

Flora of India  
Series - 2

# FLORA OF SIKKIM

Volume 1  
(Monocotyledons)

Editors  
P.K. HAJRA  
D.M. VERMA

*with assistance from*  
S. Bandyopadhaya



BOTANICAL SURVEY OF INDIA

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**BOTANICAL SURVEY OF INDIA**

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Date of Publication, December 1996

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*Cover Photo* : A view of Khangchendzong from Thang sing (West Sikkim)

*Price* :

Published by the Director, Botanical Survey of India, P-8, Brabourne Road, Calcutta-700001 and printed at Deep Printers, 3/26, Ramesh Nagar, New Delhi-110015

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## Acknowledgements

It gives the editors great pleasure to record their thanks to all the contributors.

They also express their thanks to Shri Utpal Chatterjee, Scientist, and all staff members of Publication Unit, Botanical Survey of India for their help.

Finally the editors acknowledge Shri M.L. Jain of Deep Printers for printing of this volume.

## Contributors

BASU, P. Botanical Survey of India, P-8, Brabourne Road,  
Calcutta 700 001.

KRISHNA, B. Shiv Niketan, M.P. Sinha Road, Kadamkuam,  
Patna 800 003.

KUMAR, S. Botanical Survey of India, Northern Circle, 192, Kaulagarh  
Road, Dehra Dun 248 195.

MANDAL, N.R. Botanical Survey of India, Central National Herbarium,  
P.O. Botanic Garden, Howrah 711 103.

MITRA, B. Botanical Survey of India, Central Botanical Laboratory, P.O.  
Botanic Garden, Howrah 711 103.

RAJU, D.C.S. "Lumbini", 7th Road, Banjara Hills, Hyderabad - 500 034.

SINGH, PARAMJIT. Botanical Survey of India, Sikkim, Himalayan  
Circle, Sikkim.

SINGH, S. Remote Sensing Institute, Kalidas Road, Dehra Dun.

SRIVASTAVA, R.C. Botanical Survey of India, Central Circle, 10  
Chatham Line, Allahabad 211 002.



*Hedygium spicatum* Buch. Ham. ex J.F. Smith



*Pandanus nepalensis* St. John



Maimaichu Lake (East Sikkim District)



*Arisaema griffithii* Schott.

## INTRODUCTION

(R.C. Srivastava)

The State of Sikkim situated on the flanks of the Eastern Himalayas between 27°10' 28°5' N and 88°30' 89° E is bounded by Nepal in the West, Bhutan in the South-East, Tibet in the North and North-East and the Darjeeling district of West Bengal in the South.

The topography of this pretty Himalayan State is varied. The altitudes range from 244 m to over 8598 m. Most of the 7300 sq km area is interlaced with jungle-clad ridges and deep ravines created by, and through which, the raging torrents of the mountain rivers speed and emerald valleys alternating with their terraced hill-sides and dense forests ; a variety of plant beauties along with water-falls, rivulets, lakes and snow-capped mountains girdling the state in a protective embrace, embellish the land.

The climatic, edaphic, altitudinal and biotic variations with their complex inter-relationship and species composition have resulted in different kinds of vegetation cover in the area. The forests cover *ca* 42.8% (3124 sq. km) of the total geographic area, of which 2260 sq km are protected and reserve forests. The state is very rich in biological diversity. It is estimated that *ca* 5000 species of flowering plants, *ca* 350 pteridophytes and *ca* 15 species of Gymnosperms occur in this region. In addition to these a large number of non-flowering plants such as liver-worts, lichens, mosses, algae and fungi also occur.

**CLIMATE :** The abrupt variations in the altitude (elevations) have created diverse climatic conditions. The climate is warm and humid during summer and monsoon season (June Oct.) and moderately cold during winter (Dec. Feb.) at lower elevations. The winter months become more severe as one goes up. Places like Lachen, Lachung and Dzongri areas remain almost snow covered during most of the winter months. The perennial snow line however, begins from *ca* 4880 m only.

