vernonia volkmeriifolia*.

The undergrowth composed of shrubs and herbs are less dense and constitute two distinct layers. The upper layer consists of shrubs 1-3 m high and the most common ones are: *Randia griffithii*, *Boehmeria sidaefolia*, *Ardisia thomsonii*, *A. griffithii*, *Leea crispa*, *Clerodendrum serratum*, *Indigofera atropurpurea*, *Desmodium triangulare*, *Abelmoschus moschatus*, *Eriobotrya angustissima* and occasionally *Priotropis cytisoides*. Among the herbaceous plants of the lowermost layer, the common ones are *Costus speciosus*, *Pilea umbrosa*, *Zingiber capitatum*, *Curcuma domestica*, *Pogostemon auricularis*, *Leucas mollissima*, *Hedyotis ovatifolia*, *H. verticillata*, *Crotalaria mysorensis*, *Amorphophalus bulbifer* and *Hedychium* spp. Large populations of *Forrestia mollissima* are found sporadically in shaded wet sandy soil along streamsides.

The vegetation tends to be entangled with vines and woody scandent plants. Among these the lianas are scarce, with only *Mucuna macrocarpa* and *Entada phaseoloides* found at certain places. However, scandent shrubs and slender climbers are common. *Dalbergia mimosoides*, *D. confertiflora* and *Byttneria pilosa* are among the few stragglers which overgrow their supporting hosts and form dense impenetrable thickets. *Cissus repens*, *C. discolor*, *Willughbeia edulis*, *Cryptolepis sinensis*, *Solena heterophylla*, *Dioscorea trinervia*, *D. bulbifera*, *Smilax lancifolia*, *Argyreia hookeri*, *Diplocyclos palmatus* and frequently the large purple-flowered *Thunbergia grandiflora* are also commonly seen. Along the edges of forests, the introduced American plant, *Mikania micrantha* often virulently spreads in large patches over bushes.

Epiphytes are scarce, as is to be expected, because of the seasonally dry climate, but Loranthaceous hemiparasites like *Scurrula parasitica* and

*S. gracilifolia* are common. *Acampe ochracea* and *Agapetes variegata* are seen occasionally.

(3) *Subtropical Evergreen Zone*: Subtropical evergreen forests cover the southern portion of the plateau bordered by Jowai-Jarain-Raliang-Sutnga with altitudes above 1200 m. This zone is characterised by very heavy rainfall of 300-500 cm per year and high humidity spread over most of the year. Being cloudy for most of the time, incident sunlight is less. There is noticeable difference between summer and winter, ground frosts being common in December-January. A transitional zone of mixed vegetation of both tropical and subtropical species is perceptible between altitudes of 1000-1400 m.

These woodlands of climatic climax forests are seen scattered in deep sheltered valleys, banks of rivers and streams and occasionally in plain areas. These are surrounded by grasslands or pine forests and the demarcation between them is always precise. The trees are generally of a bushy appearance and shorter than in the tropical zone. The leaves are usually simple, smaller in size and often toothed, but at the same time firmer and more leathery. Plank buttresses are rare. The tree layers are less distinguishable into strata. This reduction in tree strata, coupled with lowering of canopy are associated with the increase in altitude. The shrubby and herbaceous layers are well-marked. These moist-loving forests are characterised by the rarity of lianas and the predominance of epiphytes. Mosses and liverworts are abundant. Undergrowth is so dense as to make it necessary to clear the way at every step, when traversing these forests. The forest floor is soft and dark with humus detritus, giving it a cushion-like texture, where many mosses, fungi, *Balanophora* and orchids grow. The floristic composition exhibits exceptional richness in species which are different from those of the tropical evergreen, although some of its components may be generically and even specifically identical with lowland species. In its great multiplicity of trees, these forests agree with the tropical forests, but a single species or a group of species showing dominance is much more common.

The usual trees of the uppermost storey are *Castanopsis tribuloides*, *Lithocarpus elegans*, *Engelhardia spicata*, *Ficus elastica*, *Mangleitia insignis*, *Prunus nepaulensis*, *Euodia trichotoma*, *Exbucklandia populnea* and *Betula alnoides*. Occasionally *Schima wallichii* can also be seen, however, this species prefers association with pines. This storey of tall trees is discontinuous and scattered. It is also noticeable that in many places these trees are smaller in stature and merge with those of the second storey, composed of *Viburnum foetidum*, *V. simonsii*, *Quercus glauca*, *Helicia nilagirica*, *Michelia punduana*, *Syzygium macrocarpum*, *Vernonia volkameriaefolia*, *Ternstroemia gymnanthera*, *Daphne involucreta*, *Lindera melastomacea*,

*Styrax serrulatum*, *Symplocos racemosa*, *Debregeasia wallichiana*, *Schefflera alata*, *Acer oblongum* and *Ligustrum robustum*. Occasionally *Corylopsis himalayana* could be seen in fairly sunny places in these forests. Tree ferns are very common in these forests.

In deep valleys, as well as in sheltered slopes of hills, where wind velocity is less, the trees grow taller and in these forests large lianas like *Tetragium obovatum*, *T. leucostaphylum*, *T. rumicispermum*, *Cayratia pedata* and *Entada phaseoloides* climb over the trees to the upper most layer. There are also many large scandent shrubs which do not reach such height, like *Aspidopterys indica*, *Hiptage benghalensis*, *Elaeagnus pyriformis*, *Rourea minor*, *Rosa moschata*, *Berchemia floribunda*, *Kadsura heteroclita* and various species of *Calamus*.

Perhaps the strata richest in number of species are the shrubby and herbaceous layers. The common shrubby species are *Goniothalamus sesquipetalis*, *Sarcococca saligna*, *Sarcandra glabra*, *Baliospermum micranthum*, *Neillia thyrsiflora*, *Ixora subsessilis*, *Mycetia longifolia*, *Clerodendrum* spp.; *Eurya japonica*, *Psychotria* spp., *Ardisia* spp., *Camellia caudata*, *Saurauia* spp., *Oxyspora paniculata*, and various species of Acanthaceae and Araliaceae. Along the edges of these forests and in fairly open places, *Lobelia nicotianifolia*, *Solanum nigrum*, *S. indicum* and *Polygala arillata* can be seen.

The forest floor is densely covered with fungi, moss, Selaginellas, Lycopodiums and various herbaceous angiosperms, represented by *Begonia palmata*, *Senecio griffithii*, *Houttuynia cordata*, *Sonerilla* spp., *Impatiens* spp., *Chlorophytum khasianum*, *Disporum* spp., *Adenostemma lavena* and various species of Zingiberaceae, Araceae and Commelinaceae, *Didymocarpus punduana*, *Chirita oblongifolia*, *Teucrium quadrifarium* and *Gomphostemma velutinum*. On rocks and boulders near streams and moss-covered cliffs, *Sarcopyramis napalensis*, *Elatostema rupestre*, *Begonia rubrovenia* and *Impatiens* spp., usually grow profusely. Many terrestrial orchids such as *Anoectochilus*, *Hateria*, *Phaius*, etc. are common in rich humus soil in shaded places. Root parasites like *Balanophora dioica* are also common.

There are many species of climbers spreading over bushes and shrubs and the usual ones are species of *Clematis*, *Smilax*, *Dioscorea*, *Melodinus*, *Menispermaceae*, *Cucurbitaceae* and occasionally *Holboellia latifolia* and at certain places near Jarain *Nepenthes khasiana*. Along the borders of forests spreading over bushes, thick masses of *Paederia foetida*, *Rubia cordifolia*, *Porana racemosa*, *Trichosanthes* spp.; and *Passiflora napalensis* are prominent.

The branches of trees bear innumerable species of orchids, mosses and ferns. The epiphytic orchid flora in these forests are the richest in the area, with almost every other tree forming a veritable hanging garden

of orchids and ferns. Species of *Agapetes*, *Hoya*, *Aeschynanthes*, *Piper* and *Medinella* are also very common. There are also many Loranthaceous hemiparasites, like *Helixanthera* spp.; *Taxillus vestitum*, *Viscum articulatum* and *Dendrophthoe falcata*. Along streams and rocky places with dripping water, *Utricularia bifida*, *U. striatula*, *Gonatanthus pumilus*, *Remusatia vivipara* and *Lindernia* spp. grow in isolated populations.

(4) *Subtropical Semievergreen Zone*: The vegetation of the area on the northern and north-eastern slopes of Jaintia hills, between altitudes of 1200-1800 m, experiencing lesser rainfall (150-300 cm per year) with a fairly dry season of 2-3 months from January to April, is broadly classified as subtropical semievergreen forests. Humidity may be high during rainy season, but comparatively less during the rest of the year. High winds are scarce. Winter and summer temperatures are noticeably different. Ground frost is common in January. A transitional zone of mixed vegetation with both tropical and subtropical types of species may be distinguishable at certain places between altitudes of 1000-1400 m.

There are lesser number of species in these forests than in the subtropical evergreen forests of southern portion. Most of the trees are ever green, but a few deciduous species can also be seen and thus giving it the semievergreen appearance during the dry months of February-April. Sometimes it is possible to notice certain species of trees occurring frequently and appearing to be dominant. While many of the component species in these forests are identical with those of the subtropical evergreen zone, there are also a good number of species exclusive to this region. Prickly and thorny species are more common.

Among the largest trees, the common ones are *Engelhardia roxburghiana*, *Castanopsis indica*, *Sapindus rarak*, *Paramichelia baillonii*, *Elaeocarpus floribunda*, *Albizia chinensis*, *Meliosma wallichii*, *Alcimandra cathartii*, *Diospyros lancifolia*, *D. undulata*, *Ficus altissima* and *Vitex glabrata*. The second storey in these forests consists of trees which are of lesser height and the common ones are *Vitex vestita*, *Quercus semicarpifolia*, *Pyrularia edulis*, *Brucea mollis*, *Casearia vareca*, *Micromelum integerrimum*, *Photinia arguta*, *Loropetalum chinensis*, *Glyptopetalum quadrangulare*, *Docynia indica*, *Symplocos cochinchinensis* and *Xylosma controversum*.

Lianas are scarce, however, *Mucuna macrocarpa*, *Tetrastigma obovatum* and *Celastrus campionii* and *Gnetum scandens* are to be seen at certain places. There are also a few stragglers like *Fissistigma verrucosum*, *Dalbergia confertiflora*, *D. mimosoides*, *Erycibe schmidtii*, *Dendrotrophe umbellata*, *Calamus* spp. and *Dioscorea pentaphylla*.

The shrubby layer consists of fewer species and the common ones are *Crotalaria assamica*, *Boehmeria platyphylla*, *Capparis acutifolia*, *Lyonia ovalifolia*, *Randia griffithii*, *Mussaenda glabra*, *Desmodium* spp., *Sida*

*rhombifolia*, *Sambucuc javanica*, *Maesa tetrandra*, *Clerodendrum* spp. and *Sarcococca saligna*.

The herbaceous layer in these forests are very poorly developed, mosses, ferns and Selaginellas are scarce except near very wet streamsides in sheltered valleys. Among the usual flowering plants are *Pilea umbrosa*, *Galinsoga parviflora*, *Anisadenia khasiana*, *Curcuma* spp., *Polygala* spp., *Lysimachia laxa*, *Acanthus leucostachys*, *Pouzolzia hirta*, *Globba clarkei*, *Hedychium* spp., *Costus speciosus* and many species of Asteraceae. Along streams and marshy shaded places in forests, more moist-loving plants like *Lindernia* spp., *Limnophila chinensis*, *Centella asiatica*, *Dactylicapnos torulosa*, *Polygala* spp., *Aneilema* spp. and *Salomonina* sp. can be seen.

### B. Biotic Factors on Vegetation

In extensive areas of the region, the primary vegetation has been much disturbed and modified and in some places, destroyed. This has happened due to seismic activities, frequent landslides and soil erosion. While these natural causes have contributed to some extent in the change in vegetation types, it is man and his domestic animals that share the major part, in a rather rapid and often irrevocable transformation in the landscape. Even the most remote region of these hills have been ravaged by anthropomorphic influences.



Biotic influence on Flora : A recently jhummed (cleared and burned) area

By far the most important cause of destruction has been the system of shifting cultivation (called *Jhuming* locally), practiced by the local people. It is an ancient custom of the people of this region to clear a given area by chopping down the primary forest and burn it over to dispose off the debris from clearings. In this process the fire usually spreads and destroys the whole hill, much more than what is needed for cultivation. In a freshly cleared area, the soil is extremely fertile with rich humus content and hence the first few crops of upland paddy or millet (which they plant in such cleared areas) yield substantial harvests. However, slowly the soil shows signs of exhaustion and denudation mainly due to erosion. In the absence of any sort of terrace cultivation, (which is practically unknown in this area and now being introduced), the soil layer is gradually lost reducing its fertility and ultimately the area is abandoned and another area is cleared of primary vegetation. The deserted one reverts to barren rocky places, grasslands, scrubs or secondary forests, providing an easy path for migration of exotic plants. All gradations could be seen from grasslands studded with a few crooked charred shrubs or malformed trees to thickets or closed secondary forests. At higher elevations such abandoned places develop into grasslands or pine forests and at lower elevations to grasslands or secondary forests.

Another cause is the method of cultivation of potato and sweet potato, adding much to the erosion and depletion of the fertility of the soil. To prevent water-logging of the soil and consequent rotting of tubers, potato-beds are set up on steep hill-slopes with the ridges of plots steeply tilted downwards. The heavy rains wash away all soil between the beds and in a shortwhile such slopes become useless for cultivation.

Vegetation studies reveal the speed at which our vegetable wealth is being destroyed. For example, in 1851 J. D. Hooker on his expedition to Jaintia hills, collected 7 headloads of live *Vanda coerulea* plants for cultivation in England. Now after 100 years, during various field trips stretching from 1965 to 1970, the present author could hardly spot a dozen plants even in remote forest areas of Nartiang, where Hooker made his collections. This is an indicator of the rate at which primary forests and the wealth it carries are being irrevocably destroyed.

During the sixty years period from 1901 to 1961, the human population of the district has increased three-fold (Pakynstein, 1965). This increase in population coupled with the increased demand on natural forest areas for cultivation of cereals for food and for fuel, forest areas are being destroyed at a greater pace, year after year. Similarly increased communication even with remote villages by new road connections, etc. facilitates more movement of people from outside and consequently more interference with the vegetation. To quote Blair (1964): 'Man has enormously and

often recklessly modified ecosystems through interruption of ecological succession and substitution of simple (agricultural) plant communities for natural diversity through disruption of energy balance of communities by assisting (through artificial feeding) his herbivorous domesticates to escape the checks and balances that normally exist between primary producers and their consumers. All of this promotes erosion of soils that have evolved through countless centuries and thus degrades the ecosystem'. Such degraded ecosystems develop into several types of secondary vegetations as detailed below.

### C. Secondary Vegetation

There is a succession of several edaphic formations, in many disturbed spots within the primary forests. These can be observed in various stages of development, depending on the extent of disturbance and the span of time during which the succession of secondary vegetation is taking place. These may be scattered herbaceous growth of several weed species or homogeneous grasslands or woody vegetation of shrubs, short trees or even quite tall trees, either belonging to several species or sometimes to a single species like in the case of pine. This secondary vegetation developing consequent on the disturbance of primary vegetation can also be partially and parallelly classified into (1) Tropical Evergreen Zone, (2) Tropical Semi-evergreen Zone, (3) Subtropical Evergreen Zone, and (4) Subtropical Semi-evergreen Zone.

(1) *Tropical Evergreen Zone*: The herbaceous type forms the first succession stage and among the pioneers, mention may be made of *Cassia tora*, *C. occidentalis*, *Scoparia dulcis*, *Mimosa pudica*, *Euphorbia hirta* and various grasses like *Garnotia stricta*, *Cyrtococcum oxyphyllum*, *Paspalum conjugatum* and *Oplismenus compositus*. In due course certain shrubby species make their way and invade such herbaceous regrowth. Among them the usual ones are *Lantana camara*, *Calotropis gigantea*, *Phyllanthus* spp., *Tithonia diversifolia*, *Flemingia strobilifera*, *Eranthemum suffruticosum* and grasses like *Thysanolaena maxima*. Subsequently such places may either remain purely shrubby or, if destroyed by frequent fires, may develop into grasslands or in places where the soil layer is thick and where frequent fires do not occur, may develop into secondary forests.

In grasslands the common species of grasses are *Imperata cylindrica*, *Chrysopogon gryllus*, *Digitaria adscendens*, *Brachiaria distachya*, *Panicum brevifolium*, *Centotheca lappacea* and *Microstegium vagans*. These grasses are usually associated with herbaceous geophytes like *Hedychium* spp., *Asparagus* spp., etc. Very rarely such places may develop into bamboo forests, with the most common species like *Bambusa tulda*, *Dendrocalamus strictus* and *Pseudostachyum polymorphum*.



If the vegetation develops into secondary forests, trees like *Trema orientalis*, *Alstonia scholaris*, *Glochidion oblatum*, *Oroxylum indicum* and *Zanthoxylum ovalifolium* are common. Some of these trees are still surviving clumps of relict trees of primary forests, while others are new intruders. *Mikania micrantha*, an exotic straggling shrub with white flowers usually occupy such places early and establishes very well, spreading over bushes and scrubs forming gregarious carpets.

Aquatic vegetation is very poorly developed in this region, the landscape being a continuous slope. However, there are a few ponds and ditches in wastelands, near villages, where *Monochoria hastata*, *Tenagocharis latifolia* and various aquatic sedges are commonly seen. Along the edges of these ditches and ponds, marsh-loving plants like *Rotala indica*, *Murdannia blumei*, *Hydrocotyle javanica*, *Sacciolepis indica*, *Paspalum orbiculare* and species of *Polygonum* usually grow in large populations.

(2) *Tropical Semievergreen Zone*: Vast areas of this zone are occupied by grasslands and the common grass species are *Saccharum arundinaceum*, *Sorghum nitidum*, *Phragmites karka*, *Digitaria ternata*, *D. setigera*, *Eulalia* spp., etc. and those are usually associated with herbaceous plants like *Crotalaria occulta*, *Commelina bengalensis*, *Cyathula prostrata*, *Synedrella nodiflora*, *Cyanotis vaga*, *Hedychium* spp., *Cyperus digitatus*, *Mosla dianthera*, *Scleria levis* and *Plectranthus* sp.

In scrubby vegetation, the common plants are *Lantana camara*, *Barleria cristata*, *Desmodium* spp., *Indigofera* spp., *Cassia occidentalis*, *Ageratum conyzoides*, *Cynoglossum glochidiatum*, etc. In secondary forests the dominant tree species are *Trichelia connaroides*, *Glochidion acuminatum*, *Phyllanthus emblica*, *Symplocos paniculata*, *Rhus chinensis* and *Ziziphus mauritiana*. The undergrowth in these forests are usually plants such as *Abutilon indicum*, *Sida spinosa*, *S. rhombifolia*, *Leea indica*, *Crotalaria occulta*, *Desmodium racemosum*, *Indigofera dosua*, *Ageratum conyzoides*, *Blumea sessiliflora*, *Plectranthus ternifolius*, *Chenopodium ambrosoides*, *Cyathula prostrata*, *Jatropha curcas* and *Atylosia scarabaeoides*. The common climbers are *Mukia maderaspatana*, *Gymnopetalum cochinchinense*, *Argyreia splendens*, *Smilax lancifolia* and *Thunbergia grandiflora*.

In open places, pondsides and streamsides, plants like *Cyperus cyperoides*, *Elaeocharis acutangula*, *Eriocaulon luzulaefolium*, *Lindernia* spp. and *Murdannia* spp. grow. In such situations *Commelina paludosa* often grow in large populations.

(3) *Subtropical Evergreen Zone*: The main types of secondary vegetation in this zone are the grass savannas, bamboo forests and pine forests, which are dealt with separately below.

GRASS SAVANNAS occupy vast areas along the southern part of the plateau and these are not mixed with any shrubby or arborescent plants, but only certain herbaceous plants. In pockets along valleys, depressions and steep slopes patches of primary broad-leaved forests can be seen. Usually these are clearly demarcated from grasslands. The grass species of this zone are mainly of short height, rarely reaching 50-60 cm. They reach their full dominance by autumn when almost all the species are in full bloom. By late winter, they get completely dried up and fire raging everywhere rapidly reduces the hills to smoking black wastes. Sporadic recurrence of fire and grazing result in substantial check to the succession of these grasslands to scrub or woodlands. Thus the over-riding factor in the successional dynamics of these grasslands in keeping them permanent, is fire. Frequent fires and grazing also tend to select species which are capable of regeneration from underground parts. Hence after burning, the relative frequency of different species may be altered, i.e. the species present may be completely eliminated or many new ones may invade. In some places where the soil layer is shallow, burning makes it liable to erosion by heavy rain, washing away the top soil and leaving the hillslopes as barren rocks.

The common species of grasses found in this area are *Leersia hexandra*, *Imperata cylindrica*, *Setaria pallide-fusca*, *Sclerostachya fusca*, *Ischaemum* spp., *Erianthus rufipilus*, *Isachne albens*, *Eragrostiella leioptera*, *Arundinella* spp., *Echinochloa crus-galli* and *Lophatherum gracile*. Associated with these grasses, there are many other herbaceous plants with usually perennial rootstocks and regenerating every spring. Among these the most common ones are *Polygonum bistorta*, *Duchesnea indica*, *Youngia cineripappa*, *Emilia sonchifolia*, *Conyza japonica*, *Exacum tetragonum*, *Osbeckia glauca*, *Polygala* spp., *Centranthera grandiflora*, *Calamintha umbrosa*, *Wahlenbergia gracilis* and *Crinum amoenum*. Scattered in these grasslands are many terrestrial orchids like *Arundina chinensis*, *Anthogonium gracile*, *Brachycorythis obcordata*, *Herminium angustifolium*, *Spathoglottis pubescens* and various species of *Habenaria*. At certain places near Jarain, *Nepenthes khasiana* grows amidst grass.

There are many spots where water-logged conditions facilitate the development of marshy grasslands, where moist-loving Cyperaceae, *Eragrostis* spp., *Juncus* spp., *Luzula campestris*, *Ranunculus cantoniensis*, *Drosera peltata*, *Burmammia disticha*, *Parnassia wightiana*, *Centella asiatica*, *Murdannia* spp., *Rotala rotundifolia*, *Haloragis micrantha* and *Salomonina cantoniensis* occur in isolated populations. In certain places it is possible to find large populations of *Osbeckia benthamii* with pink and white flowers. Among aquatic plants growing in water-logged streams, ponds and paddy fields, the common ones are various species of Cyperaceae, *Blyxa echinosperma*, *Sagittaria sagittifolia*, *Caldesia grandis* and *Potamogeton nodosus*.

BAMBOO FORESTS are best developed in this zone, especially at lower altitudes. Often large clumps of bamboos could be seen in patches along borders of forests and in clearings in forests. The common species are *Dendrocalamus hamiltonii*, *Bambusa vulgaris*, *Arundina suberecta* and *Chimonobambusa khasiana*.

PINE FORESTS are found at higher elevations along slopes of hills and these are climax forests of secondary nature. Often these are found in pure stands, but occasionally associated with *Schima wallichii*, *Rhododendron arboreum*, *Ternstroemia gymnanthera* and species of *Acer*, *Cinnamomum* and *Engelhardia*. The floor of these forests are covered with thick layer of pine needles, which usually get burnt accidentally or by human interference during dry season. Wherever the fire frequencies are less, the undergrowth is dense, consisting of many grass species in large populations, associated with shrubby plants like *Lyonia ovalifolia*, *Butea minor*, *Dipsacus asper*, *Inula cappa*, *Saussurea nivea*, *Anaphalis contorta*, *A. adnata*, *Agrimonia nepalensis*, *Osbeckia* spp., *Vernonia satigna*, *Rubus rugosus*, *Artemisia parviflora* and *Callicarpa rubella*. Other herbaceous plants commonly seen are *Scutellaria discolor*, *Sanicula elata*, *Ainslaea latifolia*, *Ajuga macroperma*, *Anotis wightiana*, *Valeriana jatamansii*, *Centranthera cochinchinensis*, *Osbeckia nepalensis*, *Hedyotis corymbosa*, *Selinium striatum*, *Senecio griffithii*, *Elsholtzia strobilifera*, *Arisaema consanguineum*, *Melissa axillaris* and various grasses like *Pogonatherum* sp., *Coelorachis striata*, *Apocopis paleacea*, *Capillipedium* sp. and *Sporobolus piliferus*, *Aeginetia indica*, the parasite on roots of grasses can also be seen at certain places. *Vanda coerulea*, *Dendrobium* spp. and *Oberonia myriantha* are the rare orchids here.

(4) *Subtropical Semievergreen Zone*: The main type of secondary vegetation in these areas are tree and shrub savannas. These formations are defined as grasslands with scattered trees and shrubs and can be seen in the northern slopes of the plateau up to Nartiang-Mynso region.

The grasses of these formations are normally 1 m high, often reaching up to 3-4 m and form a continuous layer dominating over a lower strata of herbs and small grasses. These grasslands are often burnt during dry season. The trees, wherever they occur in scattered patches, have thin round canopies permitting sufficient light for the sun-loving grasses to grow well under them, and in many places where the soil is reduced to lithosols, the ecology in such places is not conducive to the development of trees and in those places pure formations of grasses develop. Wherever the top soil is deep, many arborescent forms develop, forming transition to woodlands and these play an important role in the formation of trees and shrub savannas. Under long term favourable conditions, a nucleus of these tree

species can be seen maintained at certain places, which are precursors for mature well-developed secondary forests.

Among the tall grasses, the common ones are *Themeda villosa*, *T. triandra*, *Sorghum nitidum*, *Erianthus longisetosus*, *Thyrsia zea*, *Apluda mutica*, *Arundinella* spp., *Narenga fallax* and *N. porphyrocoma*. Among the grasses of lesser height, mention may be made of *Eulalia* spp., *Digitaria* spp., *Rytidix granularis*, *Ophiuros megaphyllus*, *Cymbopogon* spp., *Andropogon ascinoides*, *Miscanthus nepalensis*, *Eccoilopus cotulifer*, *Setaria palmifolia* and *Polytoca digitata*.

The common shrubby and herbaceous plants associated with these grasses are *Urena lobata*, *Crotalaria alata*, *Smithia ciliata*, *Desmodium laxiflorum*, *D. sequax*, *Cassia mimosoides*, *Cirsium involucreatum*, *Bidens pilosa*, *Eupatorium* spp., *Sopubia trifida*, *Artemisia parviflora*, *Cynoglossum furcatum*, *Plectranthus terniflorus*, and species of *Hedychium*, *Arundina bambusifolia* the bamboo orchid with pale pink flowers and *Murdannia divergens*. *Phoenix humilis* grows in large scattered clumps along open hill slopes at lower elevations and these are replaced by *Butea minor* at higher elevations.

The common trees met with in these grasslands are *Castanopsis tribuloides*, *Oroxylum indicum*, *Callicarpa arborea*, *Lithocarpus elegans*, *Sida macrophylla*, *Castanopsis kurzii*, *Dillenia indica* and *Ficus* spp.

There are a few ponds and small lakes in this zone, exhibiting plants like *Brasenia schreberi*, *Scirpus* spp., *Scleria* spp., *Carex* spp., *Sagittaria sagittifolia* and *Caldesia grandis*.

#### D. Cultivated and other Useful Plants

The Jaintias forming one of the numerous tribal societies, have a rich plant lore and are well-versed in the use of plant materials for various domestic purposes: food, clothing, shelter, medicine, etc. This ethnobotanical aspect in itself constitutes a major research programme. Even today, in spite of the considerable sophistication of the local people, a visit to the weekly markets held in very traditional fashion in different principal towns and villages is a fine exhibition of the intimate acquaintance of the local people with plants, in all their diversity.

Fruits of many wild plants are eaten by local people and among them mention may be made of *Docynia indica*, *Ficus neriifolia*, *F. auriculata*, *Garcinia paniculata*, *G. pedunculata*, *G. laucifolia*, *Rubus niveus*, *R. rugosus*, *Gardenia campanulata*, *Syzygium cumini*, *Lepisanthes rubiginosa*, *Ardisia floribunda*, *Meyna spinosa*, *Debregeasia longifolia* and *Actinida callosa*.

Many wild plants are used as vegetables. The leaves of *Mussaenda roxburghii*, *Vaccinium donianum*, *Thunbergia grandiflora*, *Houttuynia cordata*, *Sambucus javanica*, *Medinella erythrophylla*, *Olax acuminata*, and

*Tetrastigma thomsonianum*, flowers of *Buddleia asiatica* and *Corylopsis himalayana* are often cooked with meat and fish. Seeds of *Hodgsonia macrocarpa*, *Sterculia hamiltonii* and *S. roxburghii* are also eaten either roasted or cooked. Fruits of *Elaeocarpus floribundus* are cooked or pickled and those of *Dillenia indica*, with their persistent fleshy calyx are cooked and eaten. The aril covering the seeds of *Horsfieldia amygdalina* are eaten raw. The young shoots of bamboos form a delicacy among the local people and they prepare various types of stew out of it. Fruits of *Citrus latipes* and *Zanthoxylum armatum* are used as condiments.

Among the numerous wild plants used by the local people for medicine, mention may be made of the fruits of *Casearia vareca* used for worms, fruits of *Zanthoxylum armatum* for toothache, roots of *Hedyotis scandens* for eye diseases and leaves of *Paederia foetida* for diarrhoea and dysentery.

There are also many types of natural fibres used as ropes for building huts, carrying baskets and for other purposes. Among the common plants which yield fibres are *Boehmeria* spp., *Urena lobata*, *Abroma augusta* and *Bixa orellana*.

The staple food of the people consist of hill rice, maize and millets, cultivated with considerable effort in the jhumed areas. Due to the initiative of David Scott, the first Agent of the Governor General in Assam, potato was introduced during 1827-28 and now it is the most widely cultivated food crop, other than rice. Sweet potato is being cultivated in the northern slopes of Jaintia hills. Apart from these food crops, various vegetable crops in scattered plots and kitchen gardens are also raised. Of these the common ones are cabbage, cauliflower, peas, beans, carrot, raddish, turnip, and beet root at high elevations, and tomato, brinjal, cucumber, pumpkin, ash-gourd, bitter-gourd and snake-gourd at lower elevations.

Orange together with lemon constitute one of the earliest orchard plants of the area. These are widely cultivated at altitudes between 500 and 1400 m, in Raliang-Mynso in the north and Bataw-Sohka in the south. Bananas also are partly cultivated and partly harvested from the wild and constitute another popular native fruit-crop. Still other fruit trees grown in small orchards are pear, peach, plum and pomegranate at higher elevations and pineapple, papaya and mango at lower elevations.

Among other cultivated plants raised in cleared forest areas in these hills are ginger, turmeric and garlic. In lower warmer areas on southern slopes, especially in Dawki-syndai area there are arecanut plantations, on the tall stems of which the associated betel vines are grown. Betel leaf and arecanut are constant items in all markets and shops, and in very early times have been the agency for the introduction of the tribal hill people to the plains people. Of recent introduction in Lumshnong area, more or less

on an experimental scale, having promise of success is coffee and in Dawki area the introduced S. American root crop, Tapioca.

The less commonly cultivated kitchen garden plants are the tree-tomato of S. America (*Cyphomandra betacea*) spinachs (*Basella rubra* and *Tetragona expansa*) and various types of chillies (*Capsicum*).

The European Christian missionaries appear to have had considerable influence in the lay out of domestic ornamental gardens and introduction of many familiar ornamental trees, shrubs, climbers and border plants. Of those giving a characteristic appearance to the sky line of the town are the giant trees of *Eucalyptus* and *Cryptomeria* with here and there the dense glossy leaved *Magnolia* and blue-flowered *Jacaranda*. In many gardens nicely clipped *Thuja* and *Juniperus* as also *Podocarpus neriifolius* also strike the eye. The common shrubby plants in these gardens are *Cestrum*, *Hibiscus*, *Poinsettia*, *Callistemon*, *Hypericum* and *Rosa*. The common border plants are *Dahlia*, *Canna*, *Gladiolus*, *Begonia*, *Impatiens*, *Tropaeolum*, *Aster*, *Pelargonium*, *Antirrhinum*, *Crinum*, *Celosia*, *Kniphofia*, etc. and many climbers like *Bougainvillea*, *Rosa*, *Jasminum*, etc. Local wild orchids like *Phaius*, *Cymbidium* and *Dendrobium* spp. are also being cultivated.

#### SALIENT STATISTICS ON THE FLORA

This account of the flora of Jowai is chiefly concerned with flowering plants, with 1517 species in 749 genera and 165 families among the angiosperms. Table 2 below indicates the break-up with respect to the monocots and dicots. The proportion of monocots to dicots is 1 to 2.5 and genera to species is 1:2. Taking into account the entire Indian subcontinent, including Malaya, Hooker (1904) estimates the proportion of monocots to dicots to be 1 to 2.3 and genera to species 1 to 7.

TABLE 2 : GENERAL SURVEY

	Genera	Species
Monocots	196	493
Dicots	551	1084
Total	749	1517

The ten dominant families in the present flora with their respective genera and species, are listed below in table 3. A comparison of this sequence with those given by Hooker (1904) for Flora of British India as given in table 4 indicates interesting similarities as well as dissimilarities. While Orchidaceae occupies the top position in both, Leguminosae and Poaceae

have interchanged their positions, by the former occupying second position in the Flora of British India and third position in the present flora, and Poaceae taking the second position in the present flora and third position in the Flora of British India. Hooker included Fabaceae, Caesalpiniaceae and Mimosaceae together under Leguminosae (*sensu lato*), which though separately treated in the present flora, are combined for the sake of comparison in table 4. Similarly Urticaceae, as treated by Hooker, includes Moraceae, Ulmaceae, Cannabinaceae and Urticaceae, which have been treated separately in the present flora and for purposes of comparison, treated (in table 4) in the same sense as of Hooker.

Table 5 lists the species of endemic distribution in the area. Of these, there are 6 species endemic to Jaintia hills alone and 44 species endemic to Meghalaya. This accounts for about 3% of the plants included in this flora.

TABLE 3 : THE LARGEST FAMILIES

Family	Genera	Species
Orchidaceae	50	141
Poaceae	63	106
Rubiaceae	31	75
Asteraceae	33	66
Fabaceae	25	66
Cyperaceae	10	48
Euphorbiaceae	22	44
Acanthaceae	20	37
Lamiaceae	20	31
Zingiberaceae	13	29

TABLE 4 : THE LARGEST FAMILIES

(Comparison with Flora of British India)	
Flora of Jowai	'Flora of British India
Orchidaceae	Orchidaceae
Poaceae	Leguminosae
Leguminosae	Poaceae
Rubiaceae	Rubiaceae
Asteraceae	Euphorbiaceae
Urticaceae	Acanthaceae
Cyperaceae	Asteraceae
Euphorbiaceae	Cyperaceae
Acanthaceae	Lamiaceae
Lamiaceae	Urticaceae

TABLE 5 : LIST OF ENDEMIC

No.	Species	Family	Endemic to Jowai District	Endemic to Meghalaya
1.	<i>Adiantum griffithii</i>	Theaceae		+
2.	<i>Aechmanthera leiosperma</i>	Acanthaceae	+	
3.	<i>Aeschynanthus parasiticus</i>	Gesneriaceae		+
4.	<i>A. superba</i>	"		+
5.	<i>Anacotlosa ilicoides</i>	Oleaceae		+
6.	<i>Baliospermum micranthum</i>	Euphorbiaceae		+
7.	<i>Calliandra griffithii</i>	Mimosaceae		+
8.	<i>Callicarpa psilocalyx</i>	Verbenaceae		+
9.	<i>Camellia caduca</i>	Theaceae		+
10.	<i>Ceropegia angustifolia</i>	Asclepiadaceae		+
11.	<i>Citrus latipes</i>	Rutaceae		+
12.	<i>Cynanchum wallichii</i>	Asclepiadaceae		+
13.	<i>Dactylicapnos torulosa</i>	Fumariaceae		+
14.	<i>Daphne shillong</i>	Thymelaeaceae		+

No.	Species	Family	Endemic to Jowai District	Endemic to Meghalaya
15.	<i>Eria ferruginea</i>	Orchidaceae		+
16.	<i>Eriobotrya angustissima</i>	Rosaceae		+
17.	<i>Glochidion thomsonii</i>	Euphorbiaceae		+
18.	<i>Goldfusia glabrata</i>	Acanthaceae		+
19.	<i>Gymnostachyum venustum</i>	"		+
20.	<i>Habenaria khasiana</i>	Orchidaceae		+
21.	<i>Hedychium dokianum</i>	Zingiberaceae	+	
22.	<i>Hyparrhena griffithii</i>	Poaceae	+	
23.	<i>Ilex embelioides</i>	Aquifoliaceae		+
24.	<i>I. venulosa</i>	"		+
25.	<i>Impatiens acuminata</i>	Balsaminaceae		+
26.	<i>I. khasiana</i>	"		+
27.	<i>I. laevigata</i>	"		+
28.	<i>I. porrecta</i>	"		+
29.	<i>Lindera latifolia</i>	Lauraceae		+
30.	<i>Liparis acuminata</i>	Orchidaceae		+
31.	<i>Pavamignya micrantha</i>	Rutaceae		+
32.	<i>Phanera khasiana</i>	Gaesalpinaceae		+
33.	<i>Phlogacanthus wallichii</i>	Acanthaceae		+
34.	<i>Photinia cuspidata</i>	Rosaceae		+
35.	<i>P. polycarpa</i>	"		+
36.	<i>Pogonatherum rufo-barbatum</i>	Poaceae		+
37.	<i>Pogostemon strigosus</i>	Lamiaceae		+
38.	<i>Pteracanthus griffithianus</i>	Acanthaceae		+
39.	<i>P. nobilis</i>	"		+
40.	<i>P. rubescens</i>	"	+	
41.	<i>P. urophyllus</i>	"		+
42.	<i>Rhynchospora griffithii</i>	Cyperaceae		+
43.	<i>Rubus khasianus</i>	Rosaceae		+
44.	<i>Salix psilostigma</i>	Salicaceae		+
45.	<i>Senecio jowaiensis</i>	Asteraceae	+	
46.	<i>Sympagis maculata</i>	Acanthaceae		+
47.	<i>S. monadelphra</i>	"		+
48.	<i>Tarphochlamys affinis</i>	"		+
49.	<i>Tetrastigma obovatum</i>	Vitaceae		+
50.	<i>Trachyspermum khasianum</i>	Apiaceae		+
51.	<i>Trivalvaria kanjilatii</i>	Annonaceae	+	

## DISCUSSION AND CONCLUSIONS

Hooker (1904) considered the flora of India to be a mixture of floras from surrounding areas, enriched by the migration of plants from China, Tibet and Siberia in the north, Malaysia in the south and Africa and Europe in the west. Chatterjee (1940 & 1962) taking up this view, has made an elaborate analysis of the flora of the entire Indian subcontinent including Burma, Ceylon and Pakistan and relying upon the herbarium material available to him concluded that 'there existed an original flora which got



mixed up and became partly masked due to the invasion of plants from outside' (1962: p. 37). He bases his conclusion on an analysis of the percentage of endemics as indication of the distinctiveness of the flora and also the natural barriers of lofty Himalayas and to vast Indian ocean separating the subcontinent. He has estimated that for the entire area, a percentage of 61.5% and for the eastern region of Assam and Himalayas 28.8% are endemics.

Any review of the phytogeography of Meghalaya should be in the context of its historical geomorphology (see ch. III). Two factors—the ancient Gondwanaland with which Khasi and Jaintia hills formed a part and the Great Ice Age—have influenced the formation of the present flora of this tract. Due to its being a part of the great Gondwanaland, the flora of this region shows affinities with the Malaysian and peninsular Indian floras, as well as to a lesser degree with Australian and African floras. During the Ice Age, vast plateau and mountainous areas in the Sino-Himalayan region were covered with ice. This and the subsequent retreat of ice had a two-fold effect: (i) the migration of northern Siberian and Sino-Himalayan species southwards along with the advancement of ice; (ii) the subsequent movement of southern Malaysian elements northwards along with the retreat of ice. To quote Wulff (1950: p. 154): 'The advance and retreat of ice occupied a period of thousands of years, during which, as a result of changes in climatic conditions, plants and animals migrated, as the ice advanced, from the north to the south and from the upper altitudinal zones to the plains and valleys, and, as the ice retreated, returned, in part to the north and to higher elevations.' Turrill (1953: 278) stated: 'The southern drive of the flora must have had a telescoping effect, crowding the alpine on to the subalpine, the subalpine on to the warm temperate, and so forth.' This seems to explain the reason for the occurrence of many temperate northern species even at comparatively lower elevations in the subtropical zone in Jaintia hills, as shown by Bor (1942) in his comparison of the floras of Khasi and Naga hills.

The Meghalaya flora thus shows affinities with nearby Sino-Himalayan, Burma-Malaysian and to a lesser extent with peninsular Indian floras. It also shows relationship with distant areas of Australia, Africa and America. These affinities are best illustrated by an enumeration of some of the common elements. Of the Chinese and Himalayan genera found in Jaintia hills, are *Kadsura*, *Actinidia*, *Corylopsis*, *Mahonia*, *Manglietia*, *Camellia*, *Skimmia*, *Holboellia*, *Eurya*, *Loxostigma*, *Hydrangea*, *Anisadenia*, *Hovenia*, *Caryopteris*, *Codonopsis*, *Dactylicapnos*, *Anisopappus*, *Achillea*, etc. and many species in different genera.

Of the Malayan elements occurring in Jaintia hills, are genera like *Nepenthes*, *Vaccinium*, *Engelhardia*, *Xantolis*, *Daphniphyllum*, *Pueraria*,

*Balanophora*, *Talauma*, *Pittosporum*, many *Zingiberaceae*, etc. and the species like *Exbucklandia populnea*, *Valeriana hardwickii*, *Mosla dianthera*, *Melissa parviflora*, *Rubus niveus*, *R. rosifolius*, *Neillia thyrsiflora*, *Craniotome versicolor*, etc. Some species like *Cryptolepis elegans*, *Dichroa febrifuga*, *Pottsia cantoniensis*, *Macrosolen cochinchinensis* and *Actinidia callosa* range from China to Malaysia through Meghalaya and some other species, *Boehmeria* sp., *Adenantha pavonina*, *Pholidota imbricata*, *Deeringia amaranthoides*, *Burmanna disticha*, *Haloragis micrantha*, etc. range from Asia to Australia and New Zealand.

The flora of this region has significant affinities with peninsular India and this is shown by the discontinuous distribution of *Kadsura heteroclita*, *Eurya japonica*, *Dillenia indica*, *D. pentagyna*, *Gardneria ovata*, *Helicia nilagirica*, *Xanthophyllum flavescens*, *Elaeocarpus rugosus*, *Aspidopterys indica*, *Munronia pinnata*, *Parnassia wightiana*, *Leea crispa*, *Schefflera wallichiana*, etc. which occur in peninsular India and Assam, especially Meghalaya.

van Steenis (1962) has discussed transpecific floristic affinities in support of the theory of land-bridge across Pacific Ocean, an alternative to the theory of continental drift, in his elaborate essay on the 'Land-bridge theory in botany.' Interesting examples of transpecific dispersal are *Boschniakia*, a root-parasite of *Orobanchaceae*, which has one species in Jaintia hills and E. Himalayas and another solitary one in N.W. America. Similarly *Pyrularia* (*Santalaceae*) has a solitary extra-American species, *P. edulis* in Jaintia hills. The following genera which occur in Jaintia hills have relative species present in the New World also: *Zanthoxylum*, *Berchemia*, *Itea*, *Disporum*, *Gelsemium*, *Buddleia*, *Meliosma*, *Lespedeza*, *Sapindus*, *Eurya*, *Lyonia*, *Lysimachia*, *Hydrangea*, *Aralia*, *Photinia*, *Houttuynia*, *Talauma*, *Saurauia*, *Arisaema*, *Berberis*, *Osmanthus*, *Schoepfia*, *Turpinia*, *Calophyllum*, *Salomonina*, etc.

Affinities with Africa, though comparatively less are shown by *Flacourtia*, *Nepenthes*, *Ochna*, *Dipsacus*, *Meyna*, *Synedrella*, *Heritiera*, *Geniosporum*, *Phoenix*, *Gerbera*, *Sphaeranthus*, *Striga*, etc. and the species, *Cudrania cochinchinensis*, *Albizia lebbek*, *Atylosia scarabaeoides*, *Elatostema sessile*, etc.

Another feature of the flora is its richness. This was remarked about a century ago by Hooker (1854 & 1904). However, at that time, the flora of the E. Himalayas was unknown. As a result of intensive explorations of Botanical Survey of India, in various parts of the E. Himalayas, Sikkim and Bhutan and the more recent work of Japanese botanists (Hara, 1966) in Sikkim and Bhutan, we know now that this richness of Meghalaya flora is shared by the mountain areas of E. Himalayas also.

A striking feature of the flora of Jaintia hills (as also in general of Assam) is the presence of many primitive flowering plants *i.e.* *Manglietia*, *Michelia*, *Alcimandra*, *Paramichelia*, *Talauma*, *Kadsura*, *Sarcandra*, *Holboellia*, *Houttuynia*, *Exbucklandia*, *Loropetalum*, *Corylopsis*, Annonaceae, Myristicaceae, Piperaceae, Lauraceae, etc. Takhtajan, who visited Khasi hills in 1966, has also noticed this significant feature (Takhtajan, 1969: p. 166), and considers the area including Assam, E. Himalayas, Upper Burma, and Yunnan to Fiji Islands in the Pacific, showing excessive concentration of primitive angiosperms, to be the primary centre of origin of angiosperms or to put it in his own words, 'the cradle of flowering plants.'

The floristic subdivisions of India, as accepted by Hooker (1904) are essentially based on Clarke's paper, 'On the sub-subareas of British India' (Clarke, 1898), and includes the western parts of Assam, along with the entire Brahmaputra Valley under his subdivision of Gangetic Plains, and the eastern part with Burma in his subdivision of Burma. Good (1953) in his phytogeographical subdivision of the world, follows essentially Hooker, and combines the eastern part of Assam and Upper Burma together and includes it under the Continental South-east Asiatic Region of his Indo-Malaysian Kingdom.

Thus in most of the accounts of floristic divisions of India, there appears to be more or less a consensus on the Assam (or the North Eastern region) having a distinctive flora, though the boundaries or limits varied from one author to another. Whether this view is correct or is to be modified, has to remain until a detailed investigation is undertaken part by part of this rather difficult countryside with poor communication as yet, and with other handicaps for a botanist. It is clear that there is a need for more detailed studies of small areas, so as to obtain sufficient data for a more confident and decisive recasting of our conception of the Indian flora, apart from many other valuable and enduring useful aspects of such plant inventories.

#### STYLE OF PRESENTATION OF THE FLORA

The sequence of families in this flora follows the system of Bentham and Hooker (1862-83) with some modifications based on recent knowledge. Genera and species are in the same order as they appear in the *Keys*. Short descriptions to only species are provided, based mainly on the specimens studied.

The correct name of the species is followed by its basionym (if any) and reference to the Flora of British India and Flora of Assam, and to recent literature, in some necessary instances. All literature reference following binomials are abbreviated as per 'Guide to citation of literature' of the International Code of Botanical Nomenclature, 1972. Vernacular

names as locally used in *Synteng* or *Khasi* dialects, are indicated wherever known, at the end of citations. Further, habitat notes, altitudinal range within Jowai district, data on flowering and fruiting, are provided. Specimens are cited only in cases of endemics, and some interesting and rare plants. Names of villages or the route are indicated, for collection localities. Also very brief notes pertaining to uses, endemism, etc. are added. Excepting for a few specimens at Kew Herbarium, England (K) and at the Central National Herbarium (CAL) all other specimens, studied for the flora are in the Kanjilal Herbarium of the Botanical Survey of India, Shillong (ASSAM).

Conventional abbreviations to metric measurements have been used: m: metre, cm: centimetre, mm: millimetre,  $\pm$  : means more or less; fl.: flowering, fr.: fruiting, var. is variety.

Except otherwise indicated, measurements refer to length or height or to length times width, thus 'herb 10-50 cm' means that the plants are 10-50 cm high; 'leaves 2.4 x 1.2 cm' means that leaves are 2.4 cm long and 1.2 cm wide.

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## KEY TO FAMILIES

(Note : This key applies only to the plants described in this flora. Some of the families appear more than once in the key.)

- 1a. Plants insectivorous; leaves adapted to catching insects, modified into large pitchers, flat or dish-like sticky structures or bladders.
- 2a. Erect or scandent herbs, terrestrial or in marshy places, 0.5-5.0 m high; apical part of leaf modified into long pitchers; ovary 3-5-celled. NEPENTHACEAE 112
- 2b. Slender herbs, aquatic, in marshy places or on wet rocks, erect, floating or subscandent, not more than 25 cm high; leaves not producing pitchers.
- 3a. Leaves flat, sticky with gland-tipped hairs at margins; petals free, not spurred; fertile stamens 5-20; ovules attached to parietal placentas. DROSERACEAE 61
- 3b. Leaves modified into subovoid bladders with sensitive trap-doors; petals united, spurred at base; fertile stamens 2; ovules on free central placenta. LENTIBULARIACEAE 100
- 1b. Plants not insectivorous; leaves not modified for catching insects.
- 4a. Hemiparasites on aerial parts of host plants. LORANTHACEAE 122
- 4b. Holoparasites, on roots of host plants, saprophytes or normal green plants.
- 5a. Holoparasitic plants, devoid of chlorophyll, attached to roots of hosts plants.
- 6a. Flowers 1-5 cm long, solitary or in racemes or spikes, bisexual; ovules numerous; fruit capsular. OROBANCHACEAE 99
- 6b. Flowers minute, in spadices, unisexual; ovules 1-3; fruit a nut. BALANOPHORACEAE 124
- 5b. Normal green plants or plants green with chlorophyll for at least part of their life cycle, or if devoid of chlorophyll then saprophytic (in *Aphyllorchis* of Orchidaceae).
- 7a. Stems spurious, composed of tightly convolute leaf sheaths; inflorescence solitary, arising from the underground rhizome through the centre of the spurious stem, emerging at top, bearing many large spathaceous closely imbricate bracts; stamens 5 with 1 staminode. MUSACEAE 142
- 7b. Not this combination of characters.
- 8a. Tall erect shrubs or trees or climbers or twiners; leaves spirally arranged, with large stem-embracing sheaths; leaf-blade usually deeply pinnati- or palmatifid or lobed, or 2-4-pinnatifid, parallel-veined; perianth in 2 whorls of 3 each, hard and rigid. ARECACEAE 156
- 8b. Not this combination of characters.
- 9a. Herbs with underground rhizomes or woody climbers, climbing with the help of adventitious roots; flowers very minute, unisexual or bisexual, collected on fleshy spadices and subtended by a large spathaceous bract attached to the apex of peduncle. ARACEAE 159
- 9b. Not this combination of characters.
- 10a. Herbaceous aquatics rooting at bottom-mud; leaves floating, in radical rosettes or distant on creeping rhizome, simple, peltate or cordate, palmatinerved, not split into narrow segments; petioles very long; flowers axillary, solitary, more than 2.5 cm diam., showy; peduncles long; petals 3 or more, free; stamens 10 or more. NYMPHAEACEAE 9
- 10b. Not this combination of characters.

- 11a. Stamens and stigma much modified, and scarcely recognisable as such, attached to each other and forming a special structure.
- 12a. Leaves parallel-veined; flowers irregular, the lower (rarely upper) petal differing from the other two in size or shape or colour; ovary inferior, 3-celled, appearing below the perianth. ORCHIDACEAE 139
- 12b. Leaves net-veined; flowers regular; the 5 petals alike; ovary superior, 2-celled, located above the perianth, but usually concealed inside a corona. ... ASCLEPIADACEAE 92
- 11b. Stamens and stigma distinguishable.
- 13a. Flowers minute, pentamerous, in simple or compound umbels or heads; corolla polypetalous; stamens 5, opposite to petals, incurved in bud; ovary inferior.
- 14a. Carpels consistently 2; fruit a dry schizocarp with carpels separating at maturity, leaving a carpophore; stigma with stylopodium at base. ... APIACEAE 74
- 14b. Carpels 1-many, mostly 5; fruits drupaceous or laccate; carpels sometimes separating but without carpophore; stigmas without a stylopodium at base. ... ARALIACEAE 75
- 13b. Not this combination of characters.
- 15a. Flowers bisexual in involucrate heads; corolla gamopetalous; stamens epipetalous at base of corolla-tube; ovary inferior; fruit a 1-seeded achene with persistent calyx modified into pappus hairs.
- 16a. Stamens 5; anthers connate or connivent into a tube around the style ... ASTERACEAE 81
- 16b. Stamens 2-4; anthers free. ... DIPACACEAE 80
- 15b. Not this combination of characters.
- 17a. Grass or bamboo or such-like plants; leaves linear or linear-lanceolate, parallel-veined, sometime reduced to a sheath.
- 18a. Flowers in axils of chaffy scale-like bracts and entirely or largely concealed by them; perianth absent or consisting of 2-3 small scales or bristles.
- 19a. Stem mostly solid and triquetrous at least at base; flowers in axils of solitary bracts and these collected into spikelets; anthers basifixed. ... CYPERACEAE 164
- 19b. Stem with hollow internodes, usually terete; flowers enclosed by a bract and bractlets (lemma and palea) and arranged in spikelets; anthers usually basifixed or versatile. ... POACEAE 165
- 18b. Flowers either not in the axils of chaffy bracts or if subtended by bracts, exceeding or equalling them and not concealed; perianth present, 4-6.
- 20a. Aquatic rhizomatous herbs; fruit 1-seeded achene. ... SPARGANIACEAE 158
- 20b. Marshy or rarely aquatic herbs; fruits 2-many-seeded capsules.
- 21a. Sepals and petals not scale-like; at least petals conspicuous and yellow. ... XYRIDACEAE 153
- 21b. Sepals and petals scale-like, none of them conspicuously petaloid, usually green or brown or white.
- 22a. Flowers bisexual, in repeatedly branched panicle or umbel of heads. ... JUNCACEAE 155
- 22b. Flowers unisexual, in solitary button-like head at the summit of each scape. ... ERIOGAULACEAE 163
- 17b. Not grass or bamboo or such-like plants.
- 23a. Leaves spirally arranged, distichous or alternate, never opposite or whorled; carpel solitary, 1-celled; fruit typically a legume or lomentum.
- 24a. Flowers papilionaceous. ... FABACEAE 53
- 24b. Flowers not papilionaceous.



- 25a. Flowers zygomorphic; perianth segments predominantly imbricate in bud. ... CAESALPINIACEAE 54
- 25b. Flowers actinomorphic; calyx and corolla valvate in bud. ... MIMOSACEAE 55
- 23b. Not this combination of characters.
- 26a. Plants climbing with the help of tendrils.
- 27a. Tendrils developing from the apex of leaf-sheaths; flowers 3-merous. ... SMILACACEAE 151
- 27b. Tendrils not at apex of leaf-sheaths; flowers 5-merous.
- 28a. Petioles tendrillar. ... RANUNCULACEAE 1
- 28b. Petioles not tendrillar.
- 29a. Fruits 1-seeded.
- 30a. Leaves distichous, peltate or subpeltate at base ... OLACACEAE 40
- 30b. Leaves opposite or subopposite, not peltate at base. ... ICACINACEAE 41
- 29b. Fruits 2- or more-seeded.
- 31a. Leaves decomposed; rachis ending in tendrils; fruits capsular, pod-like, torulose. ... FUMARIACEAE 11
- 31b. Leaves simple, tendril distinct from petiole; fruits variously shaped.
- 32a. Fruits 3-winged; capsules separating into 1-seeded indehiscent cocci. ... RHAMNACEAE 44
- 32b. Fruits wingless, fleshy.
- 33a. Stem sympodial in growth; corolla valvate, free; stamens free, not on gynophore; ovules on axile placenta. ... VITACEAE 45
- 33b. Stems monopodial in growth; corolla imbricate or if valvate, then gamopetalous; filaments completely or partly united, often on gynandrophore.
- 34a. Flowers with corona; ovary superior; seeds arillate. ... PASSIFLORACEAE 71
- 34b. Flowers without corona; ovary inferior; seeds not arillate. ... CUCURBITACEAE 72
- 26b. Plants not climbing, or if climbing, then not with tendrils.
- 35a. Gynoecium consisting of 2 or more free pistils, each of 1-celled carpel.
- 36a. Plants with milky latex; corolla gamopetalous; carpels free with connate styles. ... APOCYNACEAE 91
- 36b. Plants without milky latex; corolla polypetalous; carpels free, with separate styles and stigmas.
- 37a. Aquatic or marshy plants; leaves parallel-veined.
- 38a. Aquatic plants with floating leaves; flowers in spikes, brown; stamens 1-4; carpels 4. ... POTAMOGETONACEAE 162
- 38b. Marshy or aquatic plants; leaves not floating; flowers in umbels, racemes or panicles, white; stamens 6-9; carpels 10 or more.
- 39a. Leaves oblong-lanceolate; flowers in whorls or umbels on elongated peduncles; fruits of many follicles. ... BUTOMACEAE 161
- 39b. Leaves hastate-sagittate, ovate or orbicular; flowers in racemes or panicles; fruits of many achenes. ... ALISMACEAE 160
- 37b. Non-aquatic and non-marshy plants; leaves net-veined.
- 40a. Flowers unisexual or bisexual; sepals often petaloid; filaments connate into a gynophore, at apex of which the sessile anthers and/or pistils are inserted; fruits large woody follicles. ... STERCULIACEAE 27
- 40b. Not this combination of characters.
- 41a. Calyx connate into a tube; stamens perigynous. ... ROSACEAE 56
- 41b. Calyx not connate into a tube; stamens hypogynous.

- 42a. Stamens 11 or more; usually numerous.
- 43a. Flowers unisexual; carpels not completely closed along ventral margin. ... SCHIZANDRACEAE 4
- 43b. Flowers bisexual; carpels completely closed along the ventral margin.
- 44a. Leaves stipulate.
- 45a. Stipules intrapetiolar; flowers in many-flowered cymes; filaments terete. ... OCOTINACEAE 38
- 45b. Stipules not intrapetiolar; flowers solitary or paired; filaments flat. ... MAGNOLIACEAE 3
- 44b. Leaves exstipulate.
- 46a. Herbs or woody vines; leaves pinnately compound, ternate or if simple, then petioles tendrillar. ... RANUNCULACEAE 1
- 46b. Trees or shrubs; leaves simple; petioles never tendrillar.
- 47a. Sepals 3, valvate, usually caducous; seeds with copious ruminant endosperm. ... ANNONACEAE 5
- 47b. Sepals 5, imbricate, persistent; seeds without ruminant endosperm. ... DILLENACEAE 2
- 42b. Stamens 10 or less.
- 48a. Leaves digitately 3-7-foliolate. ... LARDIZABALACEAE 8
- 48b. Leaves not so.
- 49a. Leaves pellucid-punctate with oil glands (visible when seen through against light). ... RUTACEAE 56
- 49b. Leaves not pellucid-punctate.
- 50a. Slender twining herbs or shrubs; leaves usually palmately nerved. ... MENISPERMACEAE 6
- 50b. Trees, shrubs or scandent stout shrubs, never twining; leaves pinnately nerved.
- 51a. Flowers unisexual or polygamous; styles lateral. ... SIMAROUBACEAE 37
- 51b. Flowers bisexual; styles terminal or subterminal.
- 52a. Panicles axillary or in axils of fallen leaves; seeds arillate. ... CONNARACEAE 52
- 52b. Panicles terminal; seeds not arillate.
- 53a. Leaves spirally arranged; fertile stamens 1-2. ... ANACARDIACEAE 51
- 53b. Leaves opposite; fertile stamens 5. ... STAPHYLEACEAE 49
- 35b. Gynoecium consisting of one pistil of one carpel, or 2 or more carpels united completely; styles connate at least basally.
- 54a. Calyx and corolla not prominently differentiated; either calyx or corolla or both absent (to page 45).
- 55a. Ovary semi-inferior or inferior (to page 42).
- 56a. Ovary semi-inferior.
- 57a. Anther-cells opening by 1 or 2 superposed lateral flaps; gynoecium of 1 pistil of 1 carpel. ... LAURACEAE 118
- 57b. Anther-cells opening by longitudinal slits or valves, never by flaps; gynoecium of 2-many united carpels.
- 58a. Leaves exstipulate; pinnately nerved with an intramarginal nerve. ... MYRTACEAE 65
- 58b. Leaves stipulate, palmately nerved, without an intramarginal nerve. ... HAMAMELIDACEAE 62
- 56b. Ovary inferior.
- 59a. Stems twining, with huge subterranean tubers; flowers in long spikes, racemes or panicles of spikes; capsules with 3 wings. ... DIOSCOREACEAE 148
- 59b. Not this combination of characters.

- 60a. Leaves 1-2 m long, crowded on short stem, sessile, with apical spine and tiny recurved spines at margins; panicles terminal, 5-8 m long. ... ACAYACEAE 146
- 60b. Not this combination of characters.
- 61a. Leaves in basal rosettes, on subterranean tubers or bulbs; flowers pedicelled, umbellate on long peduncles; perianth gamophyllous.
- 62a. Leaves sessile, linear, ensiform, 2-4 cm broad. ... AMARYLLIDACEAE 145
- 62b. Leaves long-petioled, elliptic or oblong-ovate, 7-20 cm broad. ... TACCACEAE 147
- 61b. Not this combination of characters.
- 63a. Marshy plants; leaves in basal rosettes, linear-lanceolate; perianth-tube trigonous or 3-winged. ... BURMANNIACEAE 138
- 63b. Not this combination of characters.
- 64a. Rhizomatous herbs; leaves parallel-veined.
- 65a. Leaves without a distinct midrib; flowers actinomorphic; perianth free to base; fertile stamens 3. ... HYPOXIDACEAE 144
- 65b. Leaves with a distinct midrib; flowers zygomorphic; perianth tubular at base; fertile stamen 1.
- 66a. Sepals united into a tube; anthers 2-locular. ... ZINGIBERACEAE 140
- 66b. Sepals free or at most connivent; anther 1-locular.
- 67a. Ovules solitary in each cell; fruit utricular, 1-seeded. ... MARANTACEAE 141
- 67b. Ovules numerous in each cell; fruit capsular, many-seeded. ... CANNACEAE 143
- 64b. Non-rhizomatous plants; leaves net-veined.
- 68a. Flowers in large numbers completely concealed within a common receptacle (syconia); each syconium with an apical pore (ostiole), which is covered by congested scales. ... MORACEAE 129.
- 68b. Flowers not entirely concealed within a common receptacle.
- 69a. Leaves stipulate (often caducous and hence obscure young leaves); stipular scars visible.
- 70a. Flowers bisexual.
- 71a. Leaves alternate. ... HAMAMELIDACEAE 62
- 71b. Leaves opposite. ... CHLORANTHACEAE 116
- 70b. Flowers unisexual.
- 72a. Stamens and ovules numerous. ... BEGONIACEAE 73
- 72b. Stamens and ovules few.
- 73a. Male flowers with a perianth.
- 74a. Ovule 1 in the ovary; stamens often inflexed in bud. ... MORACEAE 129
- 74b. Ovules 2 in each cell of the ovary; stamens not inflexed in bud. ... FAGACEAE 134
- 73b. Male flowers without perianth.
- 75a. Flowers mostly capitate; fruits capsular. ... HAMAMELIDACEAE 62
- 75b. Flowers in catkins; fruit a nut, enclosed in foliaceous accrescent involucre. ... CORYLACEAE 135
- 69b. Leaves without stipules; stipular scars absent.
- 76a. Leaves opposite and gland-dotted. ... MYRTACEAE 65
- 76b. Leaves alternate or if opposite, then not gland-dotted.
- 77a. Perianth variously tubular in lower half; ovules numerous on axile placentas. ... ARISTOLOCHIACEAE 113
- 77b. Perianth not so; ovules solitary or few; usually inserted at top or base of ovary.
- 78a. Stamens erect in bud, same number as the perianth lobes. ... SANTALACEAE 123
- 78b. Stamens with filaments inflexed in bud, often double the number of perianth lobes. ... COMBRETACEAE 64
- 55b. Ovary superior (from page 41).

- 79a. Perennial woody, often branched shrubs or small trees; branches with annual leaf-scars; leaves crowded at the top of stem or branches, sessile or shortly petioled, linear-lanceolate, acuminate, longitudinally parallel-veined.
- 80a. Stems with prop roots; leaves sharply aculeate at margins and on midrib beneath, more than 60 cm long; flowers in spadices, subtended by spathe. ... PANDANACEAE 157
- 80b. Stems without prop roots; leaves not aculeate, less than 60 cm long; flowers in panicles or racemes. ... AGAVACEAE 146
- 79b. Not this combination of characters.
- 81a. Slender unarmed climbers; leaves cordate or subcordate at base, palmately nerved from apex of petiole.
- 82a. Leaves opposite; flowers large, 5-6 cm, on 5-7 cm long pedicels. ... STEMONACEAE 140
- 82b. Leaves spirally arranged; flowers minute, up to 6 mm, on up to 5 mm long pedicels. ... MENISPERMACEAE 6
- 81b. Not this combination of characters.
- 83a. Terrestrial moist-loving herbs with bright-coloured showy flowers; posterior sepal nectariferous, saccate to long curved-tubular calcarate; capsules explosively dehiscent. ... BALSAMINACEAE 35
- 83b. Not this combination of characters.
- 84a. Perianth absent, or represented by 1-2 glands only, no milky juice (either white, yellow or brown).
- 85a. Leaves compound. ... JUGLANDACEAE 131
- 85b. Leaves simple.
- 86a. Leaves opposite or verticillate. ... PIPERACEAE 114
- 86b. Leaves otherwise.
- 87a. Trees or shrubs; branchlets studded with yellow glands; leaves not peltate; flowers in catkins; stamens in male flowers; 2-4; filaments connate at base; style deeply bifid. ... MYRICACEAE 132
- 87b. Not this combination of characters.
- 88a. Trees; leaves finely sinuate-crenate. ... SALICACEAE 136
- 88b. Shrubs or herbs; leaves quite entire.
- 89a. Spikes with a basal whorl of 4 patent white bracts; seeds 2-4 in each fruit. ... SAURURACEAE 115
- 89b. Spikes without such bracts; seeds solitary in each fruit. ... PIPERACEAE 114
- 84b. Not this combination of characters.
- 90a. Trees; leaves spirally arranged, simple, double-serrate; flowers in catkins; male catkins in terminal racemes or panicle of racemes, drooping; female flowers closely packed, subtended by a bract and 4 bractcoles, these enlarged and woody in fruit; fruit narrowly winged, 1-seeded. ... BETULACEAE 133
- 90b. Not this combination of characters.
- 91a. Aquatic or marshy plants with creeping branched rhizomes; each branch of rhizome bearing at its apex a single hastate or sagittate leaf; flowers pale blue, in 30-60-flowered terminal racemes or umbels. ... PONTEDERIACEAE 152
- 91b. Not this combination of characters.
- 92a. Leaves compound. ... SIMAROUBACEAE 37
- 92b. Leaves simple.
- 93a. Herbs, shrubs or climbers; leaves spirally arranged with intrapetiolar amplexicaul ochraceous stipule; perianth 4-6, less than 1 cm at anthesis; stamens 6-9, surrounding a crenate disk; styles 2-3; fruit 1-seeded biconvex or trigonous nut. ... POLYGONACEAE 111
- 93b. Not this combination of characters.

- 94a. Scandent xerophytic shrubs; leaves reduced to minute membranous scales, each leaf in its axil with 1-15 subulate sickle-shaped or linear-lanceolate flat or triquetrous cladodes; flowers 2-5 mm across, pale yellow or white; berries 5-8 mm diam., red. ... LILIACEAE 150
- 94b. Not this combination of characters.
- 95a. Herbs, usually with subterranean bulbs, tubers or rhizomes; leaves parallel-veined; flowers 3-merous; fruits many-seeded.... LILIACEAE 150
- 95b. Not this combination of characters.
- 96a. Ovules attached to the outer wall or walls of the ovary.
- 97a. Stamens 4; staminodes absent; ovary and fruit stipitate. ... PROTEACEAE 119
- 97b. Stamens 6 or more; staminodes present; ovary and fruit sessile. ... FLACOURTIACEAE 16
- 96b. Ovules attached to the central axis or to near the base of ovary, if 1-ovuled, than pendulous or basal, erect.
- 98a. Leaves opposite.
- 99a. Slender diffusely branched glandular-pubescent herbs; leaves ovate, orbicular or reniform; filaments connate at base into a shallow cup; ovary 1-celled; ovules many on free central placenta. ... CARYOPHYLLACEAE 19
- 99b. Not this combination of characters.
- 100a. Ovary 1-celled, 1-ovuled, or rarely many ovuled.
- 101a. Stamens numerous, double the number of perianth-lobes; anther-cells opening by 1-2 superposed lateral flaps. ... LAURACEAE 118
- 101b. Stamens up to 5, same number as the perianth-lobes; anther-cells opening by longitudinal slits.
- 102a. Herbs or undershrubs, prostrate, erect or climbing, without milky juice; leaves exstipulate; flowers clustered or solitary along spikes or catkins, subtended by scarious or spinescent bracts and bracteoles; perianth pellucid-dotted; filaments free or basally united; ovary 1- or many-ovuled. ... AMARANTHACEAE 109
- 102b. Not this combination of characters.
- 103a. Mostly herbaceous plants, with fibrous stems; ovules erect. ... URTICACEAE 130
- 103b. Mostly shrubs or trees; ovule pendulous. ... MORACEAE 129
- 100b. Ovary 2- or more-celled; 2- many-ovuled.
- 104a. Trees; fruit a double samara with 2, 1-seeded winged mericarps. ... ACERACEAE 48
- 104b. Not this combination of characters.
- 105a. Trees, erect or scandent, often armed with spiny stipules; flowers with prominent nectariferous intrastaminal disk; stamens opposite to petals and adnate to them at base. ... RHAMNACEAE 44
- 105b. Not this combination of characters.
- 106a. Trees; leaves exstipulate; flowers in paniculate racemes; seeds many in each capsule. ... CRYPTERONIACEAE 69
- 106b. Herbs; leaves stipulate; flowers enclosed inside an involucre cup (cyathium); seeds 3 in each capsule. EUPHORBACEAE 127
- 98b. Leaves spirally arranged, alternate, radical or rarely in pseudo-whorls or some leaves subopposite.
- 107a. Leaves pinnately compound. ... SAPINDACEAE 47
- 107b. Leaves otherwise.
- 108a. Flowers perigynous, with prominent nectariferous disk; stamens same number as sepals, opposite to petals and alternate with sepals. ... RHAMNACEAE 44
- 108b. Not this combination of characters.
- 109a. Ovary 2- or more-celled.

- 110a. Scapigerous herbs with basal rosette of leaves; petiole sheathing at base; sepals and petals scarious. ... PLANTAGINACEAE 100
- 110b. Not this combination of characters.
- 111a. Plants often with milky sap; stipules usually present (often early caducous); styles 3 or more; fruit a dry capsule or rarely a drupe, 3-12-celled, 3-24-seeded; seeds often carunculate. ... EUPHORBACEAE 127
- 111b. Plants with watery sap; stipules never present; styles 2 or absent; fruit drupaceous, 2-3-celled, 1-2-seeded; seeds never carunculate.
- 112a. Leaves crowded at apex of branches, penninerved; staminodes present in female flowers; ovary incompletely 2-celled; stigma sessile. ... DAPHNIPHYLLACEAE 126
- 112b. Leaves alternate, distichous, trinerved at base; staminodes absent in female flowers; ovary 2-3-celled; style present. ... BUXACEAE 125
- 109b. Ovary 1-celled.
- 113a. Stipules present, often early caducous, then stipular scars present.
- 114a. Filaments erect in bud.
- 115a. Plants often with milky sap; flowers unisexual. ... MORACEAE 129
- 115b. Plants with watery sap; flowers bisexual. ... ULMACEAE 128
- 114b. Filaments inflexed in bud.
- 116a. Trees or shrubs, with milky sap; ovules pendulous. ... MORACEAE 129
- 116b. Herbs or undershrubs, with watery sap; ovules erect. ... URTICACEAE 130
- 113b. Stipules absent; never with stipular scars.
- 117a. Herbs; fruits minute, membranous-walled utricles.
- 118a. Leaves membranous, thin; perianth scarious and dry; flowers always with scarious hyaline bracts and bracteoles; anthers 1-2-celled. ... AMARANTHACEAE 109
- 118b. Leaves often fleshy; flowers rarely bracteate; perianth membranous, herbaceous, coriaceous or fleshy, never scarious; anthers 2-4-celled. ... CHENOPODIACEAE 110
- 117b. Trees or shrubs; fruits large, a drupe, berry or capsule.
- 119a. Stamens with filaments connate into a solid central column or anthers sessile; seeds arillate. ... MYRISTICACEAE 117
- 119b. Stamens attached to the mouth of perianth-tube, free among themselves; seeds not arillate.
- 120a. Flowers racemose or if fascicled, then without an envelope of involucrel bracts; stamens in 1 whorl of 4 anthers; ovules erect. ... ELAEAGNACEAE 121
- 120b. Flowers in pseudo-umbellate heads, often surrounded by an envelope of involucrel bracts; stamens usually in 2 or more whorls of 4 anthers each.
- 121a. Anther-cells opening by 1 or 2 superposed lateral flaps. ... LAURACEAE 118
- 121b. Anther-cells opening by longitudinal lateral slits. ... THYMELAEACEAE 120
- 54b. Calyx and corolla prominently differentiated, not connected by intermediates (from page 41).
- 122a. Ovary inferior or semi-inferior (to page 47).
- 123a. Rhizomatous herbs; leaves 2-ranked, parallel-veined; fertile stamen 1, 2 stamens connate and modified into a large lip-like staminode. ... ZINGIBERACEAE 140
- 123b. Not this combination of characters.
- 124a. Corolla gamopetalous.
- 125a. Ovary 1-celled.
- 126a. Leaves pinnately or bipinnately compound or at least the upper leaves pinnatipartite or pinnate.

- 127a. Herbs with hollow rhizomes; leaves partly in a basal rosette, higher ones pinnate or pinnatifid or partite; stamens 3. VALERIANACEAE 79
- 127b. Shrubs or undershrubs without rhizome and without basal rosette of leaves; leaves pinnate or imperfectly bipinnate; stamens 5. ... CAPRIFOLIACEAE 77
- 126b. Leaves simple. ...
- 128a. Ovules solitary, pendulous from the top of ovary. ... CAPRIFOLIACEAE 77
- 128b. Ovules 5 or more, immersed in central or parietal placenta.
- 129a. Herbs with subterranean rhizomes; leaves radical, parallel-veined. ... TACCAGEAE 147
- 129b. Trees or shrubs without subterranean rhizomes; leaves always cauline, net-veined. ... MYRSINACEAE 85
- 125b. Ovary 2- or more-celled.
- 130a. Herbs with subterranean bulbs, tubers or rhizomes; leaves parallel-veined; flowers 3-merous; ovules on parietal placentas. ... LILIACEAE 150
- 130b. Not this combination of characters.
- 131a. Leaves mostly opposite, rarely verticillate, stipules usually connate, interpetiolar or rarely intrapetiolar, rarely leaf-like and forming a pseudo-whorl with leaves. ... RUBIACEAE 78
- 131b. Not this combination of characters.
- 132a. Stamens epipetalous, more than twice as many as corolla-lobes, usually 15; ovules pendulous. ... SYMPLOGACEAE 88
- 132b. Stamens free from corolla, as many as corolla-lobes or twice as many, 5 or 10; ovules axile.
- 133a. Herbs or undershrubs; stamens as many as corolla-lobes, usually 5; anther-cells opening longitudinally. ... CAMPANULACEAE 82
- 133b. Shrubs or trees; stamens twice as many as corolla-lobes, usually 10; anther-cells opening by round or slit-like pores. ERICACEAE 83
- 124b. Corolla polypetalous.
- 134a. Acaulous aquatic herbs; leaves radical, parallelveined. HYDROCHARITACEAE 137
- 134b. Not this combination of characters.
- 135a. Leaves opposite or verticillate.
- 136a. Leaves stipulate.
- 137a. Stamens same number as and opposite to petals. ... RHAMNACEAE 44
- 137b. Stamens same number as and alternate with petals or more numerous.
- 138a. Stipules interpetiolar; ovules pendulous. ... RHIZOPHORACEAE 63
- 138b. Stipules not interpetiolar; ovules ascending or attached to central axis. ... ROSACEAE 56
- 136b. Leaves exstipulate.
- 139a. Stamens numerous in several series. ... MYRTACEAE 65
- 139b. Stamens twice as or same number as petals, rarely-less.
- 140a. Anthers opening by apical pores. ... MELASTOMATACEAE 67
- 140b. Anthers opening longitudinally.
- 141a. Aquatic or marshy plants; fruit a nutlet. ... HALORAGACEAE 60
- 141b. Not this combination of characters.
- 142a. Ovule solitary in each cell. ... CORNACEAE 76
- 142b. Ovules 2 or more in each cell.
- 143a. Stamens erect in bud; fruit a loculicidal capsule, many-seeded. ... HYDRANGEACEAE 57
- 143b. Stamens inflexed in bud; fruit a dry indehiscent pseudocarp, 1-seeded. ... COMBRETACEAE 64
- 135b. Leaves alternate, spirally arranged or all radical.
- 144a. Leaves stipulate.

145a. Stamens same number as and opposite to petals. ...	RHAMNACEAE	44
145b. Stamens same number as and alternate with petals or more numerous.		
146a. Flowers capitate; ovary composed of 2 carpels, more or less free at apex. ...	HAMAMELIDACEAE	62
146b. Flowers not capitate; ovary composed of 2 or more carpels, completely united.		
147a. Flowers unisexual, often zygomorphic; fruit a winged capsule, often 3-4-horned. ...	BEGONIACEAE	73
147b. Flowers bisexual, actinomorphic; fruit never winged or horned.	ROSACEAE	56
144b. Leaves exstipulate.		
148a. Stamens numerous.		
149a. Leaves gland-dotted or pellucid-punctate. ...	MYRTACEAE	65
149b. Leaves neither gland-dotted, nor pellucid-punctate. ...	BARRINGTONIACEAE	66
148b. Stamens definite, the same number as or twice as many as petals, rarely fewer.		
150a. Stamens opposite to petals. ...	OLACACEAE	40
150b. Stamens alternate with petals.		
151a. Stamens same number as petals.		
152a. Petals 5; stamens 5; fruit a capsule. ...	ITEACEAE	58
152b. Petals 4; stamens 4; fruit a drupe. ...	CORNACEAE	76
151b. Stamens twice as many as petals.		
153a. Herbs; filaments erect in bud; ovary 4-celled. ...	ONAGRACEAE	70
153b. Shrubs or trees; filaments incurved in bud; ovary 1-celled.	COMBRETACEAE	64
122b. Ovary superior (from page 45).		
154a. Petals all connate, at least at base, into a lobed tube or cup, or there is only a single petal present (to page 50).		
155a. Ovules parietal, attached to the outer wall or walls of ovary (to page 48).		
156a. Stamens free from corolla-tube.		
157a. Ovary composed of one carpel. ...	MENISPERMACEAE	6
157b. Ovary composed of more than one carpel.		
158a. Stamens numerous, more than twice the number of corolla-lobes. ...	FLACOURTIACEAE	16
158b. Stamens definite in number in relation to corolla-lobes.		
159a. Anther-cells opening by terminal pores. ...	POLYGALACEAE	18
159b. Anther-cells opening by longitudinal slits.		
160a. Anther-connective not produced into an appendage. ...	PITTOFORACEAE	17
160b. Anther-connective produced into an appendage. ...	VIOLACEAE	14
156b. Stamens inserted on the corolla-tube or adnate to its base.		
161a. Stamens double the number of corolla-lobes or more numerous. ...	POLYGALACEAE	18
161b. Stamens same number as the corolla-lobes or fewer.		
162a. Corolla actinomorphic; stamens 4 or 5.		
163a. Ovules 1 or 2 in each cell. ...	VERBENACEAE	106
163b. Ovules numerous.		
164a. Trees or woody climbers. ...	BIGNONIACEAE	102
164b. Herbs. ...	GENTIANACEAE	94
162b. Corolla zygomorphic; stamens 2 or 4.		
165a. Stems and branches 4-angled; ovules 1 - 2 on each placenta. ...	VERBENACEAE	106
165b. Stems and branches terete; ovules numerous on each placenta.		
166a. Mostly trees or shrubs or woody climbers; leaves compound; seeds winged. ...	BIGNONIACEAE	102
166b. Mostly herbs; often epiphytic; leaves simple; seeds not winged.		



- 167a. Pedicels with glands at base; anther-cells parallel. ... PEDALIACEAE 103  
 167b. Pedicels without glands at base; anther-cells divaricate. ... GESNERIACEAE 101  
 155b. Ovules axile, attached to the central axis or near to the base of ovary, or sometimes to the top; rarely only one ovule present. (from page 47).  
 168a. Corolla distinctly zygomorphic.  
 169a. Ovary vertically deeply 4-lobed; style gynobasic.  
 170a. Leaves spirally arranged or partly opposite often with bulbous-based hairs. ... BORAGINACEAE 95  
 170b. Leaves always opposite, without such hairs. ... LAMIACEAE 107  
 169b. Ovary not vertically lobed; style not gynobasic.  
 171a. Lower sepal modified into a nectariferous sac or long spur. ... BALSAMINACEAE 35  
 171b. Lower sepal not saccate nor spurred.  
 172a. Stamens as many as or more than corolla-lobes.  
 173a. Leaves compound. ... BIGNONIACEAE 102  
 173b. Leaves simple.  
 174a. Stamens free from corolla; anther-cells opening by apical pores. ... ERICACEAE 83  
 174b. Stamens inserted on corolla; anther-cells not opening by apical pores.  
 175a. Corolla-lobes valvate or contorted. ... SOLANACEAE 97  
 175b. Corolla-lobes imbricate or folded. ... SCROPHULARIACEAE 98  
 172b. Stamens fewer than corolla-lobes.  
 176a. Filaments more or less monadelphous and tube split at adaxial side. ... POLYGALACEAE 18  
 176b. Filaments not monadelphous.  
 177a. Leaves often with cystoliths; seeds inserted on hardened out-growths from central axis, (retinacula). ... ACANTHACEAE 105  
 177b. Leaves without cystoliths; seeds not inserted on retinacula.  
 178a. Ovary many-ovuled. ... SCROPHULARIACEAE 98  
 178b. Ovary cells 1- or 2-ovuled.  
 179a. Fruit a capsule, crowned by a long seedless solid beak. THUNBERGIACEAE 104  
 179b. Fruit a drupe or schizocarp without such beak. VERBENACEAE 106  
 168b. Corolla actinomorphic.  
 180a. Stamens twice the number of petals or more than twice or rarely reduced to same number and the rest modified to staminodes.  
 181a. Stamens twice the number of petals or reduced to same number with equal number of staminodes.  
 182a. Leaves gland-dotted; disk conspicuous between stamens and ovary. ... RUTACEAE 36  
 182b. Leaves not gland-dotted; disk not conspicuous or absent.  
 183a. Leaves compound; filaments connate into a cylindrical tube. ... MELIACEAE 39  
 183b. Leaves simple; filaments not connate into a tube.  
 184a. Succulent herbs, or herbs with subterranean bulbs, tubers or rhizomes; leaves parallel-veined.  
 185a. Ovules uniseriate in each cell of ovary; rarely solitary. ... COMMELINACEAE 154  
 185b. Ovules biseriate in each cell of ovary; never solitary. ... LILIACEAE 150  
 184b. Not this combination of characters.  
 186a. Anther-cells opening by apical pores. ... ERICACEAE 83  
 186b. Anther-cells opening by longitudinal slits. ... STYRACACEAE 89  
 181b. Stamens more than twice as many as petals.  
 187a. Flowers unisexual. ... EUPHORBIACEAE 127  
 187b. Flowers bisexual.

188a. Anther-cells opening by terminal pores or by transverse slits at apex.		
189a. Filaments glabrous; anthers dorsifixed; fruit a berry or capsule; seeds many.	...	SAURAUACEAE 24
189b. Filaments puberulous; anthers basifixed; fruit a drupe; seed solitary in each cell.	...	ELAEOCARPACEAE 29
188b. Anther-cells opening by longitudinal slits.		
190a. Sepals imbricate.	...	THEACEAE 23
190b. Sepals valvate.		
191a. Anthers 1-celled.	...	MALVACEAE 26
191b. Anthers 2-celled.	...	STERCULIACEAE 27
180b. Stamens same number as petals or less.		
192a. Stamens opposite petals.		
193a. Succulent herbs or herbs with subterranean rhizomes, tubers or bulbs; leaves parallel-veined.		
194a. Ovules uniseriate in each cell of ovary, or rarely solitary.	...	COMMELINACEAE 154
194b. Ovules biseriate in each cell of ovary, never solitary.	...	LILIACEAE 150
193b. Not this combination of characters.		
195a. Slender twining climbers; leaves usually palmately nerve.	...	MENISPERMACEAE 6
195b. Not this combination of characters.		
196a. Leaves gland-dotted.	...	RUTACEAE 36
196b. Leaves not gland-dotted.		
197a. Sepals imbricate, free.	...	THEACEAE 23
197b. Sepals valvate, connate with each other at least partly.		
198a. Ovules 2 or more in each cell of the whole ovary; style mostly undivided.		
199a. Herbs.	...	PRIMULACEAE 84
199b. Trees or shrubs.	...	MYRSINACEAE 85
198b. Ovule solitary in the whole ovary or in each cell of the ovary; style often lobed.		
200a. Herbs.	...	PORTULACACEAE 20
200b. Trees or shrubs.		
201a. Leaves compound; inflorescence leaf-opposed.	...	LEEACEAE 46
201b. Leaves simple; inflorescences not leaf-opposed.		
202a. Flowers mostly unisexual; stamens free from or attached only to the base of the corolla-tube; corolla-lobes contorted in bud.	...	EBENACEAE 87
202b. Flowers bisexual; stamens inserted on the corolla; corolla-lobes imbricate in bud.	...	SAPOTACEAE 86
192b. Stamens alternate with petals.		
203a. Leaves opposite or verticillate.		
204a. Ovary 1-celled with 2 ovules.	...	ICACINACEAE 41
204b. Ovary 2- or more-celled, with 2 or more ovules in each cell.		
205a. Ovules many in each cell.		
206a. Anther-cells opening by longitudinal slits.	...	LOGANIACEAE 93
206b. Anther-cells opening by terminal pores.	...	GENTIANACEAE 94
205b. Ovules 2 in each cell.		
207a. Leaves pinnately compound or simple; stamens 2.	...	OLEACEAE 90
207b. Leaves simple; stamens 3-5.	...	CELASTRACEAE 43
203b. Leaves alternate or spirally arranged.		
208a. Anther-cells opening by terminal pores.	...	ERICACEAE 83
208b. Anther-cells opening by longitudinal slits.		
209a. Filaments connate into a tube with 5 stamens and 5 staminodes.	...	STERCULIACEAE 27
209b. Filaments not connate into a tube, never with staminodes.		

- 210a. Filaments connate at base only. ... LINACEAE 30
- 210b. Filaments entirely free from each other.
- 211a. Erect or scandent herbs or shrubs, often twining; corolla funnel-shaped or salver-shaped, plaited or twisted in bud, often with intrastaminal disk; ovary 1-4-celled, 4-ovuled. ... CONVOLVULACEAE 96
- 211b. Not this combination of characters.
- 212a. Ovules erect and basal, superposed. ... CELASTRACEAE 43
- 212b. Ovules pendulous, apical or nearly so.
- 213a. Petals imbricate; ovary 4-6- or more-celled. ... AQUIFOLIACEAE 42
- 213b. Petals valvate; ovary 1-celled. ... ICACINACEAE 41
- 154b. Petals quite free from each other, or at least not all of them connate, though sometimes cohering at base by means of stamens or disk (from page 47).
- 214a. Ovules attached to the wall of the ovary, if only 1 carpel, then attached to the adaxial suture.
- 215a. Leaves opposite or verticillate. ... HYPERICACEAE 21
- 215b. Leaves alternate or all radical.
- 216a. Fertile stamens numerous, more than 12.
- 217a. Filaments connate into separate bundles. ... FLACOURTIACEAE 16
- 217b. Filaments free or partly connate at base only.
- 218a. Ovary situated on a gynophore.
- 219a. Herbs; fruit dehiscent, capsular. ... CLEOMACEAE 13
- 219b. Trees or shrubs; fruit indehiscent. ... CAPPARACEAE 12
- 218b. Ovary sessile.
- 220a. Anthers horse-shoe-shaped; ovary with 2 placentas. ... BIXACEAE 15
- 220b. Anthers straight; ovary with 5 placentas. ... FLACOURTIACEAE 16
- 216b. Fertile stamens definite in number in relation to sepals and petals, 12 or fewer.
- 221a. Flowers zygomorphic.
- 222a. Lowermost petal spurred or saccate at base; lower 2 stamens spurred at base; anther-connective produced into an appendage. ... VIOLACEAE 14
- 222b. Lowermost petal not spurred or saccate; lower 2 stamens not spurred; anther-connective not produced into an appendage. ... POLYGALACEAE 18
- 221b. Flowers actinomorphic.
- 223a. Stamens 6, of which 4 longer and 2 shorter. ... BRASSICACEAE 10
- 223b. Stamens not as above, if 6, then more or less equal in length.
- 224a. Stamens completely united into a column or tube.
- 225a. Leaves simple; stamens united into a column. ... MENISPERMACEAE 6
- 225b. Leaves pinnately compound; stamens united into a tube. ... MELIACEAE 39
- 224b. Stamens free or connate at base only.
- 226a. Leaves with stipules; anther-connective with an appendage at apex. ... VIOLACEAE 14
- 226b. Leaves without stipules; anther-connective without appendage.
- 227a. Leaves compound. ... CONNARACEAE 52
- 227b. Leaves simple.
- 228a. Herbs; staminodes present. ... PARNASSIACEAE 59
- 228b. Shrubs or trees; staminodes absent. ... PITTOSPORACEAE 17
- 214b. Ovules attached to the central axis or to or near the base or apex of the ovary, sometimes only with one ovule, rarely ovule or ovules pendulous from top.
- 229a. Stamens united into 1 or more separate bundles.
- 230a. Leaves opposite, often with resinous lines.

231a. Herbs or shrubs; lateral nerves not close-together; flowers bisexual; styles free up to base or nearly so. ...	HYPERICACEAE	21
231b. Trees or shrubs; lateral nerves close-together; flowers mostly unisexual; styles more or less united. ...	CLUSIACEAE	22
230b. Leaves alternate, not with resinous lines.		
232a. Sepals valvate.		
233a. Stamens either monadelphous or if in separate bundles, then some sterile. ...	STERCULIACEAE	27
233b. Stamens in separate bundles and all fertile. ...	TILIACEAE	28
232b. Sepals imbricate.		
234a. Leaves glandular-punctate, often compound or unifoliolate. ...	RUTACEAE	36
234b. Leaves not glandular-punctate, always simple. ...	THEACEAE	23
229b. Stamens more or less free from each other or connate at base only.		
235a. Stamens numerous, more than twice the number of sepals or petals. (to page 52).		
236a. Leaves opposite or verticillate.		
237a. Calyx-lobes or sepals valvate.		
238a. Stamens inflexed or reflexed in bud. ...	EUPHORBIACEAE	127
238b. Stamens neither inflexed nor reflexed in bud. ...	TILIACEAE	28
237b. Calyx-lobes or sepals imbricate.		
239a. Stipules present.		
240a. Stipules split into hairs; sepals 2-3; styles 2-8-branched. ...	PORTULACACEAE	20
240b. Stipules not split into hairs; sepals 4-7, usually 5; style 1.	THEACEAE	23
239b. Stipules absent.		
241a. Flowers bisexual; fruit a septicidal capsule. ...	HYPERICACEAE	21
241b. Flowers unisexual or polygamous; fruit indehiscent or irregularly dehiscent drupe or berry. ...	CLUSIACEAE	22
236b. Leaves alternate, spirally arranged or all radical.		
242a. Sepals or calyx-lobes valvate or open in bud, or minute.		
243a. Anthers 1-celled. ...	MALVACEAE	26
243b. Anthers 2-celled.		
244a. Staminodes present; fruit a dehiscent woody capsule; seeds winged. ...	STERCULIACEAE	27
244b. Staminodes absent; fruit an indehiscent drupe; seeds not winged. ...	ELAEOCARPACEAE	29
242b. Sepals or calyx-lobes imbricate or contorted.		
245a. Petals and stamens perigynous or epigynous.		
246a. Herbs, flowers with only 2 sepals. ...	PORTULACACEAE	20
246b. Shrubs or trees; flowers with more than 2 sepals.		
247a. Flowers capitate; ovary of 2 carpels. ...	HAMAMELIDACEAE	62
247b. Flowers not capitate; ovary with more than 2 carpels, sometimes only 1. ...	ROSACEAE	56
245b. Petals and stamens hypogynous.		
248a. Leaves with stipules. ...	EUPHORBIACEAE	127
248b. Leaves without stipules.		
249a. Anthers basifixed; seeds few.		
250a. Petals contorted; stamens united into a tube. ...	MELIACEAE	39
250b. Petals imbricate; stamens not united into a tube. ...	THEACEAE	23
249b. Anthers dorsifixed, versatile; seeds many.		
251a. Climbers; flowers unisexual; anther-cells opening by lateral slits. ...	ACTINIDIACEAE	25
251b. Erect trees or shrubs; flowers bisexual; anther-cells opening by terminal pores or slits. ...	SAURAUACEAE	24

- 235b. Stamens not more than twice the number of sepals or petals (from page 51).
- 252a. Flowers zygomorphic.
- 253a. Succulent herbs; leaves sheathing at base, parallel-veined; flowers 3-merous; filaments hairy. ... COMMELINACEAE 154
- 253b. Not this combination of characters.
- 254a. Leaves compound; petals one less than sepals; stamens unilateral or excentric. ... SAPINDACEAE 47
- 254b. Leaves simple; petals as many as sepals; stamens not excentric.
- 255a. Posterior sepal more or less elongated into a spur; ovary usually 4-5-celled; ovules 2-many in each cell. ... BALSAMINACEAE 35
- 255b. Posterior sepal neither spurred nor saccate; ovary usually 2-celled; ovule 1 in each cell. ... POLYGALACEAE 18
- 252b. Flowers actinomorphic.
- 256a. Perfect stamens the same number as the petals and opposite them.
- 257a. Calyx-lobes or sepals valvate or calyx much reduced or open in bud.
- 258a. Disk absent. ... STERCULIACEAE 27
- 258b. Disk present.
- 259a. Leaves stipulate. ... RHAMNACEAE 44
- 259b. Leaves exstipulate. ... OLACACEAE 40
- 257b. Calyx-lobes or sepals imbricate, well-developed.
- 260a. Inflorescence leaf-opposed; petals valvate. ... LEEACEAE 46
- 260b. Inflorescence not leaf-opposed; petals imbricate or biseriata.
- 261a. Ovary 1-celled; ovules basal, erect or on central placenta.
- 262a. Shrubs; leaves acutely or spinulosely serrate; petals with 2 glands at base; ovule solitary, erect. ... BERBERIDACEAE 7
- 262b. Herbs; leaves entire; petals without glands; ovules usually many on central placenta. ... PORTULACACEAE 20
- 261b. Ovary 2- or 3-celled; ovule solitary and pendulous in each cell or if 2, then collateral.
- 263a. Flowers bisexual; fertile stamens 2; ovules 2 in each cell. ... SABIACEAE 50
- 263b. Flowers unisexual; fertile stamens 4; ovule solitary in each cell. ... SIMAROUBACEAE 37
- 256b. Perfect stamens the same number as the petals and alternate with them, or up to twice as many or rarely fewer.
- 264a. Leaves compound or unifoliolate.
- 265a. Stamens united into a tube. ... MELIACEAE 39
- 265b. Stamens free or connate at base only.
- 266a. Leaves gland-dotted. ... RUTACEAE 36
- 266b. Leaves not gland-dotted.
- 267a. Herbs; ovules few-many in each cell. ... OXALIDACEAE 34
- 267b. Trees or shrubs; ovules 1 or 2 in each cell.
- 268a. Ovules pendulous from near the apex of each cell.
- 269a. Ovary of more than one carpel. ... SIMAROUBACEAE 37
- 269b. Ovary of one carpel. ... ANACARDIACEAE 51
- 268b. Ovules ascending or horizontal and axile.
- 270a. Ovules 2 in each cell. ... CONNARACEAE 52
- 270b. Ovule 1 in each cell. ... SAPINDACEAE 47
- 264b. Leaves simple, not unifoliolate.
- 271a. Leaves opposite or verticillate.
- 272a. Herbs.
- 273a. Ovary incompletely septate with free central placenta.

- 274a. Stipules subulate-filiform; petals 2-fid; style 3-fid. ... CARYOPHYLLACEAE 19  
 274b. Stipules minute or absent; petals entire; style entire. ... LYTHRACEAE 68  
 273b. Ovary completely septate into separate cells. ... LINACEAE 30  
 275a. Stipules single, sometimes minute. ... GERANIACEAE 33  
 275b. Stipules in pairs, prominent. ...  
 272b. Trees, shrubs or woody climbers.  
 276a. Leaves with stipules.  
 277a. Leaves often biglandular at base or on petiole; stipules usually intrapetiolar; sepals persistent in fruit; usually with a pair of conspicuous glands outside. ... MALPIGHIACEAE 32  
 277b. Not this combination of characters.  
 278a. Flowers unisexual; ovule pendulous; seeds often carunculate. EUPHORBIACEAE 127  
 278b. Flowers bisexual; ovules not pendulous; seeds not carunculate. CELASTRACEAE 43  
 276b. Leaves without stipules.  
 279a. Stamens united into a tube. ... CLUSIACEAE 22  
 279b. Stamens free or shortly connate at base.  
 280a. Ovules numerous in each cell of ovary. ... PITTOSPORACEAE 17  
 280b. Ovules few or 1 in each cell of ovary.  
 281a. Ovules pendulous from apex of cell. ... ICACINACEAE 41  
 281b. Ovules erect or ascending from or near the base of cell.  
 282a. Leaves gland-dotted; sepals valvate. ... RUTACEAE 36  
 282b. Leaves not gland-dotted; sepals imbricate.  
 283a. Disk absent. ... ACERACEAE 48  
 283b. Disk present.  
 284a. Flowers bisexual. ... CELASTRACEAE 43  
 284b. Flowers unisexual or polygamous. ... CLUSIACEAE 22  
 271b. Leaves alternate or radical.  
 285a. Succulent herbs or herbs with subterranean rhizomes, tubers or bulbs; leaves parallel-veined; flowers 3-merous.  
 286a. Ovules biseriate in each cell, never solitary. ... LILIACEAE 150  
 286b. Ovules uniserial in each cell, or rarely solitary. ... COMMELINACEAE 154  
 285b. Not this combination of characters.  
 287a. Herbs, rarely slightly woody at base.  
 288a. Flowers unisexual. ... EUPHORBIACEAE 127  
 288b. Flowers bisexual.  
 289a. Stipules free; sepals valvate. ... TILIACEAE 28  
 289b. Stipules intrapetiolar, connate; sepals imbricate. ... LINACEAE 30  
 287b. Trees, shrubs, undershrubs or woody climbers.  
 290a. Leaves with stipules (often early caducous and leaving scars) (to page 54).  
 291a. Stamens perigynous, inserted on the calyx-tube.  
 292a. Style near the base of the ovary or on its side. ... ROSACEAE 56  
 292b. Style or styles terminal on ovary. ... HAMAMELIDACEAE 62  
 291b. Stamens hypogynous, or inserted on or at the base of disk.  
 293a. Stipules intrapetiolar; petals with a ligulate appendage at apex of claw. ... ERYTHROXYLACEAE 31  
 293b. Stipules not intrapetiolar; petals not appendaged.  
 294a. Sepals valvate. ... TILIACEAE 28  
 294b. Sepals imbricate.  
 295a. Disk absent. ... AQUIFOLIACEAE 42  
 295b. Disk present, annular or of separate glands.  
 296a. Petals imbricate; staminodes absent; ovules erect. ... CELASTRACEAE 43  
 296b. Petals contorted; staminodes present; ovules pendulous. ... LINACEAE 30

290b. Leaves without stipules (from page 53).		
297a. Leaves gland-dotted; stamens united into a tube.	...	RUTACEAE 36
297b. Leaves not gland-dotted; stamens free.		
298a. Stamens double the number of petals or fewer by abortion; ovary 1-ovuled.	...	ANACARDIACEAE 51
298b. Stamens same number as petals or fewer; ovary 2-or more- ovuled.		
299a. Disk present.	...	GELASTRACEAE 43
299b. Disk absent.		
300a. Ovules numerous in each cell.	...	PHYTOSPORACEAE 17
300b. Ovules 1 or 2 in each cell.		
301a. Anther-cells opening by apical pore.	...	THEACEAE 23
301b. Anther-cells opening by longitudinal slits.		
302a. Ovary 3-or more-celled; ovules collateral.	...	AQUIFOLIACEAE 42
302b. Ovary 1-or 2-celled; ovules superposed.	...	ICACINACEAE 41

## 1 RANUNCULACEAE

- |  |     |                     |
|--|-----|---------------------|
| 1a. Herbs; leaves spirally arranged; sepals imbricate. | ... | <i>Ranunculus</i> 1 |
| 1b. Woody climbers; leaves opposite; sepals valvate.   | ... | <i>Clematis</i> 2   |

### 1. RANUNCULUS L.

***Ranunculus cantoniensis*** DC. Prodr. 1: 43. 1824. *R. pennsylvanicus* (non L. f. 1781) *sensu* Hook. f. & Th. in Fl. Brit. Ind. 1: 19. 1872, *p.p.*; Fl. As. 1: 9. 1934. **Fig. 1**

Herbs, rooting at base, up to 1 m; radical leaves trifoliolate; petioles 25-30 cm; leaflets tripartite into narrow segments, 4-8 × 5-10 cm; cauline leaves with 1-5 cm long petioles; leaflets ternisect, 4-6 × 5-7 cm; flowers yellow, ± 1.5 cm across, solitary, terminal or leaf-opposed; achenes compressed, in globose heads, ± 2 × 2 mm, margined and glandular.

Open moist grasslands and marshy places, 800-1600 m; fl. & fr.: May-Dec.; Jowai. Between Jowai & Jarain, Raliang.

### 2. CLEMATIS L.

- |   |     |                           |
|---|-----|---------------------------|
| 1a. Leaves simple.  | ... | <i>C. loureiriana</i> 1   |
| 1b. Leaves compound.  |     |                           |
| 2a. Inflorescence axillary, sessile, 1-3-flowered.  | ... | <i>C. acutangula</i> 2    |
| 2b. Inflorescence axillary or terminal, paniculate, many-flowered.                          |     |                           |
| 3a. Plants glabrous, except innovations.  | ... |                           |
| 4a. Sepals erect; filaments hairy.  | ... | <i>C. acuminata</i> 3     |
| 4b. Sepals spreading; filaments glabrous.   | ... | <i>C. gouriana</i> 4      |
| 3b. Plants coarsely hairy or tomentose.   |     |                           |
| 5a. Plants coarsely hairy; leaves 5-7-foliolate; sepals ribbed; anthers twisted.            | ... | <i>C. buchianiana</i> 5   |
| 5b. Plants densely tomentose; leaves 3-5-foliolate; sepals not ribbed; anthers not twisted. | ... | <i>C. graveoliflora</i> 6 |

1. ***Clematis loureiriana*** DC. Syst. 1: 144. 1818. *C. smilacifolia* Wall. Pl. As. Rar. 13: 402. 1820; Fl. Brit. Ind. 1: 3. 1872; Fl. As. 1: 3. 1934.

Extensive climbers; leaves ovate, oblong-ovate, cordate or rounded at base, subacute or mucronate at apex, 6-8 × 8-10 cm; petioles 8-10 cm long, flattened at base, tendrillar above; inflorescence 3- or more-flowered, 3-chotomous panicles; bracts foliaceous, elliptic-lanceolate, ± 1.5 × 0.5 cm; flowers purplish-brown, ± 3.5 cm across; achenes flat, elliptic-ovate, ± 1.0 × 0.3 cm; styles 6-7 cm.

Damp moist ravines in forests, 100-1600 m; fl. & fr.: Sept.-June; Umkhlaew, south of Jarain.



2. *Clematis acutangula* Hook. f. & Th. Fl. Ind. 5. 1855; Fl. Brit. Ind. 1: 3. 1872; Fl. As. 1: 2. 1934.

Slender climbers; leaves bipinnate; petioles 6-8 cm; leaflets ovate to ovate-lanceolate, simple or shallowly 3-lobed, cuncate or acute at base, acute to acuminate; bracts sessile, ovate-lanceolate,  $\pm$  5 mm; flowers yellowish-

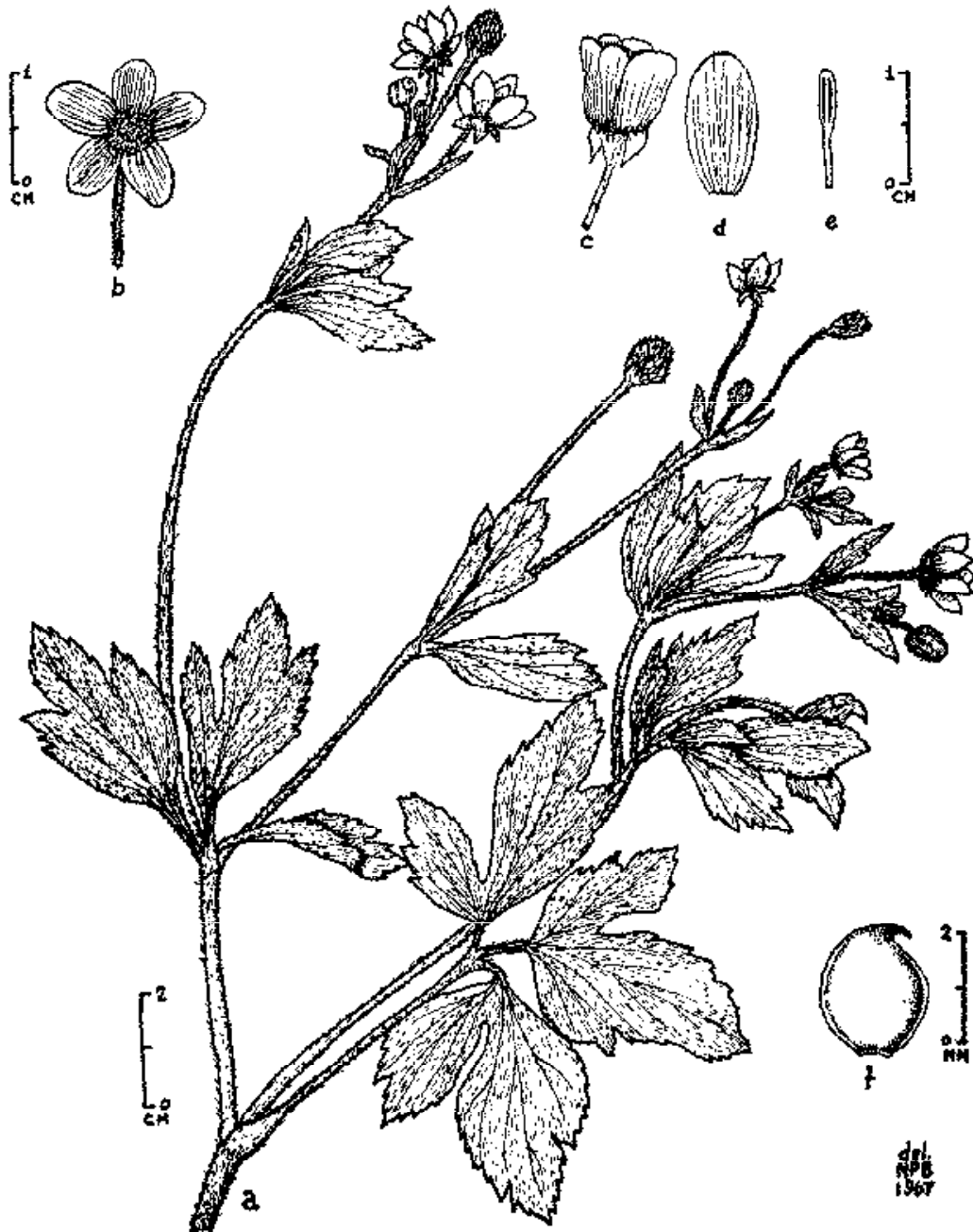


Fig. 1. *Ranunculus cantoniensis* DC.  
a. Branch. b & c. Flower. d. Petal. e. Stamen. f. Achene.

brown,  $\pm 1.5$  cm across; achenes elliptic-ovate,  $\pm 3 \times 2$  mm; styles  $\pm 2.5$  cm.