Most of the areas of the state are very wet during June to September, except the areas in North which are shielded from the monsoon clouds by the high embattlements of the Himalayas, or those areas where the monsoon loses its intensity. Average annual rainfall is *ca* 4000 mm and

average minimum/maximum temperature ranges between 4.2° 17.1° C/13.9° 23.9° C. Rainfall is usually very heavy during May Sept. being maximum in July.

Relative humidity is 70 80% throughout the year and at most of the places in Sikkim.

PEOPLE : Sikkim's population as per the 1991 census is 4,03,612 with a density of 57 per sq. km. However, the density varies district wise due to varied climatic conditions and topography. East district has the highest of 157, while it is 133 for South District, 83 for West District and only 7 for North District. Gangtok being the Capital is the most populated place in the State of which *ca* 83% is rural and consists mainly of Nepalese, Bhutia, Lepcha, Limbus (very few). In the township, service group and business people have come from the plains. But of these, Nepalese who themselves have a conglomeration of different ethnic types are at present largest in number. But the Lepchas (Rongkup-Children of Rong, Rongpa ravine dwellers) are the earliest settlers of Sikkim. They have an extremely well stocked vocabulary on plants. (Rip-flower; Kung-tree). Even today the old and rural folk can distinguish most of the species at a glance and tell their local uses (mostly medicinal/edible). Sir J.D. Hooker the world renowned explorer of the Sikkim Himalaya also mentioned in glorious terms about the Lepcha's wonderful knowledge of the Sikkim plants.

The state has been divided into four districts viz. East, North, South and West.

## BOTANICAL EXPLORATIONS

Sikkim's botanical diversity has attracted a large number of plant collectors from different parts of the world since Griffith's visit in 1843. The famous botanist J.D. Hooker visited Sikkim during 1848-49 and the account published by him in 'Himalayan Journals' is still one of the most comprehensive description of the botanical splendour of this region.

Subsequently distinguished botanists such as Sir G. King, C.B. Clarke, G.H. Cave, W.W. Smith and J.M. Cowan visited the area during later part of the 19th century and early 20th century. In the post 1940 period, comparatively little collections were made except for K.P. Biswas, R.S. Rao, B.D. Sharma, B. Ghosh Hara *et al.* and A.R.K. Sastry & P.K. Hajra. But the exploration work gained momentum after the establishment of the Sikkim Himalayan Circle of the Botanical Survey of India at Gangtok in December 1979. In the post 1979 period, P.K. Hajra, P. Chakraborty, B. Krishna, A.K. Verma, D.C.S. Raju,

R.C. Srivastava, S. Kumar and N.R. Mandal, P. Basu, B. Mittal, S. Singh, M. Sanjappa, M. Ahmedullah, V. Sampat Kumar, K.D. Kumar, A.K. Raut, L.B. Chowdhury collected plants from different areas of the state including the areas like Sakyong Valley (Lepchas land). The Herbarium of this Circle until now houses ca 14000 specimens.

## VEGETATION

Broadly Sikkim can be divided into three distinct botanical zones viz. Tropical, Temperate and Alpine, depending on the elevation and characteristics of the vegetation. The foothills of Sikkim are covered with forests consisting of the species of *Shorea*, *Adina*, *Dalbergia*, *Dillenia*, *Artocarpus*, *Ficus*, *Bauhinia*, *Litsea*, *Lagerstroemia*, *Terminalia* etc. In the lower hill ranges (600-1500m) the forests chiefly include the species of *Schima*, *Syzygium*, *Duabanga*, *Engelhardtia*, *Ficus*, *Castanopsis*, *Pandanus*, *Cyathia*, *Michelia*, *Quercus*, *Saurauia*, *Photinia*, *Juglans*, *Leucocephalum* etc.