Primary forests in shaded places, 1200-1500 m; fl. & fr.: Junc-Jan.; Jowai.

3. **Clematis acuminata** DC. Syst. 1: 148. 1818; Fl. Brit. Ind. 1: 5. 1872; Fl. As. 1: 4. 1934. '*Tilli-tymen-khla*'.

Slender climbers; leaves trifoliolate; petioles 5-7 cm; leaflets ovate to ovate-lanceolate, acute, rounded or subcordate at base, acute to acuminate, 5-11  $\times$  3-7 cm; inflorescences axillary 3-6-flowered, 3-chotomously branched panicles; bracts linear-lanceolate, 3-5 mm; flowers pale yellow,  $\pm 2 \times 3$  cm; achenes ovate,  $\pm 3$  mm, silky hairy; styles  $\pm 1.5$  cm.

Shaded places in forests, 1000-1500 m; fl. & fr.: Oct.-Apr.; Jowai-Jarain.

4. **Clematis gouriana** DC. Syst. 1: 138. 1818; Fl. Brit. Ind. 1: 4. 1872; Fl. As. 1: 4. 1934.

Large climbers; leaves ternate or biternate; petioles flattened at base, 3-5 cm; leaflets ovate-lanceolate or elliptic, rounded or obliquely cordate at base, acute to acuminate, 3-6  $\times$  1.5-4.5 cm; inflorescences axillary or terminal, dense 3-chotomously branched panicles; bracts ovate-lanceolate,  $\pm 5$  mm; flowers greenish-white,  $\pm 1$  cm across; achenes narrowly oblong, 3-5  $\times$  1-2 mm; styles  $\pm 5$  cm.

Moist shaded localities in forests, 500-1500 m; fl. & fr.: July-Nov.; Jarain.

5. **Clematis buchariana** DC. Syst. 1: 140. 1818; Fl. Brit. Ind. 1: 6. 1872 (as *C. bucharaniana*); Fl. As. 1: 5. 1934. '*Tilli-kynsaw-blai*'.

Woody climbers or stragglers; leaves simply pinnate; petioles flattened at base, 5-7 cm; leaflets ovate to elliptic-ovate, rounded to cordate at base, acute to acuminate, 5-10  $\times$  3-8 cm; inflorescences axillary, many-flowered, 3-chotomously branched panicles; bracts foliaceous, ovate-lanceolate, 3-5  $\times$  0.5-2.0 cm; flowers creamy-white, 4-5 cm across; achenes ovate to elliptic, 4-5  $\times$  2-3 mm; styles  $\pm 5$  cm.

Primary forests in shaded places and village groves, 1200-1600 m; fl. & fr.: Sept.-Mar.; Jowai, Khleibriat.

6. **Clematis grewiaeflora** DC. Syst. 1: 140. 1818; Fl. Brit. Ind. 1: 6. 1872; Fl. As. 1: 4. 1934 (as *C. grewiaefolia*).

Woody climbers; leaves pinnate; petioles 3-4 cm; leaflets broadly ovate, cuneate or rounded at base, acute to acuminate, 5-15 × 2-6 cm; inflorescences axillary, many-flowered, 3 chotomously branched panicles; bracts ovate-lanceolate, foliaceous, ± 10 × 6 mm; flowers greenish-brown, ± 2.5 cm across; achenes ovate, ± 2 cm, velvety hairy; styles ± 2.5 cm.

Forests and forest-edges, 1000-1600 m; fl. & fr.: Aug.-Jan.; Jowai, U. N. Kanjilal 9528.

## 2. DILLENACEAE

### DILLENIA L.

- |  |     |                       |
|--|-----|-----------------------|
| 1a. Evergreen trees; each pedicel bracteate at about the middle; flowers white, appearing with leaves, solitary. | ... | <i>D. indica</i> 1    |
| 1b. Deciduous trees; pedicels ebracteate; flowers greenish yellow, appearing before leaves, fascicled.           | ... | <i>D. pentagyna</i> 2 |

1. **Dillenia indica** L. Sp. Pl. 535. 1753; Fl. Brit. Ind. 1: 36. 1872; Fl. As. 1: 10. 1934.

Trees, up to 30 m; leaves oblong to oblanceolate or elliptic, rounded to acute at base, obtuse or slightly acuminate, dentate or denticulate at margins, 15-35 × 6-12 cm; lateral nerves 30-50 pairs; petioles 3-8 cm; flowers solitary, terminal, 15-20 cm across; petals white with green veins; fruits indehiscent pseudocarps, subglobose, 8-10 cm diam., yellowish-green, enclosed by persistent sepals.

Primary forests, 100-1000 m; fl. & fr.: June-Apr.; Khleihriat to Sonapur.

2. **Dillenia pentagyna** Roxb. Pl. Corom. 1: 21. t. 20. 1795; Fl. Brit. Ind. 1: 38. 1872; Fl. As. 1: 11. 1934.

Trees, up to 25 m; leaves elliptic-obovate, acute and decurrent on petioles at base, rounded to obtuse, dentate at margins, 30-55 × 15-25 cm; lateral nerves 30-40 pairs; petioles 2-5 cm; flowers 3-7, fascicled on ± 3 mm long shoots, 2.5-3.0 cm across, greenish yellow; pedicels 3-6 cm; fruits subglobose, ± 15 mm diam., yellow to red, enclosed in enlarged fleshy sepals.

Tropical forests, 100-500 m; fl. & fr.: July-Jan.; Garampani.

## 3. MAGNOLIACEAE

- |  |     |                       |
|--|-----|-----------------------|
| 1a. Flowers axillary.  |     |                       |
| 2a. Carpels and follicles free from each other, dehiscing along dorsal suture.             | ... | <i>Michelia</i> 1     |
| 2b. Carpels and follicles fused together, forming a fleshy syncarp, dehiscing irregularly. | ... | <i>Paramichelia</i> 2 |
| 1b. Flowers terminal.  |     |                       |

- |  |                     |
|--|---------------------|
| 3a. Gynophores stipitate, not exerted from the androecium. ...   | <i>Alcimandra</i> 3 |
| 3b. Gynophores sessile, more or less exerted from the stamens.   |                     |
| 4a. Carpels and follicles free, dehiscing along dorsal suture, persistent on gynophore; ovules 4 or more in each carpel. ... | <i>Manglietia</i> 4 |
| 4b. Carpels and follicles fused at least at base, deciduous with seeds; ovules 2-3 in each carpel. ...                       | <i>Talauma</i> 5    |

1. MICHELIA L.

- |   |                      |
|---|----------------------|
| 1a. Leaves glabrous beneath; flowers 3-5 cm across; ovules 2 in each carpel. ...      | <i>M. punduana</i> 1 |
| 1b. Leaves puberulous beneath; flowers 8-10 cm across; ovules 3-4 in each carpel. ... | <i>M. doltsopa</i> 2 |

1. **Michelia punduana** Hook. f. & Tb. Fl. Ind. 81. 1855 et in Fl. Brit. Ind. 1: 43. 1872; Fl. As. 1: 23. 1934. '*Dieng-ritiang-khlaw*'.

Trees, 10-15 m; leaves elliptic-obovate or oblanceolate, cuneate at base, obtuse or short-caudate, 7-12 x 3-5 cm; lateral nerves 7-10 pairs; petioles 1.0-1.5 cm; flowers solitary, white; fruits 8-10 x 2-3 cm; follicles sessile, obovoid, ± 7 mm thick, woody, speckled with large white lenticels; seeds reddish-brown, faceted.

Primary forests, 500-1600 m; fl. & fr.: Jan.-Dec.; Jarain, U. N. *Kanjilal* 6450; Shangpung, G. K. *Deka* 17218.

2. **Michelia doltsopa** DC. Syst. 1: 448. 1818. *Magnolia excelsa* Wall. Tent. Fl. Nep. 5. t. 2. 1824. *Michelia excelsa* (Wall.) Bl. Fl. Jav. 1: 9. 1828; Fl. Brit. Ind. 1: 43. 1872; Fl. As. 1: 21. 1934.

Trees, 15-20 m; leaves elliptic to lanceolate, cuneate or rounded at base, acuminate, 10-20 x 4-8 cm; main lateral nerves 8-16 pairs; petioles 1.5-3.0 cm, swollen at base; flowers white, turning pink, sweet-scented; fruits 10-15 x 4-6 cm; follicles obliquely ovoid, beaked, ± 1.5 x 1.2 cm; seeds red, faceted.

Primary forests, 1300-1700 m; fl. & fr.: Apr.-Sept.; Jowai-Jarain.

2. PARAMICHELIA HU

**Paramichelia baillonii** (Pierre) Hu in Sunyatsenia 4: 142. 1940. *Magnolia baillonii* Pierre, Fl. For. Cochinch. 1: t. 2. 1881. *Talauma phellocarpa* King in Ann. R. Bot. Gard. Calc. 3: 205. t. 47. 1891; Fl. As. 1: 18. 1934. '*Karo-phang*'.

Trees, 20-30 m; leaves elliptic or oblong-lanceolate, acute at base, acute to shortly acuminate, 8-20 x 3-6 cm; lateral nerves 10-15 pairs; petioles 8-20 mm; flowers pale white, axillary, solitary, 2.5-3.0 cm across; fruiting

spike continuous, forming a fleshy syncarp, oblong, 7.9×3.4 cm, speckled with large grey corky lenticels; midrib of follicles woody, hooked, 2.0-2.3 cm, persistent; seeds 2-4 in each carpel, ovoid, 8-10×7.9 mm, red.

Primary forests, 800-1300 m; fl. & fr.: Apr.-Oct.; Nartiang.

### 3. *ALCIMANDRA* Dandy

***Alcimandra cathcartii*** (Hook. f. & Th.) Dandy in Kew Bull. 1927: 260. 1927. *Michelia cathcartii* Hook. f. & Th. Fl. Ind. 79. 1855; Fl. Brit. Ind. 1: 42. 1872; Fl. As. 1: 21. 1934.

Trees, 20-25 m; leaves lanceolate to oblong-lanceolate, rounded to acute at base, acute to shortly acuminate, 7-15×2.5 cm; lateral nerves 10-15 pairs; petioles 5-12 mm; flowers solitary, terminal, white, 8-10 cm across; fruits 8-12×3.0-3.5 cm; follicles sub-orbicular, compressed, 8-10 mm diam.; seeds 2-4 in each follicle.

Primary forests, 100-1000 m; fl. & fr.: Mar.-Sept.; Nongringkoh, U. N. Kanjilal 7344.

### 4. *MANGLIETIA* Bl.

***Manglietia insignis*** (Wall.) Bl. Fl. Jav. 1: 23. 1828; Fl. Brit. Ind. 1: 42. 1872; Fl. As. 1: 16. 1934. *Magnolia insignis* Wall. Tent. Fl. Nep. 1: t. 1. 1824. **Fig. 2**

Trees, 20-30 m; leaves elliptic- to oblong-lanceolate, cuneate at base, acute or acuminate, 15-21×3-6 cm; lateral nerves 16-20 pairs; petioles 1.5-2.0 cm; flowers white or pale pink, 8-10 cm across; fruiting spike narrowly ovoid or subcylindric, 5-8×4-5 cm, bright purple when fresh; follicles woody, dorsally dehiscent; seeds 4-6 in each, 5-6×3-4 mm, red, faceted.

Primary forests, 500-1500 m; fl. & fr.: May-Jan.; Jarain, Jowai, Rytang, Shangpung.

### 5. *TALAUMA* Jussieu

***Talauma hodgsonii*** Hook. f. & Th. Fl. Ind. 74. 1855; Fl. Brit. Ind. 1: 40. 1872; Fl. As. 1: 17. 1934.

Trees, 10-15 m; leaves elliptic to oblong-oblancoate, cuneate at base, obtuse or subacute, 25-40×8-15 cm; lateral nerves 15-25 pairs, ridged beneath; petioles 2-5 cm, thick at base; flowers white or pale pink, sweet-scented, never fully opening, ± 4×3 cm; fruits ovoid to ellipsoid, 10-15×

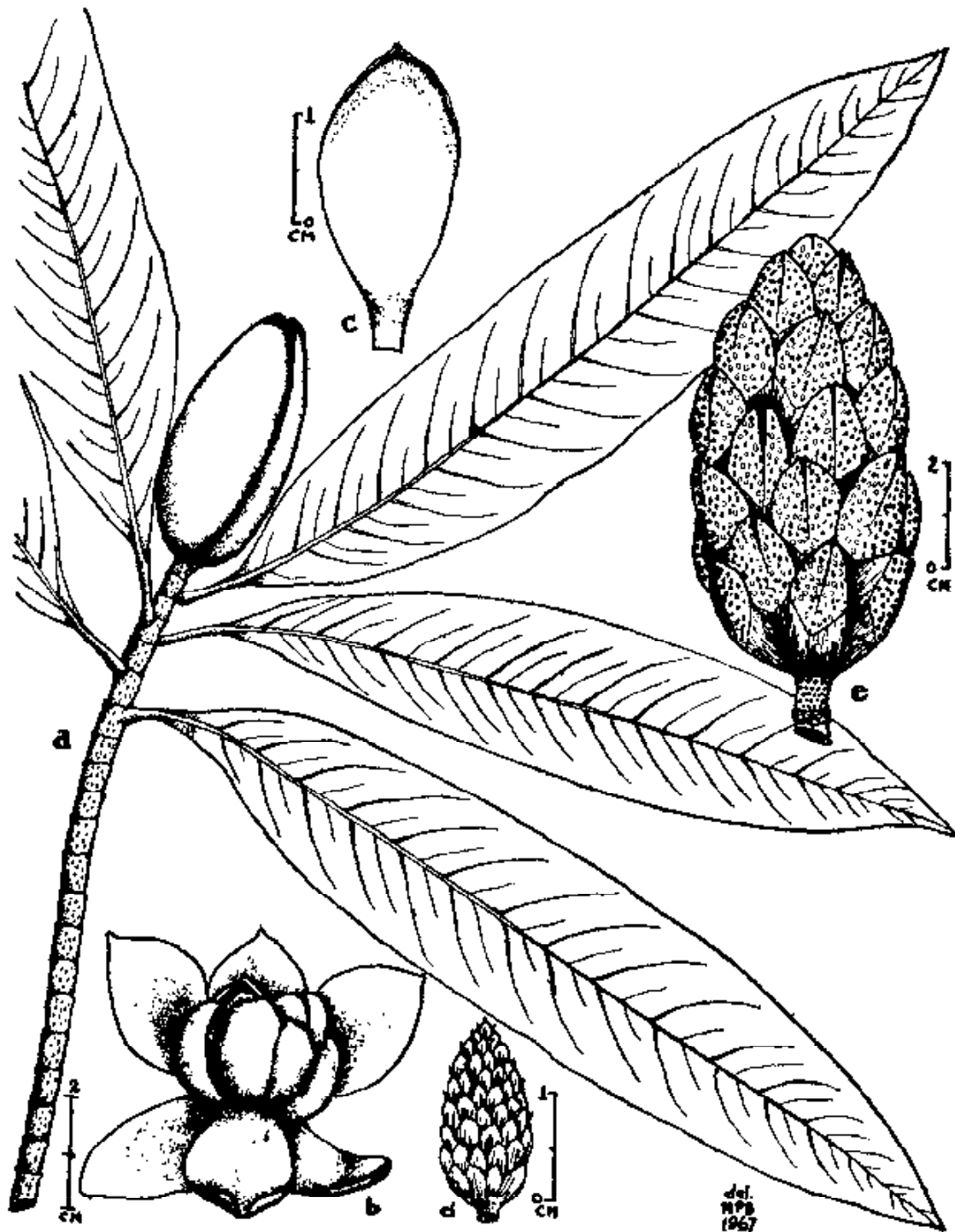


Fig. 2. *Manglietia insignis* (Wall.) Bl.  
 a. Twig with bud. b. Flower. c. Petal. d. Ovaries. e. Fruit.

6-9 cm; follicles woody, sharply beaked,  $\pm 1.5 \times 9.0$  mm; seeds oblong, plano-convex,  $\pm 9 \times 7$  mm, red.

Primary and secondary forests, 100-1000 m; fl. & fr.: Apr.-Nov.; near Dawki.

## 4. SCHIZANDRACEAE

## KADSURA Jussieu

**Kadsura heteroclita** (Roxb.) Craib, Fl. Siam. Enum. 1: 28. 1925.  
*Uvaria heteroclita* Roxb. Fl. Ind. 2: 663. 1832. *K. roxburghiana* Arn. in  
 Mag. Zool. Bot. 2: 256. 1838; Fl. Brit. Ind. 1: 45. 1872; Fl. As. 1: 29.  
 1934. Fig. 3



Fig. 3. *Kadsura heteroclita* (Roxb.) Craib  
 a. Branch. b. Flower. c. Stamens and ovaries in globose heads.

Climbing shrubs; leaves oblong-lanceolate or broadly elliptic-ovate, rounded or cuneate at base, acute or subacute; lateral nerves 10-15 pairs; petioles 1.0-1.5 cm; flowers axillary, solitary, white or pale creamy,  $\pm$  1.3 cm across; fruits globose, consisting of many 1-seeded carpels, scarlet-red, 2.5-3.5 cm diam., fleshy, indehiscent; seeds orbicular, compressed.

Primary forests, 500-1500 m; fl. & fr.: July-Dec.; Jowai, Laskein, near Raliang, Pudiem Sirkep.

5. ANNONACEAE

- 1a. Petals equal or subequal, spreading.
  - 2a. Flowers solitary; carpels of fruit moniliform, several-seeded. ... *Desmos* 1
  - 2b. Flowers fasciated; carpels of fruit ovoid to ellipsoid, 1-seeded. ... *Polyalthia* 2
- 1b. Petals unequal, erect.
  - 3a. Outer petals smaller than inner ones.
    - 4a. Anther-connectives widened and truncate at apex. ... *Trivalvaria* 3
    - 4b. Anther-connectives narrow and pointed at apex. ... *Milusa* 4
  - 3b. Outer petals larger than inner ones.
    - 5a. Carpels of fruit long-stalked, globose or subglobose. ... *Fissistigma* 5
    - 5b. Carpels of fruit sessile, ellipsoid, pointed at apex. ... *Coniothalamus* 6

1. DESMOS Lour.

- 1a. Leaves 5-15 cm long; petals 6; segments of ripe carpels globose or subglobose. ... *D. chinensis* 1
- 1b. Leaves 20-30 cm long; petals 3; segments of ripe carpels oblong or ellipsoid. ... *D. longiflorus* 2

1. **Desmos chinensis** Lour. Fl. Cochinch. 352. 1790. *Unona discolor* Vahl, Symb. Bot. 2: 63. t. 36. 1791; Fl. Brit. Ind. 1: 59. 1872; Fl. As. 1: 35. 1934.

Shrubs,  $\pm$  5 m, erect or scandent; leaves oblong-lanceolate, rounded or subcuneate at base, acute to acuminate, 5-15 x 2.5-3.5 cm; lateral nerves 8-10 pairs; petioles 4-6 mm; flowers leaf-opposed, extra-axillary or terminal, pale yellow, 8-12 cm; seeds 2-5, brownish.

Forests, often cultivated in gardens of villages, 100-1000 m; fl. & fr.: Apr.-Oct.; Nongthala, Sutnga.

2. **Desmos longiflorus** (Roxb.) Safford in Bull. Torrey Bot. Club 39: 507. 1912. *Unona longiflora* Roxb. Fl. Ind. 2: 668. 1832; Fl. Brit. Ind. 1: 61. 1872; Fl. As. 1: 34. 1934. '*Dieng-sala-tyrkai*'.

Shrubs, 5-8 m; leaves narrowly oblong or oblong-lanceolate, rounded or cuneate at base; acute to cuspidate, 20-30 x 5-6 cm; lateral nerves 12-16 pairs; flowers solitary, axillary, reddish-brown or orange outside, yellow



inside, 12-15 cm; fruits of 15-50 moniliform carpels, each with 1-4, 1-seeded segments.

Primary forests, 100-1000 m; fl. & fr.: Apr.-Oct.; Pudiem Sirkep.

## 2. POLYALTHIA Bl.

- |   |     |                        |
|---|-----|------------------------|
| 1a. Leaves oblong-lanceolate; flowers less than 1.5 cm diam.; sepals as long as petals.         | ... | <i>P. cerasoides</i> 1 |
| 1b. Leaves oblong-ovate or obovate; flowers more than 3.5 cm diam.; sepals shorter than petals. | ... | <i>P. simiarum</i> 2   |

1. ***Polyalthia cerasoides*** (Roxb.) Bedd. Fl. Sylv. 1: t. 1. 1809; Fl. Brit. Ind. 1: 63. 1872; Fl. As. 1: 33. 1934. *Uvaria cerasoides* Roxb. Pl. Corom. 1: t. 33. 1795.

Shrubs or small trees, 2-6 m; leaves acute or rounded at base, long acuminate, 8-18 × 2.5-3.5 cm; lateral nerves 8-10 pairs; petioles 2-3 mm; flowers 1-3 on axillary tubercles, greenish-white, 8-12 mm diam.; bracts oblong-ovate, 6-10 mm; fruits ellipsoid or ovoid, ± 10 mm, dark red.

Primary and secondary forests and in village grooves, 100-800 m; fl. & fr.: May-Oct.; Dawki.

2. ***Polyalthia simiarum*** (Hook. f. & Th.) Hook. f. & Th. in Fl. Brit. Ind. 1: 63. 1872; Fl. As. 1: 31. 1934. *Guatteria simiarum* Hook. f. & Th. Fl. Ind. 142. 1855.

Trees, 20-30 m; leaves bifarious, rounded or subcuneate at base, 15-20 × 6-7 cm; lateral nerves 12-18 pairs; petioles 3-6 mm; flowers fasciated on woody tubercles on leafless branches, greenish-yellow outside and purplish inside, 3.5-4.0 cm across; fruits ovoid, oblong-ellipsoid, 3.0-3.5 × 1.5-1.8 cm, orange-red, turning purplish-black; seeds solitary, transversely ribbed.

Primary forests, 100-500 m; fl. & fr.: May-Nov.; Jira, foot of Jaintia Hills, *Balram Sing* s.n.

## 3. TRIVALVARIA Miq.

- |   |     |                        |
|---|-----|------------------------|
| 1a. Leaves 12-24 × 4.0-7.5 cm; petioles 5-6 mm long; flowers polygamo-dioecious; ripe carpels not grooved.          | ... | <i>T. argentea</i> 1   |
| 1b. Leaves 10-15 × 3.5-4.0 cm; petioles 2-3 mm long; flowers bisexual; ripe carpels transversely grooved in middle. | ... | <i>T. kanjilalii</i> 2 |

1. ***Trivalvaria argentea*** (Hook. f. & Th.) Sinclair in Sarawak Mus. J. 5: 603. 1951. *Polyalthia argentea* Hook. f. & Th. in Fl. Brit. Ind. 1: 67. 1872.

Shrubs, 2-3 m; leaves oblong-lanceolate, rounded or acute at base, acuminate, 10-20 × 3-7 cm; lateral nerves 9-10 pairs, arched; petioles 5-6 mm; flowers 4-5 mm across, 1-3 on short supra-axillary woody tubercles, pale

yellowish green; bracts median on pedicels, brown tomentose; fruits oblong,  $\pm 1$  cm, red; seeds solitary.

Primary forests, in shaded places 500-1000 m; fl. & fr.: Mar.-Dec.; Lumshnong.

2. **Trivalvaria kanjilalii** D. Das in Bull. Bot. Surv. Ind. 10: 263. f. 1. 1968 (1969).

Shrubs, 2-4 m; leaves lanceolate, subacute or rounded at base, acuminate, 12-15  $\times$  3.5-4.0 cm; lateral nerves 8-9 pairs; petioles 2-3 mm; flowers solitary, axillary or terminal, pale green or yellow, 5-6 mm across; bracts median on pedicels, 2-3 mm, brown-tomentose; fruits subglobose, grooved medianly,  $\pm 1$  cm diam., fleshy, red; seeds solitary.

Shaded places in forests, 200-1200 m; fl. & fr.: Oct.-Feb.; Syndai, U. N. Kanjalai 2800 —Endemic to Meghalaya.

#### 4. MILIUSA Lesch.

**Miliusa roxburghiana** (Wall.) Hook. f. & Th. Fl. Ind. 150. 1855; Fl. Brit. Ind. 1: 87. 1872; Fl. As. 1: 42. 1934. *Hyalostemma roxburghiana* Wall. Num. list no. 6434. 1832, descr. '*Dieng-jwat*'.

Shrubs or small trees, 3-12 m; leaves oblong to ovate-lanceolate, obtuse or subacute at base, abruptly acuminate, 13-18  $\times$  3.5-6.0 cm; lateral nerves  $\pm 10$  pairs; petioles 1-2 mm; flowers axillary or extra-axillary, solitary or fascicled, drooping, red,  $\pm 1.5$  cm; fruits subglobose or ovoid, 5-6  $\times$  4-5 mm; stalk 5-9 mm; seeds ovoid,  $\pm 4 \times 3$  mm.

Shaded places in forests, 200-800 m; fl. & fr.: Mar.-Dec.; Dawki, Sutnga, Syndai.

*Note:* *Hyalostemma roxburghiana* Wall. is validly published as Wallich has given the short diagnosis, '*gen. nov. Miliusiae prox. Corolla valvato-gamopetalae*,' in his Numerical list or catalogue.

#### 5. FISSISTIGMA Griff.

- |  |                        |
|--|------------------------|
| 1a. Lateral nerves of leaves 10-15 pairs; carpels of fruits minutely verrucose, 1.5-2.0 cm long; seeds 1-2 per carpel. ...     | <i>F. wallichii</i> 1  |
| 1b. Lateral nerves of leaves 15-18 pairs; carpels of fruits strongly verrucose, 3-4 cm long; seeds more than 4 per carpel. ... | <i>F. verrucosum</i> 2 |

1. **Fissistigma wallichii** (Hook. f. & Th.) Merr. in Philip. J. Sci. Bot. 15: 137. 1919. *Melodorum wallichii* Hook. f. & Th. Fl. Ind. 118. 1855; Fl. Brit. Ind. 1: 81. 1872; Fl. As. 1: 48. 1934.

Woody climbers; leaves narrowly oblong to lanceolate, rounded or cuneate at base, acute to acuminate, 8-15 × 2.0-4.5 cm; petioles 4-8 mm; flowers in terminal and leaf-opposed fascicles; petals fleshy, brownish-purple; fruits yellowish-brown, minutely verrucose; seeds oblong-ellipsoid, ± 1.2 × 0.9 cm, brown.

Humid dense forests, 100-1000 m; fl. & fr.: Jan.-Aug.; Dawki.

2. **Fissistigma verrucosum** (Hook. f. & Th.) Merr. in Philip. J. Sci. Bot. 15: 137, 1919. *Melodorum verrucosum* Hook. f. & Th. Fl. Ind. 119, 1855; Fl. Brit. Ind. 1: 80, 1872; Fl. As. 1: 47, 1934.

Woody climbers; young shoots brownish-pubescent; leaves oblong-lanceolate, rounded at base, short-acuminate, 7-11 × 2.5-3.5 cm; petioles 8-12 mm; flowers 1-5 fascicled in terminal or leaf-opposed umbels on short peduncle; petals tawny-velvety outside; fruits subglobose or ellipsoid, verrucose-wrinkled, velvety; seeds in 2 rows of 3-5 each, elliptic-oblong, dark-brown.

Dense humid forests, 100-1600 m; fl. & fr.: Jan.-Dec.; Shangdain, near Shangpung, U. N. Kanjilal 750P.

#### 6. GONIOTHALAMUS Hook. f. & Th.

**Goniothalamus sesquipedalis** (Wall.) Hook. f. & Th. Fl. Ind. 108, 1855; Fl. Brit. Ind. 1: 73, 1872; Fl. As. 1: 37, 1934. *Gutteria sesquipedalis* Wall. Pl. As. rar. 3: t. 266, 1892. Fig. 4

Sparingly branched erect undershrubs, 1-2 m; leaves oblong, lanceolate, narrowed at base, bluntly caudate-acuminate, 25-30 × 5-9 cm; lateral nerves 15-18 pairs; petioles ± 1.5 cm; flowers solitary or fascicled, axillary or supra-axillary, greenish-yellow, ± 2 cm; fruits sessile, 5 or more, obovoid to ellipsoid, ± 2 × 1 cm, orange-red; seeds solitary, ± 1.5 × 8 mm, transversely grooved.

Forests in shaded places, 500-1500 m; fl. & fr.: May-Dec.; Jarain, Jowai.

#### 6. MENISPERMACEAE

- |   |                           |
|---|---------------------------|
| 1a. Carpel 1.   |                           |
| 2a. Sepals 6-10, free; petals 3-5, symmetrical in both male and female flowers.                   | ... <i>Stephania</i> 1    |
| 2b. Sepals 4-8, connate; petals absent in male flowers, paired and symmetrical in female flowers. | ... <i>Cyclea</i> 2       |
| 1b. Carpels 3.  |                           |
| 3a. Leaves palmately 5-nerved.  | ... <i>Pericampylus</i> 3 |
| 3b. Leaves palmately 3-nerved.  |                           |
| 4a. Leaves glabrous; anthers longitudinally dehiscent; styles cylindrical.                        | ... <i>Hypserpa</i> 4     |
| 4b. Leaves villous beneath; anthers transversely dehiscent; styles compressed.                    | ... <i>Cocculus</i> 5     |

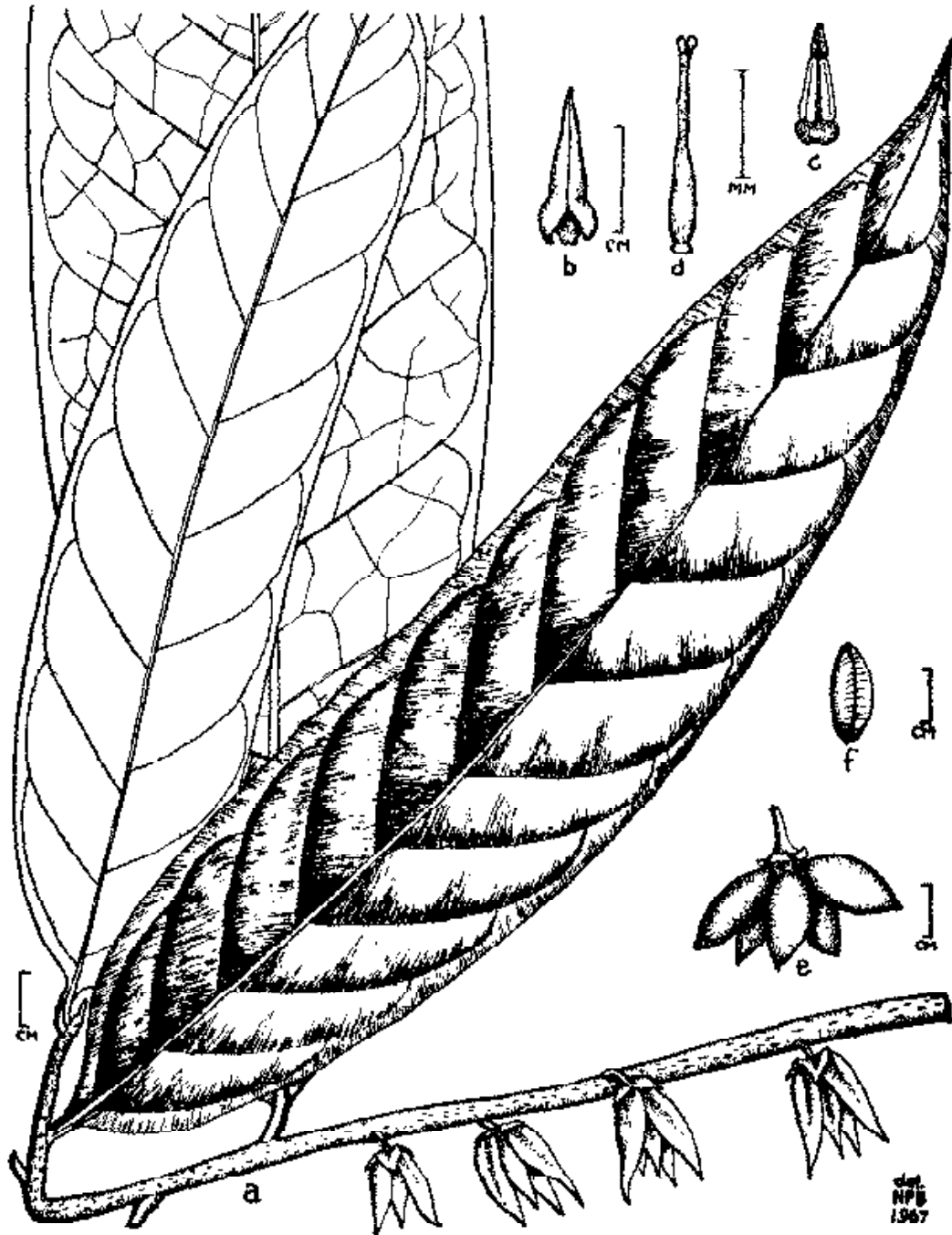


Fig. 4. *Goniothalamus sesquipedalis* (Wall.) Hook. f. & Th.  
 a. Twig. b. Inner perianth. c. Stamen. d. Carpel. e. Fruit. f. Seed.

1. STEPHANIA LOUR.

**Stephania hernandifolia** (Willd.) Walp. Repert. 1: 96, 1842; Fl. Brit. Ind. 1: 103, 1872; Fl. As. 1: 51, 1934. *Cissampelos hernandifolia* Willd. Sp. Pl. 4: 863, 1806.

Climbers with striate-grooved branches; leaves peltate, ovate-deltoid, truncate or subcordate at base, subobtuse, mucronate or acute, 7-13 × 7-10 cm; basal nerves 8-10; petioles 5-11 cm; flowers yellow, in axillary pedunculate umbels; ultimate umbels often capitate with sessile flowers; drupes globose, ± 7 mm, red, tubercled.

Primary and secondary forests, 1200-1600 m; fl. & fr.: Mar.-Sept.; Jowai.

## 2. CYCLEA Arn.

**Cyclea bicristata** (Griff.) Diels in Engler, Pflanzenr. 46: 317, f. 93 A-E. 1910. *Lophophyllum bicristatum* Griff. Notul. 4: 313. 1854; Fl. Brit. Ind. 1: 105. 1872; Fl. As. 1: 53. 1934. **Fig. 5**

Climbing shrubs; leaves sub-peltate, ovate or oblong-deltoid, subcordate or truncate at base, acuminate; basal nerves 5-9; petioles 4-5 cm; flowers in fascicles on slender 5-9 cm long compound panicles, axillary or on leafless old stems; pedicels ± 1 mm; petals absent; drupes orbicular, compressed, ± 7 mm diam.; endocarp with 3 series of hooked spines on each edge, horse-shoe-shaped.

Forests in shaded places, 500-1500 m; fl. & fr.: Apr.-Sept.; Jowai.

## 3. PERICAMPYLUS Miers

**Pericampylus glaucus** (Lamk.) Merr. Interpr. Rumph. Herb. Amb. 219. 1917. *Menispermum glaucum* Lamk. Encycl. 4: 100. 1797. *Cocculus incanus* Colebr. in Trans. Linn. Soc. 13: 57. t. 22. 1822. *Pericampylus incanus* (Colebr.) Miers, in Ann. Nat. Hist. ser. 2. 7: 40. 1851; Fl. Brit. Ind. 1: 102. 1872; Fl. As. 1: 52. 1934.

Climbing shrubs; leaves subpeltate, suborbicular to broadly ovate, truncate or cordate at base, acute to obtuse-mucronate, 3-9 × 2-8 cm; basal nerves 5; petioles 2-7 cm; flowers small, in axillary paniculate cymes; peduncles solitary or many, fascicled, 7-16 cm; drupes subglobose, 5-6 mm diam., echinate, red.

Primary forests, 1000-1500 m; fl. & fr.: Apr.-Sept.; Jowai.

## 4. HYPSEERPA Miers

**Hypserpa cuspidata** (Hook. f. & Th.) Miers in Contrib. Bot. 3: 102. t. 108. 1871. *Limacia cuspidata* Hook. f. & Th. Fl. Ind. 189. 1855; Fl. Brit. Ind. 1: 100. 1872; Fl. As. 1: 56. 1934.

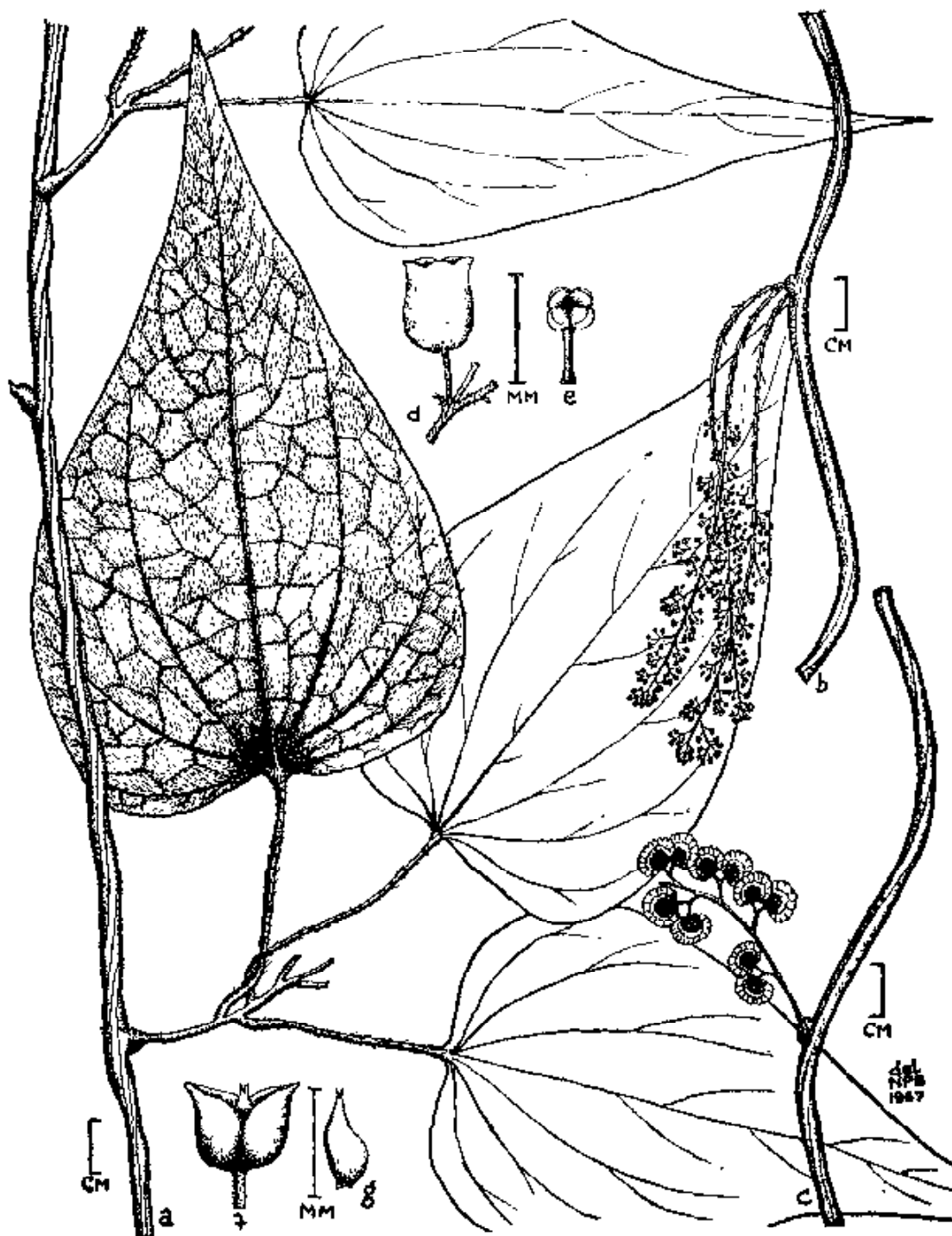


Fig. 5. *Cyclea bicristata* (Griff.) Diels

a, b & c. Twigs, vegetative, flowering & fruiting. d. Male flower. e. Stamen.  
f. Female flower. g. Ovary.

Stiff climbing shrubs; leaves ovate or elliptic-oblong or lanceolate, rounded at base, acute to acuminate, 5-12 × 2-5 cm; basal nerves 3; lateral nerves 1-2 pairs; petioles 1-3 cm; flowers pale yellow, in 2-3-chotomous axillary 1-3 cm long paniculate cymes; drupes globose, subcompressed, 8-10 mm diam.; styler scars subbasal; seeds curved.

Primary forests, 200-1000 m; fl. & fr.: June-Nov.; Umtapoh.

5. *Cocculus* DC. *nom. cons.*

**Cocculus mollis** Hook. f. & Th. Fl. Ind. 1: 193. 1855; Fl. Brit. Ind. 1: 102. 1872; Fl. As. 1: 57. 1934.

Scandent shrubs; leaves ovate, cordate, truncate or abruptly cuneate at base, acute or apiculate, 3.5-5.5 x 1.5-3.0 cm, glabrous above, villous beneath; basal nerves 3; lateral nerves 2-3 pairs; petioles slender, 8-10 mm; flowers in axillary or extra-axillary or terminal cymes or 1-3 cm long panicles; drupes compressed laterally, 4-6 mm, with 4 rows of tubercles on lateral sides.

Primary and secondary forests, in shaded places, 1000-1500 m; fl. & fr.: June-Oct.; between Jowai & Jarain.

## 7. BERBERIDACEAE

- |  |                   |
|--|-------------------|
| 1a. Leaves simple, spirally arranged and fascicled in axils of spines. ... | <i>Berberis</i> 1 |
| 1b. Leaves pinnate, crowded at ends of branches. ...                       | <i>Mahonia</i> 2  |

## 1. BERBERIS L.

**Berberis wallichiana** DC. Prodr. 1: 107. 1824; Fl. Brit. Ind. 1: 110. 1872; Fl. As. 1: 61. 1934.

Shrubs, 2-3 m; wood yellowish; spines 3 at each node, 1.2-2.8 cm; leaves in fascicles of 2-3 from tubercles at spine-axils, oblong-lanceolate, cuneate or narrowed at base, subacute or obtuse, spinous-serrate with 12-25 teeth on each side, 6-12 x 1-3 cm; flowers yellow, 7-8 mm across, 10-20 fascicled at each axil; pedicels 8-12 mm; berries ovoid,  $\pm$  5 x 3 mm, purple.

Open and partially shaded places in forests, 1000-1500 m; fl. & fr.: Aug.-Dec.; Jowai.

2. MAHONIA Nutt. *nom. cons.*

**Mahonia pycnophylla** (Fedde) Takeda in Notes R. Bot. Gard. Edinb. 6: 218. tt. 4 & 33. ff. 6-13. 1917. *M. nepalensis* var. *pycnophylla* Fedde in Engler, Bot. Jahrb. 31: 124. f. 4A. 1901. *Berberis nepalensis* (non Spreng.) Hook. f. & Th. in Fl. Brit. Ind. 1: 109. 1872, *p.p.* *M. nepalensis* (non DC.) Kanjilal et al. Fl. As. 1: 61. 1934, *p.p.* 'Dieng-la-ranong'.

Erect, rarely branched shrubs, 1-2 m; wood yellowish; leaves 25-40 cm; leaflets 5-6 pairs, oblong or obovate-oblong, rounded or obliquely truncate at base, 6-10 x 4-5 cm with 4-6 spines at lower margin and 2-4 spines at upper margin; basal nerves 5; racemes fasciculate, dense-flowered; flowers yellow, 5-6 mm; berries ovoid or subglobose, 6-7 mm diam.; glaucous-purplish.

Open and partially shaded places in forests, 1000-1500 m; fl. & fr.: Oct.-Jan.; Amwee riverside, near Jarain.

8. LARDIZABALACEAE

*HOLBOELLIA* Wall.

***Holboellia latifolia*** Wall. Tent. Fl. Nap. 24. t. 16. 1824; Fl. Brit. Ind. 1: 108. 1872; Fl. As. 1: 61. 1934. '*Soh-Tymbra*'. **Fig. 6**

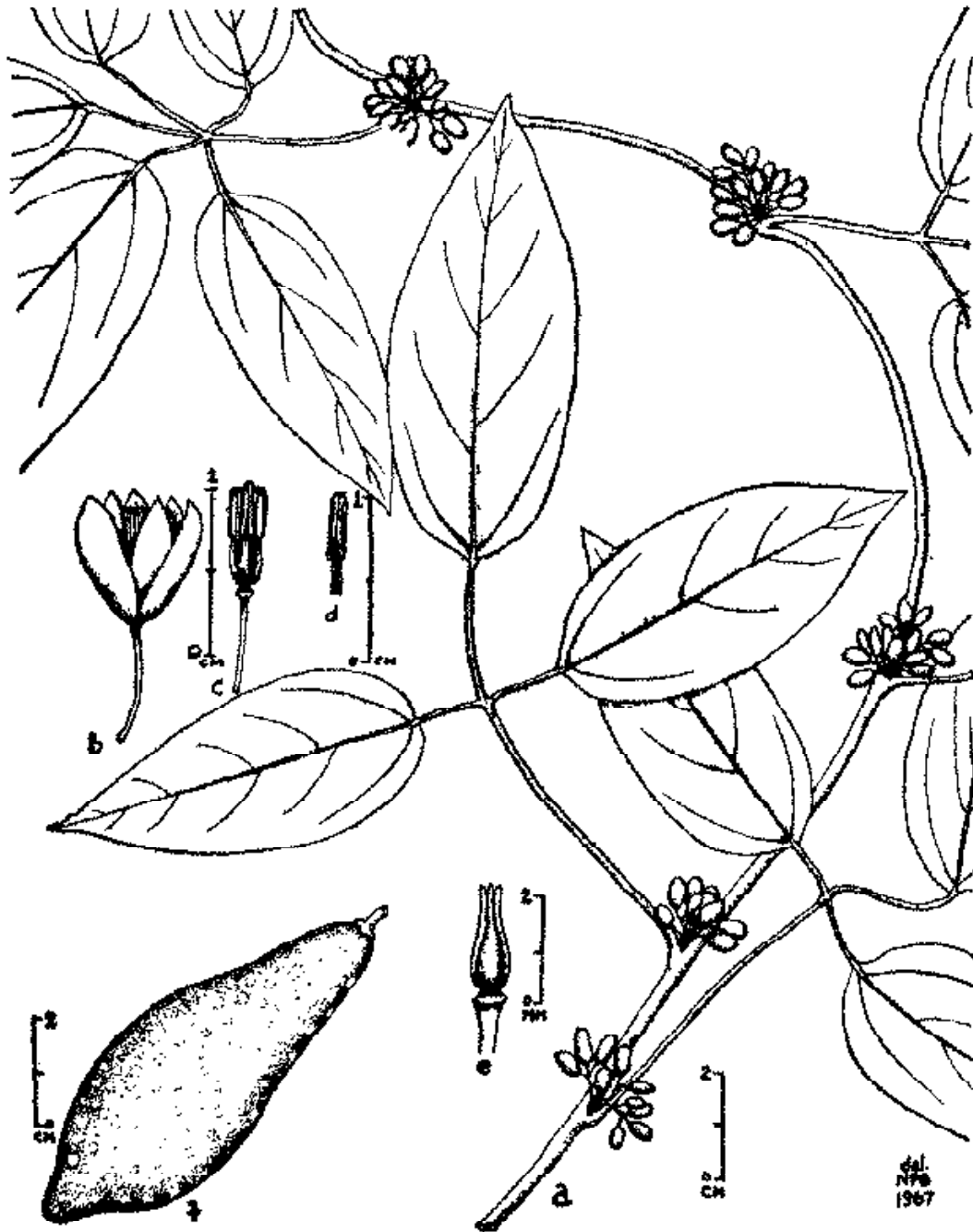


Fig. 6. *Holboellia latifolia* Wall.  
 a. Branch. b. Flower. c. Flower with perianth removed. d. Stamen. e. Ovary. f. Fruit.



Woody climbers; leaves alternate, digitately 3-7-foliolate; petioles 4-7 cm; petiolules 1.5-3.0 cm; leaflets elliptic-ovate to lanceolate, rounded or cuneate at base, acute to acuminate, 7-10×3-5 cm; basal nerves 3; flowers in axillary fascicles or racemes, green to purplish-green; fruits usually of one carpel, pyriform, 8-12×3-4 cm, rugose outside; seeds black.

Primary forests in shaded humid places, 1000-1600 m; fl. & fr.: Mar.-Nov.; Jarain, *U. N. Kanjilat* 2735.

## 9. NYMPHAEACEAE

- |  |                   |
|--|-------------------|
| 1a. Leaves cleft at base; sepals 4-6; petals many; carpels united; ovules numerous in each cell; fruit irregularly dehiscent berry. ...    | <i>Nymphaea</i> 1 |
| 1b. Leaves undivided; sepals and petals 3 each; carpels free; ovules solitary or 1-3 in each carpel; fruit leathery, hard indehiscent. ... | <i>Brasenia</i> 2 |

### 1. NYMPHAEA L. *nom. cons.*

***Nymphaea nouchali*** Burm. f. Fl. Ind. 120. 1768. *N. stellata* Willd. Sp. Pl. ed. 4. 2: 1153. 1797; Fl. Brit. Ind. 1: 114. 1872; Fl. As. 1: 64. 1934.

Perennial aquatic herbs; leaves floating, elliptic-orbicular, rounded or sometimes acute, peltate or subpeltate at base, rounded or retuse, entire or irregularly sinuate at margins, 5-35 across, purplish beneath; veins 5-7; palmate; flowers 5-12 cm across, purplish-blue; fruits globose, 1.5-2.5 cm across; seeds ellipsoid-globose, 8-10 mm, longitudinally ribbed.

Cultivated in tanks and puddles, 100-1500 m; fl. & fr.: July-Nov.; Jowai.

### 2. BRASENIA Schreb.

***Brasenia schreberi*** J. F. Gmel. in L. Syst. 2(1): 853. 1791. *B. peltata* Pursh, Fl. Bor. Amer. 2: 289. 1814; Fl. Brit. Ind. 1: 113. 1872; Fl. As. 1: 63. 1934.

Perennial aquatic herbs; leaves floating, peltate, elliptic-oblong, entire, 6-10×4-8 cm, purplish and covered with mucilaginous jelly beneath; petioles 2-4 mm thick, covered with mucilage; flowers red or purplish, 2.5-3.0 cm across; peduncles long, axillary, solitary, mucilage-coated; fruits clavate, 1.0-1.5 cm, indehiscent with 1 or 2 small dull greyish-white operculate seeds.

In ponds and tanks, ± 1400 m; fl. & fr.: Feb.-June; Nartiang, *Bala-krishnan* 47164. Seen only at this locality.

The first leaf is subulate, the second narrowly oblong, and petiolate at lower end; the subsequent ones are eccentrically peltate and the ultimate ones are centrally peltate.

10. BRASSICACEAE (Nom. alt.: CRUCIFERAE)

An economically important family with many species cultivated for vegetables. The following are mainly under cultivation in our area:

1. *Brassica oleracea* L. var. *botrytis* L.—Cauliflower, 'Phulkobi'.
2. *B. oleracea* L. var. *capitata* L.—Cabbage, 'Bandakobi'.
3. *B. rapa* L.—Turnip, 'Shalgam'.
4. *Raphanus sativus* L.—Radish, 'Muli'.

- |   |     |             |
|---|-----|-------------|
| 1a. Sepals erect; petals white or greenish-white; pods flat, linear; seeds in 1 series. | ... | Cardamine 1 |
| 1b. Sepals spreading; petals bright yellow; pods turgid; seeds in 2 series.             | ... | Rorippa 2   |

1. CARDAMINE L.

**Cardamine hirsuta** L. Sp. Pl. 655. 1753; Fl. Brit. Ind. 1: 138. 1872; Fl. As. 1: 70. 1934.

Annual herbs, 15-30 cm; leaves pinnatisect or pinnate; leaflets 5-11, variable in size and shape, orbicular to ovate or elliptic, entire or dentate-lobed, 8-15 × 3-12 mm; upper leaves narrower; petioles 1.0-2.5 cm; flowers white, 1.5-2.0 cm across; capsules linear, flat, narrowly subobtuse at apex, 1.5-2.0 × 1-2 cm; seeds 8-16 per cell, ellipsoid, ± 1 mm diam., smooth.

Open places near roads, wastelands and gardens, 1000-1600 m; fl. & fr.: Apr.-Oct.; Jowai.

2. RORIPPA Scop.

**Rorippa indica** (L.) Hiern. in Cat. Afr. Pl. Welw. 1: 26. 1896. *Sisymbrium indicum* L. Mant. 1: 93. 1767. *Nasturtium indicum* (L.) DC. Syst. 2: 199. 1818; Fl. Brit. Ind. 1: 134. 1872; Fl. As. 1: 70. 1934.

Erect annuals, 15-40 cm; leaves elliptic-ovate to spatulate, narrowed or amplexicaul at base, obtuse at apex, entire or irregularly lyrate-pinnatifid or pinnatisect, 4-10 × 2-4 cm; flowers bright yellow, ± 2 mm across, in many-flowered, 4-8 cm long racemes; capsules patent or erecto-patent, cylindrical, 1.5-2.0 cm; seeds numerous, ellipsoid, ± 1 mm diam., rugose.

Moist cultivated fields, marshy wastelands and other damp places, 100-1000 m; fl. & fr.: Feb.-Oct.; Dawki.

## 11. FUMARIACEAE

*DICENTRA* *Bernhardi*, *nom. cons.*

***Dicentra torulosa*** Hook. f. & Th. Fl. Ind. 272. 1855; Fl. Brit. Ind. 1: 121. 1872; Fl. As. 1: 62. 1934. *Dactylicapnos torulosa* (Hook. f. & Th.) Hutch. in Kew Bull. 1921: 104. 1921.

Glabrous herbs; stems slender, climbing or trailing, 2-3 m, sulcate, yellowish; leaves compound, 6-10 cm; rachis ending in a branched tendril; leaflets ovate, elliptic or linear-lanceolate, acute, 1-2 × 0.6-1.0 cm; racemes leaf-opposed, subumbellate; flowers yellow, ± 1 cm; capsules linear, torulose, 3-5 × 0.2-0.3 cm; seeds 4-12 per capsule; beaked with 2-lobed aril.

Shaded places in humid forests, 1200-1600 m; fl. & fr.: June-Sept.; Jowai, *Balakrishnan* 42856 —Endemic to Meghalaya.

## 12. CAPPARACEAE

*CAPPARIS* L.

- |   |                        |
|---|------------------------|
| 1a. Leaves 5—14 cm long; flowers in axillary and extra-axillary rows. ... | <i>C. acutifolia</i> 1 |
| 1b. Leaves 16—20 cm long; flowers in terminal racemose spikes. ...        | <i>C. assamica</i> 2   |

1. ***Capparis acutifolia*** Sweet, Hort. Brit. ed. 2: 585. 1830. *C. sabiaefolia* Hook. f. & Th. in Fl. Brit. Ind. 1: 179. 1872; Fl. As. 1: 78. 1934.

Shrubs or small trees, erect or scandent; leaves elliptic to oblong-lanceolate, rounded or subacute at base, acuminate, 5-14 × 2-4 cm; lateral nerves 7-10 pairs; petioles ± 5 mm, grooved above; flowers axillary, solitary or extra-axillary in 2-3 serial rows, white, 1.0-1.5 cm across; pedicels 1.3-1.8 cm; stamens 20-30; fruits globose, 1.0-1.5 cm diam.; seeds 1-3.

Primary forests, 1200-1600 m; fl. & fr.: Apr.-Oct.; Raliang.

2. ***Capparis assamica*** Hook. f. & Th. in Fl. Brit. Ind. 1: 177. 1872; Fl. As. 1: 76. 1934. **Fig. 7**

Shrubs, often scandent, 2-3 m; leaves oblong-lanceolate, cuneate at base, acute to acuminate, 16-20 × 5-6 cm; lateral nerves 8-12 pairs; petioles 6-9 mm, grooved above; racemes terminal or subterminal, dense-flowered, 12-25 cm; flowers white, 8-9 mm across; pedicels 1.5-2.0 cm; stamens 16-20; fruits globose, ± 8 mm diam., red, 1-seeded.

Primary forests, 100-1000 m; fl. & fr.: Apr.-Oct.; Dawki.



Fig. 7. *Capparis assamica* Hook. f. & Th.  
a. Twig. b. Infructescence. c. Flower.

### 13. CLEOMACEAE

#### CLEOME L.

**Cleome gynandra** L. Sp. Pl. 671. 1753. *C. pentaphylla* L. Sp. Pl. ed. 2: 938. 1763 *nom. illegit.* *Gynandropsis pentaphylla* (L.) DC. Prodr. 1: 238. 1824; Fl. Brit. Ind. 1: 171. 1872.

Annual erect herbs, 0.5-1.5 m; leaves 3-5-foliolate; petioles 5-8 cm; leaflets sessile, ovate to oblanceolate, cuneate at base, acute to acuminate, entire or serrulate, 3-8 × 1-2 cm; racemes terminal, corymbose; flowers white or purplish-pink, 2-3 cm across; pedicels filiform, 2-3 cm; bracts trifoliolate, decreasing in size upwards; capsules subterete, 6-8 × 0.4-0.5 cm; seeds reniform, brownish-black.

Wastelands, cultivated fields and gardens, 100-1500 m; fl. & fr.: June-Dec.; Dawki, Sutnga.

The purplish-pink forms are usually found cultivated in village gardens as ornamental plants.

#### 14. VIOLACEAE

- |   |                  |
|---|------------------|
| 1a. Herbs; flowers zygomorphic; sepals pouched or produced at base; abaxial stamens spurred at base. ...            | <i>Viola</i> 1   |
| 1b. Trees or shrubs; flowers subactinomorphic; sepals not pouched at base; abaxial stamens not spurred at base. ... | <i>Rinorea</i> 2 |

##### 1. VIOLA L.

- |  |                         |
|--|-------------------------|
| 1a. Stems stoloniferous; leaves distantly placed; stipules entire; pedicels hairy; flowers purplish-blue, with darker stripes. ...                         | <i>V. palmaris</i> 1    |
| 1b. Stems erect, not stoloniferous; leaves crowded towards top of stems; stipules lacinate; pedicels glabrous; flowers creamy-white with purple tinge. ... | <i>V. sikkimensis</i> 2 |

1. ***Viola palmaris*** Ging. in DC. Prodr. 1: 298, 1824. *V. distans* Wall. in Trans. Med. Phys. Soc. Calc. 7: 227, 1835; Fl. Brit. Ind. 1: 183, 1872. *V. arcuata* Bl. Bijdr. 68, 1825; Fl. As. 1: 81, 1834.

Perennial herbs with slender woody rootstock and decumbent or ascending runners up to 30 cm; leaves ovate, deltoid, cordate at base, acute to subacute, crenate at margins, 2.0-3.5 × 1.8-3.5 cm, palmately 3-5-nerved; petioles 2-4 cm; flowers solitary, ± 1.5 cm; pedicels 4-7 cm; capsules elliptic-oblong, ± 8 mm with persistent style and sepals.

Grasslands, roadsides and forest edges, in shaded places, 1200-1600 m; fl. & fr.: Apr.-Nov.; Jowai.

2. ***Viola sikkimensis*** W. Becker in Bieh. Bot. Centralbl. Aft. 34: 260, 1916. *V. hookeri* Thoms. in Fl. Brit. Ind. 1: 183, 1872; *p.p.*

##### Fig. 8

Perennials, with woody rootstock; leaves ovate, cordate with broad sinus at base, acute to subacute, crenate at margins, 3-5 × 1.5-3.0 cm, palmately 3-5-nerved at base; petioles 3.0-5.5 cm; flowers ± 1.5 cm; pedicels 3.0-6.5 cm; capsules elliptic-oblong, beaked, ± 8 mm, with persistent sepals.

Pine forests and grasslands, 1300-1700 m; fl. & fr.: Mar.-Aug.; Jowai.

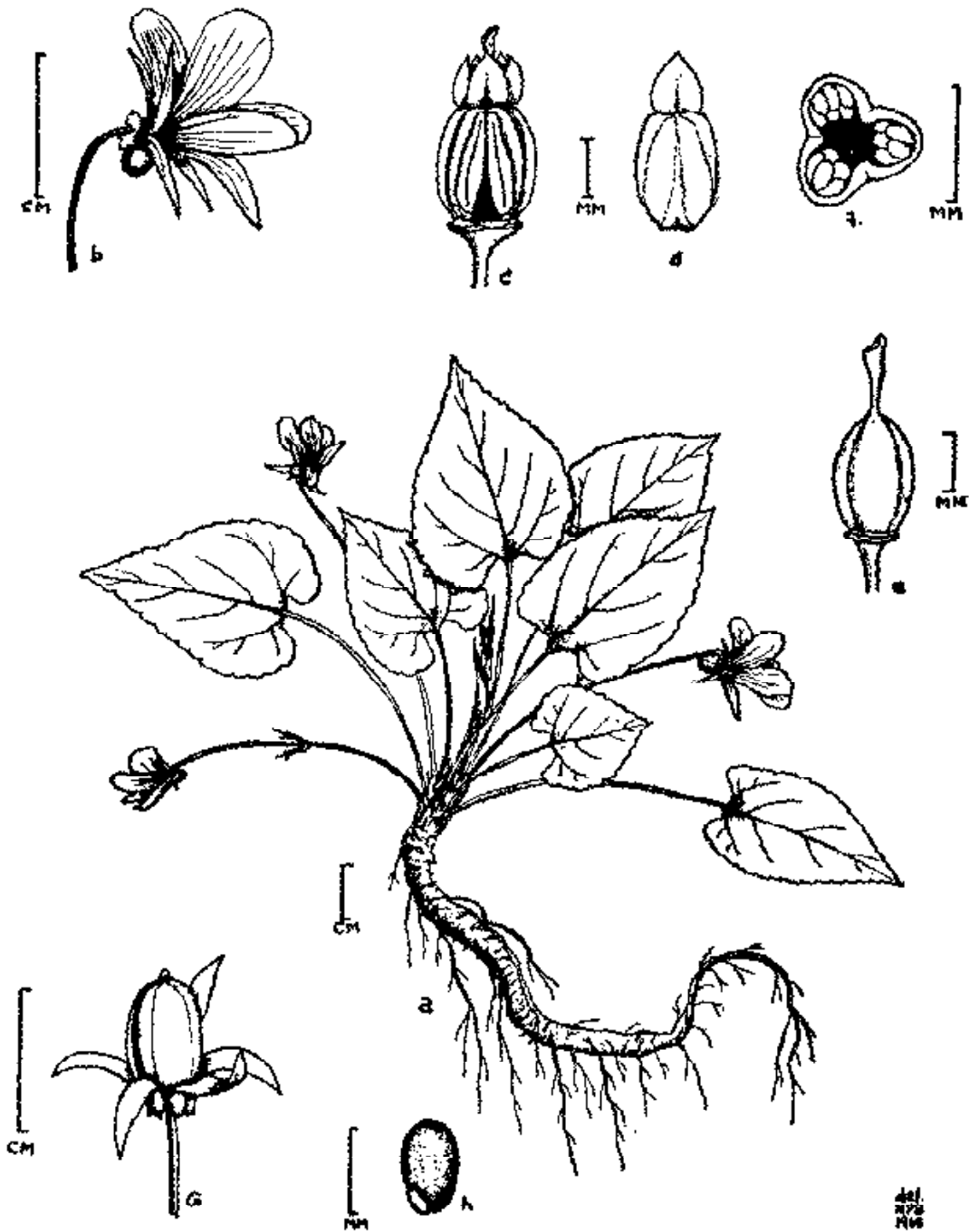


Fig. 8. *Viola sikkimensis* W. Becker  
 a. Plant. b. Flower. c. Flower with perianth removed. d. Stamen. e. Ovary.  
 f. T. S. of ovary. g. Fruit. h. Seed.

2. *RINOREA* Aubl.

***Rinorea bengalensis*** (Wall.) O. Ktze. Rev. Gen. Pl. 1: 42. 1891. *Also-  
 deia bengalensis* Wall. Trans. Med. Phys. Soc. Calc. 7: 224. 1835; Fl. Brit.  
 Ind. 1: 186. 1872; Fl. As. 1: 82. 1934.

Shrubs, leaves elliptic-lanceolate, acute at base, caudate-acuminate, 6-18 × 2-5 cm; lateral nerves 10-12 pairs; petioles 8-10 mm; stipules linear, 5-8 mm; petals subequal, oblong-ovate; capsules 3-valved, ± 1 cm; seeds 3, globose, ± 5 mm diam.

Primary forests, 100-500 m; fl. & fr.: Nov.-May; Dawki.

## 15. BIXACEAE

### BIXA L.

**Bixa orellana** L. Sp. Pl. 512. 1753; Fl. Brit. Ind. 1: 190. 1872; Fl. As. 1: 83. 1934.

Shrubs or small trees, 2-8 m; leaves ovate, subcordate to truncate at base, long acuminate, 7-22 × 4-14 cm, glossy above, densely red-dotted beneath; lateral nerves 4-5 pairs; petioles 4-10 cm; stipules 5-6 mm; panicles terminal, corymbose; flowers white or pinkish, 3-5 cm across; capsules ovoid, 2-4 × 2-3 cm, densely clothed with long red or greenish-brown bristles.

Secondary forests and near villages, 100-800 m; fl. & fr.: July-Dec.; Jaintea Hills, *G. Mann* s. n.

## 16. FLACOURTIACEAE

- |  |                     |
|--|---------------------|
| 1a. Petals present.  |                     |
| 2a. Flowers unisexual, in fascicles or cymes; petals with a scale at base inside; stamens many. ...                      | <i>Gynocardia</i> 1 |
| 2b. Flowers bisexual, in racemes, spikes or panicles; petals without basal scales inside; stamens as many as petals. ... | <i>Homalium</i> 2   |
| 1b. Petals absent.   |                     |
| 3a. Flowers bisexual; receptacle with one whorl of clavate appendages; stamens 6-10. ...                                 | <i>Casearia</i> 3   |
| 3b. Flowers unisexual; receptacle without appendages or with scattered glands; stamens numerous.                         |                     |
| 4a. Ovary imperfectly 2-5-locular; styles 3 or more. ...   | <i>Flacourtia</i> 4 |
| 4b. Ovary 1-locular; style simple. ...   | <i>Xylosma</i> 5    |

### 1. GYNOCARDIA R. Br.

**Gynocardia odorata** R. Br. in Roxb. Pl. Corom. 3: 95, t. 299. 1819; Fl. Brit. Ind. 1: 195. 1872; Fl. As. 1: 87. 1934.

Diocious trees, 10-15 m; leaves oblong to oblong-lanceolate, rounded or subacute at base, short-acuminate, 15-25 × 4-8 cm; lateral nerves 5-9 pairs; petioles 1-3 cm; flowers pale yellow, fragrant, 2.5-3.5 cm across, in axillary fascicles or in large bunches on tubercles on trunks; pedicels 2.5-5.0 cm;

fruits woody, globose, 8-12 cm, with  $\pm$  5 mm thick hard rind; seeds many,  $\pm$  2.5 cm diam., immersed in pulp.

Primary forests, 500-1000 m; fl. & fr.: Mar.-Dec.; Solika, *Balahrishnan* 46750.

## 2. HOMALIUM Jacq.

**Homalium schlichii** Kurz, For. Fl. Brit. Burma 1: 532. 1877; Fl. Brit. Ind. 2: 597. 1879; Fl. As. 1: 86. 1934.

Trees, up to 35 m; leaves ovate, oblong-elliptic, acute to cuneate at base, acute to acuminate, 12-16  $\times$  4-7 cm; lateral nerves 8-10 pairs; petioles 7-9 mm; racemes terminal, 5-8 cm long; flowers  $\pm$  4 mm across, white; pedicels  $\pm$  3 mm; stamens in bundles of 3, opposite to each petal; capsules 2-5-valved at apex; seeds few, oblong, angular.

Forests, 100-1300 m; fl. & fr.: Mar.-Nov.; Wah-Rang-Kasam, near Jarain.

## 3. CASEARIA Jacq.

**Casearia vareca** Roxb. Fl. Ind. 2: 418. 1832; Fl. Brit. Ind. 2: 593. 1879; Fl. As. 1: 93. 1934. '*Dieng-soh-rang*.'

Shrubs or small trees, 2-10 m, branching from base; leaves oblong-lanceolate to oblanceolate, cuneate at base, obtuse to subacute, closely serrate to spinulose-dentate at margins, 7-15  $\times$  3-5 cm; lateral nerves 7-12 pairs; petioles 3-5 mm; flowers clustered in lax axillary fascicles, greenish-grey, 3-4 mm across; pedicels 2-4 mm; capsules ovoid, 3-angled, 5-7 mm, diara., orange-yellow; seeds 4-6, oblong.

Primary forests, 100-1000 m; fl. & fr.: May-Feb.; Nartiang, Rytang, near Garampani, Sonapur.

## 4. FLACOURTIA L'Herit.

**Flacourtia jangomas** (Lour.) Raeusch. Nomencl. Bot. ed. 3: 290. 1897. *Stigmarota jangomas* Lour. Fl. Cochinch. 2: 634. 1790. *F. cataphracta* Willd. Sp. Pl. 4: 830. 1806; Fl. Brit. Ind. 1: 193. 1872; Fl. As. 1: 89. 1934.

Dioecious trees, 5-10 m; leaves ovate to ovate-lanceolate, rounded or broadly cuneate at base, obtusely long-acuminate, serrulate at margin, 4-9  $\times$  2.5-4.5 cm; lateral nerves 4-5 pairs; petioles 4-7 mm; racemes axillary, subcorymbose; flowers fragrant; pedicels slender, 5-10 mm; berries subglobose, 1.5-2.5 cm, dark purple; style-column persistent.

Forests and forest edges, 100-500 m; fl. & fr.: Mar.-Oct.; Dawki.



5. *Xylosma* Forst. f. *nom. cons.*

***Xylosma controversum*** Clos. in Ann. Sc. Nat. sér. 4, 8: 231. 1857; Fl. Brit. Ind. 1: 194. 1872; Fl. As. 1: 91. 1934.

Diocious trees or large shrubs, 5-10 m; stem with short axillary spines; leaves elliptic-ovate or obovate-lanceolate, cuneate at base, acuminate, shallowly glandular-serrate at margin, 4-12 × 2.5-7.0 cm; lateral nerves 6-9 pairs; petioles 7-10 mm; racemes axillary, few-flowered, paniculate, 3-4 cm; pedicels articulate above base, 2-3 mm; berries globose, red; seeds 2-8, plano-convex.

Secondary forests and forest edges, 1000-1500 m; fl. & fr.: Jan.-Dec.; Jowai.

## 17. PITTOSPORACEAE

PITTIOSPORUM Gaertn. *nom. cons.*

- |   |                        |
|---|------------------------|
| 1a. Petioles less than 5 mm long; inflorescences glandular-hairy or glabrescent; ovary pubescent; capsules longer than broad, 3-valved; seeds many. ... | <i>P. podocarpum</i> 1 |
| 1b. Petioles 6-10 mm long; inflorescences ferruginous pubescent; ovary glabrous; capsules as long as broad, 2-valved; seeds 4. ...                      | <i>P. reticosum</i> 2  |

1. ***Pittosporum podocarpum*** Gagnep. Not. Syst. 8: 211. 1939. *P. glabratum* (non Lindl. 1846) Hook. f. & Th. in Fl. Brit. Ind. 1: 198. 1872; Fl. As. 1: 95. 1934.

Erect shrubs, 2-4 m; leaves oblong-lanceolate to oblanceolate, cuneate at base, acute, revolute at margins, 3-16 × 1-3 cm; lateral nerves faint; petioles 2-5 mm, grooved above; racemes terminal, corymbose; flowers pale yellow, 1.2-1.5 cm; pedicels slender, 5-10 mm; capsules obovoid or ellipsoid, ± 2 cm, striate inside; seeds compressed, faceted, orange-red.

Primary forests, 1200-1600 m; fl. & fr.: May-Oct.; Jowai.

2. ***Pittosporum reticosum*** Ridl. Fl. Malay Pen. 1: 137. 1922. *P. kerrii* Craib in Kew Bull. 1924; 16. 1924; Gowda in J. Arn. Arb. 32: 333. 1951.

Small trees or shrubs, 3-5 m; leaves crowded at ends of twigs, elliptic-lanceolate, attenuate at base, acuminate, wavy at margins, 4-15 × 2-4 cm; lateral nerves impressed above, distinct beneath; inflorescences terminal, thyrsoid panicles; flowers pale yellow, 7-8 mm; pedicels 2-3 mm; capsules subglobose, ⊥ 1.5 cm; seeds 4-6 mm, reddish-brown.

Primary forests, 1000-1500 m; fl. & fr.: May-Sept.; Jarain.

18. POLYGALACEAE

- 1a. Stamens more or less free ; ovary 1-celled; ovules 2—6 on parietal placentae. ... *Xanthophyllum* 1
- 1b. Stamens monadelphous or sub-diadelphous and united into a tube ; ovary 2—3-celled ; ovules solitary on axile placentae. ...
- 2a. Inner 2 sepals much larger than the outer ones; stamens 8. ... *Polygala* 2
- 2b. Sepals subequal ; stamens 4—6. ... *Salomonina* 3

1. XANTHOPHYLLUM Roxb. *nom. cons.*

**Xanthophyllum flavescens** Roxb. Pl. Corom. 3: 81. t. 284. 1820; Fl. Brit. Ind. 1: 290. 1874; Fl. As. 1: 99. 1934. **Fig. 9**

Trees, 5-10 m; spinules on twigs in vertical series of 2-3 above petiole, ± 1 mm, blunt; leaves lanceolate to oblong-lanceolate, acute to subacute at base, long-acuminate, 10-20 × 3-6 cm; lateral nerves 5-9 pairs; petioles 5-10 mm; panicles terminal or axillary, 9-12 cm; flowers yellow, 10-12 mm across; pedicels up to 5 mm; fruits indehiscent, globose, ± 2 cm diam., greenish to yellow.

Primary forests, 100-500 m; fl. & fr.: Mar.-Oct.; Dawki.

2. POLYGALA L.

- 1a. Shrubs, more than 1 m high ; sepals and alae (inner calyx lobes) caducous. ... *P. arillata* 1
- 1b. Herbs, less than 0.5 m high ; sepals and alae persistent. ...
- 2a. Alae asymmetric, subfalcate, oblong to elliptic, subobtuse or acute at apex, not petaloid. ...
- 3a. Inflorescences lax-flowered, 2—6 cm long ; pedicels 3—6 mm long ; leaves less than 1 cm broad ; alae 8—10 mm long, subobtuse to subacute-mucronate at apex. ... *P. sibirica* 2
- 3b. Inflorescences dense-flowered, 0.5—2.0 cm long ; pedicels less than 2 mm long ; leaves 1—3 cm broad ; alae 6—7 mm long, acute-mucronate at apex. ... *P. glomerata* 3
- 2b. Alae symmetric, obovate or elliptic, blunt at apex, petaloid. ...
- 4a. Alae elliptic, less than 5 mm long in fruits, 3-nerved ; bracts caducous after anthesis. ... *P. longifolia* 4
- 4b. Alae obovate to nearly orbicular, 6—7 mm long in fruits, 5- or more-nerved ; bracts persistent. ...
- 5a. Leaves elliptic-lanceolate to linear-lanceolate, acute at apex, 15—50 × 3—10 mm ; racemes at the forks of branches and terminal on lateral branches ; alae obtuse at apex. ... *P. persicariaefolia* 5
- 5b. Leaves obovate to oblanceolate, rounded at apex, 15—20 × 7—10 mm ; racemes supraaxillary or terminal on lateral branches ; alae mucronate at apex. ... *P. crotalaroides* 6

1. **Polygala arillata** Buch.-Ham. in D. Don, Prodr. Fl. Nep. 199. 1825 ; Fl. Brit. Ind. 1: 200. 1872 ; Fl. As. 1: 97. 1934.

Erect shrubs, 1-3 m; leaves elliptic to oblong-lanceolate, rounded to acute at base, mucronate or acute, 6-18 × 3-6 cm; lateral nerves 9-10 pairs; petioles 5-15 mm; racemes terminal, axillary or supra-axillary, simple or

paniculate, 5-8 cm; flowers orange-yellow, 1.0-1.2 cm; capsules broadly reniform, notched at apex, 10-12 mm diam., fleshy; seeds black with white appressed hairs; caruncle hooded, 2-lobed.

Forests, in shaded places, 1000-1600 m; fl. & fr.: May-Dec.; Jowai-Jarain, Khleihriat.

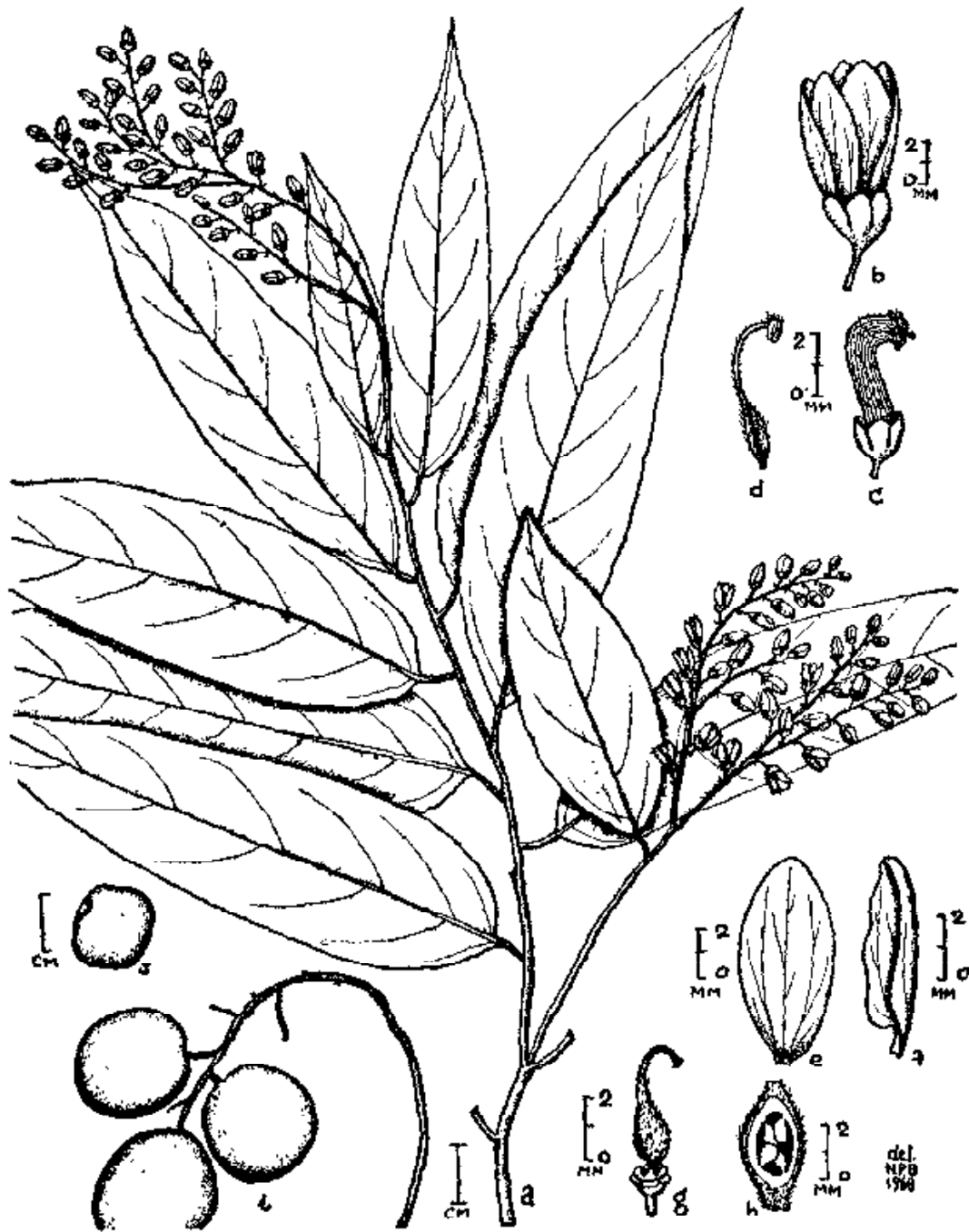


Fig. 9. *Xanthophyllum flavescens* Roxb.

a. Twig. b. Flower. c. Flower with petals removed. d. Stamen. e & f. Petals, two views. g. Ovary. h. L. S. of ovary. i. Fruits. j. Seed.

2. ***Polygala sibirica*** L. Sp. Pl. 702. 1753; Fl. Brit. Ind. 1: 205. 1872; Fl. As. 1: 98. 1934.

Perennial erect or ascending herbs, 15-35 cm, crispate-pubescent; leaves elliptic to linear-lanceolate, subacute at base, acute to acuminate, 2.5-3.5 × 3-8 mm; lateral nerves 7-9 pairs; racemes axillary or supra-axillary, 5-10-flowered; flowers blue or purple, 6-7 mm; pedicels recurved in fruit; capsules suborbicular, notched at apex, 5-6 mm long, broadly winged.

Grasslands and secondary forests, 1300-1600 m; fl. & fr.: Apr.-Sept.; Jowai.

3. ***Polygala glomerata*** Lour. Fl. Cochinch. 426. 1790; Fl. Brit. Ind. 1: 206. 1872; Fl. As. 1: 98. 1934.

Erect or ascending herbs, 10-60 cm; leaves ovate to elliptic-lanceolate, acute at base, obtuse-mucronate, 1.5-10.5 × 1-3 cm; racemes axillary or supra-axillary, 2-8-flowered, flowers 6-7 mm, drooping, greenish-white with pink blotches on lateral pair of petals; capsules suborbicular, oblong, notched at apex, 5-7 mm diam., ciliate at narrow marginal wing.

Grasslands, forest edges and roadsides, 500-1300 m; fl. & fr.: Apr.-Oct.; Umtapoh, south of Jarain.

4. ***Polygala longifolia*** Poir. in Lamk. Encycl. 5: 501. 1804. *P. leptalea* DC. Prodr. 1: 325. 1824; Fl. Brit. Ind. 1: 202. 1872; Fl. As. 1: 98. 1934.

Slender erect herbs, 20-60 cm; leaves linear-lanceolate, subsessile, acute at both ends, 10-40 × 1-4 mm, 1-nerved; racemes subconical, 2-8 cm; flowers purplish-white, ± 2 mm; capsules obovate, obcordate, ± 3 × 2 mm, winged; seeds oblong-terete, ± 2 × 1 mm, short appressed white hairy; caruncle with 3 membranous appendages.

Shaded places in forests and grasslands, 200-1000 m; fl. & fr.: May-Nov.; Garampani.

5. ***Polygala persicariaefolia*** DC. Prodr. 1: 326. 1824; Fl. Brit. Ind. 1: 202. 1872.

Erect annuals, 10-50 cm; leaves cuncate at base, acuminate or acute-mucronate; petioles short; racemes terminal or leaf-opposed, erect or erecto-patent, 6-10 cm; flowers purple to reddish-purple, 3-4 mm; capsules oblong-obovate, notched at apex, ± 4 × 3 mm, sparsely ciliate at narrowly winged margins.

Pine forests, grasslands and forest edges, 1300-1600 m ; fl. & fr.: July-Oct. ; Mawryngkneng, *Saikia* 23462 ; Umthalong, *Balakrishnan* 46902.

6. ***Polygala crotalarioides*** Buch.-Ham. in D. Don, Prodr. Fl. Nep. 199. 1825 ; Fl. Brit. Ind. 1: 201. 1872 ; Fl. As. 1: 97. 1934.

Perennial herbs, 10-40 cm ; leaves acute or cuneate at base, rounded-apiculate ; racemes axillary or extra-axillary, 1-3 cm ; flowers purple or purplish-white, 6-8 mm ; capsules oblong-orbicular, notched at apex,  $\pm$  4 mm diam., narrowly winged and ciliate at margin ; seeds appressed white hairy.

Grasslands, forest edges and secondary forests, 200-1600 m ; fl. & fr.: May-Nov. ; Garampani, Raliang.

### 3. SALOMONIA LOUR. *nom. cons.*

***Salomonina cantoniensis*** Lour. Fl. Cochinch. 14. 1790 ; Fl. Brit. Ind. 1: 206. 1872. **Fig. 10**

Annual erect or ascending herbs, 5-20 cm ; leaves ovate to lanceolate, broadly rounded, cuneate or truncate at base, obtuse or subacute, 5-20  $\times$  4-15 mm ; flowers pinkish, in terminal 2-3 cm long spikes ; capsules compressed, obcordate,  $\pm$  2  $\times$  1 mm, dehiscent along margins ; seeds lenticular,  $\pm$  1 mm, shiny black.

Moist places in grasslands, streamsides and marshy places, 1000-1600 m ; Jarain, Jowai-Bodarpur Road, Kheihriat.

## 19. CARYOPHYLLACEAE

### DRYMARIA Roem. & Schult.

***Drymaria cordata*** (L.) Roem. & Schult. Syst. Veg. 5: 406. 1819 ; Fl. Brit. Ind. 1: 244. 1874. *Holosectum cordatum* L. Sp. Pl. 88. 1753.

Glandular-pubescent or glabrate annuals, prostrate or spreading, rooting at nodes ; leaves orbicular to reniform or deltoid-ovate, truncate or obtuse at base, obtusely apiculate at apex, 5-25  $\times$  5-30 mm, 3-7-nerved ; petioles 2-10 mm ; cymes dichasial, terminal or axillary ; pedicels 2-15 mm ; capsules ovoid, 1.5-2.5 mm, dehiscent into 2-3 valves ; seeds dark brown.

Wastelands, roadsides and gardens, 1000-1600 m ; fl. & fr.: May-Oct. ; Jowai.

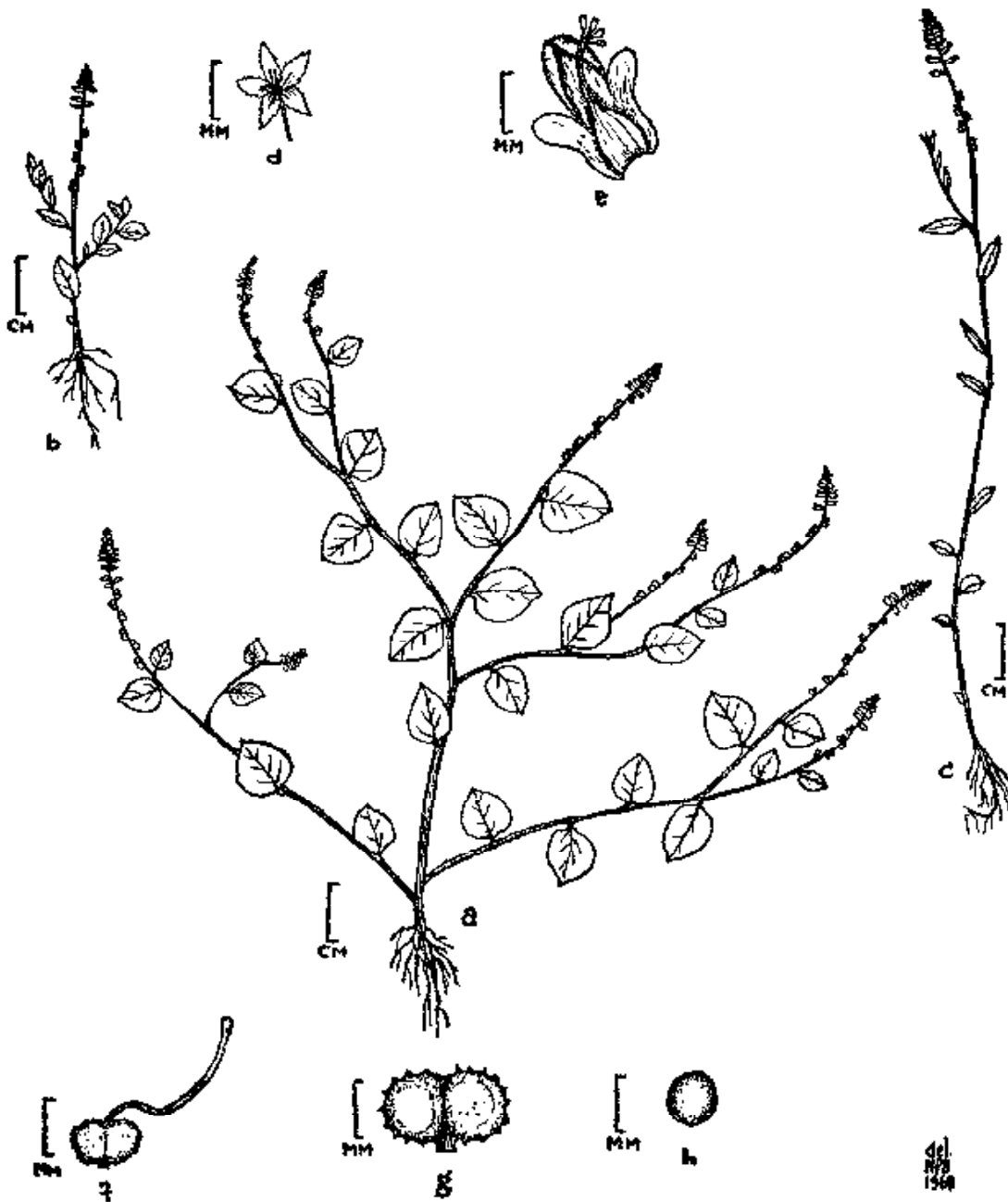


Fig. 10. *Salomonina cantoniensis* Lour.  
 a, b & c. Different habits. d. Calyx. e. Stamen with keel petal. f. Ovary. g. Fruit.  
 h. Seed.

20. PORTULACACEAE

PORTULACA L.

**Portulaca oleracea** L. Sp. Pl. 445. 1753; Fl. Brit. Ind. 1: 246. 1874.

Erect to decumbent succulent annual herbs, up to 50 cm; leaves opposite below flowers, ovate or obovate, cuneate at base, rounded

or obtuse, 2-40 × 1-15 mm; petioles up to 5 mm; flowers solitary or 2-6 in a head within an involucre of leaves; sepals ± 4 mm, keeled and joined in a tube; persistent and enclosing fruits; capsules obovoid, 3-9 mm; seeds black, tuberculate-punctate.

Weed in gardens and cultivated places, 200-1000 m; fl. & fr.: Apr - Sept.; Garampani.

## 21. HYPERICACEAE

### HYPERICUM L.

- |   |     |                        |
|---|-----|------------------------|
| 1a. Petals deciduous; ovary 5-celled.                     | ... | <i>H. patulum</i> 1    |
| 1b. Petals persistent; ovary 1-3-celled.                  |     |                        |
| 2a. Stamens 3-adelphous at base; ovary 3-celled.          | ... | <i>H. elodeoides</i> 2 |
| 2b. Stamens shortly monadelphous at base; ovary 1-celled. | ... | <i>H. laxum</i> 3      |

1. **Hypericum patulum** Thunb. Fl. Jap. 295. t. 17. 1784; Fl. Brit. Ind. 1: 254. 1874; Fl. As. 1: 100. 1934.

Erect undershrubs, 1-3 m; leaves ovate to oblong-lanceolate, acute at base, narrowed to apex, 1.5-5.5 × 0.5-3.0 cm; lateral nerves 4-6 pairs; flowers bright yellow, 3-5 cm across, in few flowered terminal or upper axillary corymbose cymes; capsules ovoid, 1.0-1.5 cm, brownish-red; seeds numerous, minute.

Shaded places in forests and riversides, 1200-1600 m; fl. & fr.: Apr.-Nov.; Jarain.

2. **Hypericum elodeoides** Choisy in DC. Prodr. 1: 552. 1824; Fl. Brit. Ind. 1: 255. 1874; Fl. As. 1: 101. 1934.

Stoloniferous herbs or undershrubs, 15-75 cm; leaves ovate-oblong to elliptic-lanceolate, acute to obtuse, 1.5-2.5 × 0.5-1.2 cm, pellucid-punctate and with scattered black glands; flowers yellow, 6-7 × 10-12 mm, in terminal and subterminal paniculate cymes; capsules ellipsoid, 6-7 mm; seeds black.

Open places, forest edges and grasslands, 1300-1600 m; fl. & fr.: June-Sept.; Jowai.

3. **Hypericum laxum** (Bl.) Koidzumi in Bot. Mag. Tokyo 40: 344. 1926. *Brathys laxa* Bl. Mus. Bot. Lugd.-Bat. 2: 19. 1856. *H. japonicum* (non Thunb.) *sensu* Dyer in Fl. Brit. Ind. 1: 256. 1874; Fl. As. 1: 102. 1934.

Erect herbs, unbranched or few-branched, 4-50 cm; stem 4-angled, hairy on angles; leaves ovate to obovate, amplexicaul at base, 4-18 × 1-10 mm; flowers yellow, 4-6 mm across, terminal and axillary, solitary or in few-

flowered dichasial cymes; capsules with persistent styler bases, ellipsoid or ovoid; seeds pale brown.

Open grasslands, wastelands and paddy fields, 100-1500 m; fl. & fr.: May-Nov.; Dawki, Jowai-Jarain, Khleihriat, Khongsnong, Raliang.

22. CLUSIACEAE

- 1a. Petiole-bases sheathing; flowers unisexual; ovary 2-12-celled; stigma sessile or nearly so. ... *Garcinia* 1
- 1b. Petiole-bases not sheathing; flowers bisexual; ovary 1-2-celled; style long. ... *Calophyllum* 2

1. GARCINIA L.

- 1a. Flowers pentamerous; sepals and petals 5 each. ... *G. tinctoria* 1
- 1b. Flowers tetramerous; sepals and petals 4 each.
  - 2a. Lateral nerves of leaves close together, more than 20 pairs. ... *G. anomala* 2
  - 2b. Lateral nerves of leaves distant, less than 15 pairs.
    - 3a. Leaves 5-8 x 2-3 cm; flowers solitary, paired or 3 together. ... *G. lancifolia* 3
    - 3b. Leaves 10-30 x 5-12 cm; flowers many in compound panicles or simple spikes.
      - 4a. Male flowers dull white; female flowers sessile; stigma entire; fruits 2-3 cm diam. ... *G. paniculata* 4
      - 4b. Male flowers pale green; female flowers pedicellate; stigma deeply 8-12-lobed; fruits 8-10 cm diam. ... *G. pedunculata* 5

1. **Garcinia tinctoria** (DC.) W. F. Wight in U. S. Dept. Agr. Bur. Pl. Indus. Bull. 137: 50. 1909. *Xanthochymus pictorius* Roxb. Pl. Corom. 2: 51. t. 106. 1798 (non *G. pictoria* Roxb.). *X. tinctorius* DC. Prodr. 1: 562. 1824; Choi y in Mem. Soc. Phys. Hist. Nat. Geneve 12: 43. 1851. *G. xanthochymus* Hook. f. Fl. Brit. Ind. 1: 269. 1872; Fl. As. 1: 104. 1936.

Trees, 10-15 m; branches and branchlets tetragonous; leaves oblong-lanceolate, acute to rounded at base, acute, 10-35 x 5-12 cm; lateral nerves 10-35 pairs; petioles 2-3 cm; flowers dull white, 2.0-2.5 cm across, in 4-8-flowered fascicles at axils of fallen leaves; pedicels fleshy, 2.5-3.0 cm; berries ovoid, apiculate at apex, 4-6 cm diam., fleshy; seeds 3-5, oblong.

Forests, 100-1000 m; fl. & fr.: Mar.-Jan.; Sohka-Nongthala. Fruits acidic, eaten raw and cooked.

2. **Garcinia anomala** Planch. & Triana in Ann. Sci. Nat. ser. 4. 14: 329. 1860; Fl. Brit. Ind. 1: 266. 1874; Fl. As. 1: 107. 1934. **Fig. 11**

Trees, 8-12 m; leaves elliptic or oblong-lanceolate, cuneate or rounded at base, acute or shortly acuminate, 10-20 x 3.5-8.5 cm; lateral nerves 20-25 pairs; petioles 8-15 mm; flowers ± 1.2 cm across in axillary short-peduncled cymes; pedicels 3-4 mm; berries subglobose, 4-5 cm, with accrescent sepals; seeds 1-2, oblong-ellipsoid, angled.



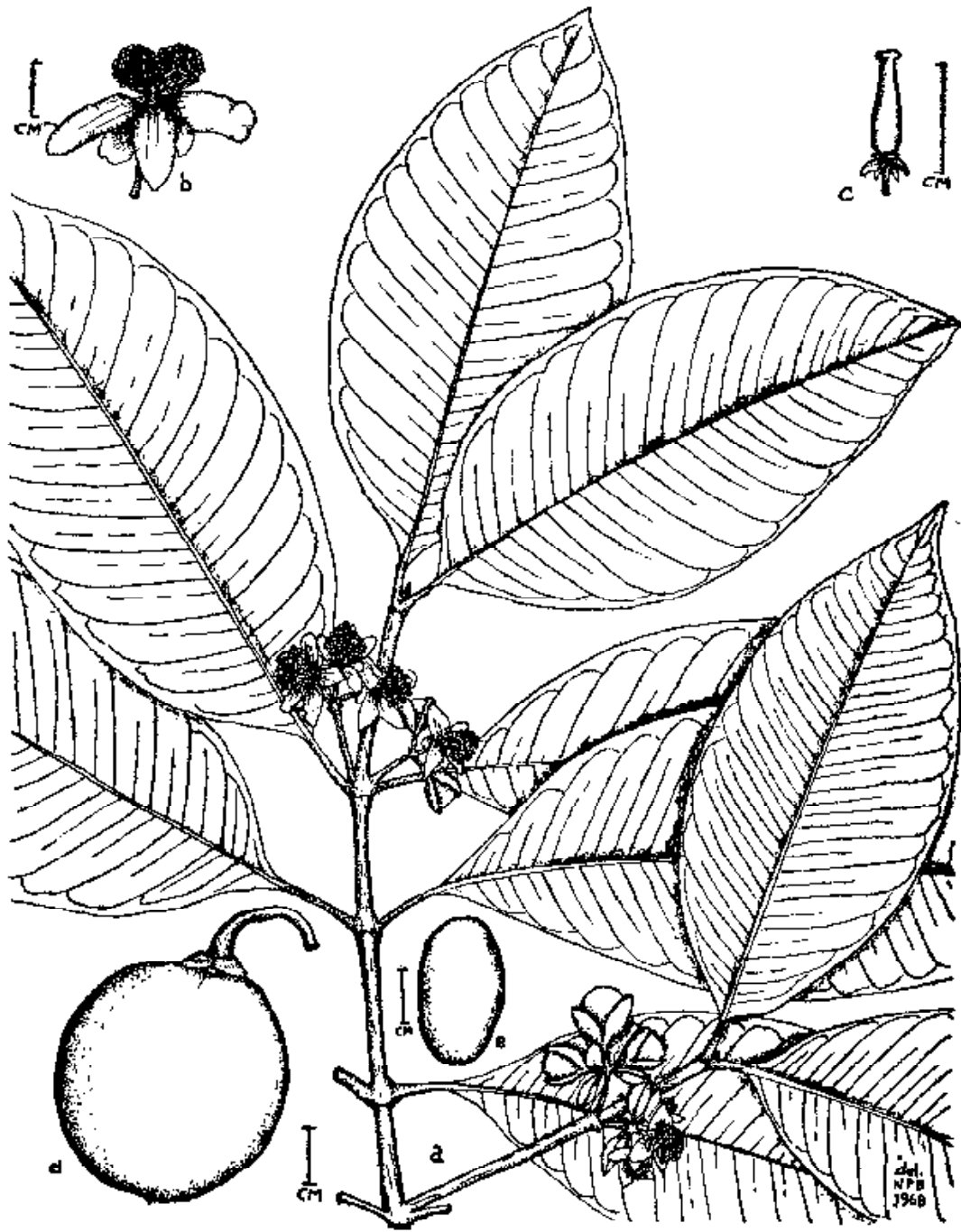


Fig. 11. *Garcinia anomala* Planch. & Triana  
 a. Twig. b. Male flower. c. Female flower. d. Fruit. e. Seed.

Primary forests, 500-1600 m ; fl. & fr. : May-Feb. ; Jarain, Jowai, Jowai-Jarain, Laskcin.

3. ***Garcinia lancifolia*** (G. Don) Roxb. Fl. Ind. 2: 263. 1832 ; Fl. Brit. Ind. 1: 263. 1874 ; Fl. As. 1: 106. 1934. *Stalagmitis lancifolia* G. Don, Gen. Syst. 1: 621. 1831.

Trees or large shrubs, 4-14 m; leaves narrowly lanceolate, cuncate at base, cuspidate-acuminate, 8-10 × 2-3 cm; lateral nerves 8-10 pairs; petioles 8-12 mm; flowers creamy pink or red, 7-8 mm across, terminal or axillary, solitary or 2-3 together; pedicels  $\pm$  8 mm; berries obovoid,  $\pm$  2.5 cm, orange-yellow; seeds 6-8.

Primary forests, 200-1400 m; fl. & fr.: Feb.-Sept.; Jarain-Khongsong, Nartiang.

4. **Garcinia paniculata** (G. Don) Roxb. Fl. Ind. 2: 626. 1832; Fl. Brit. Ind. 1: 266. 1874; Fl. As. 1: 266. 1934. *Stalagmitis paniculata* G. Don, Gen. Syst. 1: 621. 1831.

Trees, 15-20 m; leaves obovate, oblanceolate or oblong-lanceolate, cuncate at base, acute, 10-23 × 5-9 cm; lateral nerves 8-12 pairs; petioles 1.5-2.5 cm; flowers dull white,  $\pm$  1.3 cm across; male flowers in axillary or terminal 3-chotomous 7-10 cm long panicles; female flowers in 5-8 cm long terminal spikes; berries globose to ellipsoid,  $\pm$  2.5 cm; seeds 4.

Primary forests, 100-1000 m; fl. & fr.: Nov.-July; Dawki, Syndai. Ripe fruits eaten by local people.

5. **Garcinia pedunculata** G. Don, Gen. Syst. 1: 620. 1831; Fl. Brit. Ind. 1: 264. 1874; Fl. As. 1: 107. 1934.

Trees, 15-25 m; leaves obovate to oblanceolate, cuncate at base, acute to subacute, 10-30 × 5-12 cm; lateral nerves 10-15 pairs; petioles 1-2 cm; male flowers  $\pm$  1.8 cm across, in terminal 8-12-flowered short panicles; female flowers white to pale green,  $\pm$  2.2 cm across, terminal or upper axillary, solitary or in few-flowered clusters; berries globose, yellow; seeds 1 in each cell, enclosed in fleshy aril.

Forests, 100-1000 m; fl. & fr.: Oct.-July; Sohka. Ripe fruits are acidic and eaten raw or cooked.

## 2. CALOPHYLLUM L.

**Calophyllum polyanthum** Choisy in Mem. Soc. Phys. Hist. Nat. Geneve 12: 43. 1851; Fl. Brit. Ind. 1: 274. 1874; Fl. As. 1: 114. 1934.

**Fig. 12**

Trees, 10-15 m; leaves oblong-lanceolate to elliptic, cuncate at base, acuminate to subacute, 7-15 × 2.5-4.0 cm; petioles 1.5-2.0 cm; flowers white,  $\pm$  1 cm across, in terminal and upper axillary 3-10 cm long racemose panicles; pedicels 10-12 mm, slender, ebracteate; stamens 100-150; fruits drupaceous, subglobose to ovoid,  $\pm$  2.5 cm; seeds ovoid, brown.

Primary forests, 1000-1600 m; fl. & fr.: Mar.-Jan.; Wah-tyring, near Jowai.

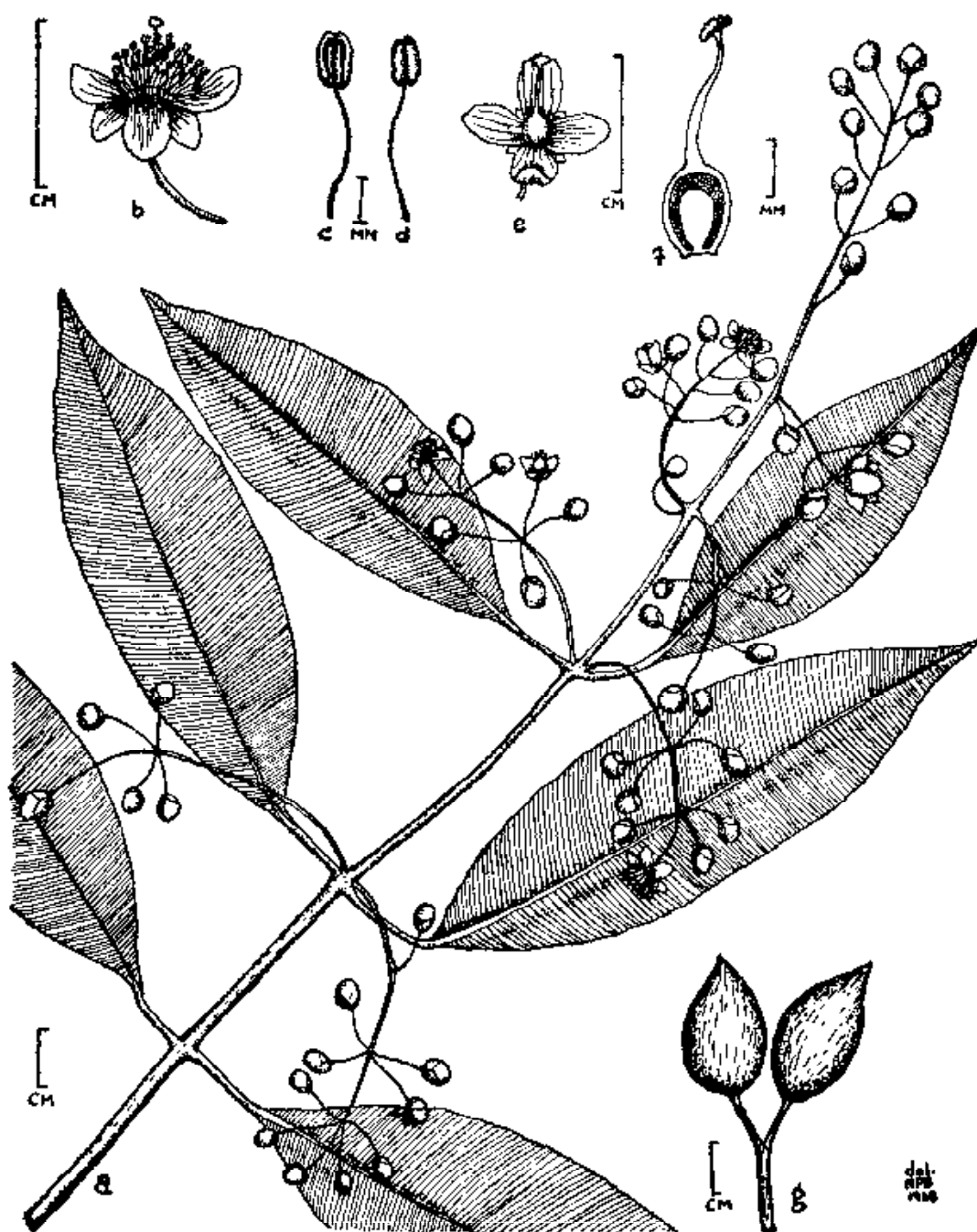


Fig. 12. *Calophyllum polyanthum* Choisy  
 a. Twig. b. Male flower. c & d. Stamens, ventral and dorsal views. e. Female flower.  
 f. L. S. of ovary. g. Fruits.

### 23. THEACEAE

- 1a. Flowers bisexual, sometimes double; anthers dorsifixed or inserted in deep basal incisions; fruits dehiscent.  
 2a. Ovary pubescent; style simple; seeds winged. ...  
 2b. Ovary glabrous or pubescent; styles 3-5; seeds not winged. ...

*Schima* 1

*Camellia* 2

- 1b. Flowers bisexual or unisexual, not double; anthers basifixed, not inserted in deep basal incisions; fruits indehiscent.
- 3a. Flowers less than 1 cm across, 1-6 together in leaf-axils; styles 3-5, free or united at base. ... *Eurya* 3
- 3b. Flowers more than 1 cm across, 1-2 in leaf axils; styles 1 or absent.
- 4a. Flowers extra-axillary; stamens entirely glabrous; ovules 2 in each cell; fruits 1-4-seeded; testa fleshy, red. ... *Ternstroemia* 4
- 4b. Flowers axillary; stamens ± pubescent; ovules many in each cell; fruits many-seeded; testa brittle, black. ... *Adinandra* 5

1. *SCHIMA* Bl.

*Schima wallichii* (DC.) Korth. Bijdr. Ternstr. in Tem. Verh. Nat. Gesch. Bot. 3: 143. 1840. *Gordonia wallichii* DC. Prodr. 1: 528. 1824.

Trees, up to 30 m; leaves oblong to lanceolate or ovate to obovate, cuneate at base, acuminate to caudate, 4-25 × 2-10 cm, appressed hairy, to glabrescent; lateral nerves 4-20 pairs; petioles 3-30 mm; flowers white, 4.5-6.5 cm across, fragrant; pedicels 1-5 cm; capsules woody, 5-6-celled, oblong or subglobose, bluntly 5-angular, 6-20 × 10-26 mm, silky hairy; seeds 3 per cell, reniform, 6-10 × 4-7 mm.

- 1a. Leaves entire to undulate; lateral nerves mostly forked; pedicels up to 2.5 mm thick; flowers up to 5 cm across. ... var. *wallichii* 1
- 1b. Leaves strongly crenate; lateral nerves scarcely forked; pedicels 3.0-3.5 mm thick; flowers up to 6 cm across. ... var.  *khasiana* 2

1. var. *wallichii* *S. wallichii* Dyer in Fl. Brit. Ind. 1: 289. 1874; Fl. As. 1: 119. 1934.

Forests and near villages, 1200-1700 m; fl. & fr.: Apr.-Feb.; Jowai, Um-tapoh.

2. var. *khasiana* (Dyer) Bloemb. in Reinwardtia 2: 164. 1952. *S. khasiana* Dyer in Fl. Brit. Ind. 1: 289. 1874; Fl. As. 1: 120. 1934.

Forests, 1200-1700 m; fl. & fr.: June-Apr.; Jowai.

2. *CAMELLIA* L.

- 1a. Pedicels less than 2 mm long; flowers erect; sepals deciduous.
- 2a. Leaves glossy, smooth; secondary nerves distinct; stamens 70-80; capsules ovoid to subglobose, rounded at base, glabrous. ... *C. kissi* 1
- 2b. Leaves pale, minutely and densely tuberculate-wrinkled on both sides; secondary nerves indistinct; stamens ± 30; capsules pyriform, narrowed at base, silky-pubescent when young. ... *C. caduca* 2
- 1b. Pedicels 3-7 mm long; flowers drooping; sepals persistent.
- 3a. Branchlets glabrous; leaves acute at apex, coriaceous, glabrous; filaments glabrous; capsules usually 3-seeded. ... *C. sinensis* 3
- 3b. Branchlets pubescent; leaves caudate-acuminate at apex, membranous, pubescent along midrib; filaments villous; capsules usually 1-seeded. ... *C. caudata* 4

1. **Camellia kissi** Wall. in As. Research. 13: 429. 1820. *C. drupifera* (non Lour. 1790) Dyer in Fl. Brit. Ind. 1: 293. 1874; Fl. As. 1: 123. 1934.

Shrubs or small trees, 2-5 m; leaves elliptic-oblong to oblong-lanceolate, cuneate at base, acute to acuminate, 4-7 × 1.5-2.5 cm; lateral nerves 7-10 pairs; petioles 2-5 mm; flowers white, ± 2 cm across, axillary or terminal, solitary or 1-3 together; pedicels ± 2 mm; capsules, ± 1.5 cm, dehiscent into 3 woody valves, greenish-red; seeds 1-3, subglobose, ± 1 cm, brown.

Forests, in shaded places, 1000-1700 m; fl. & fr.: Jan.-Sept.; Jowai, Nartiang.

2. **Camellia caduca** Brandis, Ind. Trees 61. 1907; Fl. As. 1: 123. 1934.

Shrubs or small trees, 2-5 m; leaves oblong-lanceolate to elliptic-lanceolate to elliptic, acute to cuneate at base, acute to short-acuminate, 5-10 × 1.5-4.5 cm broad; lateral nerves 6-9 pairs; petioles 3-5 mm; flowers white, ± 1.5 cm across, axillary or terminal, solitary or 1-2 together; pedicels ± 2 mm; capsules acute at apex, 12-18 mm; seeds 1-2, subglobose.

Forests in shaded valleys and streamsides, 1000-1600 m; fl. & fr.: Mar.-Sept.; Jarain, *Balakrishnan* 42202; *Halim* 28610; Jarain to Wah Umngot, *Balakrishnan* 46700 & 46836; Nartiang, *Balakrishnan* 47097 —Endemic to Meghalaya.

3. **Camellia sinensis** (L.) O. Ktze in Act. Hort. Petrop. 10: 195. 1887. *Thea sinensis* L. Sp. Pl. 515. 1753. *C. theifera* Griff. Notul. 4: 558. 1854; Fl. Brit. Ind. 1: 292. 1874; Fl. As. 1: 122. 1934.

Shrubs or small trees, 1-4 m; leaves oblong-elliptic to obovate, acute at base, 6-18 × 2-6 cm; lateral nerves 8-12 pairs; flowers white, 3.0-3.5 cm across, axillary, solitary or few together, cernuous; capsules ovoid to subglobose, 17-23 mm, 3-lobed, leathery; seeds one in each cell, globose, faceted, ± 1.5 cm, brown.

Primary forests, in moist shaded places, 1000-1500 m; fl. & fr.: Jan.-Sept.; Jarain, Jowai, Khleihriat.

4. **Camellia caudata** Wall. Pl. As. Rar. 3: 36. 1832; Fl. Brit. Ind. 1: 293. 1874; Fl. As. 1: 123. 1934.

Shrubs or small trees, 2-5 m; leaves elliptic-oblong to narrowly lanceolate, acute to attenuate at base, serrulate at base, 3.5-8.0 × 1.5-3.0 cm; lateral nerves 8-12 pairs; petioles 2.5-5.0 mm; flowers white, ± 2.5 cm across, axillary, solitary or 2-5 together in fascicles; pedicels 3-5 mm; capsules globose, subtrigonal, acute, 1-celled, ± 2.5 × 2.0 cm.

Forests, 1000-1400 m; fl. & fr.: Sept.-June; Jarain.

## 3. EURYA Thunb.

- |  |                         |
|--|-------------------------|
| 1a. Ultimate branchlets entirely glabrous ; petioles and midribs pubescent or puberulous beneath ; sepals glabrous. ...  | <i>E. japonica</i> 1    |
| 1b. Ultimate branchlets pubescent or patently lanate ; petioles and midribs glabrous, sepals pubescent.                  |                         |
| 2a. Ultimate branchlets striate, appressed-pubescent ; leaves entire or serrulate at upper margins, 2.5—4.0 cm wide. ... | <i>E. cerasifolia</i> 2 |
| 2b. Ultimate branchlets terete, patently hairy ; leaves serrate, 1.5—2.0 cm wide. ...                                    | <i>E. acuminata</i> 3   |

1. **Eurya japonica** Thunb. Nov. Gen. 3: 67. 1783 ; Fl. Brit. Ind. 1: 284. 1874 ; Fl. As. 1: 124. 1934.

Shrubs or small trees, 1-5 m ; leaves elliptic, obovate to oblanceolate, cuneate to acute at base, obtuse to subacute, serrate at margins, 2-6 × 1.0-2.5 cm ; lateral nerves 10-15 pairs ; petioles 1-3 mm ; flowers white, ± 2.5 mm across ; pedicels 1-2 mm, recurved in fruits berries globose to ovoid, ± 5 mm ; seeds many, angular.

Primary forests and forest edges, 1300-1700 m ; fl. & fr. : Jan.-Dec. ; Jarain, Jowai.

2. **Eurya cerasifolia** (D. Don) Kobuski in Ann. Missouri Bot. Gard. 25: 326. 1938. *Diospyros cerasifolia* D. Don, Prodr. Fl. Nep. 144. 1825. *E. symplocina* Bl. Mus. Bot. Lugd.-Bat. 2: 114. 1850 ; Fl. Brit. Ind. 1: 284. 1874 ; Fl. As. 1: 125. 1934.

Shrubs or small trees, 1-5 m ; leaves oblong-elliptic to lanceolate, acute to cuneate at base, obliquely acuminate, 4-12 × 2.0-3.5 cm ; lateral nerves 15-20 pairs ; petioles 2-10 mm ; flowers white, ± 4 mm across, fasciculate at axils of fallen leaves ; pedicels 1.5-2.0 mm ; berries subglobose to ovoid, 7-9 mm, brownish-black ; seeds many, angular, minutely tuberculate, brown.

Primary forests, in shaded places, 1300-1600 m ; fl. & fr. : Nov.-June ; Shangpung.

3. **Eurya acuminata** DC. Mem. Ternstr. 26. 1822 ; Fl. Brit. Ind. 1: 285. 1874 ; Fl. As. 1: 125. 1934.

Large shrubs or trees, 5-14 m ; leaves oblong- to elliptic-lanceolate, acute to cuneate at base, acuminate, 4-9 × 1-3 cm ; lateral nerves 12-15 pairs ; petioles 1-3 mm, hairy ; flowers white, fragrant, ± 3 mm across, 1-5 together in fascicles at lower leaf-axils and axils of fallen leaves ; berries globose, ± 5 mm, bluish-black ; seeds trigonous, shiny-brown.

Primary forests and forest edges, 500-1500 m ; fl. & fr. : July-Dec. ; Jarain-Jowai, Jarain-Syndai, Jowai, Laksein.

4. *TERNSTROEMIA* L. f. *nom. cons.*

***Ternstroemia gymnanthera*** (W. & A.) Bedd. Fl. Sylv. 91. 1871. *Cleyera gymnanthera* W. & A. Prodr. 87. 1834. *T. japonica* [auctt. non (Thunb.) Thunb.] Dyer in Fl. Brit. Ind. 1: 280. 1874; Fl. As. 1: 116. 1934.

Trees or stunted shrubs, 8-20 m; leaves pseudo-verticillate at apices of stems, elliptic to oblong-lanceolate, cuneate-decurrent at base, rounded-apiculate, entire or minutely crenulate at margins, 5-8 × 2-3 cm; lateral nerves ± 8 pairs; flowers yellow, 10-15 mm across, solitary, axillary or extra-axillary, nodding; fruits fleshy or corky, obovoid or globose, beaked, 12-15 mm; seeds 1-2 per cell, fleshy, 6-9 mm, red.

Primary forests in moist shaded places, 1000-1600 m; fl. & fr.: Apr.-Nov.; Jowai, Thangkuli, east of Jorain.

5. *ADINANDRA* Jack

***Adinandra griffithii*** Dyer in Fl. Brit. Ind. 1: 282. 1874; Fl. As. 1: 177. 1934.

Trees, 10-15 m; leaves elliptic-lanceolate to oblong-lanceolate, cuneate at base, bluntly acute to acuminate, entire with recurved translucent margins; lateral nerves 20-25 pairs, obscure; petioles 10-15 mm, grooved above; flowers white, ± 1 cm across, fragrant, axillary, solitary or paired; pedicels 2.5-3.0 cm; fruits globose or ovoid, ± 1.5 × 1.0 cm, indehiscent; seeds many.

Primary forests, 1200-1700 m; fl. & fr.: Apr.-Dec.; Shangpung, G. K. Deka 17928.

## 24. SAURAUACEAE

*SAURAUIA* Willd.

- |   |     |                         |
|---|-----|-------------------------|
| 1a. Flowers in 15-30 cm long panicles.  | ... | <i>S. napaulensis</i> 1 |
| 1b. Flowers in less than 10 cm long cymes or solitary.  |     |                         |
| 2a. Leaves glabrous beneath; lateral nerves 10-25 pairs; petioles 2-5 cm long; flowers 4-6 mm across.                 | ... | <i>S. roxburghii</i> 2  |
| 2b. Leaves densely rusty tomentose beneath; lateral nerves 20-30 pairs; petioles 1-3 cm long; flowers ± 15 mm across. | ... | <i>S. punduana</i> 3    |

1. ***Saurauia napaulensis*** DC. in Mem. Soc. Phys. Genev. 1: 421. 1822; Fl. Brit. Ind. 1: 280. 1874; Fl. As. 1: 127. 1934.

Trees or large shrubs, 5-10 m; leaves oblong-elliptic to oblanceolate, cuneate to subacute at base; abruptly acute, serrate, 16-30 × 5-15 cm; lateral nerves 25-35 pairs; petioles 2-4 cm; flowers pink ± 1 cm across;

pedicels 1.5-2.5 cm, articulate slightly above the base; berries subglobose to ovoid, 5-locular, 8-9 mm; seeds many, red-brown.

Primary forests, forest edges, 1300-1700 m; fl. & fr.: Dec.-May; Mawryngkneng.

2. **Saurauia roxburghii** Wall. Pl. As. Rar. 2: 40. 1831; Fl. Brit. Ind. 1: 287. 1874; Fl. As. 1: 128. 1934.

Trees or large shrubs, 3-10 m; leaves elliptic-oblong or oblanceolate, acutely rounded at base, acute to short-acuminate, shallowly crenate at margins, 10-25 × 3-9 cm; petioles 2-5 cm; flowers pale pink, urceolate, on slender 2-3 cm long peduncled cymes; berries subglobose, white, fleshy, ± 5 mm; seeds many, brown.

Primary forests, 200-1000 m; fl. & fr.: Mar.-Oct.; Jarain to Dawki, Sohka.

3. **Saurauia punduana** Wall. Pl. As. Rar. 2: 40. 1831; Fl. Brit. Ind. 1: 287. 1874; Fl. As. 1: 129. 1934.

Shrubs or small trees, 2-7 m; innovations brown tomentose and densely scaly; leaves elliptic-ovate to lanceolate, acute and round at base, acute to short-acuminate, cuspidate-serrate at margins, 10-25 × 4-12 cm; lateral nerves 20-35 pairs; petioles 1-3 cm; flowers white, becoming pink, in 3-8 cm long cymes, axillary or often in axils of fallen leaves; berries ± 8 mm, white.

Primary, secondary and pine forests, often as hedge plants, 1200-1700 m; fl. & fr.: Apr.-Dec.; Jarain, Jowai.

## 25. ACTINIDIACEAE

### ACTINIDIA Lindl.

**Actinidia callosa** Lindl. Nat. Syst. ed. 2: 439. 1836; Fl. Brit. Ind. 1: 286. 1874; Fl. As. 1: 130. 1934.

Climbing or trailing shrubs, up to 30 m; leaves ovate-oblong, obovate, rounded to subcuneate at base, acute to acuminate, serrate-dentate at margins, 5-10 × 2.5-5.5 cm; lateral nerves 5-8 pairs; petioles 1-4 cm; flowers white, ± 1.2 cm across, in cymes or pseudo-umbels; peduncles 5-15 mm; pedicels 10-15 mm; berries obovoid to ellipsoid, 2-3 × 1.0-1.5 cm, greyish-green, white-spotted; seeds many, pitted.

Primary forests, 1000-1600 m; fl. & fr.: Apr.-Sept.; Jowai, Nartiang.



## 26. MALVACEAE

- 1a. Style-branches and stigmas twice as many as carpels; staminal tube antheriferous throughout. ... *Urena* 1
- 1b. Style-branches and stigmas as many as carpels, or styles undivided and stigma entire or nearly so; staminal tube not antheriferous at apex.
- 2a. Fruits schizocarpic; carpels usually separating finally from each other and from the persistent axis.
- 3a. Carpels 20; ovules usually 2 or more in each carpel, erect and ascending. ... *Abutilon* 2
- 3b. Carpels 5-10; ovules solitary in each carpel, pendulous or horizontal. ... *Sida* 3
- 2b. Fruits loculicidal; carpels remaining attached to one another and to the central axis.
- 4a. Capsules 3-celled; seeds 2 in each cell. ... *Kydia* 4
- 4b. Capsules 5-10-celled; seeds 3 or more in each cell.
- 5a. Calyx campanulate, 5-toothed or 5-lobed, persistent, not splitting transversely, nor spathaceous *Hibiscus* 5
- 5b. Calyx spathaceous, 2-partite almost to base, caducous. ... *Abelmoschus* 6

## 1. URENA L.

**Urena lobata** L. Sp. Pl. 692. 1753; Fl. Brit. Ind. 1: 329. 1874; Fl. As. 1. 141. 1934.

Erect undershrubs, up to 2 m; lower leaves orbicular, incised or palmatifid; upper ones ovate to oblong-lanceolate, occasionally rhomboid, rounded to acute at base, acute, serrate, 2-10 × 1-12 cm, 3-9-nerved at base; petioles 0.5-1.0 cm; stipules lanceolate, 2-4 mm; flowers 2-3 cm across, pink with purple centre, solitary or in clusters of 2-3; capsules subglobose; mericarps 5 or more, 4-5 × 3-4 mm, covered with glochidia on dorsal surface.

Shaded places in wastelands, secondary forests and grasslands, 200-1500 m; fl. & fr.: Oct.-Feb.; Jowai, Khongsong, Mawryngkneng, Wah Umngot, near Jarain, Umthalong.

## 2. ABUTILON Mill.

**Abutilon indicum** (L.) Sweet, Hort. Brit. ed. 1: 54, 1826, *emend.* Hochr. in Ann. Cons. Jard. Bot. Genève 6: 19. 1902; Fl. Brit. Ind. 1: 326. 1874; Fl. As. 1: 141. 1934. *Sida indica* L. in Cent. Pl. 2: 26. 1754.

Herbs or undershrubs, 1-2 m; leaves ovate to orbicular, cordate at base, acute to acuminate, 2-12 × 1-8 cm, palmately 7-9-nerved; petioles 4-11 cm; flowers axillary, solitary, 2.5-3.0 cm across, golden or orange-yellow; capsules subglobose to cylindrical, 1.5-2.0 cm; mericarps 15-25, mucronate from the round apex, flattened-reniform, ± 12 × 7 mm, stellate-hairy.

Secondary forests and wastelands, in fairly dry and open places, 100-1200 m; fl. & fr.: Aug.-Feb.; Garampani.

3. SIDA L.

- |   |     |                         |
|---|-----|-------------------------|
| 1a. Leaves orbicular-cordate; calyx sparsely villous; carpels 5, mucicous.  | ... | <i>S. mysorensis</i> 1  |
| 1b. Leaves ovate, rhomboid, elliptic or lanceolate; calyx densely stellate-pubescent; carpels 5-10, birostrate.                         |     |                         |
| 2a. Styles and mericarps 5; stipules leaving a spinulose scar; calyx 3-5 mm diam.; mericarps prominently reticulate-veined.             | ... | <i>S. spinosa</i> 2     |
| 2b. Styles and mericarps 7-10; stipules not leaving a spinulose scar; calyx 9-12 mm diam.; mericarps not prominently reticulate-veined. | ... | <i>S. rhombifolia</i> 3 |

1. **Sida mysorensis** W. & A. Prodr. 59. 1834; Fl. Brit. Ind. 1: 322. 1874.

Herbs or undershrubs, covered with glutinous multicellular hairs, 0.5-1.0 m; leaves acute to acuminate at apex, serrate-crenate at margins, 3-8 × 2-7 cm, 5-9-nerved from base; petioles 2-6 cm, glandular hairy; stipules ± 5 mm; flowers yellow, solitary or in condensed racemose panicles; pedicels 4-12 mm; capsules 3-4 mm diam., enclosed in inflated calyx; mericarps 5, tetrahedral, bimucronulate at apex.

Open wastelands, roadsides and grasslands, 100-1000 m; fl. & fr.: Jan.-Dec.; Dawki.

2. **Sida spinosa** L. Sp. Pl. 683. 1753; Fl. Brit. Ind. 1: 323. 1874.

Undershrubs, up to 50 cm; leaves ovate, obovate, linear-lanceolate, or orbicular, rounded or acute at base, acute to subacute, obliquely serrate, 10-40 × 3-20 mm, 3-nerved from base, stellate-hairy; petioles 2-13 mm; stipules linear, 2-4 mm, with 1-2 minute emergences near stipules; flowers yellow, axillary, solitary or in clusters of 2-5; pedicels 2-5 mm; mericarps trigonous, 2-3 mm, with 2 awns at apex.

Wastelands, roadsides and open places, 100-1200 m; fl. & fr.: Jan.-Dec.; Sonapur, Umjaisaw-Mynsyngnat.

3. **Sida rhombifolia** L. Sp. Pl. 684. 1753; Fl. Brit. Ind. 1: 323. 1874; Fl. As. 1: 140. 1934.

Herbs or undershrubs, up to 1 m; leaves oblong-lanceolate, ovate or obovate-rhomboid, obtuse, acute to truncate at base, obtuse to acute, 2.5 × 0.7-3.0 cm, 3-nerved at base; petioles 2-20 mm; stipules filiform, 3-4 mm; flowers yellow, ± 1.5 cm across, axillary, solitary or in clusters of 2-5; pedicels 2-4 cm; capsules subdiscoid, 6-7 mm diam.; mericarps flattened, trigonous, 2-awned at apex.

Open places in grasslands, roadsides and wastelands, 500-1200 m; fl. & fr.: Jan.-Dec.; Nartiang, Umjaisaw to Seitsohma.

## 4. KYDIA Roxb.

**Kydia calycina** Roxb. Pl. Corom. 3: 12, t. 215. 1819; Fl. Brit. Ind. 1: 348. 1874; Fl. As. 1: 146. 1934.

Trees, 5-10 m; leaves ovate to suborbicular, cordate to truncate at base, palmately 3-5-lobed at apex, 6-16 cm diam., palmately 5-7-nerved, downy-pubescent beneath; petioles 3-12 cm; flowers white, 1.2-1.8 cm across, in terminal panicles; pedicels 12-18 mm; bracteoles 4-6, oblong-lanceolate, hispid; capsules depressed-globose,  $\pm$  5 mm across, yellow, pubescent.

Forests, in fairly dry areas, 300-1000 m; fl. & fr.: Mar.-Dec.; Garampani.

5. HIBISCUS L. *nom. cons.*

- |  |     |                          |
|--|-----|--------------------------|
| 1a. Trees; leaves entire.  | ... | <i>H. macrophyllus</i> 1 |
| 1b. Shrubs; leaves palmately lobed or partite.   |     |                          |
| 2a. Straggling shrubs; pedicels 4-14 cm long; bracteoles appendaged; calyx after anthesis not becoming fleshy.             | ... | <i>H. surattensis</i> 2  |
| 2b. Erect shrubs; pedicels less than 3 cm long; bracteoles not appendaged; calyx after anthesis becoming thick and fleshy. |     | <i>H. sabdariffa</i> 3   |

1. **Hibiscus macrophyllus** Hornem. Hort. Hafn. Suppl. 149. 1819; Fl. Brit. Ind. 1: 337. 1874; Fl. As. 1: 142. 1934.

Trees, 10-25 m, covered with up to 1 cm long tufted shiny brown stellate hairs; leaves suborbicular, cordate at base, cuspidate-acuminate, 20-45 cm across, palmately 7-9-nerved; petioles stout, 5-40 cm; stipules foliaceous, oblong, amplexicaul at base, 5-15  $\times$  1.0-2.5 cm; flowers yellow, 7-10 cm diam.; bracteoles 10-12, linear-lanceolate, connate at base; capsules oblong-lanceolate or ovoid, 2-3  $\times$  1.5-2.0 cm, hairy.

Primary forests, 100-800 m; fl. & fr.: Mar.-Aug.; Dawki.

2. **Hibiscus surattensis** L. Sp. Pl. 696. 1753; Fl. Brit. Ind. 1: 334. 1874; Fl. As. 1: 144. 1934.

Shrubs, up to 2 m; leaves palmately 3-5-lobed, orbicular to suborbicular, subcordate to truncate at base, 5-10  $\times$  8-15 cm, aculeate on nerves beneath; petioles 4-11 cm; stipules semilunar-subcordate, 1-2 cm; flowers pale yellow with a dark purple center, 2.5-3.5 cm; bracteoles 9-12, linear, 15-25 cm, upcurved and knee-shaped below the middle with oblong-lanceolate 7-17 mm long appendage; capsules bristly-hairy.

Scrubs, secondary forests and forest edges, 200-1000 m; fl. & fr.: Aug.-Dec.; Sonapur.

3. **Hibiscus sabdariffa** L. Sp. Pl. 695. 1753; Fl. Brit. Ind. 1: 340. 1874.

Erect shrubs, 0.5-2.5 m; stems blood-red; leaves orbicular, palmately lobed into 3-5 oblong-lanceolate segments, 6-15 x 5.16 cm; petioles 3-10 cm; flowers pale yellow with a bright purple center, 3-5 cm; bracteoles 8-12, connate at base, adnate to the base of calyx-tube; calyx 2-4 cm, blood-red, enlarged and thick-fleshy in fruits; capsules ovoid, pointed, villous.

Cultivated and also found in open wastelands, 100-800 m; fl. & fr.: Aug.-Jan.; Garampani.

6. ABELMOSCHUS Medic.

**Abelmoschus moschatus** Medic. Malv. 46. 1787, *descr. ampl.* Hochr. in Candollea 2: 86. 1924. *Hibiscus abelmoschus* L. Spl. Pl. 696. 1753; Fl. Brit. Ind. 1: 342. 1874; Fl. As. 1: 143. 1934.

Erect herbs, up to 1.5 m; leaves polymorphic, orbicular, angular or palmately 3-5-lobed; upper leaves usually narrower and/or sagitate with deltoid to linear-lanceolate segments, cordate at base, 6-20 x 8-24 cm, 5-9-nerved; petioles 9-15 cm; stipules linear to lanceolate, 6-8 mm; flowers yellow with dark purple center, ± 10 cm across, axillary, solitary; capsules ovoid, 5-celled, 5-angular, 5-8 x 2-3 cm, densely hispid-hairy.

Shaded forests and open places in forests, 200-1500 m; Garampani, Nartiang.

27. STERCULIACEAE

- |   |     |                       |
|---|-----|-----------------------|
| 1a. Flowers unisexual or polygamous, apetalous; calyx corolline.                    | ... |                       |
| 2a. Anthers numerous; fruits dehiscent.   | ... | <i>Sterculia</i> 1    |
| 2b. Anthers 5; fruits indehiscent.  | ... | <i>Heritiera</i> 2    |
| 1b. Flowers bisexual; perianth differentiated into calyx and corolla.               |     |                       |
| 3a. Gynandrophores distinct; stamens and carpels inserted at apex of gynandrophore. | ... | <i>Pterospermum</i> 3 |
| 3b. Gynandrophores absent; stamens and carpels inserted on receptacle.              |     |                       |
| 4a. Scandent shrubs; anthers 5.   | ... | <i>Byttneria</i> 4    |
| 4b. Erect shrubs; anthers 15-25.  | ... | <i>Atroma</i> 5       |

1. STERCULIA L.

- |  |     |                        |
|--|-----|------------------------|
| 1a. Leaves attenuate at base; racemes up to 18 cm long; flowers creamy-white; tepals broad at base, linear-acuminate at apex, ± 1.5 mm broad, patently white hairy; follicles crimson-red. | ... | <i>S. hamiltonii</i> 1 |
| 1b. Leaves rounded at base; racemes up to 10 cm long; flowers brick-red; tepals elliptic-acute, ± 4 mm broad, glabrous; follicles pink.  | ... | <i>S. roxburghii</i> 2 |

1. ***Sterculia hamiltonii*** (O. Ktze.) Adelb. in Backer, Beckn. Fl. Java, Aufl. 4b., Fam. 107: 23. 1944. *Clompanus hamiltonii* O. Ktze. Rev. Gen. 77. 1891. *S. coccinea* Roxb. Fl. Ind. 3: 151. 1832 (*non* Jack, 1920); Fl. Brit. Ind. 1: 357. 1874; Fl. As. 1: 153. 1934.

Trees, 5-10 m; leaves oblong-lanceolate, obovate to oblanceolate, short-acuminate, 10-32 × 3-12 cm; lateral nerves 10-12 pairs; petioles 1-4 cm; inflorescences axillary or supra-axillary panicles, puberulous; flowers ± 2.5 cm, velvety outside, scarlet-red inside; seeds ovoid, ± 1.5 × 0.8 cm, black.

Primary forests, 200-1000 m; fl. & fr.: Apr.-Oct.; Dawki, Nongthala.

2. ***Sterculia roxburghii*** Wall. Pl. As. Rar. 3: 39. 1832; Fl. Brit. Ind. 1: 356. 1874; Fl. As. 1: 153. 1934.

Trees, 6-12 m; leaves elliptic-oblong to oblanceolate, abruptly acuminate, 8-16 × 3-6 cm; lateral nerves 6-8 pairs; petioles 1.5 - 3.5 cm, swollen at both ends; inflorescences axillary or extra-axillary panicles of racemes, sparsely stellate-pubescent; flowers ± 2 cm across; follicles 1-5, ellipsoid-lanceolate, shortly beaked, compressed, 6-10 × 2-3 cm; seeds 4-8, oblong-ovoid, 1.5-2.0 × 0.8-1.2 cm, black.

Primary forests, 200-1400 m; fl. & fr.: Mar.-Aug.; Dawki.

## 2. HERITIERA Ait.

***Heritiera macrophylla*** Kurz in J. As. Soc. Beng. 42(2): 61. 1873; Fl. As. 1: 155. 1939. *H. littoralis* (*non* Dryand) Mast. in Fl. Brit. Ind. 1: 363. 1874, *p.p.* **Fig. 13**

Trees, 3-15 m; leaves elliptic to ovate-elliptic, cuneate, rounded, subcordate or subpeltate at base, acute to acuminate, 12-48 × 4-16 cm, silvery with appressed fimbriate scales beneath; lateral nerves 10-12 pairs; petioles stout, 2-12 cm; inflorescences axillary, pyramidal panicles, up to 12 cm, densely stellate hairy; flowers white with crimson centre, 4-6 mm; fruits indehiscent; nut ellipsoid-ovoid; apical wing falcate-spathulate, ± 2.5 × 0.8 cm; seeds ellipsoid.

Primary forests, 100-700 m; fl. & fr.: Apr.-Oct.; Dawki.

## 3. PTEROSPERMUM Schreb. *nom. cons.*

***Pterospermum lancifolium*** DC. in Mem. Mus. Hist. Nat. Paris 10: 112. 1823; Fl. Brit. Ind. 1: 368. 1874; Fl. As. 1: 158. 1934 (as *lanceae-folium*).

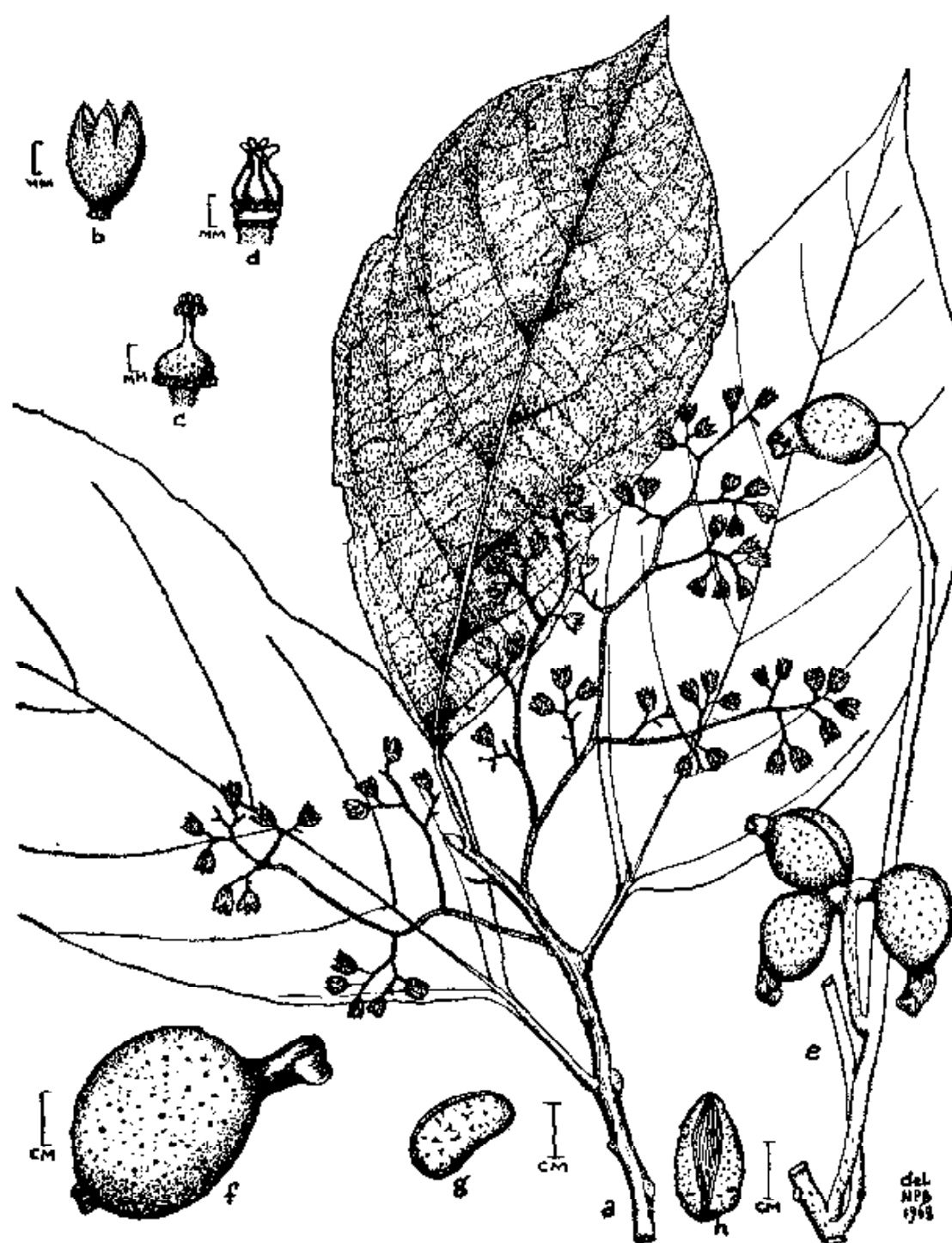


Fig. 13. *Heritiera macrophylla* Kurz

a. Twig. b. Flower. c. Staminal column. d. Ovary. e. Inflorescence. f. Fruit. g & h. Seed, lateral and ventral views.

Trees or large shrubs, 3-15 m; leaves distichous, elliptic to oblong-lanceolate, obliquely rounded or subcordate at base, acute to finely acuminate, 6-15 × 2-5 cm; lateral nerves 4-5 pairs; petioles 3-12 mm; stipules subulate, 5-6 mm; flowers white, 5-6 cm across, fragrant, solitary, axillary; pedicels

4-5 cm; capsules felted-tomentose, woody, 5-celled, 5-angled, ellipsoid, 7-8 × 0.8-0.9 cm; wing oblong, 23-28 × 8-9 mm, papery, brown.

Primary forests, 200-1200 m; Mar.-Oct.; Dawki, Garampani.

#### 4. BYTTNERIA Loeffl. *nom. cons.*

- |   |                    |
|---|--------------------|
| 1a. Leaves finely serrate-dentate, more or less pilose and dull above, membranous; prickles on capsules dense, stout, soft hairy. ... | <i>B. pilosa</i> 1 |
| 1b. Leaves entire, glabrous and shiny above, chartaceous; prickles on capsules moderately crowded, thin, wiry, glabrous. ...          | <i>B. aspera</i> 2 |

1. **Byttneria pilosa** Roxb. Fl. Ind. 1: 618, 1820; Fl. Brit. Ind. 1: 377, 1874; Fl. As. 1: 160, 1934.

Woody climbers, densely stellate-pubescent; leaves orbicular to ovate, cordate at base, abruptly acuminate, shallowly 3-lobed, 10-20 × 8-15 cm; basal nerves 7-9; petioles 1-15 cm; cymes paniculate, stellate pubescent; pedicels capillary, 1-4 cm; flowers yellow, ± 5 mm across; capsules subglobose, 15-20 mm diam.; prickles 2-4 mm; seeds ovoid, angular.

Shaded places in forests, 100-1000 m; fl. & fr.: Aug.-Jan.; Garampani.

2. **Byttneria aspera** Wall. in Roxb. Fl. Ind. 2: 383, 1824; Fl. Brit. Ind. 1: 377, 1874; Fl. As. 1: 160, 1934.

Climbing or straggling shrubs; leaves ovate-orbicular, cordate at base, acuminate, 4-18 × 3-10 cm; basal nerves 5-7, with 1 or more glands near base; lateral nerves 4-5 pairs; petioles 4-6 cm; stipules linear-lanceolate, ± 1.2 cm; inflorescences axillary, panicles or cymose umbels, up to 10 cm, stellate-pubescent; flowers pale brown, 5-6 mm across; capsules globose, ± 2 cm diam.; prickles conical, sharp; seeds immersed in watery sap.

Shaded forests, 200-1200 m; fl. & fr.: Apr.-Dec.; Dawki.

#### 5. ABROMA Jacq.

**Abroma augusta** (L.) L. f. Suppl. Pl. 341, 1781; Fl. Brit. Ind. 1: 375, 1874; Fl. As. 1: 156, 1934. *Theobroma augusta* L. Syst. ed. 12: 233, 1767.

Erect shrubs, 2-3 m; branches horizontal; leaves distichous, ovate to lanceolate, subcordate at base, acuminate, 12-30 × 6-18 cm; petioles 1.5-4.0 cm; flowers purple, 4-5 cm across, in leaf-opposed few-flowered cymes; petals concave-clawed at base, prolonged into a large spatulate lamina, 20-25 mm long; capsules obconical, 5-winged, truncate at apex, 4-5 cm; seeds oblong, ± 3 mm, black.

Primary forests, in shaded and partially sunny places, 200-1000 m; fl. & fr.: June-Dec.; Dawki, Syndai.

28. TILIACEAE

- 1a. Herbs or undershrubs ; leaves spirally arranged ; flowers leaf-opposed or extra-axillary ; petals glandless ; fruits setose or with hooked prickles. ... *Triumfetta* 1
- 1b. Trees or shrubs ; leaves distichous ; flowers axillary or terminal ; petals with glands, surrounded by hairs at base inside ; fruits not echinate or setose. ... *Cerevia* 2

1. TRIUMFETTA L.

- 1a. Leaves ovate or rhomboid ; lower leaves deeply 3-lobed. ... *T. rhomboidea* 1
- 1b. Leaves oblong-lanceolate ; lower leaves unlobed.
  - 2a. Plants sparsely puberulous-ciliate ; fruits glabrous. ... *T. annua* 2
  - 2b. Plants densely stellate-hairy ; fruits pubescent.
    - 3a. Petioles 10-60 mm long ; arms of stellate hairs stiff ; prickles on fruits hooked at apex. ... *T. obliqua* 3
    - 3b. Petioles 2-20 mm long ; arms of stellate hairs flexuous ; prickles on fruits not hooked. ... *T. tomentosa* 4

1. **Triumfetta rhomboidea** Jacq. Enum. Pl. Carib. 22. 1760 ; Fl. Brit. Ind. 1: 395. 1874 ; Fl. As. 1: 168. 1934.

Herbs or undershrubs, 0.5-1.2 m ; branchlets hairy on one side ; leaves ovate-rhomboid, cross-ovate to lanceolate-rhomboid ; lower leaves subcordate to rounded at base, acute to acuminate, 1.8 x 1.8 cm, stellate-pubescent beneath ; petioles 3-70 mm ; flowers orange-yellow, 4-5 mm, in dense leaf-opposed fascicles ; capsules globose, 4-6 mm diam. ; prickles 1.0-1.5 mm, glabrous.

Roadsides, grasslands and wastelands in shaded and open places, 300-1300 m ; fl. & fr. : July-Dec. ; Jarain-Dawki, Khongsnong-Raliang.

2. **Triumfetta annua** L. Mant. Pl. 1: 73. 1767 ; Fl. Brit. Ind. 1: 396. 1874.

Undershrubs, 1-2 m ; stems brown, with a line of crispate hairs ; leaves ovate to elliptic-lanceolate, acute to acuminate, coarsely dentate-crenate, 6-12 x 2.0-4.5 cm, glabrescent ; petioles 5-25 mm ; flowers orange-brown, 5-8 mm, in dense extra-axillary or leaf-opposed fascicles ; capsules depressed-globose, 13-15 mm diam. ; prickles 5-6 mm, glabrous.

Roadsides, wastelands and forest edges, 1000-1500 m ; fl. & fr. : June-Nov. ; Jowai.

3. **Triumfetta obliqua** Roth, Nov. Sp. Pl. 224. 1821. *T. cana* Bl. Bijdr. 113. 1825 ; Fl. Brit. Ind. 1: 396. 1874 ; Fl. As. 1: 168. 1934.

Shrubs or undershrubs, 0.5-1.5 m, densely stellate-tomentose ; leaves ovate to oblong-lanceolate, subcordate to subobovate at base, acuminate, 2-12 x 1.5 cm, upper leaves smaller, densely stellate-tomentose beneath ; flowers



orange, or yellowish orange, 5-6 mm, in dense axillary fascicles; capsules oblong, subglobose, 12-15 mm diam.; prickles patently pilose.

Roadsides, wastelands and forest edges, 200-1200 m; fl. & fr.: June-Dec.; Nartiang.

4. **Triumfetta tomentosa** Bojer in Bouton, Rapp. Ann. Maur. 19. 1842; Fl. Brit. Ind. 1: 394. 1874; Fl. As. 1: 168. 1934.

Shrubs, 1-2 m, strongly foetid and hairy; leaves ovate-lanceolate to orbicular, rounded or cordate at base, acuminate, crenulate at margins; 2-12 x 1-7 cm, densely stellate-hairy beneath; flowers orange-yellow, 5-6 mm, fasciculate in upper leaf axils forming interrupted spikes; capsules globose, 8-15 mm diam.; prickles 4-8 mm, patently pilose.

Roadsides, wastelands and forest edges, 200-1300 m; fl. & fr.: June-Dec.; Kheihriat to Sonapur, Raliang to Garampani.

## 2. GREWIA L.

- |  |                      |
|--|----------------------|
| 1a. Flowers in axillary cymes, more than 2.5 cm across; stigma widened, simple. ...                  | <i>G. disperma</i> 1 |
| 1b. Flowers in terminal panicles, less than 2 cm across; stigma not widened, minutely 3-dentate. ... | <i>G. microcos</i> 2 |

1. **Grewia disperma** Spreng. Syst. 2: 579. 1825; Fl. As. 1: 164. 1934.  
*G. laevigata* (non Vahl, 1790) Mast. in Fl. Brit. Ind. 1: 389. 1874.

Shrubs or small trees, 3-10 m; leaves oblong-lanceolate to elliptic-lanceolate, acute and subequal at base, acuminate, glandular-serrate at margins, 3-16 x 1.5-5.0 cm, 3-nerved from base; petioles 3-12 mm; flowers white, 3-4 cm across, in 2-4-flowered, 7-30 mm long cymes; fruits deeply 2-lobed, globose,  $\pm$  5 x 10 mm, dark purple; pyrenes 1-2 in each lobe.

Primary forests, 100-1200 m; fl. & fr.: June-Dec.; Dawki, Sohka, Sonapur.

2. **Grewia microcos** L. Syst. ed. 12: 602. 1766; Fl. Brit. Ind. 1: 392. 1874; Fl. As. 1: 162. 1934.

Trees up to 15 m; leaves elliptic-oblong, ovate-lanceolate to obovate, acute to obliquely rounded from base, acute to acuminate, 4-25 x 2-10 cm, 3-nerved at base; petioles 5-12 mm; flowers pale yellow, 12-14 mm wide, fragrant, in 4-10 cm long terminal and upper axillary panicles; fruits globose, obovoid, entire, 8-10 mm, fleshy, black; pyrenes 1-3.

Primary and secondary forests, 100-1000 m; fl. & fr.: Apr.-Dec.; Dawki, Sohka.

## 29. ELAEOCARPACEAE

## ELAEOCARPUS L.

- 1a. Anthers distinctly awned at apex.  
 2a. Leaves obovate to oblanceolate, 15-35 × 7-15 cm; petals narrowed at base, wide towards apex. ... *E. rugosus* 1  
 2b. Leaves elliptic-lanceolate, 5-12 × 3-5 cm; petals wide at base, narrowed towards apex. ... *E. prunifolius* 2
- 1b. Anthers exaristate at apex, sometimes with a tuft of hairs at apex.  
 3a. Petioles less than 2 cm long, eglandular; leaves elliptic-lanceolate, less than 3 cm broad; stamens up to 15. ... *E. lancifolius* 3  
 3b. Petioles more than 2 cm long, with a pair of glands at apex near the base of leaf-blade; leaves broadly elliptic-oblong to ovate, more than 4 cm broad; stamens more than 20.  
 4a. Twigs prominently lenticellate; bracteoles large, boat-shaped, 3-6 mm long; flower-buds ovoid-acute. ... *E. sikkimensis* 4  
 4b. Twigs not or indistinctly lenticellate; bracteoles minute; flower-buds oblong-ovoid, obtuse.  
 5a. Leaves crowded near apices of branchlets; lateral nerves 5-7 pairs, glabrous; petals lacinate into 3-4 mm long lobes. ... *E. floribundus* 5  
 5b. Leaves not crowded at apices of branchlets; lateral nerves 10-12 pairs, rusty-pubescent; petals lacinate into ± 1 mm long lobes. ... *E. tectorius* 6

1. ***Elaeocarpus rugosus*** Roxb. Fl. Ind. 2: 596. 1832; Fl. Brit. Ind. 1: 405. 1874; Fl. As. 1: 178. 1934.

Trees, 20-30 m, buttressed at base; leaves crowded at ends of branchlets, cuneate or subobtruse at base, acute to bluntly acute, lateral nerves 12-20 pairs, each with a sessile gland at the axil; petioles 2-6 cm; flowers pale white, ± 1.5 cm; pedicels 2-3 cm; drupes obovoid to ellipsoid, 30-35 mm; stone 1-celled, compressed, rugulose.

Primary forests 100-1000 m; fl. & fr.: Mar.-Oct.; Dawki.

2. ***Elaeocarpus prunifolius*** (C. Muell.) Mast. in Fl. Brit. Ind. 1: 407. 1874; Fl. As. 1: 180. 1934. *Monocera prunifolius* C. Muell. Anot. de Fam. Elaeocarp. 15. 1849. 'Dieng-ruin'.

Trees, 5-10 m; leaves cuneate at base, acute to acuminate, crenate-serrate to subentire, lateral nerves 6-9 pairs; petioles 1-3 cm; flowers pale yellowish green, 4-5 × 7-8 mm, in axillary 4-9 cm long racemes; pedicels slender, 5-6 mm; drupes oblong-ovoid, 1.5-2.0 cm; stone ovoid, 3-angled, slightly rugose.

Primary forests, 300-1200 m; fl. & fr.: Feb.-Aug.; Pdengskab, on Jarain-Syndai road.

3. ***Elaeocarpus lancifolius*** Roxb. Fl. Ind. 2: 598. 1832; Fl. Brit. Ind. 1: 402. 1874; Fl. As. 1: 175. 1934. 'Dieng-soh-lyngka.'

Trees, 5-10 m; young twigs silky pubescent; leaves cuneate to acute at base, acute to acuminate, distantly and sparsely crenate-serrate, 5-10 × 1.5-5.0 cm; lateral nerves 6-8 pairs; petioles 8-15 mm; flowers white, 6-7 × 10-12 mm, in axillary 5-9 cm long racemes; pedicels 10-13 mm; drupes ovoid, 2.5-3.0 × 2.0-2.5 cm; stone oblong, rugose, with 3 longitudinal grooves.

Primary forests, 100-1000 m; fl. & fr.: Mar.-Dec.; Syndai.

4. **Elaeocarpus sikkimensis** Mast. in Fl. Brit. Ind. 1: 402. 1874; Fl. As. 1: 174. 1934.

Trees, 15-20 m; leaves acute to subobtusate at base, acute to acuminate, distantly and obscurely serrate, 10-22 × 5-9 cm; lateral nerves 7-9 pairs; petioles 2-6 cm, thickened at both ends; flowers white, 5-6 × 8-10 mm, in axillary 12-20-flowered 6-10 cm long racemes; drupes ovoid to ellipsoid, ± 2.5 × 2.0 cm; stone 3-celled, obtusely tubercled.

Primary forests, 100-1000 m; fl. & fr.: Jan.-Aug.; Dawki.

5. **Elaeocarpus floribundus** Bl. Bijdr. 120. 1825; Fl. Brit. Ind. 1: 401. 1874; Fl. As. 1: 173. 1934.

Trees, 20-30 m; leaves cuneate at base, acute to bluntly acuminate, coarsely repand-serrate, 4-20 × 1.5-8.5 cm; petioles 2-5 cm; flowers white, ± 6 × 8 mm, in 12-16 cm long, 20-30-flowered racemes; drupes oblong, pyriform, rounded at both ends, 25-35 mm; stone 3-celled, terete, tapering to both ends, rugulose.

Primary and secondary forests, 1000-1500 m; fl. & fr.: May-Dec.; Mynso, Raliang.

6. **Elaeocarpus tectorius** (Lour.) Poir. in Lamk. Encycl. Meth. Suppl. 2: 704. 1812. *Craspedum tectorium* Lour. Fl. Cochinch. 256. 1951. *E. robustus* Roxb. Fl. Ind. 2: 597. 1832; Fl. Brit. Ind. 1: 402. 1874; Fl. As. 1: 173. 1934.

Trees, 15-25 m; leaves rounded to broadly cuneate at base, acute to acuminate, repand-serrate, 6-20 × 3-10 cm; petioles 2-5 cm; flowers white, ± 5 × 6 mm, in axillary 6-15 cm long puberulous racemes; pedicels 7-8 mm; drupes oblong-ovoid, ± 2.5 cm; stone 2-3-celled, oblong, with 3 longitudinal grooves.

Primary forests, 100-1000 m; fl. & fr.: Apr.-Sept.; Dawki.

### 30. LINACEAE

- |  |                      |
|--|----------------------|
| 1a. Stipules distinct; inflorescences spicate-racemose; sepals with 1-2 rows of gland-tipped bristles within the margin; capsules with false septa. ...        | <i>Anisadenia</i> 1  |
| 1b. Stipules minute, gland-like; inflorescences racemose or cymose or flowers solitary; sepals glabrous; capsules with complete or incomplete false septa. ... | <i>Reinwardtia</i> 2 |

## 1. ANISADENIA Endl.

**Anisadenia khasiana** Griff. Notul. 4: 534. 1851 et Ic. Pl. Asiat. t. 593. 1854. *A. saxatilis* Hook. f. Fl. Brit. Ind. 1: 412. 1874; Fl. As. 1: 186. 1936.

Herbs with perennial rhizomes, up to 28 cm; stems ascending; leaves lanceolate to oblanceolate, cuneate at base, acute to acuminate, 5-10 × 2-3 cm; lateral nerves 7-9 pairs; petioles  $\pm$  1.7 cm; flowers pink, 4-5 × 8-10 mm, in terminal 6-10 cm long spikes; capsules oblong, subtrigonal, indehiscent, 1-seeded; seeds oblong.

Roadsides, forest edges and other shaded wastelands; 1200-1600 m; fl. & fr.: June-Nov.; Jowai-Jarain, Umjaisaw.

## 2. REINWARDTIA Dumort.

**Reinwardtia indica** Dumort. Comm. Bot. 19, 1822. *Linum trigynum* Roxb. in As. Res. 6: 357. 1799 (*non* L. 1753). *R. trigyna* (Roxb.) Planch. in Hook. Lond. J. Bot. 7: 522. 1848; Fl. Brit. Ind. 1: 412. 1874; Fl. As. 1: 185. 1936.

Shrubs, 1.0-1.5 m; leaves elliptic to oblong-lanceolate, decurrent at base, acute to subacute, 1.5-7.5 × 0.5-3.0 cm; lateral nerves 5-9 pairs; petioles 4-8 mm; flowers golden yellow, 3-4 cm across, solitary, terminal or axillary; pedicels up to 3 cm; capsules globose, septicidal, falsely 6-8-celled,  $\pm$  6 mm; seeds arillate.

Open rocky places on roadsides and waste lands, also in shaded forests; 800-1600 m; fl. & fr.: Sept.-Mar.; Jarain, Pudiem Sirkep, Shangpung.

## 31. ERYTHROXYLACEAE

## ERYTHROXYLUM P. Br.

**Erythroxylum kunthianum** Kurz in J. As. Soc. Beng. 41(2): 294. 1872; Fl. Brit. Ind. 1: 414. 1874; Fl. As. 1: 187, 1934. '*Dieng-sugsi*.'

Shrubs or small trees, 3-6 m; leaves oblong-elliptic to lanceolate, acute at base, acute to acuminate, 4-10 × 2-3 cm; midrib distinct; lateral nerves indistinct; petioles 3-4 mm; flowers in axillary clusters; pedicels 6-10 mm; drupes oblong, falcate, obtuse, subtrigonal, 10-15 × 3.5-5.0 mm with persistent calyx, red.

Primary forests, 1000-1600 m; fl. & fr.: Apr.-Sept.; Jarain, Jowai.

## 32. MALPIGHIACEAE

- 1a. Petals clawed ; style 1 or rarely 2. ... *Hiptage* 1  
 1b. Petals not clawed ; styles 3. ... *Aspidopterys* 2

## 1. HIPTAGE Gaertn.

**Hiptage benghalensis** (L.) Kurz in J. As. Soc. Beng. 43(2): 136. 1874.  
*Banistera benghalensis* L. Sp. Pl. 437. 1753. *H. madablota* Gaertn., Fruct.  
 2: 169. t. 116. 1791 ; Fl. Brit. Ind. 1: 418. 1874 ; Fl. As. 1: 188. 1936.

Shrubs, often scandent, up to 3 m ; leaves elliptic to ovate-lanceolate, acute to rounded at base, obtuse, to acuminate, 8-20 × 3-8 cm ; lateral nerves 6-7 pairs ; petioles 7-10 mm ; flowers pink to white, 15-25 mm across, in terminal and axillary 10-20 cm long racemes ; pedicels 1-2 cm, thickened upwards ; fruits of 1-3 samaras ; mericarps globose ; wings 3, oblong, obtuse, 2-6 × 1.0-1.5 cm, dark red.

Primary forests, 200-1500 m ; fl. & fr.: Jan.-Dec. ; Dawki, Jarain, Jowai.

## 2. ASPIDOPTERYS Jussieu

**Aspidopterys indica** (Willd.) Hochr. in Bull. Inst. Bot. Btzg. 19: 45. 1904.  
*Triopteris indica* Willd. Sp. Pl. ed. 4, 2: 744. 1799. *A. roxburghiana* A. Juss.  
 in Ann. Sci. Nat. ser. 2, 13: 267. 1840 ; Fl. Brit. Ind. 1: 420. 1874. *A.*  
*glabriuscula* (non A. Juss.) Kanjilal et al. Fl. As. 1: 189. 1936.

Climbing shrubs ; leaves ovate or elliptic-ovate, obtuse to cordate at base, acute to short-acuminate, 5-10 × 3-5 cm ; lateral nerves 4-7 pairs ; petioles 10-15 mm ; flowers ± 2 mm across, in axillary and terminal rusty tomentose panicles ; peduncles 0.5-1.5 cm ; bracts linear-subulate ; fruits of 1-3 samaras ; wings 3 ; dorsal wing minute ; lateral ones linear-oblong, 35-55 × 10-15 mm.

Primary and secondary forests ; 200-1600 m ; fl. & fr.: Apr.-Jan. ; Khongsong-Raliang, Shangpung, Umjaisaw.

## 33. GERANIACEAE

## GERANIUM L.

**Geranium nepalense** Sweet, Geraniac. 1: t. 12. 1820 ; Fl. Brit. Ind. 1: 430. 1874.

Decumbent-ascending herbs, hairy or villous ; leaves orbicular, 2-6 cm across, 5-angled or 3-5-partite, palmately, 3-5-nerved ; petioles 2-20 mm ;

stipules subulate-lanceolate, 5-7 mm; flowers pale purple, 9-15 mm across, axillary, solitary or paired on 2-4 cm long peduncles; pedicels 1-4 cm; capsules ellipsoid to subglobose, 5-lobed, 3-4 × 2-3 mm, hairy; seeds black.

Roadsides, forest edges and grasslands, in moist shaded places, 1000-1600 m; fl. & fr.: May-Oct.; Nartiang.

### 34. OXALIDACEAE

- |   |                    |
|---|--------------------|
| 1a. Leaves trifoliolate; capsules with valves cohering to the axis. ...       | <i>Oxalis</i> 1    |
| 1b. Leaves many-foliolate; capsules with valves separating from the axis. ... | <i>Biophytum</i> 2 |

#### 1. OXALIS L.

***Oxalis corniculata*** L. Sp. Pl. 435. 1753; Fl. Brit. Ind. 1: 436. 1874.

Perennial pubescent herbs; stems creeping or decumbent, rooting at nodes; leaves palmately 3-foliolate; petioles 3-8 cm; leaflets broadly obovate, cuneate at base, emarginate at apex, 3-15 × 8-12 mm; flowers yellow, ± 10 mm diam., subumbellate; peduncles 1-4-flowered, 2-9 cm; capsules cylindrical, 1-2 cm, puberulous; seeds transversely ridged, dark brown.

Gardens, roadsides and wastelands, 1000-1500 m; fl. & fr.: June-Dec.; Jowai-Jarain, Khongsnong.

#### 2. BIOPHYTUM DC.

***Biophytum petersianum*** Klotz. in Peters, Reise Mossam. Bot. 1: 81, t. 15. 1862. *Oxalis apodiscias* Turcz. in Bull. Nat. Moscou 36(1): 595. 1863. *B. apodiscias* (Turcz.) Edgew. & Hook. f. in Fl. Brit. Ind. 1: 437. 1874.

Erect herbs, 2-8 cm; leaves crowded at stem apices; rachis with swollen base, 5-35 mm, produced into a filiform appendage beyond terminal pair of leaflets; leaflets 3-9 pairs, obliquely obovate or oblong, obtuse to subacute at apex, 2-8 × 1-4 mm; flowers reddish orange, 4-5 mm, in sessile or short-peduncled subcapitate racemes; capsules loculicidally 5-valved; seeds 1-2 in each cell.

Open wastelands and roadsides, 1000-1500 m; fl. & fr.: July-Oct.; Umthalong.

### 35. BALSAMINACEAE

#### IMPATIENS L.

- |   |                          |
|---|--------------------------|
| 1a. Flowers racemose, spicate or corymbose.                   |                          |
| 2a. Leaves white-glaucous beneath; bracts early caducous. ... | <i>I. drepanophora</i> 1 |
| 2b. Leaves green beneath; bracts persistent.                  |                          |

- 3a. Inflorescences terminal ; bracts fimbriate. ... *I. bracteata* 2
- 3b. Inflorescences axillary or mostly in upper leaf-axils ; bracts not fimbriate.
- 4a. Leaves linear-lanceolate to oblanceolate, up to 2 cm broad ; bracts more than 5 mm long ; spur more than 10 mm long, curved at apex ; capsules turgid in the middle, narrow at both ends. ... *I. acuminata* 3
- 4b. Leaves elliptic, elliptic-lanceolate or falcate-lanceolate, more than 2 cm broad ; bracts 3-4 mm long ; spur up to 5 mm long, coiled at apex ; capsules elongated, linear to clavate. ... *I. racemosa* 4
- 1b. Flowers solitary, fascicled or umbellate.
- 5a. Leaves all opposite.
- 6a. Leaves at least the lower ones with up to 2 cm long petioles. ... *I. tripetala* 5
- 6b. Leaves sessile or subsessile with up to 5 mm long petioles.
- 7a. Stems glabrous ; leaves linear-lanceolate ; lateral nerves indistinct ; seeds smooth, shiny. ... *I. chinensis* 6
- 7b. Stems crisply pubescent ; leaves oblong-lanceolate ; lateral nerves distinct ; seeds tuberculate or granulate. ... *I. benthamii* 7
- 5b. Leaves spirally arranged or with opposite or subopposite ones towards apical portion.
- 8a. Lower leaves spirally arranged, upper ones opposite or subopposite ; stipular glands much-lobed. ... *I. trilobata* 8
- 8b. All leaves spirally arranged ; stipular glands unlobed or absent.
- 9a. Stems and petioles glabrous ; leaves lanceolate to elliptic-lanceolate.
- 10a. Pedicels 2-3 cm long ; flowers purplish pink ; with dark red streaks ; spur 3-4 cm long. ... *I. pulchra* 9
- 10b. Pedicels 0.5-2.0 cm ; flowers yellow with pink streaks ; spur up to 2 cm long. ... *I. laevigata* 10
- 9b. Stems and petioles hairy or at least the stem-tip hairy ; leaves oblong-obovate to elliptic-oblong.
- 11a. Slender herbs, rooting at lower nodes ; stems  $\pm 2$  mm thick ; leaves  $2-7 \times 1.5-3.5$  cm. ... *I. porrecta* 11
- 11b. Stout herbs, not rooting at lower nodes ; stems 3-4 mm thick ; leaves  $6-15 \times 2.0-6.5$  cm.
- 12a. Leaves hairy on nerves above ; flowers orange-yellow with purple streaks ; capsules turgid in the middle, narrowed at both ends, 1.5-2.0 cm long. ... *I. khasiana* 12
- 12b. Leaves not hairy on nerves above ; flowers white with dark red spots ; capsules elongated, linear or clavate, 2.5-3.0 cm long. ... *I. juripa* 13

1. *Impatiens drepanophora* Hook. f. in Rec. Bot. Surv. Ind. 4: 17, 22 & 31. 1905.

Slender glabrous herbs, often creeping at base, 25-50 cm ; leaves elliptic-ovate to lanceolate, acute to cuneate at base, acute to bluntly acuminate, serrulate,  $2.5 \times 1.2$  cm ; lateral nerves 4-5 pairs ; petioles 2-5 mm ; racemes axillary, 3-6 cm ; flowers yellow, 5-8 mm across ; bracts ovate-lanceolate, 3-4 mm ; pedicels filiform, 1.0-1.5 cm ; capsules linear-ellipsoid, clavate, 1.5-2.0 cm ; seeds glabrous.

Shaded moist places in primary forests, 1300-1700 m ; fl. & fr. : June-Sept. ; Jowai.

2. ***Impatiens bracteata*** Wall. in Roxb. Fl. Ind. 2: 459. 1824; Hook. f. & Th. in J. Linn. Soc. 4: 142. 1860. *I. fimbriata* Hook. Exot. Fl. 2: t. 146. 1825; Fl. Brit. Ind. 1: 461. 1874.

Erect herbs, 25-75 cm; leaves ovate-lanceolate to elliptic, cuneate at base, acute to acuminate, serrulate-ciliate at margins, 4-8 × 1-3 cm; lateral nerves 5-7 pairs; petioles 3-20 mm; racemes 2-4 cm; peduncles 3-4 cm; bracts 5-8 mm, purple hairy at margins; pedicels 8-10 mm, capillary; capsules ellipsoid, 8-10 mm; seeds arillate with coiled hairs.

Moist places in forests and forest edges, 1000-1400 m; fl. & fr.: June-Sept.; Jarain.

3. ***Impatiens acuminata*** Hook. f. & Th. in J. Linn. Soc. 4: 145. 1860; Fl. Brit. Ind. 1: 462. 1874.

Perennial shrubs, up to 60 cm; stems simple, 3-6 mm thick; leaves cuneate at base, acuminate, crenate with minute setae at margins, 5-12 × 1-2 cm; petioles 1.0-2.5 cm; racemes axillary, 4-6 cm; bracts ovate to orbicular, 7-10 mm; pedicels 1-2 cm; flowers reddish, ± 2.5 cm across; capsules ellipsoid, ± 8 mm; seeds arillate, woolly.

Primary forests in shaded moist places, 800-1500 m; fl. & fr.: July-Dec.; Jaintia Hills, *G. Mann s.n.*; Jowai, *G. K. Deka* 17626; Sohka-Nongthala, *Balakrishnan* 46710 —Endemic to Meghalaya.

4. ***Impatiens racemosa*** DC. Prodr. 1: 688. 1824; Fl. Brit. Ind. 1: 479. 1875.

Annual glabrous herbs, up to 1 m; leaves cuneate-acute at base, acute to acuminate, crenate at margins, 3-10 × 1.5-3.0 cm; petioles 5-10 mm, with 2 large stipular glands at base; peduncles 3-8 cm; bracts ovate with stout glandular points; pedicels many, 1-4 cm, wiry; flowers yellowish-white with reddish-brown blotches; capsules 18-24 mm; seeds obovoid, apiculate.

Primary forests and forest edges, shaded streamsides, 1300-1600 m; fl. & fr.: June-Oct.; Jowai-Jarain.

5. ***Impatiens tripetala*** DC., Prodr. 1: 687. 1824; Fl. Brit. Ind. 1: 470. 1875.

Annual erect herbs, 25-65 cm; stem swollen at nodes, up to 1 cm thick; leaves elliptic-lanceolate, cuneate at base, acuminate, closely crenate at margins, 3-7 × 1.0-2.5 cm; lateral nerves 12-15 pairs; stipules consisting of many cylindrical glands; flowers reddish-purple, ± 1.3 cm across, axillary, solitary or fascicled; pedicels 8-15 mm; capsules linear-ellipsoid, 15-20 mm; seeds up to 10, rough granulose.



Forests and forest edges, near streams in shaded places, 100-800 m; fl. & fr.: Feb.-Aug.; Dawki.

6. ***Impatiens chinensis*** L. Sp. Pl. 937. 1753; Fl. Brit. Ind. 1: 444. 1874.

Slender erect herbs, 15-40 cm; stems angled, prostrate and rooting at base; leaves oblanceolate, rounded or subcordate at base, acute to mucronate-acuminate, sharply serrate at margins, 4-8 × 0.4-0.8 cm, white-glaucous beneath; stipules setaceous-subulate, gland-tipped; flowers pink or reddish-pink, ± 2 cm across, axillary, solitary or in 2-3-flowered fascicles; capsules ellipsoid, 15-20 mm; seeds many.

Open grasslands, pine forests and forest edges, near streams and marshy places, 1000-1600 m; fl. & fr.: May-Oct.; Jarain, Jowai, Jowai-Badarpur Road, Ummulong.

7. ***Impatiens benthamii*** v. Steenis in Bull. Bot. Gard. Botz. ser. 3, 17: 385. 1948. *I. radicans* Hook. f. & Th. in J. Linn. Soc. 4: 126. 1860; Fl. Brit. Ind. 1: 451. (*non* Zoll. & Mor. 1854). *I. salicifolia* Hook. f. & Th. in J. Linn. Soc. 4: 124. 1860; Fl. Brit. Ind. 1: 450. 1874. (*non* Turcz. 1859).

Herbs, 25-65 cm, sparsely branched; stems tetragonous; leaves acute to rounded at base, acute to acuminate, with minute ciliate serrations, 4-7 × 1-2 cm; lateral nerves 10-14 pairs; stipules of soft gland-tipped setae; flowers dark purple, 20-25 mm across, axillary, solitary or in fascicles of 2-4; peduncles 2-5 mm; pedicels 15-20 mm; capsules ellipsoid, ± 2 cm.

Shaded moist places in forests, 1000-1400 m; fl. & fr.: July-Sept.; Thangkuli, near Jarain, Ummulong.

8. ***Impatiens trilobata*** Coleb. in Hook. Exor. Fl. 2: t. 141. 1825; Fl. Brit. Ind. 1: 451. 1874.

Erect herbs, 30-60 cm; leaves elliptic or ovate-lanceolate, cuneate at base, acute to long-acuminate, crenate-serrate at margins, 5-10 × 1.5-3.5 cm; lateral nerves 15-23 pairs; petioles 0-3 cm; flowers purple-red, 15-20 mm, axillary, solitary or in fascicles of 2-4, on 1-4 cm long peduncles; pedicels 8-15 mm; capsules ellipsoid, 15-20 mm; seeds pyriform.

Open and partially shaded moist places in forests, 800-1500 m; fl. & fr.: June-Sept.; Jarain, Jarain-Dawki.

9. ***Impatiens pulchra*** Hook. f. & Th. in J. Linn. Soc. 4: 139. 1860; Fl. Brit. Ind. 1: 459. 1874.

Erect herbs, 10-30 cm; stems nodose, sparsely branched; leaves cuneate at base, acute to acuminate, serrate-crenate at margins, 2-10 × 1.0-2.5 cm;

lateral nerves 8-12 pairs; petioles 5-15 mm; flowers 4-5 cm; peduncles 2-5 cm, 1-2-flowered; bracts lanceolate,  $\pm$  2 mm; pedicels 2-3 cm; capsules ellipsoid, 1.5-2.0 cm; seeds subglobose, papillose.

Shaded moist places near streams in forests, 1000-1600 m; fl. & fr.: July-Dec.; Jowai-Jarain.

10. ***Impatiens laevigata*** Hook. f. & Th. in J. Linn. Soc. 4: 146. 1860; Fl. Brit. Ind. 1: 473. 1875.

Erect undershrubs; stems woody below, much-branched; leaves obliquely cuneate at base, acute to caudate-acuminate, distantly serrate with ciliate or mucronate crenations, 5-15  $\times$  2-5 cm; lateral nerves 6-8 pairs; petioles 5-40 mm, often glandular; racemes dense; peduncles 1-2 cm; flowers 2.5-3.0 cm; capsules elongate-linear,  $\pm$  20  $\times$  4 mm; seeds obovoid, rugulose.

Primary forests in shaded places, 400-1200 m; fl. & fr.: July-Jan.; Jaintia Hills, G. Mann s.n.; Khleihriat, *Balakrishnan* 42940 & 50113; Mynso, G. K. *Deka* 17498; Sohka-Nongthala, *Balakrishnan* 46196; Syndai, *Balakrishnan* 46161 —Endemic to Meghalaya.

11. ***Impatiens porrecta*** Hook. f. & Th. in J. Linn. Soc. 4: 138. 1860; Hook. f. in Rec. Bot. Surv. Ind. 4: 33. 1905 (*non* Hook. f. 1875).

Tufted diffuse herbs, 25-45 cm; stems slender, creeping at base, glandular hairy; leaves cuneate at base, obtuse, acute or acuminate, crenate-serrate at margins; lateral nerves 8-12 pairs; petioles 2-3 mm; flowers orange-red or golden-yellow with purple nerves at throat,  $\pm$  2.5 cm; peduncles 1-2-flowered; pedicels 5-12 mm; capsules ellipsoid, 10-15 mm; seeds subglobose, puberulous.

Shaded moist places in forests, 1000-1400 m; fl. & fr.: July-Dec.; Jarain, *Balakrishnan* 46811; Jowai-Jarain, *Balakrishnan* 42952 —Endemic to Meghalaya.

12. ***Impatiens khasiana*** Hook. f. in Rec. Bot. Surv. Ind. 4: 27, 33. 1905. *I. bella* var. *major* Hook. f. Fl. Brit. Ind. 1: 459. 1874.

Erect herbs, 60-80 cm; stems few-branched, sparsely hispidulous; leaves obliquely acute to cuneate at base; acute to acuminate, crenate-serrate with ciliate crenations; lateral nerves 8-12 pairs; petioles 5-25 mm with scattered glandular emergences; flowers  $\pm$  2.5 cm; peduncles slender, 2-4 cm; pedicels 15-20 mm; capsules ellipsoid, 15-20 mm; seeds papillose.

Primary forests in shaded moist places, 1200-1600 m; fl. & fr.: May-Nov.; Jowai, *Balakrishnan* 42967 —Endemic to Meghalaya.

13. **Impatiens juripa** Hook. f. & Th. in J. Linn. Soc. 4: 140. 1860; Fl. Brit. Ind. 1: 471. 1875.

Erect undershrubs, 0.5-1.5 m; leaves acute to cuneate and often oblique at base, acute to caudate at apex, crenate-serrate, glandular-ciliate at margins; 9-15 × 3-5 cm; lateral nerves 7-9 pairs; petioles 1-5 cm with scattered glandular emergences; flowers 4-5 cm; peduncles 4-15 cm, 1-3-flowered; bracts subulate; pedicels 15-25 mm; seeds many, globose, tubercled.

Primary forests, in shaded moist places, 600-1200 m; fl. & fr.: June-Oct.; Nongthala.

### 36. RUTACEAE

- |   |     |                      |
|---|-----|----------------------|
| 1a. Leaves opposite.  | ... |                      |
| 2a. Leaves unifoliolate; stamens 7-10.  | ... | <i>Acronychia</i> 1  |
| 2b. Leaves 3 or more-foliolate; stamens 4-5.                                    | ... | <i>Euodia</i> 2      |
| 1b. Leaves spirally arranged.   |     |                      |
| 3a. Petioles often winged; ovules many in each cell; fruit a berry.             | ... | <i>Citrus</i> 3      |
| 3b. Petioles not winged; ovules 1-2 in each cell; fruit capsular or drupaceous. |     |                      |
| 4a. Plants armed with spines.   |     |                      |
| 5a. Flowers bisexual; stamens 8-10.   | ... | <i>Paramignya</i> 4  |
| 5b. Flowers polygamous; stamens 3-5.  |     |                      |
| 6a. Ovary deeply lobed; styles free; fruits capsular.                           |     | <i>Zanthoxylum</i> 5 |
| 6b. Ovary entire; style united; fruits drupaceous.                              |     | <i>Toddalia</i> 6    |
| 4b. Plants unarmed.   |     |                      |
| 7a. Flowers polygamous; disk obsolete; stamens 5.                               | ... | <i>Skimmia</i> 7     |
| 7b. Flowers usually bisexual; disk prominent; stamens 8-10.                     |     |                      |
| 8a. Petals 2-5 mm long; styles hardly 1 mm long, often persistent.              |     |                      |
| 9a. Ovary sessile on a cushion-shaped disk; cells 1- or 3-ovuled.               | ... | <i>Glycosmis</i> 8   |
| 9b. Ovary on a stalk-like disk; cells 2-ovuled...                               |     | <i>Clausena</i> 9    |
| 8b. Petals 8-28 mm long; styles 2-9 mm long, caducous.                          |     |                      |
| 10a. Ovary and style glabrous; style 4-9 mm long.                               | ... | <i>Murraya</i> 10    |
| 10b. Ovary and style hairy; style 2-3 mm long.                                  |     | <i>Micromelum</i> 11 |

#### 1. ACRONYCHIA J. R. & G. Forst. *nom. cons.*

**Acronychia pedunculata** (L.) Miq. Fl. Ind. Bat. Suppl. 532. 1861. *Jambolifera pedunculata* L. Sp. Pl. 849. 1753. *A. laurifolia* (non Bl. 1823) Hook. f. Fl. Brit. Ind. 1: 498. 1875; Fl. As. 1: 203. 1936. 'Sarmon-blai'.

Shrubs or trees, 8-10 m; leaves oblong-lanceolate to oblanceolate, acute at base, acuminate, 6-20 × 3-7 cm; lateral nerves 10-12 pairs; petioles 1-4 cm; panicles axillary, corymbose; peduncles 3-6 cm; pedicels 2-10 mm; flowers white, ± 1 cm across; petals hairy inside; drupes globose or obovoid, 5-8 mm, beaked.

Primary and secondary forests, 100-1400 m; fl. & fr.: Jan.-Dec.; Dawki, Jarain, Jarain-Dawki, Jowai, Khleihriat, Syndai-Muktapur.

2. EUODIA J. R. & G. Forst.

1a. Leaves 3-foliolate.	...	<i>E. lunu-ankenda</i> 1
1b. Leaves 5-15-foliolate.		
2a. Leaflets crenulate, glabrous; petioles glabrous, $\pm$ 4 mm thick.	...	<i>E. trichotoma</i> 2
2b. Leaflets entire, pubescent to puberulous; petioles pilose, $\pm$ 2 mm thick.	...	<i>E. glabrifolia</i> 3

1. **Euodia lunu-ankenda** (Gaertn.) Merr. in Philip. J. Sci. Bot. 7: 378. 1912 (1913). *Fagara lunu-ankenda* Gaertn. Fruct. 1: 334, t. 68, f. 9. 1788. *E. roxburghiana* Benth. Fl. Hongk. 59. 1861; Fl. Brit. Ind. 1: 487. 1875; Fl. As. 1: 194. 1936.

Trees, up to 15 m; innovations puberulous; leaflets elliptic-ovate to oblong-lanceolate, cuneate at base, acute to acuminate, 10-22  $\times$  4-10 cm; lateral nerves 16-20 pairs; petioles 5-15 cm; petiolules 2-3 mm; cymes axillary or terminal, in 3-chotomous panicles; flowers white,  $\pm$  3 mm across; capsules globose, consisting of 4, 2-valved cells; seeds black, 1-2 in each cell, globose or faceted.

Primary forests, 1200-1700 m; fl. & fr.: Aug.-Mar.; Raliang.

2. **Euodia trichotoma** (Lour.) Planch. in Pierre, Fl. Cochinch. t. 287. 1893. *Tetradium trichotomum* Lour. Fl. Cochinch. 91. 1790. *Rhus fraxinifolium* D. Don, Prodr. Fl. Nep. 248. 1825. *E. fraxinifolia* (D. Don) Hook. f. Fl. Brit. Ind. 1: 490. 1875; Fl. As. 1: 196. 1936. '*Dieng-siaru*'.

Trees, 10-20 m; innovations pubescent; leaves 20-38 cm; rachis 6-10 cm; leaflets (5-) 9-11, elliptic or oblong-lanceolate, cuneate at base, acute to acuminate, 6-25  $\times$  3-10 cm; lateral nerves 12-20 pairs; petiolules 2-4 mm; cymes axillary or terminal, in corymbiform panicles; flowers greenish-white, 10-15 mm across; capsules 7-8 mm, of 4, 2-valved cells, red; seeds ellipsoid, dark brown.

Primary forests, 1000-1600 m; fl. & fr.: Apr.-Nov.; Jarain, Jarain-Dawki, Jowai, Khongsong-Shangpung, Shangpung.

3. **Euodia glabrifolia** (Champ.) Balakr. *comb. nov.* *Boynia glabrifolia* Champ. in Hook J. Bot. Kew Misc. 3: 330. 1851. *Megabotrya miliaefolia* Hance in Walp. Ann. 2: 259. 1852. *E. miliaefolia* (Hance) Benth. Fl. Hongk. 58. 1861; Fl. Brit. Ind. 1: 490. 1875; Fl. As. 1: 195. 1936.

Trees, 10-30 m; leaves 20-35 cm; petioles 6-12 cm; leaflets 9-15 ovate-lanceolate to elliptic-lanceolate, inequilateral, obliquely acute at base, acu-

minate, 7-15 × 3-6 cm; lateral nerves 10-20 pairs; cymes terminal, in 3-cho-  
tomous panicles, 12-20 × 15-20 cm; flowers greenish-white, 4-5 mm across;  
capsules globose, 7-8 mm, of 5, 2-valved, cells; seeds 5, globose, black.

Primary forests, 200-1000 m; fl. & fr.: Apr.-July; Dawki, Pangla  
Woods.

### 3. CITRUS L.

- |  |     |                     |
|--|-----|---------------------|
| 1a. Petioles broadly winged; fruits globose or ovoid, 6-8 cm long;<br>rind 5-6 mm thick. | ... | <i>C. latipes</i> 1 |
| 1b. Petioles not winged; fruits ellipsoid, 6-12 cm long; rind 15-25<br>mm thick.         | ... | <i>C. medica</i> 2  |

1. **Citrus latipes** (Swingle) Tanaka in Stud. Citrolog. 2: 155. 1929  
et in J. Bot. 68: 233. 1930. *C. ichangensis* var. *latipes* Swingle in J. Agr.  
Res. 1: 2. 1913. *C. hystrix* (non DC. 1813) Hook. f. Fl. Brit. Ind. 1: 515.  
1875, p. p.; Fl. As. 1: 214. 1936, p. p. 'Dieng-sohbah.'

Trees, 5-15 m; spines ascending; leaves ovate-elliptic or lanceolate,  
rounded at base, acute and submarginate, crenate to crenulate at margins,  
3-7 × 1.5-3.5 cm; lateral nerves many, subparallel; petioles oblanceolate,  
3-7 × 1-3 cm, emarginate at apex; flowers white or pale purple, ± 1.5 cm  
across, axillary, solitary or 2-5 together; seeds 30-60, ± 15 × 10 mm.

Primary forests, 500-1200 m; fl. & fr.: Mar.-Nov.; Umjaisaw to Myn-  
syngnat *Balakrishnan* 47139 —Endemic to Meghalaya.

2. **Citrus medica** L. Sp. Pl. 782. 1753; Fl. Brit. Ind. 1: 514. 1875;  
Fl. As. 1: 213. 1936, 'Dieng-soh-sarman'.

Shrubs or small trees, 1-5 m; spines straight, ascending; leaves elliptic-  
ovate or lanceolate, acute at base, obtuse or subacute, crenulate-serrate, 10-  
18 × 4-8 cm; lateral nerves 10-12 pairs; petioles margined, 5-12 mm; flowers  
pink or purplish, 15-20 mm, solitary or in axillary racemes; seeds 20-35,  
± 10 × 4 mm.

Primary forests, 500-1200 m; fl. & fr.: Jan.-Dec.; Umjaisaw to Myn-  
syngnat.

### 4. PARAMIGNYA Wt.

**Paramignya micrantha** Kurz in J. As. Soc. Beng. 44(2): 135. 1875.  
*Limonia citrifolia* Roxb. Fl. Ind. 2: 379. 1824. *P. citrifolia* (Roxb.) Hook. f.  
Fl. Brit. Ind. 1: 510. 1875 (non Oliver, 1861); Fl. As. 1: 211. 1936.  
'Miesohkhar-khlaw.'

Shrubs or small trees, 2-5 m; leaves elliptic or oblong-obovate, rounded or acute at base, bluntly acuminate, 4-12 × 2-6 cm; lateral nerves 10-12 pairs; petioles 3-5 mm; flowers white, 7-8 mm across, solitary or in fascicles of 2-3; pedicels  $\pm$  6 mm; berries ovoid or subglobose, obtusely 4-angled,  $\pm$  2.5 cm; seeds 3-5, oblong, compressed.

Primary forests, 1000-1500 m; fl. & fr.: Apr.-Dec.; Raliang, *Bala-krishnan* 47017 —Endemic to Meghalaya.

### 5. ZANTHOXYLUM L.

- |  |     |                         |
|--|-----|-------------------------|
| 1a. Leaves trifoliolate; petals present. | ... | <i>Z. ovalifolium</i> 1 |
| 1b. Leaves imparipinnate; petals absent. | ... | <i>Z. armatum</i> 2     |

1. **Zanthoxylum ovalifolium** Wt. Ill. Ind. Bot. 1: 169. 1831; Fl. Brit. Ind. 1: 492. 1875; Fl. As. 1: 202. 1936.

Trees or shrubs, 2-8 m; prickles, slightly incurved; young twigs pubescent; leaflets 3, elliptic to ovate-lanceolate or oblanceolate, acute at base, acuminate to obtuse-emarginate, shallowly crenate, 3-18 × 1.5-7.0 cm; lateral nerves 14-18 pairs; petioles 1-8 cm; petiolules  $\pm$  2 mm; cymes paniculate, terminal; flowers yellowish-white, 5-6 mm across; follicles solitary, subglobose, 6-7 mm, 1-celled, red; seed solitary, black.

Primary forests, 100-1000 m; fl. & fr.: Mar.-Sept.; Dawki, Syndai, Syndai-Muktapur.

2. **Zanthoxylum armatum** DC. Prodr. 1: 727. 1824. *Z. alatum* Roxb. Fl. Ind. 3: 768. 1832; Fl. Brit. Ind. 1: 493. 1875; Fl. As. 1: 199. 1936.

Trees, up to 8 m; prickles straight, woody on old stems; young twigs glabrous; leaflets 5-11, elliptic to oblong-lanceolate or oblanceolate, cuneate at base, acute to bluntly acuminate, serrulate, 3-8 × 1-2 cm; lateral nerves 10-16 pairs; rachis 6-15 cm, winged; petiolules  $\pm$  1 mm; cymes paniculate, 5-12 cm; flowers pale yellow,  $\pm$  3 mm across; follicles 1-2 (-3), free, subcompressed, rugulose, 4-5 mm; seeds black, shiny.

Forests, and also cultivated near villages, 500-1600 m; fl. & fr.: Mar.-Nov.; Ioski, on Garampani-Raliang Road, Puring.

### 6. TODDALIA Jussieu, nom. cons.

**Toddalia asiatica** (L.) Lamk. Tabl. Encycl. 2: 116. 1797. *Paullinia asiatica* L. Sp. Pl. 365. 1753. *T. aculeata* Pers. Syn. 1: 249. 1805; Fl. Brit. Ind. 1: 497. 1875; Fl. As. 1: 209. 1936.

Scandent, shrubs, up to 15 m; prickles curved and straight; young shoots rusty-tomentose; leaves 3-foliolate; petioles 20-25 mm; leaflets oblong to oblanceolate, cuneate or acute at base, obtusely long-acuminate, crenulate, 2-10 × 1-3 cm; petiolules 2-4 mm; cymes axillary or terminal, paniculate, up to 8 cm; flowers white, or pale yellow, 6-8 mm across; drupes globose, ± 8 mm, orange; seed 1, reniform.

Primary forests, 1000-1600 m; fl. & fr.: Nov.-May; Raliang, Shang-pung.

#### 7. SKIMMIA Thunb. *nom. cons.*

**Skimmia laureola** (DC.) Hook. f. Fl. Brit. Ind. 1: 499. 1875; Fl. As. 1: 204. 1936. *Limonia laureola* DC. Prodr. 1: 536. 1824.

Shrubs, up to 5 m; leaves crowded at ends of branchlets, oblong-lanceolate to oblanceolate, narrow-acute at base, acuminate, 5-13 × 1.5-4.0 cm; lateral nerves 6-8 pairs; petioles 5-12 mm, margined; panicles terminal, 3-5 cm; flowers white or greenish-yellow, ± 8 mm across; pedicels 1-2 mm; bracts ovate-oblong, ± 3 mm, ciliolate; drupes ellipsoid or subglobose, 8-10 mm; seeds 1-3.

Primary forests, 1500-1700 m; fl. & fr.: Mar.-Sept.; Ummulong.

#### 8. GLYCOSMIS Correa

- |  |     |                        |
|--|-----|------------------------|
| 1a. Leaves simple, glossy-white beneath.   | ... | <i>G. longifolia</i> 1 |
| 1b. Leaves compound; leaflets pale green beneath.  |     |                        |
| 2a. Leaflets entire; inflorescences axillary, cymose, shorter than leaf-rachis; stamens subequal; fruits ellipsoid.  | ... | <i>G. cymosa</i> 2     |
| 2b. Leaflets crenate or crenulate-dentate; inflorescences partly terminal contracted panicles, as long as or longer than leaf-rachis; stamens equal; fruits globose. | ... | <i>G. arborea</i> 3    |

1. **Glycosmis longifolia** (Hook. f.) Tanaka in Bull. Soc. Bot. Fr. 75: 709. 1928. *G. pentaphylla* var. 2, subvar. 1, *longifolia* Hook. f. Fl. Brit. Ind. 1: 500. 1875; Fl. As. 1: 205. 1936.

Shrubs, 3-4 m; leaves oblong-lanceolate to oblanceolate, acute at base, acute to short-acuminate, 8-28 × 3-8 cm; lateral nerves 8-12 pairs; petioles 4-8 mm; cymes paniculate, axillary, 1-2 cm; pedicels 1-2 mm; flowers pale white, ± 5 mm; fruits ellipsoid or obovoid, ± 10 × 7 mm, glandular-pitted, 1-celled, 1-seeded.

Forests and scrubs, 100-1000 m; fl. & fr.: Jan.-Aug.; Dawki.

2. **Glycosmis cymosa** (Kurz) Narayanasw. in Rec. Bot. Surv. Ind. 14(2): 26. 1941. *G. cyanocarpa* var. *cymosa* Kurz in J. Bot. 14: 34. 1876.

*G. pentaphylla* var. 2, subvar. 4. Hook. f. Fl. Brit. Ind. 1: 500. 1875; Fl. As. 1: 206. 1936.

Shrubs or small trees, 3-5 m; leaflets 3-5, alternate or subopposite, ovate-elliptic to linear-lanceolate, acute or cuneate at base, acute or obtusely acuminate, 3-20 × 1-6 cm; lateral nerves 8-12 pairs; rachis 6-15 cm, narrowly winged; petiolules 2-4 mm; cymes axillary or terminal, 2-4 cm; flowers pale white, 4-5 mm across; fruits 10-15 × 8-10 mm; seed solitary, pitted.

- |  |     |                               |
|--|-----|-------------------------------|
| 1a. Leaflets ovate, elliptic-oblong or elliptic-lanceolate, 8-20 × 3-6 cm. | ... | var. <i>cymosa</i> 1          |
| 1b. Leaflets linear-lanceolate, 4-10 × 1-2 cm.                             | ... | var. <i>linearifoliolis</i> 2 |

1. var. **cymosa**

Forests, in shaded places, 100-1000 m; fl. & fr.: Oct.-May; Dawki, Syndai.

2. var. **linearifoliolis** (Tanaka) Mitra & Subr. in J. Arn. Arb. 50: 156. 1969. *G. cyanocarpa* var. *linearifoliolis* Tanaka in J. Ind. Bot. Soc. 16: 229. 1937.

Primary forests, 100-800 m; fl. & fr.: Feb.-Aug.; Dawki.

3. **Glycosmis arborea** (Roxb.) DC. Prodr. 1: 538. 1824; Brizicky in J. Arn. Arb. 43: 90. 1962. *Limonia arborea* Roxb. Pl. Corom. 1: 60, t. 85. 1798. *G. pentaphylla* (non DC. 1824) Hook. f. Fl. Brit. Ind. 1: 499. 1875, p. p.; Fl. As. 1: 205. 1936, p. p. 'Dieng-kajatske'.

Shrubs or small trees, up to 6 m; leaflets 3-5, oblong-lanceolate, cuneate or acute at base, obtuse, acute or short-acuminate, crenulate-dentate at margins, 5-20 × 1-6 cm; lateral nerves 8-12 pairs; rachis 2-7 cm; petiolules 1-3 mm; panicles axillary, 4-10 cm; flowers white, 2-4 cm across; fruits globose, ± 1 cm diam., pinkish-white, 1-seeded.

Primary forests, 100-800 m; fl. & fr.: Jan.-Dec.; Dawki.

9. **CLAUSENA** Burm. f.

- |   |     |                          |
|---|-----|--------------------------|
| 1a. Leaves 7-11-foliolate; inflorescence terminal.  | ... | <i>C. heptaphylla</i> 1  |
| 1b. Leaves 13-19-foliolate; inflorescence axillary. | ... | <i>C. suffruticosa</i> 2 |

1. **Clausena heptaphylla** (Roxb.) W. & A. Prodr. 95. 1834; Fl. Brit. Ind. 1: 504. 1875; Fl. As. 1: 206. 1936. *Amyris heptaphylla* Roxb. Fl. Ind. 2: 248. 1824.

Shrubs, ± 1 m; leaflets elliptic-lanceolate, obliquely acute at base, acute to acuminate, entire or crenulate, 5-18 × 1-5 cm, densely pellucid-glandular; lateral nerves 6-8 pairs; white, fading to pale yellow, ± 3 mm



across; fruits oblong-ovoid or ellipsoid,  $\pm$  15 mm, glandular-pitted, orange-red; seed 1, ovoid.

Primary forests and forest edges, 100-1000 m; fl. & fr.: Feb.-Aug.; Dawki, Nongringkoh, Pdengsakab, Sohka-Dawki.

2. **Clausena suffruticosa** (Roxb.) W. & A. Prodr. 96. 1834; Fl. Brit. Ind. 1: 506. 1875; Fl. As. 1: 207. 1936. *Amyris suffruticosa* Roxb. Fl. Ind. 2: 250. 1824.

Undershrubs, 0.5-1.0 m; leaflets obliquely ovate to lanceolate, acute to rounded at base, acute to acuminate, entire, 4-12 $\times$ 2-5 cm; lateral nerves 8-12 cm; flowers greenish-white,  $\pm$  4 mm across; fruits fusiform-ovoid,  $\pm$  2 cm, glandular-pitted, purplish-orange; seed 1, oblong.

Primary and secondary forests, 100-500 m; fl. & fr.: Feb.-Aug.; Dawki.

#### 10. MURRAYA L. *nom. cons.*

**Murraya paniculata** (L.) Jack in Malay. Misc. 1: 535. 1824. *Chalcas paniculata* L. Mant. ed. 1: 68. 1767. *M. exotica* L. Man. Pl. 2: 563. 1771; Fl. Brit. Ind. 1: 502. 1875; Fl. As. 1: 207. 1936.

Shrubs or small trees, 3-7 m; leaflets 3-9, oblong-ovate or obovate, acute at base, obliquely acuminate and emarginate, entire or subcrenulate at margins, 3-7 $\times$ 2-4 cm; lateral nerves 8-12 pairs; rachis 5-10 cm; petiolules 3-4 mm; cymes terminal or axillary; pedicels 2-8 mm; flowers white,  $\pm$  2.5 cm; fruits ovoid,  $\pm$  1 cm, rugose, shiny-red; seeds 1-2, oblong.

Forest edges, secondary forests and near villages, 100-500 m; fl. & fr.: Mar.-Dec.; Dawki.

#### 11. MICROMELUM Bl. *nom. cons.*

**Micromelum integerrimum** (Roxb.) Roem. in Fam. Nat. Reg. Veg. 1: 47. 1846. *Berber integerrima* Roxb. Fl. Ind. 2: 376. 1832. *M. pubescens* (non Bl.) Hook. f. Fl. Brit. Ind. 1: 501. 1875. *p.p.*

Trees or shrubs, 2-10 m; innovations appressed-pubescent; leaflets 7-15, obliquely ovate-lanceolate, obliquely acute at base, long-acuminate, wavy or obscurely crenulate at margins, 3-15 $\times$ 2-6 cm; petiolules 3-4 mm; corymbs terminal, appressed-hairy; flowers dull white, 7-9 mm across; fruits ellipsoid, 8-12 mm, orange-red or yellowish-red.

Primary forests, 800-1600 m; fl. & fr.: Nov.-June; Raliang, Sutnga, Syndai, Umjaisaw-Mynsyngnat.

## 37. SIMAROUBACEAE

- |   |     |                   |
|---|-----|-------------------|
| 1a. Disk entire ; styles free ; fruits supported by persistent calyx and petals.  | ... | <i>Picrasma</i> 1 |
| 1b. Disk 4-lobed ; styles nearly free ; fruits not supported by calyx and petals. | ... | <i>Brucea</i> 2   |

## 1. PICRASMA Bl.

**Picrasma javanica** Bl. Bijdr. 247. 1825 ; Fl. Brit. Ind. 1: 520. 1875 ; Fl. As. 1: 217. 1936. *P. nepalensis* Benn. Pl. Jav. Rar. 201. 1844 ; Fl. Brit. Ind. 1: 520. 1872 ; Fl. As. 1: 218. 1934.

Trees, 4-15 m ; leaflets 3-5 pairs, oblong to elliptic-ovate, obtuse at base, acuminate, 4-15 × 2-5 cm ; lateral nerves 5-7 pairs ; rachis 10-18 cm ; stipules obovate-orbicular, ± 1 cm ; petiolules 3-6 mm ; panicles corymbose, axillary, 10-20 cm ; flowers dull white to greenish-white, ± 7 mm across ; drupelets 4, globose or obovoid, ± 1 cm, black, seated on cushion-like disk.

Primary forests, 100-500 m ; fl. & fr. : Apr.-Nov. ; Dawki.

2. BRUCEA Mill. *nom. cons.*

**Brucea mollis** Kurz in J. As. Soc. Beng. 42(2): 64. 1873 ; Fl. Brit. Ind. 1: 521. 1875 ; Fl. As. 1: 218. 1936. '*Dieng-lakasein*.'

Shrubs or small trees, 1-6 m ; leaflets 7-13, ovate-oblong to lanceolate, rounded or subequal at base, caudate to acuminate, entire or undulate at margins, 5-16 × 1-8 cm ; lateral nerves 8-11 pairs ; petioles 2-12 cm ; petiolules 2-8 mm ; terminal petiolule 3-30 mm ; inflorescences 10-23 cm, terminal or axillary ; flowers white or pale green ; fruits of 1-2 drupelets, ovoid, 9-13 mm, orange-red.

Primary forests, 1200-1700 m ; fl. & fr. : Mar.-Nov. ; Nartiang, Raliang.

## 38. OCHNACEAE

## OCHNA L.

**Ochna integerrima** (Lour.) Merr. in Trans. Amer. Phil. Soc. n.s. 24, 2: 265. 1935. *Elaeocarpus integerrimus* Lour. Fl. Cochinch. 338. 1790. *O. wallichii* Planch. in Hook. Lond. J. Bot. 5: 650. 1846 ; Fl. Brit. Ind. 1: 524. 1875 ; Fl. As. 1: 217. 1936.

Shrubs or small trees, 1-8 m ; leaves obovate, to oblanceolate, subacute at base, acute to cuspidate, denticulate at margins, 6-15 × 2-5 cm ; lateral

nerves 15-19 pairs; petioles 2-5 mm; stipules intrapetiolar, subulate, 5-6 × 2-3 mm; inflorescences many-flowered cymes; rachis 5-15 mm; pedicels 2-4 cm; flowers yellow; fruits of 2-4 drupelets, 2-3 mm, greenish-yellow with red-purple sepals.

Primary forests, 100-1000 m; fl. & fr.: Feb.-Aug.; Dawki.

### 39. MELIACEAE

- |  |                      |
|--|----------------------|
| 1a. Shrubs, up to 1 m; petals connate for more than half way. ...  | <i>Munronia</i> 1    |
| 1b. Trees; petals connate less than half way, sometimes connate at base only.                                |                      |
| 2a. Leaves 3-5-foliolate; fruits indehiscent, baccate. ...   | <i>Walsura</i> 2     |
| 2b. Leaves more than 5-foliolate; fruits capsular.   |                      |
| 3a. Leaves pale glaucous beneath; filaments free towards apex. ...   | <i>Trichilia</i> 3   |
| 3b. Leaves not pale glaucous beneath; filaments completely united.   |                      |
| 4a. Flowers bisexual; disk conspicuous, tubular or cupular, enveloping the ovary. ...                        | <i>Dysoxylum</i> 4   |
| 4b. Flowers polygamous; disk not so, obscure.  |                      |
| 5a. Calyx 4-partite; staminal tube linear-oblong; style long; ovule 1 in each cell; fruits 5-7 cm diam. ...  | <i>Chisocheton</i> 5 |
| 5b. Calyx 5-partite; staminal tube globose; style absent; ovules 2 in each cell; fruits up to 4 cm diam. ... | <i>Aphanamixis</i> 6 |

#### 1. MUNRONIA Wt.

***Munronia pinnata*** (Wall.) Harms in Engler & Prantl. Natur. Pflanzenfam. cd. 2. 19b: 92. 1940; A. S. Rao in Bull. Bot. Surv. Ind. 5: 255-256, t. 1. 1963. *Turrea pinnata* Wall. Pl. As. Rar. 2: 21, t. 119. Apr. 1831. *M. wallichii* Wt. Ill. Bot. 1: 147. June 1831; Fl. Brit. Ind. 1: 543. 1875; Fl. As. 1: 235. 1936.

Shrubs or undershrubs, 25-100 cm; leaves crowded at ends of shoots, 20-25 cm; petioles 6-10 cm; leaflets 5-9, ovate-oblong to lanceolate, obliquely acute or round at base, bluntly acuminate, 3-12 × 2-5 cm, pubescent on nerves beneath; lateral nerves 5-6 pairs; peduncles 10-15 mm; flowers white or pale pink, ± 3 cm; pedicels 5-8 mm; capsules subglobose, 10-15 mm, rugulose, 5-valved; seeds planoconvex, shiny-black.

Primary forests in shaded places, 1200-1700 m; fl. & fr.: Sept.-Feb.; Raliang.

#### 2. WALSORA Roxb.

***Walsura robusta*** Roxb. Fl. Ind. 2: 386. 1832; Fl. Brit. Ind. 1: 565. 1875; Fl. As. 1: 241. 1936.

Trees, 20-25 m; branchlets white-lenticellate; leaves 15-25 cm; rachis flat above; petioles 4-6 cm; leaflets elliptic to oblong-lanceolate, acute to cuneate at base, bluntly short-acuminate, 5-15 × 2-6 cm; lateral nerves 5-7 pairs; petiolules 5-10 mm; panicles terminal, 10-20 cm; flowers white, ± 5 mm across; berries subglobose, 15-18 mm, pubescent; seeds enclosed in a fleshy aril.

Primary forests, 100-500 m; fl. & fr.: Dec.-Aug.; Dawki.

3. *TRICHILIA* P. Br. *nom. cons.*

***Trichilia connaroides*** (W. & A.) Benth. in Acta Bot. Neerl. 11: 18. 1832. *Heynea trijuga* Sims in Curt. Bot. Mag. 41: t. 1738. 1815; Fl. Brit. Ind. 1: 565. 1875; Fl. As. 1: 229. 1936 (*non Trichilia trijuga* Vell. 1825). *Zanthoxylon connaroides* W. & A. Prodr. 148. 1834.

Small trees or shrubs, 3-12 m; leaves 20-50 cm; rachis angular; leaflets ovate-oblong, rounded or unequally subacute at base, acuminate, 5-20 × 2-8 cm; lateral nerves 10-13 pairs; petiolules articulate at apex, 5-20 mm; cymes in corymbose panicles, axillary; pedicels 1-2 mm; flowers white, 2-4 mm; capsules oblong, subglobose, 1-celled, 2-valved, red; seed 1, ovoid, attached basally, enveloped in thin white aril, brown when dry.

Primary and secondary forests, 100-1000 m; fl. & fr.: Mar.-Dec.; Ioski, near Garampani.

4. *DYSOXYLUM* Bl.

- |  |     |                            |
|--|-----|----------------------------|
| 1a. Leaflets opposite to subopposite; panicles spreading; calyx subtire.       | ... | <i>D. gobara</i> 1         |
| 1b. Leaflets alternate; panicles narrow, racemiform; calyx 4-5-fid or partite. | ... | <i>D. binectariferum</i> 2 |

1. ***Dysoxylum gobara*** (Buch.-Ham.) Merr. in J. Arn. Arb. 23: 173. 1942. *Guarea gobara* Buch.-Ham. in Trans. Wern. Soc. 6: 306, f. 1. 1832. *D. procerum* Hiern, in Fl. Brit. Ind. 1: 547. 1875; Fl. As. 1: 231. 1936.

Trees, 15-25 m; leaves 35-65 cm; rachis terete; leaflets obovate or elliptic-oblong, obliquely subacute at base, obtuse to broadly subacute, 15-25 × 6-10 cm; lateral nerves 10-16 pairs; petiolules 10-15 mm; panicles axillary or on old wood; flowers creamy-white, fragrant; bracts subulate; capsules 3-4-celled, pyriform, ± 6 cm; seeds 2-3, black, shiny with orange aril.

Primary forests, 500-1000 m; fl. & fr.: Dec.-Aug.; Jaintia Hills, G. Mann 916.

2. **Dysoxylum binectariferum** (Roxb.) Bedd. in Trans. Linn. Soc. Lond. 25: 212. 1866; Fl. Brit. Ind. 1: 546. 1875; Fl. As. 1: 232. 1936. *Guarea binectariferum* Roxb. Fl. Ind. 2: 240. 1832.

Trees, up to 20 m; leaves 30-40 cm; rachis 15-25 cm; leaflets obliquely ovate-oblong, cuneate at base, acute to acuminate, obscurely dentate, 7-17 × 3-8 cm; lateral nerves 5-10 pairs; panicles 20-30 cm; flowers pale white, ± 4 mm across; capsules obovoid, narrow at base, 25-30 mm, 4-celled, pale yellow to orange; seeds 4, obovoid, shiny dark purple with large yellow hilum and white aril.

Primary forests, 100-500 m; fl. & fr.: Jan.-Dec.; Dawki.

#### 5. CHISOCHETON BL.

**Chisocheton paniculatus** (Roxb.) Hiern in Fl. Brit. Ind. 1: 552. 1875; Fl. As. 1: 234. 1936. *Guarea paniculata* Roxb. Fl. Ind. 2: 242. 1832.

Trees, 10-15 m; young shoots and inflorescences brownish hairy; leaves 30-100 cm; leaflets 7-31, oblong to ovate-lanceolate, subacute or obtuse at base, acute to short-acuminate, 7-25 × 3-11 cm; lateral nerves 7-13 pairs; panicles axillary, lax, 45-85 cm; pedicels 3-5 mm; flowers pale yellow, ± 1.5 cm; capsules subglobose, shiny, orange-red; seeds black with pale yellow aril.

Primary forests, 100-800 m; fl. & fr.: July-Apr.; Dawki, Sonapur.

#### 6. APHANAMIXIS BL.

**Aphanamixis polystachya** (Wall.) Parker in Ind. For. 57: 486. 1931. *Aglaia polystachya* Wall. in Roxb. Fl. Ind. 2: 429. 1824. *Andersonia rohituka* Roxb. Fl. Ind. 2: 218. 1832. *Amoora rohituka* (Roxb.) W. & A. Prodr. 119. 1834; Fl. Brit. Ind. 1: 559. 1875; Fl. As. 1: 236. 1936.

Trees, 5-10 m, with spreading crown; leaves crowded at ends of branchlets, 30-70 cm; leaflets 9-19, oblong, obovate or oblanceolate, obliquely acute at base, caudate, 8-25 × 4-10 cm; lateral nerves 12-15 pairs; petiolules 3-5 mm; panicles as long as leaves; flowers dull white, sessile, 3-5 mm; capsules obovoid, 3-4 cm, 3-valved, purplish; seeds black, covered with scarlet red aril.

Primary forests, 100-1200 m; fl. & fr.: Jan.-Dec.; Dawki, Lumshnong, Khleihriat-Sonapur.