The temperate vegetation comprises of forests consisting of the species of *Alnus*, *Acer*, *Betula*, *Magnolia*, *Rhododendron*, *Larix*, *Berberis*, *Salix*, *Cotoneaster*, *Vaccinium*, *Daphne*, *Sorbus*, *Rubus* and the herbaceous species of *Aconitum*, *Anemone*, *Potentilla* etc. *Abies densa*, *Larix griffithiana*, *Tsuga dumosa*, *Picea spinulosa* and *Taxus wallichiana* represent the coniferous belt in the altitudinal range of 2700-3900m. The Rhododendron-Conifer forests comprising of the several species of *Rhododendron*, *Daphne*, *Betula* etc. mark the timberline in the altitude of ca 4000m.

The alpine vegetation which occurs above 4500m and up to a limit of ca 5500m is confined to moorlands of coarse meadows with many stunted and dwarf shrubby species of *Rhododendron*, prostrate plants of *Juniperus squammata* and cushion-like herbaceous species of *Arenaria*, *Androsace*, *Aconitum*, *Cassiope*, *Saxifraga*, *Primula*, *Pinguicula*, *Sedum*, *Rheum*, *Saussurea*, *Gentiana*, *Kobresia*, *Carex* etc.

The vegetation in the area may be classified into the following categories :

i) *Low Hill Forests* (tropical to sub-tropical type, up to 900m) : From the base (244m) to 900m, the sub-mountainous tracts are inhabited by dense broad-leaved semi-evergreen forests with trees attaining 24-36 m height. The rainfall is heavy, even up to 500cm annually. Canes yams and other climbers are common. Epiphytes like orchids, aroids etc. are abundantly represented. The undergrowth is luxuriant and varied. *Shorea robusta* (sal) is very common, covering large tracts especially

along the Teesta and Rangit rivers. *Schima wallichii*, *Bauhinia purpurea*, *Cedrela toona*, *Stereospermum tetragonum*, *Bombax ceiba*, *Dillenia pentagyna*, *Lagerstroemia parviflora*, *Sterculia villosa*, *Terminalia myriocarpa*, *T. tomentosa* and *Albizia* spp. are prominent components of the forests. Other trees occasionally met with *Garuga pinnata*, *Cedrela microcarp*, *Amoora wallichii*, *A. rohituka*, *Chukrasi tabularis*, *Evodia mellaefolia*, *Ailanthus grandis*, *Duabanga grandiflora*, *Tetrameles nudiflora*, *Celtis tetrandra*, *Castanopsis indica*, *Syzygium formosa*, and *Michelia champaca* together with laurel like *Phoebe lanceolata*, *P. hainesiana*, *P. attenuata* *Litsea polyantha* and *Cinnammomum tamala*. Several species of *Artocarpus* such as *A. integrifolia*, *A. chaplasha* together with *Bischofia javanica* also occur. Large cultivated trees of *Ficus elastica* are often seen along banks of the river Teesta, along side Pakyong road, and near Dickchu. Occasionally interspersed in the forest are *Ficus semicordata* and *Pandanus nepalensis*. Tree-ferns are not uncommon in the low-land forests of Sikkim.

ii) *Middle Hill Forests* (subtropical type, 750-1500 m) : These are formed largely of evergreen species which are dominant. Deciduous trees may also occur. The trees are usually 20-30 m in height. Epiphytes and climbers occur in large numbers. The undergrowth is not usually dense and consists of numerous herbaceous and shrubby species. *Castanopsis tribuloides*, *C. indica*, *Schima wallichii* and *Phoebe hainesiana* are the commonest tree species between 750 and 1200m. *Michelia champaca* and *Stereospermum tetragonum* may also be occasionally met with. Other prominent components of the forests of this region are : *Drimycarpus racemosus*, *Juglans regia*, *Engelhardtia spicata*, *Spondias lutea*, *Exbucklandia populnea*, *Michelia cathcartii*, *Talauma hodgsonii*, *Saurauia nepalensis*, *Ficus oligodon*, *F. semicordata*, *Betula alnoides*, *Alnus nepalensis*, *Terminalia* spp., *Macaranga* sp., *Litsea polyantha*, *Phoebe lanceolata*, *P. attenuata*, and members of the family Meliaceae. Large evergreen trees of *Quercus glauca*, *Q. spicata*, *Q. serrata*, and *Q. griffithii* grow in dense formations between 1200 and 1600 m or above. Bamboos may also be found near habitations.