## 40. OLACACEAE

- |  |     |                      |
|--|-----|----------------------|
| 1a. Lianas ; tendrils present ; leaf-base peltate or subpeltate.   | ... | <i>Erythopalum</i> 1 |
| 1b. Trees or erect shrubs ; tendrils absent ; leaf-base epeltate.  |     |                      |
| 2a. Petals 3 ; staminodes present.   | ... | <i>Olax</i> 2        |
| 2b. Petals 5-6 ; staminodes absent.  |     |                      |
| 3a. Bracts connate, forming a persistent epicalyx ; calyx free from fruit ; petals glabrous within ; ovary 3-celled. |     | <i>Schoepfia</i> 3   |
| 3b. Bracts not connate, minute, caducous ; calyx adherent to fruit ; petals hairy within ; ovary 1-celled.           | ... | <i>Anacolosa</i> 4   |

## 1. ERYTHROPALUM Bl.

**Erythopalum scandens** Bl. Bijdr. 921. 1826; Fl. Brit. Ind. 1: 578. 1875; Fl. As. 1: 248. 1936.

Rambling climbers or lianas; tendrils axillary, shortly bifid; leaves distichous, ovate-oblong to lanceolate, rounded and narrowly peltate at base, acute to short-acuminate, 7-20 × 3-12 cm, palmately 3-nerved; petioles 3-5 cm; cymes axillary, paniculate; peduncles 3-10 cm; flowers white, 2-3 mm; pedicels 1-2 cm; drupes ellipsoid, obtuse, 20-25 mm, 3-6-valved, yellowish red; seed 1.

Primary forests, 100-500 m; fl. & fr.: May-Dec.; Dawki.

## 2. OLAX L.

**Olax acuminata** Benth. in Trans. Linn. Soc. 18: 678. 1841; Fl. Brit. Ind. 1: 576. 1875; Fl. As. 1: 247. 1936.

Shrubs or small trees, 3-6 m; leaves ovate-lanceolate to oblong-lanceolate, rounded to subacute at base, acute to acuminate, 6-10 × 3-6 cm; lateral nerves 7-10 pairs; petioles margined, 4-7 mm; racemes axillary, solitary or in fascicles, 8-12 mm; flowers greenish-yellow, 3-4 mm; drupes ellipsoid or ovoid, 15-20 × 10-12 mm, orange-red; seed 1.

Primary forests, 100-1000 m; fl. & fr.: June-Mar.; Dawki.

## 3. SCHOEFFIA Schreb.

**Schoepfia fragrans** Wall. in Roxb. Fl. Ind. 2: 188. 1824; Fl. Brit. Ind. 1: 581. 1875; Fl. As. 1: 249. 1936. 'Dieng-sa-niriang'.

Trees, 5-15 m; branchlets angular; leaves elliptic-lanceolate, acute to cuneate at base, acute to acuminate, 5-8 × 1-3 cm; lateral nerves 5-7 pairs; petioles margined, 5-8 mm; racemes axillary, 2-3 cm; pedicels

5-7 mm; flowers yellow, 6-8 mm, fragrant; drupes ellipsoid, 12-15 mm, 1-celled, white and fleshy; seed 1, white.

Primary forests, 1000-1700 m; fl. & fr.: Jan.-Dec.: Jarain, Jowai, Khongsnong, Raliang, Shangpung.

#### 4. ANACOLOSA Bl.

**Anacolosa ilicoides** Mast. in Fl. Brit. Ind. 1: 580. 1875; Fl. As. 1: 250. 1936.

Trees, 4-10 m; leaves elliptic to oblong-lanceolate, acute to cuneate at base, acute to acuminate, 5-22 × 2-6 cm; lateral nerves 6-8 pairs; petioles 5-10 mm; cymes axillary, subumbellate, 3-8-flowered; peduncles 3-4 mm; pedicels 3-4 mm; flowers greenish-white, 4-5 × 3-4 mm; drupes included by enlarged disk, oblong-ellipsoid, ± 3 × 2 cm; seed 1, pendulous.

Primary forests, 1000-1500 m; fl. & fr.: Jan.-Dec.; Jarain. *Balarishnan* 46801 —Endemic to Meghalaya.

### 41. ICACINACEAE

- |  |                   |
|--|-------------------|
| 1a. Erect trees or shrubs; leaves spirally arranged; flowers bisexual. ... | <i>Apodytes</i> 1 |
| 1b. Climbing shrubs; leaves opposite; flowers unisexual. ...               | <i>Iodes</i> 2    |

#### 1. APODYTES Arn.

**Apodytes dimidiata** Arn. in Hook. J. Bot. 3: 155. 1840. *A. benthamiana* Wt. Ic. Pl. Ind. Or. 3(4): 14. t. 1153. 1846; Fl. Brit. Ind. 1: 588. 1875; Fl. As. 1: 251. 1936.

Trees, 20-30 m; leaves elliptic to ovate-lanceolate, subequally acute at base, short-acuminate, revolute at margins, 5-12 × 3-5 cm; lateral nerves 4-7 pairs; petioles 15-25 mm; panicles corymbose, terminal, 7-12 cm; flowers white, ± 6 mm across, fragrant; drupes compressed, obliquely obovoid, ± 8 × 5 mm, with a lateral shield-like appendage, hirsute, reddish-brown; seed 1.

Primary forests, 1000-1600 m; fl. & fr.: Apr.-Jan.; Shangpung.

#### 2. IODES Bl.

**Iodes hookeriana** Baill. in Adansonia 10: 268. 1872; Fl. Brit. Ind. 1: 596. 1875; Fl. As. 1: 254. 1936. *Mappianthus hookerianus* (Baill.) Sleumer in Blumea 17: 225. 1969.

Large climbing shrubs; leaves oblong-ovate, lanceolate or rarely obovate, subacute at base, caudate-acuminate, subcrenulate and recurved at margins, 6-13 × 3-6 cm; lateral nerves 5-7 pairs; petioles 4-10 mm, brown hairy; cymes axillary or extra-axillary; peduncles 4-10 mm, lower ones modified into tendrils; flowers white, ± 4 mm across; drupes ellipsoid, 3-4 × 2-3 cm, red or orange-red; seed 1, ovoid-compressed.

Primary forests, 1000-1500 m; fl. & fr.: Feb.-Nov.; Shangpung.

## 42. AQUIFOLIACEAE

### ILEX L.

- 1a. Leaves entire.
  - 2a. Leaves acute to short-acuminate at apex; lateral nerves 8-10 pairs; umbellules racemously arranged on 1-3 cm long peduncles. ... *I. umbellulata* 1
  - 2b. Leaves long caudate-acuminate at apex; lateral nerves 12-15 pairs; umbellules cymose, solitary or crowded on less than 1 cm long peduncles. ... *I. venulosa* 2
- 1b. Leaves crenate-serrate or serrulate.
  - 3a. Branchlets pubescent; leaves ovate-elliptic; female flowers solitary. ... *I. triflora* 3
  - 3b. Branchlets glabrous; leaves elliptic-lanceolate; female flowers fasciated.
    - 4a. Midrib grooved above; male flowers in dense corymbose cymes; stamens longer than petals. ... *I. odorata* 4
    - 4b. Midrib convex above; male flowers in peduncled umbellules; stamens as long as petals. ... *I. embelioides* 5

1. ***Ilex umbellulata*** (Wall.) Loes. Monogr. Aquifol. 1: 99. 1901. *Ehretia umbellulata* Wall. in Roxb. Fl. Ind. 2: 344. 1824. *I. godjam* Hook. f. Fl. Brit. Ind. 1: 604. 1875; Fl. As. 1: 256. 1936. *I. sulcata* Hook. f. *l.c.* 604.

Trees, 15-30 m; leaves ovate-elliptic to lanceolate, acute at base, 6-12 × 3-5 cm, glossy above, pale and puberulous on nerves beneath; petioles 15-25 mm; umbels simple or paniculate; secondary peduncles 10-15 mm; flowers pale white, fragrant, ± 3 mm across; fruits ovoid, ± 3 mm.

Primary and secondary forests, 100-1000 m; fl. & fr.: Feb.-July; Dawki, G. K. Deha 16345.

2. ***Ilex venulosa*** Hook. f. Fl. Brit. Ind. 1: 602. 1875; Fl. As. 1: 257. 1936.

Trees or scandent shrubs, 8-15 m; leaves oblong or elliptic-lanceolate, subequally acute at base, 5-20 × 2-6 cm; petioles 15-20 mm; umbels of male flowers 1-3 cm long; female flowers solitary or in umbels; pedicels ± 3 mm; flowers white; fruits globose, ± 3 mm, red.

Primary forests and near villages, 1200-1700 m; fl. & fr.: Feb.-Sept.;



Jowai-Jarain, *Balakrishnan* 42552 & 46798; Shangpung, *U. N. Kanjilal* 6815 — Endemic to Meghalaya.

3. ***Ilex triflora*** Bl. Bijdr. 1150. 1826. *I. griffithii* Hook. f. Fl. Brit. Ind. 1: 601. 1875; Fl. As. 1: 250. 1936.

Shrubs or small trees, 2-5 m; leaves acute at base, acute to obtuse, 3-7 × 2-4 cm; lateral nerves 6-7 pairs; male flowers in compound umbels or cymes; pedicels 2-3 mm; pedicels ± 1 mm; flowers white, 4-5 mm across; fruits globose, 5-7 mm, black.

Primary forests, 1000-1500 m; fl. & fr.: Mar.-Apr.; near Amwee river, Jarain, *Balakrishnan* 46863.

4. ***Ilex odorata*** D. Don, Prodr. Fl. Nep. 189. 1825 (*non* Hook. f. 1875). *I. gaultheriaefolia* Kurz in J. As. Soc. Beng. 41(2): 259. 1872. *I. theifolia* Hook. f. Fl. Brit. Ind. 1: 601. 1875; Fl. As. 1: 258. 1936.

Trees or shrubs, 3-5 m; leaves elliptic-oblong to lanceolate, acute or rounded at base, acute to short-acuminate at apex, serrate or serrulate at margins, 3-8 × 1.5-3.5 cm; lateral nerves 7-8 pairs; petioles 5-10 mm; male flowers in ± 1 cm long cymes; female flowers fascicled or crowded on small protruberances on branches; pedicels ± 5 mm; flowers white; fruits globose, 6-8 mm diam., reddish-brown.

Pine forests and near villages, 1400-1800 m; fl. & fr.: Apr.-Sept.; Thadlaskein Lake, near Jowai, *G. K. Deka* 17131.

5. ***Ilex embelloides*** Hook. f. Fl. Brit. Ind. 1: 601. 1875; Fl. As. 1: 258. 1936.

Trees, 4-8 m; leaves elliptic to oblong-lanceolate, acute to cuneate at base, caudate-acuminate, 3-8 × 1.5-2.5 cm; lateral nerves 10-14 pairs; male flowers at ends of branches or leaf-axils; female umbellules in axillary fascicles or on short branches; flowers white, ± 3 mm across; fruits globose, 4-6 mm diam., brown.

Primary forests, 100-1000 m; fl. & fr.: Apr.-Nov.; Dawki, *G. K. Deka* 12252 — Endemic to Meghalaya.

#### 43. CELASTRACEAE

- |  |     |                  |
|--|-----|------------------|
| 1a. Stamens 2 or 3; fruits drupaceous, indehiscent.                              | ... | <i>Salacia</i> 1 |
| 1b. Stamens 4 or 5; fruits capsular, dehiscent.                                  |     |                  |
| 2a. Leaves cross-bar veined between nerves; ovary surrounded by a tuft of hairs. | ... | <i>Bhesa</i> 2   |
| 2b. Leaves reticulate veined between nerves; ovary not surrounded by hairs.      |     |                  |

- 3a. Leaves spirally arranged.
  - 4a. Scandent shrubs; ovary free from disk; seeds fully enveloped by aril. ... *Celastrus* 3
  - 4b. Erect shrubs or small trees; ovary partly immersed in disk; seeds enveloped by aril at basal half only. ... *Maytenus* 4
- 3b. Leaves decussate or opposite.
  - 5a. Petals slightly connate at base; disk absent; filaments united at base into a ring or short tube; fruits 1-celled, 1-seeded, dehiscent on one side; seed not arillate. ... *Microtropis* 5
  - 5b. Petals free; disk conspicuous; filaments free; fruits 3-5-celled, 3-5-valved, 3 or more seeded; seeds arillate.
  - 6a. Ovules 2 in each cell; fruit-valves dehiscent leaving no columella; seeds usually 2 in each cell. ... *Euonymus* 6
  - 6b. Ovules 1 in each cell; fruit-valves dehiscent leaving a free columella; seed 1 in each cell. ... *Glyptopetalum* 7

1. SALACIA L.

**Salacia floribunda** Wt. III. Bot. 1: 134. 1840; Fl. Brit. Ind. 1: 629. 1872; Fl. As. 1: 275. 1936.

Scandent shrubs or nearly lianas; leaves elliptic-lanceolate to oblong, acute to subobtuse at base, bluntly acuminate, sharp-serrate at margins, 8-15 × 3-6 cm; lateral nerves 9-12 pairs; petioles 8-12 mm; cymes axillary, paniculate; peduncles 10-15 mm long; pedicels 5-7 mm; drupes subglobose to ellipsoid, 3.0-3.5 × 2-3 cm, red; seeds 1-4, embedded in mucilaginous pulp.

Primary forests, 100-500 m; fl. & fr.: Oct.-May; Dawki.

2. BHESA Arn.

**Bhesa robusta** (Roxb.) Ding Hou in Blumea, suppl. 4: 152. 1958. *Celastrus robustus* Roxb. Fl. Ind. 2: 395. 1824. *Kurrimia pulcherrima* Laws. in Fl. Brit. Ind. 1: 622. 1875; Fl. As. 1: 270. 1936.

Trees, up to 30 m; buttresses up to 4 m high; leaves elliptic or oblong-obovate, obtuse or cuneate at base, acute to short-acuminate, 6-15 × 2-8 cm; lateral nerves 10-16 pairs; petioles 1-3 cm; stipules lanceolate, 5-10 mm; racemes simple or rarely-branched, up to 15 cm; flowers white, ± 4 mm across, subsessile; capsules loculicidal, 2-valved, 1-celled, ovoid-oblong, ± 3 × 1 cm; seed 1, oblong, ± 2.5 cm, completely or basally covered with fleshy yellow aril.

Primary forests, 100-1000 m; fl. & fr.: June-Feb.; Dawki, R. N. De 18442 & 19038.

## 3. CELASTRUS L.

- 1a. Inflorescences axillary, up to 2 cm long; fruits 3-6-seeded; seeds plano-convex, attenuate at both ends, 4-6 mm long. ... *C. stylosus* 1  
 1b. Inflorescences terminal or in uppermost axils, 4-6 cm long; fruits 1-seeded; seeds obovoid or ellipsoid, obtuse at both ends, 12-15 mm long. ... *C. championii* 2

1. **Celastrus stylosus** Wall. in Roxb. Fl. Ind. 2: 401. 1824; Fl. Brit. Ind. 1: 618. 1875; Fl. As. 1: 268. 1936.

Subscandent shrubs, 3-4 m; leaves obovate, oblong-lanceolate to elliptic, obtuse or acute at base, acute to obtusely acute, cuspidate-serrate, 4-8 × 2.5-5.0 cm; lateral nerves 5-8 pairs; petioles 1-2 cm; peduncles 5-11 mm; pedicels 2-5 mm; flowers greenish white, ± 5 mm across; capsules subglobose, 7-12 × 5-10 mm, yellow; seeds plano-convex, enclosed in red aril.

Primary forests and also rarely in pine forests, 1300-1700 m; fl. & fr.: Mar.-Nov.; Raliang, Thatlaskein Lake.

2. **Celastrus championii** Benth. in Hook. Kew J. Bot. 3: 334. 1851; Fl. As. 1: 269. 1936.

Lianas or subscandent shrubs; leaves elliptic-obovate or oblanceolate, cuneate to acute at base, bluntly short-acuminate cuspidate-serrulate, 12-18 × 5-8 cm; lateral nerves 5-8 pairs; petioles 5-13 mm; panicles ± 10 cm; peduncles 4-6 cm; pedicels 3-4 mm; flowers greenish-white, 3-4 mm across; capsules obovoid, 15-20 mm, 3-valved; seed 1, ovoid or ellipsoid, covered with orange-yellow aril.

Primary forests, 1000-1500 m; fl. & fr.: Mar.-Dec.; Mynso, U. N. Kanjilal 6530.

## 4. MAYTENUS Molina

**Maytenus hookeri** Loes. in Engler & Prantl, Pflanzenfam. 20b: 140. 1942. *Gymnosporia acuminata sensu* Laws. in Fl. Brit. Ind. 1: 619. 1875. [*non* (L. f.) Szysz. 1888; *nec M. acuminata* (L. f.) Loes. 1942]; Fl. As. 1: 271. 1936.

Trees, up to 10 m; leaves ovate to elliptic-lanceolate or oblanceolate, cuneate or acute at base; lateral nerves 7-9 pairs; petioles 5-8 mm; cymes dichotomously branched, axillary, peduncles 15-25 mm; pedicels 3-4 mm; flowers reddish-brown, ± 3 mm across; capsules 2-celled, loculicidal, obcordate or subglobose, compressed, 7-8 mm, black seeds ellipsoid, ± 2 mm.

Primary and secondary forests, 100-1000 m; fl. & fr.: Mar.-Sept.; Syndai, U. N. Kanjilal 2802.

5. *MICROTROPIS* Meisn. *nom. cons.*

**Microtropis discolor** (Wall.) Arn. in Ann. Nat. Hist. 3: 152. 1839; Fl. Brit. Ind. 1: 614. 1875; Fl. As. 1: 267. 1936. *Cassine discolor* Wall. in Roxb. Fl. Ind. 2: 378. 1824.

Shrubs or small trees, 3-8 m; leaves elliptic to lanceolate, attenuate at base, acuminate, 7-14 × 2-5 cm; lateral nerves 5-7 pairs; petioles 8-18 mm; cymes 3-chotomously branched, axillary or supra-axillary; peduncles 3-8 mm; flowers greenish-white, ± 5 mm across; capsules ellipsoid, 12-16 × 8-12 mm, 1-celled, 2-valved; seed 1, stipitate, ellipsoid, 12-13 × 7-8 mm, scarlet-red, finely veined.

Primary forests, 500-1600 m; fl. & fr.: Jan.-Dec.; Jarain, Jowai, Sutnga, Syndai.

6. *EUONYMUS* L.

- |   |                        |
|---|------------------------|
| 1a. Shrubs, trailing or climbing with adventitious roots; fruits echinate. ...                        | <i>E. echinatus</i> 1  |
| 1b. Trees or shrubs, erect, subscaudent or scandent, without adventitious roots; fruits not echinate. |                        |
| 2a. Leaves entire; flowers 5-merous. ...  | <i>E. attenuatus</i> 2 |
| 2b. Leaves serrulate or serrate; flowers 4-merous.  |                        |
| 3a. Climbing shrubs; peduncles up to 1 cm long; fruits subglobose, rarely angled. ...                 | <i>E. theifolius</i> 3 |
| 3b. Erect trees or shrubs; peduncles 15-30 mm long; fruits obconic, deeply 4-lobed. ...               | <i>E. lawsonii</i> 4   |

1. **Euonymus echinatus** Wall. in Roxb. Fl. Ind. 2: 410. 1824; Fl. Brit. Ind. 1: 611. 1875; Fl. As. 1: 265. 1936.

Undershrubs, climbing on trees or trailing on rocks; leaves elliptic to ovate-lanceolate, cuneate to broadly acute at base, acute to acuminate, serrate, 2-5 × 1-3 cm; lateral nerves 6-8 pairs; petioles 2-4 cm; cymes axillary; peduncles 15-25 mm; pedicels 3-5 mm; flowers greenish-white, 4-5 mm across; capsules globose, covered with dark conical tubercles; seeds subglobose, with red aril.

Primary forests in partially sunny places, 1000-1400 m; fl. & fr.: May-Jan.; Sutnga, U. N. *Kanjilal* 6473.

2. **Euonymus attenuatus** Laws. in Fl. Brit. Ind. 1: 610. 1875; Fl. As. 1: 262. 1936.

Shrubs or small trees, 3-5 m; leaves oblong-lanceolate to elliptic, cuneate to acute at base, bluntly acuminate, 6-15 × 2-4 cm; lateral nerves 6-8 pairs; petioles 5-12 mm; cymes axillary or supra-axillary, peduncles 15-50 mm; bracts lanceolate, 1-2 mm; pedicels 3-12 mm; flowers blood-red,

5-8 mm across; capsules obovoid, 8-12 mm, red; seeds one in each cell, black, yellow arillate.

Primary forests in shaded places, 100-1200 m; fl. & fr.: Apr.-Nov.; Dawki, Pdengsakah, Jarain-Syndai.

3. **Euonymus theifolius** Laws. in Fl. Brit. Ind. 1: 612. 1875; Fl. As. 1: 264. 1936.

Subscandent shrubs, 2-3 m; leaves ovate to elliptic-lanceolate, acute or cuneate at base, acuminate to acute, recurved at margins, 4-12 × 1-5 cm; lateral nerves 7-10 pairs; petioles 4-8 mm; cymes axillary or supra-axillary; flowers greenish-white, 4-8 mm; capsules 8-12 mm, red; seeds 2 in each cell, plano-convex, 6-7 mm, with yellowish-orange aril.

Primary forests and forest-edges, 1000-1600 m; fl. & fr.: Apr.-Jan.; Jarain, Jowai, Jowai-Jarain, Sutnga.

4. **Euonymus lawsonii** Clarke & Prain in J. As. Soc. Beng. 73: 195. 1904; Fl. As. 1: 263. 1936.

Erect shrubs or small trees, 3-6 m; leaves ovate to lanceolate, acuminate, serrulate at margins, 6-20 × 5-8 cm; lateral nerves 5-8 pairs; petioles 7-12 mm; cymes axillary, 7-12 cm; pedicels 6-8 mm; flowers red, ± 5 mm across; capsules 4-celled, 10-15 mm, greenish-yellow; seeds ovoid, dark brown.

Primary forests and forest-edges, Feb.-Dec.; Jarain, *U. N. Kanjilal* 2730.

#### 7. GLYPTOPETALUM Thw.

**Glyptopetalum quadrangulare** Kurz in J. As. Soc. Beng. 65(2): 345. 1896.

Shrubs or small trees, up to 5 m; leaves elliptic to lanceolate, cuneate to acute at base, short-acuminate, irregularly crenate at margins, 8-18 × 2-8 cm; lateral nerves 7-10 pairs; petioles 5-12 mm; cymes axillary or supra-axillary, up to 8 cm; peduncles 2-5 cm; pedicels 2-3 mm; flowers greenish-yellow, ± 5 mm across; capsules depressed-globose, 3-4-celled, 8-10 mm; seed 1 per cell, subglobose, ± 6 mm, reddish-brown.

Primary forests, 1000-1400 m; fl. & fr.: June-Dec.; Nartiang, *Sharma* 16099.

### 44. RHAMNACEAE

1a. Branchlets with tendrils; disk with linear processes; ovary inferior; fruits 3-winged. ...

*Gouania* 1

1b. Branchlets without tendrils; disk without processes; ovary superior; fruits not winged.

- 2a. Leaves pinnately nerved.  
 3a. Erect trees or shrubs ; disk thin, lining the calyx-tube. ... *Rhamnus* 2  
 3b. Scandent or subscentent shrubs ; disk thick, filling the calyx-tube. ... *Berchemia* 3  
 2b. Leaves palmately 3-5-nerved at base.  
 4a. Branchlets armed with stipular spines ; fruit with 1 pyrene. ... *Ziziphus* 4  
 4b. Branchlets without stipular spines ; fruits with 3 pyrenes. ... *Hovenia* 5

1. *GOUANIA* Jacq.

***Gouania filiaefolia*** Lamk. *Encycl. Meth.* 3: 5. 1789; Merr. in *Contr. Arn. Arb.* 8: 96. 1934. *G. leptostachya* DC. *Prodr.* 2: 40. 1825; *Fl. Brit. Ind.* 1: 643. 1875; *Fl. As.* 1: 286. 1936.

Scandent shrubs with circinate tendrils at ends of twigs; leaves ovate to oblong-ovate, rounded to subcordate at base, acute to acuminate, serrate at margins, 4-10 × 2-6 cm; lateral nerves 5-6 pairs; petioles 8-25 mm; racemes simple or branched, 15-30 cm, axillary or terminal; bracts linear-lanceolate, 2-3 mm; flowers greenish-white, 2-3 mm; capsules 3-celled, 7-8 mm, splitting into 3, 1-seeded indehiscent cocci.

Primary forests in dense shaded places, 100-1300 m; fl. & fr.: July-Dec.; Dawki, Sohka-Nongthala.

2. *RHAMNUS* L.

***Rhamnus nepalensis*** (Wall.) Laws. in *Fl. Brit. Ind.* 1: 640. 1875; *Fl. As.* 1: 285. 1936. *Ceanothus nepalensis* Wall. in Roxb. *Fl. Ind.* 2: 369. 1824.

Large bushy or subscentent shrubs 3-8 m; branching from base; leaves elliptic or ovate, rounded or acute at base, short acuminate, serrulate, 5-12 × 3-6 cm; lateral nerves 5-7 pairs; petioles 8-18 mm; racemes simple or branched, 10-15 cm; flowers pale white or greenish white, ± 2 mm across; drupes ovoid or obovoid, 5-6 mm, dark red, turning to black, seated on reflexed calyx-tube.

Primary forests, 1200-1600 m; fl. & fr.: Sept.-Apr.; Jowai, *Balakrishnan* 47301.

3. *BERCHEMIA* A. P. DC. *nom. cons.*

***Berchemia floribunda*** (Roxb.) Brongn. in *Ann. Sci. Nat. sér.* 1: 10: t. 13. 1. 1827; *Fl. Brit. Ind.* 1: 637. 1875; *Fl. As.* 1: 282. 1936. *Zizyphus floribunda* Roxb. *Fl. Ind.* 2: 368. 1824.

Scandent shrubs; leaves ovate or oblong-ovate, rounded to cordate at base, finely acuminate, 5-10 × 2-5 cm; lateral nerves 10-12 pairs; petioles 15-25 mm; stipules triangular-subulate, 2-fid at apex, 2-3 mm; flowers

greenish-white, 2-3 mm, in terminal, 12-20 cm long panicles; pedicels  $\pm$  2 mm; bracteoles ovate; drupes oblong-ovoid, cylindrical, 10-12 mm; pyrenes 2-celled; seeds 2.

Primary forests, 1000-1400 m; fl. & fr.: June-Sept.; Jarain.

#### 4. ZIZIPHUS Mill.

**Ziziphus mauritiana** Lamk. Encycl. Meth. Bot. 3: 319. 1789. *Z. jujuba* Lamk. Encycl. Meth. Bot. 3: 318. 1789 (*non* Miller, 1768); Fl. Brit. Ind. 1: 632. 1875; Fl. As. 1: 279. 1936.

Small trees, up to 10 m; leaves elliptic-oblong or suborbicular, obliquely rounded at base, acute to subacute, serrulate, 2.8 x 1.5 cm, 3-nerved at base; lateral nerves 3-6 pairs; petioles 3-12 mm; stipules modified into spines, straight or curved; cymes subsessile, axillary, 15-20 mm across; flowers yellowish-green; drupes globose, or obovoid, 15-20 mm, orange-red; pyrenes solitary, 2-celled; seeds 2.

Secondary forests, 100-1000 m; fl. & fr.: Aug.-Feb.; Umjaisaw.

*Ziziphus* is the correct orthography of this name.

#### 5. HOVENIA Thunb.

**Hovenia acerba** Lindl. in Bot. Reg. 6: t. 501. 1820. *H. dulcis* (*non* Thunb. 1781) Roxb. Fl. Ind. 2: 414. 1824; Fl. Brit. Ind. 1: 640. 1875; Fl. As. 1: 282. 1936. '*Dieng-mylliat*'.

Trees, 15-30 m; leaves elliptic to suborbicular-ovate, rounded or acute at base, long-acuminate, serrate, 10-18 x 6-12 cm, 3-nerved at base; lateral nerves 2-5 pairs; petioles 15-35 mm; stipules lanceolate,  $\pm$  3 mm; cymes axillary and terminal, dichotomously branched, 3-8 cm; flowers white,  $\pm$  6 mm across; drupes 3-celled, 7-8 mm; seeds 3, orbicular, plano-convex, 3-4 mm, black, shiny.

Primary forests 500-1500 m; fl. & fr.: Jan.-Dec.; Mynso. Often cultivated near villages.

Fruits and fleshy peduncles are edible and sweet.

### 45. VITACEAE

1a. Petals 5, connate into a deciduous cap at top.	...	<i>Vitis</i> 1
1b. Petals 4-5, free.	...	
2a. Inflorescences cirriferous.	...	<i>Ampelocissus</i> 2
2b. Inflorescences not cirriferous.	...	
3a. Leaves simple or lobate.	...	<i>Cissus</i> 3
3b. Leaves pedately or digitately compound.	...	
4a. Flowers unisexual; stigma broad and lobed.	...	<i>Tetrastigma</i> 4
4b. Flowers bisexual; stigma not broad, nor lobed.	...	<i>Cayratia</i> 5

L. VITIS L.

**Vitis heyneana** Roem. & Schult. Syst. 5: 318. 1820. *V. lanata* Roxb. Fl. Ind. 2: 474. 1824; Fl. Brit. Ind. 1: 651. 1875; Fl. As. 1: 293. 1936.

Large climbers; tendrils leaf-opposed, forked, tomentose; leaves ovate-orbicular to triangular-ovate, cordate at base, acute to acuminate, serrate, angled or lobed at margins; 5-12 × 4-10 cm; basal nerves 5; lateral nerves 4-7 pairs; petioles 2-9 cm, woolly; cymes in leaf-opposed corymbose panicles; peduncles 2-5 cm, bearing simple or forked tendrils; flowers yellow, ± 4 mm across; berries globose, 5-7 mm, purplish-black; seeds obconic, flat, ± 3 mm.

Primary forests, 1000-1500 m; fl. & fr.: May-Oct.; Jaintia Hills, G. Mann 838.

Roots and fruits are edible and eaten by local people.

2. AMPPELOCISSUS Planch. *nom. cons.*

**Ampelocissus latifolius** (Roxb.) Planch. in J. Vigne Am. 8: 374. 1884. *Vitis latifolia* Roxb. Fl. Ind. 2: 474. 1824; Fl. Brit. Ind. 1: 652. 1875; Fl. As. 1: 293. 1936. 'Shyrmow-sohdoh'.

Extensive climbers with tuberous rootstocks; young shoots glaucous, purplish; leaves ovate, cordate or subtruncate at base, acute to short-acuminate, 8-7-angled or lobed, serrate at margins, 10-25 × 8-20 cm; basal nerves 7-9; petioles 10-20 cm; cymes in leaf-opposed panicles; flowers red-brown, ± 4 mm across; berries ellipsoid, 6-7 mm, black; seeds 2, oblong, compressed.

Primary forests, 100-1000 m; fl. & fr.: May-Sept.; Syndai-Muktapur.

3. CISSUS L.

- |   |     |                      |
|---|-----|----------------------|
| 1a. Leaves more or less hairy; ovary and style hairy.             | ... | <i>C. adnata</i> 1   |
| 1b. Leaves glabrous or nearly so; ovary and style glabrous.       |     |                      |
| 2a. Young shoots glaucous or nearly white; calyx equal-sided.     | ... | <i>C. repens</i> 2   |
| 2b. Young shoots not glaucous; calyx unequal-sided.               |     |                      |
| 3a. Slender climbers; tendrils forked; leaves usually variegated. |     | <i>C. discolor</i> 3 |
| 3b. Large woody climbers; tendrils simple; leaves not variegated. | ... | <i>C. assamica</i> 4 |

1. **Cissus adnata** Roxb. Fl. Ind. 1: 423. 1820. *Vitis adnata* (Roxb.) W. & A. Prodr. 126. 1834; Fl. Brit. Ind. 1: 649. 1875; Fl. As. 1: 291. 1936.

Slender climbing shrubs; innovations downy, brown hairy; tendrils leaf-opposed, 2-fid; leaves ovate to orbicular, cordate at base, acute to short-



acuminate, bristly-serrate at margins, 5-15 × 4-13 cm; basal nerves 3-5; lateral nerves 4-6 pairs; petioles 3-13 cm; cymes drooping, brown hairy; peduncles 2-5 cm; flowers greenish-yellow, 3-4 mm across; berries obovoid, 6-7 mm, blue-black, seed 1, obovoid.

Primary forests, 100-1000 m; fl. & fr.: July-Sept.; Dawki, Garampani.

2. **Cissus repens** Lamk. Encycl. Meth. Bot. 1: 31. 1783. *Vitis repens* (Lamk.) W. & A. Prodr. 124. 1834; Fl. Brit. Ind. 1: 646. 1875; Fl. As. 1: 293. 1936. 'Ja-jaw'.

Spreading climbers; stems quadrangular; tendrils forked; leaves ovate to triangular, cordate at base, acute, sharp bristly dentate at margins, 4-10 × 2-7 cm; basal nerves 5-7; lateral nerves 3-4 pairs; petioles 5-9 cm; umbels axillary, compound; peduncles 2-6 cm; pedicels 15-20 mm; flowers greenish-red, ± 4 mm; berries ellipsoid, ± 3 mm, red, turning black; seed 1, globose, pale brown.

Primary forests and forest edges, 100-1000 m; fl. & fr.: Aug.-Jan.; Jowai, Myntang valleys, Mynso.

Leaves and new shoots are cooked and eaten locally.

3. **Cissus discolor** Bl. Cat. Gew. Btzg. 99. 1823. *Vitis discolor* (Bl.) Dalz. in Hook. Kew J. Bot. 2: 39. 1850; Fl. Brit. Ind. 1: 647. 1875; Fl. As. 1: 290. 1936.

Slender climbers; branches subangular, red; leaves ovate to lanceolate, cordate to subtruncate at base, acute to acuminate, bristly crenate at margins, 5-12 × 2-7 cm, with white blotches above and purplish beneath; basal nerves 5-7; lateral nerves 3-5 pairs; petioles 8-25 mm; stipules oblong, 3-4 mm; umbels compound, leaf-opposed; peduncles 2-3 cm; pedicels 2-5 mm; flowers greenish-yellow, ± 4 mm; berries obovoid, 5-6 mm, red turning to black.

Primary and secondary forests and forest edges, 100-1000 m; fl. & fr.: June-Nov.; Raliang-Garampani.

4. **Cissus assamica** (Laws.) Craib in Kew Bull. 1911: 30. 1911. *Vitis assamica* Laws. in Fl. Brit. Ind. 1: 648. 1875; Fl. As. 1: 291. 1936. 'Shyrmoi'.

Woody climbers; leaves ovate-orbicular to lanceolate, cordate at base, blunt-acuminate, bristly serrate at margins, 8-15 × 5-8 cm; basal nerves 5; lateral nerves 5-6 pairs; petioles 25-40 mm; cymes in axillary compound umbels; peduncles 15-65 mm; pedicels 3-5 mm; flowers greenish-yellow, ± 4 mm across; berries obovoid-turbinate, subangular, 6-7 mm, dark blue turning black; seed 1, pyriform.

Primary and secondary forests, 100 - 1000 m; fl. & fr.: July-Nov.;  
Syndai.

#### 4. TETRASTIGMA (Miq.) Planch.

- |   |     |                           |   |
|---|-----|---------------------------|---|
| 1a. Leaves 3-foliolate.   | ... | <i>T. thomsonianum</i>    | 1 |
| 1b. Leaves 5-foliolate.   |     |                           |   |
| 2a. Leaves digitately 5-foliolate; leaflets fulvous-pubescent.  | ... | <i>T. obovatum</i>        | 2 |
| 2b. Leaves pedately 5-foliolate; leaflets glabrous.   |     |                           |   |
| 3a. Slender climbers; leaflets thin; cymes umbellate; corolla glabrous.   | ... | <i>T. serrulatum</i>      | 3 |
| 3b. Large lianas; leaflets coriaceous; cymes subcorymbose; corolla papillose.   |     |                           |   |
| 4a. Disk of female flowers flat; fruits smooth, usually 2-seeded; seeds grooved.  | ... | <i>T. leucostaphyllum</i> | 4 |
| 4b. Disk of female flowers cupular; fruits with a distinct ring and minute tubercles below the middle, usually 4-seeded; seeds tuberculate-wrinkled on ventral surface. | ... | <i>T. runicispermum</i>   | 5 |

1. **Tetragstigma thomsonianum** Planch. in DC. Monogr. Phan. 5: 438. 1887. *Cissus angustifolius* Roxb. Fl. Ind. 1: 408. 1820 (non *T. angustifolium* Planch. 1887). *Vitis angustifolia* (Roxb.) Wt. Ic. Pl. Ind. Or. 1: 9. t. 176. 1839; Fl. Brit. Ind. 1: 654. 1875; Fl. As. 1: 297. 1936.

Slender climbers; tendrils simple, slender; petioles 15 - 55 m; stipules ovate, 3 - 5 mm; leaflets elliptic-lanceolate, obliquely rounded to acute at base, acute to acuminate, 7 - 15 × 2 - 4 cm; lateral nerves 5 - 7 pairs; cymes dense, axillary; peduncles 1 - 3 cm, pubescent; flowers yellowish-green, ± 4 mm across; berries globose, ± 5 mm, black; seeds 2 - 4, furrowed on each face, rugose on sides.

Primary forests, 100 - 500 m; fl. & fr.: Jan-Dec.; Dawki.

2. **Tetragstigma obovatum** (Laws.) Gagnep. in Not. Syst. 1: 266. 1911. *Vitis obovata* Laws. in Fl. Brit. Ind. 1: 658. 1875; Fl. As. 1: 298. 1936.

Large lianas; stems flattened; tendrils simple; petioles 10 - 20 cm; leaflets obovate or elliptic, acute to cuneate at base, acute to short-acuminate distantly bristly serrate, 10 - 15 × 5 - 10 cm; lateral nerves 7 - 9 pairs; petiolules 5 - 12 mm; cymes in corymbs; flowers greenish-yellow, ± 4 mm across; berries ellipsoid, 15 - 20 mm, black; seeds ellipsoid, plano-convex, 10 - 12 mm, transversely furrowed.

Primary forests, 1000 - 1600 m; fl. & fr.: May-Oct.; Khongsong to Raliang, Raliang.

3. **Tetragstigma serrulatum** (Roxb.) Planch. in DC. Monogr. Phan. 5: 432. 1887. *Cissus serrulatus* Roxb. Fl. Ind. 1: 414. 1820. *Vitis capriolata* D. Don, Prodr. Fl. Nep. 188. 1825; Fl. Brit. Ind. 1: 659. 1875; Fl. As. 1: 299. 1936. (as *capriolata*).

Wiry glabrous climbers; tendrils simple or forked ending in adhesive disks; petioles 1-6 cm; leaflets rhomboid to obovate or lanceolate, obliquely acute to cuncate at base, cuspidate-acuminate, sharply serrate at margins, 2-13 × 1-5 cm; lateral nerves 5-10 pairs; petiolules 2-15 mm; cymes terminal or axillary; peduncles 15-35 mm; pedicels 5-8 mm; flowers green, 4-5 mm across; berries obovoid, 7-8 mm, red-brown; seeds 2-4, obovoid.

Primary and secondary forests, 1200-1600 m; fl. & fr.: Jan.-Dec.; Jarain, Jowai.

4. **Tetrastigma leucostaphylum** (Dennst.) Balakr. *comb. nov.* *Vitis leucostaphylum* Dennst. in Schluess. Hort. Malab. 33. 1818. *Cissus lanceolarium* Roxb. Fl. Ind. 1: 430. 1820. *V. lanceolaria* (Roxb.) W. & A. Prodr. 128. 1834; Fl. Brit. Ind. 1: 660. 1875; Fl. As. 1: 300. 1936. *T. lanceolarium* (Roxb.) Planch. in DC. Monogr. Phan. 5(2): 433. 1887.

Large climbers. Stems woody flat; tendrils simple, stout; petioles 5-15 cm; stipules oblong-lanceolate, ± 1 cm; leaflets ovate or lanceolate, obliquely acute at base, acute to acuminate, serrate-dentate at margins, 7-15 × 3-7 cm; lateral nerves 8-10 pairs; cymes axillary, subcorymbose, 2.5-3.5 cm broad; flowers pale green, ± 3 mm across; berries ovoid, 15-20 mm, brown-red; seeds 1-2, subpyriform, 6-8 mm, wrinkled.

Primary forests, 1000-1500 m; fl. & fr.: Mar.-July; Jowai, Balakrishnan 47314.

5. **Tetrastigma rumicispermum** (Laws.) Planch. in DC. Monogr. Phan. 5: 432. 1847. *Vitis rumicisperma* Laws. in Fl. Brit. Ind. 1: 661. 1875; Fl. As. 1: 301. 1936.

Lianas; stems terete; tendrils bifid; petioles 3-10 cm; leaflets 5-6, ovate-oblong to oblanceolate, obliquely acute to cuncate at base, short-acuminate, sharply serrate at margins, 5-15 × 2-6 cm; lateral nerves 10-12 pairs; petiolules 2-10 mm; cymes axillary and terminal, subcorymbose, 8-12 cm; peduncles up to 5 cm; pedicels 2-3 mm; flowers pale green, ± 4 mm across; berries globose, turbinate at apex, 8-9 mm, reddish-black; seeds 1-4.

Primary forests, 1000-1600 m; fl. & fr.: Apr.-Sept.; Jarain, Jowai, Pangla Woods, Raliang.

#### 5. CAYRATIA Jussieu *nom. cons.*

- |   |     |                       |
|---|-----|-----------------------|
| 1a. Leaves 3-4-foliolate.   | ... | <i>C. thomsonii</i> 1 |
| 1b. Leaves 5-12-foliolate.  |     |                       |
| 2a. Leaves 7-12-foliolate; leaflets 10-15 × 3-5 cm, distantly and shortly serrulate-crenulate; peduncles articulate; main branches 2. | ... | <i>C. pedata</i> 2    |
| 2b. Leaves 5-foliolate; leaflets 2-7 × 1-4 cm, sharply serrate-dentate; peduncles not articulate; main branches 3.                    | ... | <i>C. japonica</i> 3  |

1. **Cayratia thomsonii** (Laws.) Reid & Chandl. London Clay Fl. 388. 1933. *Vitis thomsonii* Laws. in Fl. Brit. Ind. 1: 657. 1875.

Large spreading climbers; innovations subfleshy; leaflets elliptic-lanceolate or ovate, acute or rounded at base, acute, sharply serrate at margins, 2-6 × 1-3 cm; lateral nerves 5-6 pairs; petioles 1-5 cm; petiolules 2-5 mm; cymes in dichotomous corymbs; flowers green; drupes subglobose, 5-10 mm; rusty-pubescent; seeds obovoid, rounded at one side, wedge-shaped at the other end.

Primary forests, 100-1000 m; fl. & fr.: July-Jan.; Dawki.

2. **Cayratia pedata** (Lour.) Gagnep. in Not. Syst. 1: 346. 1911. *Columella pedata* Lour. Fl. Cochinch. 86. 1790. *Vitis pedata* Wall. ex W. & A. Prodr. 128. 1834; Fl. Brit. Ind. 1: 661. 1875; Fl. As. 1: 202. 1930.

Lianas, with hirsute stems; tendrils slender, forked at apex; petioles 5-15 cm, fleshy; leaflets elliptic to oblong-lanceolate, rounded to subcordate at base, short-acuminate; lateral nerves 5-6 pairs; petiolules 2-3 cm; cymes axillary, corymbose; pedicels 2-3 mm; flowers pale green, 3-4 mm across; berries depressed-globose, 7-9 mm, white; seeds 3-4, plano-convex.

Primary forests and forest-edges, 100-1200 m; fl. & fr.: Apr.-Oct.; Dawki, Sutnga.

3. **Cayratia japonica** (Thunb.) Gagnep. in Not. Syst. 1: 349. 1911. *Vitis japonica* Thunb. Fl. Jap. 104. 1784. *V. tenuifolia* W. & A. Prodr. 129. 1834; Fl. Brit. Ind. 1: 660. 1875; Fl. As. 1: 300. 1936.

Slender climbers; tendrils simple or forked; petioles 3-9 cm; leaflets ovate-lanceolate to obovate, acute or cuneate at base, acute to rounded; lateral nerves 10-14 pairs; lateral petiolules 4-8 mm; terminal petiolules 1-2 cm; cymes axillary, corymbose; peduncles 2.5-5.0 cm; flowers green, 2-3 mm across; berries turbinate-globose, ± 5 mm, white, turning to bluish-black; seeds 1-4, muricate.

Primary forests, 600-1600 m; fl. & fr.: Apr.-July; Dawki-Jarain Road, Jarain-Jowai, Raliang, Umkhlaw.

#### 46. LEEACEAE

##### LEEAE L. *nóm. cons.*

- 1a. Branches, petioles and peduncles with crisped wings; leaves simply pinnate.  
1b. Branches, petioles and peduncles not winged; leaves 1-3 pinnate,

...  
*L. crispa* 1

- 2a. Stipules small, not auricled at base ; nerves hairy at lower surface ; lateral nerves 15-18 pairs ; connective of anthers blunt at apex. ... *L. edgeworthii* 2
- 2b. Stipules large, auricled at base ; nerves glabrous at lower surface ; lateral nerves 8-12 pairs ; connective of anthers apiculate. ... *L. indica* 3

1. **Leea crispa** L. Mant. Pl. 124. 1767; Fl. Brit. Ind. 1: 665. 1875; Fl. As. 1: 305. 1936.

Shrubs, 1-2 m; leaves 15-25 cm; rachis stout, 3-10 cm; petioles 1-2 cm; leaflets 3-5, elliptic to oblong-ovate, rounded at base, acute to short-acuminate, sharply serrate at margins, 6-15 × 2-8 cm; lateral nerves 16-20 pairs; petiolules 5-13 mm; corymbs axillary, solitary or paired, 5-8 × 3-5 cm; pedicels 1-2 mm; flowers pale yellow, ± 5 mm across; berries subglobose, 7-8 mm, grey, turning black; seeds 5-6.

Primary forests and scrubs, 100-1200 m; fl. & fr.: June-Oct.; Garampani-Raliang.

2. **Leea edgeworthii** Santapau in Rec. Bot. Surv. Ind. 16(1): 54. 1953. *L. aspera* Edgew. in Trans. Linn. Soc. 20: 36. 1841 (*non* Wall. 1824); Fl. Brit. Ind. 1: 665. 1875; Fl. As. 1: 306. 1936.

Shrubs, up to 5 m; leaves 50-100 × 40-80 cm; petioles 4-10 cm; leaflets elliptic-oblong to ovate-lanceolate, subcordate to acute at base, acute to long-acuminate, cuspidate-serrate at margins, 7-18 × 4-10 cm; petiolules 5-12 mm; cymes axillary, in 3-chotomous corymbs, 5-10 cm; flowers pale green, ± 5 mm across; berries depressed-globose, 6-7 mm, greyish-green, turning to black; seeds 5.

Primary and secondary forests, 100-1000 m; fl. & fr.: Apr.-Oct.; Dawki, Umkhlaw.

3. **Leea indica** (Burm. f.) Merr. in Phil. J. Sci., Bot. 14: 245. 1919. *Staphylea indica* Burm. f. Fl. Ind. 75. t. 24. f. 2. 1788. *Leea sambucina* (L.) Willd. Sp. Pl. 1: 1177. 1797; Fl. Brit. Ind. 1: 666. 1875; Fl. As. 1: 307. 1936. *Aquilicia sambucina* L. Mant. 2: 211. 1771.

Shrubs, up to 5 m; main stems up to 10 cm thick at base; leaves up to 1.3 × 1.0 m; leaflets oblong, ovate-lanceolate, rounded to acute at base, acute to long-acuminate, sharply serrate at margins, 7-20 × 2-9 cm; petiolules of lateral leaflets 5-10 mm; of terminal leaflets 3-5 cm; cymes 10-15 × 10-30 cm, in subterminal corymbs; peduncles ± 5 cm; flowers pale green, 6-7 mm across; berries subglobose, 5-7 mm, red to black; seeds 3-6.

Primary and secondary forests, 500-1200 m; fl. & fr.: May-Dec.; Jarain-Dawki, Umjaisaw-Seitsohma.

## 47. SAPINDACEAE

1a. Leaves palmately compound ; petals with scales above.	...	<i>Allophylus</i> 1
1b. Leaves pinnately compound ; petals without scales.		
2a. Sepals valvate ; petals absent.	...	<i>Litchi</i> 2
2b. Sepals imbricate ; petals present.		
3a. Leaflets 2-4.	...	<i>Xerospermum</i> 3
3b. Leaflets 8-20.		
4a. Petaline scale with a crest ; ovary densely hairy ; cocci oblong, juicy, 10-15 mm long.	...	<i>Lepisanthes</i> 4
4b. Petaline scale without a crest ; ovary glabrous ; cocci globose, days, 20-25 mm long.	...	<i>Sapindus</i> 5

## 1. ALLOPHYLUS L.

1a. Racemes equal to or longer than petioles.	...	<i>A. aporeticus</i> 1
1b. Racemes shorter than petioles.		
2a. Glabrous plants ; leaflets entire or obscurely serrulate.	...	<i>A. distachys</i> 2
2b. Rusty villous plants ; leaflets sharply serrate.	...	<i>A. villosus</i> 3

1. ***Allophylus aporeticus*** (Roxb.) Kurz in J. As. Soc. Beng., 44(2): 185. 1875. *Ornitrophe aporetica* Roxb. Fl. Ind. 2: 264. 1832. *A. cobbe* forma *aporeticus* (Roxb.) Hiern. in Fl. Brit. Ind. 1: 674. 1875; Fl. As. 1: 315. 1936.

Shrubs 1-2 m; petioles 2.5-8.0 cm; leaflets 3, oblong-ovate to oblanceolate, acute or cuneate at base, acute or acuminate, sharply serrulate-dentate and ciliate at margins, 9-23 × 4-9 cm; lateral nerves 10-15 pairs; racemes axillary, solitary, 3-10 cm, simple; flowers pale yellow, ± 2 mm across; capsules with globose cocci, glabrous, orange-red; cocci ± 7 mm diam.

Primary forests, 100-500 m; fl. & fr.: Jan.-Dec.; Dawki, Near Syndai.

2. ***Allophylus distachys*** (DC.) Radlk. in Engler & Prantl, Pflanzenf. 3, 5: 315. 1895. *Schmidelia distachya* DC. Prodr. 1: 610. 1824. *A. cobbe* forma *distachys* (DC.) Hiern. in Fl. Brit. Ind. 1: 674. 1875; Fl. As. 1: 315. 1936.

Trees or large shrubs, 3-6 m; petioles 5-15 mm; leaflets 3, ovate-lanceolate to oblanceolate, subequally cuneate at base, acute to acuminate, 7-24 × 3-9 cm; lateral nerves 10-14 pairs; petiolules 3-10 mm; racemes solitary or rarely paired, 2-8 cm, simple; flowers dull white, ± 2 mm across; capsules with globose cocci, glabrous, orange-red; cocci ± 6 mm diam.

Primary forests, 100-600 m; fl. & fr.: Jan.-Dec.; Sohka, Syndai-Muktapur.

3. **Allophylus villosus** (Roxb.) Bl. Rumph. 3: 132. 1847. *Ornitrophe villosa* Roxb. Fl. Ind. 2: 265. 1832. *Allophylus cobbe* forma *villosus* (Roxb.) Hiern. in Fl. Brit. Ind. 1: 674. 1875.

Shrubs, 2-3 m; petioles 4-15 cm, densely brown-villous; leaflets 3-5, lanceolate or oblanceolate, acute to cuneate at base, acute to short-acuminate, 10-22 × 4-9 cm; lateral nerves 10-15 pairs; racemes axillary, solitary, simple, 4-9 cm; peduncles densely brown-villous; flowers pale green or yellow, ± 2 mm across; capsules glabrous, orange-red; cocci subglobose, 7-8 mm, pilose.

Primary forests and forest-edges, 100-600 m; fl. & fr.: Jan.-Dec.; Sohka-Dawki.

## 2. LITCHI Sonner.

**Litchi chinensis** Sonner. Voy. Ind. Or. Chine 2: 230, t. 129. 1782. *Dimocarpus litchi* Lour. Fl. Cochinch. 233. 1790. *Nephelium litchi* (Lour.) Camb. in Mem. Mus. Nat. Hist. Paris 18: 30. 1829; Fl. Brit. Ind. 1: 687. 1875; Fl. As. 1: 323. 1936.

Trees, 15-20 m; leaves paripinnately 4-8-foliolate, 8-22 cm; rachis 4-16 cm; leaflets oblong to ovate-lanceolate, cuneate to acute at base, acuminate, 4-15 × 2-5 cm; lateral nerves 10-15 pairs; petiolules 3-10 mm; racemes paniculate, terminal and axillary, 10-16 cm; pedicels ± 3 mm; flowers pale green, 2-3 mm across; capsules 1-2-lobed, ellipsoid, indehiscent, ± 2.5 cm; seeds oblong-ovoid, brownish-black, enclosed in a fleshy aril.

Cultivated near villages, often in secondary forests, 100-500 m; fl. & fr.: Feb.-Aug.; Dawki.

Aril edible, sweet and delicious.

## 3. XEROSPERMUM Bl.

**Xerospermum glabratum** (Kurz) Radlk. Sap. Holl. Ind. 23. (93). 1877. *Cupania glabrata* Kurz in J. As. Soc. Beng. 44(2): 186. 1875 (*non* Hiern. in Hook. f. 1875). *X. noronhianum* (*non* Bl. 1847) Hiern. in Fl. Brit. Ind. 1: 686. 1875; Fl. As. 1: 322. 1936.

Trees, 10-20 m; leaves paripinnate; rachis 4-10 cm; petioles 2.0-4.5 cm; leaflets generally 4, rarely 2, elliptic-lanceolate, cuneate at base, acute to bluntly acuminate, 8-23 × 2-6 cm; lateral nerves 10-14 pairs; petio-

lules 3-6 mm; racemes simple or branched, axillary, fasciculate, up to 10 cm; pedicels 2-3 mm; flowers pale yellow, 2-3 mm across; fruits ellipsoid, muricate by pyramidal scales,  $\pm 3 \times 2$  cm, dark brown; seeds slightly pilose.

Primary forests and forest edges, 100-500 m; fl. & fr.: Mar.-Sept.; Dawki.

#### 4. LEPISANTHES BL.

**Lepisanthes rubiginosa** (Roxb.) Leenh. in Blumea 17: 82. 1969. *Sapindus rubiginosus* Roxb. Pl. Corom. 1: 44. 1795. *Erioglossum edule* Bl. Bijdr. 229. 1925; Fl. Brit. Ind. 1: 672. 1875. *E. rubiginosum* (Roxb.) Bl. Rumphia 3: 118. 1849; Fl. As. 1: 316. 1936.

Trees, 5-15 m; leaves imparipinnately 5-15-foliolate, 20-35 cm; rachis 10-20 cm; leaflets ovate to oblong-lanceolate, obliquely subacute to rounded at base, acute to acuminate, 6-20  $\times$  2-6 cm; lateral nerves 10-12 pairs; petiolules 2-5 mm; panicles terminal or upper axillary, 10-35 cm; rusty-tomentose; pedicels 2-5 mm; bracts linear, woolly,  $\pm 2$  mm; fruits succulent with 1-3 cocci, cohering at base; cocci oblong, black, 10-15 mm.

Primary forests, 100-500 m; fl. & fr.: Mar.-Aug.; Dawki, G. K. Deha 16372.

#### 5. SAPINDUS L.

**Sapindus rarak** DC. Prodr. 1: 608. 1824. *Dittelasma rarak* (DC.) Hiern. in Fl. Brit. Ind. 1: 672. 1875; Fl. As. 1: 316. 1936.

Trees, 10-20 m; leaves paripinnately 10-14-foliolate; rachis angled; leaflets oblong-lanceolate, falcately lanceolate, obliquely acute at base, acuminate to cuspidate, 4-16  $\times$  1-4 cm; lateral nerves 20-25 pairs; petiolules 2-5 mm; panicles terminal, widely branched, 15-35 cm; pedicels 1-2 mm, yellowish-hairy; flowers pale white,  $\pm 5$  mm; fruits fleshy, 3-lobed; cocci globose, 20-25 mm, brown, wrinkled; seed globose.

Primary and secondary forests, 200-1000 m; fl. & fr.: June-Dec.; Mynso, U. N. Kanjilal 6552.

### 48. ACERACEAE

#### ACER L.

- |  |     |                        |
|--|-----|------------------------|
| 1a. Petioles less than 1 cm long; leaves green beneath; cymes glabrous.        | ... | <i>A. laevigatum</i> 1 |
| 1b. Petioles more than 1.5 cm long; leaves glaucous beneath; cymes puberulous. | ... | <i>A. oblongum</i> 2   |



1. **Acer laevigatum** Wall. Pl. As. Rar. 2: 3. t. 104. 1831; Fl. Brit. Ind. 1: 693. 1875; Fl. As. 1: 312. 1936.

Trees 8-12 m; leaves elliptic-oblong or ovate-lanceolate, acute caudate-acuminate, 4-14 × 2-5 cm; lateral nerves 6-10 pairs, with a tuft of grey hairs at axils beneath; petioles 5-10 mm; racemes sub-corymbose, terminal or axillary, up to 13 cm; flowers white, 3-4 mm across; fruits ± 3.5 cm; mericarps ovoid; wings spatulate, 20-25 × 10-12 mm, thick at lower margins, closely veined.

Primary forests and forest-edges, 1200-1600 m; fl. & fr.: Mar.-Aug.; Jowai, Pudiem Sirkep.

2. **Acer oblongum** Wall. in DC. Prodr. 1: 593. 1824; Fl. Brit. Ind. 1: 693. 1875; Fl. As. 1: 311. 1936.

Trees 10-15 m, often buttressed at base; leaves oblong or ovate-lanceolate, acuminate, 5-17 × 3-7 cm; lateral nerves 6-8 pairs, often 3-nerved at base; petioles 15-80 mm; panicles 7-12 cm, terminal or lateral; flowers white, 3-4 mm across; fruits ± 3.5 cm; mericarps ovoid, angular, white-hairy; wings oblanceolate ± 2.5 × 1.3 cm, divergent, closely veined.

Primary forests, 1000-1600 m; fl. & fr.: June-Feb.; Raliang, Raliang-Mynso.

#### 49. STAPHYLEACEAE

##### TURPINIA Vent. *nom. cons.*

- |   |     |                        |
|---|-----|------------------------|
| 1a. Leaflets 5-9; panicles large, mostly terminal; fruits more than 2.5 cm diam.    | ... | <i>T. pomifera</i> 1   |
| 1b. Leaflets 3-5; panicles small, generally axillary; fruits less than 1.5 cm diam. | ..  | <i>T. nepalensis</i> 2 |

1. **Turpinia pomifera** (Roxb.) DC. Prodr. 2: 3. 1825; Fl. Brit. Ind. 1: 698. 1875; *p. p.*; Fl. As. 1: 309. 1936. *Dalrympelia pomifera* Roxb. Pl. Corom. 3: 76. t. 279. 1819.

Trees, 10-20 m; leaves 12-25 cm; stipules triangular, 4-5 mm; leaflets 5-9, ovate to oblong-elliptic, acute to rounded at base, acuminate, 8-15 × 2-6 cm; lateral nerves 6-8 pairs; petiolules of lateral leaflets 3-10 mm; of terminal leaflet 2-4 cm; panicles 10-30 cm; flowers yellowish, ± 5 mm across; nuts globular, 3-grooved from top, ± 2.5 cm, fleshy; seeds brown, glossy.

Primary and secondary forests, 100-700 m; fl. & fr.: Feb.-Oct.; Dawki, Garampani.

2. **Turpinia nepalensis** W. & A. Prodr. 156. 1834; Fl. As. 1: 310. 1936.

Shrubs or small trees, 2-7 m; leaves 12-20 cm; stipules 3-4 mm; leaflets 3-5, elliptic-lanceolate acute to cuncate at base, caudate-acuminate, closely serrulate, 5-10 x 2-4 cm; lateral nerves 4-7 pairs; petiolules of lateral leaflets 4-8 mm; of terminal leaflets 2-3 cm; panicles 10-20 cm, axillary; flowers greenish-white, 2-3 mm across; nuts globose, slightly 3-lobed, 8-14 mm, succulent; seeds brown-grey.

Primary and secondary forests, 1000-1400 m; fl. & fr.: Apr.-Dec.; Jarain, Jowai-Jarain.

## 50. SABIACEAE

- |  |     |                   |
|--|-----|-------------------|
| 1a. Climbing shrubs; leaves simple; sepals and petals equal; stamens equal, all fertile. | ... | <i>Sabia</i> 1    |
| 1b. Trees; leaves compound; sepals and petals unequal; stamens unequal, only 2 fertile.  | ... | <i>Meliosma</i> 2 |

### 1. SABIA Colebr.

**Sabia lanceolata** Coleb. in Trans. Linn. Soc. 12: 355. t. 14: 1817; Fl. Brit. Ind. 2: 2. 1876; Fl. As. 1: 324. 1936.

Large climbers; leaves lanceolate or oblong, acute or rounded at base, caudate-acuminate, 7-18 x 2-5 cm; lateral nerves 8-12 pairs; petioles 5-10 mm; panicles corymbose, axillary or extra-axillary, 4-6 cm; flowers greenish-yellow, fragrant, 4-5 mm across; pedicels 2-3 mm; drupes seated on persistent calyx, with 2 drupelets, obovoid, 14-18 mm, blue; seed reniform.

Primary forests, 400-1200 m; fl. & fr.: Oct.-Mar.; Jowai-Jarain, Khongsnong-Raliang.

### 2. MELIOSMA Bl.

**Meliosma wallichii** Hook. f. Fl. Brit. Ind. 2: 6. 1876; Fl. As. 1: 328. 1936. '*Dieng-shniat*'.

Trees, 10-25 m; leaves imparipinnately 5-13-foliolate, 25-35 cm; leaflets oblong-ovate to obovate, obliquely rounded or subacute at base, acuminate, entire or distantly serrate, 8-18 x 2-5 cm; lateral nerves 8-12 pairs; petiolules 5-15 mm; panicles terminal, rusty-tomentose; flowers

white,  $\pm$  4 mm across; drupes  $\pm$  5 mm diam., globose; red; pyrenes 1-celled, 1-seeded.

Primary forests, 800-1500 m; fl. & fr.: June-Nov.; Khongsong, U. N. Kanjal 734P; Mynso, U. N. Kanjal 6560.

## 51. ANACARDIACEAE

1a. Leaves simple.	...	<i>Anacardium</i> 1
1b. Leaves imparipinnate.		
2a. Leaflets with intramarginal nerve; ovary 4-6-celled; styles 4-6; drupes fleshy, more than 3 cm diam.	...	<i>Spondias</i> 2
2b. Leaflets without intramarginal nerve; ovary 1-celled; styles 3; drupes dry, less than 1 cm diam.	...	<i>Rhus</i> 3

### I. ANACARDIUM L.

**Anacardium occidentale** L. Sp. Pl. 383. 1753; Fl. Brit. Ind. 2: 20. 1876.

Trees 4-12 m; leaves crowded at ends of branchlets, obovate to oblanceolate, acute to cuneate at base, rounded-emarginate, 4-20 x 2-10 cm; petioles 5-20 mm; panicles terminal or upper axillary, 10-25 cm; flowers white or pale pink,  $\pm$  2 cm across; pedicels 2-5 mm, pubescent; fruits reniform, 2-3 cm, indehiscent, attached to a fleshy obconical-swollen, 3-7 cm long yellow-orange receptacle.

Cultivated near villages, also seen run wild, 100-500 m; fl. & fr.: Mar.-Oct.; near Dawki.

### 2. SPONDIAS L.

**Spondias pinnata** (L. f.) Kurz, Pegu Rep. A. 44. 1875. *Mangifera pinnata* L. f. Suppl. 156. 1781. *Spondias mangifera* Willd. Sp. Pl. 2: 751. 1799; Fl. Brit. Ind. 2: 42. 1876; Fl. As. 1: 340. 1936. 'Amra'.

Trees, 10-25 m; leaves imparipinnate, 30-45 cm; leaflets 9-13, elliptic-oblong, subacute at base, abruptly caudate-acute, 10-25 x 5-12 cm; lateral nerves 10-30 pairs, parallel; petiolules  $\pm$  5 mm; panicles axillary or terminal, 12-34 cm; flowers pale green,  $\pm$  3 mm across, sweet-scented; drupes oblong-ovoid, 3-5 cm, greenish-yellow, pulp soft, acid, aromatic; pyrene woody, 1-5-celled; seeds 1-5.

Primary and secondary forests, 100-500 m; fl. & fr.: Mar.-Sept.; Dawki. Often cultivated.

Fruits eaten when ripe and also pickled or made into curries.

## 3. RHUS L.

- |   |     |                       |
|---|-----|-----------------------|
| 1a. Leaves glabrous, glossy.  | ... | <i>R. acuminata</i> 1 |
| 1b. Leaves pubescent or tomentose beneath.  |     |                       |
| 2a. Leaflets 6-9, entire; petiole and leaf rachis glabrous; drupes glabrous, shiny, dehiscent.              | ... | <i>R. hookeri</i> 2   |
| 2b. Leaflets 9-13, serrate-dentate; petiole and leaf-rachis pubescent; drupes rusty-pubescent, indehiscent. | ... | <i>R. javanica</i> 3  |

1. **Rhus acuminata** DC. Prodr. 2: 68. 1825. *R. succedanea* L. var. *acuminata* (DC.) Hook. f. Fl. Brit. Ind. 2: 12: 1876. *R. succedanea* (non L.) Kanjilal et al., Fl. As. 1: 332. 1936. 'Dieng-suit'.

Trees, 10-20 m; leaves crowded at ends of branchlets, 7-13-foliolate, 17-36 cm; leaflets oblong-lanceolate, subequally acute to rounded at base, short-acuminate, 5-15 × 2-5 cm; lateral nerves 20-30 pairs; petiolules 3-8 mm; panicles axillary, 10-20 cm; pedicels 1-2 mm; flowers pale green, ± 2 mm across; drupes ellipsoid, laterally compressed, 6-8 mm, rugose, yellow-brown.

Primary forests, 1300-1600 m; fl. & fr.: Mar.-Aug.; Jowai, Raliang.

2. **Rhus hookeri** Sahni & Bahd. in Indian For. 96: 769. 1970. *R. insignis* Hook. f. Fl. Brit. Ind. 2: 11. 1876; Fl. As. 1: 332. 1936 [non (Del.) Oliv. 1868].

Trees, 8-12 m; leaves 25-50 cm; leaflets ovate to oblong-lanceolate, rounded at base, caudate-acuminate, 7-20 × 4-10 cm; lateral nerves 20-30 pairs; petiolules 2-6 mm; panicles axillary, lax, 20-40 cm; flowers pale yellowish-green, ± 2 mm across; drupes globose, ± 5 mm; pericarp thin, dry; endocarp waxy, white, pyrene flattened, crustaceous.

Primary forests and forest-edges, 1200-1600 m; fl. & fr.: Apr.-Sept.; Jaintia Hills; Mann 847; Nartiang, Balakrishnan 47184.

3. **Rhus javanica** L. Sp. Pl. 1: 265. 1753. *R. semialata* Murray in Comm. Soc. Sci. Gotting. 6: 27. t. 3. 1784; Fl. Brit. Ind. 2: 10. 1876; Fl. As. 1: 331. 1936. 'Sama'.

Trees, 6-12 m; leaves, 25-35 cm; leaflets elliptic to ovate-lanceolate, obliquely rounded at base, acute to acuminate, deeply crenate-dentate at margins, 5-10 × 2-5 cm; lateral nerves 10-15 pairs; panicles terminal, conical, 15-20 cm; flowers white or pale greenish-white, 2-3 mm across; drupes subglobose, compressed, 4-5 mm; pericarp pink; pyrene compressed.

Secondary forests and places adjacent to human habitations, 800-1500 m; fl. & fr.: July-Nov.; Garampani-Jowai, Nartiang, Umjaisaw-Mynsyngnat.

## 52. CONNARACEAE

- |   |     |                   |
|---|-----|-------------------|
| 1a. Calyx persistent ; carpels 4-5 ; follicles sessile. | ... | <i>Rourea</i> 1   |
| 1b. Calyx deciduous ; carpels 1 ; follicle stipitate.   | ... | <i>Connarus</i> 2 |

1. *ROUREA* Aubl. *nom. cons.*

***Rourea minor*** (Gaertn.) Leenh. in Fl. Males. ser. I, 5: 514. 1958.  
*Aegiceras minor* Gaertn. Fruct. 1: 216. 1788. *R. caudata* Planch. in  
 Linnæa 23: 419. 1850; Fl. Brit. Ind. 2: 48. 1876; Fl. As. 2: 2. 1938.  
*R. commutata* Planch. Lc. 420; Fl. Brit. Ind. 2: 47. 1870; Fl. As. 2: 2. 1938.

Large lianas; leaves unifoliolate to imparipinnate; leaflets 5-13, sub-orbicular to ovate-lanceolate or obovate, 2-25 × 1-10 cm; lateral nerves 4-7 pairs; panicles in upper leaf-axils or pseudo-terminal; main peduncle up to 20 cm; flowers 8-10 mm across, white; fruits oblique-ellipsoid to ovoid, straight or curved, 2-3 × 1.0-1.5 cm; seed solitary, oblong, 1-2 cm, enveloped by bright red aril.

Primary forests and forest edges, 800-1500 m; fl. & fr.: Jan.-Dec.; Jarain, Mynso, Syndai.

2. *CONNARUS* L.

***Connarus paniculatus*** Roxb. Fl. Ind. 3: 139. 1832; Fl. Brit. Ind. 2: 52. 1876; Fl. As. 2: 2. 1938.

Large lianas; leaflets 3-7, oblong to elliptic-lanceolate, sub-peltate, 10-16 × 3-6 cm; lateral nerves 5-8 pairs; rachis 1-18 cm; cymes paniculate, 10-40 cm, ferruginous-obovoid, inflated, ± 3.5 × 1.7 cm, ± 1.2 cm thick, densely pubescent inside; stipe ± 4 mm; seeds compressed, 2.0-2.5 × 1.0-1.5 cm, black; aril a quarter of the seed length.

Primary forests, 100-1200 m; fl. & fr.: Mar.-Oct.; Dawki, Pdeng-sakab, Jarain-Syndai.

## 53. FABACEAE

- |  |     |                     |
|--|-----|---------------------|
| 1a. Filaments all free from base to apex or rarely connate at base only.                                     | ... | <i>Sophora</i> 1    |
| 1b. Filaments partly or almost wholly united into one another, either monadelphous or diadelphous.           |     |                     |
| 2a. Anthers dimorphic, alternately dorsifixed and basifixed, either all equal or alternately long and short. |     |                     |
| 3a. Style glabrous.  |     |                     |
| 4a. Vexillary filament free from others or nearly so.  | ... | <i>Mucuna</i> 2     |
| 4b. Vexillary filament connate to others.  | ... | <i>Teramnus</i> 3   |
| 3b. Style bearded.   |     |                     |
| 5a. Fruits usually turgid or inflated.   | ... | <i>Crotalaria</i> 4 |
| 5b. Fruits more or less compressed.  | ... | <i>Priotropis</i> 5 |

- 2b. Anthers uniform in size and shape or nearly so, not alternately basifixed and dorsifixed.
- 6a. Fruits jointed and transversely septate between seeds, usually breaking up into 1-seeded segments.
- 7a. Leaflets without stipels. ... *Smithia* 6
- 7b. Leaflets with stipels.
- 8a. Fruits enclosed by calyx. ... *Uraria* 7
- 8b. Fruits not enclosed by calyx. ... *Desmodium* 8
- 6b. Fruits not breaking up into separate joints when mature, sometimes filled between seeds or divided by longitudinal septum.
- 9a. Filaments monadelphous and partly connate into more or less closed tube, sometimes the adaxial filament free at base but connate higher up with the remainder.
- 10a. Racemes with swollen nodes at the insertion of pedicels. ... *Peuraria* 9
- 10b. Racemes without swollen nodes at the insertion of pedicels.
- 11a. Fruits dehiscent. ... *Millettia* 10
- 11b. Fruits indehiscent. ... *Derris* 11
- 9b. Filaments diadelphous, mostly the adaxial (vexillary) filament free or partly connate at base to the rest or if monadelphous, then all more or less connate into a sheath split adaxially and more rarely abaxially.
- 12a. Leaves digitately foliolate, sometimes unifoliolate by reduction.
- 13a. Leaves gland-dotted or pellucid-punctate below.
- 14a. Ovules 4 or more in each ovary. ... *Atylosia* 12
- 14b. Ovules 2, rarely 3 in each ovary.
- 15a. Fruits turgid. ... *Flemingia* 13
- 15b. Fruits compressed. ... *Eriosema* 14
- 13b. Leaves neither gland-dotted, nor pellucid-punctate.
- 16a. Indumentum composed of mainly medifixed (T-shaped) hairs; anther-connective tipped by gland or mucro. ... *Indigofera* 15
- 16b. Indumentum when present not composed of medifixed hairs; anthers neither tipped by gland, nor mucro.
- 17a. Upper calyx teeth completely united giving a 4-toothed calyx. ... *Shuteria* 16
- 17b. Upper calyx teeth free at least at apex, giving a 5-toothed calyx. ... *Glycine* 17
- 12b. Leaves pinnately trifoliolate or pinnate.
- 18a. Leaves gland-dotted or pellucid-punctate below; ovules 1-4. ... *Millettia* 10
- 18b. Leaves neither gland-dotted, nor pellucid-punctate; ovules more than 4, rarely 2 or 1.
- 19a. Fruits indehiscent.
- 20a. Leaflets alternate, rarely unifoliolate. ... *Dalbergia* 18
- 20b. Leaflets opposite or leaflets 3.
- 21a. Leaves imparipinnate. ... *Derris* 11
- 21b. Leaves 3-foliolate or unifoliolate. ... *Lespedeza* 19
- 19b. Fruits dehiscent by valves.
- 22a. Petals very unequal in length (to page 150).
- 23a. Slender climbers. ... *Dumasia* 20
- 23b. Erect trees or shrubs.
- 24a. Armed trees; vexillum the largest petal (to page 150). ... *Erythrina* 21

- 24b. Unarmed shrubs; keel petal the largest or longest of all. (from page 149). *Butea* 22
- 22b. Petals more or less equal in length (from page 149).
- 25a. Indumentum when present composed of at least in part adpressed medifixed (T-shaped) hairs; anther connective with a gland or mucro at apex. ... *Indigofera* 15
- 25b. Indumentum not as above; anther connective without gland or mucro at apex.
- 26a. Leaves 3-foliolate. ... *Vigna* 23
- 26b. Leaves many-foliolate.
- 27a. Rachis of leaves ending in tendril or bristle. ... *Abrus* 24
- 27b. Rachis of leaves ending in leaflet. ... *Tephrosia* 25

## 1. SOPHORA L.

***Sophora wightii*** Baker in Fl. Brit. Ind. 2: 250. 1878. *S. heptaphylla* (non L. 1758) Wt. Ic. Pl. Ind. Or. 2: t. 1155. 1846. *S. acuminata* Baker, Fl. Brit. Ind. 2: 250. 1878; Fl. As. 2: 117. 1938. (non Desv. 1814).

Shrubs or small trees, 2-6 m; innovations adpressed rusty-villous; leaves 12-25 cm; stipules lanceolate, 2-5 mm; leaflets 11-19 pairs, ovate to lanceolate, acute at base, acuminate, 2.5-8.5 × 1-3 cm; lateral nerves 10-12 pairs; racemes axillary or leaf-opposed, 10-35 cm; flowers white or yellow, ± 2 cm; pods moniliform, 8-10 cm; stalk 2-5 cm; acumen 1-2 cm; seeds ± 8 mm, scarlet.

Primary forests, 800-1300 m; fl. & fr.: July-Jan.; Sunga, U. N. Kanjilal 6472.

## 2. MUCUNA Adans. nom. cons.

***Mucuna macrocarpa*** Baker in Fl. Brit. Ind. 2: 186. 1876; Fl. As. 2: 67. 1938.

Lianas; leaves 3-foliolate; petioles 5-15 cm; leaflets elliptic-ovate, rounded at base, acute to abruptly acuminate, 7-16 × 5-10 cm; lateral nerves 5-6 pairs; racemes axillary, often on old trunks; rachis simple or branched, velvety; bracteoles ovate, 15-20 mm, velvety; flowers 5-7 cm, purple; pods constricted between seeds, 35-45 × 4-5 cm; stipe 2-5 cm; seeds ellipsoid, brown.

Primary forests, 100-1500 m; fl. & fr.: Mar.-Nov.; Jowai, Rytiang, near Garampani.

3. TERAMNUS SW.

**Teramnus labialis** (L. f.) Spreng. Syst. 3: 235. 1826; Fl. Brit. Ind. 2: 184. 1876. *Glycine labialis* L. f. Suppl. 325. 1781.

Slender climbers; leaves 3-foliolate; rachis up to 10 cm; leaflets rhomboid, ovate-lanceolate, acute at base, obtuse to acute, often 3-lobed, 2-10 × 2-5 cm; lateral nerves 5-6 pairs; petiolules 2-4 mm; stipels setaceous, 2-3 mm; racemes axillary, solitary or 2- to 3-nate; flowers geminate, 5-8 mm, reddish to bluish-purple; pods sessile, linear-compressed, brown-hairy, 2-6 × 0.3-0.5 cm, 5-12-seeded.

Primary forests and forests edges, 100-600 m; fl. & fr.: Apr.-Dec.; Dawki, Sonapur.

4. CROTALARIA L.

1a. Leaves digitately 3-foliolate.	...	<i>C. anagyroides</i> 1
1b. Leaves simple.		
2a. Stems winged by decurrent stipules.	...	<i>C. alata</i> 2
2b. Stems not winged.		
3a. Calyx glabrous or short hairy, split more than half way; corolla much larger than calyx.	...	<i>C. assamica</i> 3
3b. Calyx long hairy, split to base; corolla hardly exceeding the calyx.		
4a. Floral bracts 1-4 mm long; bracteoles up to 3 mm long; flowers and pods secund.		
5a. Stipules absent; corolla pale yellow; pod longer than calyx.	...	<i>C. albida</i> 4
5b. Stipules present; corolla deep violet; pod as long as and included in calyx.	...	<i>C. occulta</i> 5
4b. Floral bracts more than 5 mm long; bracteoles more than 5 mm long; flowers and pods not secund.		
6a. Racemes dense; pods 1.0-1.7 cm long.	...	<i>C. sessiliflora</i> 6
6b. Racemes lax; pods 2-4 cm long.		
7a. Bracteoles 5-8 mm long; hairs on calyx less than 1.5 mm long	...	<i>C. ferruginea</i> 7
7b. Bracteoles 10-16 mm long; hairs on calyx 3-4 mm long.	...	<i>C. mysorensis</i> 8

1. **Crotalaria anagyroides** HBK. Nov. Gen. Sp. 6: 404. 1823.

Shrubs, 2.0-3.5 m; petioles 4-10 cm; stipules linear-setaceous, 4-6 mm; leaflets oblong to lanceolate, cuneate to subacute at base, subacute and mucronate, 5-12 × 0.5-4.5 cm; petiolules 2-4 mm; racemes terminal, 10-50 cm; bracts linear, 8-13 mm; pedicels 7-10 mm; corolla yellow; standard petal 10-18 mm diam., yellow with brownish-red streaks; pods 2.5-4.5 cm, black.

Wastelands and hedges, 200-1000 m; fl. & fr.: June-Dec.; Garampani, Sohka.

Native of trop. America, introduced as green manure; now naturalised.



2. **Crotalaria alata** D. Don, Prodr. Fl. Nep. 241. 1825; Fl. Brit. Ind. 2: 69. 1876; Fl. As. 2: 13. 1938.

Undershrubs, up to 75 cm, pubescent; leaves obovate, ovate-oblong, obtuse at base, rounded or acute and mucronate, 2.9 × 1.3 cm, pellucid dotted beneath; lateral nerves 5-6 pairs; petioles 3-5 mm; stipules ending as stiff acutely triangular flaps below leaves; racemes 2-5-flowered, 2-15 cm; bracts lanceolate, 3-5 mm; corolla pale yellow; pods linear-oblong, 3-4 cm, black.

Secondary forests, grasslands and bushes, 500-1500 m; fl. & fr.: Aug.-Dec.; Garampani-Raliang, Jowai.

3. **Crotalaria assamica** Benth. in Hook. Lond. J. Bot. 2: 481. 1843; Fl. Brit. Ind. 2: 75. 1876; Fl. As. 2: 15. 1938.

Shrubs, 1-2 m; leaves oblong-oblancoate, cuneate at base, sub-acute and mucronate, 5.12 × 2-4 cm, rugose above, silky-pubescent beneath; lateral nerves 10-12 pairs; petioles 2-3 mm; racemes terminal, 20-30 cm, 20-30-flowered; bracts linear, 2-5 mm; corolla golden yellow, 2.0-2.5 cm; pods oblanceolate, 3-5 cm; many-seeded.

Forests, forest edges and shaded places in grasslands, 1000-1600 m; fl. & fr.: Aug.-Jan.; Nartiang, Shangpung.

4. **Crotalaria albida** Roth, Nov. Pl. Sp. 333. 1821; Fl. Brit. Ind. 2: 71. 1876.

Erect diffuse herbs up to 75 cm; leaves linear-oblong to oblanceolate, cuneate at base, obtuse to subacute, 1.4 × 0.2-1.2 cm, pellucid-punctate and hairy beneath; lateral nerves 5-6 pairs; petioles 2-3 mm; racemes terminal, 2-18 cm; rachis densely hairy, 6-20-flowered; bracts linear, 1-2 mm; standard suborbicular, 7-10 mm; pods oblong to cylindrical, ± 1 cm, 6-12-seeded.

Secondary forests and roadsides, 1200-1600 m; fl. & fr.: July-Dec.; Jowai.

5. **Crotalaria occulta** Benth. in Hook. Lond. J. Bot. 2: 565. 1843; Fl. Brit. Ind. 2: 72. 1876; Fl. As. 2: 14. 1938.

Erect undershrubs, 0.5-1.5 m; leaves elliptic-oblong or oblanceolate, cuneate at base, acute, 3-8 × 0.8-2.5 cm, pilose on midrib above, grey-silky beneath; racemes 7-18 cm, 6-25-flowered; bracts setaceous, 3-4 mm; pods oblong, sessile, 2.0-2.5 × 0.4-0.6 cm, 10-15-seeded.

Secondary forests, forest edges and grasslands, 200-1500 m; fl. & fr.: Aug.-Oct.; Garampani, Jowai, Garampani-Raliang.

6. **Crotalaria sessiliflora** L. Sp. Pl. ed. 2: 1004. 1763; Fl. Brit. Ind. 2: 73. 1876; Fl. As. 2: 12. 1938.

Herbs or undershrubs, 0.5-2.0 m; leaves linear-lanceolate, acute to narrowed at both ends, 5-13 × 0.5-1.0 cm; petioles ± 2.5 mm; stipules subulate, up to 4 mm; racemes solitary, 2-20 cm, densely 2-20-flowered; bracts 5-12 mm, persistent; corolla pale bluish-white; standard violet, orbicular, 7-12 mm; pods oblong, 5-25-seeded.

Forest edges and grasslands in shaded places, 200-1400 m; fl. & fr.: Aug.-Nov.; Garampani, Garampani-Raliang.

7. **Crotalaria ferruginea** Benth. in Hook. Lond. J. Bot. 2: 476, 570. 1843; Fl. Brit. Ind. 2: 68. 1876; Fl. As. 2: 12. 1938.

Erect or ascending herbs, 20-100 cm; leaves subsessile, oblong-obovate or linear-lanceolate, narrowly obtuse at base, acute to subacute, 1-6 × 0.5-2.5 cm, patently brown-hairy; stipules ovate-lanceolate, 5-10 mm; racemes 2-11 cm, laxly 1-5-flowered; bracts 6-10 mm; pedicels 5-8 mm; corolla yellow; standard petals 10-13 mm diam.; pods linear-oblong, 2-4 cm, 20-40-seeded.

Primary forests, in partially shaded places, 1200-1600 m; fl. & fr.: Aug.-Dec.; Jaintia Hills, *Mann s.n.*

8. **Crotalaria mysorensis** Roth, Nov. Sp. Pl. 338. 1821; Fl. Brit. Ind. 2: 70. 1876; Fl. As. 2: 12. 1938.

Erect diffuse herbs, 25-75 cm; leaves oblong or elliptic-ovate, narrowly obtuse to subacute at base, acute, 15-75 × 3-20 mm; stipules linear-lanceolate, 5-15 mm; racemes 6-25 cm, laxly 3-12-flowered; bracts ovate-lanceolate, 1-2 cm, often with 2 linear stipules; pedicels 7-10 mm; corolla yellow; standard ovate, 13-19 mm; pods oblong, 3.0-3.5 cm, 20-30-seeded.

Forests, 200-1500 m; fl. & fr.: July-Dec.; Jowai, Rytiang.

##### 5. PRIOTROPIS W. & A.

**Priotropis cytisoides** (Roxb.) W. & A. Prodr. 1: 180. 1834; Fl. Brit. Ind. 2: 65. 1876; Fl. As. 2: 9. 1938. *Crotalaria cytisoides* Roxb. Fl. Ind. 3: 276. 1832.

Bushy shrubs, 1-3 m; petioles 15-45 mm; leaflets 3, oblong to lanceolate, acute at both ends, 15-80 × 7-22 mm; lateral nerves 8-10 pairs; racemes terminal or leaf-opposed 7-12 cm, 10-50-flowered; corolla 7-8 mm, yellow, brownish-red; with purple veins after anthesis; standard ± 12 mm across; pods oblong, acute at both ends, 25-35 × 10-13 mm; seeds 2-8, brown.

Secondary forests and grasslands, 200 - 1000 m; fl. & fr.: May-Jan.; Garampani, Jowai, Raliang-Garampani.

6. SMITHIA Ait. *nom. cons.*

- |  |     |                     |
|--|-----|---------------------|
| 1a. Annual; stems puberulous or glabrescent; leaflets 6—9 mm long; racemes simple.         | ... | <i>S. ciliata</i> 1 |
| 1b. Perennial; stems densely patently long-hairy; leaflets 12—15 mm long; racemes paniced. | ... | <i>S. blanda</i> 2  |

1. **Smithia ciliata** Royle, *Illus. Bot. Himal.* 3: 201. t. 35. f. 2. 1835; *Fl. Brit. Ind.* 2: 150. 1876; *Fl. As.* 2: 36. 1938.

Prostrate-ascending herbs, up to 80 cm; leaves 1.0 - 2.5 cm; stipules 8 - 12 mm; leaflets 3 - 7 pairs, linear-lanceolate to oblanceolate, cuneate at base, rounded mucronate, 5 - 15 × 1 - 3 mm; racemes axillary, many-flowered, 1 - 3 cm; bracteoles 3 - 5 mm, hairy; corolla yellow to bluish-white; standard obovate to suborbicular, 7 - 8 mm across; pods 6 - 8-jointed, 10 - 15 mm.

Pine forests and secondary forests, 1200 - 1800 m; fl. & fr.: Aug.-Nov.; Jowai, *G. K. Deka s.n.*

2. **Smithia blanda** Wall. ex W. & A. *Prodr.* 221. 1834; *Fl. Brit. Ind.* 2: 151. 1876; *Fl. As.* 2: 37. 1938.

Herbs or undershrubs, 0.5 - 1.5 m; leaves 2 - 3 cm; stipules 10 - 15 cm; leaflets 6 - 10, oblong-oblanceolate, narrowly rounded at base, obtuse-mucronate, 1 - 2 × 0.5 - 0.8 cm; racemes paniculate, terminal or upper axillary, lax, 3 - 6 cm; bracts linear, 4 - 5 mm, ciliate at margins; corolla bright yellow; standard obovate, shortly clawed, 1.2 - 1.3 × 0.7 - 0.8 cm; wings 1.0 - 1.2 cm; pods twisted, 12 - 15 mm, 5 - 6-jointed.

Shaded places in forests, 1000 - 1700 m; fl. & fr.: Aug.-Jan.; Myntedu Valley, Jowai, *U. N. Kanjilal* 2703.

7. URARIA Desv.

- |   |     |                       |
|---|-----|-----------------------|
| 1a. Leaflets elliptic; racemes paniculate; calyx-lobes subequal.  | ... | <i>U. rufescens</i> 1 |
| 1b. Leaflets oblong; racemes simple; the lower 3 calyx lobes thrice as long as the upper 2.   |     |                       |
| 2a. Leaves 3—7-foliolate; leaflets subequal; racemes up to 35 cm long; bracts densely long-ciliate.                                     | ... | <i>U. crinita</i> 2   |
| 2b. Leaves normally 3-foliolate; leaflets unequal; terminal one much larger than lateral ones; racemes up to 20 cm; bracts short hairy. | ... | <i>U. arboreum</i> 3  |

1. **Uraria rufescens** (DC.) Schindl. in *Fedde Repert.* 21: 14. 1925. *Desmodium rufescens* DC. in *Ann. Sci. Nat. ser. 1.* 4: 101. 1825. *Doodia hamosa* Roxb. *Fl. Ind.* 3: 367. 1832. *U. hamosa* (Roxb.) W. & A. *Prodr.* 222. 1834; *Fl. Brit. Ind.* 2: 156. 1876; *Fl. As.* 2: 41. 1938.

Undershrubs, 1-2 m; stipules setaceous; leaflets 1-3, subcordate or obtuse at base, narrow-obtuse, 5-15 × 2-8 cm; lateral nerves 10-18 pairs; racemes paniculate, 15-25 cm, terminal or axillary; bracts densely silky pubescent; corolla pink or pale purple; standard obovate, 8-12 mm; pods of 4-8 puberulous joints, brown or black.

Grasslands and forest edges, 500-1200 m; fl. & fr.: Aug.-Dec.; Sohka, *Balakrishnan* 46764.

2. **Uraria crinita** (L.) Desv. J. de Bot. 1: 123. 1813; Fl. Brit. Ind. 2: 155. 1876; Fl. As. 2: 40. 1938. *Hedysarum crinitum* L. Mant. Pl. 1: 102. 1767.

Shrubs, 1-3 m; leaves 15-25 cm; stipules subulate, 10-15 mm; leaflets rounded or subacute at base, acute to subacute and mucronate, 8-16 × 1.5-5.0 cm; racemes terminal, simple, 10-35 cm, densely hairy; bracts ovate, long cuspidate, 1.3-1.8 × 0.5-0.6 cm; corolla reddish-violet to blue, delicately purple veined; standard 6-8 mm; pods 4-7-segmented.

Forests and forest edges, 100-1000 m; fl. & fr.: Sept.-Feb.; Dawki, *Syndai*.

3. **Uraria arboreum** (D. Don) G. Don, Gen. Syst. 2: 287. 1832. *Hedysarum arboreum* D. Don, Prodr. 243. Oct. 1825. *Uraria lagopus* DC. Prodr. 2: 324. Nov. 1825; Fl. Brit. Ind. 2: 156. 1876. *U. alopecuroides* Wt. Ic. Pl. Ind. Or. 1: 15. t. 290. 1840; Fl. As. 2: 40. 1938.

Undershrubs, up to 2 m; stipules subulate, 6-10 mm; leaflets oblong lanceolate, rounded or cordate at base, obtuse, subacute or mucronate, 3-9 × 1-4 cm; lateral nerves 6-10 pairs; racemes terminal, simple, 10-22 cm; bracts ovate to lanceolate; corolla deep purple; pods articulate into 2-8 joints, black.

Shaded places in forests, 1000-1400 m; fl. & fr.: Aug.-Dec.; Khleibriat, *Balakrishnan* 50117.

8. **DESMODIUM** Desv. *nom. cons.*

- |   |     |                         |
|---|-----|-------------------------|
| 1a. Flowers subtended and enclosed by persistent leaves, each with one pair of orbicular-ovate leaflets, 1-3 cm across and obliquely rounded at base. | ... | <i>D. pulchellum</i> 1  |
| 1b. Flowers never subtended by such leaves, but by simple leaf-like deciduous bracts.   |     |                         |
| 2a. Flowers in dense-flowered umbels; pods corky when mature.   |     | <i>D. triangulare</i> 2 |
| 2b. Flowers in axillary or terminal racemes or panicles, solitary or in 2- or more-flowered fascicles along the rachis; pods never corky.             |     |                         |
| 3a. Leaves 1-foliolate; petioles winged.  | ... | <i>D. triquetrum</i> 3  |
| 3b. Leaves 3-foliolate; petioles not winged.  |     |                         |

- 4a. Pods distinctly stalked in the calyx. ... *D. racemosum* 4  
 4b. Pods sessile in the calyx.
- 5a. Lateral leaflets much reduced or wanting.
- 6a. Lateral leaflets if present, 6-15 × 1-6 mm; terminal leaflet linear-lanceolate to elliptic-ovate, acute; rachis with hooked hairs; pods short hooked-hairy. ... *D. motorium* 5  
 6b. Lateral leaflets if present, 10-30 × 5-15 mm; terminal leaflets elliptic-obovate, acute or obtuse; rachis with appressed or patent straight hairs; pods long hooked-hairy. ... *D. gyroides* 6
- 5b. Lateral leaflets not much reduced, though often smaller than terminal leaflet.
- 7a. Middle joints of pods twice as long as broad. ... *D. laxiflorum* 7  
 7b. Middle joints of pods less than twice as long as broad.
- 8a. Leaflets small, 3-15 × 1-5 mm. ... *D. microphyllum* 8  
 8b. Leaflets large, 2-9 × 1-5 cm.
- 9a. Bracts subulate or narrowly ovate-lanceolate, at most 1 mm broad; young inflorescences spicate, often paniculate; flowers rather laxly arranged.
- 10a. Leaflets repand at upper half; pods densely hairy. ... *D. sequax* 6  
 10b. Leaflets entire; pods glabrous. ... *D. oxyphyllum* 10
- 9b. Bracts triangular, concave, more than 2 mm broad; young inflorescences suggestive of coniferous strobili; flowers densely arranged.
- 11a. Stems angular, densely pubescent; leaflets densely hairy beneath, acute to subacute-mucronate at apex; pods with short appressed straight hairs. ... *D. floribundum* 11  
 11b. Stems terete, sparsely hairy; leaflets sparsely hairy beneath, obtuse to subacute at apex; pods with long hooked hairs at sutures. ... *D. heterocarpon* 12

1. **Desmodium pulchellum** (L.) Benth. Fl. Hongk. 83. 1861; Fl. Brit. Ind. 2: 162. 1876; Fl. As. 2: 47. 1938. *Hedysarum pulchellum* L. Sp. Pl. 747. 1753.

Shrubs, 1-2 m; stipules subulate, 4-6 mm; leaflets 3, elliptic to ovate-oblong, rounded at base, obtuse to subacute, 1.5-7.0 × 1.5-3.5 cm; lateral nerves 8-10 pairs; racemes terminal or axillary, 7-50 cm, composed of 10-100, 2-6-flowered umbellules, each subtended by a pair of persistent bracts placed back to back; corolla white or yellow; pods of 2 joints.

Secondary forests and grasslands, 200-1000 m; fl. & fr.: June-Dec.; Garampani.

2. **Desmodium triangulare** (Retz.) Mert. in J. Arn. Arb. 23: 170. 1942. *Hedysarum triangulare* Retz. Obs. Bot. 3: 40. 1783. *H. cephalotes* Roxb. Fl. Ind. 3: 360. 1832. *D. cephalotes* (Roxb.) W. & A. Prodr. 224. 1834; Fl. Brit. Ind. 2: 161. 1876; Fl. As. 2: 46. 1938.

Erect shrubs, 1-2 m; stipules linear-lanceolate, 1-2 cm; leaflets 3, oblong-elliptic to lanceolate, acute at both ends, 5-12 × 2-7 cm, densely grey-silky beneath; lateral nerves 10-20 pairs; stipules filiform, 3-7 mm; inflorescence axillary, solitary; peduncles up to 10 mm; bracts linear, hairy; corolla pale red, 8-10 mm; pods sessile, 1.0-2.5 × 0.3-0.4 cm, appressed grey-silky; joints 2-5; seeds  $\pm$  2 × 3 mm.

Grasslands, in shaded places, 200-1000 m; fl. & fr.: June-Nov.; Garampani-Raliang.

3. **Desmodium triquetrum** (L.) DC. Prodr. 2: 326. 1825; Fl. Brit. Ind. 2: 163. 1876; Fl. As. 2: 56. 1938. *Hedysarum triquetrum* L. Sp. Pl. 746. 1753. *Tadehagi triquetrum* (L.) Ohashi in Ginkgoana 1: 290. 1973.

Undershrubs, 1.0-2.5 m; petioles 5-8 mm; stipules lanceolate, 15-20 mm; leaflet ovate-oblong, lanceolate, rounded or subcordate at base, acute or short-acuminate, 2-18 × 1-5 cm; lateral nerves 13-17 pairs; racemes terminal or axillary, 8-30 cm; pedicels in fascicles of 3-7, 2-4 mm; bracts sessile, 4-5 mm; corolla purplish-pink; pods strap-shaped, 25-35 × 4-6 mm; joints 5-8, densely hairy.

1a. Pods hairy all over; joints 5-6 × 2.5-3.5 mm.

1b. Pods hairy only along sutures; joints 4-6 × 2.0-2.5

... ssp. *triquetrum* 1

... ssp. *pseudotriquetrum* 2

1. ssp. **triquetrum**

Primary forests and forest-edges, 400-1200 m; fl. & fr.: Aug.-Mar.; Garampani, Raliang-Garampani, Syndai.

2. ssp. **pseudotriquetrum** (DC.) Prain in J. As. Soc. Beng. 66 (2): 390. 1897. *Pteroloma pseudotriquetrum* (DC.) Schindl. in Fedde Rep. 20: 272. 1924. *D. pseudotriquetrum* DC. in Ann. Sci. Nat. Paris 4: 100. 1825 et Prodr. 2: 326. 1825.

Secondary forests and forest edges, amidst bushes, 400-1000 m; fl. & fr.: July-Dec.; Sonapur.

4. **Desmodium racemosum** (Thunb.) DC. Prodr. 2: 337. 1825. *Hedysarum racemosum* Thunb. Fl. Jap. 285. 1784. *D. podocarpum* DC. in Ann. Sci. Nat. Paris 4: 102. 1825; Fl. Brit. Ind. 2: 165. 1876. excl. var. *laxum*. *D. laxum* (non DC. 1825) sensu Kanjilal et al., Fl. As. 2: 52. 1938.

Undershrubs, 50-100 cm; petioles 5-10 cm; leaflets elliptic or obliquely lanceolate, narrowed or cuncate at base, short-acuminate, 7-15 × 3-7 cm; lateral nerves  $\pm$  4 pairs; petiolules 5-6 mm; racemes often paniced, 15-35 cm, lax-flowered; corolla pink, 3-4 mm; pods 8-10 mm, thick at sutures; joints 1-2, 4-7 × 2-4 mm.

Secondary forests and grasslands, 500-1200 m; fl. & fr.: July-Oct.; Raliang-Garampani.

5. **Desmodium motorium** (Houtt.) Merr. in J. Arn. Arb. 19: 345. 1938. *Hedysarum motorium* Houtt. Nat. Hist. 2, 10: 246. 1779. *H. gyrans* L. f. Suppl. 332. 1781. *D. gyrans* (L. f.) DC. Prodr. 2: 326. 1825; Fl. Brit. Ind. 2: 174. 1876; Fl. As. 2: 58. 1938.

Undershrubs, 20-150 cm; stems with hooked hairs at apex; stipules subulate, broad at base, 8-15 mm; lateral leaflets reduced or very small; terminal leaflet obtuse at base, 2-12 x 1-4 cm; lateral nerves 7-10 pairs; racemes axillary and terminal, 5-14 cm; bracts ovate, 3-7 mm; corolla purple-pink to orange; pods 2-5 x 0.4-0.6 cm, not jointed; seeds 3-11, reniform.

Shaded places in forests, 500-1200 m; fl. & fr.: July-Nov.; Syndai.

6. **Desmodium gyroides** (Link) DC. Prodr. 2: 326. 1825 et Mem. Leg. 7: 322. 1825; Fl. Brit. Ind. 2: 175. 1876; Fl. As. 2: 59. 1938. *Hedysarum gyroides* Link, Enum. alt. 2: 247. 1822.

Shrubs, 1.0-2.5 m; leaflets 1-3; rachis 15-30 mm; stipules subulate, 8-15 mm; terminal leaflet truncate or cordate at base, 3-7 x 1.5-4.5 cm; lateral nerves 5-7 pairs; lateral leaflets none or 1-2 x 0.5-1.0 cm; racemes terminal or axillary, 4-16 cm; bracts ovate, 3-6 mm; corolla pale pink to purple-pink; pods 2-4 x 0.4-0.5 cm, densely long hairy; joints 3-10.

Forests and forest edges, 1200-1500 m; fl. & fr.: Sept.-Jan.; Jowai.

7. **Desmodium laxiflorum** DC. in Ann. Sc. Nat. Paris ser. 1. 4: 100. 1825; Fl. Brit. Ind. 2: 164. 1876; Fl. As. 2: 48. 1938.

Undershrubs, 1-2 m; stipules long-triangular, 10-15 x 2-3 mm; leaflets ovate or lanceolate, cuneate or rounded and oblique at base, cuspidate-acute, 6-17 x 2-11 cm; lateral nerves 7-12 pairs; stipules setaceous, 4-7 mm; inflorescences axillary or terminal, 12-40 cm; bracts lanceolate, 5-7 mm; corolla purplish-pink; standard white with a violet blotch, 5-6 mm; pods 25-35 mm; joints 8-10, 4-6 x 2-3 mm, strongly nerved.

Secondary forests and grasslands, 500-1200 m; fl. & fr.: July-Nov.; Mynsyngnat, Raliang.

8. **Desmodium microphyllum** (Thunb.) DC. Prodr. 2: 337. 1825. *Hedysarum microphyllum* Thunb. Fl. Jap. 284. 1784. *D. parvisolium* DC. in Ann. Sci. Nat. Paris ser. 1. 4: 100. 1825; Fl. Brit. Ind. 2: 174. 1876; Fl. As. 2: 60. 1938.

Much-branched decumbent, slender annual, often forming dense entangled masses; leaves 1-3-foliolate; stipules 3-8 mm; leaflets ovate or oblong-ovate, mucronate; terminal leaflets 3-15 × 1.5-4.0 mm; lateral leaflets orbicular, ± 3 mm diam.; racemes terminal and lateral, 1.5-5.0 cm; pedicels filiform, 8-15 mm; corolla purplish-pink; pods 5-12 × 2.0-2.5 mm; joints 1-4.

Forests and forest edges, 1200-1600 m; fl. & fr.: Sept.-Nov.; Raliang.

9. **Desmodium sequax** Wall. Pl. As. Rar. 2: 46. t. 157. 1831; Fl. Brit. Ind. 2: 170. 1876. *D. strangulatum* W. & A. var. *sinuatum* Miq. Fl. Ind. Bat. 1(1): 225. 1855. *D. sinuatum* (Miq.) Baker in Fl. Brit. Ind. 2: 166. 1876.

Shrubs, 1-3 m; leaves 3-foliolate; rachis 2-5 cm; stipules ± 5 mm; leaflets ovate-rhomboid, acuminate at both ends, 3.5-8.0 × 2-5 cm; lateral nerves 4-6 pairs; racemes terminal and axillary, 5-16 cm; pedicels ± 5 mm; bracts lanceolate or subulate; corolla reddish-violet to pale purple; pods 2.5-3.5 cm; joints 6-12, densely short-hooked-hairy.

Forest edges and grasslands, 1200-1600 m; fl. & fr.: July-Jan.; Jowai.

10. **Desmodium oxyphyllum** DC. in Ann. Sci. Nat. 4: 102. 1825 et Prodr. 2: 336. 1825; Fl. Brit. Ind. 2: 167. 1876.

Undershrubs, 1-3 m; leaves 3-foliolate; rachis 2-6 cm; stipules ovate-lanceolate, 3-9 mm; leaflets ovate, obovate, obtuse at base, acute to short-acuminate, 2-6 × 1-3 cm; lateral nerves 6-8 pairs; racemes terminal or upper axillary; pedicels filiform, 1-2 cm; corolla pale purple, 9-12 mm; pods subsessile, 2-4 × 0.2-0.3 cm; joints 7-9.

Forests and forest edges, 1000-1600 m; fl. & fr.: July-Jan.; Jarain.

11. **Desmodium floribundum** (D. Don) G. Don, Gen. Syst. 2: 297. 1832; Fl. Brit. Ind. 2: 167. 1876. *Hedysarum floribundum* D. Don, Prodr. Fl. Nep. 224. 1825. *H. sambuense* D. Don, l. c. 243. *D. sambuense* (D. Don) DC. Prodr. 2: 335. 1825; Fl. As. 2: 51. 1938.

Shrubs, 0.5-1.5 m; leaves 3-foliolate; rachis 2-10 cm; stipules lanceolate, 5-12 mm; leaflets ovate or oblong-obovate, rounded or narrowly obtuse at base, acute, 3-8 × 1-4 cm; lateral nerves 6-8 pairs; racemes often paniced, 7-15 cm; bracts 5-6 × 2-3 mm; corolla pink or nearly white, 5-7 mm; pods 2-3 cm; joints 6-8, appressed-silky.

Forests and forest edges, 1200-1600 m; fl. & fr.: Aug.-Nov.; Jarain, Ummulong.



12. **Desmodium heterocarpon** (L.) DC. Prodr. 2: 337. 1825. *Hedysarum heterocarpon* L. Sp. Pl. 747. 1753. *H. polycarpum* Poir. in Lamk. Encycl. Meth. Bot. 6: 413. 1804. *D. polycarpum* (Poir.) DC. Prodr. 2: 334. 1825; Fl. Brit. Ind. 2: 171. 1876; Fl. As. 2: 54. 1938.

Undershrubs, 0.5-1.5 m; leaves 3-foliolate; rachis 2-4 cm; stipules  $\pm$  13 mm; leaflets elliptic-oblong or obovate, obtuse or rounded at base, rounded and notched at apex, 2-9  $\times$  1-4 cm; lateral nerves 7-9 pairs; racemes terminal or axillary, 5-10 cm; pedicels 4-5 mm; corolla purple; pods 1.0-2.5  $\times$  0.2-0.3 cm; joints 5-8.

Forests and forest edges, 100-1400 m; fl. & fr.: June-Oct.; Dawki, Garampani-Raliang, Jowai, Khleihriat.

#### 9. PUERARIA DC.

- |  |     |                          |
|--|-----|--------------------------|
| 1a. Stipules medifixed and produced below the point of insertion.  | ... | <i>P. lobata</i> 1       |
| 1b. Stipules basifixed, not produced below the point of insertion. | ... |                          |
| 2a. Leaflets usually lobed; pods cylindrical or subulate.          | ... | <i>P. phaseoloides</i> 2 |
| 2b. Leaflets unlobed; pods flattened.                              | ... | <i>P. wallichii</i> 3    |

1. **Pueraria lobata** (Willd.) Ohwi in Bull. Nat. Sci. Mus. Tokyo, no. 18: 16. 1947. *Dolichos lobatus* Willd. Sp. Pl. 3(2): 1047. 1802. *Pachyrrhizus thunbergianus* S. & Z. in Abhand. Akad. Munch. 4(3): 237. 1846. *Pueraria thunbergianus* (S. & Z.) Benth. in J. Linn. Soc. Bot. 9: 122. 1865; Fl. As. 2: 81. 1938. *P. thomsonii* Benth. in J. Linn. Soc. Bot. 9: 122. 1865; Fl. Brit. Ind. 2: 198. 1876.

Large climbers; petioles 10-15 cm; stipules 2.0-2.5 cm; leaflets ovate-rhomboid, subcuneate or rounded at base, sharp-acuminate, entire or 2-3-lobed, 12-37  $\times$  10-35 cm; lateral nerves 5-7 pairs; racemes simple, 20-40 cm; bracts paired, lanceolate, 6-8 mm; corolla purple or reddish,  $\pm$  2.5 cm; pods flat, 10-13  $\times$  0.9-1.2 cm, densely brown hairy.

Forests and forest edges, 100-1200 m; fl. & fr.: Sept.-Dec.; Dawki, Garampani, Raliang, Shangpung.

2. **Pueraria phaseoloides** (Roxb.) Benth. in J. Linn. Soc. Bot. 9: 125. 1867; Fl. Brit. Ind. 2: 199. 1876; Fl. As. 2: 82. 1938. *Dolichos phaseoloides* Roxb. Fl. Ind. 3: 316. 1832.

Twining herbs, often trailing; petioles 5-10 cm; stipules basifixed, lanceolate,  $\pm$  1.5 cm; leaflets 3, subrhomboidal to broadly lanceolate or ovate, cuneate or rounded at base, acute to subobtuse, shallowly lobed, 5-18  $\times$  4-15 cm; lateral nerves 3-5; racemes simple, 10-30 cm; bracts lanceolate, 1.5-3.0 mm; corolla pale blue or reddish, 2.0-3.0 cm; pods linear, 8-12 cm, hairy.

Primary forests, 100-500 m; fl. & fr.: Aug.-Dec.; Dawki.

3. **Pueraria walfichii** DC. Prodr. 2: 240. 1825; Fl. Brit. Ind. 2: 198. 1876; Fl. As. 2: 80. 1938.

Subscandent shrubs; petioles 8-15 cm; stipules linear-lanceolate,  $\pm$  1 cm; leaflets 3, elliptic, subrhomboid, obliquely acute to cuneate at base, acute to acuminate, 7-12  $\times$  0.4-0.8 cm; lateral nerves 6-8; petioles 4-6 mm; racemes 10-25 cm; corolla pink or brick-red, 1.5-2.0 cm; pods flat, 5-8  $\times$  0.8-1.0 cm glabrous.

Forests and forest edges, 100-1500 m; fl. & fr.: June-Oct.; Dawki, Jowai, Nartiang, Syndai.

10. MILLETTIA W. & A.

- |   |                     |
|---|---------------------|
| 1a. Climbers; racemes generally paniculate; flowers solitary at each node on rachis; pods swollen and turgid at seeds. ...        | <i>M. cinerea</i> 1 |
| 1b. Erect trees or shrubs; racemes simple; flowers fasciculate at each node of raceme; pods flat, not swollen or turgid at seeds. |                     |
| 2a. Leaflets 15-21, stipulate and stipellate, acute to subobtuse at apex; pedicels 3-5 mm. ...                                    | <i>M. pulchra</i> 2 |
| 2b. Leaflets 5-9, exstipulate and exstipellate, caudate-acuminate at apex; pedicels 1-2 mm. ...                                   | <i>M. caudata</i> 3 |

1. **Millettia cinerea** Benth. in Miq. Pl. Jungh. 1: 249. 1851; Fl. Brit. Ind. 2: 106. 1876; Fl. As. 2: 28. 1938.

Large climbers; leaves 15-25 cm; stipules subulate,  $\pm$  4 mm; leaflets 5-7, obovate-oblong or elliptic, narrowly obtuse or cuneate at base, cuspidate, 5-12  $\times$  2.5-5.5 cm; lateral nerves 7-9 pairs; racemes 10-20 cm, silky pubescent; pedicels  $\pm$  5 mm; corolla reddish, 12-14 mm; pods 1-3-seeded, up to 13  $\times$  2 cm; joints globose,  $\pm$  2.5 cm, velvety when young.

Primary forests, 200-1500 m; fl. & fr.: May-Jan.; Dawki, Jowai-Jarain, Nongringkoh.

2. **Millettia pulchra** (Benth.) Kurz in J. As. Soc. Beng. 43(2): 69. 1873; Fl. Brit. Ind. 2: 104. 1876; Fl. As. 2: 25. 1938. *Mundulea pulchra* Benth. in Miq. Pl. Jungh. 2: 248. 1852.

Shrubs or trees, 4-10 m; leaves 12-25 cm; leaflets narrowly elliptic, oblong-lanceolate, obtuse at base, acute to acuminate, 2-7  $\times$  0.5-2.5 cm, silky pubescent and bluish-grey beneath; lateral nerves  $\pm$  7 pairs; racemes axillary, 10-20 cm; corolla  $\pm$  1.2 cm, reddish-purple; pods 5-10 cm, minutely appressed-hairy, 2-3-seeded.

Forests and forest edges, 100-1500 m; fl. & fr.: Apr.-Nov.; Dawki, Jowai, Jowai-Jarain.

3. **Millettia caudata** (Benth.) Baker in Fl. Brit. Ind. 2: 100. 1876; Fl. As. 2: 29. 1938. *Otosema caudata* Benth. in Miq. Pl. Jungh. 1: 249. 1851.

Straggling shrubs,  $\pm$  5 m; leaves 20-35 cm; leaflets oblong to lanceolate, rounded or subobtusate at base, long-acuminate, 8-18  $\times$  4-8 cm, glaucous beneath; lateral nerves 9-12 pairs; racemes axillary, 15-25 cm, lax-flowered; corolla 7-10 mm, densely silky; pods 7-12  $\times$  1-2 cm, appressed-pubescent, 3-5-seeded.

Forests and forest edges, 100-1000 m; fl. & fr.: May-Dec.; Dawki.

#### 11. DERRIS Lour. *nom. cons.*

- |   |                               |
|---|-------------------------------|
| 1a. Pods winged along the upper suture only.                                  |                               |
| 2a. Trees; leaflets 21-25 per leaf.   | ... <i>D. robusta</i> 1       |
| 2b. Scandent shrubs or climbers; leaflets 3-17 per leaf.                      |                               |
| 3a. Leaflets 3-7 per leaf; pods 2.0-3.5 cm wide, 2-6-seeded.                  | <i>D. trifoliata</i> 2        |
| 3b. Leaflets 13-17 per leaf; pods 1.5-2.0 cm wide, 1-3-seeded.                | ... <i>D. pseudorobusta</i> 3 |
| 1b. Pods winged along both sutures.   |                               |
| 4a. Branches and leaflets more or less pubescent; pods brown silky-pubescent. | ... <i>D. ferruginea</i> 4    |
| 4b. Branches and leaflets glabrous; pods glabrous.                            |                               |
| 5a. Flowers pale red; stamens monadelphous.                                   | ... <i>D. marginata</i> 5     |
| 5b. Flowers white; stamens diadelphous.                                       | ... <i>D. thyrsiflora</i> 6   |

1. **Derris robusta** (DC.) Benth. in J. Linn. Soc. 4 (suppl.): 104. 1860; Fl. Brit. Ind. 2: 241. 1878; Fl. As. 2: 111. 1938. *Dalbergia robusta* DC. Prodr. 2: 417. 1825.

Erect trees, 3-10 m; leaves 15-20 cm; stipules ovate; leaflets oblong or elliptic-lanceolate, narrowed at base, rounded or apiculate, 4-6  $\times$  1.5-2.5 cm; lateral nerves 5-6 pairs; racemes axillary, 8-25 cm; pedicels 3-5 mm; calyx golden-hairy; corolla white, 8-12 mm; pods strap-shaped, 3-8  $\times$  0.5-0.8 cm, with  $\pm$  2 mm broad wing on upper suture; seeds orbicular,  $\pm$  2.5 mm.

Primary forests, 100-1000 m; fl. & fr.: Apr.-Nov.; Dawki.

2. **Derris trifoliata** Lour. Fl. Cochinch. 2: 433. 1790. *Robinia uliginosa* Willd. Sp. Pl. 3: 1133. 1802. *D. uliginosa* (Willd.) Benth. in Miq. Pl. Jungh. 1: 252. 1852; Fl. Brit. Ind. 2: 241. 1878; Fl. As. 2: 112. 1938.

Large climbers; leaves 12-25 cm; leaflets oblong-ovate or lanceolate, subobtusate at base, acute to caudate-acuminate, 4.5-13.0  $\times$  2.5-6.5 cm; lateral nerves 8-9 pairs; racemes axillary, simple or branched; calyx hairy at margins; corolla reddish-purple,  $\pm$  6 mm; pods oblong, 2.5-5.0  $\times$  2.0-3.5 cm; seeds orbicular,  $\pm$  1.3 cm, reddish-brown.

Primary forests and forest edges, 100-1000 m; fl. & fr.: Mar.-Sept.; Dawki.

3. **Derris pseudorobusta** Thoth. in Bull. Bot. Surv. Ind. 3: 181. t. 2. 1961.

Subscandent shrubs, 3-10 m; leaves 15-25 cm; leaflets elliptic-oblong to lanceolate, rounded at base, bluntly acuminate, 4-6 × 1.5-3.0 cm; lateral nerves 6-8 pairs; racemes 15-35 cm; flowers not known; pods oblong, strap-shaped, narrowed at base, curved and acute at apex, with 2-3 mm broad wing on dorsal suture, 5-12 × 1.5-2.0 cm.

Primary forests and forest edges, 200-1400 m; fr.: Aug.; Garampani, *Balakrishnan* 47038; Nongringkhoh, *Balakrishnan* 46887.

4. **Derris ferruginea** (Roxb.) Benth. in Miq. Pl. Jungh. 1: 252. 1852; Fl. Brit. Ind. 2: 245. 1878; Fl. As. 2: 114. 1938. *Robinia ferruginea* Roxb. Fl. Ind. 3: 329. 1832.

Large climbers; leaves 15-29 cm; leaflets 5-9, ovate or oblong-obovate, cuneate or rounded at base, acuminate, 4-12 × 2-6 cm; lateral nerves 6-8 pairs; racemes axillary, simple or rarely branched, 15-28 cm; pedicels 5-8 mm; calyx pubescent outside; corolla 10-12 mm, reddish-white or red; pods 4.5-7.5 × 2.0-2.5 cm.

Forests and forest edges, 1000-1500 m; fl. & fr.: Apr.-Oct.; Jarain-Dawki.

5. **Derris marginata** (Roxb.) Benth. in Miq. Pl. Jungh. 2: 232. 1852; Fl. Brit. Ind. 2: 245. 1878; Fl. As. 2: 112. 1938. *Dalbergia marginata* Roxb. Fl. Ind. 3: 230. 1832.

Large climbers; leaves 15-25 cm; leaflets 5-7, elliptic or obovate-oblong, rounded to cuneate at base, acute to blunt-acuminate at apex, 6-14 × 3-6 cm; lateral nerves 8-12 pairs; racemes axillary or terminal; pedicels filiform, 8-12 mm; calyx fringed with silky hairs; corolla 10-12 cm; pods oblong-elliptic, narrowed at base, acute at apex, 6-14 × 2.5-4.0 cm.

Primary forests, 100-500 m; fl. & fr.: Mar.-Jan.; Dawki.

6. **Derris thyrsiflora** Benth. in J. Linn. Soc. Bot. 4(suppl): 114. 1860; Fl. Brit. Ind. 2: 246. 1878; Fl. As. 2: 113. 1938.

Large woody climbers; leaves 25-45 cm; leaflets elliptic or oblong-lanceolate, rounded or cuneate at base, bluntly caudate-acuminate, 8-15 × 4-8 cm; lateral nerves 5-7 pairs; panicles 15-50 cm; pedicels 1.0-1.5

mm; calyx reddish-green, silky; corolla 8-10 mm; pods 4-9 × 2-3 cm, 1 4-seeded.

Forests and forest edges, 100-1400 m; fl. & fr.: June-Feb.; Dawki, Pdengsakab.

## 12. ATYLOSIA W. & A.

- |  |     |                           |
|--|-----|---------------------------|
| 1a. Herbaceous twiners; leaflets ovate-oblong, obtuse or subacute at base, 2-4 cm; petioles 1-3 cm long; flowers in short-peduncled few-flowered corymbs; pods 1.5-3.0 cm long.  | ... | <i>A. scarabaeoides</i> 1 |
| 1b. Woody climbers; leaflets ovate-rhomboid, broadly rounded or subcordate at base, 2-10 cm; petioles 3-9 cm long; flowers in peduncled many-flowered racemes; pods 2-8 cm long. | ... | <i>A. goensis</i> 2       |

1. ***Atylosia scarabaeoides*** (L.) Benth. in Miq. Pl. Jungh. 2: 243. 1852; Fl. Brit. Ind. 2: 215. 1876; *Dolichos scarabaeoides* L. Sp. Pl. 1020. 1753.

Slender climbers; leaves digitately 3-foliolate; leaflets obtuse and mucronate at apex, 2-4 × 1-2 cm; petiolules 2-5 mm; racemes axillary; peduncles 10-15 mm; bracts palmatifid, ± 1 mm; pedicels 4-6 mm; corolla yellow, ± 1 cm; pods compressed, apiculate at apex, 15-30 × 5-8 mm, finely grey or pale brown silky hairy.

Secondary forests and forest edges, 100-500 m; fl. & fr.: July-Nov.; Garampani.

2. ***Atylosia goensis*** (Dalz.) Dalz. in J. Linn. Soc. Bot. 13: 186. 1873. *Cajanus goensis* Dalz. in Kew J. Bot. 2: 264. 1850. *Dunbaria barbata* Benth. in Miq. Pl. Jungh. 242. 1852. *Atylosia barbata* (Benth.) Baker in Fl. Brit. Ind. 2: 216. 1876; Fl. As. 2: 97. 1938.

Woody climbers; leaves 3-foliolate; leaflets acuminate at apex, 2-10 × 3-8 cm; lateral nerves 3-5 pairs; petioles ± 4 mm; racemes ± 30 cm; peduncles 4-15 cm; bracts ovate, acuminate, ± 1 cm; corolla yellowish-orange, ± 1.5 cm; pods narrowly beaked, 2-8 cm, spreading brown hairy.

Secondary forests and forest edges, 100-1000 m; fl. & fr.: Aug.-Feb.; Garampani-Raliang.

## 13. FLEMINGIA Ait. nom. cons.

*Flemingia vestita* Baker, locally called 'Soh-phlong', is being cultivated for the edible tubers, eaten by local people and also sold in markets.

- |   |     |                          |
|---|-----|--------------------------|
| 1a. Leaflet 1; flowers in small cymes; bracts large, folded, reniform, persistent.                              | ... | <i>F. strobilifera</i> 1 |
| 1b. Leaflets 3; flowers in dense spike-like, often fascicled racemes; bracts linear-lanceolate, early caducous. | ... | <i>F. macrophylla</i> 2  |

1. **Flemingia strobilifera** (L.) R. Br. in Ait. Hort. Kew. ed. 2. 4: 350. 1812; Fl. Brit. Ind. 2: 227. 1876; Fl. As. 2: 88. 1938. *Hedysarum strobiliferum* L. Sp. Pl. 1053. 1753.

Erect shrubs, 1 - 3 m; leaflet oblong to ovate-lanceolate, rounded or subcordate at base, acute to acuminate, 4 - 18 × 3 - 11 cm, silky-pubescent and gland-dotted beneath; lateral nerves 8 - 12 pairs; stipules linear-lanceolate, 5 - 10 mm; cymes 3 - 4-flowered; arranged in 5 - 20 cm long racemes; bracts 15 - 35 mm; calyx velvety; corolla pale yellow with red streaks; pods 7 - 12 × 6 - 7 mm, 2-seeded.

Secondary forests and forest edges, 100 - 1000 m; fl. & fr.: Feb.-Sept.; Dawki.

2. **Flemingia macrophylla** (Willd.) Prain in J. As. Soc. Beng. 66(2): 440. 1897. *Crotalaria macrophylla* Willd. Sp. Pl. 3: 982. 1800. *F. congesta* Roxb. Fl. Ind. 3: 340. 1832; Fl. Brit. Ind. 2: 228. 1876; Fl. As. 2: 90. 1938.

Erect or trailing shrubs, 0.5 - 3.8 m; leaves digitately 3-foliolate; petioles flattened, 3 - 10 cm; stipules linear-lanceolate, 10 - 15 mm; leaflets ovate or lanceolate, cuneate at base, acute, 6 - 30 × 3 - 18 cm, 3-nerved at base; lateral nerves ± 6 pairs; racemes simple or paniculate; bracts 10 - 20 mm; calyx silky; corolla purplish; pods turgid, 11 - 15 mm, brown-velvety.

Primary & secondary forests, in partially sunny places, 200 - 1500 m; fl. & fr.: Apr.-Jan.; Dawki, Garampani, Jowai, Nartiang, Sutnga, Syndai.

#### 14. ERIOSEMA (A. P. DC.) G. Don *nom. cons.*

**Eriosema himalaicum** Ohashi in J. Jap. Bot. 41: 96. 1966. *E. chinense* (non Vogel, 1848) Baker in Fl. Brit. Ind. 2: 219. 1876. *p. p.*; Fl. As. 2: 94. 1938.

Undershrubs, 20 - 70 cm; rootstock tuberous; leaves simple, linear, mucronate at apex, recurved and pilose at margins, 2 - 5 × 0.3 - 0.5 cm; lateral nerves obscure; petioles 1 - 3 mm; stipules subulate, 2 - 3 mm; flowers solitary, axillary, 7 - 8 mm; pedicels 6 - 10 mm; calyx pubescent; corolla yellowish, purple-veined, fading to reddish purple; pods oblong or orbicular, 8 - 12 mm, densely long-hairy.

Grasslands and secondary forests, in partially shaded places, 500 - 1500 m; fl. & fr.: June-Oct.; Garampani, Jarain, Raliang.

#### 15. INDIGOFERA L.

##### 1a. Leaflets 7-15.

2a. Leaflets 3-6 × 1.0-2.5 cm; racemes 10-38 cm long. ... *I. atropurpurea* 1

2b. Leaflets 1-2 × 0.5-1.0 cm; racemes 3-13 cm long. ... *I. nigrescens* 2

1b. Leaflets 15—31.

3a. Leaflets linear-oblong or elliptic-oblong, 15—20 mm long. ... *I. dosua* 3

3b. Leaflets obovate, oblong-oblanccolate, 5—15 mm long. ... *I. heterantha* 4

1. ***Indigofera atropurpurea*** Hornem., Hort. Reg. Bot. Hafn. Suppl. 152. 1819; Fl. Brit. Ind. 2: 101. 1876; Fl. As. 2: 20. 1938.

Undershrubs, 1-2 m; leaves 9-13, oblong-ovate, cuncate at base, obtuse-mucronate; racemes axillary and terminal; bracts broad and boat-shaped at base, setaceous at apex; corolla crimson-red; pods linear,  $\pm$  4 cm, narrowed at apex into short curved beak; seeds 8-10, orbicular, red.

Secondary forests and grasslands, 800-1300 m; fl. & fr.: May-Jan.; Umjaisaw.

2. ***Indigofera nigrescens*** King & Prain in J. As. Soc. Beng. 67: 286. 1898.

Erect shrubs, 0.5-1.5 m; leaves 10-15 cm; leaflets 7-15, oblong-ovate or elliptic-oblong, cuneate-acute at base, rounded and often emarginate at apex; racemes erect, axillary, dense-flowered; bracts linear-lanceolate, 2.0-2.5 mm; calyx black or brown hairy; corolla crimson-red; pods 1.5-3.0 cm, 6-8-seeded.

Forests and forest edges, 200-1200 m; fl. & fr.: Aug-Dec.; Raliang-Garampani.

3. ***Indigofera dosua*** D. Don, Prodr. Fl. Nep. 244. 1825; Fl. Brit. Ind. 2: 102. 1876; Fl. As. 2: 20. 1938.

Much-branched woody shrubs, 50-150 cm; leaves 2.5-15.0 cm; stipules 2-3 mm; leaflets 21-31, subacute at base, acute to apiculate, 15-20  $\times$  3-4 mm; racemes axillary, dense-flowered, 4-10 cm; bracts narrow-lanceolate, cuspidate, 4-6 mm; corolla bright red or purplish-pink; pods terete, 2-4 cm, 8-12-seeded.

Forests and forest edges, 200-1200 m; fl. & fr.: June-Dec.; Garampani, Balakrishnan 47057; Myntang, U. N. Kanjilal 6555.

4. ***Indigofera heterantha*** Brandis, For. Fl. 135. 1876. *I. gerardiana* Baker in Fl. Brit. Ind. 2: 100. 1876; *p. p. I. gerardiana* var. *heterantha* Baker l. c. 100; Fl. As. 2: 19. 1938.

Much-branched shrubs, up to 1.5 m; leaves 8-10 cm; leaflets 15-31, obtuse-mucronate at apex, 5-15  $\times$  2-8 mm; racemes axillary, 12-25-flowered, 3-7 cm; bracts setaceous; corolla pale red or purple, hairy outside; pods subsylindrical 2.5-3.5 cm, 4-10-seeded, appressed-hairy.

Pine forests and grasslands, 1200-1600 m; fl. & fr.: May-Oct.; Jowai,

16. SHUTERIA W. & A.

**Shuteria vestita** W. & A. Prodr. 207. 1834; Fl. Brit. Ind. 2: 181. 1876; Fl. As. 2: 63. 1938.

Slender twiners; leaves pinnately 3-foliolate; rachis 2-7 cm; stipules lanceolate, 5-7 mm; leaflets subrhomboid or oblong-ovate, subobtusate at base, obtuse-mucronulate, 1-7 x 1-5 cm; lateral nerves 5-6 pairs; flowers axillary, solitary, or in 1-6 cm long racemes; bracteoles subulate, 4-5 mm; calyx long hairy; corolla reddish or purplish; pods linear, compressed, 3-4 x 0.4-0.5 cm.

Forests, in shaded places, 1200-1600 m; fl. & fr.: Aug.-Jan.; Shang-pung.

17. GLYCINE Willd. *nom. cons.*

**Glycine soja** (L.) S. & Z. Fl. Jap. 11. 1835; Fl. Brit. Ind. 2: 184. 1876; Fl. As. 2: 65. 1938. *Dolichos soja* L. Sp. Pl. 727. 1753.

Herbs, 0.5-1.5 m; stems angular, brown hairy; leaves 3-foliolate; petioles 5-17 cm; leaflets oblong-ovate to narrow ovate, acute at base, acute to obtuse and apiculate, 3-15 x 2-8 cm; lateral nerves 5-6 pairs; flowers sessile, axillary, fasciculate or in up to 2.5 cm long racemes; calyx reddish, long hairy, corolla white or lilac; pods linear, 3-5 x 0.8-1.2 cm, brown hairy.

Near villages and wastelands, 1200-1500 m; fl. & fr.: Aug.-Jan.; Jowai.

Often cultivated for forage and edible oil from seeds.

18. DALBERGIA L. f. *nom. cons.*

- |   |                               |
|---|-------------------------------|
| 1a. Stamens in 2 bundles of 5 each.   |                               |
| 2a. Scandent shrubs; leaflets 2-3 x 0.7-1.5 cm; pedicels longer than calyx. | ... <i>D. stipulacea</i> 1    |
| 2b. Trees; leaflets 3.5-7.5 x 2.0-3.0 cm; pedicels as long as calyx.        | ... <i>D. assamica</i> 2      |
| 1b. Stamens 9, rarely 10 in one bundle.                                     |                               |
| 3a. Leaflets 5-13 per leaf.   |                               |
| 4a. Leaflets 5-9, 5-10 x 2.5-8.0 cm subacute or acute at apex.              | ... <i>D. simosa</i> 3        |
| 4b. Leaflets 9-13, 2.0-5.0 x 1.2-2.0 cm, obtuse or emarginate at apex.      | ... <i>D. confertiflora</i> 4 |
| 3b. Leaflets 25-41 per leaf.  |                               |
| 5a. Leaflets 33-41, oblique at base; pods 8-15 mm broad.                    | ... <i>D. pinnata</i> 5       |
| 5b. Leaflets 25-33, not oblique at base; pods 5-6 mm broad.                 | ... <i>D. mimosoides</i> 6    |



1. **Dalbergia stipulacea** Roxb. Fl. Ind. 3: 233. 1832; Fl. Brit. Ind. 2: 237. 1876; Fl. As. 2: 107. 1938.

Leaves 13-25 cm; leaflets 17-25, oblong, sub-obliquely cuneate at base, obtuse and often emarginate; lateral nerves 14-16 pairs; panicles axillary, 7-12 cm; bracts oblanceolate, 4-7 cm; corolla reddish-purple, 5-7 mm; pods oblong, flat, subacute at base, obtuse at apex, 5-9 × 0.2-0.3 cm; stipe 5-12 mm; seed 1, 15-25 mm across, brown.

Forests, 100-600 m; fl. & fr.: Mar.-Nov.; Dawki, Rytiang.

2. **Dalbergia assamica** Benth. in Miq. Pl. Jungh. 1: 255. 1851; Fl. Brit. Ind. 2: 235. 1876; Fl. As. 2: 102. 1938.

Trees, 15-25 m; leaves 20-30 cm; stipules ovate, subacute, falcate, ± 2 mm; leaflets 15-21, oblong, subcuneate at base, obtuse or subemarginate; lateral nerves 10-12 pairs; petiolules 3-5 mm; panicles axillary, 10-15 cm; pedicels ± 3 mm; calyx silky; corolla white or purplish-blue, ± 6 mm; pods linear-oblong, strap-shaped, acute at base, mucronate at apex, 5-8 × 1.0-2.0 cm.

Forests, 600-1200 m; fl. & fr.: Mar.-Jan.; Khongsong, Mynso.

3. **Dalbergia rimosa** Roxb. Fl. Ind. 3: 233. 1832; Fl. Brit. Ind. 2: 233. 1876; Fl. As. 2: 104. 1938.

Subscandent or straggling shrubs or erect trees, 3-8 m; leaves 12-25 cm; leaflets oblong-elliptic, subacute at base; lateral nerves 10-15 pairs; panicles axillary and terminal, 10-20 cm; pedicels 1-2 mm; corolla white, ± 3 mm; pods obliquely oblong-elliptic, cuneate at base, subacute at apex, 7-13 × 2-3 cm; stipe 2-4 mm.

Forests, 100-1000 m; fl. & fr.: Apr.-Nov.; Dawki, Sohka-Dawki.

4. **Dalbergia confertiflora** Benth. in Miq. Pl. Jungh. 1: 255. 1851; Fl. Brit. Ind. 2: 233. 1876; Fl. As. 2: 104. 1938.

Scandent shrubs; leaves 10-20 cm; leaflets elliptic to ovate-oblong, acute to subacute at base; lateral nerves 15-20 pairs; panicles terminal, 30-85 cm, axillary, 4-9 cm; pedicels 2-3 mm; corolla 6-7 mm; pale blue; pods oblong, 4-6 × 1.2-1.5 cm; stipe 2-4 mm; seeds 1 or rarely 2.

Forests, 600-1200 m; fl. & fr.: Feb.-Aug.; Myntang Valley, Mynso.

5. **Dalbergia pinnata** (Lour.) Prain in Ann. R. Bot. Gard. Calc. 10: 48. 1904. *Derris pinnata* Lour. Fl. Cochinch. 432. 1790. *D. tamarindifolia* Roxb. Fl. Ind. 3: 233. 1832; Fl. Brit. Ind. 2: 234. 1876; Fl. As. 2: 105. 1938.

Woody climbers, 2-12 m; innovations brownish pubescent; leaves 8-18 cm; leaflets oblong, rounded emarginate, 10-20 × 3-9 mm; panicles mostly axillary, 3-5 cm; pedicels  $\pm$  2 mm; bracts ovate or suborbicular,  $\pm$  1.5 mm; calyx pubescent; corolla white, 6-7 mm; pods oblong, 4-7 cm; stipe 3-5 mm; seeds 1-3.

Forests, 200-1200 m; fl. & fr.: Feb.-Oct.; Dawki, Jorain.

6. **Dalbergia mimosoides** Franch. Pl. Delav. 1: 187. 1889; Fl. As. 2: 106. 1938.

Woody climbers; leaves 7-14 cm; leaflets oblong, subacute at base, rounded emarginate, 10-15 × 3-6 mm; panicles axillary, 3-5 cm, lax-flowered; pedicels  $\pm$  2 mm; corolla pale purple, 4-5 mm; pods oblong-elliptic, 3-5 cm; stipe 4-8 mm; seeds 1-3.

Forests, 1000-1300 m; fl. & fr.: Mar.-Nov.; Mynso.

#### 19. LESPEDEZA MICHX.

**Lespedeza juncea** (L. f.) Pers. Syn. Pl. 2: 318. 1807; Fl. Brit. Ind. 2: 142. 1876. *Hedysarum junceum* L. f. Dec. Prim. Pl. Hort. Upsal. 1: t. 4. 1762. *H. sericeum* Thunb. Fl. Jap. 289. 1784. *L. sericea* (Thunb.) Miq. in Ann. Mus. Lugd.-Bat. 3: 49. 1867. (non Benth. 1852); Fl. Brit. Ind. 2: 142. 1876.

Herbs or undershrubs, 0.5-1.0 m; leaves 3-foliolate; petioles 1-8 mm; stipules setaceous, 3-5 mm; leaflets obovate to linear-oblongate, cuneate at base, obtuse-mucronate, 5-20 × 2-8 mm; lateral nerves 5-8 pairs; flowers axillary, solitary or 2-4-nate, 5-6 mm; corolla yellowish-white with purple tinge; pods ellipsoid or ovoid, 5-6 mm, thinly silky, 1-seeded.

Forest edges and grasslands, 1000-1500 m; fl. & fr.: May-Nov.; Nartiang.

#### 20. DUMASIA DC.

**Dumasia villosa** DC. Prodr. 2: 241. 1825; Fl. Brit. Ind. 2: 188. 1876; Fl. As. 2: 64. 1938.

Slender twiner; leaves 3-foliolate; petioles  $\pm$  9 cm; stipules  $\pm$  5 mm; leaflets ovate, subcuneate at base, obtuse and obscurely mucronate, 7-9 × 2-5 cm; lateral nerves 4-6 pairs; petiolules 2-4 cm; racemes axillary, 2-15 cm; flowers yellow or purple; pods 3-4 cm; velvety, torulose between seeds.

Forests and forest edges, 600-1200 m; fl. & fr.: July-Mar.; Sutnga.

## 21. ERYTHRINA L.

**Erythrina arborescens** Roxb. Pl. Corom. 3: t. 219. 1811; Fl. Brit. Ind. 2: 190. 1876; Fl. As. 2: 72. 1938.

Trees, 5-8 m; leaves pinnately 3-foliolate; rachis 20-35 cm; leaflets ovate or rhomboid, truncate at base, acute to short-acuminate, 12-20 × 13-22 cm; lateral nerves 5-7 pairs; cymes terminal or axillary, 20-25 cm; pedicels up to 5 mm; flowers bright-red, 3-4 cm; pods 15-22 × 2.0-2.5 cm; seeds 4-6, oblong, white turning to dark brown, shiny.

Secondary forests, 1000-1500 m; fl. & fr.: Aug.-Jan.; Nartiang.

22. BUTEA Willd. *nom. cons.*

**Butea minor** Baker in Fl. Brit. Ind. 2: 195. 1876; Fl. As. 2: 74. 1938.

Erect shrubs, 1-3 m; leaves pinnately 3-foliolate; petioles 10-25 cm; stipules semicircular, 1-2 cm; lateral leaflets ovate to elliptic; terminal leaflets rhomboid or obovate, 10-35 × 8-30 cm; lateral nerves 7-9 pairs; flowers orange-red, 1.5-2.0 cm, fascicled in axillary or terminal simple 10-30 cm long racemes; pods oblong-elliptic, 7-10 × 2-3 cm; seeds obovate, 1.5-2.0 cm, dark brown, shiny.

Open grasslands and pine forests, 1000-1700 m; fl. & fr.: July-Jan.; Dawki, Raliang.

## 23. VIGNA Savi

- |  |     |                       |
|--|-----|-----------------------|
| 1a. Stipules distinctly peltate and prominently appendaged below insertion; keel petals spirally twisted, spurred on one side. | ... | <i>V. umbellata</i> 1 |
| 1b. Stipules not peltate, nor appendaged below insertions; keel petals not spirally twisted, nor spurred.                      | ... | <i>V. vexillata</i> 2 |

1. **Vigna umbellata** (Thunb.) Ohwi & Ohashi in J. Jap. Bot. 44: 31. 1969. *Dolichos umbellata* Thunb. in Trans. Linn. Soc. 2: 339. 1794. *Phaseolus calcaratus* Roxb. Fl. Ind. 2: 289. 1832; Fl. Brit. Ind. 2: 203. 1876; Fl. As. 2: 83. 1938.

Slender herbs, climbing up to 2 m; leaves 3-foliolate; petioles 5-12 cm; stipules subfalcate, 8-15 mm; leaflets ovate-lanceolate to rhomboid-ovate, sublobate, cuneate at base, acute to acuminate, 4-10 × 2-8 cm; lateral nerves 5-6 pairs; petiolules 2-4 mm; racemes 7-12 cm, 10-20-flowered; flowers 15-20 mm, yellow; pods compressed, 6-9 × 0.3-0.4 cm; seeds 8-12, brown.

Forests and forest edges, 200-1400 m; fl. & fr.: Aug.-Dec.; Garampani, Jowai.

2. **Vigna vexillata** (L.) A. Rich. Hist. Fis. Polit. Nat. 1. Cuba (Spanish ed.) 11: 191. 1845; Fl. Brit. Ind. 2: 206. 1876; Fl. As. 2: 84. 1938. *Phaseolus vexillatus* L. Sp. Pl. 724. 1753.

Slender twiners with tuberous fusiform root; leaves 3-foliolate; petioles 3-10 cm; stipules lanceolate, truncate at base, 7-8 mm; leaflets ovate, oblong-lanceolate or linear-lanceolate, rounded at base, acuminate, 5-13 × 1-6 cm; lateral nerves 4-5 pairs; petiolules 2-14 mm; racemes 10-20 cm, 5-10-flowered, flowers 20-25 mm; purple with deeper purple veins inside, yellowish outside; pods compressed, 7-12 × 0.4-0.6 cm; seeds 8-15, brown or black.

Forests and forest edges, 800-1500 m; fl. & fr.: Mar.-Dec.; Jowai, Mynsyngnat.

#### 24. ABRUS Adans.

**Abrus fruticulosus** W. & A. Prodr. Fl. Pen. Ind. Or. 296. 1834; Fl. Brit. Ind. 2: 176. 1876; *A. pulchellus* Thw. Enum. Pl. Zeyl. 91. 1859; Fl. Brit. Ind. 2: 175. 1876; Fl. As. 2: 62. 1938.

Straggling or climbing shrubs; leaves 7-14 cm; stipules ovate-lanceolate, up to 10 mm; leaflets 6-16 pairs, oblong-ovate or obovate, cuneate, subcordate to unequally narrowed at base, obtuse or truncate-mucronate, 10-35 × 6-15 mm; racemes terminal or lateral; peduncles 2-18 cm; corolla 12-15 mm, pinkish to purplish-yellow; pods strap-shaped, 2-7 × 0.8-1.3 cm.

Forests in shaded places, 100-1000 m; fl. & fr.: Aug.-Dec.; Dawki, Mynsyngnat-Nartiang.

#### 25. TEPHROSIA Pers. *nom. cons.*

**Tephrosia candida** (Roxb.) DC. Prodr. 2: 249. 1825; Fl. Brit. Ind. 2: 111. 1876; Fl. As. 2: 31. 1938. *Robinia candida* Roxb. Fl. Ind. 3: 327. 1832.

Much-branched robust shrubs, 2-3 m; leaves 15-30 cm; rachis 10-25 cm; stipules deltoid-setaceous, 4-5 mm; leaflets 13-27, elliptic-lanceolate, acute at base, acute-mucronate, 2-8 × 0.8-1.4 cm, densely silky beneath; racemes terminal or upper axillary, 15-25 cm; pedicels filiform; 1-2 cm; calyx 5-6 mm, thinly hairy; corolla ± 2 cm, creamy white, pods flat linear, 6-10 × 0.8-1.0 cm.

Wastelands and forest edges, 100-600 m; fl. & fr.: Aug.-Jan.; Dawki.

## 54. CAESALPINIACEAE

- 1a. Leaves 1-foliolate, entire or bilobed.
- 2a. Trees or shrubs, without tendrils; sepals united and split on one side, spathaceous. ... *Bauhinia* 1
- 2b. Climbers or stragglers with tendrils; sepals free or some connate at base, not spathaceous. ... *Phanera* 2
- 1b. Leaves pinnate.
- 3a. Petals absent; calyx segments petaloid. ... *Saraca* 3
- 3b. Petals present; calyx segments not petaloid.
- 4a. Stamens equal, all perfect; anther-cells dehiscing by longitudinal slits. ... *Cynometra* 4
- 4b. Stamens unequal, usually 3-5 reduced to staminodes; anther-cells dehiscing by terminal pores. ... *Cassia* 5

## 1. BAUHINIA L.

- 1a. Flowers appearing when leafless or nearly so; flower-buds not angled; fertile stamens 5. ... *B. variegata* 1
- 1b. Flowers appearing with leaves; flower-buds sharply angled; fertile stamens 3. ... *B. purpurea* 2

1. **Bauhinia variegata** L. Sp. Pl. 375. 1753; Fl. Brit. Ind. 2: 284. 1878; Fl. As. 2: 140. 1938.

Trees, 5-10 m; leaves ovate, suborbicular, cordate at base, bifid for about 1/3 way into rounded lobes, 6-14 × 5-13 cm; basal nerves 11-13; petioles 2.5-3.5 cm; flowers white, pink or purplish-pink, 6-8 cm across, in 8-12-flowered, 1.5-2.5 cm long corymbose racemes; calyx grey-pubescent; pods flat, subfalcate, 20-30 × 2-3 cm; seeds 10-15, orbicular, flat, 1.5-2.0 cm across.

Forests and forest edges, 1000-1500 m; fl. & fr.: Feb.-Aug.; Jowai.

2. **Bauhinia purpurea** L. Sp. Pl. 375. 1753; Fl. Brit. Ind. 2: 284. 1878; Fl. As. 2: 141. 1938.

Trees or large shrubs, 2-7 m; leaves ovate, 8-12 cm across, bifid for 1/4-1/3 way down, with wide sinus and acute or blunt lobes; petioles 2.5-4.5 cm; flowers pinkish-purple, 5-6 cm across, in terminal 5-25-flowered 6-12 cm long corymbose panicles; pedicels 5-15 mm; calyx tomentose; pods flat, subfalcate, 20-25 × 1.4-2.0 cm; seeds 10-16, orbicular, ± 5 mm across.

Forests and forest edges, 100-1200 m; fl. & fr.: Sept.-Apr.; Dawki, Jarain-Dawki.

## 2. PHANERA Lour.

- 1a. Lobes of leaves acute or acuminate; flower-buds globose or subglobose.
- 2a. Petals shorter than calyx limb; ovary rusty pubescent along sutures only. ... *P. khasiana* 1

- |   |                        |
|---|------------------------|
| 2b. Petals longer than calyx limb ; ovary completely rusty pubescent.   |                        |
| 3a. Petioles 5—8 cm long ; pedicels 5—10 mm long. ...   | <i>P. wallichii</i> 2  |
| 3b. Petioles 2—4 cm long ; pedicels 15—45 mm long. ...  | <i>P. stipularis</i> 3 |
| ib. Lobes of leaves obtuse to subobtuse ; flower-buds ellipsoid or ovoid.   |                        |
| 4a. Bracts and bracteoles spatulate ; calyx-tube as long as or slightly longer than limb ; petals 3.0—3.5 cm long ; ovary densely brownish pubescent. ... | <i>P. nervosa</i> 4    |
| 4b. Bracts and bracteoles filiform ; calyx-tube 2—3 times longer than limb ; petals 1.0—1.5 cm ; ovary glabrous. ...                                      | <i>P. tenuiflora</i> 5 |

1. **Phanera khasiana** (Baker) Thoth. in Bull. Bot. Soc. Bengal 19: 131. 1965. *Bauhinia khasiana* Baker in Fl. Brit. Ind. 2: 281. 1878; Fl. As. 2: 143. 1938.

Lianas; stems deeply fluted; tendrils apex bifid; leaves ovate to lanceolate, truncate or subcordate at base, bifid for about 1/3 - 1/4 way down, 8 - 18 × 4 - 12 cm; main nerves 7 - 9; petioles 3 - 5 cm; flowers yellowish to red, 1.0 - 1.5 cm across in 5 - 12 cm long corymbs, often paniculate; bracts lanceolate, ± 5 mm; pods not seen.

Primary forests, 800 - 1300 m; fl. & fr.: June-July; Umtapoh, *Bala-krishnan* 42712 —Endemic to Meghalaya.

2. **Phanera wallichii** (Macbride) Thoth. in Bull. Bot. Soc. Bengal 19: 131. 1965. *Bauhinia macrostachya* Baker in Fl. Brit. Ind. 2: 281. 1878; Fl. As. 2: 144. 1938. (*non* Benth. 1840). *B. wallichii* Macbride in Contr. Gray Herb. ser. 3. 59: 23. 1919.

Large climbers; tendrils forked; leaves suborbicular to ovate, deeply to shallowly cordate at base, bifid for about 1/4 way down with wide sinus, 7 - 14 × 6 - 13 cm; basal nerves 7 - 9; flowers pale yellow to brownish-yellow, ± 2 cm across, in terminal and upper axillary 7 - 15 cm long racemes; calyx silky-tomentose; pods flat, 10 - 15 × 4.5 - 5.5 cm, tomentose, 2 - 4-seeded.

Primary forests, 500 - 1200 m; fl. & fr.: Apr.-Jan.; Jaintea Hills, *Prain's Coll. s. n.* (CAL).

3. **Phanera stipularis** (Korth.) Benth. in Miq. Pl. Jungh. 1: 263. 1851. *Bauhinia stipularis* Korth. in Verh. nat. Gesch. Bot. 92. 1841. *P. albolutea* Miq. Fl. Ind. Bat. 1(1): 1079. 1858. *B. albolutea* (Miq.) Prain in J. As. Soc. Beng. 66(2): 187. 1897; Fl. As. 2: 145. 1938.

Slender climbers; tendrils circinate; leaves orbicular, 6 - 10 cm across, cordate or subtruncate at base, bilobed at apex for 1/3 way down; basal nerves 11 - 13; flowers yellow, 5 - 6 cm across, in terminal 8 - 12 cm long corymbose racemes; calyx-tube ± 1 cm; limb split into 5 lanceolate ± 15 × 2 mm segments; pods oblong, 6 - 10 × 0.9 - 1.2 cm, 2-seeded.

Primary forests, 100 - 1000 m; fl. & fr.: Sept.-Mar.; Dawki.

4. **Phanera nervosa** Benth. in Miq. Pl. Jungh. 1: 262. 1851. *Bauhinia nervosa* (Benth.) Baker in Fl. Brit. Ind. 2: 283. 1878; Fl. As. 2: 145. 1938.

Large climbers; tendrils in pairs; leaves oblong-ovate, truncate to subcordate at base, bilobed for  $1/3 - 1/2$  way down; basal nerves 11-15; petioles 2-4 cm; flowers white, 5-6 cm across, in terminal 15-25 cm long corymbose racemes; pedicels 2-4 cm; calyx-tube  $\pm 2.5$  cm, ferruginous pubescent; pods flat, 15-20  $\times$  3-4 cm, glabrescent, 5-7-seeded.

Primary forests, 100-500 m; fl. & fr.: Sept.-Apr.; Dawki.

5. **Phanera tenuiflora** (Clarke) de Wit in Reinwardtia 3: 490. 1956. *Bauhinia tenuiflora* Clarke in J. Linn. Soc. 25: 18. t. 6. 1889; Fl. As. 2: 146. 1938.

Large climbers; tendrils simple or forked; leaves suborbicular, truncate or subcordate at base, bilobed for about  $1/5 - 1/4$  way down, 6-10 cm; basal nerves 7-9; petioles 2.5-3.5 cm; flowers white, in terminal and lateral rusty-tomentose corymbs; peduncles 2.5-5.0 cm; calyx tube 2.0-2.5 cm; lobes 5, lanceolate; pods oblong, beaked, 20-25  $\times$  3.5-4.5 cm, 15-20-seeded.

Primary forests, 1000-1400 m; fl. & fr.: Sept.-May; Nartiang.

### 3. SARACA L.

**Saraca asoca** (Roxb.) de Wilde in Blumea 15: 393. 1968; Zuijd. in Bluraca 15: 422. 1967, *Jonesia asoca* Roxb. in As. Res. 4: 355. t. 1. 1799. *S. indica* (non L.) Bedd. Fl. Sylv. 1: 57. t. 57. 1869; Fl. Brit. Ind. 2: 271. 1878; Fl. As. 2: 136. 1938.

Trees, 3-10 m; leaflets 3-6 pairs, oblong-lanceolate, cuneate or rounded at base, acute to acuminate, 4-25  $\times$  1-8 cm; lateral nerves 8-12 pairs; flowers orange to scarlet, 2.5-3.0 cm, in compact 2-15 cm broad corymbs; pedicels 7-15 mm; bracts ovate, 1-6  $\times$  1-3 mm; calyx-tube 10-17 mm; lobes ovate, 7-10  $\times$  5-9 mm; pods oblong, 4-15  $\times$  2-4 cm,  $\pm 1.5$  cm thick, 4-8-seeded.

Forests edges, near villages, 100-1000 m; fl. & fr.: Feb.-Oct.; Dawki, Nongringkoh.

### 4. CYNOMETRA L.

**Cynometra polyandra** Roxb. Pl. Corom. 3: t. 286. 1820; Fl. Brit. Ind. 2: 268. 1878; Fl. As. 2: 184. 1938.

Trees, 3-12 m; rachis 5-12 cm; leaflets 2-3 pairs, obovate or oblong-lanceolate, unequally cuneate at base, obtuse or emarginate-acuminate, 5-10 × 2-4 cm; lateral nerves 7-8 pairs; corymbs axillary, 2.5-5.0 cm; bracts imbricating in buds, ovate; pedicels 2.0-2.5 cm; calyx-lobes obovate, 7-10 mm; petals 5, linear to oblanceolate, 10-12 mm, white; pods flat, falcate, beaked at apex, 3-7 × 3.0-4.5 cm; seeds ovoid, 2.5-3.5 cm across.

Primary forests, 100-1000 m; fl. & fr.: Feb.-Aug.; Dawki.

5. CASSIA L.

- |  |                          |
|--|--------------------------|
| 1a. Leaflets 15-60 pairs; bracteoles absent; sepals acute; fertile stamens 10; pods flat, dehiscent. ...   | <i>C. mimosoides</i> 1   |
| 1b. Leaflets less than 12 pairs; bracteoles present or absent; sepals blunt or rounded; fertile stamens 6-7; pods indehiscent or subindehiscent. |                          |
| 2a. Leaf-rachis with a solitary gland on or near the base. ...   | <i>C. occidentalis</i> 2 |
| 2b. Leaf-rachis with glands between the first pair of leaflets and some reduced glands scattered above.  |                          |
| 3a. Flowers 4-many, in 2-4 cm long peduncled racemes; filaments of long stamens more than 5 mm long. ...   | <i>C. floribunda</i> 3   |
| 3b. Flowers in pairs on up to 5 mm long peduncles; filaments of long stamens less than 5 mm long. ...  | <i>C. tora</i> 4         |

1. **Cassia mimosoides** L. Sp. Pl. 379. 1753; Fl. Brit. Ind. 2: 266. 1878; Fl. As. 2: 133. 1938.

Herbs or undershrubs; leaves 4-10 × 0.7-1.1 cm; leaflets oblong, truncate at base, acute-mucronate, 4-8 × 1.0-1.5 mm; petioles ± 3 mm; stipules linear, ± 2 cm; racemes axillary or extra axillary; pedicels 5-15 mm; sepals ovate, ± 8 mm petals orbicular, 7-11 mm, yellow; pods, 25-45 × 4-5 mm; seeds ± 4 mm, brown, glossy.

Grasslands and secondary forests, in open places, 1000-1600 m; fl. & fr.: Apr.-Oct.; Garampani, to Raliang, Jowai-Jarain.

2. **Cassia occidentalis** L. Sp. Pl. 377. 1753; Fl. Brit. Ind. 2: 262. 1878; Fl. As. 2: 129. 1938.

Herbs or undershrubs, 0.5-2.0 m; leaflets 3-5 pairs, ovate to oblong, rounded at base, acute to acuminate, 5-12 × 2-4 cm; lateral nerves 8-10 pairs; petioles 3-4 cm; stipules 8-16 mm; flowers yellow, 10-15 mm across, in 2-4-flowered corymbs; peduncles 1-4 mm; sepals ovate, 7-10 mm; pods linear, curved 10-12 × 0.7-1.0 cm; seeds 20-35, suborbicular, ± 4 mm.

Wastelands and roadsides, 400-1000 m; fl. & fr.: July-Jan.; Umjaisaw.

3. **Cassia floribunda** Cav. Descr. 132. 1802. *C. laevigata* Willd. Enum. Hort. Berol. 441. 1809; Fl. As. 2: 132. 1938.



Herbs or shrubs, 1-3 m; leaflets 3-5 pairs, ovate to elliptic, rounded to cuneate at base, acute to acuminate, 4-10 × 2-3 cm; lateral nerves 8-12 pairs; rachis 6-12 cm; petioles 15-55 mm; flowers yellow, 2-3 cm across, in 5-10 cm long racemes; sepals oblong, 6-10 mm; pods linear, cylindrical, 6-10 × 1.2-1.5 cm; seeds 40-55, ± 8 mm.

Secondary forests and forest edges, 500-1600 m; fl. & fr.: Jan.-Dec.; Jowai, Nongringkoh, Raliang, Sutnga.

4. **Cassia tora** L. Sp. Pl. 376. 1753; Fl. Brit. Ind. 2: 263. 1878; Fl. As. 2: 131. 1938.

Herbs or undershrubs, 0.3-1.2 m; leaflets 3 pairs, obovate, obliquely cuneate at base, acute, 2.5-5.0 × 1.5-2.5 cm; lateral nerves 6-9 pairs; petioles 1.5-3.5 cm; stipules linear, falcate, 10-15 mm; flowers yellow, ± 1.2 cm across; pedicels 4-10 mm; sepals ovate, 5-6 mm; pods terete, subtetragonous, 10-15 × 0.4-0.6 cm; seeds 20-30 rhomboidal, subcylindric, ⊥ 5 mm.

Wastelands and roadsides, 100-500 m; fl. & fr.: May-Dec.; Dawki.

## 55. MIMOSACEAE

- |  |                             |
|--|-----------------------------|
| 1a. Filaments more or less united into a tube.   |                             |
| 2a. Trees with weak or strong stipular spines; valves of fruits elastically splitting from apex to base. | ... <i>Calliandra</i> 1     |
| 2b. Unarmed trees; valves of fruits not elastically splitting.   |                             |
| 3a. Pods thin, papery, flat; seeds not arillate.   | ... <i>Albizia</i> 2        |
| 3b. Pods woody, fleshy or coriaceous, twisted or circinate; seeds arillate.                              | ... <i>Pithecellobium</i> 3 |
| 1b. Filaments free from one another or united only at base.  |                             |
| 4a. Stamens numerous, more than 100.   | ... <i>Acacia</i> 4         |
| 4b. Stamens 10 or fewer.   |                             |
| 5a. Flowers in heads; anthers without a gland at apex.   | ... <i>Mimosa</i> 5         |
| 5b. Flowers spicate; anthers with a gland at apex.   |                             |
| 6a. Fruits dehiscing into 2 thin valves which twist spirally; seeds scarlet red.                         | ... <i>Adenanthera</i> 6    |
| 6b. Fruits breaking transversely into 1-seeded segments; seeds dark brown-red.                           | ... <i>Entada</i> 7         |

### 1. *CALLIANDRA* Benth. *nom. cons.*

- |   |                            |
|---|----------------------------|
| 1a. Small trees; stipular spines strong and ultimately woody; common petiole 2.5-7.5 cm long. | ... <i>C. umbrosa</i> 1    |
| 1b. Bushy shrubs; stipular spines weak and never woody; common petiole 0.5-1.5 cm long.       | ... <i>C. griffithii</i> 2 |

1. ***Calliandra umbrosa*** (Wall.) Benth. in Benth. & Hook. f. Gen. Pl. 1: 597. 1865; Fl. Brit. Ind. 2: 302. 1878; Fl. As. 2: 174. 1938. *Inga umbrosa* Wall. Pl. As. Rar. 2: t. 124. 1830.

Trees or large shrubs, 3-8 m; pinnae 2, 3-8 cm; leaflets 1 pair or rarely 2 pairs, oblong-elliptic, obtuse at base, acute to acuminate, 5-18 × 3-8 cm; lateral nerves 5-10 pairs; heads  $\pm$  16 mm across; corolla  $\pm$  3 mm, pale yellow or white; pods 15-25 × 2.0-2.5 cm; seeds 4-9, 12-17 × 10-15 mm, compressed.

Primary forests, 100-600 m; fl. & fr.: Sept.-Mar.; Dawki, G. K. Deka 22489.

2. **Calliandra griffithii** Benth. in Trans. Linn. Soc. 30: 537. 1875; Fl. Brit. Ind. 2: 302. 1878; Fl. As. 2: 175. 1938.

Bushy or subscandent shrubs, 2-3 m; leaves bipinnate with one pair of pinnae and one pair of terminal leaflets on each pinna; stipular spines 3-6 mm; rachis of pinnae 5-19 mm; leaflets lanceolate to elliptic-lanceolate, acute to obtuse at base, acute to short-acuminate, 2-10 × 0.5-3.5 cm; lateral nerves 5-7 pairs; heads solitary or fascicled; peduncles 2-3 cm; flowers white, 6-8 mm; corolla-lobes  $\pm$  3 mm; filaments pale pink, 6-8 mm.

Primary forests, 500-1200 m; fl. & fr.: July-Oct.; Syndai, Balakrishnan 46133; U. N. Kanjilal 2801; Umtapoh, Balakrishnan 42726 —Endemic to Meghalaya.

## 2. ALBIZIA Durazz

- |  |     |                       |
|--|-----|-----------------------|
| 1a. Pinnae 2-3 pairs; leaflets 5-12 pairs, 2-5 × 1.0-2.5 cm; midrib not close to upper edge. | ... | <i>A. lebbeck</i> 1   |
| 1b. Pinnae 5-12 pairs; leaflets 20-40 pairs, 4-8 × 2-4 mm; midrib very close to upper edge.  | ... | <i>A. chinensis</i> 2 |

1. **Albizia lebbeck** (L.) Benth. in Hook. Lond. J. Bot. 3: 87. 1844; Baker in Fl. Brit. Ind. 2: 298. 1879; Fl. As. 2: 165. 1938. *Mimosa lebbeck* L. Sp. Pl. 516. 1753.

Trees, 16-20 m; rachis 7-15 cm, with a large oblong gland at base; rachis of pinnae 5-20 cm; leaflets oblong, obovate, unequal at base, rounded emarginate; basal nerves 2-3; heads 15-30-flowered; peduncles 5-10 cm, solitary or in fascicles of 2-4; pedicels 2-3 mm; corolla 8-9 mm, greenish-white; filaments 25-30 mm, united at base, yellow; pods 12-25 × 3-6 cm, 3-12-seeded.

Primary forests, 100-500 m; fl. & fr.: Apr.-Dec.; Dawki.

2. **Albizia chinensis** (Osbeck) Merr. in Amer. J. Bot. 3: 575. 1916. *Mimosa chinensis* Osbeck. Dag. Ostind. Res. 233. 1757. *M. stipulata* Roxb. Fl. Ind. 2: 549. 1832. *A. stipulata* (Roxb.) Boivin in Encycl. 19(2): 33. 1838; Fl. Brit. Ind. 2: 300. 1878; Fl. As. 2: 167. 1938.

Trees, 20-30 m; rachis 15-25 cm, with one large gland at base and one or more between pinnae; leaflets linear-oblong, falcate, obliquely acute at both ends; heads 15-25-flowered, in 15-25 cm long corymbs or racemes; corolla 6-7 mm, yellowish-white; filaments 25-30 mm, united at base into 4 mm long tube; pods 10-18 × 2-3 cm, 4-15-seeded.

Primary forests, 800-1500 m; fl. & fr.: May-Dec.; Nartiang.

### 3. PITHECELLOBIUM Mart. *nom. cons.*

- |   |     |                       |
|---|-----|-----------------------|
| 1a. Branchlets prominently angled; pinnae and leaflets 4 or more pairs. | ... | <i>P. clypearia</i> 1 |
| 1b. Branchlets not angled; pinnae 1-2 pairs; leaflets 1-3 pairs.        | ... | <i>P. bigeminum</i> 2 |

1. **Pithecellobium clypearia** (Jack) Benth. in Hook. Lond. J. Bot. 3: 209. 1844; Fl. Brit. Ind. 2: 305. 1878. *Inga clypearia* Jack in Malay, Misc. 2(7): 78. 1822. *P. montanum* Benth. in Hook. Lond. J. Bot. 3: 209. 1844; Fl. Brit. Ind. 2: 306. 1878; Fl. As. 2: 173. 1938.

Trees, 5-12 m; leaves bipinnate with 2-6 pairs of pinnae; rachis 15-20 cm; with a gland at base, leaflets 5-16 pairs, trapezoid or rhomboid-ovate, obtuse or rather acute, 0.5-4.5 × 0.3-1.5 cm; lateral nerves 4-14 pairs; flowers white or yellowish-white; pods circinnate, sinuate along ventral suture, 16-20 × 1.0-1.5 cm; seeds 8-10, purplish or bluish-black.

Primary forests and forest edges, 500-1000 m; fl. & fr.: Mar.-Jan.; Raliang, Syndai.

2. **Pithecellobium bigeminum** (L.) Mart. Flora 20 (2), Beibl. 8: 115. 1837; Fl. Brit. Ind. 2: 303. 1878; Fl. As. 2: 170. 1938. *Mimosa bigeminum* L. Sp. Pl. 517. 1753. '*Dieng-siar*'.

Trees or straggling shrubs, 3-6 m; leaves bipinnate with 1-2 pairs of pinnae; rachis 3-10 cm; rachises of pinnae 5-12 cm; leaflets 1-3 on lower pinnae, up to 4 pairs on terminal pinnae, elliptic to lanceolate, acute or obtuse at base, short-acuminate, 3-15 × 2-6 cm; lateral nerves 8-12 pairs; flowers white or pale creamy, peduncles 1-3 cm; pods twisted, 8-20 × 2.0-2.5 cm; seeds 8-12, brown.

Primary forests and forest edges, 1200-1600 m; fl. & fr.: Mar.-Feb.; Jowai, Myntang, Shangpung.

### 4. ACACIA Mill.

- |  |     |                         |
|--|-----|-------------------------|
| 1a. Branchlets pruinose; pinnae up to 10 pairs.  | ... | <i>A. pruinescens</i> 1 |
| 1b. Branchlets not pruinose; pinnae 12-17 pairs. | ... | <i>A. pennata</i> 2     |

1. **Acacia pruinescens** Kurz in J. As. Soc. Beng. 45(2): 296. 298. 1876; Fl. As. 2: 155. 1938.

Large climbers with recurved prickles; leaves bipinnate; main rachis 10-25 cm; pinnae 7-10 cm; leaflets 40-50 pairs; linear-oblong, truncate at base, obtuse, 7-10 × 1-2 mm; flowers yellow, in 20-30-flowered heads; bracts linear-lanceolate, 5-8 mm; peduncles in fascicles, in 10-18 mm; pods not seen.

Primary forests and forest edges, 300-1000 m; fl.: Apr.-June; Sohka, Balakrishnan 42649.

2. **Acacia pennata** (L.) Willd. Sp. Pl. 4: 1090. 1806; Fl. Brit. Ind. 2: 297. 1878; Fl. As. 2: 156. 1938. *Mimosa pennata* L. Sp. Pl. 1507. 1753.

Large prickly climbers, leaves bipinnate; main rachis up to 22 cm; pinnae 4-10 cm; leaflets 16-50 pairs; sessile, linear-oblong, unequally broad, sharply acute, 3-8 mm long, ± 1 mm broad; flowers pale white; heads 8-12 mm across, arranged in terminal leafy panicles; peduncles 10-15 mm; pods strap-shaped, beaked at apex, 10-15 × 2.0-3.5 cm; seeds 8-14.

Forests and forest edges, 100-600 m; fl. & fr.: July-Nov.; Dawki.

#### 5. MIMOSA L.

**Mimosa pudica** L. Sp. Pl. 516. 1753; Fl. Brit. Ind. 2: 291. 1878; Fl. As. 2: 152. 1938.

Decumbent-straggling prickly shrubs, 30-150 cm; leaves bipinnate; pinnae 2-4, digitate; rachis 2-3 cm; leaflets 5-26 pairs, narrowly oblong, obliquely rounded at base, acute to subobtuse, 5-15 × 1-3 mm; flowers pink, ± 2 mm; heads globose, axillary; peduncles 2-5 cm, 1-4, fascicled; pods linear-oblong, flat, constricted between seeds, with 2-3 mm long bristly hairs on sutures.

Wastelands and forest edges, 100-800 m; fl. & fr.: June-Dec.; Syndai.

#### 6. ADENANTHERA L.

**Adenantha pavonina** L. Sp. Pl. 384. 1753; Fl. Brit. Ind. 2: 287. 1878; Fl. As. 2: 150. 1938.

Trees or large shrubs, 5-15 m; leaves bipinnate; rachis 20-35 cm; rachises of pinnae 8-15 cm; leaflets 4-16, ovate or oblong-elliptic, cuneate at base, emarginate or cuspidate, 2-5 × 1-3 cm; lateral nerves 8-10 pairs; racemes in terminal panicles, 12-25 cm; flowers greenish-yellow, 4-5 mm;

Pods linear, spirally coiled, 15-25 × 1.0-1.5 cm; seeds 8-15, 6-8 mm, scarlet-red.

Forests and forest edges, 100-600 m; fl. & fr.: Mar.-Oct.; Dawki.

The seeds are used as weights by goldsmiths.

#### 7. ENTADA Adans. *nom. cons.*

**Entada phascoloides** (L.) Merr. in Philip. J. Sci. 9: 86. 1914. *Mimosa entada* L. Sp. Pl. 518. 1753. *Lens phaseoloides* L. Herb. Amboin. 18. 1754. *Mimosa scandens* L. Sp. Pl. ed. 2: 1501. 1763. *Entada scandens* (L.) Benth. in Hook. J. Bot. 4: 332. 1841; Fl. Brit. Ind. 2: 287. 1878; Fl. As. 2: 149. 1938.

Gigantic lianas, 30-150 m; stems angled, much twisted; leaves bipinnate, terminal pair of pinnae modified into deciduous tendrils; leaflets 2-5 pairs, obovate to oblong, obtuse at base, bluntly short acuminate, 25-85 × 15-45 mm; lateral nerves 7-9 pairs; spikes 15-35 cm; flowers pale yellow, 2-3 mm; pods woody, 35-130 × 7-10 cm, breaking up into 1-seeded segments; seeds lenticular, 4-5 cm diam., shiny brown.

Primary forests, 100-1400 m; fl. & fr.: Jan.-Dec.; Raliang. Raliang-Garampani.

#### 56. ROSACEAE

- |   |                      |
|---|----------------------|
| 1a. Fruits dehiscent, follicular.   |                      |
| 2a. Leaves stipulate; flowers in panicles; calyx with stalked glands.                               | <i>Nothofagus</i> 1  |
| 2b. Leaves exstipulate; flowers in umbels or fascicles; calyx not provided with stalked glands. ... | <i>Spiraea</i> 2     |
| 1b. Fruits indehiscent, composed of achenes, berries, drupes or pomes.                              |                      |
| 3a. Carpels in fruit neither enclosed, nor fused with calyx-tube.                                   |                      |
| 4a. Erect or straggling shrubs or trees; ovules 2 in each carpel.                                   |                      |
| 5a. Trees or shrubs; calyx or calyx-lobes deciduous; carpel one.                                    | <i>Prunus</i> 3      |
| 5b. Straggling shrubs; calyx or calyx-lobes persistent; carpels many. ..                            | <i>Rubus</i> 4       |
| 4b. Erect shrubs; ovules solitary in each carpel.   |                      |
| 6a. Leaves palmately 3-foliolate; styles not or slightly elongated and straight in fruit. ...       | <i>Duchesnea</i> 5   |
| 6b. Leaves imparipinnate; styles elongated and hooked in fruit. ...                                 | <i>Agrimonia</i> 6   |
| 3b. Carpels in fruit enclosed by or fused with the fleshy calyx-tube.                               |                      |
| 7a. Carpels numerous; fruits small and dry; achenes free within the enlarged fleshy receptacle. ... | <i>Rosa</i> 7        |
| 7b. Carpels 1-5; fruits fleshy and fused with fleshy enlarged calyx.                                |                      |
| 8a. Leaves pinnate. ...   | <i>Sorbus</i> 8      |
| 8b. Leaves simple.  |                      |
| 9a. Flowers in umbels, fascicles or corymbs; styles 4-5.  |                      |
| 10a. Styles united at base; carpels 3-many seeded. ...  | <i>Docynia</i> 9     |
| 10b. Styles free; carpels 1-2-seeded. ...   | <i>Pyrus</i> 10      |
| 9b. Flowers in racemes or panicles; styles 2-3.   |                      |
| 11a. Carpels partly free from each other; fruits drupaceous, hard. ...                              | <i>Photinia</i> 11   |
| 11b. Carpels wholly connate; fruits juicy, baccate. ...   | <i>Eriobotrya</i> 12 |

1. NEILLIA D. Don

**Neillia thyrsiflora** D. Don, Prodr. Fl. Nep. 228. 1825; Fl. As. 2: 206. 1938.

Erect shrubs, 2-3 m, with drooping branches; leaves ovate, cordate, truncate or rounded at base, long-acuminate, often lobed, biserrate, 4-11 × 2-7 cm; basal nerves 3-5; lateral nerves 4-5 pairs; petioles 15-20 mm; panicles 5-12 cm, terminal and upper axillary; flowers white, 4-5 mm across; calyx 4-7 mm; fruits dry, dehiscent on ventral sutures; seeds brown, polished.

Primary forests and forest edges, 1200-1600 m; fl. & fr.: May-Nov.; Jowai, Jowai-farain, Khleihriat.

2. SPIRAEA L.

**Spiraea cantoniensis** Lour. Fl. Cochinch. 322. 1790; Fl. Brit. Ind. 2: 326. 1878; Fl. As. 2: 206. 1938.

Shrubs, 2-3 m; leaves rhombic-ovate to elliptic-oblong, cuneate at base, acute, serrate, 3-7 × 1-3 cm; 3-nerved at base; lateral nerves 4-5 pairs; petioles 2-5 mm; umbels 10-20-flowered, terminal or axillary; pedicels 1-2 cm; flowers 5-6 mm across; calyx ± 3 mm; petals white; follicles free, oblong, dehiscent along ventral sutures.

Hedges and wastelands, near villages, 1400-1600 m; fl. & fr.: Mar.-Aug.; Jowai.

Usually used as hedge plant and propagated by cuttings, fruits set rarely.

3. PRUNUS L.

- |   |                             |
|---|-----------------------------|
| 1a. Flowers solitary, fascicled or closely umbellate.                           |                             |
| 2a. Pedicels more than 8 mm long; calyx glabrous; ovary glabrous.               | ... <i>P. cerasoides</i> 1  |
| 2b. Pedicels less than 5 mm long; calyx-lobes densely villous; ovary tomentose. | ... <i>P. persica</i> 2     |
| 1b. Flowers in many-flowered racemes.   |                             |
| 3a. Leaves deciduous.   | ... <i>P. napaulensis</i> 3 |
| 3b. Leaves persistent.  |                             |
| 4a. Leaves densely black-dotted beneath.  | ... <i>P. phaeosticta</i> 4 |
| 4b. Leaves not black-dotted beneath.  |                             |
| 5a. Leaves dentate at margins, linear lanceolate to oblanceolate                | ... <i>P. jenkinsii</i> 5   |
| 5b. Leaves entire at margins, linear-lanceolate to elliptic-oblong.             |                             |
| 6a. Sepals and petals alike; petals about 1½ times longer than sepals.          | ... <i>P. ceylanica</i> 6   |
| 6b. Sepals and petals distinctive; petals 2-3 times longer than sepals,         | ... <i>P. wallichii</i> 7   |

1. **Prunus cerasoides** D. Don, Prodr. Fl. Nep. 239. 1825; Fl. As. 2: 180. 1938. *Cerasus puddum* Wall. Pl. As. Rar. 2: 37. t. 143. 1831. *P. puddum* (Wall.) Brandis, For. Fl. NW. Centr. Ind. 194. 1874; Fl. Brit. Ind. 2: 314. 1878.

Deciduous trees, 8-15 m; leaves ovate to oblong-lanceolate, rounded with 3-4 glands at base, long acuminate, glandular serrate, 8-14 × 4-6 cm; lateral nerves 6-10 pairs; petioles 10-15 mm; racemes corymbose, at axils of fallen leaves; pedicels 8-13 mm; flowers pale pink, ± 2.5 cm across; calyx campanulate, ± 8 mm; petals ± 1 cm; drupes ellipsoid, 2.0-2.5 cm, yellow, tinged dark red.

Primary forests and near villages, 1200-1600 m; fl. & fr.: Mar.-Aug.; Shangpung.

Often planted near villages, for the sour and astringent fruits.

2. **Prunus persica** (L.) Batsch, Beytr. Pragm. Gesch. Naturr. 1: 30. 1801; Fl. Brit. Ind. 2: 313. 1878; Fl. As. 2: 182. 1938. *Amygdalus persica* L. Sp. Pl. 472. 1753.

Trees, 3-8 m; leaves lanceolate to broadly oblanceolate, acuminate, sharply serrate at margins, 8-15 × 1.5-3.5 cm, puberulous on midrib beneath; petioles glandular at upper portion, 4-10 mm; stipules subulate, fimbriate; flowers pink to white; drupes succulent, downy pilose; pyrenes rugose.

On open places near villages and forest edges, 1400-1700 m; fl. & fr.: Feb.-July; Thadlaskain, near Jowai.

3. **Prunus napaulensis** (Ser.) Steud. Nom. Bot. ed. 2, 2: 403. 1841; Fl. Brit. Ind. 2: 316. 1878 (sphalm: *nepalensis*); Fl. As. 2: 178. 1938. *Cerasus napaulensis* Ser. in DC. Prodr. 2: 540. 1825.

Trees, 15-20 m; leaves lanceolate to oblong-lanceolate, rounded or acute at base, caudate-acuminate, crenate-serrate, 7-13 × 3-5 cm; lateral nerves 14-22 pairs; petioles 1-2 cm; racemes terminal, 7-8 cm; pedicels 4-5 mm; flowers white, 7-8 mm across; calyx turbinate, ± 4 mm; petals broadly obovate, ± 3 mm; drupes oblong, fleshy, ± 2 cm.

Primary forests, 1000-1600 m; fl. & fr.: Oct.-Mar.; Raliang, Shangpung, Sutnga.

4. **Prunus phaeosticta** (Hance) Maxim. in Bull. Ac. Imp. Sc. St.-Pet. 29: 110. 1883; *Pygeum phaeostictum* Hance in J. Bot. 8: 72. 1870. *Prunus punctata* Hook. f. Fl. Brit. Ind. 2: 317. 1878; Fl. As. 2: 182. 1938.

Shrubs or small trees, 9-12 m; leaves oblong to ovate-oblong or obo-

vate-oblong, acute to rounded at base, acuminate to caudate, 6-13 × 2-4 cm; lateral nerves 6-9 pairs; basal glands 2; racemes subcorymbiform, 2-6 cm, 8-10-flowered; pedicels 3-6 cm; flowers 2-3 mm across, white; calyx 1.5-2.0 mm; petals orbicular, 2-3 mm; drupes ellipsoid, ± 9 mm.

Forests and forest edges, 1200-1600 m; fl. & fr.: Apr.-Oct.; Jarain, Jowai.

5. **Prunus jenkinsii** Hook. f. Fl. Brit. Ind. 2: 317. 1878; Fl. As. 2: 181. 1938.

Trees, 15-20 m; leaves acute to cuneate at base, caudate-acuminate, 8-15 × 2.5-4.5 cm; lateral nerves 9-13 pairs; petioles 5-8 mm; racemes axillary, 5-8 cm; pedicels 2-3 mm; flowers ± 5 mm across, white; calyx ± 1.5 mm, turbinate, pubescent; petals 5, orbicular, 2.0-2.5 mm; drupes ellipsoid, 2.2-2.5 cm, yellow, tinged red.

Primary forests, 1200-1600 m; fl. & fr.: Oct.-Mar.; Laskein, Jowai, Raliang.

6. **Prunus ceylanica** (Wt.) Miq. Fl. Ind. Bat. 1. 1: 366. 1855. *Polydonta ceylanica* Wt. Ill. Ind. Bot. 1: 203. 1840. *Pygeum acuminatum* Colebr. in Trans. Linn. Soc. 12: 360. t. 18. 1818 (*non* Michx. 1803); Fl. Brit. Ind. 2: 318. 1878; Fl. As. 2: 185. 1938. *P. wightianum* C. Muell. in Walp. Ann. 4: 642. 1857 & in Fl. Brit. Ind. 2: 319. 1878. *P. glaberrimum* Hook. f. Fl. Brit. Ind. 2: 319. 1878.

Trees, 18-24 m; leaves elliptic-oblong or ovate-lanceolate, acute or rounded at base, acuminate, 6-16 × 2-7 cm; lateral nerves 5-9 pairs; petioles 1-2 cm; racemes axillary, 4-12 cm; pedicels 1-3 mm; flowers 8-10 mm across, white; calyx 6-lobed; petals elliptic-orbicular, ± 1 mm; drupes ellipsoid, 9-18 × 14-25 mm, red purple and ultimately black.

Primary forests, 500-1200 m; fl. & fr.: Apr.-Oct.; Syndai.

7. **Prunus wallichii** Steud. Nomencl. ed. 2. 2: 404. 1841; *Cerasus acuminata* Wall. Pl. As. Rar. 2: 78. t. 181. 1831. *Prunus acuminata* (Wall.) Dietr. Syn. 3: 42. 1843 (*non* Michx. 1803); Fl. Brit. Ind. 2: 317. 1878; Fl. As. 2: 181. 1938.

Large shrubs or small trees, 6-14 m; leaves elliptic-oblong to lanceolate, acute to rounded at base, acuminate, 8-15 × 3-6 cm; petioles 5-10 mm; racemes axillary, solitary, 3-10 cm; pedicels 2-8 mm; flowers 6-8 mm, white; calyx 5-lobed; petals elliptic to suborbicular, 2-4 mm; drupes ellipsoid, 10-18 × 6-11 mm.



Primary forests and forest edges, 1400 - 1700 m; fl. & fr.: Nov.-May; Jowai, Raliang.

#### 4. RUBUS L.

- |  |     |                         |
|--|-----|-------------------------|
| 1a. Leaves imparipinnate.  |     |                         |
| 2a. Leaflets 3—5, obcordate or rounded at apex.  | ... | <i>R. ellipticus</i> 1  |
| 2b. Leaflets 5—11, lanceolate, acuminate.  |     |                         |
| 3a. Stems and branches eglandular; petals pink; drupes black.  |     | <i>R. niveus</i> 2      |
| 3b. Stems and branches with gland-tipped stiff black hairs; petals white; drupes orange-yellow or scarlet.                                     | ... | <i>R. rosifolius</i> 3  |
| 1b. Leaves simple.   |     |                         |
| 4a. Leaves almost entire.  |     |                         |
| 5a. Leaves white velvety beneath; petals absent.   | ... | <i>R. assamensis</i> 4  |
| 5b. Leaves glabrous or pubescent, not white beneath; petals present.   |     |                         |
| 6a. Mature leaves glabrous, caudate-acuminate.   | ... | <i>R. betulinus</i> 5   |
| 6b. Mature leaves pubescent, acute to acuminate.   | ... | <i>R. hexagynus</i> 6   |
| 4b. Leaves palmatifid.   |     |                         |
| 7a. Stems and branches covered with patent hairs; lobes of stipules and bracts filiform, with erecto-patent hairs.                             | ... | <i>R. alceifolius</i> 7 |
| 7b. Stems and branches appressed-tomentose; lobes of stipules and bracts triangular-linear, appressed-pubescent.                               |     |                         |
| 8a. Petioles less than 3 cm long; stipules and bracts more or less deeply pectinate, less than 5 mm broad; lobes of leaves obtuse to subacute. | ... | <i>R. rugosus</i> 8     |
| 8b. Petioles more than 5 cm long; stipules and bracts ovate, toothed at apex only, more than 1 cm broad; lobes of leaves acute.                | ... | <i>R. khasianus</i> 9   |

1. **Rubus ellipticus** Smith in Rees, Cyclop. 30: no. 16. 1819; Fl. Brit. Ind. 2: 336. 1878; Fl. As. 2: 196. 1938.

Suberect shrubs, 2-3 m; prickles short, hooked or curved; leaves pinnately 3-foliolate; rachis 3-6 cm; stipules filiform; leaflets elliptic to sub-orbicular, acute to rounded at base, obtuse or emarginate, 2-8 × 2-6 cm; lateral nerves 7-9 pairs; panicles terminal, leafy; pedicels 4-8 mm; flowers ± 8 mm across, white; fruits globose, ± 12 mm diam., orange-yellow.

Forests and forest edges, 1200-1600 m; fl. & fr.: Feb.-July; Jowai, Jowai-Jarain.

2. **Rubus niveus** Thunb. Diss. Bot. Med. de Rubo 9(6): t. 3. 1818. *R. lasiocarpus* Smith in Rees, Cyclop. 30: no. 6. 1815; Fl. Brit. Ind. 2: 339. 1878; Fl. As. 2: 200. 1938.

Large spreading shrubs; prickles stout, hooked, compressed; leaves pinnately 5-11-foliolate, 12-15 cm; rachis 7-9 cm; stipules linear-subulate 5-7 mm; leaflets elliptic, ovate to lanceolate, cuneate at base, acute, acutely toothed, 2-6 × 1-3 cm; lateral nerves 7-10 pairs; panicles corymbose; pedicels 6-8 mm; flowers 6-8 mm across; fruits ovoid, subglobose, ± 1.3 cm.

Forests and forest edges and bushes, 1300-1600 m; fl. & fr.: Mar.-Aug.; Jowai.

3. **Rubus rosifolius** Smith, Pl. Ic. ined. 3: t. 60. 1791; Fl. Brit. Ind. 2: 341. 1878; Fl. As. 2: 200. 1938. '*Soh-depai*'.

Subscandent shrubs with stiff purple gland-tipped hairs; prickles straight, flattened; leaves pinnately 5-9-foliolate; rachis 6-10 cm; leaflets ovate-oblong, acute to acuminate, 2-6 × 1-3 cm; lateral nerves 8-12 pairs; stipules linear, filiform, 3-4 cm; panicles axillary, lax, 1-5-flowered; flowers ± 2 cm across; fruits oblong to sub-globose, 1.2-1.5 cm.

Forests edges and wastelands, 1500-1700 m; fl. & fr.: Jan.-Sept.; Mawryngkneng.

4. **Rubus assamensis** Focke in Bremen, Abh. Nat. Ver. 4: 197. 1874; Fl. Brit. Ind. 2: 328. 1878; Fl. As. 2: 192. 1938.

Subscandent shrubs; prickles hooked, scattered, ± 1 mm; leaves oblong, or ovate, acute to subcordate at base, short-acuminate, unequally toothed, 6-10 × 2-4 cm; lateral nerves 5-6 pairs; petioles 3-4 mm; stipules pectinately lobed, 2-3 mm; panicles pyramidal, 12-13 cm; pedicels ± 8 mm; flowers 4-5 × 8-10 mm; fruits globose, ± 6 mm.

Primary forests and forest edges, 1400-1600 m; fl. & fr.: May-Aug.; Jowai.

5. **Rubus betulinus** D. Don, Prodr. Fl. Nep. 233. 1825. *R. acuminatus* Smith in Rees, Cyclop. 30: no. 43. 1815; Fl. Brit. Ind. 2: 327. 1878; Fl. As. 2: 190. 1938.

Scandent prickly shrubs; leaves ovate-lanceolate, rounded at base, serrate, 8-16 × 2-7 cm; lateral nerves 7-10 pairs; petioles slender, 8-18 mm; corymbs terminal, paniculate, 2-8-flowered; peduncles ± 1 cm; pedicels 8-18 mm; bracts subulate, ± 2 mm; flowers white; fruits of large drupelets, scarlet-red.

Primary forests, 1200-1500 m; fl. & fr.: Aug.-Dec.; Amwee river, near Jarain.

6. **Rubus hexagynus** Roxb. Fl. Ind. 2: 516. 1832; Fl. Brit. Ind. 2: 327. 1878; Fl. As. 2: 191. 1938.

Scandent shrubs; prickles recurved, flattened; leaves oblong to ovate, subcordate to rounded at base, serrate, 6-10 × 3-5 cm; lateral nerves 8-10 pairs; petioles 5-8 mm; stipules lobed into filiform segments, white villous;

panicles terminal; flowers  $\pm$  1 mm, white; bracts simple, filiform or multifid; pedicels  $\pm$  4 mm; drupes obliquely ovoid, red to chocolate coloured.

Primary forests, 800-1400 m; fl. & fr.: Oct.-Jan.; Sutnga, Syndai.

7. **Rubus alceifolius** Poir. in Lamk. Encycl. 6: 247. 1804. *R. moluccanus* (non L. 1753) Hook. f. Fl. Brit. Ind. 2: 330. 1878, *p. p.*; Fl. As. 2: 194. 1938, *p. p.*

Subscandent shrubs; prickles curved; leaves suborbicular, cordate at base, with 3-7 broadly ovate-triangular acute lobes at apex, closely serrate, 6-14  $\times$  5-12 cm, velvety grey tomentose beneath, palmately 5-nerved at base; petioles 3-6 cm; panicles terminal and upper axillary, patently pilose; flowers  $\pm$  1.5 cm across, white; fruits globose,  $\pm$  1.3 cm, scarlet.

Forests, forest edges and bushes, 1400-1700 m; fl. & fr.: May-Sept.; Mawryngkneng, Raliang.

8. **Rubus rugosus** Smith in Rees, Cyclop. 30: 34. 1815. *R. moluccanus* (non L. 1753) Hook. f. Fl. Brit. Ind. 2: 330. 1878, *p. p.*; Fl. As. 2: 194. 1938, *p. p.*

Straggling or subscandent shrubs; prickles short, straight or slightly curved; leaves suborbicular, cordate at base, with 3-7 ovate orbicular lobes, unequally serrate, 4-8  $\times$  3-7 cm, densely grey velvety tomentose beneath; palmately 5-nerved; petioles 10-35 mm; panicles terminal and axillary; pedicels 5-10 mm; flowers  $\pm$  1 cm across, cream-yellow; calyx densely hairy, 6-10 mm; fruits globose,  $\pm$  1 cm, red.

Open scrubs and pine forests, 1300-1600 m; fl. & fr.: May-Sept.; Jowai, Jowai-Jarain, Khongsnong, Mawryngkneng.

9. **Rubus khasianus** Cordot in Le Comte, Notul. Syst. 3: 298. 1917; Fl. As. 2: 202. 1938.

Subscandent straggling shrubs; leaves suborbicular to ovate-cordate with 5-7 ovate-triangular lobes, irregularly serrate, 6-15  $\times$  5-13 cm; racemes terminal and axillary, glomerate; bracts spathaceous,  $\pm$  1.5  $\times$  1.2 cm; flowers  $\pm$  1 cm across, white; calyx dense hairy,  $\pm$  1 cm; petals suborbicular, shortly clawed, sinuate-erose at apex,  $\pm$  5 mm; fruits unknown.

Forests, forest edges and bushes, 1000-1500 m; fl.: May-June; Jowai, Balakrishnan 42204; Deb 24419 B; Umtapoh, Balakrishnan 42702 — Endemic to Meghalaya.

## 5. DUCHESNEA Smith

**Duchesnea indica** (Andr.) Focke in Engler & Prantl, Pflanzenfam, 3(3): 33. 1888. *Fragaria indica* Andr. Bot. Repos. 7: t. 470. 1807; Fl. Brit. Ind. 2: 343. 1878; Fl. As. 2: 203. 1938.

Perennial herbs, with epigeal rooting stolons; leaves in rosette, 3-foliolate; leaflets obovate, cuneate or acute at base, obtuse, crenate-dentate, 1.4 × 0.8 - 2.5 cm, white pilose; flowers solitary or in 2-4-flowered terminal cymes, yellow, 8-10 mm; receptacle spongy, 1-2 cm diam., achenes black, resting on bright red receptacle.

Open places near forests, in pine forests, gardens and wastelands, 1300-1700 m; fl. & fr.: Mar.-Aug.; Raliang.

## 6. AGRIMONIA L.

**Agrimonia nepalensis** D. Don, Prodr. Fl. Nep. 229. 1825. *A. eupatoria* (auctt. mult. non L.) Hook. f. Fl. Brit. Ind. 2: 381. 1878; Fl. As. 2: 205. 1938. **Fig. 14**

Erect perennial hairy herbs, 0.5-1.0 m; leaves 5-16 cm, all cauline, imparipinnately 5-9-foliolate, with many smaller leaflets in between; leaflets serrate or crenulate, 1.4 × 1-2 cm; flowers golden yellow, 4-6 mm across, in stiff terminal erect spicate racemes; pedicels 1-3 mm; lower bracts 3-lobed; achenes 1-2, enclosed in bristly obconical hypanthium.

Wastelands and pine forests, 1300-1700 m; fl. & fr.: Apr.-Sept.; Jowai.

## 7. ROSA L.

**Rosa moschata** Herrm. Diss. De Rosa 15. 1762; Fl. Brit. Ind. 2: 367. 1878. *R. longicuspis* Bertol. Misc. Bot. 21: 15. t. 3. 1862; Fl. Brit. Ind. 2: 367. 1878; Fl. As. 2: 208. 1938.

Prickly shrubs or climbers; prickles recurved, 2-4 mm; leaves imparipinnate, 10-15 cm; leaflets 5-9, ovate to lanceolate, rounded to subobtusate at base, acute to caudate-acuminate, sharply serrate, 3-7 × 2-4 cm; lateral nerves 7-11 pairs; stipules lanceolate, 10-15 mm; corymbs terminal, simple or compound; flowers 3.5-4.5 cm across, white; fruits obovoid, 1.0-1.3 cm, yellowish-brown.

Forests and forest edges, 1300-1600 m; fl. & fr.: Apr.-Jan.; Jowai-Jarain.

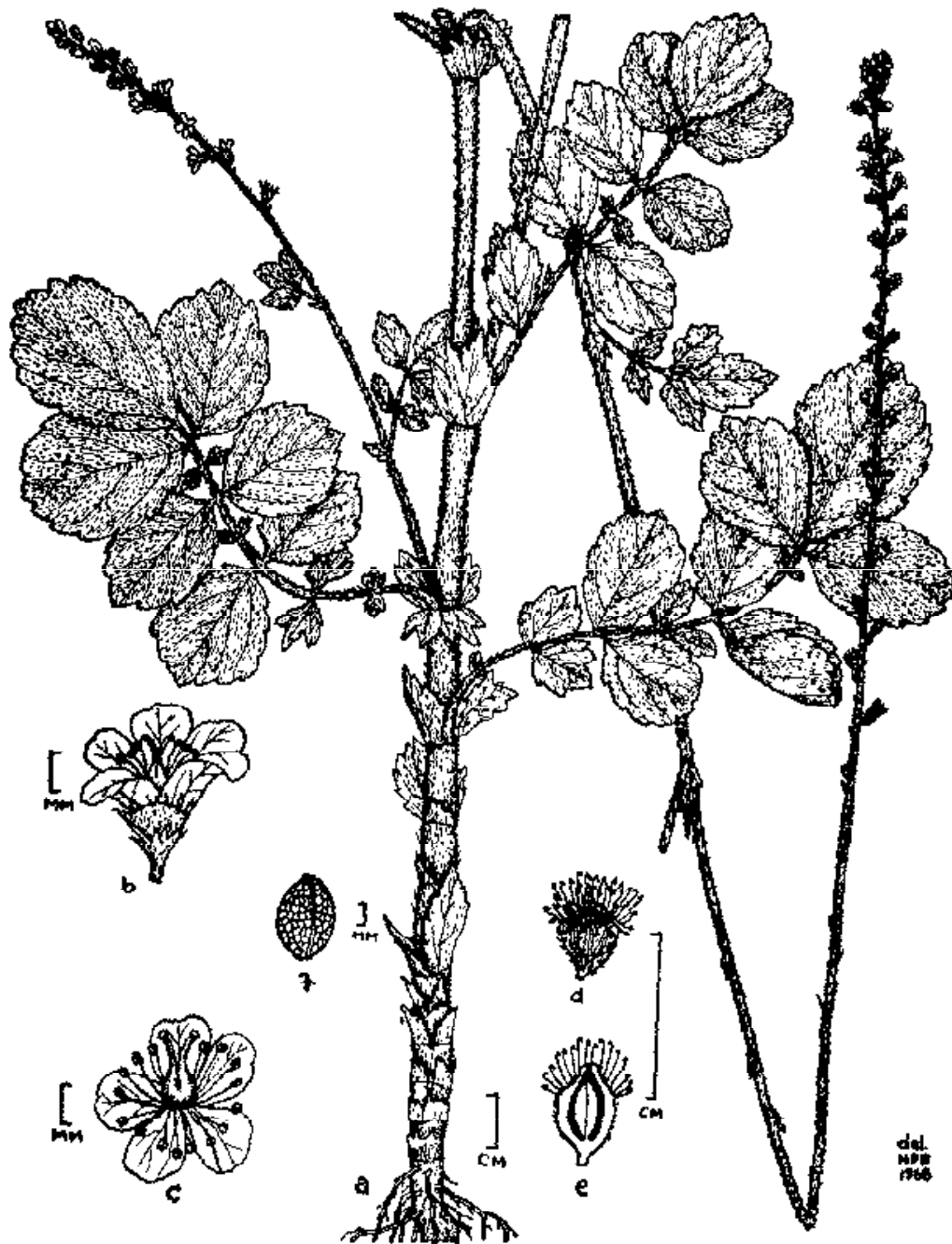


Fig. 14. *Agrimonia nepalensis* D. Don  
 a. Plant. b. Flower. c. Flower-top view. d. Fruit. e. L. S. of fruit. f. Seed.

### 8. SORBUS L.

***Sorbus microphylla*** Decaisne in Nouv. Arch. Mus. Paris 10: 159. 1874.  
*Pyrus microphylla* (Decaisne) Hook. f. Fl. Brit. Ind. 2: 376. 1878. **Fig. 15**

Large shrubs or trees, 8 - 8 m; leaves 7 - 14 cm; rachis 6 - 13 cm; leaflets 21 - 29, linear to oblong, cuneate at base, subacute, deeply serrate, 1 - 2 × 0.3 - 0.8 cm; stipules subulate, ± 3 mm; flowers purple, 7 - 8 mm across, in terminal lax corymbs; pedicels 5 - 10 mm; bracts elliptic, ± 6 × 3 mm; calyx 3 - 4 mm; petals 5, orbicular, ± 5 × 3 mm; fruits globose, ± 1.5 cm, white to pale blue.

Primary forests, 1400 - 1700 m; fl. & fr.: Jan.-Aug.; Raliang.

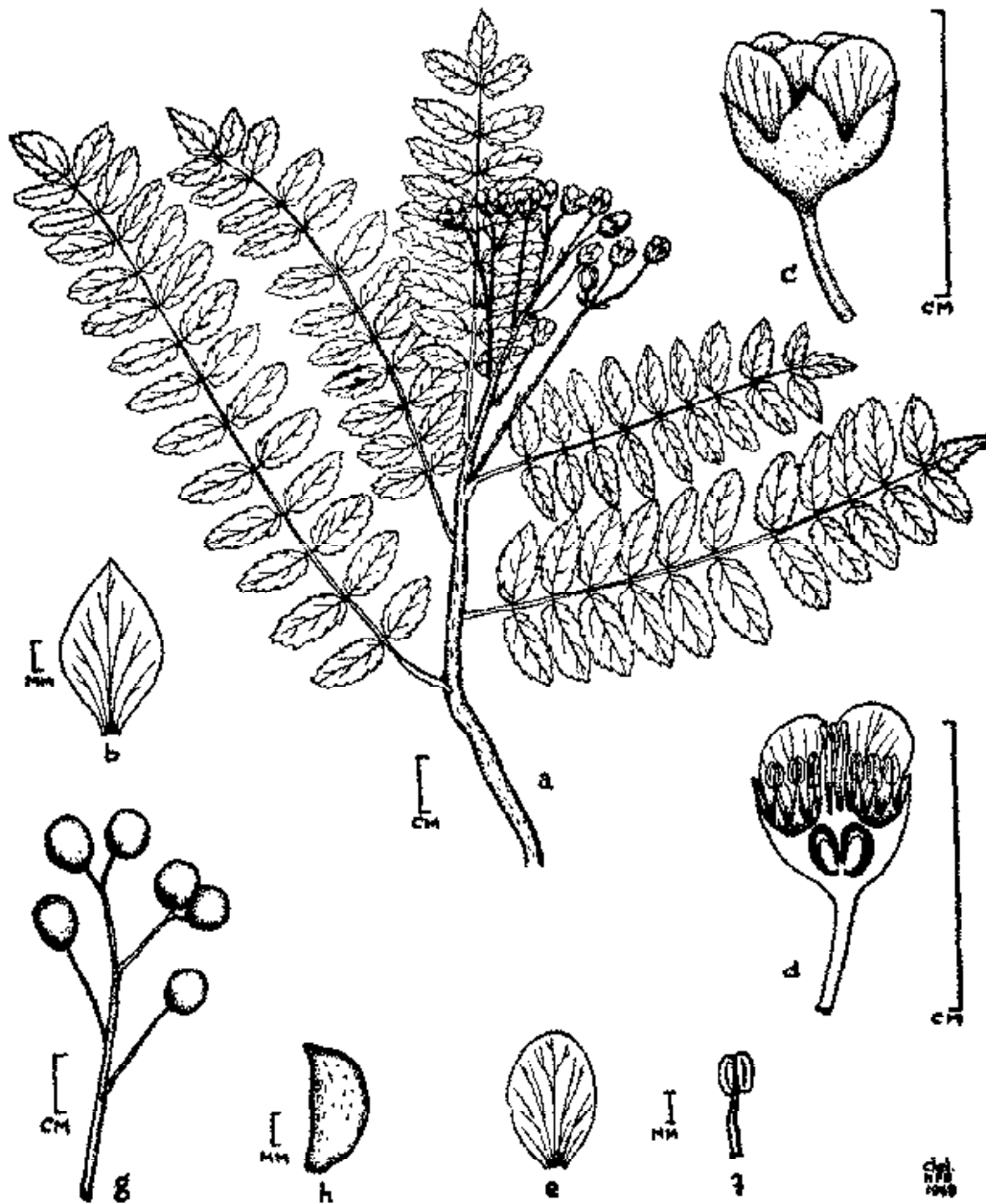


Fig. 15. *Sorbus microphylla* Decaisne  
a. Branch. b. Bract. c. Flower. d. L. S. of flower. e. Petal. f. Stamen. g. Fruits. h. Seed.

9. *DOCYNIA* Decaisne

***Docynia indica*** (Wall.) Decaisne in Nouv. Arch. Mus. Paris 10: 131. t. 14. 1874; Fl. Brit. Ind. 2: 369. 1878; Fl. As. 2: 210. 1938. *Pyrus indica* Wall. Pl. As. Rar. 2: 56. t. 173. 1831.

Trees, 4-6 m; leaves obovate-elliptic to lanceolate, rounded to cuneate at base, acuminate, serrate to serrulate, 4-10×2-4 cm; lateral nerves 5-8 pairs; petioles 10-25 mm; stipules ± 5 mm, subulate; flowers ± 2 mm across, 2-5 in umbels or fascicles or rarely solitary; pedicels 5-8 mm; calyx ± 5 mm; fruits ovoid, pear-shaped, 2.5-3.0×1.5-2.0 cm, yellowish-green with orange spots.

Pine forests, near villages and also in primary forests, 1200-1600 m; fl. & fr.: Feb.-June; Raliang, Umjaisaw.

Fruits are edible.

10. *PYRUS* L.

***Pyrus pashia*** D. Don, Prodr. Fl. Nep. 236. 1825; Fl. Brit. Ind. 2: 374. 1878; Fl. As. 2: 216. 1938.

Trees, 10-15 m; leaves ovate-elliptic to lanceolate, rounded or sub-obtuse at base, acute to acuminate, finely serrate to serrulate, 4-8×2-4 cm; lateral nerves 7-10 pairs; petioles 15-20 mm; stipules setaceous, ± 1 cm; flowers white and pale pinkish, ± 1.5 cm across, in axillary and terminal umbels or fascicles; pedicels 20-24 mm; calyx ± 6 mm, densely brownish-woolly; fruits globose, depressed at apex, 1.1×1.3 cm; seeds 1-2 per cell.

Primary forests and in open secondary forests, 1400-1600 m; fl. & fr.: Mar.-Oct.; Jowai, Jowai-Jarain.

11. *PHOTINIA* Lindl.

***Photinia*** Lindl. in Trans. Linn. Soc. 13: 103. 1821; Vidal in Adansonia 5: 221. 1965. *Micromeles* Decaisne in Nouv. Arch. Mus. Paris ser. 1, 10: 168. 1874, *syn. nov. Pourthiaca* Decaisne, *l. c.* 146; Hook. f. Fl. Brit. Ind. 2: 382. 1878. *Pyrus* sect. *Micromeles* (Decaisne) Hook. f. Fl. Brit. Ind. 2: 377. 1878.

Sect. *Micromeles* of *Pyrus* is reduced to *Photinia* as it is found that the species of this section clearly fall within the generic delimitation of *Photinia*, possessing 2-3 free or united styles.

- |   |     |                         |
|---|-----|-------------------------|
| 1a. Leaves entire.  | ... | <i>P. integerrima</i> 1 |
| 1b. Leaves serrate.   |     |                         |
| 2a. Petioles up to 12 mm long; young shoots densely woolly; calyx densely woolly.           | ... | <i>P. arguta</i> 2      |
| 2b. Petioles more than 15 mm long; young shoots glabrescent; calyx glabrescent when mature. |     |                         |
| 3a. Leaves cuneate at base; fruiting stalks with small lenticels; fruits $\pm$ 4 mm diam.   | ... | <i>P. polycarpa</i> 3   |
| 3b. Leaves rounded at base; fruiting stalks densely warted; fruits $\pm$ 8 mm diam.         | ... | <i>P. cuspidata</i> 4   |

1. **Photinia integerrima** (D. Don) Balakr. *comb. nov.* *Pyrus integerrima* D. Don, Prodr. Fl. Nep. 237. 1825. *Photinia integrifolia* Lindl. in Trans. Linn. Soc. 15: 103. 1821; Fl. Brit. Ind. 2: 381. 1878; Fl. As. 2: 222. 1938.

Trees, 15-20 m; leaves elliptic-obovate to oblanceolate, acute to cuneate at base, obliquely acuminate, undulate at margins, 8-15  $\times$  3.5-7.5 cm; lateral nerves 8-15 pairs; petioles stout, 15-30 mm; panicles corymbose, terminal, 15-20 cm across; pedicels 2-5 mm; bracts tricuspidate, woolly at apex,  $\pm$  3 mm; flowers 6-9 mm across, white; fruits obovoid,  $\pm$  8 mm, yellow to purple-brown.

Primary forests, 600-1400 m; fl. & fr.: Feb.-Aug.; Jarain-Sohka, Balakrishnan 49843; Shangpung, U. N. Kanjital 753 P.

2. **Photinia arguta** Lindl. in Edw. Bot. Reg. 23: t. 1956. 1837. *Pourthiaca arguta* (Lindl.) Decaisne in Nouv. Mus. Hist. Nat. Paris 10: 147. 1874; Fl. Brit. Ind. 2: 382. 1878; Fl. As. 2: 223. 1938.

Large shrubs or small trees, 10-15 m; leaves oblong to elliptic-lanceolate, cuneate at base, caudate-acuminate, finely serrate or serrulate, 6-15  $\times$  2-5 cm; lateral nerves 7-12 pairs; petioles 7-12 mm; corymbs terminal, few-flowered; pedicels 6-8 mm; flowers white, 6-10 mm; fruits obovoid, 7-8 mm across; seeds 1-2 per cell, plano-convex, ellipsoid.

Primary forests, 1200-1500 m; fl. & fr.: Apr.-Dec.; Nartiang.

3. **Photinia polycarpa** (Hook. f.) Balakr. *comb. nov.* *Pyrus polycarpa* Hook. f. Fl. Brit. Ind. 2: 378. 1878; Fl. As. 2: 219. 1938.

Trees, 10-15 m; leaves lanceolate to ovate-lanceolate, acuminate, unequally serrate at margins, 7-12  $\times$  2.5-4.0 cm; lateral nerves 8-12 pairs; petioles 15-25 cm; corymbs terminal; pedicels 5-8 mm; flowers  $\pm$  8 mm across, white; calyx  $\pm$  5 mm; fruits ovoid; seeds 2, plano-convex.

Primary forests, 1200-1500 m; fl. & fr.: Mar.-Nov.; Jarain, Balakrishnan 42272; Shangpung, U. N. Kanjital 751 P —Endemic to Meghalaya.



4. **Photinia cuspidata** (Bertol.) Balakr. *comb. nov.* *Pyrus cuspidata* Bertol. *Plant. Nouv. Asiat.* 2: 9. t. 1. 1865; *Fl. Brit. Ind.* 2: 378. 1878; *Fl. As.* 2: 219. 1938.

Trees, 15-20 m; leaves ovate to oblong-lanceolate, abruptly caudate-acuminate, sharply serrate, 7-12 × 3.5-5.0 cm; lateral nerves 10-12 pairs; petioles 25-35 mm; corymbs pyramidal, ± 4 cm; pedicels ± 5 mm; flowers 7-8 mm across, white; calyx ± 3 mm; fruits globose.

Primary forests, 1300-1700 m; fl. & fr.: Apr.-Dec.; Shangpung, G. K. *Deka* 17333 —Endemic to Meghalaya.

## 12. ERIOBOTRYA Lindl.

**Eriobotrya angustissima** Hook. f. *Fl. Brit. Ind.* 2: 372. 1878; *Fl. As.* 2: 212. 1938.

Shrubs, 2-4 m; leaves linear-lanceolate to oblanceolate, cuneate to attenuate at base, obtuse, distantly serrate, 8-15 × 1-2 cm; panicles terminal, 3-5 cm; flowers white, 8-10 mm; bracts and bracteoles linear-spathulate, up to 1 cm; pedicels 3-4 mm; calyx ± 6 mm, puberulous or glabrous; berries obpyriform, 12-15 × 10-12 mm; seeds 2.

Primary forests, 200-100 m; fl. & fr.: Mar.-Nov.; Jaintia Hills *Mann* 905; Kopili riverbank, Garampani, *Balakrishnan* 47058 —Endemic to Meghalaya.

## 57. HYDRANGEACEAE

- |   |                    |
|---|--------------------|
| 1a. Calyx corolline, longer than corolla; petals less than 5 mm long;<br>fruits capsular. ...     | <i>Hydrangea</i> 1 |
| 1b. Calyx not corolline, smaller than corolla; petals more than 6 mm<br>long; fruits baccate. ... | <i>Dichroa</i> 2   |

### 1. HYDRANGEA L.

**Hydrangea vestita** Wall. *Tent. Fl. Nep.* 2: t. 50. 1824; *Fl. Brit. Ind.* 2: 405. 1878; *Fl. As.* 2: 227. 1938.

Erect trees or large shrubs, 3-5 m; leaves ovate or elliptic-oblong to suborbicular, unequally serrate, 8-18 × 6-14 cm; petioles 2-3 cm; corymbs terminal; flowers greenish-white, ± 6 mm across; outer flowers male, modified into decoy-flowers; capsules 2-4 mm, crowned with a conical cap of persistent styles, seeds minute, caudate at both ends.

Forests and forest edges, 1300-1700 m; fl. & fr.: June-Nov.; Jowai.

2. *DICHROA* Lour.

***Dichroa febrifuga*** Lour. Fl. Cochinch. 301. 1790; Fl. Brit. Ind. 2: 406. 1879; Fl. As. 2: 228. 1938.

Erect shrubs, 1-2 m; leaves elliptic-oblong to oblanceolate, tapering at base, acuminate, serrate-dentate, 6-20 × 3-7 cm; lateral nerves 7-9 pairs; petioles ± 2.5 cm; cymes paniculate, terminal, 4-15 cm; flowers ± 7 mm across, blue; berries globose, glossy blue, crowned by persistent calyx lobes, ± 5 mm.

Primary forests, forest edges, and roadsides, 1300-1700 m; fl. & fr.: July-Dec.; Jowai, Shangpung.

## 58. ITEACEAE

## ITEA L.

- |  |                         |
|--|-------------------------|
| 1a. Leaves 11-20 × 6-12 cm; petioles stout; petals recurved, caducous; ovary glabrous. ... | <i>I. macrophylla</i> 1 |
| 1b. Leaves 7-9 × 3-5 cm; petioles slender; petals erect, persistent; ovary pilose. ...     | <i>I. chinensis</i> 2   |

1. ***Itea macrophylla*** Wall. in Roxb. Fl. Ind. 2: 419. 1824; Fl. Brit. Ind. 2: 408. 1878; Fl. As. 2: 230. 1938. '*Dieng-saru*'.

Small trees or shrubs, 3-5 m; leaves elliptic-oblong to broadly ovate, rounded or subacute at base, acuminate, glandular-serrate; lateral nerves 7-10 pairs; racemes simple, 3-15 cm, 1-8 in each axil; pedicels 15-30 mm; flowers 4-5 mm across, white with pale pink tinge; capsules ± 5 mm, divergent in upper half, united by stigma; seeds caudate at both ends.

Primary forests and forest edges, 1000-1600 m; fl. & fr.: Apr.-Jan.; Jaintia Hills, Mann 853; Raliang, Balakrishnan 50155; A. S. Rao 42537; R. S. Rao 2599; Umtapoh, Balakrishnan 42708.

2. ***Itea chinensis*** Hook. & Arn. Bot. Beech. Voy. 3: 89. 1832 et 4: t. 89. 1833; Fl. Brit. Ind. 2: 408. 1878; Fl. As. 2: 231. 1938. '*Lamit-rit*'.

Small trees or shrubs, 3-10 m; leaves elliptic-oblong to obovate, acute at base, caudate-acuminate, glandular-serrate; lateral nerves 5-8 pairs; petioles 1-2 cm; racemes 3-6 cm, 1-3 in each axil; pedicels ± 2.5 mm; flowers ± 3 mm across, white to yellow; capsules 7-8 mm; divergent at upper half, united by stigma; seeds caudate-acuminate at both ends.

Primary forests, 1300-1600 m; fl. & fr.: Apr.-Feb.; Jowai, Sohka.

## 50. PARNASSIACEAE

## PARNASSIA L.

**Parnassia wightiana** Wall. in W. & A. Prodr. 35. 1834; Fl. Brit. Ind. 2: 402. 1878.

Scapigerous herbs, 20 - 35 cm; leaves radical, broadly ovate to oblong, cordate at base, acute to subacute, 2.5 - 3.5 × 2 - 3 cm; petioles dilated at base, 4 - 8 cm; flowers 2.5 - 3.0 cm across, solitary on 15 - 30 cm long peduncle with a sessile solitary leaf at middle; petals 5, pale yellow, fimbriate at margins; capsules obovoid, 3-angled, ± 1 cm.

Streamsides, marshy places and open places, near forests and grasslands, 1200 - 1500 m; fl. & fr.: Aug.-Dec.; Jaintia Hills, Jaintia.

## 60. HALORAGACEAE

## HALORAGIS J. R. &amp; C. Forst.

**Haloragis micrantha** (Thunb.) S. & Z. Fl. Jap. 1: 25. 1845; Fl. Brit. Ind. 2: 430. 1878. *Gonocarpus micranthus* Thunb. Nov. Gen. Pl. 3: 55. 1783. *G. tetragonus* Labill. Fl. Nov. Holl. 1: t. 53. 1804. *H. tetragona* (Labill.) Hook. f. Fl. New. Zeal. 1: 62. 1852.

Creeping ascending much-branched herbs, up to 10 cm; leaves ovate to elliptic-obovate, crenate-serrate, 3 - 10 × 2 - 7 mm; petioles ± 1 mm; racemes terminal, spiciform; flowers red, ± 1.5 mm; bracts oblong, 0.5 - 1.5 mm; nuts 1-celled, 1-seeded, dark red, ± 1 mm with 8 vertical ribs.