It will not be out of place to mention that *Cryptomeria japonica* is being extensively cultivated. It covers large areas and forms dense forests between 1200 and 2400 m altitude. It thrives best in this climate but due to rapid growth the wood remains soft and thus loses much of its commercial values. The ground vegetation underneath these forests is scanty due to lack of sun light and unsuitable substratum. Only a few ferns grow on the fringes of such forests.

iii) *Upper Hill forests* (Warm or wet temperate type 1500 -2700 m) : The forests are evergreen with medium-sized trees, rarely over

24 m height. There are a number of deciduous tree species but these form only a small proportion. Oaks and laurels form large patches in otherwise mixed forests. The oaks have branched crowns and are abundantly covered with mosses and other epiphytes. The forests extremely thick and the requisite amount of moisture available for the ground growing as well as epiphytic vegetation. The shelter of trees provided shade and prevents rapid air movements to a considerable extent. This results in a prolific growth of small herbs, shrubs and ferns on the forest floor. Woody climbers are frequent but not conspicuous.

Several altitudinal zones may be distinguished by the preponderance of certain such as laurels between 1800 and 2100 m, *Quercus lamellosa* between 2100 and 2400 m and *Q. pachyphylla* between 2400 and 2700m, though freely overlapping. *Michelia cathcartii*, *Mangolia campbellii*, *Machilus edulis*, *Quercus fenestrata* and *Castanopsis hystrix* are quite common in all the forests up to 2100m. Between 2100 and 2400 m of altitudes *Quercus lamellosa*, *Castanopsis tribuloides*, *Acer campbellii*, *Michelia excelsa* and *M. cathcartii* are dominant. *Quercus lineata* *Betula alnoides* and *Symplocos theaeifolia* are also frequently met with the former being quite prominent. The oaks constitute the greater part of the trees of top canopy and Lauraceae is usually relegated to the second storey, though numerically predominant. Laurels like *Machilus grammiana* *M. gamblei* *M. edulis* *Litsea sericea*, *elongata* *L. kingii*, *L. zeylanica* and *Cinnamomum obtusifolium* are not uncommon. *Alnus nepalensis* grows mainly along water courses and is the chief colonizer of new landslip areas. *Michelia excelsa* is well known timber tree of this zone.

Still higher up, between 2400m and 2700m or so *Quercus lamellosa* *Q. pachyphylla*, *Castanopsis tribuloides* *Acer campbellii* *Magnolia campbellii* *Symploco theaeifolia* and *Taxus wallichiana* are the prominent elements of the forests. Above 2700m in this zone *Quercus pachyphylla* occurs in pure formations. Under the shade of these forest *Rhododendron griffithianum* finds a favourable place. Dwarf bamboos, *Arundinaria* spp. are not uncommon as undergrowth at higher altitudes.

iv) *Rhododendron-Conifer Zone* (cold temperate or sub-alpine, 2700m-3600m) : The forests of this zone are also evergreen, mainly composed of *Rhododendrons* and conifers. Quite often *Quercus pachyphylla* and *Q. lineata* formations extend above 2,700m altitude and *Acer combellu*, *A. caudatum* *Betula utilis* an *Magnolia campbellii* may also be met with though very infrequently. As one proceeds higher up, there is a gradual replacement of oak trees by *Rhododendron arboreum* *R. campanulatum* and *R. grande* and other species of the genus. *Betula utilis* is occasionally found in the high level *Rhododendron*

forest at the head of Lachen valley near or above Samdong (3300 m). *Taxus wallichiana* grows in the forests as one proceeds above Lachung. Interspersed with these are patches of *Tsuga wallichiana* and *Abies densa*. At about 2700-3000 m, in Lachen valley, *Tsuga dumosa* grows in abundance and is the dominant tree. It also grows at Chhoka in West Sikkim. *Picea spinulosa* grows abundantly on all the hills around Lachen intermixed with *Tsuga dumosa* but does not reach the heights above 3000 m. The bamboo, *Arundinaria aristata* forms dense undergrowth in silver fir forests, especially where fire has destroyed the tree canopy. *Abies densa* also occurs in almost pure formations between Karponang and Chhangu (East Sikkim), and Simdong to Thangu (North Sikkim) extending upto 3600 m or a little above. Few trees of *Salix wallichiana*, are also seen growing near Thangu along streams.

*Rhododendron arboreum* forms scrub on steeper slopes at about 3000 m. Above the tall tree line, the vegetation is a sort of mosaic of *Rhododendron campanulatum*, *R. wightii*, *R. thomsonii*, *R. cinnabarinum* and *R. decipens*. Lacaita scrub on slopes near Chhangu (3900 m) and near Thangu (3900 m). *Rhododendron anthopogon*, *R. setosum* and *R. barbatum* may also be occasionally met with. Grasslands are frequent at 2700 m altitude and above. *Arisaema* spp. may be found in open places. Various species of *Aconitum* grow abundantly on the forest floor underneath *Rhododendrons* at high altitudes especially around Thangu.

v) *Alpine Scrub and Grasslands* (3600-4300 m and above) : At the heights above 3600 m where the tree line ends, *Juniperus pseudo-sabina*, and *J. recurva* grow in bushy formations in North and East Sikkim especially on the exposed sunny hill slopes around Thangu (4200 m) and Chhangu (4300 m). *Ephedra gerardiana* covers vast areas tops of hills around Thangu (ca 4200). The species has not been seen flourishing anywhere else. The beautiful yellow-flowered *Rhododendron lepidotum* is another plant of high altitudes (3600 m or above) and grows in exposed rock crevices, hardly attaining 30 cm. In the open meadows on gentle mountain slopes a few species each of the genera like *Ranunculus*, *Anemone*, *Delphinium*, *Rhus*, *Potentilla*, *Primula*, *Fragaria*, *Cassiope*, *Allium* etc. are seen.

### PHYTOGEOGRAPHICAL ASPECTS

Owing to the varied climatic and ecological conditions in its entire length and breadth, the Sikkim Himalayan region offers very suitable spots into which a variety of floristic elements have migrated from several near and far-off lands. Sino-Japanese elements (viz. species of *Quercus*, *Schima* etc.) are quite common in this region. The floristic

elements of Western China, which are distributed all along the Sikkim Himalayas are *Aletris pauciflora*, *Anemone rupicola*, *A. vitifolia* and others. *Primula sikkimensis* and *Magnolia campbellii* are also the species of Western China which extend from Yunnan in to the Eastern Himalaya. The European and Mediterranean elements are represented by the species of *Ranunculus*, *Gentiana*, *Swertia*, *Anemone*, *Tamarix*, *Allium*, *Artemisia*, etc. The American elements in Sikkim flora are exhibited generally by weeds of agricultural lands, open forest edges and waste places e.g. *Eupatorium adenophorum*, *E. odoratum*, *Parthenium hysterophorus*, *Mikania cordata* and *Lantana camara*. African elements such as the species of *Flacourtia*, *Grewia*, *Holarrhena*, *Alstonia* are represented in this region. The Siberian elements are exhibited in many predominantly temperate genera like *Potentilla*, *Pedicularis* and *Lonicera*. Tibetan elements like *Hippobhae*, *Prezwalakia* etc. are also found. An example of considerable phytogeographical significance is the occurrence of *Glaux maritima* (Primulaceae) in Leh area of Kashmir and Llonhak valley of Sikkim. This plant is distributed along the coastal and inland salt marshes of northern temperate and arctic regions. In addition to such examples, there are very interesting areas that can be called 'Isolation belts' that have led to the isolation of certain species. *Meconopsis bella*, *Cathcartia lyrata*, *Senecio chola*, *Sausurea lanearia*, *Geranium* spp., *Primula elwesiana*, *Primula wattii* and *Swertia burkilliana* serve as such examples in the Sikkim Himalayas.