Grassy slopes near streams and marshy places in open places, 1300 - 1500 m; fl. & fr.: Nov.-Mar.; Shangpung.

## 61. DROSERACEAE

## DROSERA L.

**Drosera peltata** Smith in Willd. Sp. Pl. 1: 1546. 1797; Fl. Brit. Ind. 2: 424. 1878; Fl. As. 2: 235. 1938.

Erect insectivorous herbs, 10 - 25 cm; tuber underground, globose, ± 5 mm; leaves peltate, suborbicular to semilunar, with caudate lobes at base, and upturned tentacles at margins; petioles slender, 6 - 14 mm; flowers white, ± 1 cm across, terminal or upper axillary, solitary or in 2 - 10-flowered racemes; pedicels 5 - 20 mm; capsules 3 - 5-valved; seeds many, ovoid, black.

Wet places on rocky cliffs, grasslands and marshes, 1000-1600 m; fl. & fr.: May-Oct.; Jarain, Jowai, Raliang.

## 62. HAMAMELIDACEAE

1a. Leaves palmately nerved; ovules many in each cell.	...	<i>Exbucklandia</i> 1
1b. Leaves pinnately nerved; ovules solitary in each cell.		
2a. Leaves deciduous; flowers in spike-like racemes; petals ovate-oblong.	...	<i>Corylopsis</i> 2
2b. Leaves evergreen; flowers capitate; petals linear.	...	<i>Loropetalum</i> 3

## 1. EXBUCKLANDIA R. W. Br.

**Exbucklandia populnea** (Griff.) R. W. Br. in J. Wash. Acad. Sci. 36: 348. 1946. *Bucklandia populnea* Griff. in As. Res. 19(1): 94. t. 13-14. 1886; Fl. Brit. Ind. 2: 429. 1878; Fl. As. 2: 240. 1938.

Trees, 15-35 m; leaves broadly ovate to suborbicular, rounded-obtuse or subcordate at base, acute to acuminate, 5-15 × 3.5-12.0 cm; basal nerves 5-7; lateral nerves 3-4 pairs; petiole 2-5 cm; stipules obovate, obtuse, 15-40 × 5-15 mm; heads 10-20-flowered; peduncles articulated, 10-15 mm; capsules woody, subglobose, 6-10 mm; seeds ± 6 in each cell.

Forests and forest edges, 1300-1600 m; fl. & fr.: Oct.-Feb.; Shangpung, Khleihriat.

## 2. CORYLOPSIS Sieb. &amp; Zucc.

**Corylopsis himalayana** Griff. in J. As. Soc. Beng. 23: 642. 1844; Fl. Brit. Ind. 2: 427. 1878; Fl. As. 2: 237. 1938. '*Dieng-la-painer*'.

Shrubs or small trees, 3-6 m; leaves plicate in bud, broadly ovate to suborbicular, obliquely rounded or cordate at base, acute to short-acuminate, serrate, 4-12 × 3-8 cm; lateral nerves 9-12 pairs; petioles 1.0-2.5 cm; stipules linear-lanceolate, 1.0-1.5 cm; flowers appearing before leaves, pale yellow, ± 7 mm across, in catkin-like ± 3 cm long pendulous racemes; capsules ± 7 × ± 6 mm.

Primary forests and pine forests, 1300-1800 m; fl. & fr.: Jan.-Aug.; Jowai, Nartiang, Raliang, Shangpung.

## 3. LOROPETALUM Oliv.

**Loropetalum chinense** (R. Br.) Oliver in Trans. Linn. Soc. 23: 459. f. 4. 1862; Fl. Brit. Ind. 2: 428. 1878; Fl. As. 2: 238. 1938. *Hamamelis chinensis* R. Br. in Abel. Nar. Journ. China App. B: 375. f. 1. 1818.

Shrubs or small trees, 3-16 m; leaves lanceolate to obovate, subequally rounded or cuncate at base, acute to acuminate, 3-6 × 1.5-3.0 cm; lateral nerves 5-7 pairs; petioles 4-6 mm; stipules linear; heads 6-8-flowered, solitary or in short racemes or 2-3; flowers 25-30 mm across, greenish-white; capsules ovoid to obovoid, 2-cusped, ± 1 cm, rusty tomentose.

Primary forests and forest edges, 1000-1800 m; fl. & fr.: Apr.-Nov.; Jowai, U. N. Kanjilal 7366; Nartiang, Hook. f. & Thomson s. n. (CAL).

### 63. RHIZOPHORACEAE

#### CARALLIA Roxb. *nom. cons.*

**Carallia brachiata** (Lour.) Merr. in Philip. J. Sci. 15: 249. 1919. *Diatoma brachiata* Lour. Fl. Cochinch. 296. 1790. *C. lucida* Roxb. Pl. Corom. 3: 8. t. 211. 1811; Fl. As. 2: 241. 1938. *C. integerrima* DC. Prodr. 3: 33. 1828; Fl. Brit. Ind. 2: 439. 1878.

Trees or shrubs, 5-15 m; leaves oblong to obovate, acute at base, obtuse or abruptly acuminate, entire or rarely serrate, recurved at margins, 6-15 × 3-8 cm, coriaceous, glossy; lateral nerves 8-14 pairs; petioles 4-12 mm; stipules lanceolate, 1-2 cm, early deciduous; cymes axillary, trichotomous, 2-4 cm; flowers subsessile, greenish-yellow, 4-5 mm across; berry 8-11 mm diam., pink or red.

Primary forests, 100-700 m; fl. & fr.: Nov.-Mar.; Nongthala.

### 64. COMBRETACEAE

- |  |     |                     |
|--|-----|---------------------|
| 1a. Scandent or straggling shrubs; petals present. | ... | <i>Combretum</i> 1  |
| 1b. Trees; petals absent.                          | ... | <i>Terminalia</i> 2 |

#### 1. COMBRETUM Loeffl. *nom. cons.*

- |   |     |                        |
|---|-----|------------------------|
| 1a. Petioles up to 10 mm long; flowers sessile; receptacle (calyx-tube) scarcely constricted above the ovary; petals ± 1 mm long; fruits narrowly 4-ridged. | ... | <i>C. acuminatum</i> 1 |
| 1b. Petioles 15-30 mm long; flowers subsessile; receptacle constricted above the ovary; petals ± 2 mm long; fruits broadly 4-winged.                        | ... | <i>C. latifolium</i> 2 |

1. **Combretum acuminatum** Roxb. Fl. Ind. 2: 228. 1832; Fl. Brit. Ind. 2: 455. 1878; Fl. As. 2: 252. 1938.

Lianes; leaves ovate to oblong-elliptic or broadly lanceolate, obtuse or rounded at base, acuminate, 10-22 × 4-11 cm; lateral nerves 10-15 pairs;

petioles 5-10 mm; spikes 4-8 cm, often paniculate; flowers yellowish,  $\pm 5 \times 4$  mm; rachis ferruginous scaly; fruits ellipsoid, narrow at both ends, 3-6  $\times$  1-2 cm, brownish.

Primary forests, 100-500 m; fl. & fr.: Feb.-Aug.; Dawki.

2. **Combretum latifolium** Bl. Bijdr. 641. 1825; *C. extensum* D. Don in Trans. Linn. Soc. Lond. 15: 414. 1827; Fl. Brit. Ind. 2: 458. 1878; Fl. As. 2: 255. 1938.

Lianes; leaves elliptic or elliptic-oblong, cuneate to rounded at base, short-acuminate, 8-20  $\times$  4-12 cm, scaly when young, rough and punctate-lepidote when mature; spikes 5-8 cm, in panicles; flowers white,  $\pm 1$  cm across; fruits obovoid to subglobose, 3-4 cm, with 4 thin scarious wings, viscid-glandular.

Primary forests, 100-500 m; fl. & fr.: Nov.-Mar.; Dawki.

2. **TERMINALIA** L. *nom. cons.*

- |  |     |                       |
|--|-----|-----------------------|
| 1a. Leaves clustered at the ends of branches; flowers in axillary spikes, polygamous; drupes tomentose, globose. | ... | <i>T. bellirica</i> 1 |
| 1b. Leaves scattered along the branches; flowers in terminal panicles, bisexual; drupes glabrous, ellipsoid.     | ... | <i>T. citrina</i> 2   |

1. **Terminalia bellirica** (Gaertn.) Roxb. Pl. Corom. 2: 54. t. 198. 1805 (sphalm.: *bellerica*); Fl. Brit. Ind. 2: 445. 1878; Fl. As. 2: 243. 1938. *Myrobalanus bellirica* Gaertn. Fruct. 2: 90. t. 97. f. a-d. 1791.

Trees, 25-40 m; trunk up to 2 m diam., buttressed at base; leaves often whorled, obovate to broadly elliptic, obtusely cuneate at base, rounded or bluntly acuminate, 5-17  $\times$  3-10 cm; lateral nerves 5-8 pairs; petioles 3-6 cm; spikes 6-13 cm; rachis pubescent; flowers yellowish;  $\pm 6$  mm across; fruits 2.5-3.0  $\times$  2.0-2.5 cm.

Primary forests, 100-1000 m; fl. & fr.: Apr.-Aug.; Dawki.

2. **Terminalia citrina** (Gaertn.) Flem. in As. Res. 11: 183. 1810; Fl. Brit. Ind. 2: 446. 1878; Fl. As. 2: 245. 1938. *Myrobalanus citrina* Gaertn. Fruct. 2: 91. t. 97. 1791.

Trees, 20-30 m, buttressed at base; leaves narrowly elliptic to oblong-elliptic, rounded or broadly cuneate at base, acuminate, 5-15  $\times$  3-7 cm; petioles 5-20 mm, with 2 prominent round glands near apex; flowers yellow,  $\pm 4$  mm across, fragrant; fruits 3.0-3.5  $\times$  2.0-2.5 cm, obtusely 5-angled.

Primary forests, 100-500 m; fl. & fr.: June-Feb.; Dawki.

## 65. MYRTACEAE

- |   |                      |
|---|----------------------|
| 1a. Flower-buds pubescent ; ovary 5-, rarely 4-celled, with 1—2 ovules per cell ; seeds many. ... | <i>Decaspermum</i> 1 |
| 1b. Flower-buds glabrous ; ovary 2—3-celled with many ovules in each cell ; seeds few.            |                      |
| 2a Anther-cells parallel, dehiscent by long slits. ...  | <i>Syzygium</i> 2    |
| 2b Anther-cells divergent, apically dehiscent by short slits or pores. ...                        | <i>Acmena</i> 3      |

## 1. DECASPERMUM J. R. &amp; G. Forst.

***Decaspermum fruticosum*** J. R. & G. Forst. Char. Gen. 74. t. 37. 1776.  
*D. paniculatum* (Lindl.) Kurz in J. As. Soc. Beng. 66(2): 61. 1877; Fl. Brit. Ind. 2: 470. 1878; Fl. As. 2: 284. 1938. *Nelitris paniculata* Lindl. Coll. Bot. 4: t. 16. 1821.

Trees or subscandent shrubs, 6 - 12 m; leaves elliptic to oblong-lanceolate, acute at base, acuminate, 4 - 10 × 1.5 - 2.5 cm; lateral nerves 8 - 12 pairs; petioles 3 - 6 mm; cymes paniculate, 2 - 5 cm, axillary or terminal; flowers 7 - 8 mm across, white; bracts subulate, ± 8 mm; receptacle campanulate, pubescent; berries globose, 4 - 8 mm, crowned by persistent calyx-lobes, purple.

Primary forests, 1000 - 1500 m; fl. & fr.: July-Dec.; Jarain-Syndai, Laskein.

2. SYZYGIVM GAERTN. *nom. cons.*

- |   |                          |
|---|--------------------------|
| 1a. Flowers lateral, mainly from old fallen leaf axils.   |                          |
| 2a. Leaves more than 20 × 9 cm ; flowers ± 4 cm across, pink ; petals falling off individually. ...   | <i>S. formosum</i> 1     |
| 2b. Leaves up to 17 × 7 cm ; flowers more than 6 mm across, white or greenish-white ; petals falling off together as a calyptra.                        |                          |
| 3a. Lateral nerves about 10 mm apart ; cymes up to 3.5 cm long. ...   | <i>S. tetragonum</i> 2   |
| 3b. Lateral nerves about 5 mm apart ; cymes more than 4 cm long. ...  | <i>S. cumini</i> 3       |
| 1b. Flowers axillary or terminal.   |                          |
| 4a. Leaves narrow, less than 2 cm wide. ...   | <i>S. cuneatum</i> 4     |
| 4b. Leaves broad, more than 3 cm wide.  |                          |
| 5a. Flowers less than 8 mm across; receptacles (calyx-tube) up to 4 mm long. ...  | <i>S. syzygioides</i> 5  |
| 5b. Flowers more than 10 mm across ; receptacles more than 7 mm long.   |                          |
| 6a. Petioles more than 12 mm long ; flowers mainly axillary. ...  | <i>S. grande</i> 6       |
| 6b. Petioles less than 8 mm long ; flowers mainly terminal.   |                          |
| 7a. Leaves elliptic-lanceolate, acute or cuneate at base ; lateral nerves less than 10 pairs ; calyx-lobes less than 4 mm long. ...                     | <i>S. ramosissimum</i> 7 |
| 7b. Leaves oblong-lanceolate to narrow-lanceolate, rounded or subcordate at base ; lateral nerves more than 12 pairs ; calyx-lobes more than 7 mm long. |                          |

- 8a. Leaves up to 16 cm long; lateral nerves 12—14 pairs; pedicels up to 5 mm long; fruits 3—4 mm diam. ... *S. diospyrifolium* 8
- 8b. Leaves up to 34 cm long; lateral nerves 15—25 pairs; pedicels 8—12 mm long; fruits 5—6 cm diam. ... *S. macrocarpum* 9

1. **Syzygium formosum** (Wall.) Masamune, Enum. Phan. Born. 528. 1942. *Eugenia formosa* Wall. Pl. As. Rar. 2: 6. t. 108. 1830; Fl. Brit. Ind. 2: 471. 1878; Fl. As. 2: 262. 1938.

Trees, 5-10 m; leaves elliptic-oblong to lanceolate, rounded or narrowly subcordate at base, bluntly acuminate at apex, 20-30 × 9-14 cm; lateral nerves 12-15 pairs; cymes corymbose; pedicels 10-30 mm; flowers pale pink to red; receptacles turbinate, 2.0-2.3 cm, purplish; berries globose, 3-4 cm diam., shiny, white or pinkish.

Forests, 100-500 m; fl. & fr.: Mar.-Aug.; Dawki.

2. **Syzygium tetragonum** (Wt.) Kurz in J. As. Soc. Beng. 45 (2): 66. 1877. *Eugenia tetragona* Wt. Ill. Ind. Bot. 2: 16. 1841; Fl. Brit. Ind. 2: 497. 1879; Fl. As. 2: 276. 1938.

Trees, 8-25 m; branchlets tetragonous; leaves ovate-oblong to oblanceolate, acute to attenuate at base, short-acuminate, 10-17 × 4-7 cm; lateral nerves 15-20 pairs; petioles 1.0-1.5 cm; cymes paniculate, axillary, 2-4 cm; flowers ± 8 mm across, white, scented; receptacles ± 3 mm; berries globose, ± 6 mm, reddish-black.

Primary forests, 500-1500 m; fl. & fr.: Sept.-May; Jarain, Jowai-Jarain, Sohka-Dawki.

3. **Syzygium cumini** (L.) Skeels in U. S. Dept. Agr. Bur. Pl. Indus. Bull. 248, 25. 1918. *Myrtus cumini* L. Sp. Pl. 471. 1758. *Eugenia jambolana* Lamk. Encycl. 3: 198. 1789; Fl. Brit. Ind. 2: 499. 1879; Fl. As. 2: 278. 1938.

Trees, 10-20 m; leaves elliptic-oblong to obovate, cuneate to rounded at base, abruptly acuminate, 7-15 × 3-8 cm; lateral nerves 20-30 pairs; petioles 10-25 cm; flowers 6-7 mm across in clusters of 3-8 at the branch-ends of panicles; receptacles 4-6 mm; berries oblong-ellipsoid, ± 2 × 1.5 cm, red purple to black.

Secondary forests and cultivated near villages, 100-1000 m; fl. & fr.: Apr.-Aug.; Dawki, Sutnga.

4. **Syzygium cuneatum** (Duthie) Balakr. *comb. nov.* *Eugenia cuneata* Duthie in Fl. Brit. Ind. 2: 495. 1878; Fl. As. 2: 281. 1938.



Shrubs or small trees, 6-10 m; leaves elliptic-lanceolate to linear-lanceolate, acute to cuneate at base, short acuminate, 4-8 × 1-2 cm; lateral nerves numerous; petioles 5-8 mm; cymes subcorymbose, trichotomous; cymes up to 5 cm; flowers 7-8 mm across, greenish; receptacles obconic; berries globose or ellipsoid, 1.0-1.3 cm, reddish-black, crowned by margins of calyx-tube.

Forests, 100-1000 m; fl. & fr.: Aug.-Dec.; Dawki, Jowai-Bodarpur Road, Sonapur.

5. **Syzygium syzygioides** (Miq.) Merr. & Perry in J. Arn. Arb. 19: 109, 1938. *Jambosa syzygioides* Miq. Fl. Ind. Bat. ser. I. 1: 341. 1855. *Eugenia cymosa* Wt. Ill. Ind. Bot. 2: 97. 1841; Fl. Brit. Ind. 2: 482. 1878; Fl. As. 2: 273. 1938.

Trees, 10-20 m; leaves elliptic-oblong to ovate-lanceolate, acute to rounded at base, acuminate, 4-10 × 2.5-4.5 cm; lateral nerves ± 25 pairs; petioles 5-8 mm; flowers white, with reddish calyx, 6-8 mm across, sessile in threes or fours at branch-ends of paniculate cymes; receptacles ± 4 mm; berries depressed-globose, 8-10 mm diam., red to purplish-black.

Forests and forest edges, 100-1000 m; fl. & fr.: Dec.-July; Dawki.

6. **Syzygium grande** (Wt.) Walp. Repert. 2: 180. 1843. *Eugenia grandis* Wt. Ill. Ind. Bot. 2: 17. 1841; Fl. Brit. Ind. 2: 475. 1878; Fl. As. 2: 269. 1938.

Trees, 10-30 m; leaves elliptic-oblong to lanceolate, rounded or narrowed at base, caudate-acuminate, 15-20 × 7-12 cm; lateral nerves 12-20 pairs; petioles 15-20 mm; flowers ± 2.5 cm across; white, subsessile in threes at branch-ends of paniculate cymes; receptacles turbinate, obconic, ± 1.2 cm; berries ovoid, ± 4 cm, crowned by calyx-rim.

Forests and forest edges, 100-1000 m; fl. & fr.: Dec.-June; Dawki, Syndai.

7. **Syzygium ramosissimum** (Duthie) Balakr. *comb. nov.* *Eugenia ramosissima* Duthie in Fl. Brit. Ind. 2: 480. 1878; Fl. As. 2: 270. 1938.

Trees, 5-10 m; trunk fluted at base; leaves bluntly acuminate, 8-14 × 3-6 cm; lateral nerves 8-10 pairs; cymes paniculate, up to 6 cm; rachis and branches brown scaly; flowers ± 1.5 cm across, white, fragrant; receptacles 7-8 mm; berries ovoid, 15-20 mm.

Primary forests, 100-1000 m; fl. & fr.: Mar.-Oct.; Syndai.

8. **Syzygium diospyrifolium** (Duthie) S. N. Mitra in Indian For. 99:

100. 1973. *Eugenia diospyrifolia* Duthie in Fl. Brit. Ind. 2: 472. 1878; Fl. As. 2: 264. 1938.

Trees, 5-10 m; leaves oblong-lanceolate or narrowly ovate, subcordate at base, acuminate, 13-20 × 3-6 cm; lateral nerves 12-15 pairs; petioles 2-5 mm; cymes few-flowered, terminal, 2-4 cm; flowers white, ± 2.5 cm across; receptacles widely campanulate, abruptly narrowed at base; berries oblong, subglobose.

Forests, 100-600 m; fl. & fr.: Aug.-May; Dawki.

9. *Syzygium macrocarpum* (Roxb.) Balakr. *comb. nov.* *Eugenia macrocarpa* Roxb. Fl. Ind. 2: 497. 1832; Fl. Brit. Ind. 2: 474. 1878; Fl. As. 2: 263. 1938.

Trees, 3-8 m; leaves oblong-lanceolate to narrow lanceolate, rounded at base, acute to acuminate, 18-34 × 5-10 cm; lateral nerves 15-25 pairs, prominent, beneath; petioles stout, up to 5 mm; flowers ± 5 cm across, white, solitary or in few-flowered cymes, terminal; receptacles obconic, ± 15 mm, purplish; berries subglobose.

Primary forests, 1000-1500 m; fl. & fr.: Sept.-Mar.; Jowai, Sutnga.

### 3. ACMENA DC.

*Acmena acuminatissima* (Bl.) Merr. & Perry in J. Arn. Arb. 19: 12. 1938. *Myrtus acuminatissima* Bl. Bijdr. 1088. 1826. *Eugenia acuminatissima* (Bl.) Kurz, Pegu Report. App. A. 63. 1875; Fl. Brit. Ind. 2: 483. 1878. *E. saligna* C. B. Robs. in Philip. J. Sci., Bot. 4: 392. 1909; Fl. As. 2: 274. 1938.

Trees, 10-30 m; leaves ovate-oblong to oblong-lanceolate, acute or cuncate at base, caudate-acuminate, 6-15 × 1.5-5.0 cm; lateral nerves 8-15 pairs; petioles 4-10 mm; panicles up to 12 cm; flowers ± 5 mm, white; receptacles turbinate-clavate, 3-4 cm; berries globose to depressed-globose, ± 2 cm diam., reddish-black when ripe; seed 1, subreniform, brown.

Primary, secondary forests and forest edges, 100-500 m; fl. & fr.: Mar.-Oct.; Dawki.

## 66. BARRINGTONIACEAE

### CAREYA Roxb. *nom. cons.*

*Careya arborea* Roxb. Pl. Corom. 3: 14. t. 218. 1811; Fl. Brit. Ind. 2: 511. 1879; Fl. As. 2: 288. 1938.

Deciduous trees, 5-15 m; leaves obovate to oblanceolate, cuneate at base, short-acuminate or obtuse, crenulate at margins, 15-30 × 8-20 cm; lateral nerves 10-15 pairs; petioles 1-3 cm, margined or winged upwards; flowers 6-8 cm across, white or pale pink, in terminal, few-flowered stiff spikes; bracts 3, unequal, linear; filaments purple; berries globose or ovoid, 6-7 cm, greenish-yellow; seeds many, immersed in pulp, ± 1 cm diam.

Secondary forests, 100-1200 m; fl. & fr.: Mar.-Aug.; Garampani, Raliang.

### 67. MELASTOMATACEAE

- |  |     |                       |
|--|-----|-----------------------|
| 1a. Stamens unequal.   |     |                       |
| 2a. Stamens 10-12; ovary 5-6-celled; fruits fleshy.  | ... | <i>Melastoma</i> 1    |
| 2b. Stamens 8; ovary 4-celled; fruits dry, capsular.   | ... | <i>Oxyphora</i> 2     |
| 1b. Stamens equal.   |     |                       |
| 3a. Inflorescences scorpioid; petals 3; stamens 3.   | ... | <i>Sonerila</i> 3     |
| 3b. Inflorescences not scorpioid; petals 4-6; stamens 4-10.                                  |     |                       |
| 4a. Erect, often epiphytic shrubs, creeping up against trunks; fruits fleshy.                | ... | <i>Medinilla</i> 4    |
| 4b. Erect or ascending herbs; fruits dry, capsular.  |     |                       |
| 5a. Connective or stamens not appendaged; fruits terete; seeds curved, falcate.              | ... | <i>Osbeckia</i> 5     |
| 5b. Connective of stamens dorsally appendaged; fruits quadrangular; seeds straight, obovoid. | ... | <i>Sarcopyramis</i> 6 |

#### 1. MELASTOMA L.

- |  |     |                           |
|--|-----|---------------------------|
| 1a. Young parts coarse-bristly; bracts large, enclosing the flower-buds; calyx lobes glabrous inside.      | ... | <i>M. malabathricum</i> 1 |
| 1b. Young parts silky; bracts short, not enclosing the flower-buds; calyx-lobes more or less hairy inside. | ... | <i>M. napalensis</i> 2    |

1. **Melastoma malabathricum** L. Sp. Pl. 390. 1753; Fl. Brit. Ind. 2: 528. 1879; Fl. As. 2: 297. 1938.

Bushy shrubs, up to 4 m; leaves oblong-lanceolate, rounded to acute at base, acute to acuminate, 5-10 × 2.5-5.0 cm, appressed hairy above, strigose on main nerves beneath; basal nerves 3-5; petioles 8-12 mm; flowers purple, 5-6 cm across, in clusters of 1-5 at branch-ends; bracts lanceolate, 15-18 × 6-7 mm, appressed-scaly outside; fruits ovoid, ± 7 mm, purple.

Forest edges, secondary forests and wastelands, 100-1000 m; fl. & fr.: Jan.-Dec.; Dawki, Jarain, Sohka-Nongthala.

2. **Melastoma napalensis** Lodd. Bot. Cab. t. 707. 1824. *M. normale* D. Don, Prodr. Fl. Nep. 220. 1825; Fl. Brit. Ind. 2: 524. 1879; Fl. As. 2: 298. 1938.

Large shrubs, up to 5 m; leaves oblong-lanceolate, rounded to acute at base, short-acuminate, 5-12 × 1.5-4.0 cm, appressed-hairy above, pubescent

or villous beneath; basal nerves 3 - 5; petioles 5 - 10 mm; flowers pink-purple,  $\pm$  5 cm across, 3 - 10 together in terminal clusters; bracts ovate,  $\pm$  10 x 5 mm; fruits ovoid,  $\pm$  7 mm.

Forests and clearings in forests, 1200 - 1500 m; fl. & fr.: Jan.-Dec.; Jowai.

2. OXYSPORA DC.

- |  |     |                        |
|--|-----|------------------------|
| 1a. Leaves 9—12 cm wide; basal nerves 7; panicles 6—10 cm broad; primary branches of panicles 1.5—2.5 cm long; pedicels 6—9 mm long.   | ... | <i>O. paniculata</i> 1 |
| 1b. Leaves 4—8 cm wide; basal nerves 5; panicles up to 6 cm broad; primary branches of panicles up to 1 cm long; pedicels 3—5 mm long. |     |                        |
| 2a. Hairy shrubs; leaves in each pair almost equal, rounded at base; connective of anthers spurred.                                    | ... | <i>O. vagans</i> 2     |
| 2b. Glabrous shrubs; leaves in each pair unequal, acute or obtuse at base; connective of anthers not spurred.                          | ... | <i>O. cernua</i> 3     |

1. **Oxyspora paniculata** DC. Prodr. 3: 123. 1828; Fl. Brit. Ind. 2: 525. 1879; Fl. As. 2: 300. 1938.

Shrubs, up to 1.5 m; leaves elliptic to broadly lanceolate, rounded to subcordate at base, acute or acuminate at apex, 15 - 24 cm; petioles 3 - 5 cm; flowers pinkish-purple, 10 - 15 mm across, in terminal lax panicles; pedicels purple; calyx tube campanulate, 5 - 6 mm; capsules ellipsoid, 8-ribbed.

Forests and forest edges, in shaded places, 1300 - 1600 m; fl. & fr.: July-Oct.; Jowai.

2. **Oxyspora vagans** (Roxb.) Wall. Pl. As. Rar. 1: 78. 1830, excl. var. B.; Fl. Brit. Ind. 2: 526. 1879; Fl. As. 2: 300. 1938. *Melastoma vagans* Roxb. Fl. Ind. 2: 404. 1824.

Shrubs, 1 - 2 m; leaves elliptic to ovate-lanceolate, acute to acuminate, 7 - 14 cm; petioles 1 - 4 cm; flowers purplish-red,  $\pm$  1 cm across; pedicels 4 - 5 mm; calyx-tube  $\pm$  6 mm; capsules ellipsoid, 8-ribbed,  $\pm$  10 x 5 mm.

Primary forests, in shaded places, 500 - 1200 m; fl. & fr.: Sept.-Mar.; Khleihriat-Lumshnong, Khongsnong.

3. **Oxyspora cernua** (Roxb.) Triana in Trans. Linn. Soc. 28: 73. 1872; Fl. Brit. Ind. 2: 526. 1879; Fl. As. 2: 301. 1938. *Melastoma cernua* Roxb. Fl. Ind. 2: 404. 1832.

Straggling shrubs, up to 3 m; leaves ovate to elliptic-lanceolate, acuminate, 10 - 20 x 3 - 5 cm; petioles 2 - 5 cm; panicles lax, up to 30 cm; rachis

quadrangular; flowers pink,  $\pm$  1.5 cm across; pedicels 3-5 mm; calyx-tube  $\pm$  1 cm, reddish; capsules obovoid to ellipsoid, 8-10 mm reddish.

Primary forests, 900-1400 m; fl. & fr.: Aug.-Dec.; Sutnga.

### 3. SONERILA Roxb. *nom. cons.*

- |   |     |                      |
|---|-----|----------------------|
| 1a. Stemless; leaves mostly radical, 1-3 cm long. | ... | <i>S. khasiana</i> 1 |
| 1b. Stems elongate; leaves cauline, 3-12 cm long. | ... | <i>S. maculata</i> 2 |

#### 1. *Sonerila khasiana* Clarke in Fl. Brit. Ind. 2: 539. 1879.

Herbs, up to 10 cm; leaves ovate to oblong-ovate, rounded to subcordate at base, acute to subobtuse, minutely ciliate-serrulate at margins, 1.3  $\times$  0.8-2.0 cm; basal nerves 3-5; petioles 15-40 mm, long hairy; flowers purple, 1.3-1.5 cm across; peduncles 2-5 cm; pedicels 10-15 mm; calyx campanulate,  $\pm$  5 mm; capsules oblong, funnel-shaped, 4-5 mm.

Shaded moist places in forests and streamsides, 1200-1600 m; fl. & fr.: Sept.-Feb.; Jarain, *Clarke s. n.* (CAL); Jowai, *Mann s. n.*

#### 2. *Sonerila maculata* Roxb. Fl. Ind. 1: 180. 1820; Fl. Brit. Ind. 2: 537. 1879; Fl. As. 2: 304. 1938.

Herbs, 10-35 cm; leaves broadly ovate to lanceolate, rounded at base, acute to attenuate, ciliate serrulate at margins, 3-12  $\times$  1.5-5.0 cm; lateral nerves 4-5 pairs; petioles 1-5 cm; flowers purple,  $\pm$  1 cm across, in condensed axillary scorpioid cymes; peduncles 3-5 cm; calyx-tube campanulate, obconical,  $\pm$  5 mm; capsules oblong, funnel-shaped, obscurely ribbed, 6-7  $\times$  2-4 mm.

Shaded moist places in forests, 600-1400 m; fl. & fr.: Aug.-Feb.; Dawki, Jarain, Jowai.

### 4. MEDINILLA Gaud.

*Medinilla erythrophylla* Lindl. in Edw. Bot. Reg. 24 (Misc.): 85. 1838. *M. rubicunda sensu* Clarke in Fl. Brit. Ind. 2: 547. 1879; Fl. As. 2: 302. 1938. (*non* Bl. 1831).

Erect or straggling shrubs, often epiphytic, up to 5 m; leaves elliptic to lanceolate, narrowed at base, acuminate, 5-15  $\times$  2-7 cm; lateral nerves 3-5 pairs, scarlet-red; petioles 7-18 mm, scarlet-red; flowers  $\pm$  1.5 cm across, dark pink, in axillary, many-flowered cymes; peduncles 2-5 mm; pedicels 2-4 mm; calyx-tube campanulate, 10-12-ribbed, 3-4 mm; berries globose,  $\pm$  5 mm, black.

Primary forests and forest edges, 1000-1500 m; fl. & fr.: July-Dec.; Jarain, Jarain-Syndai.

### 5. OSBECKIA L.

- |   |                            |
|---|----------------------------|
| 1a. Calyx-lobes 5; stamens 10.  |                            |
| 2a. Leaves 4-13 cm long, 5-nerved; calyx-tube with stellate hairs.                  | ... <i>O. nepalensis</i> 1 |
| 2b. Leaves 2-5 cm long, 3-nerved; calyx-tube with a few bristles at base.           | ... <i>O. nutans</i> 2     |
| 1b. Calyx lobes 4; stamens 8.   |                            |
| 3a. Flowers panicled; anthers attenuate.  |                            |
| 4a. Bracts ovate; calyx-tube glabrous; calyx-lobes triangular-elongate.             | ... <i>O. rostrata</i> 3   |
| 4b. Bracts triangular; calyx-tube with stellate hairs; calyx-lobes linear-subulate. | ... <i>O. stellata</i> 4   |
| 3b. Flowers capitate; anthers beaked.   |                            |
| 5a. Erect herbs; leaves linear-oblong; calyx-tube covered with scales.              | ... <i>O. chinensis</i> 5  |
| 5b. Diffuse herbs; leaves ovate; calyx-tube without scales.                         | ... <i>O. capitata</i> 6   |

1. ***Osbeckia nepalensis*** Hook. Exot. Fl. t. 31. 1822; Fl. Brit. Ind. 2: 521. 1879; Fl. As. 2: 295. 1938.

Shrubs, up to 1.5 m; leaves oblong-lanceolate, cordate to rounded at base, short-acuminate, 4-13 × 1.5-4.5 cm; petioles up to 2.5 mm; flowers white or purple, ± 2.5 cm across, in terminal or upper axillary corymbose cymes; pedicels 2-3 mm; bracts ovate, 10-15 × 3-5 mm; calyx-lobes lanceolate, ± 10 × 4 mm; capsules campanulate, truncate, ± 12 × 10 mm.

Forest edges, wastelands and shaded places in grasslands, 1200-1600 m; fl. & fr.: Sept.-Mar.; Jowai-Jarain, Khleihriat-Jowai, Raliang..

2. ***Osbeckia nutans*** Triana in Trans. Linn. Soc. 28: 54. 1871; Fl. Brit. Ind. 2: 521. 1879; Fl. As. 2: 296. 1938.

Shrubs or undershrubs, up to 1 m; leaves linear or elliptic-lanceolate, subacute to rounded at base, acuminate, 2-5 × 0.5-1.3 cm, pale yellow-green beneath flowers purple, ± 2.5 cm across, 1-3 together on short terminal peduncles; pedicels 6-8 mm; bracts linear-lanceolate, 6-8 × 2-4 mm; calyx-lobes lanceolate, 10-12 × 4-5 mm; capsules campanulate, ± 8 mm.

Grasslands, secondary forests and forest edges, 1300-1600 m; fl. & fr.: Oct.-Feb.; Nartiang.

3. ***Osbeckia rostrata*** D. Don, Prodr. Fl. Nep. 221. 1825; Fl. Brit. Ind. 2: 517. 1879; Fl. As. 2: 293. 1938.

Shrubs, up to 1.5 m; leaves lanceolate to ovate-oblong, rounded to cuncate at base, acuminate 8-17 × 2-5 cm; basal nerves 5; petioles 5-15 mm; flowers pinkish-purple, 4-5 cm across, in terminal paniculate corymbs; bracts 5-7 × 3-4 mm; calyx-lobes ± 10 × 5 mm; capsules ovoid, narrowed into a short neck, ± 20 × 8 mm.

Forests and wastelands, 100-1000 m; fl. & fr.: June-Dec.; Dawki, Jarain-Syndai.

4. ***Osbeckia stellata*** Ker-Gawl. in Edw. Bot. Reg. 8: t. 674. 1822. *O. crinita* Naud. in Ann. Sci. Nat. Bot. ser. 3. 14: 72. 1850; Fl. Brit. Ind. 2: 517. 1879; Fl. As. 2: 293. 1938.

Shrubs, 1-2 m; leaves ovate to oblong-lanceolate, cuncate to rounded at base, acute to acuminate, 4-10 × 1.5-4.5 cm; basal nerves 5-7; petioles 5-20 mm; flowers white or purple, ± 2.5 cm across, in terminal and upper axillary corymbose cymes; pedicels 2-8 mm; calyx-lobes ± 6 × 1 mm; capsules ovoid, narrowed into a neck, ± 12 × 7 mm.

Forests and wastelands, near forests and villages, 1000-1700 m; fl. & fr.: Aug.-May; Jowai, Khleibriat, Raliang-Garampani, Sutnga, Ummulong.

5. ***Osbeckia chinensis*** L. Sp. Pl. 345. 1753; Fl. Brit. Ind. 2: 515. 1879; Fl. As. 2: 294. 1938.

Weak undershrubs, up to 75 cm; leaves rounded to subobtusate at base, acute at apex, 1-5 × 0.5-2.0 cm; basal nerves 3-5; petioles up to 2 mm; flowers pale purple to pink purple, ± 2 cm across; pedicels 1-2 mm; bracts ovate, 4-6 × 3-4 mm; calyx-lobes 4, triangular, ± 5 × 3 mm; capsules ovoid, 6-8 mm, subglabrous.

Open grasslands and pine forests, 1000-1700 m; fl. & fr.: Mar.-Dec.; Raliang-Garampani.

6. ***Osbeckia capitata*** Walp. Nov. Act. Acad. Caesp. Leop. - Carol Nat. Cur. 10 suppl. 1: 331. 1843; Fl. Brit. Ind. 2: 516. 1879; Fl. As. 2: 295. 1938. *O. glauca* Naud. Ann. Sci. Nat. Bot. ser. 3. 14: 68. 1850 (*non* Triana 1871).

Herbs, up to 50 cm; leaves sessile, rounded at base, acute, 1-2 × 0.6-1.2 cm; basal nerves 3-5; flowers pinkish-purple, ± 2 cm across, terminal; pedicels 2-3 mm; bracts ovate, 5-6 mm; calyx-lobes ± 3 mm; capsules ovoid, ± 7 mm, glabrous.

Pine forests and grasslands, 1400-1800 m; fl. & fr.: June-Dec.; Jowai, Ummulong.

## 6. SARCOPIRAMIS Wall.

**Sarcopyramis nepalensis** Wall. Tent. Fl. Nep. 32. t. 23. 1824; Fl. Brit. Ind. 2: 541. 1879; Fl. As. 2: 308. 1938.

Erect or ascending herbs, up to 30 cm; leaves ovate to lanceolate, acute and subequal at base, long-acuminate, serrulate at margins, 1.5-5.5 × 1-3 cm; basal nerves 3-5; petioles 5-20 mm; flowers pinkish-purple, ± 1 cm across, terminal and axillary, solitary or 2-3-fascicled; pedicels 1-6 mm; calyx-lobes 4, 1-2 mm; capsules ovoid, quadrangular, ± 7 mm.

Primary forests, in shaded moist places and mossy rocky cliffs, 1200-1600 m; fl. & fr.: July-Oct.; Jarain, Jarain-Wah Umngot.

## 68. LYTHRACEAE

## ROOTALA L.

- |  |                          |
|--|--------------------------|
| 1a. Cauline leaves ovate to elliptic; flowers solitary, axillary or in numerous leafy spikes; capsules 2-valved. ... | <i>R. indica</i> 1       |
| 1b. Cauline leaves obovate to orbicular; flowers in close terminal spikes; capsules 4-valved. ...                    | <i>R. rotundifolia</i> 2 |

1. **Rotala indica** (Willd.) Koehne in Bot. Jahrb. 1: 172. 1880. *Peplis indica* Willd. Sp. Pl. 2: 244. 1799. *Ammania peploides* Spreng. Syst. 1: 444. 1825; Fl. Brit. Ind. 2: 566. 1879; Fl. As. 2: 316. 1938.

Glabrous annuals, 10-25 cm; leaves decussate, subcordate at base, acute to obtuse-mucronate, 4-20 × 2-10 mm; flowers purple, solitary in axils or forming short leafy racemes; capsules ellipsoid or obovoid-oblong; seeds many, minute, subfalcate, pink.

Marshy places, near streams and ponds, 100-500 m; fl. & fr.: Feb.-Oct.; Dawki.

2. **Rotala rotundifolia** (D. Don) Koehne in Bot. Jahrb. 1: 175. 1881. *Ammania rotundifolia* D. Don, Prodr. Fl. Nep. 220. 1825; Fl. Brit. Ind. 2: 566. 1879; Fl. As. 2: 316. 1938.

Glabrous perennial herbs, 10-25 m; rhizomes creeping; leaves opposite, sessile, narrow at base, rounded at apex, 5-8 × 4-7 mm; flowers purplish-pink, in erect 3-6 cm long terminal simple or branched racemes; capsules ellipsoid-oblong; seeds minute, ellipsoid, peltate.

Open marshy places, 1300-1600 m; fl. & fr.: May-Sept.; Jowai-Jarain.



## 69. CRYPTERONIACEAE

## CRYPTERONIA Bl.

**Crypteronia paniculata** Bl. Bijdr. 1151. 1826; Fl. As. 2: 314. 1938.  
*C. glabra* Endl. Gen. Suppl. 4(2): 39. 1847; Fl. Brit. Ind. 2: 574. 1879.

Trees with spreading crown and fluted stems, 10-25 m; leaves lanceolate to elliptic-lanceolate, acute at base, acuminate, 10-25 × 4-12 cm; lateral nerves 6-8 pairs; petioles 5-12 mm; flowers green; racemes axillary and terminal, 7-12 cm, often paniculate; pedicels 1-2 mm; capsules depressed-globose, ± 2.5 mm, pubescent; seeds many, minute, ellipsoid.

Primary forests, 100-1000 m; fl. & fr.: Oct.-Feb.; Dawki, G. K. Deka 12899.

## 70. ONAGRACEAE

## EPILOBIUM L.

**Epilobium brevifolium** D. Don, Prodr. Fl. Nep. 222. 1825. *E. hookeri* Clarke in Fl. Brit. Ind. 2: 585. 1879; Fl. As. 2: 317. 1938. *E. khasianum* Clarke l. c. 585; Fl. As. 2: 318. 1938.

Perennial erect or ascending herbs or undershrubs, up to 1 m; leaves spirally arranged at upper nodes, opposite at lower nodes, elliptic to oblong-lanceolate, cuneate to rounded at base, subacute, serrulate-dentate at margins, 1.5-5.0 × 0.5-1.5 cm; petioles up to 2 mm; flowers purple, ± 1 cm across, solitary or in subpaniculate terminal racemes; capsules linear, 5-7 cm; fruiting pedicels ± 15 mm; seeds numerous, oblong, pale brown with silky coma.

Wastelands, forest edges and pine forests, in shaded places, 1300-1600 m; fl. & fr.: Sept.-Jan.; Jowai.

## 71. PASSIFLORACEAE

- |   |                     |
|---|---------------------|
| 1a. Flowers bisexual; corona conspicuous; stamens hypogynous. ... | <i>Passiflora</i> 1 |
| 1b. Flowers unisexual; corona absent; stamens perigynous. ...     | <i>Adenia</i> 2     |

## 1. PASSIFLORA L.

- |   |                        |
|---|------------------------|
| 1a. Leaves simple; stipules linear, 5-6 mm; flowers pale yellow; fruits globose, ± 1 × 1 cm. ...      | <i>P. napalensis</i> 1 |
| 1b. Leaves trilobate; stipules ovate-lanceolate, 1-3 cm; flowers white; fruits ovoid, ± 4 × 3 cm. ... | <i>P. stipulata</i> 2  |

1. **Passiflora napalensis** Wall. Tent. Fl. Nap. 20. t. 11. 1826; Fl. Brit. Ind. 2: 600. 1879; Fl. As. 2: 322. 1938.

Slender climbers; leaves ovate-lanceolate, rounded or subcordate at base, acute to acuminate at apex, distantly denticulate at margins, 8-12 × 4-6 cm; basal nerves 3-5; lateral nerves 3-5 pairs; flowers pale yellow, 8-10 mm across, in axillary cymes; peduncles 4-5 from each axil, 2.5-3.5 cm; fruits purplish; seeds 10-15, obovoid, ± 2 mm.

Forests and forest edges, 1000-1600 m; fl. & fr.: June-Oct.; Jarain-Syndai, Jowai, Khleibriat.

2. **Passiflora stipulata** Aubl. Pl. Guiana 2: 830. 1775; Chakravarty in Bull. Bot. Soc. Beng. 3: 58. 1949.

Extensive climbers; leaves trilobed to the middle, cordate or subpeltate at base, 6-10 × 7-12 cm; lobes oblong-elliptic, obtuse-mucronate, main nerves 5-7; lateral nerves 5-7 pairs; petioles 3-5 cm; flowers white, 4-5 cm across, solitary, axillary; pedicels 2-5 cm; fruits yellowish-green; seeds many.

Forests, forest edges and scrubs near villages, 1200-1600 m; fl. & fr.: June-Sept.; Jowai, Nartiang.

## 2. ADENIA Forsk.

**Adenia trilobata** (Roxb.) Engl. in Bot. Jahrb. 14: 376. 1891. *Modecca trilobata* Roxb. Fl. Ind. 3: 133. 1832; Fl. Brit. Ind. 2: 602. 1879; Fl. As. 2: 323. 1938.

Large climbers; leaves palmately 3 or rarely 5-lobed, subtruncate or cordate at base, 15-20 × 3-6 cm; main nerves 5-9; lateral nerves 2-5 pairs; petioles 5-12 cm; flowers white, ± 6 mm across, in axillary cymes; peduncles 10-17 cm, terminating in a tendril; fruits oblong, ± 5.5 cm; carpophores ± 15 mm; seeds reniform, suspended on ± 1 cm long stalk, covered with white slimy aril.

Primary forests, in open places, 100-1000 m; fl. & fr.: June-Sept.; Dawki, Syndai-Muktapur.

## 72. CUCURBITACEAE

An economically important family with the following commonly in cultivation, for their edible fruits, as vegetables.

1. *Sechium edule* Sw.—'Soh-kwash',

2. *Cucurbita pepo* DC.—'Pathao'.  
 3. *Momordica charantia* L.—'Karela'.

1a. Filaments completely connate into a column. ...	<i>Gynostemma</i>	1
1b. Filaments free or connate at base only.		
2a. Stamens 5. ...	<i>Thladiantha</i>	2
2b. Stamens 3, rarely 2 or 1.		
3a. Anther-cells straight or slightly curved.		
4a. Male flowers subumbellate; female flowers solitary; pedicels of male flowers 2.5—8.0 cm long. ...	<i>Solena</i>	3
4b. Male and female flowers fascicled; pedicels of male flowers up to 2 cm long.		
5a. Tendrils simple; rudiment of pistil present between stamens; fruits up to 12 mm diam. ...	<i>Mukia</i>	4
5b. Tendrils bifid; rudiment of pistil absent; fruits 20—25 mm diam. ...	<i>Diplocyclos</i>	5
3b. Anther-cells conduplicate, triplicate or contorted.		
6a. Petals or corolla-lobes fimbriate.		
7a. Fruits 6—12-seeded; seeds connate in pairs. ...	<i>Hodgsonia</i>	6
7b. Fruits many-seeded; seeds not connate in pairs.	<i>Trichosanthes</i>	7
6b. Petals or corolla-lobes entire.		
8a. Male calyx elongated, tubular; anthers included in calyx-tube. ...	<i>Gynopetalum</i>	8
8b. Male calyx short, campanulate; anthers exerted.		
9a. Stamens inserted at the mouth of calyx tube.	<i>Benincasa</i>	9
9b. Stamens inserted below the mouth of calyx-tube. ...	<i>Momordica</i>	10

### 1. GYNOSTEMMA Bl.

***Gynostemma pedata*** Bl. Bijdr. 23. 1825; Fl. Brit. Ind. 2: 633. 1879; Fl. As. 2: 331. 1938.

Slender scandent shrubs; leaves ovate-oblong or lanceolate, pedate, 3-5-foliolate, undulate or crenulate-dentate at margins; middle leaflets 4-14 × 2-5 cm; lateral leaflets shorter; outermost leaflets very short; petioles 3-7 cm; petiolules 1-4 mm; flowers white, in lax axillary panicles; rachis 10-30 cm; branches divaricate, 5-15 cm; pedicels 1-4 mm; fruits globose, 7-9 mm, olive-green; seeds compressed, ellipsoid, 2.5-3.5 × 2.0-3.0 cm, yellowish.

Primary forests, in shaded places, 1000-1500 m; fl. & fr.: June-Dec.; Nartiang.

### 2. THLADIANTHA Bunge

***Thladiantha hookeri*** Clarke in Fl. Brit. Ind. 2: 631. 1879; Fl. As. 2: 330. 1938; *emend.* Chakrav. in Notes R. Bot. Gard. Edinb. 21: 121-123. 1948.

Large climbers; leaves simple, ovate to lanceolate, cordate at base, acuminate, remotely denticulate at margins, 10-13 × 6-8 cm; petioles 3-6 cm; tendrils simple; flowers golden-yellow; male flowers racemed, 4-7-flowered;

peduncles 2-3 cm; female flowers solitary or in few-flowered racemes; pedicels 2-5 cm; fruits oblong, 3.0-3.5 cm; seeds obovoid, compressed,  $\pm 6 \times 3$  mm.

Forests and wastelands, on bushes, 1200-1500 m; fl. & fr.: Apr.-Aug.; Jowai, *King's Collector s. n.* (CAL); R. S. Rao 2511.

### 3. SOLENA Lour.

**Solena heterophylla** Lour. Pl. Cochinch. 514. 1790. *Zehneria umbellata* Thw. Enum. Pl. Zeyl. 125. 1853; Fl. Brit. Ind. 2: 625. 1879. *Melothria heterophylla* (Lour.) Cogn. in DC. Monogr. Phan. 3: 618. 1881.

Climbing or trailing herbs; leaves entire to 3-5-lobed; lobes ovate to oblong-lanceolate, cordate to hastate at base, acute, remotely denticulate, 6-25  $\times$  5-10 cm; petioles 10-15 mm; tendrils simple or 2-fid; flowers dull white; male flower peduncles up to 5 cm; pedicels filiform; peduncles  $\pm 1$  cm; berries oblong, subangular, 4-5  $\times$  2.0-2.5 cm; seeds 6-12, obovoid, 4-5 mm, grey.

Forests and forest edges, 100-1200 m; fl. & fr.: Mar.-Nov.; Garampani, Jarain, Raliang-Garampani Road, Sohka.

### 4. MUKIA Arn.

**Mukia maderaspatana** (L.) M. J. Roem. Fam. Nat. Syn. Pepon. 2: 47. 1846. *Cucumis maderaspatana* L. Sp. Pl. 1438. 1753. *Bryonia scabrella* L. f. Suppl. 424. 1781. *Mukia scabrella* (L. f.) Arn. in Hook. J. Bot. 3: 276. 1841; Fl. Brit. Ind. 2: 623. 1879.

Annual scabrid herbs; leaves simple and broadly ovate to subdeltoid or 3-7-angled or lobed, cordate at base, acute to short-acuminate at apex, 4-10  $\times$  3-8 cm; petioles 1-8 cm; male flower pedicels 2-7 mm; female flowers solitary or fascicled, subsessile; corolla yellow; fruits subglobose, 10-12  $\times$  8-10 mm, green, banded, turning to red; seeds many,  $\pm 3 \times 2.5$  mm.

Wastelands and on bushes, near forests and villages, 100-800 m; fl. & fr.: May-Nov.; Garampani.

### 5. DIPLOCYCLOS Post & Kuntze

**Diplocyclos palmatus** (L.) Jeffrey in Kew Bull. 15: 352. 1962. *Bryonia palmata* L. Sp. Pl. 1012. 1753. *B. laciniosa sensu* L. Sp. Pl. 1013. 1753, *pro parte, quoad syn. cit.* excl. type; Fl. Brit. Ind. 2: 622. 1879.

Much-branched climbing herbs; leaves broadly ovate, palmately 3-9-fid, widely cordate at base, denticulate to undulate-subcrenulate at margins, 8-18 cm across; petioles 2-8 cm; flowers yellow,  $\pm$  1.5 cm across, in axillary, 2-8-flowered fascicles; pedicels 2-20 mm; berries subglobose, yellowish-green with 6 narrow white stripes, ripening to bright red; seeds few, 6-7  $\times$  3-4 mm.

Forests and forest edges and bushes, 100-1000 m; fl. & fr.: May-Dec.; Garampani, *Balakrishnan* 46991.

#### 6. HODGSONIA Hook. f. & Thoms.

**Hodgsonia macrocarpa** (Bl.) Cogn. in DC. Monogr. Phan. 3: 349. 1831. *Trichosanthes macrocarpa* Bl. Bijdr. 935. 1826. *T. heteroclita* Roxb. Fl. Ind. 3: 705. 1832. *H. heteroclita* (Roxb.) Hook. f. & Th. in Proc. Linn. Soc. 2: 257. 1853; Fl. Brit. Ind. 2: 606. 1879; Fl. As. 2: 326. 1938.

Climbing shrubs, up to 25 m; leaves palmately 3- or rarely 5-lobed, rounded or emarginate at base, 15-25 cm across; petioles 5-8 cm; tendrils 2-3-fid; flowers brown tomentose; male flowers in 15-30 cm long pedunculate racemes; female flowers solitary; bracts lanceolate, 5-10 mm; corolla white, yellowish inside; fruits depressed-globose, longitudinally 12-grooved, 7-12  $\times$  10-16 cm, red-brown; seeds in 3-6 pairs, flat, 5-7  $\times$  2.5-3.0 cm.

Primary forests, 100-1000 m; fl. & fr.: Feb.-Nov.; Dawki, Umthapoh. The large seeds are useful for their edible oil.

#### 7. TRICHOSANTHES L.

- |  |     |                         |
|--|-----|-------------------------|
| 1a. Bracts of male racemes narrowed at base, not sheathing; seeds turgid with horizontal belts.            | ... | <i>T. himalensis</i> 1  |
| 1b. Bracts of male racemes sheathing the flowers from a broad base; seeds much-compressed, usually oblong. |     |                         |
| 2a. Calyx segments dentate or lacinate.  | ... | <i>T. bracteata</i> 2   |
| 2b. Calyx segments entire.   |     |                         |
| 3a. Leaves unlobed, ovate-triangular; bracts entire.   | ... | <i>T. cordata</i> 3     |
| 3b. Leaves shortly lobed; bracts crenate or incised.   | ... | <i>T. wallichiana</i> 4 |

1. **Trichosanthes himalensis** Clarke in Fl. Brit. Ind. 2: 608. 1879.

Extensive climbers; leaves suborbicular, 3-5-lobed to palmately compound, cordate to subcordate at base, 10-15 cm across; petioles robust, 3-6 cm; flowers deep yellow,  $\pm$  1 cm across; male peduncles axillary, solitary, 2-8 cm, 4-10-flowered; female peduncles axillary, 2-3 cm; bracts obovate; berries oblong-ovoid, 8-10  $\times$  2.5-3.0 cm; seeds drum-shaped, 6-7  $\times$  7-9 mm.

Forest edges, wastelands and bushes, 1300-1600 m; fl. & fr.: June-Oct.; Jowai, *Balakrishnan* 42826 & 42838.

2. ***Trichosanthes bracteata*** (Lamk.) Voigt. Cat. Hort. Calc. 58. 1845. *Modecca bracteata* Lamk. Encycl. Meth. Bot. 4: 210. 1796. *T. palmata* Roxb. Fl. Ind. 3: 704. 1832; Fl. Brit. Ind. 2: 606. 1879; Fl. As. 2: 327. 1938.

Extensive climbers; tendrils 3-, rarely 2-fid; leaves obovate to suborbicular, deeply cordate at base, palmately 3-7-lobed, 5-25 × 6-18 cm; main nerves 3-7; petioles 3-8 cm; flowers white, 4-5 cm across; male flowers axillary, racemose; female flowers solitary; peduncles 10-20 cm; bracts obovate, 2-3 cm; berries subglobose, 5-9 × 4-6 cm, red; with orange streaks; seeds ± 12 mm.

Forest edges and hedges, near villages, 100-1400 m; fl. & fr.: June-Nov.; Dawki, Jowai-Badarpur Road, Nongringkoh, Raliang, Sohka, Sohka-Nongthala.

3. ***Trichosanthes cordata*** Roxb. Fl. Ind. 3: 703. 1832; Fl. Brit. Ind. 2: 608. 1879.

Extensive climbers with tuberous roots; leaves ovate, subangular or sublobate, cordate at base, acute to short-acuminate, dentate-serrate, 12-20 × 9-12 cm, 3-5-nerved at base; petioles 2-8 cm; flowers yellow, ± 4 cm across; female flowers axillary, solitary or fascicled; male flowers on 12-20 cm long racemes; berries globose, 5-7 cm, red, orange-streaked; seeds subquadrangular, 10-12 × 4-5 mm.

Wastelands, hedges and bushes near villages, 100-500 m; fl. & fr.: Mar.-July; Dawki.

4. ***Trichosanthes wallichiana*** (Ser.) Wt. in Ann. Mag. Nat. Hist. 8: 270. 1832. *Involucrata wallichiana* Ser. in Mem. Soc. Phys. Hist. Nat. Geneve 3(1): t. 5. 1825. *T. multiloba* Clarke in Fl. Brit. Ind. 2: 607. 1879; Fl. As. 2: 328. 1938.

Extensive climbers; tendrils 2-3-fid; leaves suborbicular, deeply cordate or subtruncate at base, palmately 3-9-lobed, 10-20 cm across, 3-9-nerved at base; petioles 2-8 cm; flowers white, 3-4 cm across; male peduncles 15-35 cm; female peduncles 2-4 cm; bracts ovate, 2-3 cm; fruits ovoid, 5-8 cm, bright red with orange stipes; seeds angular, 15-18 mm.

Primary forests and forest edges, also near villages, 1400-1600 m; fl. & fr.: May-Oct.; Jowai, Raliang.

## 8. GYMNOPTALUM Arn.

**Gymnometalum cochinchinense** (Lour.) Kurz in J. As. Soc. Bengal 40: 57. 1871; Fl. Brit. Ind. 2: 611. 1879. *Bryonia cochinchinense* Lour. Fl. Cochinch. 595. 1790.

Creeping or climbing herbs; leaves ovate, palmately 3-5-angular, lobed or partite, 4-15 × 3-15 cm; petioles 2.5-4.0 cm; tendrils simple; male flowers solitary or in 3-8-flowered racemes; peduncles 3-7 cm; female flowers solitary or in pairs; pedicels 1-4 cm; bracts ovate; corolla white; fruits ovoid, acuminate, 10-ribbed, 4-7 × 2-3 cm, pubescent, red with green pulp; seeds compressed, oblong, 7-8 × 2.5-3.5 mm, brown.

Wastelands and forest edges, on bushes, 100-500 m; fl. & fr.: Jan.-Dec.; Garampani.

## 9. BENINCASA Savi

**Benincasa hispida** (Thunb.) Cogn. in DC. Monogr. Phan. 3: 513. 1881. *Cucurbita hispida* Thunb. Fl. Jap. 322. 1872. *B. cerifera* Savi, Bibl. Ital. 9: 158. t.c. 1818; Fl. Brit. Ind. 2: 616. 1879; Fl. As. 2: 331. 1938.

Slender climbers; stems rigid, pungent-hispid; leaves ovate to reniform, cordate at base, acute, 5-11-angular, 10-26 × 10-25 cm, pubescent beneath; petioles 4-18 cm; flowers solitary, 7-11 cm across, yellow; pedicels 5-10 cm; calyx-tube 4-6 cm; lobes 2-3 cm; corolla densely pilose; fruits ellipsoid, 25-40 × 15-25 cm, dark green, white-pruinose; pulp white.

Forest edges, near villages and wastelands, often cultivated, 500-1400 m; fl. & fr.: July-Dec.; Kheihriat-Lumshnong.

## 10. MOMORDICA L.

**Momordica dioica** Willd. Sp. Pl. 4: 605. 1805; Fl. Brit. Ind. 2: 617. 1879; Fl. As. 2: 330. 1938.

Perennial climbers; roots tuberous; leaves ovate-orbicular, cordate at base, acute to obtuse-mucronate, denticulate at margins, 4-10 × 3-8 cm; pedicels 1-3 cm; flowers ± 3 cm across; male flowers solitary, pale brownish-yellow; female flowers fascicled, yellow; peduncles 4-12 cm; bracts cucullate, 15-30 mm; berries ovoid, rounded at base, beaked at base, densely echinate with soft spines, 4-6 × 2-4 cm; seeds ovoid, 6-7 × 5-6 mm, yellow.

Secondary forests, forest edges and wastelands, near village, 100-500 m; fl. & fr.: Mar.-Dec.; Dawki.

Young fruits are used in curries.

## 73. BEGONIACEAE

## BEGONIA L.

- |  |                             |
|--|-----------------------------|
| 1a. Capsules 2-celled.   |                             |
| 2a. Leaves elliptic-lanceolate.  | ... <i>B. rubro-venia</i> 1 |
| 2b. Leaves ovate, suborbicular.  |                             |
| 3a. Stems, petioles and peduncles subglabrous; leaves mostly lobed; capsules glabrous. | ... <i>B. palmata</i> 2     |
| 3b. Stems, petioles and peduncles long-hairy; leaves unlobed; capsules hairy.          | ... <i>B. thomsonii</i> 3   |
| 1b. Capsules 3- or 4-celled.   |                             |
| 4a. Capsules 4-celled.   | ... <i>B. roxburghii</i> 4  |
| 4b. Capsules 3-celled.   |                             |
| 5a. Female flowers trimerous.  | ... <i>B. ovatifolia</i> 5  |
| 5b. Female flowers pentamerous.  |                             |
| 6a. Leaves glabrous.   | ... <i>B. picta</i> 6       |
| 6b. Leaves hairy on both surfaces.   | ... <i>B. pedunculosa</i> 7 |

1. **Begonia rubro-venia** Hook. in Curtis, Bot. Mag. ser. 3. 9: t. 4689; Fl. Brit. Ind. 2: 645. 1879. **Fig. 16**

Herbs, 20 - 35 cm; leaves rounded to subcordate at base, acute to acuminate, angular-undulate at margins, 8 - 18 × 1 - 6 cm; lateral nerves 5 - 7 pairs, reddish; petioles 2 - 12 mm; stipules lanceolate, 5 - 10 × 3 - 6 cm; peduncles 7 - 15 cm; bracts lanceolate, 10 - 15 × 2 - 3 mm; flowers white or pinkish; capsules recurved, 1 - 2 × 2 - 3 cm, reddish-green.

Shaded places in forests, usually on rocky stream-sides, 500 - 1500 m; fl. & fr.: July-Oct.; Dawki, Jarain, Syndai-Muktapur.

2. **Begonia palmata** D. Don, Prodr. Fl. Nep. 223. 1825. *B. laciniata* Roxb. Fl. Ind. 3: 649. 1832; Fl. Brit. Ind. 2: 645. 1879; Fl. As. 2: 334. 1938.

Erect herbs, 15 - 55 cm; leaves unequally cordate at base, acute to caudate-acuminate at apices of lobes, serrulate-laciniate, 10 - 18 × 5 - 12 cm; main nerves, 5 - 7; petioles 4 - 12 cm; stipules oblong, 10 - 15 × 6 - 10 mm; peduncles axillary, solitary, 6 - 15 cm, 2 - 6-flowered; bracts oblong-lanceolate, 8 - 12 × 4 - 7 mm, brown-pubescent; capsules oblong, 3-winged, 10 - 15 × 15 - 20 mm, reddish.

Shaded wet places in forests and forest edges, 1000 - 1600 m; fl. & fr.: June-Jan.; Amwee riverside, Jarain, Jowai, Khleihriat, Shangpung, Sutnga.

3. **Begonia thomsonii** DC. Prodr. 15(1): 349. 1864; Fl. Brit. Ind. 2: 647. 1879.

Erect or decumbent herbs, 15 - 35 cm; leaves cordate at base, acute to short-acuminate, ciliate at margins, 6 - 17 × 4 - 10 cm; main nerves 5 - 7;



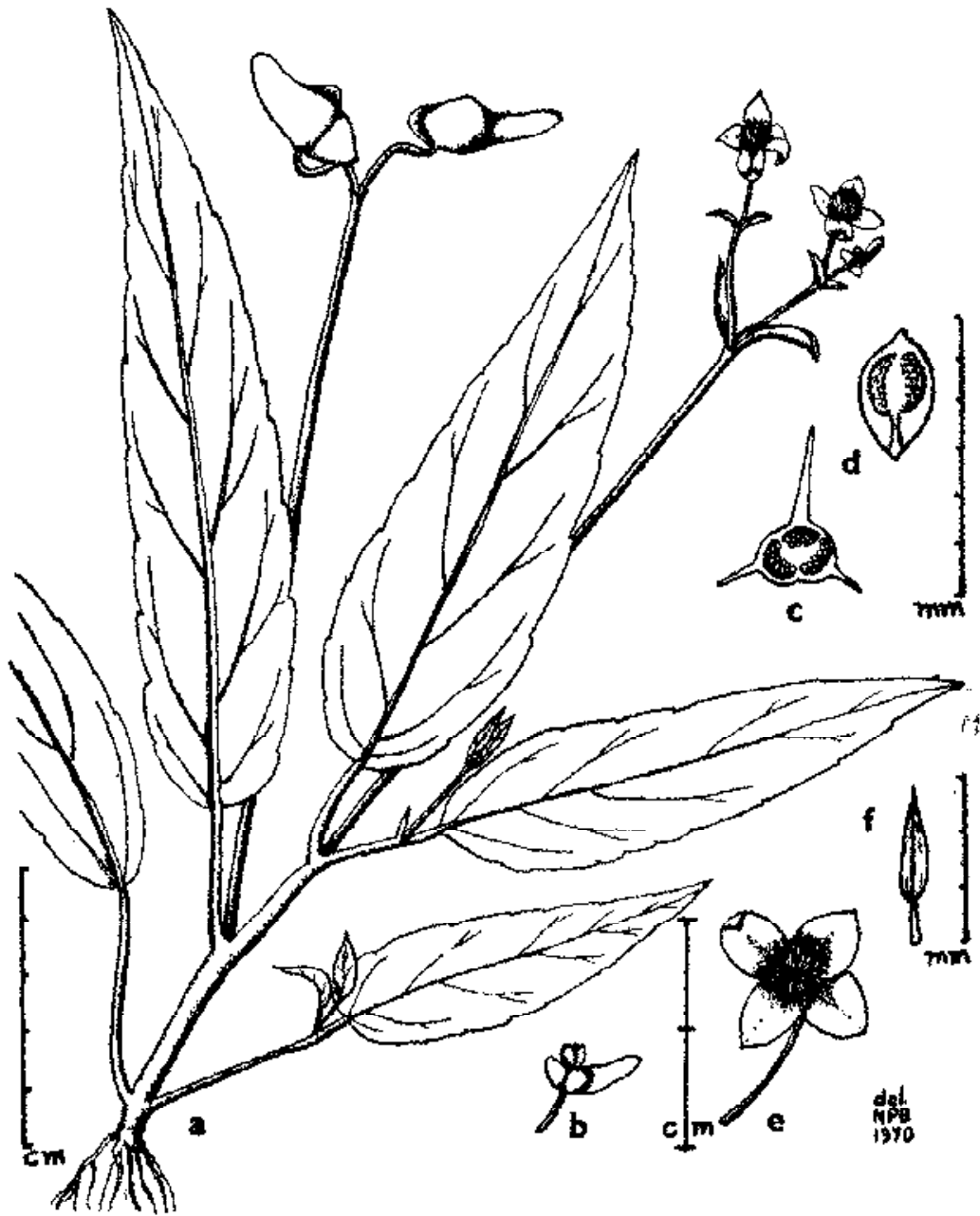


Fig. 16. *Begonia rubro-venia* Hook.

a. Habit. b. Female flower. c. Male flower. d. T. S. of ovary. e. L. S. of ovary.  
f. Stamen.

petioles 5-35 cm; stipules lanceolate,  $\pm$  1 cm; peduncles 3-10 cm; bracts lanceolate, 7-8 $\times$ 3-4 mm; flowers pinkish-purple to white; capsules erect, turgid,  $\pm$  15 $\times$ 20 mm.

Forests, in shaded places, 100-1000 m; fl. & fr.: June-Sept.; Dawki, Narpuah.

4. **Begonia roxburghii** (Miq.) DC. Prodr. 15(1): 398. 1864; Fl. Brit. Ind. 2: 635. 1879; Fl. As. 2: 333. 1938. *Diploclinium roxburghii* Miq. Fl. Ind. Bat. 1(1): 692. 1856. *B. malabarica* (non Lamk.) Roxb. Fl. Ind. 3: 648. 1832.

Erect herbs, up to 1 m; leaves broadly ovate, cordate at base, acute to short-acuminate, 15 - 30 × 12 - 25 cm; main nerves 7 - 9; petioles 5 - 35 cm; stipules lanceolate, 15 - 20 mm; peduncles axillary, dichotomous, 5 - 10 cm; bracts linear-lanceolate, 4 - 7 mm; flowers white; capsules pendent, 4-lobed, turgid, 10 - 15 mm diam., red-spotted on greenish-yellow base.

Shaded places in forests, 100 - 1000 m; fl. & fr.: May-Oct.; Garampani, Jarain, Rytang, near Garampani, Sonapur, Sutnga, Syndai.

5. **Begonia ovalifolia** DC. Prodr. 15(1): 328. 1864; Fl. Brit. Ind. 2: 642. 1879. *Jhur-jajew*.

Succulent herbs, 10 - 20 cm; leaves orbicular-ovate, rounded or cordate at base, acute to subacute at apex, dentate-serrulate at margins, 4 - 12 × 2.5 - 9.0 cm; main nerves 5 - 7; petioles 15 - 40 mm; stipules subulate, ± 2 mm; peduncles 4 - 8-flowered; bracts lanceolate; flowers white or pale pink; capsules triquetrous, ± 15 × 30 mm.

Shaded mossy places, near streams in forests, 100 - 1000 m; fl. & fr.: June-Sept.; Syndai-Muktapur.

6. **Begonia picta** Smith, Exot. Bot. t. 101. 1804-5; Fl. Brit. Ind. 2: 638. 1879; Fl. As. 2: 334. 1938.

Slender herbs, 15 - 35 cm; leaves ovate-orbicular, unevenly rounded or cordate at base, acute to short-acuminate, coarsely dentate-serrulate at margins, 4 - 12 × 3 - 8 cm; main nerves 5 - 7; petioles 2 - 10 cm; peduncles 2 - 6 cm; bracts subulate, ± 2 mm; flowers pinkish-white, 10 - 15 mm across; capsules triquetrous, 10 - 15 × 15 - 20 mm.

Forests, in shaded places near streams, 100 - 600 m; fl. & fr.: June-Oct.; Dawki.

7. **Begonia pedunculosa** Wall. Pl. As. Rar. 1: 82. t. 97. 1830; Fl. Brit. Ind. 2: 639. 1879.

Erect or decumbent herbs, 12 - 20 cm; stems zigzag; leaves oblong, unevenly rounded or cordate at base, acute to acuminate, often lobed, doubly serrate-ciliate at margins, 3 - 9 × 1 - 4 cm; petioles 2 - 25 mm; stipules ovate, 5 - 8 × 2 - 4 mm; cymes dichotomous, ± 2 cm; bracts ovate, ciliate at margins, 4 - 7 × 2 - 4 mm; pedicels filiform, ± 10 mm up to 20 mm in fruit; flowers pink, 5 - 8 mm across; capsules triquetrous, ± 13 × 15 mm.

Forests in shaded places, 1000 - 1600 m; fl. & fr.: June-Nov.; Jarain.

## 74. APIACEAE

- |  |                        |
|--|------------------------|
| 1a. Umbels simple or irregularly compound ; vittae absent.   |                        |
| 2a. Leaves compound or deeply partite ; capsules terete. ...   | <i>Sanicula</i> 1      |
| 2b. Leaves undivided or shortly lobed ; capsules laterally compressed.   |                        |
| 3a. Stipules obvious ; involucre absent ; petals acute, valvate ;<br>carpels 5-ribbed without transverse veinlets. ...             | <i>Hydrocotyle</i> 2   |
| 3b. Stipules obsolete ; involucre conspicuous ; petals obtuse,<br>imbricate ; carpels 7- to 9-ribbed with transverse veinlets. ... | <i>Centella</i> 3      |
| 1b. Umbels compound ; vittae conspicuous.  |                        |
| 4a. Carpels laterally compressed, more or less constricted at com-<br>missure. ...   | <i>Trachyspermum</i> 4 |
| 4b. Carpels dorsally compressed, widest at commissure.   |                        |
| 5a. Primary ridges of carpels more or less excurrent, winged. ...  | <i>Selinum</i> 5       |
| 5b. Primary ridges of carpels more or less distinct, not winged. ...   | <i>Oenanthe</i> 6      |

## 1. SANICULA L.

***Sanicula elata*** D. Don, Prodr. Fl. Nep. 183. 1825. *S. europaea* (non L. 1753) Clarke in Fl. Brit. Ind. 2: 670. 1879; Fl. As. 2: 340. 1938.

Perennial erect herbs with more or less creeping rhizomes; stems 15-75 cm; leaves orbicular, palmately 3-5-partite, 4-8 × 6-15 cm; segments incised or serrate; petioles 3-20 cm; umbels irregularly compound; peduncles ± 1.5 cm; petals white; fruits echinate; mericarps ± 2 × 1 mm, densely covered with ± 1 mm long bristles; ribs obscure; vittae solitary in each ridge.

Pine forests, in shaded places, 1000-1600 m; fl. & fr.: Nov.-Mar.; Khleihriat.

## 2. HYDROCOTYLE L.

***Hydrocotyle javanica*** Thunb. Diss. Hydrocot. 3. t. 6. f. 2. 1798; Fl. Brit. Ind. 2: 667. 1879; Fl. As. 2: 339. 1938.

Perennial herbs; stems prostrate, rooting at nodes; leaves orbicular-rhomboid, 5-8-angular or lobate, cordate at base, crenate-serrate, 3-8 cm across; petioles 2-20 cm; stipules 3-8 × 4-6 mm; umbels simple or irregularly compound; peduncles 1-6 cm; fruits orbicular; mericarps with emarginate dorsal ribs and lateral ribs in commissure, ± 1 mm, reddish-brown to black-brown.

Wastelands, pine forests and paddy fields, in open moist places, 1000-1600 m; fl. & fr.: May-Oct.; Jowai, Khleihriat-Lumshnong, Raliang.

## 3. CENTELLA L.

***Centella asiatica*** (L.) Urban in Mart. Fl. Bras. 11: 287. t. 78. 1f. 11.

1879. *Hydrocotyle asiatica* L. Sp. Pl. 234. 1753; Fl. Brit. Ind. 2: 669. 1879; Fl. As. 2: 340. 1938.

Perennial herbs; stems creeping, rooting at nodes; leaves in rosettes, orbicular-reniform, crenate or lobulate, 1-6 cm diam.; petioles 1-30 cm; umbels solitary or 2-5 together in axils of  $\pm$  3 mm long bracts; peduncles up to 5 cm; involuclcs 2, lanceolate, 3-4 mm; petals red; fruits laterally compressed; mericarps  $\pm$  2  $\times$  1.5 mm; lateral and intermediate ribs arcuate.

Wastelands, forest edges and paddy fields, 1400-1700 m; fl. & fr.: Apr.-Nov.; Jowai, Raliang.

#### 4. TRACHYSPERMUM Link. *nom. cons.*

**Trachyspermum khasianum** (Clarke) Wolff in Engler, Pflanzent. 90: 91. 1927. *Carum khasianum* Clarke in Fl. Brit. Ind. 2: 682. 1879; Fl. As. 2: 341. 1938.

Erect herbs, 0.5-1.2 m; roots fusiform; leaves 3-partite or pinnate; petioles 1-12 cm, broad sheathed at base; segments of lower leaves elliptic-oblong, narrowed at base, subacute to obtuse, incised-serrate at margins, 2-6  $\times$  1-2 cm; umbels upper axillary, compound; main peduncles 1-4 cm; rays 4-6; fruits  $\pm$  1 mm, densely covered with broad scale-like hairs.

Forests, usually in clearings and streamsides, 1000-1500 m; fl. & fr.: July-Sept.; Jarain, *Balakrishnan* 46164 & 46165 —Endemic to Meghalaya.

#### 5. SELINUM L. *nom. cons.*

**Selinum striatum** Clarke in Fl. Brit. Ind. 2: 699. 1879.

Perennial erect herbs, 0.5-1.5 m; leaves 10-20 cm, 3-pinnate; ultimate pinnac 1-2 pinnatifid; segments narrow, lanceolate; petioles 1-15 cm, sheathed at base; umbels axillary, compound; main peduncles 5-15 cm; rays 10-15, 15-30 mm; pedicels 10-15 per umbel, 3-5 mm; flowers white; fruits 2-3 mm, subquadrate, with dorsal commissure and 3 dorsal elevated, subequally winged ridges; commissural vittae 2.

Grasslands and forest edges, in shaded places, 1200-1800 m; fl. & fr.: June-Nov.; Jowai, Raliang-Garampani, Ummulong.

#### 6. OENANTHE L.

- |   |     |                       |
|---|-----|-----------------------|
| 1a. Leaves 1-2-pinnate; ultimate segments elliptic or rhomboid-lanceolate, 5-25 mm broad. | ... | <i>O. javanica</i> 1  |
| 1b. Leaves 3-4-pinnate; ultimate segments linear, less than 2 mm broad.                   | ... | <i>O. thomsonii</i> 2 |

1. **Oenanthe javanica** (Bl.) DC. Prodr. 4: 138. 1840. *Sium javanicum* Bl. Bijdr. 15, 881. 1826. *O. stolonifera* DC. Prodr. 4: 138. 1830; Fl. Brit. Ind. 2: 696. 1879; Fl. As. 2: 341. 1938.

Perennial glabrous herbs, up to 1 m; petioles up to 10 cm; leaflets ovate to elliptic-lanceolate or rhomboid, shallowly serrate to pinnatifid; umbels terminal or leaf-opposed, compound; main peduncles 1-20 cm; rays 4-20, 5-35 mm; pedicels 10-25, 2-7 mm; flowers white; fruits 2-3 mm; mericarps with 3 subconfluent ribs.

Pine forests and secondary forests, 1400-1800 m; fl. & fr.: Apr.-Sept.; Ummulong.

2. **Oenanthe thomsonii** Clarke in Fl. Brit. Ind. 2: 697. 1879.

Glabrous, much-branched herbs, 0.5-1.0 m; petioles 2-4 cm with narrow marginal sheaths; leaflets pinnatifid or partite; umbels terminal or leaf-opposed, compound; main peduncles 1-5 cm; rays 4-8, 15-35 cm; pedicels 8-15, 1-3 mm; flowers white; fruits  $\pm$  2 mm; mericarps dorsally compressed, subquadrate, ellipsoid.

Pine forests and forest-edges and near streams, 1200-1500 m; fl. & fr.: June-Sept.; Jarain, Jowai.

## 75. ARALIACEAE

- |   |     |                              |
|---|-----|------------------------------|
| 1a. Petals more or less imbricate in bud.   |     |                              |
| 2a. Leaves 1-3-pinnate; flowers umbellate.  | ... | <i>Aralia</i> 1              |
| 2b. Leaves 1-pinnate; flowers racemose.   | ... | <i>Pentapanax</i> 2          |
| 1b. Petals valvate in bud.  |     |                              |
| 3a. Stamens numerous, often 50-70; ovary cells indefinite.                                | ... | <i>Tupidanthus</i> 3         |
| 3b. Stamens 10 or fewer; ovary cells definite.  |     |                              |
| 4a. Ovary 4-12-celled.  |     |                              |
| 5a. Leaves digitately compound.   | ... | <i>Schefflera</i> 4          |
| 5b. Leaves simple or palmately lobed.   |     |                              |
| 6a. Stem, branches and petioles armed with prickles; ovary 7-12-celled; endosperm smooth. | ... | <i>Trevesia</i> 5            |
| 6b. Stem, branches and petioles unarmed; ovary 5-celled; endosperm ruminant.              | ... | <i>Hedera</i> 6              |
| 4b. Ovary 1-2-celled.   |     |                              |
| 7a. Leaves pinnately compound or decompound; fruits laterally compressed.                 | ... | <i>Heteropanax</i> 7         |
| 7b. Leaves digitately compound or palmately lobed; fruits ovoid or globose.               |     |                              |
| 8a. Unarmed shrubs; pedicels distinctly articulate under the flower.                      | ... | <i>Macropanax</i> 8          |
| 8b. Prickly shrubs; pedicels inarticulate.  |     |                              |
| 9a. Leaves digitately 5-7-foliolate.  | ... | <i>Brassaiopsis</i> 9        |
| 9b. Leaves palmately lobed.   | ... | <i>Pseudobrassaiopsis</i> 10 |

### 1. ARALIA L.

- |  |     |                    |
|--|-----|--------------------|
| 1a. Stems and branches densely prickly; petioles, rachises of leaves and inflorescences more or less prickly; leaves prominently serrate.                              | ... | <i>A. armata</i> 1 |
| 1b. Stems and branches sparsely prickly; petioles, rachises of leaves and inflorescences unarmed or with a few scattered prickles; leaves entire or obscurely serrate. |     |                    |

2a. Flowers sessile.	...	<i>A. dasyphylla</i> 2
2b. Flowers pedicelled.		
3a. Inflorescences pubescent towards apices only; pedicels 8—15 mm long.	...	<i>A. thomsonii</i> 3
3b. Inflorescences pubescent throughout; pedicels 2—5 mm long.	...	<i>A. chinensis</i> 4

1. ***Aralia armata*** (G. Don) Seem. in J. Bot. 6: 134. 1868; Fl. Brit. Ind. 2: 723. 1879; Fl. As. 2: 345. 1938. *Panax armatus* G. Don, Gen. Syst. 3: 386. 1834. '*Diengla-tympus*'.

Shrubs or small trees; leaves up to 2 m, 2-pinnate with a pair of leaflets at each division of rachis, ultimate pinnules 5-9 foliolate; leaflets ovate to lanceolate, rounded to cordate at base, acuminate, bristly serrulate at margins, 4-11 × 2-5 cm; lateral nerves 4-6 pairs; panicles terminal, up to 50 cm; peduncles 1-5 cm; umbels 20-25 mm across; pedicels 10-15 mm; fruits ± 4 mm diam., 5-angular.

Primary forests, 1300-1600 m; fl. & fr.: Nov.-Feb.; Jowai.

2. ***Aralia dasyphylla*** Miq. Fl. Ind. Bat. 1(1): 751. 1855; Li in Sargentia 2: 114. 1942.

Shrubs or small trees, up to 6 m; innovations densely brown pubescent; leaves up to 70 cm, bipinnate; each pair of pinnae subtended by 2 accessory leaflets; leaflets 7-9 per pinna, ovate to oblong-lanceolate, rounded to subcordate at base, acuminate, 5-14 × 2-6 cm; lateral nerves 7-10 pairs; panicles up to 20 cm; peduncles 5-14 mm; flowers ± 2.5 mm across, capitate; fruits sessile, globose, 5-angled, ± 3.5 mm.

Primary forests, 1000-1400 m; fl. & fr.: June-Nov.; Umtapoh.

3. ***Aralia thomsonii*** Seem. in J. Bot. 6: 134. 1868; Fl. Brit. Ind. 2: 723. 1879; Fl. As. 2: 345. 1938.

Large shrubs; leaves up to 1 m, 2-3-pinnate with a pair of leaflets at each division of rachis; ultimate pinnules 5-9-foliolate; leaflets elliptic-ovate or lanceolate, rounded to subcordate at base, acute to acuminate, obscurely serrulate at margins, 6-15 × 2-6 cm; lateral nerves 6-10 pairs; panicles up to 50 cm; umbels 15-20-flowered; peduncles 1-5 cm; flowers 2-3 mm across, white; fruits globose, deeply 5-angled, ± 3.5 mm.

Primary forests, 1000-1500 m; fl. & fr.: Apr.-Aug.; Jowai, Sohka.

4. ***Aralia chinensis*** L. Sp. Pl. 273. 1753; Li in Sargentia 2: 109. 1942.

Shrubs, 2-7 m; leaves 40-80 cm, 2- or 3-pinnate; usually with a pair of leaflets at each division of rachis; leaflets ovate to oblong-ovate, narrowly

rounded at base, acute, closely ciliate-serrate at margins, 5-12 x 3-8 cm; lateral nerves 6-8 pairs; panicles terminal, 25-35 cm; peduncles 1-4 cm; flowers  $\pm$  3 mm across, yellowish-green; fruits globose, 5-angled, 3-4 mm.

Primary forests, 1300-1600 m; fl. & fr.: June-Oct.; Jarain, *Balakrishnan* 46807.

## 2. PENTAPANAX Seem.

**Pentapanax subcordatus** (G. Don) Seem. in J. Bot. 2: 295. 1864; Fl. Brit. Ind. 2: 724. 1879; Fl. As. 2: 347. 1938. *Hedera subcordata* G. Don, Gen. Syst. 3: 394. 1894.

Small trees, 3-8 m; rachis 12-22 cm; petioles 8-15 cm; leaflets 3-5, ovate or oblong-ovate, rounded to subcordate at base, acuminate, obscurely serrulate, 9-13 x 5-9 cm; lateral nerves 6-10 pairs; petiolules 5-30 mm; panicles up to 30 cm; pedicels 2-3 mm; flowers  $\pm$  3 mm across, green; fruits subglobose, obscurely 5-angled,  $\pm$  5 mm.

Forests and forest edges, 1300-1600 m; fl. & fr.: May-Aug.; Jowai.

## 3. TUPIDANTHUS Hook. f. & Th.

**Tupidanthus calyptratus** Hook. f. & Th. in Curtis, Bot. Mag. 82: t. 4908. 1856; Fl. Brit. Ind. 2: 740. 1879; Fl. As. 2: 364. 1938.

Scandent woody shrubs, often epiphytic, 2-10 m; petioles 12-35 cm, up to 8 mm thick; leaflets 7-11, digitate, obovate or lanceolate, acute to attenuate at base, acute to short-acuminate, 12-20 x 4-8 cm; lateral nerves 20-30 pairs; petiolules 3-5 cm; panicles terminal; peduncles 6-8 cm; pedicels 3-7 per umbel, 2-3 cm; bracts concave,  $\pm$  1.5 cm; flowers light green,  $\pm$  1.5 cm across; fruits depressed-globose, 2.5-3.5 cm.

Dense shaded places in primary forests, 1300-1600 m; fl. & fr.: Dec.-July; Jarain, Laskein.

## 4. SCHEFFLERA J. R. & G. Forst. *nom. cons.*

1a. Styles connate into a distinct cylindric column; fruits crowned by a narrow cylindric column.

2a. Petiolules unequal in length, 1-3 cm long; leaflets often pinnately lobed. ...

2b. Petiolules subequal in length, 2-3 cm long; leaflets entire or remotely serrate. ...

1b. Styles none; stigmas sessile; fruits crowned by a conical disk.

*S. hypoleuca* 1

*S. elata* 2

- |   |     |                         |
|---|-----|-------------------------|
| 3a. Flowers and fruits sessile or subsessile.   | ... | <i>S. glomerata</i> 3   |
| 3b. Flowers and fruits distinctly pedicelled.   |     |                         |
| 4a. Leaflets oblong to obovate, broadest above the middle.  | ... | <i>S. arboricola</i> 4  |
| 4b. Leaflets elliptic to oblong, not broadest above the middle.   |     |                         |
| 5a. Nerves distinct on upper surface of leaflets; inflorescences glabrous; fruits ovoid, distinctly and sharply pentagonous.                              | ... | <i>S. venulosa</i> 5    |
| 5b. Nerves indistinct on upper surface of leaflets; inflorescences covered with deciduous tomentum; fruits globose, indistinctly and bluntly pentagonous. | ... | <i>S. wallichiana</i> 6 |

1. **Schefflera hypoleuca** (Kurz) Harms in Engl. & Prantl, Pflanzenfam. 3(8): 38. 1894. *Heptapleurum hypoleucum* Kurz, For. Fl. Brit. Burma 1: 539. 1877; Fl. Brit. Ind. 2: 728. 1879; Fl. As. 2: 350. 1938. 'Dieng-latymphu'.

Trees, 5-10 m; petioles  $\pm$  40 cm; leaflets 5-7, digitate, oblong or ovate-oblong, rounded at base, acute, 12-20  $\times$  4-10 cm; lateral nerves 8-12 pairs; panicles patently branched,  $\pm$  40 cm; peduncles 2-3 cm; pedicels 40-60 per umbel, 10-14 mm; flowers 4-5 mm, greenish-white; fruits subglobose, obtusely 5-ribbed,  $\pm$  4 mm.

Primary and secondary forests, 900-1600 m; fl. & fr.: Oct.-Apr.; Jowai-Jarain, Khongsong, Mawryngkneng, Raliang.

2. **Schefflera elata** (Buch.-Ham.) Harms in Engl. & Prantl, Pflanzenfam. 3(8): 38. 1894. *Hedera elata* Buch.-Ham. in D. Don, Prodr. Fl. Nep. 187. 1825. *Agalma glaucum* Seem. Rev. Heder. 25. 1868. *Heptapleurum glaucum* (Seem.) Kurz, For. Fl. Brit. Burma 1: 538. 1877; Fl. Brit. Ind. 2: 728. 1879; Fl. As. 2: 352. 1938. *H. elatum* (Buch.-Ham.) Clarke in Fl. Brit. Ind. 2: 728. 1879; Fl. As. 2: 351. 1938.

Trees, 5-12 m; petioles 20-50 cm; stipules connate,  $\pm$  1.5 cm; leaflets 5-7, digitate, elliptic-lanceolate, rounded at base, acute, 10-22  $\times$  4-10 cm; lateral nerves 6-10 pairs; panicles terminal, 30-40 cm; umbels racemose on primary branches; peduncles 15-20 cm; bracts ovate, acuminate, 5-10 mm; pedicels 5-12 mm; flowers greenish-white,  $\pm$  4 mm across; fruits globose, 5-grooved, 4-5 mm.

Forests, 1300-1600 m; fl. & fr.: Oct.-Feb.; Jowai, *King's Coll. s. n.* (CAL).

3. **Schefflera glomerata** Li in Sargentia 2: 33. f. 4. 1942.

Trees, 6-8 m; petioles 10-18 cm; leaflets 3-5, obovate-elliptic to oblanceolate, cuneate at base, obtuse or subacute, 8-15  $\times$  3-5 cm; lateral nerves 7-9 pairs; petiolules 2-5 cm; inflorescences terminal, paniculate, 15-20 cm; flowers glomerate, subcapitate at ends of short branches; fruits ovoid, distinctly 5-angular,  $\pm$  5  $\times$  3 mm.

Primary forests, 1000-1500 m; fl. & fr.: Mar.-Aug.; Jarain.



4. **Schefflera arboricola** (Hayata) Merr. in Lignan Sci. J. 5: 139. 1927. *Heptapleurum arboricolum* Hayata, Ic. Pl. Formosa 6: 23. t. 4. 1916.

Shrubs, often scandent, 3-4 m; petioles 10-15 cm; leaflets 7-9, obovate to oblong-ovate, acute or obtuse, 8-10 × 3-5 cm; lateral nerves 5-6 pairs; petiolules 2-4 cm; panicles terminal, 15-20 cm; peduncles 5-10 mm; pedicels 5-8 mm; fruits ovoid, distinctly 5-angular, ± 5 × 4 mm, glandular-punctate.

Primary forests, 1500-1800 m; fl. & fr.: June-Dec.; Ummulong.

5. **Schefflera venulosa** (W. & A.) Harms in Engl. & Prantl, Pflanzenfam. 3(8): 39. 1894. *Paratropia venulosa* W. & A. Prodr. 1: 377. 1894. *Heptapleurum venulosum* (W. & A.) Seem. in J. Bot. 3: 80. 1865; Fl. Brit. Ind. 2: 729. 1879; Fl. As. 2: 353. 1938. 'Tille-diyabet'.

Shrubs, subscaudent, often epiphytic; petioles 8-12 cm; stipules connate, ± 1 cm; leaflets 5-7, digitate, elliptic or oblong-elliptic, rounded to attenuate at base, acute to short-acuminate, 7-15 × 3-10 cm; lateral nerves 5-7 pairs; petiolules 15-65 mm; panicles terminal, 10-20 cm; umbels racemose on lateral branches; pedicels 8-12, 2-3 mm; flowers pale green, ± 5 mm across; fruits 3-4 mm.

Primary forests, 500-1500 m; fl. & fr.: Mar.-Oct.; Jarain.

6. **Schefflera wallichiana** (W. & A.) Harms in Engl. & Prantl, Pflanzenfam. 3(8): 39. 1894. *Paratropia wallichiana* W. & A. Prodr. 337. 1894. *Heptapleurum wallichianum* (W. & A.) Seem. Rev. Heder. 44. 1868; Fl. Brit. Ind. 2: 730. 1879. *H. khasianum* Clarke in Fl. Brit. Ind. 2: 730. 1879; Fl. As. 2: 352. 1938. *S. khasiana* (Clarke) Vig. in Ann. Sci. Nat. Bot. 9: 351. 1909.

Erect or subscaudent shrubs, 3-8 m; petioles ± 20 cm; stipules connate; leaflets 7-9, lanceolate or narrowly oblong, rounded to narrowed at base, acute to acuminate, 15-20 × 6-8 cm; lateral nerves 10-15 pairs; petiolules 3-5 cm; panicles 20-35 cm; umbels racemose on ascending branches; peduncles 8-20 mm; bracts oblong, acuminate, ± 6 mm; pedicels up to 10, 2-8 mm; flowers ± 6 mm across, white; fruits ± 4 mm.

Primary forests, 1400-1600 m; fl. & fr.: Oct.-Feb.; Jowai.

##### 5. TREVESIA Vis.

**Trevesia palmata** (Roxb.) Vis. in Mem. Acad. Torin. 2. 4: 262. 1842; Fl. Brit. Ind. 2: 732. 1879; Fl. As. 2: 363. 1938. *Gastonia palmata* Roxb; Fl. Ind. 2: 407. 1824.

Trees or large shrubs, 3 - 5 m; leaves orbicular, 30 - 45 cm across, deeply palmatifid or palmatisect into 3-9 lobes, truncate or subcordate at base; lobes acuminate, serrate or irregularly lobed; main nerves 3-9, palmate; petioles 15-40 cm, sheathing at base; panicles terminal, up to 45 cm; pedicels 15-20 mm; peduncles 4-6 cm; fruits subglobose,  $\pm$  1 cm.

Primary forests, 100 - 1000 m; fl. & fr.: Oct.-Mar.; Dawki.

#### 6. HEDERA L.

**Hedera nepalensis** K. Koch, Hort. Dendr. 284. 1853. *H. helix* (non L. 1753) Clarke in Fl. Brit. Ind. 2: 739. 1879; Fl. As. 2: 355. 1938.

Scandent shrubs, up to 20 m, adhering to trees or rocks with aerial rootlets; leaves ovate-elliptic to elliptic-lanceolate, acute to cuneate at base, acute to shortly caudate-acuminate, 5-10  $\times$  3-8 cm; petioles 1-8 cm; panicles terminal; pedicels 12-20 mm; flowers  $\pm$  5 mm across, yellowish-green; fruits globose, 7-8 mm; fleshy, yellow, shiny; seeds 3-5, ovoid.

Forests and forest edges, near villages, 1200-1600 m; fl. & fr.: Oct.-Feb.; Jowai.

#### 7. HETEROPANAX Seem.

**Heteropanax fragrans** (D. Don) Seem. Fl. Vit. 114. 1865; Fl. Brit. Ind. 2: 734. 1879; Fl. As. 2: 356. 1938. *Hedera fragrans* D. Don, Prodr. Fl. Nep. 187. 1825.

Trees, 8-20 m; leaves 0.5-1.5 m, 3- or rarely 4-pinnate; petioles 15-25 cm, dilated at base; leaflets elliptic to lanceolate, cuneate, often subequally narrowed at base, short-acuminate, 6-12  $\times$  3-8 cm; lateral nerves 5-9 pairs; petiolules 2-40 mm; panicles up to 40 cm, ferruginous-stellate-tomentose; branches 10-20 cm; peduncles 10-15 mm; flowers yellow,  $\pm$  4 mm across; fruits laterally compressed,  $\pm$  7  $\times$  4 mm.

Forests and forest edges, 100-1000 m; fl. & fr.: June-Dec.; Dawki.

#### 8. MACROPANAX Miq.

- |   |     |                       |
|---|-----|-----------------------|
| 1a. Leaflets entire or nearly so; panicles 15-25 cm long, with ascending glabrous branches; calyx-tube narrowly funnel-shaped, longitudinally ribbed in fruit.        | ... | <i>M. undulatus</i> 1 |
| 1b. Leaflets usually denticulate-serrate; panicles 35-75 cm long, with spreading ferruginous-pubescent branches; calyx-tube broadly campanulate, not ribbed in fruit. | ... | <i>M. dispermus</i> 2 |

1. **Macropanax undulatus** (G. Don) Seem. in J. Bot. 2: 294. 1864; Fl. Brit. Ind. 2: 738. 1879; Fl. As. 2: 362. 1938. *Hedera undulata* G. Don, Gen. Syst. 3: 304. 1834.

Trees, 10-15 m; leaves digitately 3-5-foliolate; petioles 10-15 cm; leaflets ovate-oblong to narrowly lanceolate, cuneate to rounded and often suboblique at base, caudate-acuminate, 7-16 × 3-5 cm; lateral nerves 5-7 pairs; petiolules 1-3 cm; panicles terminal; branches 6-10 cm; peduncles 5-15 mm; pedicels 3-6 mm; flowers ± 4 mm across, greenish-yellow; fruits ovoid, ± 5 mm.

Primary and secondary forests, 1000-1400 m; fl. & fr.: Aug.-Feb.; Jowai-Badarpur Road, Sohka-Dawki, Sutnga, Syndai.

**2. *Macropanax dispermus*** (Bl.) O. Ktze, Rev. Gen. 271, 1891. *Aralia disperma* Bl. Bijdr. 872, 1826. *M. oreophilus* Miq. Fl. Ind. Bat. 1(1): 763, 1855; Fl. Brit. Ind. 2: 738, 1879; Fl. As. 2: 362, 1938. '*Dieng-arasi*'.

Trees or large shrubs, often subscaudent, 3-10 m; leaves digitately 3-5-foliolate; petioles 10-15 cm; leaflets oblong or elliptic-lanceolate, rounded to acute at base, acute to acuminate, 10-15 × 3-4 cm; lateral nerves 6-10 pairs; petiolules 1-6 cm; panicles terminal; pedicels 3-7 mm; flowers ± 3 mm across, greenish-yellow; fruits ovoid, ± 5 mm.

Primary and secondary forests, 1200-1600 m; fl. & fr.: Aug.-Mar.; Jowai, Raliang.

### 9. BRASSAIOPSIS Decaisne & Planch.

***Brassaiopsis glomerulata*** (Bl.) Regel, Gartenfl. 12: 275, t. 411, 1863. *Aralia glomerulata* Bl. Bijdr. 872, 1826. *B. speciosa* Decaisne & Planch. Rev. Hort. ser. 4, 3: 106, 1854; Fl. Brit. Ind. 2: 737, 1879; Fl. As. 2: 359, 1938.

Shrubs or small trees, 3-10 m; petioles 30-50 cm; leaflets 5-7, digitate, elliptic-oblong to lanceolate, acute to rounded at base, acute to short-acuminate, serrulate at margins, 12-20 × 5-8 cm; panicles terminal, 20-35 cm; umbels racemose; peduncles 2-5 cm; pedicels ± 1 cm; flowers ± 6 mm across, white; fruits globose or subglobose, 8-10 mm, with 1-2 mm long style-column and elevated convex disk.

Primary forests, 1000-1300 m; fl. & fr.: Aug.-Mar.; Sutnga.

### 10. PSEUDOBRASSAIOPSIS R. N. Ban.

- |   |                     |
|---|---------------------|
| 1a. Petioles densely prickly at basal part; serratures of leaves spinescent; nerves prominently raised on both surfaces; fruits ± 15 mm diam. ... | <i>P. hispida</i> 1 |
| 1b. Petioles with very few prickles; serratures of leaves not spinescent; nerves not prominently raised; fruits ± 5 mm diam. ...                  | <i>P. mitis</i> 2   |

1. **Pseudobrassaiopsis hispida** (Seem.) R. N. Ban. in J. Bombay Nat. Hist. Soc. 72: 72. 1975. *Brassaiopsis hispida* Seem. in J. Bot. 2: 292. 1864; Fl. Brit. Ind. 2: 736. 1879; Fl. As. 2: 361. 1938.

Prickly shrubs, 1-5 m; prickles conical, compressed, deflexed; leaves 25-35 cm across, subcordate at base; lobes oblong-lanceolate, oblanceolate, 6-9 cm wide; petioles 20-30 cm; panicles terminal, 20-30 cm, prickly; umbels  $\pm$  3 cm diam.; peduncles 3-8 cm; bracts lanceolate,  $\pm$  1 cm; pedicels  $\pm$  1 cm; flowers  $\pm$  3 cm diam., greenish-white; fruits subglobose, obtusely 10-angled.

Forests and forest edges, 1000-1500 m; fl. & fr.: Feb.-Aug.; Umtapoh.

2. **Pseudobrassaiopsis mitis** (Clarke) R. N. Ban. in J. Bombay Nat. Hist. Soc. 72: 73. 1975. *Brassaiopsis mitis* Clarke in Fl. Brit. Ind. 2: 736. 1879; Fl. As. 2: 359. 1938. '*Dieng-la-tymphu*.'

Trees, 5-10 m; prickles broad-based; leaves crowded near apex of branches, orbicular, 15-45 cm across, truncate to subcordate at base; petioles 15-45 cm; lobes 9-13, with wide sinuses in between; stipules lanceolate,  $\pm$  1 cm; panicles below the bunch of leaves; peduncles 4-6 cm; bracts lanceolate,  $\pm$  15 mm; pedicels  $\pm$  15 cm; flowers  $\pm$  6 mm across, greenish-yellow; style column  $\pm$  2 mm in fruit.

Primary forests, 1000-1400 m; fl. & fr.: Mar.-Aug.; Mynso.

## 76. CORNACEAE

### SWIDA Opiz.

**Swida macrophylla** (Wall.) Sojak in Novit. Bot. & Del. Sem. Hort. Bot. Univ. Carol. Prag. 10. 1960. *Cornus macrophylla* Wall. in Roxb. Fl. Ind. 1: 433. 1820; Fl. Brit. Ind. 2: 744. 1879; Fl. As. 2: 366. 1938.

Trees, 10-15 m; leaves ovate to elliptic or lanceolate, rounded to subacute and subequal at base, acuminate, 6-11  $\times$  4-7 cm; lateral nerves 5-8 pairs; petioles 2.0-3.5 cm; cymes dichotomously corymbose, 6-10 cm across; flowers creamy-yellow, 5-6 mm across; drupes ovoid to oblong, crowned with remains of disk and calyx-tube at apex,  $\pm$  2 cm; stone 2-locular, crustaceous, 2-seeded.

Primary and secondary forests, 500-1200 m; fl. & fr.: Apr.-July; Nongrongkoh, U. N. *Kanjilal* 7351.

## 77. CAPRIFOLIACEAE

- |   |     |                   |
|---|-----|-------------------|
| 1a. Leaves simple.                            | ... | <i>Viburnum</i> 1 |
| 1b. Leaves imparipinnately lobed or compound. | ... | <i>Sambucus</i> 2 |

1. *VIBURNUM* L.

- |   |     |                       |
|---|-----|-----------------------|
| 1a. Leaves triplinerved at base.                                | ... | <i>V. foetidum</i> 1  |
| 1b. Leaves penninerved.   |     |                       |
| 2a. Cymes corymbose ; corolla tubular ; berries compressed.     | ... | <i>V. coriaceum</i> 2 |
| 2b. Cymes paniculate ; corolla rotate ; berries not compressed. | ... | <i>V. simonsii</i> 3  |

1. ***Viburnum foetidum*** Wall. Pl. As. Rar. 1: 49. t. 61. 1830; Fl. Brit. Ind. 3: 4. 1880; Fl. As. 3: 3. 1939.

Shrubs or small trees, up to 5 m; leaves rhomboid or elliptic-lanceolate, cuneate at base, acute-mucronate, remotely dentate, 3-8 × 1-3 cm; lateral nerves 3-4 pairs; corymbs 4-7 cm across; corolla white, rotate; drupes scarlet-red, ± 5 × 4 mm; seeds dorsally 2-grooved, ventrally 3-grooved.

Primary forests and forest-edges, 1200-1600 m; fl. & fr.: June-Dec.; Jarain, Jowai.

2. ***Viburnum coriaceum*** Bl. Bijdr. 656. 1826; Fl. Brit. Ind. 3: 5. 1880. *V. cylindricum* (non D. Don) *sensu* Rehder in Sargent, Trees & Shrubs 12: 112. 1908; Fl. As. 3: 4. 1939.

Shrubs or small trees up to 12 m; leaves ovate to lanceolate, acute to rounded at base, long acuminate, remotely dentate, 6-20 × 3-8 cm, glabrous above, bearded at nerve-axils beneath; corymbs up to 8 cm across, thinly pubescent; corolla creamy-white or pale purplish-white; drupes ellipsoid or ovoid, ± 6 × 5 mm, bluish-black.

Primary forests, 1200-1500 m; fl. & fr.: July-Dec.; Jarain, Laskein, near Raliang.

3. ***Viburnum simonsii*** Hook. f. & Th. in J. Linn. Soc. 2: 177. 1858; Fl. Brit. Ind. 3: 7. 1880; Fl. As. 3: 5. 1939.

Shrubs or small trees, up to 12 m; leaves ovate-elliptic to lanceolate, acute at base, short-acuminate, entire or distantly denticulate, 5-12 × 2-7 cm, glabrous; lateral nerves 5-8 pairs; panicles pyramidal, 5-10 × 6-12 cm; corolla white, tinged red; drupes ellipsoid or ovoid, ± 6 × 3 mm, scarlet-red.

Primary forests, 1200-1600 m; fl. & fr.: Jan.-Dec.; Jarain, Jowai.

2. *SAMBUCUS* L.

***Sambucus javanica*** Bl. Bijdr. 657. 1826; Fl. Brit. Ind. 3: 2. 1880; Fl. As. 3. 1. 1939.

Erect shrubs, 1-3 m, sparsely few-branched; leaves 1-6-foliolate; leaflets ovate to oblong or linear-lanceolate, sessile or subsessile, cuneate to subcordate at base, acuminate, serrate, 8-20 x 1-5 cm; corymbs flat-topped, 3-5-rayed, 8-25 cm diam., finely pubescent; flowers yellowish-white; berries ovoid, 3-4 mm, black, 3-pyrenous.

Evergreen forests, forest edges and secondary forests, in moist shaded places, 1000-1500 m; fl. & fr.: Mar.-Dec. Nartiang.

78. RUBIACEAE

- 1a. Corolla lobes imbricate or twisted in bud.
  - 2a. Corolla lobes imbricate in bud. ... *Luculia* 1
  - 2b. Corolla lobes twisted in bud.
    - 3a. Fruits dry, capsular, dehiscent regularly. ... *Wendlandia* 2
    - 3b. Fruits fleshy, drupaceous or baccate, indehiscent or dehiscent irregularly.
      - 4a. Fruits drupaceous, fleshy or woody.
        - 5a. Flowers polygamous; ovary 1-celled; fruits woody, dehiscent irregularly; seeds many. ... *Gardenia* 3
        - 5b. Flowers bisexual; ovary 2-celled; fruits fleshy, indehiscent; seeds 2.
          - 6a. Flowers axillary, fascicled or solitary. ... *Coffea* 4
          - 6b. Flowers terminal, in panicles or corymbs. ... *Isora* 5
      - 4b. Fruits baccate, fleshy.
        - 7a. Inflorescences terminal. ... *Tarenna* 6
        - 7b. Inflorescences axillary.
          - 8a. Anthers glabrous; style simple; ovules sunk in fleshy placenta. ... *Randia* 7
          - 8b. Anthers pubescent; style bifid; ovules not sunk in placenta. ... *Hyptianthera* 8
- 1b. Corolla lobes valvate in bud.
  - 9a. Fruits fleshy, drupaceous or baccate, indehiscent.
    - 10a. Ovules numerous in each cell.
      - 11a. Flowers in lax paniculate cymes or panicles.
        - 12a. Inflorescences zig-zagly and trichotomously branched. ... *Mycetia* 9
        - 12b. Inflorescences not so branched. ... *Mussaenda* 10
      - 11b. Flowers capitata.
        - 13a. Heads up to 1.5 cm diam. ... *Polysolenia* 11
        - 13b. Heads 2.5-3.5 cm diam. ... *Myrianneuron* 12
    - 10b. Ovules solitary in each cell.
      - 14a. Calyx-tubes cohering in a head; fruit a syncarpium. ... *Morinda* 13
      - 14b. Calyx-tubes not cohering in a head; fruit not a syncarpium.
        - 15a. Leaves whorled, exstipulate; seeds peltate. ... *Rubia* 14
        - 15b. Leaves not so, stipulate; seeds not peltate.
          - 16a. Ovary 5-celled; stigma 4-5-lobed. ... *Meyna* 15
          - 16b. Ovary 2-celled; stigma 2-lobed.
            - 17a. Ovules attached to septum; fruit a berry. ... *Prismatomeris* 16
            - 17b. Ovules basal or pendulous; fruit a drupe.
              - 18a. Ovules pendulous. ... *Canthium* 17
              - 18b. Ovules basal.
                - 19a. Inflorescences terminal, corymbose or paniced. ... *Psychotria* 18
                - 19b. Inflorescences axillary, fascicled, ... *Lasianthus* 19

dense cymes; corolla orange-red; drupes globose,  $\pm$  6 mm diam., red; seeds convex on back, concave inside, black.

Shaded places in primary forests, 1200 - 1600 m; fl. & fr.: Jan.-Dec.; Jowai, Raliang.

### 5. IXORA L.

1a. Calyx-teeth longer than ovary; flowers deep red.	...	<i>I. subsessilis</i> 1
1b. Calyx-teeth as long as or shorter than ovary; flowers white.		
2a. Branches tomentose or pubescent; peduncles of cymes more than 5 cm long.	...	<i>I. roxburghii</i> 2
2b. Branches glabrous; peduncles of cymes less than 4 cm long.		
3a. Lateral nerves 12-17 pairs; corolla-tube twice as long as lobes.	...	<i>I. nigricans</i> 3
3b. Lateral nerves 20-30 pairs; corolla-tube as long as or shorter than lobes.	...	<i>I. undulata</i> 4

1. ***Ixora subsessilis*** G. Don, Gen. Syst. 3: 572. 1834; Fl. Brit. Ind. 3: 139. 1880; Fl. As. 3: 68. 1939. '*Dieng-jowai*'.

Shrubs or small trees, 1-3 m; leaves elliptic to oblanceolate, acute or cuncate at base; acuminate, 8-16  $\times$  1.5 cm; lateral nerves 7-11 pairs; petioles 5-15 mm; stipules sheathing, long-cuspidate; cymes corymbiform, terminal, subsessile; peduncles paired; calyx bright red; lobes linear; corolla 2-3 cm; fruits oblong,  $\pm$  10  $\times$  8 mm; pyrenes concave.

Primary forests, in shaded places, 1000-1500 m; fl. & fr.: May-Dec.; Jarain, Sutnga.

2. ***Ixora roxburghii*** Balakr. *nom. nov.* *I. villosa* Roxb. Fl. Ind. 1: 388. 1832; Fl. Brit. Ind. 3: 144. 1880; Fl. As. 3: 69. 1939. (*non* Poir. 1789).

Shrubs, 1-3 m; leaves broadly oblong to lanceolate, acute, or rounded at base, caudate-acuminate, 12-35  $\times$  5-13 cm; lateral nerves 10-12 pairs; petioles 4-10 mm; stipules 15-25 mm, filiform, tomentose; inflorescences long-peduncled, cymose, corolla-tube  $\pm$  25 mm, slender; lobes 7-10 mm; fruits subglobose, 7-9 mm, red; pyrenes ventrally concave with a ridge in middle.

Primary forests, 100-500 m; fl. & fr.: Apr.-Nov.; Dawki.

3. ***Ixora nigricans*** W. & A. Prodr. 428. 1834; Fl. Brit. Ind. 3: 148. 1880; Fl. As. 3: 70. 1939.

Shrubs or small trees, 2-5 m; leaves oblong-obovate, or oblanceolate, acute at base, acutely acuminate, 7-15  $\times$  4-6 cm; petioles 5-10 mm;

stipules subtruncate and bristly at apex; inflorescences lax paniculate; peduncles 2-3 cm; corolla white; tube 8-12 mm; lobes acute, 6-7 mm; fruits subglobose, 6-8 mm, black; pyrenes plano-convex.

Primary forests, 100-1200 m; fl. & fr.: Apr.-Nov.; Dawki, Jarain.

4. ***Ixora undulata*** Roxb. Fl. Ind. 1: 385. 1832; Fl. Brit. Ind. 3: 147. 1880; Fl. As. 3: 71. 1939.

Shrubs or small trees, 2-8 m; innovations puberulous; leaves elliptic to linear-lanceolate, acute or cuneate at base, acuminate, 8-20×2-6 cm; cymes in subcorymbose panicles, 10-20 cm, terminal; corolla white; tube ± 12 mm, slender; lobes linear, spreading, reflexed; fruits ellipsoid, 6-7 mm, purplish, turning to black; pyrenes 2, plano-convex.

Primary forests, 100-500 m; fl. & fr.: Apr.-Sept.; Dawki.

#### 6. TARENNA Gaertn.

1a. Corolla glabrous outside; lobes as long as tube.

*T. asiatica* 1

1b. Corolla hairy outside; lobes twice as long as tube.

*T. odorata* 2

1. ***Tarenna asiatica*** (L.) Sant. & Merch. in Bull. Bot. Surv. Ind. 3: 110. 1962. *Rondeletia asiatica* L. Sp. Pl. 172. 1753. *Webera corymbosa* Willd. Sp. Pl. 1: 1224. 1798; Fl. Brit. Ind. 3: 102. 1880; Fl. As. 3: 51. 1939.

Shrubs or small trees, 1-3 m; leaves elliptic or oblong-lanceolate, acute at base, acute or acuminate, 8-15×2-6 cm; lateral nerves 6-10 pairs; cymes terminal, corymbose, trichotomous; flowers white, fragrant; corolla ± 1.5 cm, glabrous outside; berries globose to ellipsoid, black.

Primary forests, in shaded places, 1000-1500 m; fl. & fr.: June-Jan.; Dawki, Jarain.

2. ***Tarenna odorata*** (Roxb.) Robins. in Proc. Amer. Acad. Sci. 45: 405. 1910. *Webera odorata* Roxb. Fl. Ind. 1: 699. 1832; Fl. Brit. Ind. 3: 102. 1880; Fl. As. 3: 52. 1939.

Shrubs or small trees, 2-5 m; leaves elliptic-lanceolate, acute at base, acuminate, 8-20×3-7 cm; lateral nerves 7-11 pairs; cymes trichotomous corymbose, terminal; flowers white, fragrant; corolla ± 1 cm, pubescent outside; berries subglobose, black.

Primary forests, 500-1400 m; fl. & fr.: Apr.-Dec.; Jarain, Sohka, Syndai,



49. 1939. *Rondeletia longifolia* Wall. in Roxb. Fl. Ind. 2: 137. 1824.  
*Adenosacme longifolia* (Wall.) Hook. f. Fl. Brit. Ind. 3: 95. 1880.

Shrubs or undershrubs, 1-5 m; leaves elliptic or lanceolate, narrowed at base, acute to caudate-acuminate, 8-25 × 2.0-8.0 cm, pubescent beneath; flowers yellowish in trichotomous corymbose paniculate cymes; berries subglobose, 5-6 mm diam., white; seeds black, angled.

Primary forests in shaded places, 500-1500 m; fl. & fr.: June-Dec.; Jarain, Jowai, Sohka, Syndai.

#### 10. MUSSAENDA L.

- |   |     |                         |
|---|-----|-------------------------|
| 1a. Calyx lobes persistent or subpersistent in fruit.                           |     |                         |
| 2a. Stipules triangular-ovate; inflorescences glabrous.                         | ... | <i>M. corymbosa</i> 1   |
| 2b. Stipules triangular-lanceolate; inflorescences softly tomentose or villous. | ... | <i>M. roxburghii</i> 2  |
| 1b. Calyx-lobes deciduous.  |     |                         |
| 3a. Leaves glabrous on both sides; calyx-lobes up to 7 mm long.                 | ... | <i>M. glabra</i> 3      |
| 3b. Leaves minutely pubescent on both sides; calyx-lobes 8-14 mm long.          | ... | <i>M. macrophylla</i> 4 |

1. **Mussaenda corymbosa** Roxb. Fl. Ind. 2: 226. 1824; Fl. Brit. Ind. 3: 91. 1880.

Erect branching shrubs, 1-3 m; leaves ovate-lanceolate or oblong to oblanceolate, cuneate at base, acute, 8-16 × 3-8 cm; lateral nerves 8-13 pairs; stipules 12-16 mm; petioles 3-40 mm; flowers in corymbose cymes; calyx-lobes filiform, 3-8 mm; petaloid sepal white, oblong-elliptic, 5-6 × 2-4 cm with 3.0-3.5 cm long petioles; corolla-lobes deep reddish-orange.

Primary forests and forest-edges, 100-1200 m; fl. & fr.: Mar.-Dec.; Jarain-Dawki.

2. **Mussaenda roxburghii** Hook. f. Fl. Brit. Ind. 3: 87. 1880; Fl. As. 3: 46. 1939.

Erect spreading shrubs, 2-8 m; leaves oblong-lanceolate or ovate, cuneate at base, acuminate, 8-25 × 3-9 cm; lateral nerves 7-13 pairs; petioles 5-25 mm; stipules 7-20 × 4-8 mm; flowers in terminal subcapitate cymes; calyx-lobes filiform, 6-10 × 1-2 mm; petaloid sepal oblong-lanceolate, white with pale green nerves, 4-12 × 2-5 cm with 1.5-4.0 cm long petiole; corolla-lobes yellow or orange-yellow.

Forests and forest-edges, 500-1500 m; fl. & fr.: Mar.-Dec.; Jowai, Pdengsakab, Shangpung, Syndai, Umtapoh.

3. **Mussaenda glabra** Vahl, Symb. Bot. 3: 38. 1790; Fl. Brit. Ind. 3: 90. 1880; Fl. As. 3: 44. 1939.

Subscandent glabrous herbs or shrubs; leaves oblong or elliptic-lanceolate, cuneate or subacute at base, acuminate, 5-13×2-6 cm; lateral nerves 4-10 pairs; petioles 4-23 mm; stipules triangular-lanceolate, 2-8×1-6 mm; flowers in terminal cymes; calyx-lobes linear-lanceolate; petaloid sepal oblong or elliptic, 3-12×2-9 cm, with 8-20 mm long petiole; corolla yellow or orange.

Primary forests, 1000-1600 m; fl. & fr.: May-June; Raliang.

4. **Mussaenda macrophylla** Wall. in Roxb. Fl. Ind. 2: 228. 1824; Fl. Brit. Ind. 3: 89. 1880; Fl. As. 3: 45. 1939.

Subscandent or erect shrubs, 1-4 m; leaves ovate, elliptic or lanceolate, acute or cuneate at base, caudate-acuminate, 8-20×3-10 cm; lateral nerves 9-10 pairs; petioles 8-40 mm; stipules ovate, 10-14×6-9 mm; flowers in terminal compact trichotomous cymes; calyx-lobes oblong-lanceolate; petaloid sepals white, with green nerves, ovate, 6-9×2-6 cm; corolla-lobes orange-red.

Primary forests, 1000-1500 m; fl. & fr.: June-Jan.; Raliang.

#### 11. POLYSOLENIA Hook. f.

**Polysolenia wallichii** Hook. f. in Benth. & Hook. f. Gen. Pl. 2: 68. 1873 et Fl. Brit. Ind. 3: 94. 1880; Fl. As. 3: 49. 1939.

Herbs or undershrubs, 20-50 cm; stems greyish-yellow; branches rigid; leaves elliptic-lanceolate or oblanceolate, cuneate at base, acute to acuminate, 5-15×0.5-2.5 cm; flowers in solitary heads, on 3-8 cm long peduncles; corolla 2.5-3.0 cm, white, pubescent; fruits globose or obovoid, ± 6 mm, white.

Primary forests, in shaded stream beds on rocks, 200-1000 m; fl. & fr.: June-Dec.; Jaintia Hills, G. Mann s. n.; Sohka, Balakrishnan 42619, 46198 & 46200.

#### 12. MYRIONEURON Hook. f.

**Myrioneuron nutans** Kurz, For. Fl. Brit. Burma 2: 55. 1877; Fl. Brit. Ind. 3: 96. 1880; Fl. As. 3: 50. 1939.

Erect shrubs, 1-2 m; leaves elliptic, obovate, cuneate or acute at base,

acute to short-acuminate, 12.25 × 6-15 cm; lateral nerves 15-20 pairs, prominent beneath; flowers in terminal condensed corymbose nodding cymes; corolla pale orange-yellow; fruits baccate, globose, white; seeds black.

Primary forests, in shaded places, 100-1000 m; fl. & fr.: July-Mar.; Khleihriat, Sohka.

### 13. MORINDA L.

- |   |     |                          |
|---|-----|--------------------------|
| 1a. Erect shrubs or small trees; leaves 15—35 cm long; corolla 5—7-merous; tube 15—20 mm long.          | ... | <i>M. angustifolia</i> 1 |
| 1b. Scandent or subscaudent shrubs; leaves 6—10 cm long; corolla 4—5-merous; tube less than 10 mm long. | ... | <i>M. umbellata</i> 2    |

1. **Morinda angustifolia** Roxb. Pl. Corom. 3(2): t. 237. 1815; Fl. Brit. Ind. 3: 156. 1880; Fl. As. 3: 79. 1939.

Leaves narrowly lanceolate or oblanceolate, cuneate at base, caudate-acuminate; 15-35 × 3-15 cm; lateral nerves 10-15 pairs; petioles 5-30 mm; flowers fragrant, in axillary or leaf-opposed pedunculate globose heads; drupes turbinate, 20-25 mm diam., white.

Primary forests, 600-1400 m; fl. & fr.: Mar.-Oct.; Jarain, Pdengsakab.

2. **Morinda umbellata** L. Sp. Pl. 176. 1753; Fl. Brit. Ind. 3: 157. 1880; Fl. As. 3: 79. 1939.

Leaves lanceolate or obovate, acute at both ends, 6-10 × 2-4 cm; lateral nerves 6-8 pairs; petioles 8-12 mm, papillose or pubescent; stipules sheathing; flowers in terminal umbellate 4-7-flowered heads; corolla white; tube 6-8 mm; drupes pyriform, irregularly lobed, 6-9 mm, white.

Primary forests, 1200-1600 m; fl. & fr.: July-Dec.; Jowai.

### 14. RUBIA L.

**Rubia cordifolia** L. Sp. Pl. 397. 1753; Fl. Brit. Ind. 3: 202. 1881; Fl. As. 3: 94. 1939.

Climbers; leaves opposite, often with 2 foliaceous stipules giving the appearance of whorled nature, ovate-lanceolate, rounded or subcordate at base, long-acuminate, 3-10 × 1-5 cm; nerves 3-5, palmate; petioles 4-8 cm; panicles much-branched, 3-15 cm; pedicels 1-2 mm; corolla green or orange-red, ± 6 mm; lobes spreading; berries globose, 5-7 mm diam., purplish-black.

Forests, forest-edges and bushes, 500-1500 m; fl. & fr.: July-Dec.; Jarain, Jowai.

#### 15. MEYNA Link.

**Meyna spinosa** Link, Jahrb. 1(3): 32. 1820. *Vangueria spinosa* Roxb. Fl. Ind. 1: 536. 1832; Fl. Brit. Ind. 3: 136. 1880; Fl. As. 3: 66. 1939. 'Dieng-sa-matan'.

Large shrubs or small trees, 2-5 m; spines 3-nate, 1-2 cm; leaves ternate, ovate or oblong-ovate, rounded and narrowed to the petiole, acute or acuminate, 4-12 x 3-7 cm; lateral nerves 7-9 pairs; flowers in axillary short-peduncled cymes; corolla white; drupes fleshy, subglobose, or turbinate, 2.5-3.0 cm, yellowish.

Primary forests, often cultivated near villages, 1000-1500 m; fl. & fr.: Apr.-Oct.; Jarain, Jowai, Khleihriat.

Ripe fruits edible; eaten locally.

#### 16. PRISMATOMERIS Thw.

**Prismatomeris tetrandra** (Roxb.) K. Schum. Engler & Prantl, Pflanzenfam. 4(4): 138. 1891. *Coffea tetrandra* Roxb. Fl. Ind. 2: 193. 1824. *P. albidiflora* Thw. in Hook. Kew J. Bot. 8: 268. t. 7A. 1856; Fl. Brit. Ind. 3: 159. 1880.

Shrubs, 1-3 m; leaves lanceolate or elliptic-lanceolate, acute or cuneate at base, acuminate, 5-13 x 2-6 cm; lateral nerves 6-9 pairs; flowers white, fragrant, in axillary fascicles of cymes or umbels; pedicels long, filiform; corolla-tube  $\pm$  2.5 cm; lobes 7-8 mm, pubescent inside; berries, globose, purplish-black.

Primary forests, 100-1000 m; fl. & fr.: Apr.-Nov.; Dawki, Rytiang, Syndai.

#### 17. CANTHIUM Lamk.

- |  |     |                           |
|--|-----|---------------------------|
| 1a. Unarmed plants; inflorescences lax, in paniculate cymes. | ... | <i>C. dicoccum</i> 1      |
| 1b. Armed plants; inflorescences dense, in fascicles.        | ... | <i>C. angustifolium</i> 2 |

1. **Canthium dicoccum** (Gaertn.) T. & B. in Cat. Hort. Bogor. 113. 1866; Fl. As. 3: 64. 1939. *Psydrax dicoccus* Gaertn. Fruct. t. 26. 1788. *C. didymum* Roxb. Fl. Ind. 1: 535. 1832; Fl. Brit. Ind. 3: 132. 1880.

Trees or large shrubs, 5-25 m; leaves elliptic, ovate or oblong, narrowed to petiole, acuminate, 5-12 × 3-5 cm; lateral nerves 4-6 pairs; petioles 5-10 mm; inflorescences axillary; pedicels 5-15 mm; corolla 5-6 mm, white; fruits globose or obovoid, 8-15 mm, purplish-black; pyrenes flat on one side, convex on the other, rugulose.

Primary forests, 100-500 m; fl. & fr.: May-Dec.; Dawki.

2. **Canthium angustifolium** Roxb. Fl. Ind. 1: 533. 1832; Fl. Brit. Ind. 3: 135. 1880; Fl. As. 3: 66. 1939.

Subscandent shrubs, with sharp recurved supra-axillary spines; leaves ovate-lanceolate, rounded or acute at base, acuminate, 3-10 × 1-4 cm; lateral nerves 4-6 pairs; petioles 4-10 mm; inflorescences axillary; pedicels 1-2 mm; corolla white; fruits orbicular, compressed, truncate, 6-8 mm; pyrenes rounded at back, concave, inside, wrinkled-tuberculate.

Primary forests, 100-500 m; fl. & fr.: Mar.-Oct.; Dawki.

#### 18. PSYCHOTRIA L. *nom. cons.*

- |   |                           |
|---|---------------------------|
| 1a. Calyx 5-toothed; corolla-tube curved at apex in open flowers. ...                         | <i>P. curviflora</i> 1    |
| 1b. Calyx 4-5-toothed; corolla-tube straight.   |                           |
| 2a. Pyrenes not ridged dorsally.  |                           |
| 3a. Inflorescences spiciform; fruits purple, turning to black; pyrenes subglobose. ...        | <i>P. adenophylla</i> 2   |
| 3b. Inflorescences umbelliform; fruits red, turning black; pyrenes falcate, plano-convex. ... | <i>P. montana</i> 3       |
| 2b. Pyrenes ridged dorsally.  |                           |
| 4a. Calyx-teeth obscure; dorsal ridge of pyrenes 1. ...                                       | <i>P. syntlocifolia</i> 4 |
| 4b. Calyx-teeth distinct; dorsal ridges of pyrenes 4.   |                           |
| 5a. Leaves membranous, up to 5 cm broad, with 10-14 lateral nerves. ...                       | <i>P. erratica</i> 5      |
| 5b. Leaves chartaceous, more than 6 cm broad, with 14-18 lateral nerves. ...                  | <i>P. monticola</i> 6     |

1. **Psychotria curviflora** Wall. in Roxb. Fl. Ind. 2: 167. 168. 1824. *Chasalia curviflora* (Wall.) Thw. Enum. Pl. Zeyl. 150. 421. 1864; Fl. Brit. Ind. 3: 176. 1880. *C. ambigua* W. & A. Prodr. 433. 1834; Fl. As. 3: 86. 1939.

Erect shrubs, 50-150 cm; leaves elliptic to linear-lanceolate or obovate, acute at base, caudate-acuminate, 4-20 × 1-6 cm; lateral nerves 7-11 pairs; petioles 5-20 mm; stipules deeply 2-fid or shortly 2-lobed; inflorescences terminal 3-chotomous cymes; calyx blackish; corolla white with pinkish tinge at apex; fruits ellipsoid-globose, 5-6 mm; pyrenes subglobose.

Damp shaded localities in primary forests, 200-1500 m; fl. & fr.: Apr.-Dec.; Dawki, Jarain, Jowai, Raliang, Sohka, Syndai.

2. **Psychotria adenophylla** Wall. in Roxb. Fl. Ind. 2: 166. 1824; Fl. Brit. Ind. 3: 164. 1880; Fl. As. 3: 82. 1939. '*Dieng-mynro-saliang*'.

Shrubs, 1-3 m; leaves obovate to lanceolate, narrowed or rounded at base, acute or acuminate, 8-14 × 3-6 cm; lateral nerves 10-16 pairs; petioles 10-15 mm; inflorescences terminal, 6-10 cm; calyx truncate with obscure teeth; corolla white; fruits globose-ellipsoid, 5-7 mm.

Humid forests in shaded places, 200-1000 m; fl. & fr.: May-Nov.; Dawki, Pdengsakab, Sohka, Syndai.

3. **Psychotria montana** Bl. Bijdr. 960. 1826; Fl. Brit. Ind. 3: 174. 1880; Fl. As. 3: 84. 1939.

Erect shrubs, 0.5-2.0 m; leaves elliptic-lanceolate, or oblanceolate, acute at base, caudate-acuminate, 10-20 × 2-4 cm; lateral nerves 8-10 pairs; petioles 15-30 mm; cymes in terminal or axillary subcorymbs; peduncles 5-40 cm; pedicels 2-5 mm; calyx obscurely toothed; corolla white or greenish-yellow; fruits ellipsoid or subglobose, 8-13 mm.

Shaded places in forests, 200-1000 m; fl. & fr.: May-Feb.; Syndai.

4. **Psychotria symplocifolia** Kurz, For. Fl. Brit. Burma 2: 11. 1877; Fl. Brit. Ind. 3: 172. 1880; Fl. As. 3: 85. 1939.

Shrubs, 1-3 m; leaves lanceolate or elliptic-obovate, cuneate at base, acuminate, 5-15 × 1-4 cm; lateral nerves 8-10 pairs, gland-pitted at axils of nerves; inflorescences terminal or rarely axillary 3-chotomous cymes; branches slender, 3-8 cm; corolla greenish-yellow; fruits ellipsoid, tetragonous when dry, 7-8 × 5-6 mm, black; pyrenes plano-convex.

Shaded places in forests, 1000-1500 m; fl. & fr.: Mar.-Nov.; Jarain, Jowai.

5. **Psychotria erratica** Hook. f. Fl. Brit. Ind. 3: 168. 1880; Fl. As. 3: 84. 1939.

Erect shrubs, 1-3 m; leaves lanceolate, elliptic-lanceolate, narrowed at base, acuminate, 6-18 × 2-7 cm; petioles 1-2 cm; stipules bifid, recurved; inflorescences terminal or axillary trichotomous cymes; calyx-teeth longer than tube; corolla white; fruits globose, 6-7 mm, red or yellowish-red.

Shaded localities in forests, 1200-1600 m; fl. & fr.: May-Dec.; Jowai.

6. **Psychotria monticola** Kurz in J. As. Soc. Beng. 2: 315. 1872 et For. Fl. Brit. Burma 2: 11. 1877 (*non* Hiern, 1877). *P. fulva* Hook. f. Fl. Brit. Ind. 3: 169. 1880; Fl. As. 3: 85. 1939.

Shrubs or undershrubs, 1-2 m; leaves ovate, elliptic-lanceolate to oblanceolate, acute or cuneate at base, acuminate, 15-30 × 8-13 cm; petioles 6-25 mm; stipules bifid; inflorescences axillary or subterminal, compact peduncled capitate cymes; calyx-teeth lanceolate; corolla white; fruits ellipsoid, yellow, turning reddish-brown.

Forests in shaded places, 200-1500 m; fl. & fr.: Jan.-Dec.; Dawki, Jowai-Jarain, Khleihriat, Mawryngkneng, Raliang, Sutnga.

19. *LASIANTHUS* Jack *nom. cons.*

- |   |     |                         |
|---|-----|-------------------------|
| 1a. Outer bracts equal to or exceeding the flowers.   |     |                         |
| 2a. Bracts ovate; corolla 3-4 mm, long.               | ... | <i>L. cyanocarpus</i> 1 |
| 2b. Bracts subulate; corolla 14-17 mm long.           | ... | <i>L. sikkimensis</i> 2 |
| 1b. Outer bracts shorter than the flowers.            |     |                         |
| 3a. Cymes peduncled.                                  | ... | <i>L. biermannii</i> 3  |
| 3b. Cymes sessile or nearly so.                       |     |                         |
| 4a. Bracts orbicular; fruits brown or brownish-black. | ... | <i>L. tubiferus</i> 4   |
| 4b. Bracts minute or subulate; fruits pale blue.      |     |                         |
| 5a. Fruits 4-6 mm diam., with 4-5 pyrenes.            | ... | <i>L. lucidus</i> 5     |
| 5b. Fruits 2-3 mm diam., with 6 pyrenes.              | ... | <i>L. hookeri</i> 6     |

1. *Lasianthus cyanocarpus* Jack in Trans. Linn. Soc. 14: 125. 1823; Fl. Brit. Ind. 3: 179. 1880; Fl. As. 3: 89. 1939.

Shrubs up to 5 m; leaves elliptic or oblong-lanceolate, rounded or subacute at base, acuminate, 4-12 × 2-5 cm; stipules linear-subulate, 3-7 mm; bracts lanceolate or obovate, leafy, 1-2 cm, sparsely pubescent on both sides; flowers sessile, white; fruits obovoid or subglobose with 4-5 pyrenes, 5-6 mm, blue, sparsely pubescent.

Primary forests, 400-1200 m; fl. & fr.: Apr.-Oct.; Pdengsakab, on Jarain-Syndai Road.

2. *Lasianthus sikkimensis* Hook. f. Fl. Brit. Ind. 3: 180. 1880; Fl. As. 3: 90. 1939.

Undershrubs, 2-3 m; leaves oblong-lanceolate to lanceolate, acute to rounded at base, acute or acuminate, 10-20 × 3-6 cm; nerves prominent and hairy beneath; stipules lanceolate, 2-4 mm; bracts linear-subulate, hairy, 3-6 mm; flowers sessile, white, fruits subglobose, with 5 pyrenes, 3-4 mm, pale blue.

Primary forests, 1000-1600 m; fl. & fr.: Mar.-Sept; Raliang.

3. *Lasianthus biermannii* King in Fl. Brit. Ind. 3: 190. 1880; Fl. As. 3: 93. 1939.

Undershrubs or shrubs with long horizontal branches, 1-3 m; leaves elliptic-lanceolate, rounded or acute at base, acuminate, 8-15 × 2-5 cm; lateral nerves 5-7 pairs, prominent and hairy below; stipules linear-subulate; bracts minute, 1-2 mm; flowers pale blue, long-peduncled; fruits subglobose, with 5 pyrenes, 10-12 mm, pale blue.

Primary forests, 1000-1600 m; fl. & fr.: Jan.-Dec.; Shangpung.

4. **Lasianthus tubiferus** Hook. f. Fl. Brit. Ind. 3: 183. 1880; Fl. As. 3: 91. 1939.

Shrubs, 1-4 m; branches spreading; leaves elliptic-lanceolate to lanceolate, acute or cuneate at base, acuminate, 10-15 × 3-6 cm; lateral nerves 5-6 pairs; stipules triangular, 2-3 mm; flowers sessile, pale purplish; fruits ellipsoid or subglobose with 5 pyrenes, 8-10 mm.

Primary forests, 500-1500 m; fl. & fr.: Jan.-Dec.; Dawki, Jarain, Shangpung, Sutnga.

5. **Lasianthus lucidus** Bl. Bijdr. 997. 1826; Fl. Brit. Ind. 3: 184. 1880; Fl. As. 3: 91. 1939.

Shrubs, 1-2 m; leaves elliptic-ovate or oblong-lanceolate, acute or cuneate at base, acute or acuminate, 4-10 × 1-4 cm; lateral nerves 4-5 pairs; stipules triangular, acute; bracts minute, or absent; flowers sessile, white; fruits ellipsoid or subglobose, 4-6 mm.

Primary forests, 1000-1600 m; fl. & fr.: Jan.-Dec.; Jarain, Jowai, Shangpung.

6. **Lasianthus hookeri** Clarke in Fl. Brit. Ind. 3: 184. 1880; Fl. As. 3: 92. 1939.

Shrubs with horizontal branches, 1-3 m; leaves elliptic to oblong-lanceolate, subacute or rounded at base, 8-20 × 2-4 cm; lateral nerves 5-7 pairs; strigose beneath; petioles 5-7 mm; flowers sessile, white; fruits subglobose or ellipsoid, 2-3 mm.

Primary forests, 100-1000 m; fl. & fr.: Jan.-Dec.; Narpuah forests, near Lubha river; Sohka - Dawki.

## 20. ARGOSTEMMA Wall.

**Argostemma khasianum** Clarke in Fl. Brit. Ind. 3: 43. 1880; Fl. As. 3: 86. 1939.

Erect delicate herbs, 5-15 cm; leaves opposite or in whorls of 4, ovate



to elliptic-lanceolate, cuneate at base, acute or subacute, 2-8 × 1-3 cm, glabrous or puberulous; inflorescences axillary and terminal, umbels or cymes, solitary or 2-3 together; flowers white; anthers 4, free, linear-oblong, opening by pores; capsules linear.

Rocky moist places in shaded forests, 100-1000 m; fl. & fr.: July-Dec.; Dawki, Syndai.

## 21. HEDYOTIS L.

- |  |                          |
|--|--------------------------|
| 1a. Inflorescences terminal and upper axillary.  |                          |
| 2a. Erect slender herbs, rarely branched; leaves 2-4 pairs; inflorescences terminal, lax-paniculate.   | <i>H. ovatifolia</i> 1   |
| 2b. Erect or scandent shrubs or undershrubs, much-branched; leaves many; inflorescences terminal and upper-axillary, dense-paniculate or capitate. |                          |
| 3a. Climbing shrubs; flowers white, in subcorymbose paniculate cymes.  | <i>H. scandens</i> 2     |
| 3b. Erect undershrubs; flowers pale blue or purple, in globose heads.  | <i>H. uncinella</i> 3    |
| 1b. Inflorescences axillary.   |                          |
| 4a. Flowers axillary, 1-6-flowered.  |                          |
| 5a. Flowers on 4-8 mm long pedicels.   | <i>H. corymbosa</i> 4    |
| 5b. Flowers sessile or on up to 2 mm long pedicels.  |                          |
| 6a. Leaves 5-15 mm broad.  | <i>H. verticillata</i> 5 |
| 6b. Leaves up to 4 mm broad.   | <i>H. tenelliflora</i> 6 |
| 4b. Flowers axillary, many-flowered.   |                          |
| 7a. Flowers in sessile axillary clusters.  | <i>H. auricularia</i> 7  |
| 7b. Flowers in axillary short-paniculate cymes.  |                          |
| 8a. Plants glabrous; corolla white.  | <i>H. glabra</i> 8       |
| 8b. Plants pubescent or hirsute; corolla pink or purple.   | <i>H. vestita</i> 9      |

1. **Hedyotis ovatifolia** Cav. Icon. 6: 52. 1801. *Oldenlandia nudicaulis* Roth, Nov. Pl. Sp. 95. 1821; Fl. Brit. Ind. 3: 70. 1880; Fl. As. 3: 39. 1939.

Branched or unbranched herbs, 5-25 cm; leaves 2-4 pairs, often 4 together at apices of stem, ovate or oblong, 2-7 × 1-3 cm; middle ones often largest, pubescent on nerves beneath; petioles 2-8 mm; inflorescences many-flowered, corymbose panicles; corolla white or pale purple, pilose inside, ± 2 mm; capsules ± 2 mm, loculicidal at apex.

Open moist places in sandy soil, often on riversides, 100-800 m; fl. & fr.: Apr.-Sept.; Garampani, Kopili riverside, *Balakrishnan* 47042.

2. **Hedyotis scandens** D. Don, Prodr. Fl. Nep. 134. 1825; Fl. Brit. Ind. 3: 57. 1880; Fl. As. 3: 37. 1939.

Slender climbing undershrubs, often woody; leaves elliptic or lanceolate, acute or cuneate at base, 5-15 × 2-4 cm; lateral nerves 5-6 pairs, obscure; petioles 3-8 mm; stipules truncate with 2 cusps, purple-dotted; inflorescences panicles of cymes; capsules globose, 3-4 mm.

Forests, forest edges, roadsides and other places near forests, 100 - 1500 m; fl. & fr.: Jan.-Dec.; Jowai-Jarain, Nongthala, Syndai.

3. **Hedyotis uncinella** Hook. & Arn. Bot. Beech. Voy. 192. 1833; Fl. Brit. Ind. 3: 56. 1880; Fl. As. 3: 38. 1939.

Erect stout herbs or undershrubs, up to 1 m; stem glabrous, 4-angled, ribbed, purplish-red; leaves ovate to ovate-lanceolate, acute or rounded at base, acuminate, 2 - 10 × 1 - 5 cm; basal nerves distinct; petioles up to 3 mm; stipules sessile, glandular-pubescent; heads axillary or terminal, bracteate, 12 - 20 mm diam., calyx-teeth ovate-lanceolate, recurved; capsules ovoid; seeds ± 6 per cell.

Pine forests, forest edges, roadsides and wastelands, 1000 - 1600 m; fl. & fr.: May-Nov.; Jarain, Jowai, Mawryngkneng, Raliang, Ummulong.

4. **Hedyotis corymbosa** (L.) Lamk. Tabl. Encycl. Meth. 1: 272. 1792. *Oldenlandia corymbosa* L. Sp. Pl. 119. 1753; Fl. Brit. Ind. 3: 64. 1880.

Annual herbs, 5 - 50 cm; stems tetragonous, glabrous or with very short bristles; leaves linear-lanceolate, acute at both ends, 10 - 35 × 1 - 5 mm, with minute bristles above, along margins; petioles 1 - 2 mm; inflorescences, 2 - 3-flowered cymes or in fascicles; peduncles 2 - 8 mm; corolla white or pale purple, ± 2 mm; capsules 1.5 - 2.0 × 2.0 - 2.5 mm; calyx-teeth subulate.

Open and shaded places in pine forests, forest edges and roadsides, 1200 - 1500 m; fl. & fr.: Apr.-Nov.; Shangpung.

5. **Hedyotis verticillata** (L.) Lamk. Tabl. Encycl. Meth. 1: 271. 1792. *Oldenlandia verticillata* L. Mant. Pl. 1: 40. 1767. *H. hispida* Retz. Obs. 4: 23. 1786; Fl. Brit. Ind. 3: 60. 1880; Fl. As. 3: 39. 1939.

Herbs with stout taproot; branches creeping or decumbent; leaves oblong; or linear-lanceolate, acute at base, acute to acuminate, revolute at margins, 2 - 8 cm; sparsely bristly-hairy; flowers sessile, axillary, solitary or clustered, calyx hispid; lobes close together in fruits; corolla white, 4 - 5 mm; capsules ovoid, hispid.

Roadsides, wastelands and forest edges, 200 - 1000 m; fl. & fr.: May-Sept.; Garampani.

6. **Hedyotis tenelliflora** Bl. Bijdr. 971. 1826; Fl. Brit. Ind. 3: 60. 1880; Fl. As. 3: 38. 1939.

Diffuse herbs; stem woody at base, 10 - 30 cm, 4-angled; branches prostrate, decumbent; leaves sessile, linear-lanceolate, acuminate, curved at margins, 20 - 40 × 2 - 4 mm, 1-nerved; stipules long-ciliate; flowers 2 - 6 in

axillary clusters, sessile or subsessile, glabrous; calyx-teeth rigid, ovate-triangular; corolla white,  $\pm 2$  mm; capsules ovoid,  $\pm 3$  mm, glabrous.

Grassy slopes in open places, 1000 - 1500 m; fl. & fr.: Apr.-Sept.; Jarain, Jowai.

7. **Hedyotis auricularia** L. Sp. Pl. 101. 1753; Fl. Brit. Ind. 3: 58. 1880.

Stout herbs, up to 10 m; stem woody at base; branches 4-angled, erect or prostrate, appressed-hairy; leaves elliptic to oblong or lanceolate, cuneate at base, acute to acuminate, 4 - 10  $\times$  1 - 4 cm; lateral nerves 5 - 7 pairs; petioles 4 - 12 mm; stipules with 1 - 3 subulate processes, villous; corolla white; capsules globose.

Forest edges, grasslands and roadsides, in shaded places, 200 - 1000 m; fl. & fr.: May-Nov.; Dawki-Jarain, Sonapur, Umkhlaw.

8. **Hedyotis glabra** (Roxb.) Miq. Fl. Ind. Bat. 2: 183. 1857; Fl. Brit. Ind. 3. 59. 1880. *Spermacoce glabra* Roxb. Fl. Ind. 1: 368. 1832.

Diffuse much-branched herbs; stems up to 1 m; leaves elliptic-lanceolate, acute or cuneate at base, caudate-acuminate, 7 - 13  $\times$  1.5 - 3.5 cm; lateral nerves 5 - 7 pairs; petioles 2 - 6 mm; stipules cup-shaped, ciliate at mouth; peduncles 6 - 12 mm; capsules globose, 3 - 4 mm.

Shaded places in forests, 200 - 1000 m; fl. & fr.: June-Dec.; Syndai.

9. **Hedyotis vestita** G. Don, Gen. Syst. 3: 526. 1834; Fl. Brit. Ind. 3: 58. 1880; Fl. As. 3: 38. 1939.

Much-branched herbs, up to 1 m; branches erect or ascending, often rooting at nodes, hirsute at nodes; leaves elliptic or oblong-ovate to lanceolate, cuneate at base, acuminate; 3 - 12  $\times$  1 - 4 cm; lateral nerves 4 - 6 pairs, hairy beneath; petioles 3 - 15 mm; peduncles up to 12 mm, pilose; capsules globose, 2 - 3 mm, hairy.

Open places on rocky situations, near forests and roadsides, 100 - 1200 m; fl. & fr.: June-Feb.; Dawki, Jarain-Syndai, Nongthala.

## 22. ANOTIS DC.

- |   |     |                       |
|---|-----|-----------------------|
| 1a. Stems and leaves pubescent; capsules flattened.           | ... | <i>A. wightiana</i> 1 |
| 1b. Stems and leaves glabrous or puberulous; capsules turgid. | ... | <i>A. calycina</i> 2  |

1. **Anotis wightiana** Hook. f. Fl. Brit. Ind. 3: 75. 1880; Fl. As. 3: 40. 1939.

Diffuse perennial tomentose herbs; leaves ovate, rounded or acute at base, acute, 8 - 30 × 5 - 20 mm; flowers white, blue or purplish, in small terminal 2-leaved capitate cymes; capsules 2 - 4-celled, indehiscent, orbicular; seeds 1 - 2, rugose.

Grasslands, on rocky open or shaded places, 1000 - 1600 m; fl. & fr.: June-Nov.; Jarain, Jowai, Pdengsakab, Raliang, Ummulong.

2. **Anotis calycina** Hook. f. Fl. Brit. Ind. 3: 73. 1880.

Diffuse perennial herbs; leaves ovate-lanceolate, rounded or acute at base, acuminate, 5 - 25 × 5 - 15 mm; flowers pale purplish, in small terminal 2-leaved capitate cymes; fruits subglobose, 2 - 4-celled, indehiscent; seeds 20 - 40, peltate, reticulate.

Grasslands and rocky places in shaded places at roadsides and edges of forests, 500 - 1300 m; fl. & fr.: June-Sept.; Nartiang.

23. OPHIORRHIZA L.

- 1a. Bracteoles absent or if present very minute and early caducous.
  - 2a. Leaves narrowly lanceolate, whitish beneath. ... *O. argentea* 1
  - 2b. Leaves elliptic to oblong-lanceolate not whitish beneath.
    - 3a. Stipules minute, early caducous; corolla white. ... *O. mungos* 2
    - 3b. Stipules large, persistent; corolla pink. ... *O. rosea* 3
- 1b. Bracteoles linear or oblong, persistent in fruit.
  - 4a. Bracteoles glabrous; cymes and leaves reddish-purple. ... *O. succirubra* 4
  - 4b. Bracteoles pubescent; cymes and leaves not reddish-purple.
    - 5a. Corolla 2.0—2.5 cm long; lobes spurred at back. ... *O. calcarata* 5
    - 5b. Corolla less than 1.5 cm long; lobes not spurred at back.
      - 6a. Bracts lanceolate, obtuse, concealing flowers. ... *O. subcapitata* 6
      - 6b. Bracts linear or subulate, not concealing flowers.
        - 7a. Peduncles of cymes more than 3 cm long. ... *O. fasciculata* 7
        - 7b. Peduncles of cymes less than 2 cm long.
          - 8a. Stem long-creeping; leaves ovate to orbicular, obtuse at apex; corolla ± 8 mm long. ... *O. pauciflora* 8
          - 8b. Stem erect or decumbent; leaves elliptic to lanceolate, acute or acuminate at apex; corolla ± 6 mm long.
            - 9a. Hairs crisped; cymes deflexed, condensed. ... *O. nutans* 9
            - 9b. Hairs erect, stiff; cymes erect, more or less lax. ... *O. hispida* 10

1. **Ophiorrhiza argentea** (Hook. f.) Balakr. *comb. nov.* *O. harrissiana* Heyne var. *argentea* Hook. f. Fl. Brit. Ind. 3: 78. 1880.

Erect herbs, 15 - 50 cm, pubescent; leaves elliptic or lanceolate, acute or rounded at base, acute to bluntly acuminate, 3 - 10 × 1 - 3 cm, glossy above, whitish beneath; petioles 5 - 10 mm; cymes 1 - 2 cm, glabrous; flowers white or pale pink, 6 - 8 mm; calyx-teeth subulate; capsules glabrous.

Moist shaded places in primary forests, 100 - 1000 m; fl. & fr.: Feb.-Aug.; Dawki.

2. **Ophiorrhiza mongos** L. Sp. Pl. 150. 1753; Fl. Brit. Ind. 3: 77. 1880.

Succulent erect or ascending herbs, up to 50 cm; leaves elliptic or elliptic-lanceolate, acute or rounded at base, acuminate, 5-12 × 2-6 cm, glabrous above, puberulous on nerves beneath; lateral nerves 8-10 pairs; petioles 5-25 mm; inflorescences 2-6 cm across; cymes 1-2 cm, puberulous; corolla lobes obtuse; capsules 4-8 mm diam.

Shaded moist places in forests, 1300-1700 m; fl. & fr.: July-Feb.; Mawryngkneng, Raliang.

3. **Ophiorrhiza rosea** Hook. f. Fl. Brit. Ind. 3: 78. 1880.

Shrubby plants, 50-150 cm; leaves elliptic-lanceolate or oblanceolate, cuneate or acute at base, caudate-acuminate, 10-25 × 3-8 cm, glabrous; lateral nerves 10-12 pairs, ridged beneath; petioles 5-25 mm; stipules minute, bifid, caducous; inflorescences 2-4 cm across; cymes 1-2 cm; corolla 8-12 mm; capsules subglobose, 6-8 mm diam.

Primary forests, 1200-1600 m; fl. & fr.: May-Nov.; Jaintia Hills, G. Mann 917.

4. **Ophiorrhiza succirubra** Hook. f. Fl. Brit. Ind. 3: 82. 1880.

Erect herbs, 50-75 cm; stem woody at base; leaves elliptic or oblong-lanceolate, acute at base, acuminate, 10-20 × 4-8 cm, pale green beneath; lateral nerves 10-13 pairs; petioles 1-3 cm; stipules minute; inflorescences 2-3 cm across; cymes 5-10 mm; corolla white, 7-8 mm; capsules puberulous.

Moist shaded places in forests, 1000-1600 m; fl. & fr.: Aug.-Mar.; Raliang.

5. **Ophiorrhiza calcarata** Hook. f. Fl. Brit. Ind. 3: 84. 1880.

Herbs or undershrubs, 30-90 cm; stem flexuous; creeping below; leaves ovate-elliptic or ovate-lanceolate, acute or rounded and often oblique at base, bluntly acuminate, 2-8 × 1-3 cm, pale green and pubescent on nerves beneath; lateral nerves 6-9 pairs; petioles 3-8 mm; inflorescences 2-3 cm across; bracteoles linear; corolla white, puberulous; capsules 2-3 mm diam., puberulous.

Moist shaded places in forests, 1200-1500 m; fl. & fr.: Oct.-Feb.; Jarain, Jarain-Jowai, Jowai.

6. **Ophiorrhiza subcapitata** Hook. f. Fl. Brit. Ind. 3: 83. 1880.

Stem long, slender, creeping below, ascending, soft-hairy; leaves elliptic-

lanceolate, acuminate, 4 - 8 × 2 - 5 cm; lateral nerves 5 - 7 pairs; inflorescences 8 - 10 mm diam.; bractcoles pink; corolla white or pale green, glabrous; capsules glabrous.

Shaded forests, near streams, 1200 - 1600 m; fl. & fr.: May-Oct.; Jowai, *Balakrishnan* 42252 & 42550; *R. S. Rao* 2525 —Endemic to Meghalaya.

7. **Ophiorrhiza fasciculata** D. Don. Prodr. Fl. Nep. 136. 1825; Fl. Brit. Ind. 3: 83. 1880.

Erect herbs, 15 - 45 cm; stems woody below, pubescent upwards; leaves elliptic or oblong-lanceolate, obliquely acute or cuneate at base, acuminate, 5 - 15 × 2 - 5 cm, glabrous; lateral nerves 10 - 12 pairs; petioles 1 - 2 cm; inflorescences axillary and terminal, 2 - 4 cm across; peduncles 3 - 5 cm; corolla white, 12 - 18 mm, pubescent; capsules pubescent, brownish-pink.

Forests in shaded moist localities, 800 - 1200 m; fl. & fr.: Mar.-Aug.; Umtapoh.

8. **Ophiorrhiza pauciflora** Hook. f. Fl. Brit. Ind. 3: 84. 1880.

Extensive creeping-ascending herbs, rooting at lower nodes; leaves ovate, rounded or truncate at base, 15 - 25 × 10 - 20 mm, puberulous on nerves beneath; lateral nerves 5 - 6 pairs; petioles 5 - 15 mm; inflorescences lax, 6 - 12 mm across; bractcoles linear, persistent; corolla white; capsules subglobose, puberulous.

Shaded places in forests, forest edges, along streams and river banks, 1200 - 1600 m; fl. & fr.: May-Oct.; Jowai, *Balakrishnan* 42258 —Endemic to Meghalaya.

9. **Ophiorrhiza nutans** Clarke in Fl. Brit. Ind. 3: 84. 1880.

Herbs, 30 - 70 cm; stems and branches erect or ascending, rooting at lower nodes; leaves elliptic-oblanccolate, acute or cuneate at base, caudate-acuminate, 8 - 15 × 2 - 5 cm, puberulous beneath; lateral nerves 8 - 12 pairs; petioles 5 - 20 mm; cymes sessile, crisp-hairy, 2 - 4 cm across; corolla tubular, dilated at base, ± 15 mm, white, villous inside; capsules hispid.

Shaded places in forests and forest edges, 400 - 1000 m; fl. & fr.: June-Oct.; Sohka, Sohka-Nongthala.

10. **Ophiorrhiza hispida** Hook. f. Fl. Brit. Ind. 3: 83. 1880.

Erect herbs, 15 - 35 cm, densely hispid-hairy; leaves elliptic-lanceolate, acute at base, acuminate, 8 - 12 × 2 - 4 cm, glabrescent above, hispid hairy on nerves beneath; lateral nerves 7 - 9 pairs; petioles 5 - 15 mm; inflorescences 1 - 2 cm across; peduncles up to 1 cm, hispid; bracts linear, ciliate; corolla greenish-white, ± 6 mm, hispid; capsules hispid.

Forests, in shaded places near streams, 200-1000 m; fl. & fr.: June-Nov.; Narpuah Reserve.

#### 24. POLYURA Hook. f.

**Polyura geminata** Hook. f. Ic. Pl. ser. 3. 11: t. 1949. 1868 et Fl. Brit. Ind. 3: 77. 1880; Fl. As. 3: 41. 1939.

Herbs, 10-25 cm; stems woody and branching from base; leaves elliptic-oblong to elliptic-lanceolate, acute at base, acute or subacute, 2-9 × 1-4 cm; lateral nerves 10-14 pairs; flowers crowded in axillary panicles of scorpioid cymes; peduncles 2-5 cm; corolla white, funnel-shaped; throat bearded; fruits subglobose, capsular, many-seeded.

Often rocky slopes, 1000-1500 m; fl. & fr.: July-Jan.; Raliang to Nongringkoh.

#### 25. SPIRADICLIS Bl.

- |  |                        |
|--|------------------------|
| 1a. Leaves 5-10 × 1-5 cm; lateral nerves 10-12 pairs; inflorescence once or twice forked, dichotomous cymes; capsules linear-oblong. ... | <i>S. cylindrica</i> 1 |
| 1b. Leaves 10-25 × 3-10 cm; lateral nerves 14-15 pairs; inflorescence a panicle of simple or forked cymes; capsules subglobose. ...      | <i>S. bifida</i> 2     |

1. **Spiradialis cylindrica** Hook. f. Fl. Brit. Ind. 3: 76. 1880; Fl. As. 3: 41. 1939.

Herbs, 8-25 cm; stems creeping and woody at base; leaves elliptic or elliptic-lanceolate, acute at base, acute to short-acuminate; cymes 1-3 cm, simple or forked, terminal or axillary; peduncles 2-8 cm; flowers pale purple, opening one by one; capsules linear-oblong, 3-4 mm; seeds dark reddish-brown.

Primary forests in shaded places, near streams and rocks, 100-1000 m; fl. & fr.: Apr.-Dec.; Dawki, Nongthala.

2. **Spiradialis bifida** Kurz in J. As. Soc. Beng. 2: 311. 1872; Fl. Brit. Ind. 3: 76. 1880; Fl. As. 3: 41. 1939.

Herbs, up to 50 cm; leaves elliptic or elliptic-lanceolate, cuneate at base, acute or shortly acuminate; panicles 10-25 cm; cymes simple or bifid, 15-30 mm; flowers opening one by one, pale creamy; capsules subglobose, ± 2 mm; seeds black.

Shaded moist places in forests, 500-1600 m; fl. & fr.: June-Dec.; Narpuah Forests, Raliang.

26. PAEDERIA L. *nom. cons.*

- |   |                      |
|---|----------------------|
| 1a. Fruits subglobose, not compressed ; pyrenes orbicular, margined,<br>not winged. ... | <i>P. scandens</i> 1 |
| 1b. Fruits elliptic, compressed ; pyrenes elliptic, broadly winged. ...                 | <i>P. foetida</i> 2  |

1. **Paederia scandens** (Lour.) Merr. in Contr. Arn. Arb. 8: 163. 1934. *Gentiana scandens* Lour. Fl. Cochinch. 171. 1790. *P. tomentosa* Bl. Bijdr. 968. 1826; Fl. Brit. Ind. 3: 197. 1881; Fl. As. 3: 77. 1939.

Slender twiners, leaves ovate or ovate-lanceolate, rounded or subcordate at base, acute or acuminate, 3-10 × 2-6 cm; cymes arranged in widely branched panicles; corolla 10-12 mm, white-floccose outside, dark purple inside; fruits shiny, orange or yellowish, 4-6 mm diam.; pyrenes convexo-concave.

Secondary forests, forest edges, bushes and hedges, 100-1500 m; fl. & fr.: Apr.-Dec.; Shangpung.

2. **Paederia foetida** L. Mant. Pl. 7: 52. 1767; Fl. Brit. Ind. 3: 195. 1881; Fl. As. 3: 77. 1939.

Slender twiners, leaves elliptic-ovate or ovate-lanceolate, rounded or subcordate at base, acute or acuminate, 5-12 × 2-7 cm; flowers in axillary and terminal paniculate cymes; corolla 8-10 mm, greyish-purple outside, deep purple inside; fruits compressed, brownish; pyrene-wings 1.5-2.5 mm broad.

Secondary forests, bushes and hedges, 100-1500 m; fl. & fr.: Apr.-Dec.; Jarain, Khleihriat.

## 27. LEPTODERMIS Wall.

**Leptodermis griffithii** Hook. f. Fl. Brit. Ind. 3: 198. 1881; Fl. As. 3: 76. 1939.

Bushy shrubs, 1-2 m; leaves elliptic-lanceolate, narrowed at base, acute, 1-3 × 0.5-1.5 cm; lateral nerves 2-3 pairs; petioles 2-5 mm; flowers in terminal fascicles, bracteolate; teeth of calyx lanceolate; corolla pubescent outside; white; capsules ovoid to cylindrical-ovoid, 4-5 mm, 5-valved, brown; seeds enclosed in reticulate fibrous coat.

Primary forests, 1300-1600 m; fl. & fr.: June-Dec.; Jowai.

## 28. KNOXIA L.

**Knoxia sumatrensis** (Retz.) DC. Prodr. 4: 569. 1830. *Spermacoce sumatrensis* Retz. Obs. 4: 23. 1786. *K. corymbosa* Willd. Sp. Pl. 1: 582. 1798; Fl. Brit. Ind. 3: 128. 1880.



Erect herbs, 30-75 cm; stems densely hairy towards apex; leaves ovate-oblong or elliptic-lanceolate, acute, 3-8 × 1-5 cm, pubescent; petioles up to 15 mm; stipules sheathed at base, with 4-6 subulate teeth at apex; flowers purplish-blue or white, in corymbiform terminal panicles; pedicels up to 1 mm; fruits ellipsoid,  $\pm 2 \times 1$  mm, detaching from central column.

Open grasslands, roadsides and pine forests, 1000-1600 m; fl. & fr.: July-Jan.; Ummulong.

### 29. GALIUM L.

**Galium asperifolium** Wall. in Roxb. Fl. Ind. 1: 381. 1820. *G. mollugo* (non L. 1753) *sensu* Hook. f. Fl. Brit. Ind. 3: 207. 1881; Fl. As. 3: 95. 1939.

Perennial herbs, scandent or rambling over other plants; stems 4-angled, with recurved bristles at angles; leaves in whorls of 6-8, elliptic or linear-lanceolate, acute at base, acute or short-acuminate or cuspidate, recurved at margins, 1-3 × 0.3-0.4 cm; midrib and margins bristly or spinulose; flowers in lax panicle of cymes; fruits glabrous, verrucose.

Open sunny localities on bushes and forest edges, 1000-1600 m; fl. & fr.: June-Nov.; Jowai, Mawryngkneng.

### 30. RICHARDIA L.

**Richardia scabra** L. Sp. Pl. 330. 1753; Balakr. in Bull. Bot. Surv. Ind. 6: 85. 1964.

Herbs, densely pilose; stems loosely branching, spreading, tetragonous; leaves ovate to oblong-lanceolate, narrowed at base,  $\pm 2 \times 1$  cm; petioles  $\pm 5$  mm; stipules connate, cupular with setaceous appendages; flowers white, terminal, subcapitate; calyx and corolla 6-partite; stamens 6-8; capsules 3-celled, turbinate-subglobose, with persistent calyx; seeds solitary in each cell, minutely hispid.

Wastelands, roadsides and other open places, 200-1500 m; fl. & fr.: Mar.-Sept.; Raliang, R. S. Rao 2642.

### 31. BORRERIA G. F. W. Mey. *nom. cons.*

**Borreria articularis** (L. f.) F. N. Williams in Bull. Herb. Boiss. ser. 2. 5: 956. 1905. *Spermacoce articularis* L. f. Suppl. 119. 1781. *B. hispida* (L.)

K. Schum. in Engler & Prantl, Pflanzenfam. 4(4): 144. 1891 (*non* Spruce ex K. Schum. 1888); Fl. As. 3: 93. 1939. *S. hispida* L. Sp. Pl. 102. 1753; Fl. Brit. Ind. 3: 200. 1881.

Procumbent or suberect hispid herbs; branches 4-angled; leaves obovate or oblong-obovate, acute at both ends, 1-4 × 0.5-1.5 cm, sparsely strigose; flowers sessile, 4-6 in axillary whorls; bractcoles filiform; corolla 5-6 mm, pale purple with a ring of hairs at base of tube; lobes 4, valvate, hairy outside; capsules 2-valved, dehiscent longitudinally, hispid, or pubescent; seeds oblong, 2-3 mm, granulate-opaque.

Roadsides and wastelands in open places, 100-1500 m; fl.: Feb.-May; & fr.: Aug.-Dec. Jarain, Sohka.

## 79. VALERIANACEAE

### VALERIANA L.

- |   |     |                        |
|---|-----|------------------------|
| 1a. Plants 10—35 cm high; cauline leaves few, 2—4 cm long; panicles 2—8 cm long.      | ... | <i>V. jatamansii</i> 1 |
| 1b. Plants 30—150 cm high; cauline leaves many, 4—12 cm long; panicles 12—50 cm long. | ... | <i>V. hardwickii</i> 2 |

1. **Valeriana jatamansii** Jones in As. Res. 2: 416. 1790 et 4: 451. 1795. *V. wallichii* DC. Prodr. 4: 634. 1830 et Mem. Valer. 15. t. 4. 1832; Fl. Brit. Ind. 3: 213. 1881; Fl. As. 3: 97. 1939.

Pubescent erect herbs; rootstock thick, horizontal; radical leaves persistent, ovate-cordate, 2-8 × 2-7 cm; petioles 3-10 cm; cauline leaves few, entire or pinnatifid, 2-4 × 2-3 cm; panicles somewhat dense-flowered; flowers white or pinkish tinged; fruits ± 2 mm, puberulous.

Pine forests and shaded wastelands, 1200-1700 m; fl. & fr.: May-Sept.; Jowai.

2. **Valeriana hardwickii** Wall. in Roxb. Fl. Ind. 1: 166. 1820; Fl. Brit. Ind. 3: 213. 1881; Fl. As. 3: 97. 1939.

Pubescent erect herbs; rootstock descending, fibrous; radical leaves few, soon disappearing, ovate, 5-10 × 3-8 cm; petioles 3-5 cm; cauline leaves pinnatifid into 3-7 lanceolate-acute toothed or entire lobes, 4-12 × 2-6 cm; panicles lax-flowered; flowers white; fruits ± 2.5 mm, puberulous.

Pine forests and shaded wastelands, 1200-1700 m; fl. & fr.: Aug.-Dec.; Jowai, Mawryngkneng, Raliang.

## 80. DIPSACACEAE

## DIPSACUS L.

**Dipsacus asper** DC. Prodr. 4: 646. 1830; Fl. Brit. Ind. 3: 218. 1881; Fl. As. 3: 98. 1939.

Erect stout prickly perennial herbs, up to 1.5 m; leaves opposite, simple or lower ones pinnatifid, 10-25 × 2-8 cm, shortly pilose, scabrous beneath; flower-heads 15-25 mm diam., terminal, solitary or several; peduncles 5-35 cm; flowers white or pale purple; bracteoles obovate-lanceolate, ciliate; achenes 8-ribbed, crowned by and enveloped by an epicalyx.

Shaded rocky places in pine forests and grasslands, 300-1600 m; fl. & fr.: Sept.-Dec.; Dawki, Jowai-Jarain, Mawryngkeng, Thadlaskein.

## 81. ASTERACEAE

- |  |     |                         |
|--|-----|-------------------------|
| 1a. Plants with milky juice (latex) ; flowers all ligulate.                        |     |                         |
| 2a. Corolla yellow ; achenes attenuate at apex.                                    | ... | <i>Youngia</i> 1        |
| 2b. Corolla purple ; achenes beaked at apex.                                       | ... | <i>Lactuca</i> 2        |
| 1b. Plants with watery juice ; flowers all tubular or outer ones ligulate.         |     |                         |
| 3a. Leaves spinescent.   | ... | <i>Cirsium</i> 3        |
| 3b. Leaves not spinescent.   |     |                         |
| 4a. Leaves opposite or only the upper ones alternate.                              |     |                         |
| 5a. Leaves ternate, 3-fid, 3-foliolate or pinnate.                                 | ... | <i>Bidens</i> 4         |
| 5b. Leaves simple.   |     |                         |
| 6a. Receptacles columnar.  | ... | <i>Spilanthes</i> 5     |
| 6b. Receptacles flat or concave or convex.   |     |                         |
| 7a. Twiner ; heads 4-flowered.   | ... | <i>Mikania</i> 6        |
| 7b. Erect plants ; heads 5-or more-flowered.                                       |     |                         |
| 8a. Pappus consisting of basally con-<br>nate awntipped scales.                    | ... | <i>Ageratum</i> 7       |
| 8b. Pappus consisting of numerous<br>capillary bristles.                           |     |                         |
| 9a. Heads sessile, axillary.   | ... | <i>Synedrella</i> 8     |
| 9b. Heads peduncled, terminal.   |     |                         |
| 10a. Heads with ligulate marginal<br>flowers.                                      | ... | <i>Galinsoga</i> 9      |
| 10b. Heads with all flowers tubular.   |     |                         |
| 11a. Anther-tips truncate or<br>obtusate ; pappus hairs 3-5,<br>clavate.           | ... | <i>Adenostemma</i> 10   |
| 11b. Anther-tips appendicu-<br>late ; pappus hairs many,<br>setose.                | ... | <i>Eupatorium</i> 11    |
| 4b. Leaves spirally arranged or alternate.   |     |                         |
| 12a. Pappus absent.  |     |                         |
| 13a. Stems winged ; flower heads crowded into compound<br>heads.                   | ... | <i>Sphaeranthus</i> 12  |
| 13b. Stems not winged ; flower heads distinct, not crowded<br>into compound heads. |     |                         |
| 14a. Receptacles with paleae ; achenes winged.                                     | ... | <i>Achillea</i> 13      |
| 14b. Receptacles naked ; achenes not winged.                                       |     |                         |
| 15a. Involucral bracts 2-seriate.  | ... | <i>Dichrocephala</i> 14 |
| 15b. Involucral bracts 3-seriate.  | ... | <i>Artemisia</i> 15     |

- 12b. Pappus present.
- 16a. Pappus consisting of basally connate membranous scales or awn-tipped scales. ... *Tithonia* 16
- 16b. Pappus consisting of slender filiform hairs or bristles.
- 17a. Heads crowded in dense mass-like single heads, 1-few-flowered. *Elephantopus* 17
- 17b. Heads distinct, many-flowered.
- 18a. Pappus hairs slender, connate at base into a ring.
- 19a. Anther-bases long-tailed or sagittate. ... *Saussurea* 18
- 19b. Anther-bases obtuse or entire ... *Conyza* 19
- 18b. Pappus hairs free.
- 20a. Heads with marginal flowers ligulate (except *Gerbera maxima*).
- 21a. Ligules 2—3-seriate. ... *Erigeron* 20
- 21b. Ligules 1-seriate.
- 22a. Heads solitary or on long terminal racemes.
- 23a. Heads in terminal racemes. ... *Ainslaea* 21
- 23b. Heads solitary on long peduncles. ... *Gerbera* 22
- 22b. Heads in corymbs or panicles.
- 24a. Anthers tailed or conspicuously sagittate at base. ... *Inula* 23
- 24b. Anthers not tailed or sagittate at base.
- 25a. Involucral bracts of several series. ... *Aster* 24
- 25b. Involucral bracts of 1 or 2 series. ... *Senecio* 25
- 20b. Heads with all flowers tubular.
- 26a. Climbing plants; leaves palmately 3—7-nerved at base. ... (*Senecio walkeri* 25)
- 26b. Erect plants; leaves pinnately nerved.
- 27a. Receptacles with paleae subtending flowers. ... *Anisopappus* 26
- 27b. Receptacles naked or hairy, never with paleae subtending flowers.
- 28a. Involucral bracts 1-seriate, often with few minute bracteoles outside.
- 29a. Corolla purple or purple-red. ... *Emilia* 27
- 29b. Corolla orange-yellow or brownish-red. ... *Cynura* 28
- 28b. Involucral bracts 3 or more seriate.
- 30a. Heads homogamous; corolla violet, pink or white. ... *Vernonia* 29
- 30b. Heads heterogamous; corolla yellow or rarely purple.
- 31a. Receptacles alveolate; involucral bracts green, herbaceous or coriaceous; style arms of bisexual flowers filiform or rounded at apex, never truncate. ... *Blumea* 30
- 31b. Receptacles naked; involucral bracts scarious, white or translucent; style arms of bisexual flowers truncate at apex.
- 32a. Plants fibrous-rooted; involucral bracts whitish, papery; bisexual flowers sterile. ... *Anaphalis* 31
- 32b. Plants tap-rooted; involucral bracts golden-yellow or brownish-yellow; bisexual flowers fertile. ... *Cnaphalium* 32

1. YOUNGIA Cass.

**Youngia cineripappa** (Babc.) Babc. & Stebb. Gen. Youngia 60. f. 13. 1937. *Crepis cineripappa* Babc. in Univ. Calif. Publ. Bot. 14: 325. 1928. *C. fuscipappa* (non Benth.) Hook. f. Fl. Brit. Ind. 3: 395. 1881. *p. p.* excl. spec. Ceyl.

Herbs, 25 - 75 cm; radical leaves oblong-obovate or oblanceolate, sinuate-lobed or pinnatifid, 10-25 × 1-4 cm; cauline leaves linear or lanceolate, narrowed at base, 5-8 × 1-2 cm; heads 7-9 mm, few in corymbs; peduncles slender; involucre bracts linear, subacute; corolla pale purple; pappus hairs greyish-white.

Shaded places in grasslands, 1200-1600 m; fl. & fr.: Apr.-Oct.; Raliang.

## 2. LACTUCA L.

- |   |     |                       |
|---|-----|-----------------------|
| 1a. Leaves auricled at base; heads 10—13 mm long, 12—20-flowered; achenes smooth, black.      | ... | <i>L. squarrosa</i> 1 |
| 1b. Leaves not auricled at base; heads 6—8 mm long, 5—8-flowered; achenes many-ribbed, brown. | ... | <i>L. laevigata</i> 2 |

1. **Lactuca squarrosa** (Thunb.) Miq. in Ann. Mus. Bot. Lugd. Bat. 2: 189. 1866. *Prenanthes squarrosa* Thunb. Fl. Jap. 303. 1784. *L. brevirostris* Benth. in Hook. Kew Journ. 4: 237. 1852; Fl. Brit. Ind. 3: 405. 1881.

Annual erect glabrous herbs, 1-2 m; paniculately branched; leaves linear or linear-lanceolate, cuneate and auricled at base, entire or dentate; heads in terminal horizontally branched panicles; involucre bracts few-seriate, linear-ovate, inner smaller; corolla pale yellow; achenes ellipsoid, beaked at apex, 2-3 mm, black.

Open wastelands, paddy fields and marshes, 200-1200 m; fl. & fr.: June-Feb.; Carampani.

2. **Lactuca laevigata** (Bl.) DC. Prodr. 7: 140. 1838. *Prenanthes laevigata* Bl. Bijdr. 836. 1826. *L. gracilis* DC. var. *khasiana* Hook. f. Fl. Brit. Ind. 3: 411. 1881.

Slender annual herbs, 10-50 cm, unbranched; leaves mainly radical and few cauline, linear-lanceolate, tapering at base, acute or acuminate, dentate-sinuate, 5-20 × 0.5-1.5 cm; petioles 1-4 cm; heads in terminal lax corymbs; corolla pale yellow or white; achenes ellipsoid, 3-4 mm, brown.

Moist places in open grasslands, paddy fields and rocky stream-beds, 1000-1600 m; fl. & fr.: Apr.-Dec.; Jowai, Raliang, Umjaisaw.

## 3. CIRSIUM Mill.

**Cirsium involucreatum** DC. var. **horrimum** (Hook. f.) Balakr. *comb. nov.* *Cnicus involucreatus* (DC.) Hook. f. var. *horrimum* Hook. f. Fl. Brit. Ind. 3: 362. 1881.

Erect stout herbs, 1 - 2 m; leaves pinnatifid, with spinescent teeth, setulose above, white-tomentose beneath; radical leaves 25 - 35 × 10 - 26 cm; upper leaves smaller; heads 4 - 6 cm diam., solitary, terminal on branches, recurved; involucre bracts ending in erect or recurved spines; corolla ± 2.5 cm, pale purplish yellow; achenes oblong-obovoid; pappus brown.

Pine forests, open wastelands and grasslands, 1200 - 1600 m; fl. & fr.: Aug.-Dec.; Jarain, Jowai, Nartiang.

#### 4. BIDENS L.

**Bidens pilosa** L. var. **minor** (Bl.) Sherff, in Field Mus. Nat. Hist. (Chicago) Bot. ser. 16: 421. 1937. *B. sundaica* Bl. var. *minor* Bl. Bijdr. 913. 1826.

Much-branched herbs, 15 - 90 cm; leaves opposite, ternate; leaflets ovate-oblong, cuneate at base, acute, serrate, 1 - 10 × 0.5 - 5.0 cm; heads 5 - 7 × 7 - 8 mm, in terminal panicles; outer involucre bracts spatulate, glabrous or with few hairs; ray florets 5 - 7, white; disc florets yellowish; apical awns on achenes 2 or 3, 2 - 4 mm.

Cult. fields, roadsides, wastelands and secondary forests, introduced from America, 500 - 1700 m; fl. & fr.: Aug.-Dec.; Ioksi, Jowai, Mawryngk-neng.

#### 5. SPILANTHES Jacq.

**Spilanthus paniculata** DC. Prodr. 5: 625. 1896. *S. acmella* [auctt. plur. non (L.) Murr.] Hook. f. Fl. Brit. Ind. 3: 307. 1881, excl. var. *oleracea* et var. *clava*.

Annual herbs, rooting at basal nodes, 10 - 80 cm; leaves ovate to ovate-elliptic, narrowed at base, obtuse or acute at apex, 1 - 8 × 0.5 - 6.0 mm; peduncles 2 - 15 cm; involucre bracts 2-seriate, 8 - 12, oblong-elliptic, obtuse or subacute; heads 7 - 11 mm long; corolla yellow; achenes glabrous, verrucose, 2.0 - 2.5 mm long.

Open grasslands, roadsides, edges of forests, rice fields and river-banks, 100 - 1500 m; fl. & fr.: Jan.-Dec.; Empyut, between Jowai-Jarain, Jowai, Mynso, Nartiang *Balakrishnan*, 47190.

#### 6. MIKANIA Willd. *nom. cons.*

**Mikania micrantha** HBK. Nov. Gen. Pl. 4: 134. 1820.

Slender subherbaceous twiners; leaves triangular-ovate, cordate or hastate, subentire to conspicuously crenate or undulate-dentate, 5 - 12 × 3 - 8 cm,

3-5-nerved at base; heads 4-6 mm, in terminal and upper axillary corymbose panicles; bracts lanceolate, more than  $\frac{1}{2}$  as long as heads; corolla 2-3 mm, white; achenes 1.5-2.0 mm; pappus hairs 33-38 per achene, 2.5-3.0 mm, white.

Open places in thickets and bushes, 100-1000 m; fl. & fr.: Jan.-Dec.; Bonapur, *Balakrishnan* 50069 —Introduced from tropical America, this is rapidly spreading and becoming a noxious weed.

#### 7. AGERATUM L.

**Ageratum conyzoides** L. Sp. Pl. 839. 1753; Fl. Brit. Ind. 3: 243. 1881.

Annual herbs, 10-100 cm; leaves opposite, ovate, subrhomboid-ovate, elliptic-ovate, acute at base, obtuse or subobtuse, serrate, 2-10 × 1-5 cm; heads 4-6 mm in diam., in terminal dense corymbs; peduncles filiform, pubescent, 5-15 mm; involucre bracts 2-3-seriate, lanceolate, 2-3-nerved; corolla pale purple to white.

Roadsides, open places and cult. fields, 100-1600 m; fl. & fr.: Jan.-Dec.; Garampani, Jarain, Jowai.

#### 8. SYNEDRELLA Gaertn. *nom. cons.*

**Synedrella nodiflora** (L.) Gaertn. Fruct. 2: 456. t. 171. f. 7. 1791; Fl. Brit. Ind. 3: 308. 1881. *Verbesina nodiflora* L. Amoen. Acad. 4: 290. 1759.

Erect dichotomously branched herbs, 10-70 cm; leaves opposite, elliptic or ovate, narrowed at base, acute apex, crenate-serrate, 2-10 × 1-8 cm, hispidulous; heads 8-10 mm, solitary, axillary, sessile or on 1-5 mm long peduncles, 10-20-flowered; involucre tubular,  $\pm$  7 mm; bracts 2-seriate, narrowly oblong; ligules yellow; achenes 4-5 mm; awns 2-3 mm.

Cult. fields and roadsides, 100-1200 m; fl. & fr.: May-Dec.; Garampani.

#### 9. GALINSOGA Ruiz. & Pav.

**Galinsoga parviflora** Cav. Ic. Descr. Pl. 3: 41. t. 281. 1794; Fl. Brit. Ind. 3: 311. 1881.

Erect weak herbs, 20-50 cm; leaves opposite, ovate or oblong-ovate, acute or cuncate at base, obtuse or acute, shallowly serrate, 1-5 × 0.5-3.0

cm, thinly hairy; heads 5 - 8 mm diam., terminal and axillary; peduncles 7 - 30 mm; involucre bracts ovate, 2 - 4 mm; ray florets white; disk florets pale yellow; achenes ovate, angular, enveloped in a whorl of 10 - 15 fimbriate scales.

Roadsides, open places and cult. fields, 800 - 1700 m; fl. & fr.: May-Nov.; Jowai.

#### 10. ADENOSTEMMA J. R. & G. Forst.

**Adenostemma lavenia** (L.) O. Ktze. Rev. Gen. Pl. 1: 304, 1891. *Verbesina lavenia* L. Sp. Pl. 902. 1753. *A. viscosum* Forst. Char. Gen. 90. 1760; Fl. Brit. Ind. 3: 242. 1881.

Perennial herbs, 20 - 80 cm; leaves opposite, ovate, oblong-ovate or elliptic-deltoid, rounded or attenuate at base, acute to acuminate, coarsely serrate, 2 - 15 × 1 - 8 cm; petioles 1 - 6 cm; heads ± 30-flowered, 5 - 7 × 4 - 6 mm, in terminal thin dichotomous paniculate corymbs; involucre bracts 2-seriate, connate at base, oblong, obtuse; corolla white; achenes subtriangular, glandular-tuberculate.

Primary forests in shaded places, 500 - 1500 m; fl. & fr.: Mar.-Jan.; Jarain, Mawryngkneng, Sohka.

#### 11. EUPATORIUM L.

- |  |     |                        |
|--|-----|------------------------|
| 1a. Leaves deltoid or rhombic-ovate; petioles 1/5th to 1/3rd as long as blade; heads 20—30-flowered.                                       | ... | <i>E. odoratum</i> 1   |
| 1b. Leaves lanceolate or oblong-lanceolate; petioles less than 1/5th as long as blade; heads 5—10-flowered.                                |     |                        |
| 2a. Glandular-pubescent plants; leaves penninerved; branches of panicles rigid; involucre bracts obtuse or subacute and often erose.       | ... | <i>E. chinense</i> 2   |
| 2b. Scabrous-pubescent plants; leaves palmately 3—5-nerved; branches of panicles flexuous; involucre bracts acute to acuminate, not erose. | ... | <i>E. nodiflorum</i> 3 |

1. **Eupatorium odoratum** L. Syst. Nat. ed. 10. 2: 1205. 1759; Fl. Brit. Ind. 3: 244. 1881.

Much-branched shrubs, 1 - 2 m; internodes up to 10 cm; leaves deltoid or rhomboid-ovate, entire and abruptly acute at base; long-acuminate, sub-entire to dentate at margins, 7 - 10 × 3 - 4 cm; heads 20 - 35-flowered, in trichotomous convex corymbs; involucre bracts many-seriate, pale or stramineous; corolla pale blue to white.

Secondary forests, thickets and bushes, 100 - 1300 m; fl. & fr.: Nov.-Apr.; Jarain, on road to Dawki.



2. **Eupatorium chinense** L. Sp. Pl. 837. 1753. *E. reevesii* DC. Prodr. 5: 179. 1836; Fl. Brit. Ind. 3: 243. 1881.

Erect slender herbs, 25-75 cm, branched above; leaves ovate or oblong-ovate to lanceolate, rounded at base, acute, serrate, 3-6 × 1-3 cm; heads 5-6 mm, 5-8-flowered, in terminal compact panicles; involucrel bracts 3-seriate, 5-8, oblong, obtuse or subacute; corolla pale purple.

Grasslands and forest edges, in shaded places, 1000-1600 m; fl. & fr.: May-Dec.; Jarain, Umjaisaw.

3. **Eupatorium nodiflorum** DC. Prodr. 5: 179. 1836. *E. cannabinum* (non L. 1753) Hook. f. Fl. Brit. Ind. 3: 243. 1881; Fl. As. 3: 108. 1939.

Herbs, 25-75 cm; stems terete, purplish; leaves elliptic-lanceolate or elliptic-ovate, acute at base, acuminate, 3-10 × 1-2 cm; heads 5-6 mm, 5-flowered, in dense terminal corymbs, as also small corymbs at apex of side branches; involucrel bracts 3-seriate, 6-8, oblong, acute-mucronate or acuminate at apex; corolla purplish.

Shaded grasslands, 500-1500 m; fl. & fr.: June-Dec.; Khongsong-Raliang.

## 12. SPHAERANTHUS L.

**Sphaeranthus indicus** L. Sp. Pl. 927. 1753; Fl. Brit. Ind. 3: 275. 1881.

Aromatic viscid herbs, 20-50 cm; leaves sessile, decurrent forming dentate wings on stems, oblong-obovate or subspathulate, narrowed at base, rounded or obtuse-mucronate, coarsely dentate, 1.7 × 0.5-2.0 cm; heads ellipsoid, 1-2 cm, purple; peduncles winged; corolla of ray florets 1-2 mm, of disk florets 2.0-2.5 mm; achenes glandular-hairy.

Cult. fields, marshes, ditches and streamsides, 100-1000 m; fl. & fr.: Oct.-July; Dawki.

## 13. ACHILLEA L.

**Achillea sibirica** Ledeb. Ind. Sem. Hort. Dorpat. 1811 et Fl. Ross. 2: 528. 1846.

Erect undershrubs, 20-80 cm; leaves pectinately pinnatifid, linear-oblong, 2-10 × 0.5-1.5 cm; segments ± 1 mm apart, oblong-lanceolate, mucronate, acutely dentate, 1-2 mm wide, appressed-pilose; heads 9-12 mm, pale purple to white, in dense corymbs; peduncles 4-10 mm; involucrel bracts 4-seriate, 4-5 mm; achenes ± 2 × 1 mm.

Roadsides and cultivated gardens, 500 - 1000 m; fl. & fr.: Sept.-Dec.; Garampani.

#### 14. DICHROCEPHALA DC.

**Dichrocephala bicolor** (Roth) Schldl. in *Linnaea* 25: 209. 1852. *Cotula bicolor* Roth, *Catal.* 2: 116. 1800. *Grangea latifolia* Poir. *Encycl. Suppl.* 2: 826. 1811. *D. latifolia* (Poir.) DC. in *Guill. Arch. Bot.* 2: 518. 1833 et *Prodr.* 5: 371. 1836; *Fl. Brit. Ind.* 3: 245. 1881.

Aromatic erect herbs, often creeping at base, 10 - 60 cm, densely pubescent; leaves ovate, lyrate, irregularly dentate-crenate, serrate or pinnatifid, 2 - 10 × 1 - 5 cm; heads 4 - 5 mm diam. in small rigid terminal racemose panicles; involucre bracts 2-seriate, ovate, fimbriate; ray florets greyish-white, often tinged purple, gland-dotted; disk florets green or greenish-yellow.

Roadsides, open wastelands and grasslands on stony localities, 500 - 1300 m; fl. & fr.: May-Dec.; Emptyut, between Jowai-Jarain.

#### 15. ARTEMISIA L.

- |  |                        |
|--|------------------------|
| 1a. Leaves densely white-woolly beneath; lobes more than 10 mm broad; involucre pubescent; disk flowers fertile. ... | <i>A. nilagirica</i> 1 |
| 1b. Leaves pubescent or glabrous beneath; lobes less than 8 mm broad; involucre glabrous; disk flowers sterile. ...  | <i>A. parviflora</i> 2 |

1. **Artemisia nilagirica** (Clarke) Pamp. in *Nuov. Giorn. Ital.* n. s. 33: 452. 1926. *A. vulgaris* var. *nilagirica* Clarke, *Comp. Ind.* 162. 1876. *A. vulgaris* (auctt. plur. non L.) Hook. f. *Fl. Brit. Ind.* 3: 325. 1881; *Fl. As.* 3: 119. 1939. 'Sangeing'.

Erect aromatic shrubs, 1 - 2 m; leaves sessile, lobed or deeply pinnatisect with stipule-like lobes at base, 3 - 9 × 1 - 4 cm, densely white woolly beneath, glabrous above; heads ovoid, 3 - 4 mm diam., solitary or fascicled on large terminal paniculate racemes; involucre bracts few, oblong; achenes oblong-ellipsoid, minute.

Open or shaded places in grasslands and forest edges, 1000 - 1500 m; fl. & fr.: Aug.-Feb.; Jowai.

2. **Artemisia parviflora** Roxb. *Fl. Ind.* 3: 420. 1832; *Fl. Brit. Ind.* 3: 322. 1881; *Fl. As.* 3: 119. 1939.

Erect herbs or undershrubs, 1 - 2 m; leaves sessile, lobed; lobes linear, oblanceolate, acutely lobed, serrate or entire; 1 - 4 × 0.3 - 0.8 cm, glabrous

or pubescent beneath; heads subglobose, 2-3 mm diam., solitary or fascicled on large terminal paniculate racemes; involucrel bracts few, ovate-oblong, scarious-margined; achenes ellipsoid, smooth, brown.

Open and shaded places in grasslands, 500-1200 m; fl. & fr.: Aug.-Feb.; Jowai, Raliang-Khongsong.

#### 16. *TITHONIA* Juss.

***Tithonia diversifolia*** A. Gray in Proc. Amer. Acad. 19: 5. 1883.

Robust shrubs or undershrubs with subterranean stolons, 1-9 m; leaves ovate or ovate-rhomboid, narrowed at base, acute at apex, larger ones 3-7-lobed, serrate, 10-30 × 4-20 cm; petioles 2-10 cm; heads terminal, solitary, 8-12 cm diam.; involucrel bracts 3-4-seriate, outer ones shorter; ray florets 3-5 cm, yellow.

Open places in forests and near villages, 200-1500 m; fl. & fr.: Oct.-Mar.; Jowai, Sohka.

#### 17. *ELEPHANTOPUS* L.

***Elephantopus scaber*** L. Sp. Pl. 814. 1753; Fl. Brit. Ind. 3: 242. 1881; Fl. As. 3: 107. 1939.

Perennial scabrous herbs, 10-70 cm; rootstock creeping; leaves sessile in radical rosettes, oblanceolate to obovate-lanceolate, cuneate at base, rounded or short-acuminate, 5-30 × 1-8 cm; leaves of flowering branches few or none; heads glomerate, terminal on long dichotomous rigid peduncles bearing at base 3 deltoid-ovate cordate small leaves; corolla purplish.

Grasslands, roadsides, cult. fields and forest edges, 100-1500 m; fl. & fr.: Sept.-Feb.; Laskein, near Raliang.

#### 18. *SAUSSUREA* A. P. DC. *nom. cons.*

***Saussurea nivea*** (DC.) Balakr. *comb. nov.* *Aplotaxis nivea* DC. Prodr. 6: 541. 1838. *S. deltoidea* (DC.) Clarke var. *nivea* (DC.) Hook. f. Fl. Brit. Ind. 3: 375. 1881.

Shrubs, 1-3 m; stems simple below, corymbosely branched above; leaves ovate or deltoid-lanceolate, sinuate-dentate or lyrate-pinnatifid, cuneate at base, acute or obtuse, 5-35 × 2-13 cm, scaberulous above, white-tomentose

beneath; heads 10-15 mm diam., in terminal panicles; involucre bracts ovate, obtuse, purplish-red at margins; corolla pale purple.

Open forests and scrubs, 1000-1500 m; fl. & fr.: Sept.-Feb.; Jowai, Raliang-Khongsong.

#### 19. *CONYZA* Less. *nom. cons.*

- |  |     |                       |
|--|-----|-----------------------|
| 1a. Pubescent plants, 15--50 cm high, few-branched; leaves obovate-spathulate; involucre bracts ovate-lanceolate.  | ... | <i>C. japonica</i> 1  |
| 1b. Viscid plants, 75--175 cm high, much-branched; leaves elliptic-lanceolate; involucre bracts linear-lanceolate. | ... | <i>C. leucantha</i> 2 |

1. *Conyza japonica* (Thunb.) Less. Syn. Comp. 204. 1832; Fl. Brit. Ind. 3: 258. 1881. *Erigeron japonicus* Thunb. Fl. Jap. 312. 1764.

Annual or biennial herbs; leaves sessile, in basal rosettes and a few scattered cauline ones, cuneate at base, obtuse or acute, serrate or crenate, 1-5 × 0.5-2.0 cm; heads ± 8 mm diam., densely glomerata in few-branched terminal panicles; involucre bracts scarious-margined, pubescent; corolla white; achenes glabrous; pappus reddish-brown.

Open grasslands, 1200-1600 m; fl. & fr.: Apr.-July; Jowai, Raliang.

2. *Conyza leucantha* (D. Don) Ludlow & Raven in Kew Bull. 17: 71. 1963. *Erigeron leucanthus* D. Don, Prodr. Fl. Nep. 171. 1825. *C. viscidula* DC. Prodr. 5: 383. 1836; Fl. Brit. Ind. 3: 258. 1881.

Stout erect viscid-pubescent herbs; leaves acute at both ends, entire or serrate, 3-8 × 1-3 cm; heads ± 8 mm diam., glomerate in large terminal and upper axillary panicles; involucre bracts scarious-margined, pubescent; corolla white; pappus reddish.

Pine forests and shaded grasslands, 1200-1600 m; fl. & fr.: Sept.-Feb.; Mawryngkneng.

#### 20. *ERIGERON* L.

- |   |     |                         |
|---|-----|-------------------------|
| 1a. Leaves linear-lanceolate, glabrescent; heads 4--5 × 3--6 mm; involucre bracts glabrous.                     | ... | <i>E. pusillus</i>      |
| 1b. Leaves oblanceolate or spatulate, grey-pubescent; heads 6--7 × 6--9 mm; involucre bracts pubescent outside. | ... | <i>E. bonariensis</i> 2 |

1. *Erigeron pusillus* Nutt. Gen. 2: 149. 1818; Tuyama & Asai in J. Jap. Bot. 42: 335-342, 361-372. 1967.

Erect slender herbs or undershrubs, 10-80 cm; stems smooth, glabrescent; leaves entire, cuneate at base, acute, entire, 4-6 × 0.2-0.5 cm, glabrous; heads 30-50-flowered, in terminal and upper axillary panicles; peduncles slender, naked; involucre bracts scarious margined with a purple spot near apex; corolla white, 4-cleft into obtusely triangular lobes.

Open grasslands, roadsides and wastelands, introduced from trop. America, 500-1600 m; fl. & fr.: Apr.-Jan.; Nongringkoh, Mawryngkneng, Umjaisaw.

2. **Erigeron bonariensis** L. Sp. Pl. 863. 1753; Burt in Kew Bull. 1948: 371. 1948. *E. linifolius* Willd. Sp. Pl. 3: 1955. 1804.

Erect branched or simple-stemmed herbs, up to 1.5 m; branches corymbose; leaves cuneate at base, acute, coarsely serrate-incised, 1-8 × 0.3-1.5 cm; heads in long leafy panicles; involucre bracts coarsely hairy; corolla of ray florets purplish-tipped, of disk florets pale yellow; pappus ± 3 mm, yellowish.

Open grasslands, waste places and roadsides, 100-1600 m; fl. & fr.: June-Jan.; Jarain, Garampani, Umjaisaw.

## 21. AINSLIAEA DC.

**Ainsliaea latifolia** (D. Don) Sch.-Bip. in Pollichia 18-19: 169. 1861. *Liatris latifolia* D. Don, Prodr. Fl. Nep. 169. 1825. *A. pteropoda* DC. Prodr. 7: 14. 1838; Fl. Brit. Ind. 3: 388. 1881.

Scapigerous erect perennial herbs, 30-65 cm; leaves chiefly radical, ovate or lanceolate, cordate and narrowed into a broadly winged petiole at base, acute at apex, 5-12 × 2-8 cm, white-tomentose beneath; heads 10-15 mm, sessile, fascicled on simple or rarely branched spikes; involucre bracts many-seriate, linear, acute, reddish-green; corolla pale blue.

Shaded grasslands and pine forests, 1200-1600 m; fl. & fr.: Mar.-Dec.; Jowai.

## 22. GERBERA L. *nom. cons.*

- |  |                           |
|--|---------------------------|
| 1a. Leaves sagittae, hastate at base, acute to acuminate at apex; ligules absent; staminodes present in ray florets. ... | <i>G. maxima</i> 1        |
| 1b. Leaves ovate-oblong, cuneate at base, obtuse at apex; ligules present; staminodes absent in ray florets. ...         | <i>G. piloselloides</i> 2 |

1. **Gerbera maxima** (D. Don) Beauv. in Bull. Soc. Bot. Geneve ser. 2. 2: 44. 1910. *Chaptalia maxima* D. Don, Prodr. Fl. Nep. 166. 1825. *G.*

*macrophylla* Benth. in Benth. & Hook. f. Gen. Pl. 2: 497. 1879; Fl. Brit. Ind. 3: 391. 1881.

Herbs; rootstock woolly at apex; leaves in rosette, often irregularly pinnatifid, 10-20 x 5-14 cm, appressed-cottony beneath; heads 2-3 cm diam., on 15-45 cm long peduncles; involucre bracts ovate to linear-lanceolate, acute; corolla white.

Grasslands and pine forests, shaded rocky situations, 1200-1800 m; fl. & fr.: May-June; Jarain, Jowai, Mawryngkneng, Raliang.

2. ***Gerbera piloselloides*** (L.) Cass. in Dict. Sci. Nat. 18: 461. 1820; Fl. Brit. Ind. 3: 389. 1881. *Arnica piloselloides* L. Pl. Afr. Rar. 22. 1760. *Piloselloides hirsuta* (Forsk.) Jeffrey in Kew Bull. 21: 218. 1967.

Herbs; rootstock woolly; leaves in rosettes, entire, 5-12 x 2-5 cm, pubescent or appressed-cottony beneath; heads 2-3 cm diam., on 10-26 cm long peduncles; involucre bracts linear-lanceolate; corolla white.

Shaded places in pine forests, 1400-1800 m; fl. & fr.: May-Dec.; Mawryngkneng.

### 23. *INULA* L.

- |   |     |                           |
|---|-----|---------------------------|
| 1a. Stems and leaves densely white-woolly tomentose beneath; pappus hairs all of same size.         | ... | <i>I. cappa</i> 1         |
| 1b. Stems and leaves pubescent, not white-woolly; pappus hairs intermixed with short and long ones. | ... | <i>I. eupatorioides</i> 2 |

1. ***Inula cappa*** (D. Don) DC. Prodr. 5: 469. 1836; Fl. Brit. Ind. 3: 295. 1881; Fl. As. 3: 116. 1939. *Conyza cappa* D. Don, Prodr. Fl. Nep. 176. 1825. 'Dieng-ialih'.

Stout herbs or undershrubs, 1-3 m; leaves oblong-lanceolate, acute or rounded at base, 8-14 x 2-4 cm; heads 9-11 mm diam., panicles terminal or upper-axillary; involucre bracts subulate; pappus hairs dirty-white; corolla yellow achenes silky.

Open forests, pine forests and grassy wastelands, 500-1600 m; fl. & fr.: Aug.-Dec; Jowai, Khongsnong.

2. ***Inula eupatorioides*** DC. Prodr. 5: 469. 1836; Fl. Brit. Ind. 3: 295. 1881; Fl. As. 3: 116. 1939.

Stout shrubs, 1-3 m; leaves spirally arranged, elliptic-oblong, cuneate or acute to rounded at base, acute to acuminate, irregularly cuspidate-serrate, 12-18 x 2-5 cm; heads 7-8 mm diam.; panicles terminal or upper-axillary; involucre bracts linear-subulate; pappus hairs pale brownish; corolla yellow; achenes silky.

Open forests and grasslands near pine forests, 1200-1600 m; fl. & fr.: Oct.-Feb.; Jowai.

## 24. ASTER L.

**Aster trinervius** D. Don, Prodr. Fl. Nep. 177. 1825; Fl. Brit. Ind. 3: 252. 1881.

Perennial rhizomatous erect herbs, 0.5-1.0 m; leaves ovate to elliptic-lanceolate, rounded or attenuate at base, acute or acuminate, entire or serrulate at margins, 4-10 × 1-3 cm, 3-nerved at base; petioles up to 7 mm; heads 6-15 mm across, 6-7 in lax terminal corymbs; involucrel bracts 3-seriate, 20-25, linear, obtuse, 5-6 mm, purplish; ligules 10-20, 7-10 mm, white or pale pink; achenes obovoid, 3-4 mm, 2-3-ribbed; pappus hairs 5-6 mm, dirty white or reddish.

- 1a. Leaves ovate-lanceolate, rounded at base, thick or subcoriaceous in texture; trinervations of leaves basal; heads 8-15 mm across. ... ssp. *trinervius* 1  
 1b. Leaves elliptic-lanceolate, attenuate at base, thin or papery in texture; trinervations of leaves suprabasal; heads 6-10 mm across. ... ssp. *ageratoides* 2

### 1. ssp. *trinervius*

Pine forests and open grasslands, 1000-1700 m; fl. & fr.: Aug.-Feb.; Jowai.

2. ssp. ***ageratoides*** (Turcz.) Griens. in Notes R. Bot. Gard. Edinb. 26: 102. 1964. *A. ageratoides* Turcz. in Bull. Soc. Nat. Mosc. 7: 154. 1887.

Paddy fields and open places in and near pine forests, 1200-1700 m; fl. & fr.: Oct.-Feb.; Raliang.

## 25. SENECIO L.

- 1a. Climbing undershrubs.  
 2a. Leaves ovate-cordate, entire or 3-lobed; petioles not auricled at base; involucrel bracts 8; ligules absent; achenes striate. ... *S. walkeri* 1  
 2b. Leaves ovate-hastate, crenate-dentate; petioles auricled at base; involucrel bracts 10-12; ligules present; achenes 4-angled. ... *S. scandens* 2  
 1b. Erect shrubs.  
 3a. Leaves white beneath; anther-cells tailed at base. ... *S. cappa* 3  
 3b. Leaves not white beneath; anther-cells obtuse at base.  
 4a. Leaves crowded, linear, entire, revolute at margins, 2-3 mm broad. ... *S. griffithii* 4  
 4b. Leaves scattered, linear-lanceolate or oblong-lanceolate, serrate or pinnatifid, flat at margins, more than 5 mm broad.  
 5a. Leaves serrate, not pinnately lobed.  
 6a. Inflorescences terminal; involucrel bracts 16-20; ligules 8-12; pappus reddish. ... *S. wightii* 5  
 6b. Inflorescences axillary, rarely terminal; involucrel bracts 5-6; ligules 2-3; pappus greyish-white. ... *S. jowaiensis* 6

- 5b. Leaves pinnately lobed.  
 7a. Heads 10—15 mm diam. ; ray florets with pappus hairs ; ligules  $\pm$  1 mm wide ; achenes glabrous ; pappus white. ... *S. sisymbriiformis* 7  
 7b. Heads 15—20 mm diam. ; ray florets without or with a few pappus hairs ; ligules  $\pm$  3 mm wide ; achenes puberulous ; pappus reddish. *S. latiligulatus* 8

1. **Senecio walkeri** Arn. in Nov. Act. Nat. Cur. 18(1): 349. 1836. *S. araneosus* DC. Prodr. 6: 364. 1838 ; Fl. Brit. Ind. 3: 351. 1881 ; Fl. As. 3: 121. 1939.

Large woody climbers ; leaves ovate-cordate, acuminate at apex, entire or often 3-lobed, 6 - 15  $\times$  4 - 12 cm ; heads oblong, 8 - 12 mm, in open axillary and terminal panicles ; corolla pale green ; ligules absent ; achenes glabrous, striate ; pappus hairs white.

Primary forests and forest edges, in moist shaded places, 1200 - 1600 m ; fl. & fr. : Oct.-Mar. ; Raliang.

2. **Senecio scandens** D. Don, Prodr. Fl. Nep. 178. 1825 ; Fl. Brit. Ind. 3: 352. 1881 ; Fl. As. 3: 122. 1939.

Large climbers, 2 - 5 m ; young parts pubescent ; leaves ovate to hastate or lanceolate, acuminate at apex, crenate-dentate or crenulate at margins, 5 - 10  $\times$  2 - 4 cm ; petioles auricled at base ; heads oblong, 8 - 10 mm, in dense axillary corymbs ; corolla pale yellow,  $\pm$  8 mm ; ligules 6 - 8 ; achenes 4-angled or ribbed ; pappus white.

Primary forests, in shaded places, 1000 - 1600 m ; fl. & fr. : Oct.-Feb. ; Jarain, Nartiang.

3. **Senecio cappa** D. Don, Prodr. Fl. Nep. 179. 1825. *S. densiflorus* Wall. in DC. Prodr. 6: 369. 1838 ; Fl. Brit. Ind. 3: 355. 1881 ; Fl. As. 3: 123. 1939.

Erect undershrubs, 1 - 2 m ; white-tomentose ; leaves ovate-elliptic to lanceolate, acute at both ends, double-serrate at margins, 10 - 20  $\times$  3 - 8 cm ; heads  $\pm$  6 mm, in axillary and terminal large panicles ; corolla yellow ; ligules 8 - 10 ; achenes glabrous ; pappus white, equal to or shorter than the tubular corolla.

Pine forests and grasslands, in shaded places, 1200 - 1600 m ; fl. & fr. : Oct.-Mar. ; Jarain, Jowai.

4. **Senecio griffithii** Clarke, Comp. Ind. 194. 1876 ; Fl. Brit. Ind. 3: 341. 1881.

Erect herbs, 30 - 60 cm ; stems simple, woody at base ; leaves crowded, linear or linear-lanceolate, acuminate, revolute at margins, 2 - 6  $\times$  0.2 - 0.3



cm; heads  $\pm$  3 cm diam., few on long-peduncled terminal corymbs; corolla yellow; ligules 8-14; achenes papillose or scabrid; pappus hairs yellowish.

Pine forests, grasslands and cult. fields, 1000-1600 m; fl. & fr.: Oct.-Feb.; Jarain, Jowai.

5. **Senecio wightii** (DC.) Clarke, Comp. Ind. 204. 1876. *Doronicum wightii* DC. in Wt. Contr. Ind. Bot. 23. 1834. *S. saxatilis* DC. Prodr. 6: 367. 1838; Fl. Brit. Ind. 3: 344. 1881.

Weak herbs, up to 1 m; leaves sessile, oblong to elliptic-oblong, auricled at base, acute or acuminate, serrate, 1-nerved, 8-16  $\times$  0.5-1.5 cm; heads  $\pm$  2 cm diam., in terminal lax paniculate corymbs; ligules 8-12; corolla yellow; achenes linear, glabrous; pappus hairs reddish.

Shaded moist places near streams in primary forests, 1200-1500 m; fl. & fr.: Sept.-Feb.; Jowai.

6. **Senecio jowaiensis** Balakr. in Ind. For. 101: 703; f. 1. 1975.

Shrubs, 3-4 m; branches striate; leaves oblong-lanceolate, obliquely cuneate or acute at base, caudate-acuminate, serrulate, 9-13  $\times$  3-6 cm; lateral nerves 6-7 pairs, ridged beneath; heads in axillary and terminal corymbose panicles, 4-5 mm; ligulate florets 2-3; ray florets 2-3; corolla yellowish white; achenes ribbed,  $\pm$  2 mm, glabrous.

Primary forests, in deep shaded moist ravines, 1200-1600 m; fl. & fr.: Oct.-Apr.; Jowai, on road to Jarain, *Balakrishnan* 47400 —Endemic.

7. **Senecio sisymbriiformis** DC. Prodr. 6: 362. 1838. *S. chrysanthemoides* DC. Prodr. 6: 365. 1838 (*non* Schrank, 1789) Fl. Brit. Ind. 3: 339. 1881.

Erect unbranched herbs or undershrubs, 1-2 m; leaves ovate or oblong-obovate, lyrate-pinnatifid, obtuse, crenate-serrate, upper sessile, auricled at base, lower petioled, 3-20  $\times$  2-10 cm; heads 1.0-1.5 cm diam., in terminal corymbs; corolla yellow; ligules  $\pm$  1 mm broad, 1-nerved; achenes glabrous, striate; pappus white.

Open grasslands and pine forests, 1200-1600 m; fl. & fr.: July-Jan.; Ummulong.

8. **Senecio latiligulatus** Balakr. *nom. nov.* *S. diversifolius* DC. Prodr. 6: 636. 1838 (*non* Dumortier, 1827) Fl. Brit. Ind. 3: 340. 1881. *S. chrysanthemoides* DC. var. *khasianus* Clarke, Comp. Ind. 192. 1876. (*non* *S. khasianus* Balakr. 1970) Fl. Brit. Ind. 3: 339. 1881.

Erect, few-branched herbs, 0.5-1.5 m; leaves oblong, obovate, crenate,

lyrate-pinnatifid, auricled at base, obtuse, 3 - 16 × 1 - 6 cm; heads 1.5 - 2.0 cm diam. in terminal corymbose panicles; corolla yellow; ligules ± 3 mm broad, 3-nerved; achenes puberulous; pappus reddish.

Shaded moist places in primary forests, 1300 - 1600 m; fl. & fr.: June-Dec.; Jowai.

## 26. ANISOPAPPUS Hook. & Arn.

**Anisopappus chinensis** (L.) Hook. & Arn. Bot. Beech. Voy. 5: 196. 1833. *Verbesina chinensis* L. Sp. Pl. 901. 1753.

Erect rigid few-branched herbs, 30 - 50 cm; leaves ovate-oblong to oblong-lanceolate, narrowed at base, obtuse at apex, obtusely dentate, 1.5 × 0.5 - 2.0 cm; heads 12 - 15 mm diam., on long rigid peduncles forming terminal corymbs; involucral bracts 2 - 3-seriate, pubescent; corolla yellow; ray florets with 3-dentate ligules; disc florets 5-dentate at apex; achenes subterete, ribbed.

Open grasslands, 1000 - 1500 m; fl. & fr.: Oct.-Mar.; Raliang, *Balakrishnan* 50148.

## 27. EMILIA Cass.

**Emilia sonchifolia** (L.) DC. in Wt. Contr. Bot. Ind. 24. 1834; Fl. Brit. Ind. 3: 336. 1881; Fl. As. 3: 120. 1939. *Cacalia sonchifolia* L. Sp. Pl. 835. 1753.

Erect weak puberulous herbs, 8 - 60 cm, often branched at base; radical leaves simple or lyrate-pinnatifid or lobed, upper cauline ones lanceolate or oblong-lanceolate, entire or partly dentate, acutely or obtusely auricled at base, 4 - 16 × 1 - 8 cm; heads 10 - 13 × 4 - 5 mm combined into lax corymbs; involucral bracts 9 - 12 mm, connate at base; corolla pinkish-purple; achenes ± 3 mm, 5-ribbed; pappus ± 8 mm.

Open grasslands, forest clearings and roadsides, 100 - 1500 m; fl. & fr.: Jan.-Dec.; Dawki, Jarain, Jowai, Raliang.

## 28. GYNURA Cass. *nom. cons.*

- |   |                          |
|---|--------------------------|
| 1a. Leaves rounded or auricled at base, or short-stalked. Corolla rather abruptly widened at base; style arms tapering at apex, hairy. ...                    | <i>G. cusimbua</i> 1     |
| 1b. Leaves pronouncedly tapering at base into a long stalk. Corolla not widened at base, but widened into the limb; style arms truncate, sub-penicillate. ... | <i>G. crepidioides</i> 2 |

1. **Gynura cusimbua** (D. Don) S. Moore in J. Bot. 1: 212. 1912. *Cacalia cusimbua* D. Don, Prodr. Fl. Nep. 179. 1825. *G. angulosa* DC. Prodr. 6: 298. 1838; Fl. Brit. Ind. 3: 334. 1881.

Succulent herbs, 1-3 m; leaves spirally arranged, sessile, oblong-obovate to oblanceolate, rounded or auricled at base, acute to acuminate, irregularly toothed at margins, 10-25 × 2-6 cm; heads 15-23 mm, in large terminal panicles; peduncles 1-1.5 cm; involucre bracts linear-lanceolate; corolla orange-yellow.

Shaded places in forests, grasslands and thickets, 1000-1800 m; fl. & fr.: Sept.-Mar.; Jowai, Mynso.

2. **Gynura crepidioides** Benth. in Hook. Fl. Niger 438. 1849; Fl. As. 3: 127. 1939.

Erect sparingly branched annual herbs, 25-125 cm; leaves elliptic, oblong or obovate, pronouncedly tapering at base, acute or acuminate, pinnately lobed or irregularly dentate, 6-16 × 2-5 cm; heads 12-15 × 5-6 mm, pendulous in terminal congested or lax corymbs; corolla linear-tubular, yellow with brown-red or pinkish apex; achenes linear-terete, ribbed, brown.

Pine forests, open wastelands and roadsides, 1000-1600 m; fl. & fr.: May-Dec.; Jarain, Jowai.

## 29. VERNONIA Schreb. *nom. cons.*

- |  |                           |                         |
|--|---------------------------|-------------------------|
| 1a. Pappus hairs 2-seriate, outer row minute.  | ...                       | <i>V. cinerea</i> 1     |
| 1b. Pappus hairs 1-seriate.  |                           |                         |
| 2a. Involucre bracts, linear-lanceolate.   |                           |                         |
| 3a. Heads less than 15-flowered, less than 1 cm long; achenes 10-ribbed.                             | ...                       | <i>V. saligna</i> 2     |
| 3b. Heads more than 25-flowered, more than 1.5 cm long; achenes striate.                             |                           |                         |
| 4a. Heads 25-35-flowered; achenes glabrous.  | ...                       | <i>V. silhetensis</i> 3 |
| 4b. Heads 40-50-flowered; achenes silky.   | ...                       | <i>V. subsessilis</i> 4 |
| 2b. Involucre bracts, oblong-ovate or ovate-lanceolate.  |                           |                         |
| 5a. Scandent shrubs; lateral nerves 4-6 pairs; heads more than 10-flowered; pappus red.              | ...                       | <i>V. scandens</i> 5    |
| 5b. Erect trees; heads less than 10-flowered; lateral nerves 8-15 pairs; pappus white.               |                           |                         |
| 6a. Heads 3-10-flowered, more than 12 mm diam.; achenes 10-ribbed; pappus hairs of different length. | <i>V. volkameriifolia</i> | 6                       |
| 6b. Heads 3-6-flowered, less than 5 mm diam., achenes 8-ribbed; pappus hairs of equal length.        | ...                       | <i>V. arborea</i> 7     |

1. **Vernonia cinerea** (L.) Less. in Linnæa 4: 291. 1829; Fl. Brit. Ind. 3: 233. 1881; Fl. As. 3: 104. 1939. *Conyza cinerea* L. Sp. Pl. 862. 1753.

Erect perennial herbs or undershrubs, 15-120 cm; stems stiff, striate, pubescent; leaves subsessile or petiolate, elliptic, subspathulate to lanceolate,

attenuate at base, obtuse or acute, entire or repand, 2 - 8 × 1 - 4 cm; heads 6 - 7 × 4 - 5 mm, 18 - 20-flowered, corymbosely paniculate; peduncles filiform, 2 - 12 mm, pubescent; involucre bracts 4-seriate, 4 - 5 × 0.5 - 2.0 mm; corolla pink-purple; pappus hairs 4 - 5 mm, white.

- |   |     |                         |
|---|-----|-------------------------|
| 1a. Leaves fulvous-pubescent or grey puberulous beneath.                  | ... | var. <i>cinerea</i> 1   |
| 2a. Leaves rhomboid-elliptic or ovate, flat at margins.                   | ... |                         |
| 2b. Leaves linear-lanceolate or elliptic-lanceolate, recurved at margins. | ... | var. <i>linifolia</i> 2 |
| 1b. Leaves densely villous beneath.                                       | ... | var. <i>montana</i> 3   |

1. var. **cinerea**

Waysides, grasslands, cult. fields and all wastelands, 100 - 1000 m; fl. & fr.: Jan.-Dec.; Dawki, Sohka-Dawki.

2. var. **linifolia** (Bl.) Koster in *Blumea* 1: 414. 1935. *Vernonia linifolia* Bl. *Bijdr.* 893. 1826.

Roadsides, edges of forests, secondary forests and grasslands, 100 - 1500 m; fl. & fr.: Jan.-Dec.; loski, Jarain, Jowai, Raliang.

3. var. **montana** (Edgew.) Clarke, *Comp. Ind.* 21. 1876. *Vernonia montana* Edgew. in *Trans. Linn. Soc.* 20: 62. 1846.

Open places, roadsides, grasslands and secondary forests, 200 - 1000 m; fl. & fr.: Apr.-Dec.; Nongthala.

2. **Vernonia saligna** DC. *Prodr.* 5: 33. 1836; *Fl. Brit. Ind.* 3: 235. 1881.

Herbs or undershrubs, much-branched, 50 - 120 cm; leaves sessile or short-petioled, elliptic-oblong or oblanceolate, cuneate or acute at base, acute or acuminate, coarsely serrate, 6 - 12 × 2 - 5 cm; heads 6 - 8 mm diam., 6 - 10-flowered, in terminal corymbs; involucre bracts linear-oblong or lanceolate, purplish; corolla purple; achenes strongly 10-ribbed.

Pine-forests and roadsides, 1000 - 1600 m; fl. & fr.: May-Dec.; Mawryngkneng.

3. **Vernonia silhetensis** (DC.) Kerr. *Fl. Siam.* 2: 243. 1936. *Decaneuron silhetense* DC. *Prodr.* 5: 67. 1836. *V. bracteata* Clarke, *Comp. Ind.* 17. 1876; *Fl. Brit. Ind.* 3: 232. 1881; *Fl. As.* 3: 107. 1939.

Rigid undershrubs, sparingly branched, 25 - 75 cm; leaves elliptic or lanceolate, acute at both ends, remotely serrate, 3 - 10 × 1 - 3 cm, scabrid; heads 25 - 35-flowered, 15 - 20 mm diam., in terminal corymbs; peduncles rigid, 2 - 6 cm, scabrid; involucre bracts linear-oblong, recurved, acicular at apex, outer subulate, purplish; corolla dark purple; achenes glabrous.

Open grasslands, forest edges and pine forests, 500 - 1600 m; fl. & fr.: May-Jan.; Jowai, Nartiang, Pdengsakab.

4. **Vernonia subsessilis** DC. Prodr. 5: 62. 1836; Fl. Brit. Ind. 3: 230. 1881; Fl. As. 3: 103. 1939.

Stout undershrubs, up to 1 m; leaves narrowly lanceolate or oblanceolate, cuneate at base, acute or acuminate, distantly and irregularly sinuate-dentate, 4 - 18 × 1 - 4 cm; heads 40 - 50-flowered, 15 - 20 mm diam., in terminal leafy paniculate corymbs; involucrel bracts linear-oblong, acute and acicular at apex, erect; corolla purple; achenes striate.

Shaded forest edges, river-banks and wastelands, 100 - 1000 m; fl. & fr.: Sept.-Feb.; Sonapur.

5. **Vernonia scandens** DC. Prodr. 5: 32. 1836; Fl. Brit. Ind. 3: 241. 1881; Fl. As. 3: 106. 1939.

Scandent woody shrubs; leaves elliptic to ovate-lanceolate, acute or cuneate at base, acute or acuminate, entire, 3 - 18 × 1 - 8 cm, glabrescent beneath; heads 10 - 15-flowered, 8 - 12 mm diam., in leafy terminal panicles, involucrel bracts in several series, ovate or lanceolate, acute or obtuse, scarious; corolla white; achenes deeply 10-ribbed; pappus red.

Primary forests, 300 - 1500 m; fl. & fr.: Sept.-Mar.; Raliang, Garampani.

6. **Vernonia volkameriifolia** DC. Prodr. 5: 32. 1836; Fl. Brit. Ind. 3: 240. 1881; Fl. As. 3: 105. 1939. '*Dieng-duma-blai*'.

Trees or shrubs, 2 - 6 m; leaves obovate or oblong-oblanceolate, cuneate at base, obtuse or acute, coarsely dentate, 10 - 35 × 3 - 15 cm; heads 3 - 8-flowered, 12 - 18 mm diam., in terminal panicles involucrel bracts oblong-lanceolate, acute, puberulous; corolla purple; achenes glabrous, 10-ribbed.

Primary forests, pine forests and forest edges, 200 - 1600 m; fl. & fr.: Oct.-Apr.; Ioski, Jarain, Jowai, Garampani, Myntang Valley, Mynso.

7. **Vernonia arborea** Buch.-Ham. in Trans. Linn. Soc. 14: 218. 1825; Fl. Brit. Ind. 3: 239. 1881; Fl. As. 3: 104. 1939.

Trees, 10 - 20 m; leaves elliptic or ovate, rounded, subacute or attenuate at base, acute to abruptly acuminate, entire, 10 - 20 × 3 - 8 cm; heads 3 - 6-flowered, 3 - 5 mm diam., in terminal panicles; involucrel bracts 5 - 6-seriate, oblong, obtuse or subacute, glossy inside, glabrous or pubescent outside; corolla pale blue or white.

Primary forests and forest edges, 100 - 1600 m; fl. & fr.: Sept.-Mar.; Dawki.

30. *BLUMEA* A. P. DC. *nom. cons.*

- |   |                           |
|---|---------------------------|
| 1a. Plants densely white woolly-tomentose.  | <i>B. hieraciifolia</i> 1 |
| 1b. Plants glabrate or pubescent, never woolly.   |                           |
| 2a. Stems winged; leaves decurrent on stems; peduncles arching over in fruit.   | <i>B. alata</i> 2         |
| 2b. Stems not winged; leaves not decurrent on stems; peduncles straight with heads held more or less erect in fruit.                          |                           |
| 3a. Involucral bracts, at least the outer ones, oblong-ovate to oblong-lanceolate.  |                           |
| 4a. Leaves coarsely and deeply double-serrate-dentate, variously pubescent on upper surfaces; heads sessile or subsessile.                    | <i>B. procera</i> 3       |
| 4b. Leaves minutely or shortly denticulate, glabrous on upper surface; heads pedunculate.   |                           |
| 5a. Scandent shrubs; leaves petiolate, acute at base; heads 9—15 mm diam.; involucral bracts pubescent; anthers obtuse at base.               | <i>B. riparia</i> 4       |
| 5b. Erect herbs; leaves sessile, obtuse or auriculate-cordate at base; heads 5—7 mm diam.; involucral bracts glabrous; anthers acute at base. | <i>B. flava</i> 5         |
| 3b. Involucral bracts linear or linear-lanceolate.  |                           |
| 6a. Lower petioles with 1—3 appendages at base; pappus hairs reddish.   | <i>B. balsamifera</i> 6   |
| 6b. Lower petioles never appendaged at base; pappus hairs white.  |                           |
| 7a. Heads subsessile to pedunculate, paniculate; involucral bracts entirely reflexed at maturity.   | <i>B. laciniata</i> 7     |
| 7b. Heads sessile, glomerate, the clusters interruptedly spicate; involucral bracts not entirely reflexed at maturity.                        |                           |
| 8a. Receptacles pilose; involucral bracts purple or purple-tipped.  | <i>B. fistulosa</i> 8     |
| 8b. Receptacles glabrous; involucral bracts green or straw-coloured.  | <i>B. sessiliflora</i> 9  |

1. ***Blumea hieraciifolia*** (D. Don) DC. in Wt. Contr. Bot. Ind. 15. 1834; Fl. Brit. Ind. 3: 263. 1881. *Erigeron hieraciifolium* D. Don, Prodr. Fl. Nep. 272. 1825. *B. sericans* Hook. f. Fl. Brit. Ind. 3: 262. 1881.

Erect herbs, 20 - 150 cm, usually unbranched; leaves crowded at base, few cauline, obovate-spathulate to elliptic-obovate, attenuate or cuneate at base, acute or obtuse, irregularly dentate-serrate at margins, 2 - 16 × 0.3 - 5.0 cm; heads 6 - 10 mm diam., in dense axillary and terminal clusters forming interrupted spikes.

Roadsides, grasslands and waste places, in moist localities, 1200 - 1600 m; fl. & fr.: Apr.-Oct.; Jarain, Jowai, Raliang, Ummulong.

2. ***Blumea alata*** (D. Don) DC. Prodr. 5: 448. 1836. *Erigeron alatum* D. Don, Prodr. Fl. Nep. 171. 1825. *Laggera alata* (D. Don) Oliver in Trans. Linn. Soc. 29: 94. 1873; Fl. Brit. Ind. 3: 271. 1881.

Stout viscid-glandular herbs, up to 2 m; stems broadly winged; leaves sessile, oblong or elliptic to obovate, narrowed to decurrent base, obtuse-apiculate, 10 - 16 × 4 - 7 cm; heads 8 - 14 mm diam., in terminal lax pyramidal panicles; peduncles 1 - 3 cm; involucre bracts 4 - 12 mm long, outer smaller.

Grasslands and open places in forests, 500 - 1500 m; fl. & fr.: Junc-Jan.; Ioksi, Jowai.

3. **Blumea procera** DC. Prodr. 5: 445. 1836; Fl. Brit. Ind. 3: 268. 1881.

Herbs or undershrubs, 1 - 3 m; leaves subsessile, oblong, elliptic or oblanceolate, acute, cuneate or semiamplexicaul at base, short-acuminate, coarsely double-dentate at margins, 6 - 16 × 2 - 7 cm; heads 5 - 9 mm diam., in terminal large panicles, densely aggregated at ends of branches; involucre bracts linear-oblong, acute with scarious margins.

Primary forests, in shaded places, 1000 - 1500 m; fl. & fr.: Jan.-Aug.; Jowai, Nongringkoh, Raliang.

4. **Blumea riparia** (Bl.) DC. Prodr. 5: 444. 1836. *Conyza riparia* Bl. Bijdr. 899. 1826. *B. chinensis* DC. Prodr. 5: 444. 1836, p. p. (non *Conyza chinensis* L.) Fl. Brit. Ind. 3: 268. 1881; Fl. As. 3: 111. 1939.

Scandent undershrubs or shrubs, 0.5 - 2.0 m, sparsely puberulous; leaves oblong-obovate to elliptic, rounded or acute at base, short-acuminate, 2 - 13 × 1 - 5 cm; petioles up to 5 mm; heads 8 - 16 mm diam., in terminal and axillary few-headed lax paniculate racemes; peduncles up to 2 cm; involucre bracts obovate to linear-oblong.

Secondary forests and thickets and also in shaded primary forests, 500 - 1500 m; fl. & fr.: Jan.-Dec.; Jowai, Raliang.

5. **Blumea flava** DC. Prodr. 5: 439. 1836. *Laggera flava* (DC.) Benth. in Clarke, Comp. Ind. 90. 1876; Fl. Brit. Ind. 3: 270. 1881. *Blumeopsis flava* (DC.) Gagnep. in Bull. Mus. Hist. Nat. Paris 26: 76. 1920.

Erect herbs, 15 - 45 cm, few-branched; leaves sessile, in basal rosette and a few scattered cauline ones, oblong-obovate to oblanceolate, cordate-auricled at base, obtuse-mucronate at apex, denticulate, 2 - 6 × 1 - 3 cm; heads 5 - 7 mm diam., in terminal few-flowered cymose panicles; peduncles slender, 5 - 15 mm.

On rocky and humus soil in shaded places 1000 - 1600 m; fl. & fr.: June-Jan.; Mawryngkneng, Nartiang.

6. **Blumea balsamifera** (L.) DC. Prodr. 5: 447. 1836; Fl. Brit. Ind. 3: 270. 1881; Fl. As. 3: 113. 1939. *Conyza balsamifera* L. Sp. Pl. 1208. 1753.

Aromatic shrubs, 1 - 3 m; stems erect, simple at base, repeatedly branched above, ovate-oblong, acuminate at both ends, dentate-serrate at margins, 8-30 × 2-15 cm; petioles with 2-3 appendages at base; heads 7-8 mm diam., in terminal large panicles; peduncles 3-9 mm; involucre bracts linear, 1-9 mm, densely hairy.

Grasslands, thickets, pine forests and clearings of forests, 500-1500 m; fl. & fr.: Jan.-Dec.; Jowai.

7. **Blumea laciniata** (Roxb.) DC. Prodr. 5: 436. 1836; Fl. Brit. Ind. 3: 264. 1881. *Conyza laciniata* Roxb. Fl. Ind. 3: 428. 1832.

Herbs, 20-150 cm; stems ± 1.2 cm thick at base; leaves radical and cauline, upper ones smaller, passing into bracts; ovate-oblong, tapering at base, obtuse or acute, distantly dentate, 4-30 × 1-18 cm; heads 6-8 mm diam., in large terminal dense to lax panicles; peduncles up to 1.5 mm, glabrous or glandular-pubescent; involucre bracts tinged purple.

Roadsides, forest clearing and open fields, 100-1000 m; fl. & fr.: Jan.-June; Dawki.

8. **Blumea fistulosa** (Roxb.) Kurz in J. As. Soc. Beng. 46(2): 187. 1877. *Conyza fistulosa* Roxb. Fl. Ind. 3: 429. 1832. *B. glomerata* DC. in Wt. Contr. Ind. Bot. 15. 1834; Fl. Brit. Ind. 3: 262. 1881, *p. p.*

Erect herbs, 60-120 cm, puberulous or densely velutinous at apex leaves sessile or lower ones petioled, oblong-lanceolate to broadly oblanceolate, coarsely serrate-dentate or incised, 3-15 × 0.6-6.0 cm; heads 4-5 mm diam., sessile in compact globose clusters arranged in interrupted spicate panicles; involucre bracts spreading, scarious-margined.

Open grasslands, roadsides and thickets, 100-1000 m; fl. & fr.: Dec.-May; Dawki.

9. **Blumea sessiliflora** Decaisne in Nouv. Ann. Mus. Par. 2: 140. 1834. *B. glomerata* Hook. f. Fl. Brit. Ind. 3: 262. 1881, *p. p.* (*non DC.*).

Erect herbs, up to 1 m; leaves sessile, oblanceolate, tapering to base, obtuse or acute and apiculate at apex, serrate-dentate at margins, 4-16 × 1-6 cm; heads 5-6 mm diam., in clusters of 3-5 arranged in interruptedly spicate panicles, sessile or sometimes pedunculate; involucre bracts lanceolate, spreading, scarious-margined.

Grasslands, thickets and secondary forests in shaded places, 100-800 m; fl. & fr.: Nov.-Apr.; Garampani.



## 31. ANAPHALIS DC.

- |  |     |                        |
|--|-----|------------------------|
| 1a. Leaves pubescent above.  |     |                        |
| 2a. Stems branched from base ; leaves linear-lanceolate, 1-3 mm broad ; heads 3-5 mm diam. | ... | <i>A. contorta</i> 1   |
| 2b. Stems simple ; leaves elliptic-lanceolate, 5-25 mm broad ; heads 6-8 mm diam.          | ... | <i>A. adnata</i> 2     |
| 1b. Leaves glabrous above.   |     |                        |
| 3a. Leaves 3-5-nerved ; heads 5-7 mm diam.   | ... | <i>A. timmua</i> 3     |
| 3b. Leaves 1-nerved ; heads 9-12 mm diam.  | ... | <i>A. griffithii</i> 4 |

1. **Anaphalis contorta** (D. Don) Hook. f. Fl. Brit. Ind. 3: 284, 1881. *Antennaria contorta* D. Don in Edw. Bot. Reg. 7: t. 605, 1822.

Erect herbs or undershrubs, 10-60 cm; branches basal, ascending, woolly; leaves linear-lanceolate, semiamplexicaul at base, acute, 5-25 x 1-3 mm, densely woolly-tomentose; heads subglobose, 3-5 mm diam., in crowded corymbose clusters; involucre bracts ovate-oblong, white or yellowish, glistening.

Pine forest floor and rocky grasslands, 1200-1600 m; fl. & fr.: Aug.-Jan.; Jowai, Nongbah-Nartiang.

2. **Anaphalis adnata** DC. Prodr. 6: 274, 1838; Fl. Brit. Ind. 3: 282, 1881.

Stout herbs or undershrubs, 0.5-1.5 m; leaves oblong to elliptic or oblanceolate, semiamplexicaul at base, acute or obtuse, 3-12 x 0.5-2.5 cm, densely woolly; heads subglobose, 6-8 mm diam., in dense rounded terminal clusters; involucre bracts ovate-suborbicular, obtuse, white, opaque.

Pine forests and grasslands on rocky places, 1200-1600 m; fl. & fr.: Sept.-Feb.; Jarain, Jowai.

3. **Anaphalis timmua** D. Don, Prodr. Fl. Nep. 174, 1825. *A. cinnamomea* Clarke, Comp. Ind. 104, 1876; Fl. Brit. Ind. 3: 281, 1881; Fl. As. 8: 114, 1939.

Erect unbranched herbs, 30-75 cm; leaves lanceolate, semi-amplexicaul at base, acuminate, 3-10 x 0.4-0.8 cm, glabrous above, cinnamomeous-woolly beneath; heads subglobose, 5-7 mm diam., in dense terminal corymbs; involucre bracts elliptic-ovate, obtuse, erect or incurved, scarious, white opaque.

Open rocky grasslands and pine forests, 1200-1600 m; fl. & fr.: Sept.-Feb.; Jowai-Jarain.

4. **Anaphalis griffithii** Hook. f. Fl. Brit. Ind. 3: 280, 1881.

Unbranched herbs, 30-80 cm, erect or ascending; leaves linear-lanceo-

late, semiamplexicaul at base, acuminate, 3 - 8 × 0.4 - 0.8 cm, glabrous above, grey-woolly or cobwebby beneath; heads subglobose, 9 - 12 mm diam., in terminal open corymbs; involucrel bracts ovate or elliptic-obovate, subacute, white.

Pine forests and grasslands, 1200 - 1600 m; fl. & fr.: Oct.-Feb.; Jowai.

### 32. GNAPHALIUM L.

- |   |     |                           |
|---|-----|---------------------------|
| 1a. Heads in leafless terminal dense corymbs; involucrel bracts golden yellow, obtuse or subacute at apex.    | ... | <i>G. affine</i> 1        |
| 1b. Heads in leafy terminal spikes or corymbs; involucrel bracts brownish-yellow, abruptly acuminate at apex. | ... | <i>G. pensylvanicum</i> 2 |

1. **Gnaphalium affine** D. Don, Prodr. Fl. Nep. 173. 1825. *G. multiceps* DC. Prodr. 6: 222. 1838. *G. luteo-album* L. var. *multiceps* (DC.) Hook. f. Fl. Brit. Ind. 3: 288. 1881. *G. luteo-album* L. ssp. *affine* (D. Don) Koster in Blumea 4: 484. 1941.

Erect densely woolly ascending branched, 5 - 60 cm; leaves oblong-spathulate, narrowed at base, obtuse, 0.8 - 5.0 × 0.2 - 0.8 cm; heads campanulate, 3 - 4 mm, shortly peduncled; involucrel bracts obtuse or rounded at apex; corolla with pinkish-red apex; achenes ± 0.5 mm, brown; pappus ± 2 mm, yellowish.

Open wastelands, roadsides and cult. fields, 100 - 1200 m; fl. & fr.: Apr.-Oct.: Dawki.

2. **Gnaphalium pensylvanicum** Willd. Enum. Berol. 867. 1809. *G. purpureum* (auctt. non L.) Hook. f. Fl. Brit. Ind. 3: 289. 1881; Fl. As. 3: 115. 1939.

Stout erect herbs, 10 - 70 cm, branching from base, densely white appressed-woolly; leaves oblong-spathulate or oblanceolate, cuneate at base, obtuse, 1 - 6 × 0.5 - 1.5 cm; heads cylindrical, ± 4 mm, sessile in clusters; involucrel bracts acuminate; corolla reddish; achenes ± 8 mm, dark brown; pappus hairs yellowish, ± 2 mm.

Open wastelands, 100 - 1200 m; fl. & fr.: Apr.-Oct.; Syndai.

### 82. CAMPANULACEAE

- |  |     |                  |
|--|-----|------------------|
| 1a. Corolla zygomorphic; anthers and most part of filaments connate during anthesis. | ... | <i>Lobelia</i> 1 |
| 1b. Corolla actinomorphic; anthers free during anthesis.                             |     |                  |

- |  |                       |
|--|-----------------------|
| 2a. Flowers in spikes or racemes ; capsules dehiscent at sides below the calyx-lobes. ...          | <i>Campanula</i> 2    |
| 2b. Flowers solitary or in cymes or panicles ; capsules loculicidal within calyx-lobes.            |                       |
| 3a. Vine-like herbs ; leaves partly decussate ; corolla-tube adnate to ovary ; fruits baccate. ... | <i>Codonopsis</i> 3   |
| 3b. Erect herbs ; leaves spirally arranged ; corolla free from ovary ; fruits capsular. ...        | <i>Wahlenbergia</i> 4 |

## 1. LOBELIA L.

- |   |                           |
|---|---------------------------|
| 1a. Stems erect, not rooting at nodes ; leaves oblong to narrow-lanceolate ; flowers in terminal panicles or racemes. ... | <i>L. nictianifolia</i> 1 |
| 1b. Stems creeping or ascending, rooting at nodes ; leaves ovate or reniform ; flowers axillary, solitary. ...            | <i>L. angulata</i> 2      |

1. **Lobelia nicotianifolia** R. & S. Syst. 5: 47. 1819 (sphalm: '*nicotianae-folia*') Clarke in Fl. Brit. Ind. 3: 427. 1881. *L. pyramidalis* Wall. in Asiat. Res. 13: 376. 1820; Clarke, *l. c.* 426. *L. rosea* Wall. in Roxb. Fl. Ind. 2: 115. 1824; Clarke, *l. c.* 427. *L. excelsa* Roxb. Fl. Ind. 2: 114. 1824; Clarke, *l. c.* 427. *L. colorata* Wall. Pl. As. Rar. 2: 42. 1831; Clarke, *l. c.* 426.

Herbs or undershrubs, 1 - 2 (-3) m; stems terete below, angular at apex; leaves spirally arranged, oblong to narrow-lanceolate, decurrent at base, acuminate, 5 - 20 × 1 - 8 cm, decreasing in size upwards; racemes up to 40 cm, often forming large leafy panicles; sepals linear-lanceolate, 4 - 12 × 1 - 2 mm; corolla whitish, blue, or dark purple, 1 - 3 cm; lobes linear; capsules cylindrical-cupular, 8 - 10 mm; seeds flattened, brown, smooth.

Shaded places near forests and also open grasslands, 200 - 1600 m; fl. & fr.: Dec.-Aug.; Dawki, Jarain, Jowai.

2. **Lobelia angulata** Forst. Fl. Ins. Austr. Prodr. 58: no. 309. 1786. *L. begoniifolia* Wall. in Asiat. Res. 977. 1820. *Pratia begoniifolia* (Wall.) Lindl. in Edw. Bot. Reg. 15: t. 1373. 1830; Fl. Brit. Ind. 3: 422. 1881.

Creeping herbs, profusely branched; stems terete, rooting at nodes; leaves alternate, rounded to ovate or reniform, cordate at base, acute or rounded crenate-dentate, 2 - 25 × 2 - 35 mm; flowers 6 - 18, axillary, solitary; pedicels 1 - 5 cm; calyx-lobes linear-lanceolate to triangular; corolla 4 - 10 mm, pink or pale purple; fruits ellipsoid, 6 - 12 mm, dehiscent capsular or indehiscent baccate, seeds flattened-ellipsoid, brown, reticulate.

Moist open or shaded places, 500 - 1500 m; fl. & fr.: May-Dec.; Jarain-Dawki Jowai.

## 2. CAMPANULA L.

**Campanula fulgens** Wall. in Roxb. Fl., Ind. 2: 99. 1824; Fl. Brit. Ind. 3: 442. 1881.

Erect or decumbent branched herbs, 20 - 50 cm; leaves spirally arranged, ovate-lanceolate, cuneate or acute at base, acute, crenate, 2 - 6 × 1 - 3 cm; basal leaves crowded, long-petioled; cauline leaves scattered, subsessile or sessile; flowers subsessile in interrupted spikes; corolla deeply lobed, 6 - 8 mm, blue; capsules ellipsoid, turbinate, 6 - 8 mm, dehiscent along sides.

Grasslands, open and shaded places, 1000 - 1500 m; fl. & fr.: June-Oct.; Nongringkoh.

### 3. CODONOPSIS Wall.

- |  |     |                        |
|--|-----|------------------------|
| 1a. Twining herbs; leaves cordate at base; flowers axillary; corolla yellow with purple veins. | ... | <i>C. javanica</i> 1   |
| 1b. Erect or sprawling herbs; leaves decurrent at base; flowers terminal; corolla white.       | ... | <i>C. parviflora</i> 2 |

1. **Codonopsis javanica** (Bl.) Hook. f. *Illus. Himal. Pl.* 116. t, 16B, 1855. *Campanumoea javanica* Bl. *Bijdr.* 727. 1826; *Fl. Brit. Ind.* 3: 435. 1881; *Fl. As.* 3: 129. 1939.

Twincers; leaves opposite, ovate to oblong-ovate, cordate at base, obtuse to acuminate, serrate to serrulate, 2 - 8 × 2 - 5 cm; petioles 2 - 6 cm; pedicels axillary, 1 - 5 cm; calyx-lobes oblong to lanceolate; corolla 1.5 - 3.0 cm, greenish-white with purple streaks; lobes ovate, acuminate; berries subglobose, 8 - 15 × 10 - 20 mm, red to dark purple.

Open grasslands, forest edges and secondary forests, 800 - 1500 m; fl. & fr.: May-Dec.; Nongringkoh.

2. **Codonopsis parviflora** DC. *Prodr.* 7: 423. 1839. *Campanumoea parviflora* (DC.) Benth. in Benth. & Hook. f. *Gen. Pl.* 2: 558. 1876; *Fl. Brit. Ind.* 3: 436. 1881; *Fl. As.* 3: 129. 1939.

Erect, 1 - 2 m; branches drooping; leaves opposite, oblong-lanceolate or elliptic-lanceolate, obtuse or rounded at base, acuminate, coarsely serrate, 3 - 12 × 1 - 3 cm; pedicels terminal, 1 - 6 cm; calyx-lobes linear, free from ovary; corolla 6 - 10 mm, white to pale pink; lobes ovate or triangular; berries globose, 8 - 10 mm diam. greenish-white.

Edges of forests, secondary forests, in shaded moist places, 500 - 1500 m; fl. & fr.: May-Jan.; Jowai, Sohka.

### 4. WAHLENBERGIA Roth *nom. cons.*

**Wahlenbergia marginata** (Thunb.) DC. *Mon. Camp.* 143. 1830. *Campanula marginata* Thunb. *Fl. Jap.* 89. 1784. *C. gracilis* Forst. *Prodr.* 84.

1786. *W. gracilis* (Forst.) Schrad. Blumenb. 39. in obs. 1827; DC. Mon. Camp. 142. 1830; Fl. Brit. Ind. 3: 429. 1881.

Erect, perennial herbs, 3-60 cm; leaves spirally arranged, linear-lanceolate to oblanceolate, upper leaves smaller, 10-50 × 1-5 mm; inflorescences 1-few-flowered; pedicels 1-10 cm; calyx-lobes 3-5, linear-lanceolate, dentate; corolla 3-10 mm, blue; tube 1-5 mm; lobes 3-5, ovate or elliptic, acute, 1-5 mm; capsules obconical, 2-3-celled, 3-6 mm.

Open grasslands and forest edges, in rocky situations, 100-1500 m; fl. & fr.: May-Nov.; Dawki, Raliang.

### 83. ERICACEAE

- |  |                         |
|--|-------------------------|
| 1a. Ovary superior or nearly so; calyx free at anthesis; fruit a capsule.                                |                         |
| 2a. Corolla more than 2 cm long; filaments without appendages; capsules cylindrical to oblong ovoid. ... | <i>Rhododendron</i> 1   |
| 2b. Corolla less than 1 cm long; filaments with 2 horns at apex; capsules globose.                       |                         |
| 3a. Filaments straight; seeds wingless. ...  | <i>Lyonia</i> 2         |
| 3b. Filaments geniculate; seeds winged on a side. ...  | <i>Craibiodendron</i> 3 |
| 1b. Ovary inferior or nearly so; calyx partly connate with ovary at anthesis; fruit a berry.             |                         |
| 4a. Corolla long-tubular, more than 1.5 cm long. ...   | <i>Agapetes</i> 4       |
| 4b. Corolla short-campanulate, less than 0.8 cm long. ...  |                         |
| 5a. Inflorescences racemose, axillary.   | <i>Vaccinium</i> 5      |
| 5b. Inflorescences corymbose, arising from old wood.   | <i>Corallobotrys</i> 6  |

#### 1. RHODODENDRON L.

- |  |                         |
|--|-------------------------|
| 1a. Leaves 3-8 × 1-2 cm, with sessile round glandular scales beneath; corolla white, often tinged pink; filaments pubescent. ... | <i>R. iteophyllum</i> 1 |
| 1b. Leaves 10-15 × 3-5 cm, without glandular scales beneath; corolla reddish-pink; filaments pubescent. ...                      | <i>R. arboreum</i> 2    |

1. **Rhododendron iteophyllum** Hutch. in Notes R. Bot. Gard. Edinb. 12: 83. 1919; Fl. As. 3: 153. 1939. *R. formosum* Wall. var. *salicifolia* Clarke in Fl. Brit. Ind. 3: 473. 1882.

Shrubs, 1-2 m; young shoots densely scaly; leaves elliptic to lanceolate, narrowed at base, acute at apex, revolute at margins; flowers scented, 2-3 in terminal clusters; pedicels 6-8 mm, densely scaly; corolla 5-6 cm, white, tinged with pink; capsules straight, ± 1.5 cm.

Primary forests along edges of streams and other shaded places, 1000-1500 m; fl. & fr.: Apr.-Sept.; Jowai, Myntang Valley, Mynso.

2. **Rhododendron arboreum** Sm. Exot. Bot. 1: 9. t. 6. 1805; Fl. Brit. Ind. 3: 465. 1882; Fl. As. 3: 152. 1939.

Trees, 3 - 15 m; leaves oblong-lanceolate to oblong-oblancoate, narrowed and obtuse at base, acute at apex, recurved at margins, white or rusty brown-tomentose beneath; flowers 15 - 20 in terminal clusters; pedicels 7 - 8 mm; corolla tubular-campanulate, 4 - 5 cm deep scarlet-red with 5 black nectar pouches at base inside; capsules oblong-cylindric,  $\pm$  3 cm.

Primary forests in open and sparsely wooded slopes, 1400 - 1800 m; fl. & fr.: May-Sept.; Jowai, Thadlaskein, near Jowai.

## 2. LYONIA Nutt. *nom. cons.*

**Lyonia ovalifolia** (Wall.) Drude in Engler & Prantl, Pflanzenfam. 4(1): 44. 1891. *Andromeda ovalifolia* Wall. in Asiat. Res. 13: 391. 1820. *Pieris ovalifolia* (Wall.) D. Don in Edinb. Phil. J. 17: 159. 1834; Fl. Brit. Ind. 3: 460. 1882; Fl. As. 3: 150. 1939.

Shrubs or trees, 1 - 10 m; leaves ovate, oblong-ovate to elliptic, acute, rounded or subacute at base, acute to short-acuminate, 4 - 16 x 2 - 10 cm; lateral nerves 6 - 12 pairs; racemes axillary or terminal, simple or rarely with a few branches, 3 - 15 cm; pedicels 3 - 8 mm; corolla ovoid, 7 - 11 mm, white, pubescent outside; filaments 2-horned at apex; capsules globose,  $\pm$  4 mm diam.; seeds many, linear-oblong.

- 1a. Trees or large shrubs, 4-10 m; leaves ovate or oblong-ovate, rounded or subcordate at base, 8-16 x 5-10 cm; racemes 8-15 cm long; corolla 9-11 mm. ... var. *ovalifolia* 1
- 1b. Shrubs, 1-3 m; leaves elliptic, oblong-elliptic, rounded or acute at base, 4-10 x 2-5 cm; racemes 3-9 cm long; corolla 7-8 mm long. ... var. *elliptica* 2

### 1. var. **ovalifolia**

Primary and secondary forests, 1000 - 1500 m; fl. & fr.: May-Feb.; Jowai, Khongsnong, Raliang, Raliang-Garampani.

2. var. **elliptica** (S. & Z.) Hand.-Mazz. Symb. Sin. 7: 788. 1936. *Andromeda elliptica* S. & Z. in Abh. Koen. Bay, Akad. Wiss. 4(3): 126. 1846.

Open and partially shaded slopes in pine and secondary forests, 1200 - 1800 m; fl. & fr.: May-Oct.; Jowai, Nartiang.

## 3. CRAIBIODENDRON W. W. Sm.

**Craibiodendron mannii** W. W. Sm. in Notes Roy. Bot. Gard. Edinb. 24: 159. 1912.

Small trees; leaves narrowly ovate to elliptic, narrowed at both ends, acuminate, entire, 6.5 - 10.0 × 2.0 - 3.0; midrib grooved above; lateral nerves faint; racemose panicles terminal, 6 - 12 cm spread. Flower buds conical; calyx segments 5, ovate; corolla somewhat fleshy, campanulate, 5-lobed; stamens 10; filaments geniculate below anther, 2-horned at apex; ovary globose. Capsules depressed globose; seeds winged at one side.

Fl. & fr.: May-June; Jowai, *King's Collector*, s.n. CAL 266687 & 8.

#### 4. AGAPETES C. Don

- |  |                         |
|--|-------------------------|
| 1a. Leaves less than 1.5 cm long, obovate, obtuse; flowers solitary or paired. ...                                   | <i>A. obovata</i> 1     |
| 1b. Leaves more than 2 cm long, oblong-lanceolate, acute or acuminate; flowers many, corymbose.                      |                         |
| 2a. Corolla widely campanulate-infundibular, 1.0—1.5 cm diam. at mouth. ...  | <i>A. campanulata</i> 2 |
| 2b. Corolla not widely campanulate, less than 1 cm diam. at mouth.   |                         |
| 3a. Corolla distinctly curved or oblique at apex.  |                         |
| 4a. Corolla divided half-way down into linear lobes. ...   | <i>A. lobbi</i> 3       |
| 4b. Corolla shortly divided into triangular lobes. ...   | <i>A. setigera</i> 4    |
| 3b. Corolla quite straight at apex.  |                         |
| 5a. Anther-beaks spurred at back.  |                         |
| 6a. Leaves abruptly contracted into a petiole; corolla 3—6 cm long, ventricose. ...                                  | <i>A. variegata</i> 5   |
| 6b. Leaves gradually narrowed into a petiole; corolla 2.0—2.5 cm long, narrowly cylindrical. ...                     | <i>A. odontocera</i> 6  |
| 5b. Anther-beaks without spurs.  |                         |
| 7a. Leaves 3.0—5.5 cm wide; corymbs puberulous or pubescent; corolla more than 1.5 cm long. ...                      | <i>A. affinis</i> 7     |
| 7b. Leaves 0.8—2.0 cm wide; corymbs glabrous; corolla less than 1.3 cm long.   |                         |
| 8a. Peduncles less than 8 mm long; pedicels less than 1 cm long; calyx-lobes lanceolate; corolla ± 1.5 cm long. ...  | <i>A. salicifolia</i> 8 |
| 8b. Peduncles more than 12 mm long; pedicels more than 1.2 cm long; calyx lobes triangular; corolla ± 2 cm long. ... | <i>A. saligna</i> 9     |

1. **Agapetes obovata** (Wt.) Hook. f. in Benth. & Hook. f. Gen. Pl. 2: 572. 1876; Fl. Brit. Ind. 3: 447. 1881; Fl. As. 3: 137. 1889. *Vaccinium obovatum* Wt. Ic. Pl. Ind. Or. 4(1): 5. t. 1193. 1848.

Bushy shrubs; young shoots pubescent; leaves scattered, obovate, cuneate at base, acute to obtuse, 8 - 10 × 3 - 6 mm; petioles up to 3 mm; peduncles 12 - 18 mm, scattered among leaves; pedicels filiform, 7 - 9 mm; corolla tubular-campanulate, 5 - 6 mm, dark brown; filaments pubescent; anther-beaks spurred; fruits globose, 6 - 7 mm diam.

Primary forests, on trees and rocks, 200 - 1200 m; fl. & fr.: Aug.-May; Dawki.

2. **Agapetes campanulata** (Kurz) Clarke in Fl. Brit. Ind. 3: 449. 1882. *Vaccinium campanulatum* Kurz in J. As. Soc. Beng. 42(2): 85. 1873.

Bushy undershrubs, 10 - 35 cm; branches thick, glabrous; leaves pseudo-verticillate; elliptic-lanceolate, cuneate at base, acute to acuminate, 8 - 15 × 3 - 5 cm; corymbs on leafless branches; peduncles up to 6 mm; pedicels 1.5 - 1.8 cm; calyx 2 - 3 mm; corolla widely campanulate, 1.5 - 2.0 cm, deep scarlet red; filaments pubescent; anther-beaks spurred at base on back.

Primary forests, 1200 - 1600 m; fl. & fr.: Apr.-Oct.; Panglo Woods, Jaintia Hills, *G. Mann* 743.

3. **Agapetes lobbii** Clarke in Fl. Brit. Ind. 3: 448. 1881; Fl. As. 3: 136. 1939. *A. racemosa* Kanjilal in Fl. As. 3: 139. 1939.

Bushy shrubs; branches terete, lenticellate; leaves scattered, lanceolate, narrowed at base, caudate-acuminate, 7 - 12 × 1.5 - 2.5 cm; corymbs on leafless branches; peduncles 25 - 35 mm; pedicels 10 - 12 mm; calyx 5 - 6 mm; corolla narrow-tubular, curved at apex, 25-30 mm, crimson-red; lobes ± 15 mm, linear-lanceolate.

Primary forests, 1000 - 1600 m; fl. & fr.: Nov.-May; Laskein, near Raliang.

4. **Agapetes setigera** G. Don, Gen. Syst. 3: 862. 1834; Fl. Brit. Ind. 3: 443. 1881; Fl. As. 3: 133. 1939.

Shrubs, 1 - 3 m, with tuberous base; leaves pseudo-verticillate, elliptic-lanceolate to obovate-lanceolate, rounded or acute at base, acute, 8 - 15 × 2 - 6 cm; corymbs axillary; peduncles 1.5 - 2.0 cm; pedicels 1.5 - 2.0 cm; corolla tubular, curved at apex, 2.0 - 2.2 cm, scarlet-red; filaments glabrous; connective puberulous; anther-beaks not spurred.

Primary forests, 500 - 1200 m; fl. & fr.: Sept.-July; Dawki, Khleihriat-Sonapur.

5. **Agapetes variegata** (Roxb.) G. Don, Gen. Syst. 3: 862. 1834; Fl. Brit. Ind. 3: 446. 1881; Fl. As. 3: 136. 1939. *Ceratostema variegatum* Roxb. Fl. Ind. 2: 413. 1832.

Shrubs; stems yellowish; leaves scattered, elliptic-lanceolate, narrowed at base, acute to acuminate, 8 - 20 × 2 - 5 cm; corymbs fasciculate on leafless branches; peduncles up to 5 mm; pedicels 1.5 - 2.5 cm; corolla tubular, 3 - 5 cm; pinkish-red, with many V-shaped transverse bands of purple-red; fruits red to purple-black.

Primary forests, 100 - 1500 m; fl. & fr.: Nov.-Mar.; Garampani, Jarain, Jowai.



6. **Agapetes odonocera** (Wt.) Hook. f. in Benth. & Hook. f. Gen. Pl. 2: 571. 1876; *Vaccinium odonocerum* Wt. Ic. Pl. Ind. Or. 4(1): 4. t. 1187. 1848.

Shrubs with tuberous base; branches bluntly angled; leaves rarely pseudo-verticillate, elliptic-lanceolate, cuneate at base, acuminate, 9-16 × 2-4 cm; corymbs fasciculate; peduncles 1-2 mm; pedicels ± 1.5 cm; calyx-lobes 2-3 mm; corolla pentagonal-cylindric, 2.0-2.3 cm, pink with wavy purple lines; lobes subulate, 5-6 mm.

Primary forests, 500-1200 m; fl. & fr.: Mar.-Oct.; Jaintia Hills, *G. Mann s. n.*

7. **Agapetes affinis** (Griff.) Air-Shaw in Kew Bull. 13: 473. 1959. *Thibaudia affinis* Griff. Itin. Notes (Posth. Papers, 2): 84, no. 1218. 1848. *T. glabra* Griff. Ic. Pl. Asiat. t. 514. 1854. *A. glabra* (Griff.) Clarke in Fl. Brit. Ind. 3: 444. 1881; Fl. As. 3: 134. 1939.

Shrubs; branches terete, glabrous or black-puberulous; leaves pseudo-verticillate, elliptic-oblong, ovate-lanceolate, rounded or subcordate at base, acute, 6-14 × 3-6 cm; corymbs axillary or from leafless branches; peduncles 3-4 cm; pedicels 1.5-2.0 cm; calyx purplish-red; corolla ± 1.5 cm, crimson-red.

Primary forests, 1000-1600 m; fl. & fr.: July-Feb.; Jarain, Jowai.

8. **Agapetes salicifolia** Clarke in Fl. Brit. Ind. 3: 445. 1881; Fl. As. 3: 134. 1939.

Glabrous shrubs; branches obscurely angular; leaves pseudo-verticillate, linear-lanceolate or elliptic-lanceolate, cuneate at base, acuminate, 6-12 × 1.5-2.0 cm; corymbs fasciated on leafless branches; peduncles 3-8 mm; pedicels 0.8-1.0 cm; corolla ± 1.5 cm, dark red.

Primary forests, 1000-1500 m; fl. & fr.: Jan.-Oct.; Shangpung. *U. N. Kanjilal* 761P.

9. **Agapetes saligna** (Hook. f.) Hook. f. in Benth. & Hook. f. Gen. Pl. 2: 571. 1876; Fl. Brit. Ind. 3: 444. 1881. *Vaccinium salignum* Hook. f. Ill. Himal. Pl. t. 15. f. A. 1855.

Shrubs; branches terete; leaves scattered or subverticillate, lanceolate, cuneate or acute at base, acuminate, revolute at margins, 6-15 × 2-4 cm; midrib and nerves channelled above, ridged beneath; petioles 2-4 mm; corymbs glabrous, lateral on leafless portion of branches; peduncles 12-18 mm; pedicels 12-15 mm; corolla erect, widened at middle, 1.8-2.2 cm, scarlet-red; fruits red.

Primary forests, 1000 - 1400 m; fl. & fr.: Oct.-Mar.; Jarain, *Bala-krishnan* 49821.

#### 4. VACCINIUM L.

- 1a. Leaves pseudo-verticillate; inflorescences simple racemes. .. *V. vacciniaceum* 1  
 1b. Leaves scattered; inflorescences panicle of racemes.  
 2a. Leaves more than 4 cm long; bracts subulate, caducous, less than 2 mm long; anthers spurred at back. ... *V. sprengelii* 2  
 2b. Leaves less than 3 cm long; bracts foliaceous, persistent, up to 1 cm long; anthers not spurred at back. ... *V. griffithianum* 3

1. **Vaccinium vacciniaceum** (Roxb.) Sleum. in Engl. Bot. Jahrb. 71: 479. 1941. *Ceratostemma vacciniaceum* Roxb. Fl. Ind. 2: 412. 1832. *Agapetes serrata* G. Don, Gen. Syst. 3: 862. 1834. *Vaccinium serratum* (G. Don) Wt. Ic. Pl. Ind. Or. 4(1): 4. t. 1184. 1848; Fl. Brit. Ind. 3: 452. 1882.

Shrubs, 1-3 m; leaves crowded at ends of branches, lanceolate, acute at both ends, serrate, 4-10 × 1-2 cm; racemes terminal or subterminal, 3-6 cm; pedicels 6-8 mm; calyx-lobes triangular, acute; corolla ovoid-oblong, 8-9 mm, greenish-white; berries globose, ± 8 mm diam.

Primary forests, in shaded places on slopes and ravines, 1200-1800 m; Fl. & fr.: Apr.-Aug.; Jowai, Shangdain forests, Shangpung.

2. **Vaccinium sprengelii** (G. Don) Rehd. Man. Cult. Trees & Shrubs ed. 2. 754. 1940. *Agapetes sprengelii* G. Don, Gen. Syst. 3: 862. 1834. *V. donnianum* Wt. Ic. Pl. Ind. Or. 4(1): 5. t. 1191. 1850; Fl. Brit. Ind. 3: 453. 1882; Fl. As. 3: 143. 1939.

Trees or large shrubs, 3-10 m; leaves ovate-lanceolate or elliptic, acute to acuminate, cuneate at base, distantly serrulate, 5-10 × 1-3 cm; lateral nerves 5-7 pairs; panicles 8-15 × 5-9 cm; pedicels 9-10 mm; calyx-lobes subulate-triangular; corolla tubular-urceolate, white or red, 7-8 × 4-5 mm; berries subglobose, 6-7 mm diam.

Primary forests, 1000-1600 m; fl. & fr.: Apr.-Dec.; Jowai, Khleihriat, Khongsong, Nartiang, Nartiang-Nongbah, Thadlaskein, near Jowai.

3. **Vaccinium griffithianum** Wt. Ic. Pl. Ind. Or. 4(1): 5. t. 1192. 1848; Fl. Brit. Ind. 3: 454. 1882; Fl. As. 3: 144. 1939.

Shrubs, 1-2 m; young shoots pubescent; leaves scattered, oblong or elliptic-lanceolate, acute or rounded at base, acute, serrulate at margins, 2-4 × 1-2 cm, sparsely pubescent beneath; racemes 5-8 cm; bracts ovate, foliaceous, 5-15 × 3-8 mm; calyx-lobes ovate-triangular; corolla ovoid, obscurely ridged, 5-6 mm, white; berries globose, ± 3.5 mm diam.

Primary forests, along streams, 1300-1700 m; fl. & fr.: Apr.-Sept.; Jowai.

#### 5. CORALLOBOTRYS Hook. f.

**Corallobotrys acuminata** (G. Don) Hook. f. in Benth. & Hook. f. Gen. Pl. 2: 575. 1876; Fl. Brit. Ind. 3: 455. 1882; Fl. As. 3: 145. 1939. *Agapetes acuminata* G. Don, Gen. Syst. 3: 862. 1834.

Shrubs, 1-2 m, often epiphytic; leaves elliptic-lanceolate, cuneate at base, acuminate, obtusely serrate, 7-10 × 1-3 cm; flowers in corymbs on old wood or leaf-axils; pedicels ± 1 cm; calyx lobes triangular; corolla campanulate, ± 7 mm, scarlet red, glandular-pubescent; berries globose, 3-4 mm diam.

Primary forests, in shaded places, 300-1000 m; fl. & fr.: Apr.-Oct.; Nongthala.

### 84. PRIMULACEAE

#### LYSIMACHIA L.

- |   |                           |
|---|---------------------------|
| 1a. Plants glabrous; leaves alternate; capsules dehiscing irregularly.          | <i>L. laxa</i> 1          |
| 1b. Plants hirsute; leaves opposite or ternate; capsules dehiscing by 5 valves. | ... <i>L. deltoidea</i> 2 |

1. **Lysimachia laxa** Baudo in Ann. Sc. Nat. Paris 2: 20: 347. 1843. *L. ramosa* Duby in DC. Prodr. 8: 65. 1844; Fl. Brit. Ind. 3: 503. 1882; Fl. As. 3: 160. 1939.

Perennial herbs, 0.5-1.5 m, erect or decumbent; branches winged; leaves lanceolate, acute at both ends, 3-10 × 0.5-2.0 cm; flowers solitary, axillary; pedicels 2-5 cm, decurved and straightening in fruits; corolla yellow; capsules globose, ± 7 mm diam.

Roadsides, grasslands and other open and shaded places, 1000-1800 m; fl. & fr.: May-Dec.; Jarain, Jowai.

2. **Lysimachia deltoidea** Wt. Ill. Ind. Bot. 2: 137. t. 144. 1831; Fl. Brit. Ind. 3: 505. 1882.

Herbs, 5-15 cm, branched from base; leaves ovate or oblong-ovate acute or rounded at base, acute or obtuse, 0.5-2.5 × 0.4-2.0 cm; flowers axillary, solitary; pedicels 5-10 mm; corolla yellow, ± 8 mm across; capsules oblong or subglobose, ± 6 mm diam.

Open grasslands and pine forests, 1000 - 1800 m; fl. & fr.: June-Jan.; Jarain, Shangpung.

85. MYRSINACEAE

- 1a. Calyx fleshy; ovary semi-inferior, partially adnate to calyx; fruits many-seeded, enclosed by calyx. ... *Maesa* 1
- 1b. Calyx membranous; ovary superior, free from calyx; fruits 1-seeded, not enclosed by calyx.
  - 2a. Corolla-lobes imbricate or valvate in bud.
    - 3a. Trees or erect shrubs; flowers in fascicles; corolla-lobes united at base. ... *Myrsine* 2
    - 3b. Lianas or scandent shrubs; flowers racemed or paniced; corolla-lobes free almost to base. ... *Embelia* 3
  - 2b. Corolla-lobes contorted in bud.
    - 4a. Filaments as long as anthers; anthers united. ... *Amblyanthes* 4
    - 4b. Filaments absent or shorter than anthers; anthers free.
      - 5a. Corolla-lobes twisted to right; ovules in many-rows. ... *Ardisia* 5
      - 5b. Corolla-lobes twisted to left; ovules in one row. ... *Antistrophe* 6

1. MAESA Forsk.

- 1a. Leaves entire at margins. ... *M. ramentacea* 1
- 1b. Leaves serrate-dentate at margins.
  - 2a. Plants glabrous. ... *M. indica* 2
  - 2b. Plants with branchlets pubescent and nerves pilose beneath. ... *M. tetrandra* 3

1. **Maesa ramentacea** Wall. in Roxb. Fl. Ind. 2: 230. 1824; Fl. Brit. Ind. 3: 508. 1882; Fl. As. 3: 165. 1939.

Shrubs or trees, 5 - 10 m; leaves ovate-lanceolate, rounded or obtuse at base, acuminate or acute, 8 - 20 × 3 - 8 cm, glabrous; lateral nerves 6 - 10 pairs; petioles ± 1 cm; racemes in axillary simple or branched dense-flowered clusters; fruits globose, 2 - 3 mm diam., dull brown.

Primary forests, in shaded places, 100 - 1000 m; fl. & fr.: Jan.-Dec.; Dawki.

2. **Maesa indica** (Roxb.) Wall. in Roxb. Fl. Ind. 2: 230. in nota. 1824; Fl. Brit. Ind. 3: 509. 1882; Fl. As. 3: 163. 1939. *Baeobotrya indica* Roxb. Fl. Ind. 1: 557. 1832. 'Dieng-pyllein-dakha'.

Shrubs or trees, 5 - 10 m; leaves ovate-elliptic to oblong-lanceolate, acute or cuneate at base, acute or acuminate, 10 - 18 × 3 - 6 cm; lateral nerves 6 - 12 pairs; petioles 1 - 2 cm; racemes axillary, simple or branched, dense-flowered; fruits globose, 2 - 3 mm diam., cream-yellow to dull brown.

Primary forests, 1000 - 1700 m; fl. & fr.: Dec.-Aug.; Jarain, Jowai, Raliang.

3. **Maesa tetrandra** (Roxb.) DC. Prodr. 8: 82. 1844. *Baeobotrya tetrandra* Roxb. Fl. Ind. 2: 233. 1824. *B. muscosa* Bl. Bijdr. 666. 1826. *M. muscosa* (Bl.) DC. in Trans. Linn. Soc. 17: 133. 1834; Fl. Brit. Ind. 3: 511. 1882.

Shrubs or small trees, 1-5 m; branchlets densely pubescent; leaves oblong-lanceolate, acute or obtuse at base, long-acuminate, dentate-serrate at margins, 8-13 × 3-5 cm; nerves patently long-hairy beneath; petioles 1.0-1.5 cm long, villous-hairy; racemes axillary, simple or branched, pilose, 1-5 cm; corolla-lobes ovate, shorter than the tube.

Primary forests, in shaded moist places, 1200-1800 m; fl. & fr.: July-Mar.; Jowai.

## 2. MYRSINE L.

- |  |                         |
|--|-------------------------|
| 1a. Leaves obtuse or subacute, entire, recurved at margins; filaments absent; style-branches oblong, erect. ...                                    | <i>M. capitellata</i> 1 |
| 1b. Leaves acute or acuminate, serrate towards apex, flat at margins; filaments present, distinct; style-branches ovate-spathulate, spreading. ... | <i>M. semiserrata</i> 2 |

1. **Myrsine capitellata** Wall. in Roxb. Fl. Ind. 2: 795. 1824; Fl. Brit. Ind. 3: 512. 1882; Fl. As. 3: 167. 1939. '*Dieng-shing*'.

Shrubs or small trees, 5-15 m; leaves lanceolate or ovate to oblanceolate, cuneate or acute at base, subacute or obtuse, 4-10 × 1-3 cm; midrib prominently ridged beneath; petioles 5-10 mm; flowers fascicled in axils of leaves or fallen leaves; pedicels 5-8 mm; calyx-lobes ciliate; corolla reddish-purple; fruits depressed-globose, 3-4 mm diam., purple.

Primary forests, 800-1500 m; fl. & fr.: Dec.-Aug.; Khleihriat.

2. **Myrsine semiserrata** Wall. in Roxb. Fl. Ind. 2: 293. 1824; Fl. Brit. Ind. 3: 511. 1882; Fl. As. 3: 166. 1939. '*Dieng-ching*'.

Shrubs or small trees, 2-10 m; leaves elliptic-lanceolate, acute or cuneate at base, acuminate, 6-15 × 1.5-3.5 cm; petioles 3-5 mm; flowers in axillary fascicles; pedicels slender, 4-10 mm; corolla reddish-green; anthers scarlet-red; styles densely hairy; fruits globose, 5-7 mm diam., purplish-pink.

Primary forests, 1000-1700 m; fl. & fr.: Sept.-May; Jarain, Jowai, Nartiang, Shangpung.

3. *EMBELIA* Burin. f. *nom. cons.*

- 1a. Inflorescences paniculate.  
 2a. Leaves gland-dotted beneath near margins, rounded or obtuse at base; panicles axillary, glabrous; pedicels angular. ... *E. floribunda* 1  
 2b. Leaves not gland-dotted beneath; cuneate at base; panicles terminal, greyish or tawny-velvety or puberulous; pedicels terete. ... *E. ribes* 2
- 1b. Inflorescences simple racemose, corymbose or subumbellate.  
 3a. Leaves up to 3 cm long; inflorescences corymbose or subumbellate, up to 1 cm long. ... *E. parviflora* 3  
 3b. Leaves more than 5 cm long; inflorescences racemose, more than 1.5 cm long.  
 4a. Leaves elliptic or elliptic-lanceolate; petals twisted in bud. ... *E. vestita* 4  
 4b. Leaves obovate or elliptic-obovate; petals imbricate in bud. ... *E. subcoriacea* 5

1. ***Embelia floribunda*** Wall. in Roxb. Fl. Ind. 2: 291. 1824; Fl. Brit. Ind. 3: 514. 1882; Fl. As. 3: 171. 1939. '*Jajao-raiso*'.

Large scandent shrubs; leaves lanceolate, rounded or obtuse at base, acuminate, 5-16 × 2-4 cm; lateral nerves many, indistinct; petioles 5-15 mm; panicles glabrescent or glabrous; pedicels 2.0-2.5 mm; corolla lobes oblong or ovate, pubescent inside; fruits greenish to pinkish-black.

Primary forests, 1000-1700 m; fl. & fr.: Oct.-Jan.; Jarain, Khleihriat, Jowai, Shangpung.

2. ***Embelia ribes*** Burm. f. Fl. Ind. 62, t. 23. 1768; Fl. Brit. Ind. 3: 513. 1882; Fl. As. 3: 169. 1939. '*Jaodain*'.

Scandent shrubs; leaves ovate or elliptic-lanceolate, acute or cuneate at base, acute to acuminate, 3-10 × 1.5-5.0 cm; lateral nerves distinctly reticulate; petioles 5-12 mm; panicles greyish-pubescent; pedicels 1.5-2.0 mm; corolla lobes elliptic, pubescent inside and outside; fruits 2.5-3.5 mm diam., black.

Primary forests, 100-1500 m; fl. & fr.: Jan.-Mar.; Shangdain, Schka-Dawki, Umtapoh.

3. ***Embelia parviflora*** DC. in Trans. Linn. Soc. 17: 130. 1834; Fl. Brit. Ind. 3: 515. 1882; Fl. As. 3: 170. 1939. '*Tille-la-maksiar*'.

Scandent shrubs; branches ferruginous-tomentose; leaves ovate to elliptic-oblong, rounded or truncate at base, acute or obtuse, 2-3 × 0.7-1.2 cm, black-dotted beneath; midribs prominent beneath, grooved above; racemes up to 1 cm, ferruginous-pubescent; corolla-lobes oblong-rounded; fruits globose, 3-5 mm diam., orange-red, puberulous.

Primary forests, 1000-1500 m; fl. & fr.: Jan.-Dec.; Jowai, Mynso, Shangpung, Sutnga.

4. **Embelia vestita** Roxb. Fl. Ind. 2: 288. 1824; Fl. Brit. Ind. 3: 517. 1882; Fl. As. 3: 172. 1939.

Scandent shrubs; leaves oblong-lanceolate to elliptic-lanceolate, acute or obtuse at base, acute or acuminate, serrulate, 3-9 × 1.5-3.0 cm; lateral nerves slender, many; petioles 6-8 mm; racemes 1-2 cm, arising from axils of fallen leaves, ferruginous-puberulous; fruits globose, ± 3 mm diam.

Primary forests, 500-1500 m; fl. & fr.: Mar.-Nov.; Jowai.

5. **Embelia subcoriacea** (Clarke) Mez in Engler, Pflanzenr. 9: 329. 1902; Fl. As. 3: 173. 1939. *E. nagushia* D. Don var. *subcoriacea* Clarke in Fl. Brit. Ind. 3: 516. 1882. '*Jermai-masi*'.

Scandent or scandent shrubs; leaves obovate to oblanceolate or oblong-elliptic, cuneate at base, acute to short-acuminate, entire, 8-13 × 4-6 cm; lateral nerves many, indistinct; petioles 6-10 mm; racemes 3-5 mm, arising from old wood; corolla pale green; fruits depressed-globose, 8-10 mm diam., reddish.

Primary forests, 100-1800 m; fl. & fr.: May-Dec.; Jarain, Jowai.

#### 4. AMBLYANTHUS DC.

**Amblyanthus glandulosus** (Roxb.) DC. in Ann. Sc. Nat. ser. 2. 16: 83. t. 6. 1841; Fl. Brit. Ind. 3: 533. 1882; Fl. As. 3: 187. 1939. *Ardisia glandulosa* Roxb. Fl. Ind. 2: 276. 1824.

Shrubs, 1-2 m; leaves elliptic-lanceolate, acute at base, acuminate, shallowly crenate, 10-15 × 2-4 cm, gland-dotted along margins beneath; petioles 5-15 mm; inflorescences axillary, subumbellate or subcorymbose; peduncles 5-6 mm; pedicels 5-7 mm; fruits globose, 7-8 mm diam., obscurely striate.

Primary forests, 100-1000 m; fl. & fr.: May-Dec.; Dawki.

#### 5. ARDISIA Sw. *nom. cons.*

- |   |     |                           |
|---|-----|---------------------------|
| 1a. Leaves conspicuously and acutely serrate.   | ... | <i>A. odontophylla</i> 1  |
| 1b. Leaves entire, undulate or crenulate.   |     |                           |
| 2a. Inflorescences racemose or corymbose, or umbellate.   |     |                           |
| 3a. Inflorescences racemose or corymbose.   |     |                           |
| 4a. Leaves crispate-crenulate, more than 4 cm wide; lateral nerves more than 18 pairs.                    | ... | <i>A. virens</i> 2        |
| 4b. Leaves entire or crenulate, less than 3.5 cm wide; lateral nerves less than 14 pairs.                 | ... | <i>A. rhynchophylla</i> 3 |
| 3b. Inflorescences umbellate.   |     |                           |
| 5a. Leaves undulate-crispate, gland-dotted beneath at margins; anthers glandular-punctate on dorsal side. |     | <i>A. crispa</i> 4        |
| 5b. Leaves entire, not gland-dotted beneath; anthers not glandular-punctate.                              | ... | <i>A. thomsonii</i> 5     |

- 2b. Inflorescences paniculate.
- 6a. Leaves more than 20 × 6 cm ; panicles terminal, supported by false whorl of leaves. ... *A. paniculata* 6
- 6b. Leaves less than 18 × 3 cm ; panicles axillary or rarely terminal, not supported by false whorl of leaves.
- 7a. Leaves serrulate ; sepals and petals not glandular-punctate ; fruits pentagonal, not striated. ... *A. floribunda* 7
- 7b. Leaves entire ; sepals and petals distinctly glandular-punctate ; fruits vertically striated.
- 8a. Inflorescences in large terminal panicles ; sepals linear-ligulate, rounded at apex ; pedicels less than 1 cm long. ... *A. griffithii* 8
- 8b. Inflorescences in axillary racemed corymbs ; sepals ovate-triangular, acute at apex ; pedicels more than 1.5 cm long. ... *A. pedunculosa* 9

1. ***Ardisia odontophylla*** DC. in Trans. Linn. Soc. 17: 125. t. 6. 1834; Fl. Brit. Ind. 3: 525. 1882; Fl. As. 3: 183. 1939.

Shrubs, 1-2 m; leaves elliptic-oblong or oblanceolate, acute at base and apex, sharply and finely serrate, 8-16 × 3-8 cm; lateral nerves 12-14 pairs; petioles 2-4 cm; inflorescences few-flowered racemes; pedicels 5-10 mm; corolla crimson-red; fruits globose, ± 6 mm diam., scarlet-red.

Primary forests, 1200-1800 m; fl. & fr.: June-Feb.; Jowai.

2. ***Ardisia virens*** Kurz, For. Fl. Brit. Burma 2: 575. 1877 & in J. As. Soc. Beng. 46 (2): 226. 1877; Fl. Brit. Ind. 3: 524. 1882; Fl. As. 3: 183. 1939.

Shrubs or small trees, 2-6 m; branches spreading; leaves elliptic to oblong-oblanceolate, cuneate or acute at base, acute to short-acuminate, crispate-crenulate, 15-20 × 4-8 cm; lateral nerves numerous; inflorescences simple umbels, terminal or subterminal pedicels ± 2 cm; corolla pale yellow, black-dotted; fruits depressed-globose, 7-8 mm diam., black-dotted.

Primary forests, 500-1200 m; fl. & fr.: June-Dec.; Jarain.

3. ***Ardisia rhynchophylla*** Clarke in Fl. Brit. Ind. 3: 529. 1882; Fl. As. 3: 177. 1939.

Shrubs, 1-2 m; leaves elliptic, lanceolate or obovate to oblanceolate, acute or cuneate at base, acute to acuminate, distantly dentate, 10-15 × 2-4 cm; lateral nerves 12-14 pairs; inflorescences axillary, lax-flowered racemes, 2-4 cm; pedicels 4-8 mm; corolla pale greenish yellow, densely punctate; fruits globose, 5-6 mm diam., yellow.

Primary forests, in moist shaded localities, 1200-1800 m; fl. & fr.: May-Jan.; Panglo Wood.

4. ***Ardisia crispa*** (Thunb.) DC. in Trans. Linn. Soc. 17: 124. 1834.



*Bladhia crispa* Thunb. Fl. Jap. 97. 1784. *A. undulata* Clarke in Fl. Brit. Ind. 3: 524. 1882.

Shrubs, 1-2 m; leaves elliptic-lanceolate, cuneate at base, acuminate, crispate-crenulate at margins, 8-12 × 2-4 cm, prominently gland-dotted beneath near margins; inflorescences axillary, simple, few-flowered umbels; pedicels 7-8 mm; flowers 7-8 mm across; corolla white or yellow; black-dotted, fruits subglobose, 7-8 mm diam.

Primary forests, 200-1000 m; fl. & fr.: Mar.-Dec.; Syndai.

5. ***Ardisia thomsonii*** (Clarke) Mez in Engler, Pflanzenr. 9: 133. 1902. *A. khasiana* var. *thomsonii* Clarke in Fl. Brit. Ind. 3: 527. 1882; Fl. As. 3: 177. 1939.

Shrubs, 1-2 m; leaves obovate to oblanceolate, cuneate at base, acute, 8-12 × 4-6 cm; lateral nerves 12-16 pairs; petioles 8-12 mm; inflorescences axillary or in axils of fallen leaves, simple umbels or condensed corymbs; peduncles 1.5-2.5 cm; pedicels 10-12 mm; corolla pale yellow, punctate; fruits depressed-globose, 6-8 mm diam., red.

Primary forests, 100-1200 m; fl. & fr.: May-Jan.; Dawki, Myntang Valley, Mynso, Sutnga.

6. ***Ardisia paniculata*** Roxb. Fl. Ind. 1: 580. 1832; Fl. Brit. Ind. 3: 519. 1882; Fl. As. 3: 181. 1939.

Shrubs or small trees, 1-4 m; stems unbranched below with few horizontal branches at apex; leaves alternate below, whorled at apex, oblanceolate, cuneate at base, acute, 20-25 × 6-8 mm; inflorescences terminal, many-flowered panicles; corolla ± 6 mm, red or pinkish; fruits globose, longitudinally striate, 5-6 mm diam.

Primary forests, 100-600 m; fl. & fr.: Mar.-Dec.; Dawki.

7. ***Ardisia floribunda*** Wall. in Roxb. Fl. Ind. 2: 272. 1824; Fl. As. 3: 179. 1939. *Ardisia neriifolia* DC. in Trans. Linn. Soc. 17: 118. t. 8. 1834; Fl. Brit. Ind. 3: 522. 1882. '*Bhaujawa*'.

Shrubs, 1-2 m; leaves elliptic-lanceolate to oblanceolate, acute to cuneate at base, acute to acuminate, serrulate at margins, 10-30 × 4-8 cm; inflorescences paniculate, axillary or terminal; peduncles 6-10 cm; pedicels 3-4 mm; corolla pale purple; fruits depressed-globose, 3-angled, brownish-green, red-dotted.

Primary forests, 1000-1600 m; fl. & fr.: May-Nov.; Jarain, Jowai.

8. **Ardisia griffithii** Clarke in Fl. Brit. Ind. 3: 523. 1862; Fl. As. 3: 180. 1939. '*Phylleng-dakha*'.

Shrubs or small trees; leaves ovate-oblong to oblanceolate, cuneate at base, subacute, 13-20 × 3-5 cm, cinnamon-coloured beneath; inflorescences paniculate, axillary or terminal; corolla pale pink; fruits globose, striate, 5-6 mm diam., black.

Primary forests, 800-1600 m; fl. & fr.: May-Jan.; Jowai, Mynso.

9. **Ardisia pedunculosa** Wall. in Roxb. Fl. Ind. 2: 279. 1824; Fl. Brit. Ind. 3: 523. 1882; Fl. As. 3: 180. 1939.

Shrubs, 1-3 m; leaves narrow-lanceolate to oblong-lanceolate, cuneate, at base, acute to short-acuminate, distantly serrulate, 10-15 × 2-4 cm; mid-rib prominently ridged beneath; inflorescences subcorymbosely paniculate; peduncles 5-8 mm; pedicels 5-7 mm; corolla pale pink; fruits subglobose, 5-6 mm diam., black.

Primary forests, 1200-1600 m; fl. & fr.: Sept.-Mar.; Raliang.

#### 6. ANTISTROPHE DC.

**Antistrophe oxyantha** (DC.) DC. in Ann. Sc. Nat. ser. 2. 16: 84. 1841; Fl. Brit. Ind. 3: 532. 1882; Fl. As. 3: 187. 1939. *Ardisia oxyantha* DC. in Trans. Linn. Soc. 17: 121. 1834.

Shrubs, 1-3 m; leaves oblong or elliptic-lanceolate, acute or cuneate at base, acuminate, 10-15 × 2-4 cm, black-dotted above; lateral nerves 10-14 pairs; petioles 5-10 mm; inflorescences axillary, 2-5-flowered fascicles; pedicels ± 1 cm; corolla lobes lanceolate, gland-dotted; fruits subglobose, 6-7 mm diam.

Primary forests, 1000-1500 m; fl. & fr.: Mar.-Dec.; Sutnga.

#### 86. SAPOTACEAE

- |  |                      |
|--|----------------------|
| 1a. Lateral nerves straight; flowers solitary or fascicled in leaf-axils; ovary 4-5-celled; scar of seed-attachment lateral, oblong. ... | <i>Xantolis</i> 1    |
| 1b. Lateral nerves oblique; flowers in elongate racemes in leaf-axils; ovary 1-2-celled; scar of seed-attachment basal, circular. ...    | <i>Sarcosperma</i> 2 |

#### 1. XANTOLIS Raf.

- |  |                      |
|--|----------------------|
| 1a. Petioles glabrous; tertiary nerves transverse; corolla 7-10 mm long; fruits 4-5 cm long. ... | <i>X. hookeri</i> 1  |
| 1b. Petioles pubescent; tertiary nerves reticulate; corolla 4-8 mm long; fruits 2-3 cm long. ... | <i>X. assamica</i> 2 |

1. **Xantolis hookeri** (Clarke) van Royen in *Blumea* 8: 214. 1957. *Sideroxylon hookeri* Clarke in Fl. Brit. Ind. 3: 537. 1882; Fl. As. 3: 191. 1939. 'Dieng-sohphoshri'.

Trees, up to 12 m; leaves elliptic-oblong or subobovate, cuneate or acute at base, acute to acuminate, 8-15 × 2-6 cm; flowers solitary or in few-flowered clusters; pedicels 5-7 mm; corolla 7-10 mm; lobes ovate, 6-8 × 2-3 mm; fruits oblong or ellipsoid, 4-5 × 2-3 cm, 1-seeded, terminated by short persistent style.

Primary forests, 800-1200 m; fl. & fr.: Mar.-Feb.; Sutnga.

2. **Xantolis assamica** (Clarke) van Royen in *Blumea* 8: 230. 1957. *Sideroxylon assamicum* Clarke in Fl. Brit. Ind. 3: 537. 1882; Fl. As. 3: 192. 1939.

Trees up to 15 m; leaves elliptic-lanceolate, acute at base, subacute to obtusely acuminate, 5-12 × 2-5 cm; flowers in axillary clusters; pedicels 4-6 mm; corolla 4-8 mm; lobes lanceolate, obtuse; 3-4 × 1.0-1.5 mm; fruits subglobose, or ovoid, attenuate at base, crowned by persistent style, 2-3 × 0.8-1.5 cm, 1-2-seeded.

Primary forests, 1000-1700 m; fl. & fr.: Mar.-Dec.; Jowai.

## 2. SARCOSPERMA Hook. f.

- |  |     |                        |
|--|-----|------------------------|
| 1a. Leaves 16-20 × 4-6 cm, gland-pitted in nerve-axils; panicles and calyx pubescent.    | ... | <i>S. arboreum</i> 1   |
| 1b. Leaves 10-13 × 2-3 cm, not gland-pitted in nerve-axils; panicles and calyx glabrous. | ... | <i>S. griffithii</i> 2 |

1. **Sarcosperma arboreum** Clarke in Fl. Brit. Ind. 3: 535. 1882; Fl. As. 3: 193. 1939.

Trees, 15-25 m, with spreading crown; leaves oblong-lanceolate, acute at base, acute or acuminate, 16-20 × 4-6 cm; flowers in axillary 2-6 cm long racemes; corolla-lobes oblong; fruits ovoid, ± 2 × 1 cm, glaucous; seeds 1 or 2.

Primary forests, 100-1000 m; fl. & fr.: Jan.-Aug.; Dawki, Khongsong.

2. **Sarcosperma griffithii** Clarke in Fl. Brit. Ind. 3: 536. 1882; Fl. As. 8: 194. 1939. 'Dieng-jalytpai'.

Trees, 10-15 m; leaves lanceolate to elliptic-lanceolate, acute or cuneate at base, acute to acuminate, 10-13 × 2-3 cm; flowers in axillary 2-5 cm

long racemes; corolla lobes obovate; fruits oblong,  $\pm$  2.5 x 1.0 cm, reddish when ripe; seeds 2, plano-convex, brown.

Primary forests, 1200-1800 m; fl. & fr.: Nov.-July; Jowai, Raliang.

## 87. EBENACEAE

## DIOSPYROS L.

- |   |                        |
|---|------------------------|
| 1a. Stamens 12; ovary 4-celled; fruits 1.5—2.0 cm diam. ...   | <i>D. pilosula</i> 1   |
| 1b. Stamens 14 or more; ovary 8—10 celled; fruits more than 2 cm diam.  |                        |
| 2a. Corolla of male flowers glabrous; fruits more than 4 cm diam.   |                        |
| 3a. Leaves pubescent beneath, herbaceous; petioles semiterete; fruits shiny with a bloom. ...                           | <i>D. kaki</i> 2       |
| 3b. Leaves glabrous beneath, coriaceous; petioles grooved above; fruits with deciduous ferruginous scurf. ...           | <i>D. malabarica</i> 3 |
| 2b. Corolla of male flowers pubescent, at least at lobes; fruits less than 3.5 cm diam.                                 |                        |
| 4a. Petioles terete; stamens 14, glabrous; fruits 3.0—3.5 cm diam. ...  | <i>D. stricta</i> 4    |
| 4b. Petioles channelled or flat on upper side; stamens 16, pilose at back on connectives; fruits less than 2.5 cm diam. |                        |
| 5a. Leaves lanceolate; male flowers sessile. ...  | <i>D. lancifolia</i> 5 |
| 5b. Leaves oblong-ovate to obovate; male flowers pedicelled.  |                        |
| 6a. Leaves glabrous above; male flowers solitary; fruits villous. ...   | <i>D. undulata</i> 6   |
| 6b. Leaves puberulous and pubescent on nerves above; male flowers in short cymes; fruits glabrous. ...                  | <i>D. montana</i> 7    |

1. **Diospyros pilosula** (DC.) Hiern in Trans. Camb. Phil. Soc. 12: 188. 1873; Fl. Brit. Ind. 3: 554. 1882; Fl. As. 3: 205. 1939. *Gunisanthes pilosulus* DC. Prodr. 8: 220. 1844.

Trees, 10-15 m; leaves bifarious, elliptic or lanceolate, cuneate at base, acute or short-acuminate, 8-12 x 1-3 cm, hairy along midrib, glabrous otherwise; petioles terete; flowers solitary on stem below leaves; berries globose, reddish-brown.

Primary forests, 100-1000 m; fl. & fr.: Feb.-Aug.; Dawki.

2. **Diospyros kaki** L. f. Suppl. 439. 1781; Fl. Brit. Ind. 3: 555. 1882; Fl. As. 3: 200. 1939. 'Dieng-iong.'

Trees, 5-12 m; leaves ovate-elliptic or elliptic-lanceolate, acute or cuneate at base, obtusely acuminate, 5-20 x 2-8 cm, pubescent beneath; petioles semiterete; male flowers in 3-5-flowered cymes; corolla-tube yellow, glabrous;

female flowers solitary; corolla pubescent; berries pyriform, 5-6 cm diam., orange-yellow.

Primary forests, 1000-1500 m; fl. & fr.: Apr.-Dec.; Jarain, Jowai, Khongsnong, Mynso

3. **Diospyros malabarica** (Desr.) Kostel, Allg. Med. Pharm. Fl. 3: 1099. 1834. *Garcinia malabarica* Desr. in Lamk. Encycl. Meth. 3: 701. 1792. *D. embryopteris* Pers. Syn. 2: 624. 1807; Fl. Brit. Ind. 3: 556. 1882; Fl. As. 3: 201. 1939.

Trees, 5-20 m; leaves elliptic-oblong or oblong-lanceolate, obtuse or acute at base, acute or short-acuminate at apex, 6-25 × 2-6 cm; glabrous, coriaceous; male flowers in few-flowered 6-20 mm long cymes; corolla-tube glabrous; female flowers 1-5 together, subsessile or cymose; corolla appressed-pubescent; berries subglobose, 4-6 mm diam., orange-yellow.

Primary forests, 100-800 m; fl. & fr.: May-Apr.; Khongsnong.

4. **Diospyros stricta** Roxb. Fl. Ind. 2: 539. 1832; Fl. Brit. Ind. 3: 563. 1882; Fl. As. 3: 199. 1939.

Trees, 6-15 m; leaves elliptic-lanceolate, cuneate or acute at base, acuminate, 4-10 × 1-3 cm, hairy on nerves; petioles terete; male flowers in small clusters of 3-6; corolla salver-shaped; berries ovoid, 3.0-3.5 cm diam., orange.

Primary forests, 100-500 m; fl. & fr.: Oct.-May; Dawki.

5. **Diospyros lancifolia** Roxb. Fl. Ind. 2: 537. 1832 (as '*lanceaefolia*') Fl. Brit. Ind. 3: 562. 1882; Fl. As. 3: 203. 1939. '*Dieng-thang*'.

Trees, 10-18 m; leaves oblong-elliptic to ovate-lanceolate, rounded or obtuse at base, acuminate, 6-16 × 3-5 cm, glabrous; petioles grooved above; male flowers sessile, clustered; female flowers solitary, subsessile; berries ovoid, 2.0-2.5 cm diam., rusty-villous.

Primary forests, 500-1000 m; fl. & fr.: Apr.-Feb.; Mynso.

6. **Diospyros undulata** DC. Prodr. 8: 233. 1844; Fl. Brit. Ind. 3: 568. 1882; Fl. As. 3: 203. 1939.

Trees, 15-25 m; leaves elliptic-lanceolate or narrow-lanceolate, acute or cuneate at base, acute to acuminate, 5-15 × 2-7 cm, glabrous; petioles and midribs grooved above; nerves strongly raised beneath; male flowers in short cymes; female flowers solitary; berries globose, truncate at apex, 2.0-2.5 cm diam., strigose-villous.

Primary forests, 500-1500 m; fl. & fr.: Mar.-Jan.; Mynso, Raliang.

7. **Diospyros montana** Roxb. Pl. Corom. 1: 37, t. 48. 1795; Fl. Brit. Ind. 3: 555. 1882; Fl. As. 3: 200. 1939.

Shrubs or small trees, often spiny, 2-10 m; leaves ovate-oblong to oblong-obovate, acute or cuneate at base, obtuse or short-acuminate, 5-10 × 3-4 cm, puberulous and pubescent on nerves; lateral nerves 5-6 pairs; petioles 2-8 mm; flowers white; male flowers in short 2-8-flowered cymes; female flowers solitary; ovary glabrous; berries globose, 2.2-2.5 cm diam., yellow, glabrous.

Primary and secondary forests, 200-1400 m; fl. & fr.: Nov.-Aug.; Jowai.

## 88. SYMPLOCACEAE

### SYMPLOCOS Jacq.

- |  |     |                             |
|--|-----|-----------------------------|
| 1a. Midrib prominent on upper surface.                           | ... | <i>S. lucida</i> 1          |
| 1b. Midrib impressed on upper surface.                           | ... |                             |
| 2a. Inflorescences terminal and also sometimes axillary.         | ... | <i>S. paniculata</i> 2      |
| 2b. Inflorescences axillary.                                     |     |                             |
| 3a. Undersides of leaves hairy; bracts persistent.               |     |                             |
| 4a. Petioles 2-5 mm long; lateral nerves 2-7 pairs.              | ... | <i>S. viridissima</i> 3     |
| 4b. Petioles more than 5 mm long; lateral nerves 8-16 pairs.     | ... | <i>S. cochinchinensis</i> 4 |
| 3b. Undersides of leaves glabrous; bracts early caducous.        |     |                             |
| 5a. Calyx hairy; stamens about 100.                              | ... | <i>S. racemosa</i> 5        |
| 5b. Calyx glabrous; stamens less than 50.                        |     |                             |
| 6a. Terminal buds glabrous; bracts 6-7 mm long; fruits 3-celled. | ... | <i>S. pyriformis</i> 6      |
| 6b. Terminal buds hairy; bracts 2-5 mm long; fruits 1-celled.    | ... | <i>S. sumuntia</i> 7        |

1. **Symplocos lucida** (Thunb.) S. & Z. Fl. Jap. 1: 55. t. 24. 1835. *Laurus lucida* Thunb. Fl. Jap. 174. 1784. *S. theaeifolia* D. Don, Prodr. Fl. Nep. 145. 1825; Fl. Brit. Ind. 3: 575. 1882; Fl. As. 3: 218. 1939.

Trees, 6-10 m; leaves elliptic-lanceolate, acute or cuneate at base, acuminate, remotely glandular dentate or entire, 6-10 × 2-3 cm, glabrous; lateral nerves 5-15 pairs; petioles 5-15 mm; flowers shortly pedicelled or sessile in axillary branched short spikes; corolla 3-5 mm long, 5-8 mm across, pale yellow; stamens 40-70 in 5 bundles; fruits ovoid-ellipsoid, 8-10 mm, brownish-red, crowned by persistent calyx-lobes.

Primary forests, 300-1500 m; fl. & fr.: Oct.-July; Jarain, Jarain-Dawki.

2. **Symplocos paniculata** (Thunb.) Miq. in Ann. Mus. Bot. Lugd.-Bat. 3: 102. 1867. *Prunus paniculatus* Thunb. Fl. Jap. 200. 1784. *S. cratae-*

*goides* D. Don, Prodr. Fl. Nep. 145. 1825; Fl. Brit. Ind. 3: 573. 1882; Fl. As. 3: 216. 1939. '*Dieng-iang*'.

Trees or large shrubs, 2-10 m; leaves ovate-elliptic or ovate-lanceolate, rounded or obtuse at base, acute or acuminate, 3-8 × 1.5-4.5 cm, glabrous above, pilose beneath; lateral nerves 5-10 pairs; petioles 0-5 mm; flowers fragrant, yellowish-white, 5-7 mm across, in axillary and terminal paniculate racemes; stamens 30-50; fruits ovoid, 3-5 mm diam., black, 1-seeded, crowned by persistent calyx-lobes.

Primary forests, 1000-1600 m; fl. & fr.: May-Dec.; Garampani-Jowai, Jowai, Rytiang, near Garampani, Nartiang.

3. ***Symplocos viridissima*** Brand in Engler, Pflanzenr. 6: 41. 1901. *S. lancifolia* (non S. & Z. 1846) Clarke in Fl. Brit. Ind. 3: 577. 1882; Fl. As. 3: 215. 1939.

Shrubs or small trees, 3-10 m; leaves oblong-elliptic or lanceolate, acute at base, acuminate, serrulate, 5-8 × 2-3 cm, glabrous, sparsely pilose on nerves beneath; lateral nerves 4-7 pairs; petioles 2-5 mm; flowers subsessile on 1-3 cm long, few-flowered hirsute spikes; corolla pale yellow or whitish, 3-5 mm; stamens 30-50; fruits globose, 6-7 mm diam., black.

Primary forests, 1200-1600 m; fl. & fr.: Nov.-July, Jowai.

4. ***Symplocos cochinchinensis*** (Lour.) S. Moore in J. Bot. 52: 148, 1914. *Divalyx cochinchinensis* Lour. Fl. Cochinch. 1: 663. 1790. *Myrtus laurinus* Retz. Obs. Bot. 4: 26. 1786. *S. ferruginea* Roxb. Fl. Ind. 2: 542. 1832; Fl. Brit. Ind. 3: 574. 1882; Fl. As. 3: 217. 1939. *S. spicata* Roxb. Fl. Ind. 2: 542. 1832; Fl. Brit. Ind. 3: 573. 1882; Fl. As. 3: 217. 1939. *S. attenuata* DC. Prodr. 8: 256. 1844. *S. spicata* var. *attenuata* (DC.) Clarke in Fl. Brit. Ind. 3: 573. 1882.

Shrubs or small trees, 2-15 m; leaves elliptic to oblong-lanceolate, cuneate to acute at base, acute to short-acuminate, 5-18 × 3-8 cm, glabrous above, glabrous or ferruginous hairy beneath; lateral nerves 10-15 pairs; petioles 5-15 mm; flowers white to pale yellow, scented, in 1-8 cm long, glabrous or rusty tomentose spikes, corolla 3-5 mm long, 4-5 mm across; stamens monadelphous, 30-70; fruits ovoid to globose, 4-5 mm diam.

- 1a. Calyx-lobes hairy, often enlarged and forming a beak in fruit. ... ssp. *cochinchinensis* 1  
 1b. Calyx-lobes glabrous, often ciliate, not enlarged in fruit. ... ssp. *laurina* 2

1. ssp. ***cochinchinensis*** '*Dieng-pei*'.

Primary forests, 100-1200 m; fl. & fr.: Nov.-July; Dawki, Khongsong, Syndai, Umtapoh.

2. ssp. **laurina** (Retz.) Noot. Rev. Symplocaceae Old World. 156. 1975. *Myrtus laurinus* Retz. Obs. Bot. 4: 26. 1786. *S. spicata* Roxb. l. c. *S. attenuata* DC. l. c. *S. spicata* var. *attenuata* (DC.) Clarke l. c. 'Dieng-latperit'.

Primary forests, 100-1500 m; fl. & fr.: Oct.-June; Dawki, Jowai.

5. **Symplocos racemosa** Roxb. Fl. Ind. 2: 539. 1832; Fl. Brit. Ind. 3: 576. 1882; Fl. As. 3: 211. 1939. *S. racemosa* var. *khusiana* Clarke in Fl. Brit. Ind. 3: 576. 1882.

Shrubs or trees, 8-12 m; leaves ovate-oblong to oblong-lanceolate, cuncate to rounded at base, obtuse or rounded, entire or serrulate at margins, 5-15 × 2-6 cm, glabrous or sparsely pilose beneath; lateral nerves 5-10 pairs; petioles 7-15 mm; flowers in 3-4 cm long pubescent axillary spikes; corolla white, 5-6 mm long, 4-5 mm across; fruits oblong, 8-12 mm, purplish black, crowned by persistent calyx-lobes.

Primary and secondary forests, 500-1600 m; fl. & fr.: Oct.-June; Carampani-Raliang, Ioksi, Jowai-Jarain, Raliang.

6. **Symplocos pyrifolia** G. Don, Gen. Syst. 4: 3. 1837; Fl. Brit. Ind. 3: 579. 1882; Fl. As. 3: 212. 1939.

Trees or shrubs, 5-10 m; leaves elliptic-lanceolate or oblong-lanceolate, acute or cuneate at base, acuminate, 7-12 × 2-4 cm, glabrous; lateral nerves 7-12 pairs, with distinct intramarginal nerve; petioles 10-20 mm; flowers in axillary 2-5 cm long, glabrous spikes; corolla white, silky hairy outside, 3-5 mm long; stamens 30-35; fruits ellipsoid, 8-10 mm, brown, crowned by persistent calyx-lobes.

Primary forests in drier localities, 1000-1300 m; fl. & fr.: Nov.-June; Nartiang.

7. **Symplocos sumuntia** D. Don, Prodr. Fl. Nep. 145. 1825. *S. caudata* G. Don, Gen. Syst. 4: 3. 1837; Fl. Brit. Ind. 3: 577. 1882; Fl. As. 3: 213. 1939.

Shrub or small tree, 6-10 m; leaves lanceolate or elliptic-lanceolate, acute or cuneate at base, caudate-acuminate, glandular dentate or subentire at margins, 4-8 × 1-3 cm; lateral nerves 5-8 pairs; petioles 5-10 mm; flowers in 1-3 cm long axillary racemes; corolla white or yellow, 4-8 mm long, 4-5 mm across, stamens 25-40; fruits ellipsoid or ovoid, 6-10 mm, green to brown, crowned by persistent calyx-lobes.

Primary forests, 500-1500 m; fl. & fr.: Nov.-July; Jarain, Syndai.



## 89. STYRACACEAE

## STYRAX L.

**Styrax serrulatum** Roxb. Fl. Ind. 2: 415. 1832; Fl. Brit. Ind. 3: 588. 1832; Fl. As. 3: 219. 1939. '*Dieng-eit-blang*'.

Trees or shrubs, 5-15 m; leaves ovate to elliptic-lanceolate, acute or rounded at base, acuminate, serrulate, 3-8 × 2-4 cm; flowers yellowish or white, in axillary peduncled fascicles, racemes or small panicles; corolla-lobes 5, oblong; fruits ellipsoid or ovoid, ± 1 cm, grey with persistent cupular calyx.

Primary forests and forest edges, 100-1500 m; fl. & fr.: Mar.-Dec.; Jowai, Laskein, near Raliang, Raliang, Umtapoh.

## 90. OLEACEAE

- |   |     |                    |
|---|-----|--------------------|
| 1a. Corolla segments imbricate or contorted in bud.   |     |                    |
| 2a. Leaves simple on inarticulate petiole.  | ... | <i>Osmanthus</i> 1 |
| 2b. Leaves either compound and 3- or more-foliolate or by reduction 1-foliolate, but then with articulate petioles. | ... | <i>Jasminum</i> 2  |
| 1b. Corolla segments induplicate-valvate in bud.  |     |                    |
| 3a. Leaves imparipinnate; fruit a samara.   | ... | <i>Fraxinus</i> 3  |
| 3b. Leaves simple; fruit a berry or drupe.  |     |                    |
| 4a. Climbing shrubs; leaves trinerved at base.  | ... | <i>Myxopyrum</i> 4 |
| 4b. Trees or erect shrubs; leaves penninerved.  |     |                    |
| 5a. Inflorescences terminal; corolla-tube long; style rather long.  | ... | <i>Ligustrum</i> 5 |
| 5b. Inflorescences axillary; corolla-tube short; style short, thick.  | ... | <i>Olea</i> 6      |

## 1. OSMANTHUS LOUR.

- |   |     |                          |
|---|-----|--------------------------|
| 1a. Petioles less than 1.5 cm long; inflorescences fasciculate; corolla 3 mm or more long; fruit-stalk not jointed. | ... | <i>O. fragrans</i> 1     |
| 1b. Petioles more than 2 cm long; inflorescences paniculate; corolla 1.5-3.0 mm long; fruit-stalk jointed.          | ... | <i>O. matsumuranus</i> 2 |

1. **Osmanthus fragrans** Lour. Fl. Cochinch. 1: 29. 1790; Fl. Brit. Ind. 3: 306. 1881; Fl. As. 3: 235. 1939.

Trees or shrubs, 2-10 m; leaves ovate-lanceolate or oblanceolate, rounded to acute at base, abruptly acuminate, thickened at margins, 7-13 × 2-4 cm; petioles 7-13 mm; flowers ± 5 mm across, fragrant, white or pale yellow; pedicels 4-12 mm; corolla-tube ± 1 mm; lobes 2-3 mm; fruits not seen.

Primary forests, 100-1500 m; fl.: Sept.-Nov.; Dawki.

2. **Osmanthus matsumuranus** Hayata in J. Coll. Sci. Tokyo 30: 192. 1911.

Shrubs or trees, 2-15 m; leaves obovate to oblanceolate, cuneate at base, acuminate, 8-12×3-5 cm; lateral nerves 8-10 pairs; flowers fragrant, greenish white or greenish-yellow; pedicels 1.5-3.0 mm; corolla-tube 1.5-2.0 mm; lobes oblong, 1.5-2.0 mm; fruits not seen.

Forciss, 1000-1500 m; fl.: Sept.-Nov.; Amwce, near Jarain, 'Hooker & Thomson 2386 (K).'

## 2. JASMINUM L.

- 1a. Leaves compound.
  - 2a. Leaflets pinnately nerved; terminal leaflet almost same size as lateral leaflets. ... *J. lanceolarium* 1
  - 2b. Leaflets palmately 3-5-nerved at base; terminal leaflet larger than lateral leaflets.
    - 3a. Leaflets 3-foliolate; leaflets 3-nerved at base; calyx-tube almost truncate; corolla-tube ± 2 cm long. ... *J. caudatum* 2
    - 3b. Leaflets 3-5-foliolate; leaflets 5-nerved at base; calyx-teeth present; corolla-tube ± 1 cm long. ... *J. dispersum* 3
- 1b. Leaves simple.
  - 4a. Calyx pubescent.
    - 5a. Axils of lateral nerves with hairy glands; cymes 3-flowered; peduncles 2-3 mm long; bracts subulate. ... *J. listeri* 4
    - 5b. Axils of lateral nerves without hairy glands cymes more than 3-flowered; peduncles 5-15 mm long; bracts foliaceous. ... *J. amplexicaule* 5
  - 4b. Calyx glabrous.
    - 6a. Leaves prominently palmately nerved at base.
      - 7a. Pair of basal nerves extending half the length of leaf; pedicels up to 1 cm long; calyx-lobes 5-8 mm long. ... *J. subtriplinerve* 6
      - 7b. Pair of basal nerves extending up to apex; pedicels 1.5-2.5 cm long; calyx-lobes 10-15 mm long. ... *J. nervosum* 7
    - 6b. Leaves pinnately nerved
      - 8a. Calyx-teeth linear, more than 6 mm long. ... *J. adenophyllum* 8
      - 8b. Calyx-teeth triangular or minute.
        - 9a. Axils of lateral nerves with hairy glands; calyx shortly toothed; teeth 1-3 mm long; corolla-tube 2.5-3.0 cm long. ... *J. nepalense* 9
        - 9b. Axils of lateral nerves without hairy glands; calyx turbinate or minutely toothed; teeth less than 1 mm long; corolla-tube 1.5-2.0 cm long. ... *J. subglandulosum* 10

1. **Jasminum lanceolarium** Roxb. Fl. Ind. 1: 97. 1820; Fl. Brit. Ind. 3: 601. 1882; Fl. As. 3: 232. 1939.

Scandent shrubs; leaflets 3, elliptic-lanceolate, cuneate or acute at base, acute to acuminate, 5-12×2-5 cm; lateral nerves obscure; inflorescences axillary or terminal, compound 3-chotomous cymes; pedicels 3-6 mm, thickened in fruit; corolla white; tube ± 2 cm; lobes oblong, ± 1 cm; fruits ellipsoid, purplish.

Primary and secondary forests, 1000-1800 m; fl. & fr.: Apr.-Nov.; Jarain, Jowai, Laskein.

2. **Jasminum caudatum** Lindl. in Edw. Bot. Reg. 28: t. 26. 1842; Fl. Brit. Ind. 3: 601. 1882; Fl. As. 3: 232. 1939.

Scandent shrubs; leaflets 3, oblong-ovate, rounded or acute at base, acute or acuminate; terminal leaflet 6-10 × 3-5 cm; lateral leaflets 3-6 × 1.5-3.5 cm; lateral nerves 5-6 pairs; inflorescences axillary, few-flowered; pedicels 5-8 mm long; corolla white; lobes oblong, ± 2 cm; fruits ellipsoid, purplish.

Primary forests, 1000-1500 m; fl. & fr.: July-Mar.; Raliang, Syndai.

3. **Jasminum dispernum** Wall. in Roxb. Fl. Ind. 1: 99. 1820; Fl. Brit. Ind. 3: 602. 1882; Fl. As. 3: 232. 1939.

Scandent shrubs; leaflets 3-5, lanceolate, subcordate at base; acuminate; terminal leaflets 6-10 × 2.5-4.0 cm; lateral leaflets 4-6 × 2-3 cm; inflorescences few-flowered and axillary or many-flowered and terminal; pedicels ± 7 mm; calyx-teeth triangular, ± 1 cm; corolla pinkish; lobes ovate, ± 6 mm; fruits subglobose, purplish.

Primary and secondary forests and forest edges, 1300-1600 m; fl. & fr.: May-Dec.; Jowai.

4. **Jasminum listeri** Cage in Rec. Bot. Surv. Ind. 1: 349. 1901; Fl. As. 3: 228. 1939.

Scandent shrubs; leaves oblong-lanceolate or elliptic-lanceolate, rounded or obtuse at base, acuminate at apex, 6-10 × 2-3 cm; lateral nerves 4-5 pairs; inflorescences axillary, capitate; calyx-lobes subulate, sparsely villous; corolla white; tube ± 5 mm; lobes ± 1 cm.

Primary forests, in shaded places, 100-500 m; fl. & fr.: Mar.-Sept.; Dawki, G. K. Deha 16440.

5. **Jasminum amplexicaule** G. Don, Gen. Syst. 4: 60. 1837. *J. undulatum* Ker.-Gawl. in Edw. Bot. Reg. 6: t. 436. 1820 (*non* Willd. 1797) Fl. Brit. Ind. 3: 592. 1882; Fl. As. 3: 225. 1939.

Subscandent or erect shrubs, 1-2 m; leaves ovate-lanceolate, rounded or subcordate at base, acute or acuminate, 3-6 × 1.5-2.5 cm; lateral nerves 3 pairs; inflorescences subcapitate, axillary, few-flowered; pedicels ± 2 mm; calyx-lobes filiform, 7-10 mm; corolla white; tube ± 2.5 cm; lobes ovate, acute; fruits ellipsoid, red.

Primary forests and forest edges, 200 - 1500 m; fl. & fr.: Aug.-Apr.; Dawki, Jarain, Sutnga.

6. **Jasminum subtriplinerve** Bl. Mus. Bot. Lugd.-Bat. 1: 272. 1850; Fl. Brit. Ind. 3: 596. 1882; Fl. As. 3: 228. 1939.

Scandent shrubs; leaves elliptic-lanceolate, subcordate at base, acuminate at apex, 2 - 10 × 1 - 6 cm; inflorescences axillary and terminal, 3 - 5-flowered, sessile; bracts linear, 6 - 7 mm; corolla white; tube ± 2.5 mm; lobes oblong, ± 1.2 cm; fruits ellipsoid or subglobose.

Primary forests and forest edges, 100 - 1300 m; fl. & fr.: Jan.-Dec.; Dawki, Jarain, Syndai.

7. **Jasminum nervosum** Lour. Fl. Cochinch. 20. 1790. *J. anastomosans* DC. Prodr. 8: 305. 1844; Fl. Brit. Ind. 3: 596. 1882; Fl. As. 3: 228. 1939.

Scandent shrubs with pendulous branches; leaves elliptic-lanceolate or ovate-lanceolate, rounded or subcordate at base, acuminate, 3 - 10 × 1.5 - 3.5 cm; basal nerves 3, anastomosing with many lateral nerves; cymes 1 - 5-flowered; calyx-tube ± 1.5 cm; lobes subulate; corolla white; tube 2.0 - 2.5 cm; fruits ellipsoid.

Primary forests, 300 - 1000 m; fl. & fr.: Apr.-Jan.; Umtapoh.

8. **Jasminum adenophyllum** DC. Prodr. 8: 314. 1844; Fl. Brit. Ind. 3: 596. 1882.

Scandent shrubs, up to 1.5 m; leaves elliptic-oblong, acute or cuneate at base, acute or acuminate, 8 - 12 × 2 - 4 cm; lateral nerves 4 - 5 pairs; cymes 1 - few-flowered; pedicels ± 2 cm; bracts minute; calyx-lobes ± 1.2 cm; corolla pale yellowish-orange; tube 8 - 10 mm; lobes 8 - 10 mm; fruits ellipsoid.

Forests, 100 - 1000 m; fl. & fr.: Aug.-Mar.; Garampani.

9. **Jasminum nepalense** Spreng. in L. Syst. Veg. 4 (cur. post.): 12. 1828. *J. glandulosum* G. Don, Gen. Syst. 4: 61. 1837; Fl. Brit. Ind. 3: 599. 1882; Fl. As. 3: 229. 1939.

Scandent shrubs; leaves elliptic to ovate-lanceolate, rounded at base, acuminate, 6 - 10 × 2 - 5 cm; lateral nerves 5 - 7 pairs, anastomosing with intramarginal nerves; inflorescences terminal, 3-chotomous, few-flowered; pedicels 6 - 8 mm; corolla creamy-white; lobes linear; fruits ellipsoid, greenish-purple.

Primary forests, 1000 - 1500 m; fl. & fr.: July-Feb.; Raliang.

10. **Jasminum subglandulosum** Kurz in Trimen, J. Bot. 329. 1875 et Fl. Brit. Burma 2: 151. 1877; Fl. Brit. Ind. 3: 600. 1882; Fl. As. 3: 230. 1939.

Scandent shrubs; leaves elliptic or oblong-lanceolate, obtuse at base, obtusely acuminate at apex, 10-16 × 3-8 cm; lateral nerves 7-9 pairs; inflorescences lax, pubescent; pedicels ± 2.5 cm; bracts minute, subulate; corolla white; lobes strap-shaped, ± 7 mm; fruits orange-red.

Primary forests, 1200-1500 m; fl. & fr.: Aug.-Mar.; Raliang.

### 3. FRAXINUS L.

**Fraxinus floribunda** Wall. in Roxb. Fl. Ind. 1: 150. 1820; Fl. Brit. Ind. 3: 605. 1882; Fl. As. 3: 242. 1939.

Trees, 10-20 m; leaves opposite, imparipinnate; rachis 15-20 cm; leaflets 7, lanceolate or ovate-oblong, cuneate at base, caudate-acuminate at apex, serrate at margins, flowers in large terminal panicles; corolla-lobes linear-oblong, ± 3 mm; fruits samaroid, oblanceolate, ± 3 × 0.5 cm.

Open secondary forests, 200-1000 m; fl. & fr.: May-Sept.; near Khleih-riat.

### 4. MYXOPYRUM Bl.

**Myxopyrum smilacifolium** (Wall.) Bl. Mus. Bot. Lugd.-Bat. 1: 320. 1850; Fl. Brit. Ind. 3: 618. 1882; Fl. As. 3: 243. 1939. *Chionanthus smilacifolia* Wall. in Roxb. Fl. Ind. 1: 108. 1820.

Scandent shrubs; branches tetragonous; leaves elliptic-ovate to oblong-lanceolate, cuneate or acute at base, acute at apex, 12-16 × 4-6 cm, palmately trinerved at base; flowers yellowish, minute, in trichotomous panicles; corolla-lobes concave; fruits subglobose or obovoid, 7-8 mm, 1- or 2-seeded.

Forests, in shaded moist places, 100-1000 m; fl. & fr.: Apr.-Dec.; Garampani.

### 5. LICUSTRUM L.

- |   |     |                            |
|---|-----|----------------------------|
| 1a. Calyx distinctly toothed; drupes globose.   | ... | <i>L. confusum</i> 1       |
| 1b. Calyx almost truncate; drupes ellipsoid.  |     |                            |
| 2a. Leaves up to 1.5 cm broad, obtuse; corolla tube twice as long as calyx.           | ... | <i>L. massalongianum</i> 2 |
| 2b. Leaves more than 2.5 cm broad, acute or acuminate; corolla tube as long as calyx. | ... | <i>L. robustum</i> 3       |

1. **Ligustrum confusum** Decaisne in Nouv. Arch. Mus. 2(2): 24. 1879; Fl. Brit. Ind. 3: 618. 1882; Fl. As. 3: 241. 1939. '*Dieng-iangdkhar*'.

Trees or shrubs, 2-5 m; leaves ovate to elliptic-lanceolate, acute or rounded at base, acute, 3-7 × 1-3 cm; flowers white in terminal pubescent panicles; calyx-teeth 4, broadly oblong; corolla lobes 4, oblong, reflexed; drupes, 6-10 mm, 2-celled, purplish-black.

Primary forests and forest-edges, 1000-2000 m; fl. & fr.: Jan.-Dec.; Nartiang; Raliang.

2. **Ligustrum massalongianum** Vis. Ill, Pl. Nov. Orato Padova, 1: 27. t. 4. 1840; Fl. Brit. Ind. 3: 616. 1882; Fl. As. 3: 241. 1939. '*Dieng-sha-kynriaw*'.

Bushy shrubs; leaves lanceolate, cuneate at base, 2-6 × 0.5-1.5 cm; flowers white in terminal pubescent panicles; calyx almost truncate; corolla tube ± 2 mm; lobes 4, oblong; drupes erect, ellipsoid or oblong, ± 10 × 2-3 mm, rugulose, purple-blue.

Primary forests, 1000-1400 m; fl. & fr.: Mar.-Dec.; Nartiang.

3. **Ligustrum robustum** (Roxb.) Bl. Mus. Bot. Lugd.-Bat. 1: 313. 1850; Fl. Brit. Ind. 3: 614. 1882; Fl. As. 3: 239. 1939. *Phillyrea robusta* Roxb. Fl. Ind. 1: 101. 1820. '*Dieng-shieng-kha*'.

Trees, 3-10 m; leaves bifarious, ovate to elliptic-lanceolate, rounded or acute at base, 3-12 × 3-5 cm; flowers white, ± 2 mm across, in terminal pyramidal pubescent panicles; calyx campanulate; teeth minute; corolla white; lobes spreading or reflexed; drupes oblong-ellipsoid, 8-12 × 3-5 mm, purplish-black.

Primary forests, 100-1500 m; fl. & fr.: May-Jan.; Dawki, Jarain, Jowai.

## 6. OLEA L.

**Olea dentata** DC. Prodr. 8: 286. 1844; Fl. Brit. Ind. 3: 613. 1882; Fl. As. 3: 238. 1939.

Trees, 10-20 m; leaves oblong-lanceolate, acute at base, acute or acuminate, entire or dentate, 8-15 × 1.5-4.0 cm; lateral nerves 9-10 pairs; flowers small, yellowish, in axillary panicles; corolla campanulate, yellowish; tube short; lobes 4, short; drupes ovoid to ellipsoid, ± 1.5 cm, glabrous.

Primary forests, 100-1500 m; fl. & fr.: Aug.-Mar.; Laskein, Mynso, Pudiem Sirkep.

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