Studies made by Janaki Ammal in genera viz. *Magnolia*, *Camellia*, *Lonicera*, *Rhododendron* and *Viburnum* represented by many species in this region revealed high polyploidy which led her to consider this region (Eastern Himalayas) as a region of active speciation. The occurrence of many families and genera of primitive flowering plants such as *Magnolia*, *Manglietia*, *Euptelea*, *Tetracentron*, *Pycnarrhena*, *Haematocarups*, *Aspidocarya*, *Holboellia*, *Exbucklandia*, *Houttuynia*, *Myrica*, *Alnus* and *Betula* has led Takatajan to consider this region (Eastern Himalaya) the cradle of flowering plants.

## PLANT RESOURCES

### Germ Plasm

In Sikkim, the tribal populations have primitive but important germplasm of several crops. Still there is a tendency to preserve the local land races and varieties of crop plants which are the products of many years of natural selection and contain genetic treasures having natural resistance to pests and diseases and adaptability to stress conditions. Noteworthy among these is the prevailing enormous genetic diversity in Iskush, Maize, Wheat, Ginger, Cardamom, Mango, Banana, Orange,

Saccharum etc. The region is particularly important for crop plants such as brassicas, rice, cucumber, banana, mango, cardamom, *Dioscorea*, *Alocasia*, *Colocasia*, *Amorphophalus*, and horticultural significance like Orchids, Rhododendrons, Primulas, Pedicularis etc. Apart from these, several other elements in the flora which may not have an obvious economic value at present as the same has not been perceived as yet but in future may prove to be of much economic value in view of new vistas in plant research and changing patterns of our needs.

It is the sum total of such remarkable diversity which has made this state to be a 'Gene-bank' for a number of food crops, forest trees, medicinal plants, aromatic and highly ornamental plants etc.

### Endangered plants

The flora of Sikkim is at present under great pressure due to biotic factors like various developmental projects viz. many Hydel power projects, road construction activities, heavy deforestation by burning and tree-felling for preparation of agricultural fields, intensive grazing, tourist-bungalows etc. These activities have destroyed many rich diversity centres on one side and on the other side have initiated several new land slides zones due to which a large number of precious rare plants are getting lost within a very short spell of time. These include : *Acer hookeri* var. *majus*, *Pimpinella tongloensis*, *P. wallichii*, *Pternopetalum radiatum*, *Lactuca cooperi*, *Arenerai thangoensis*, *Coelogyne treutleri*, *Cymbidium eburneum*, *C. hookerianum*, *C. whiteae*, *elegans*, *Cypripedium himalaicum*, *Didiciea cunninghamii*, *Diplomeris hirsuta*, *Paphipedilum venustum*, *Zeuxine pulchra*, *Aconitum ferox*, *Cotoneaster simonsii*, *Picrorrhiza kurrooa*, *Acronema pseudotonera*, *Angelica bulbigena*, *Ceropegia hookeri*, *C. lucida*, *Codonopsis affinis*, *Rhopalocnomis phalloides*, *Carex kingiana*, *Lloydia himalensis*, *Aphyllorchis parviflora*, *Calanthe alpina*, *Ophiorrhiza lucida*, *Nardostachys grandiflora*, *Dennataedtia elwesii*, *Mecodium levingei*, *Panax pseudoginseng*, *Calamus inermis*, *Livistonia jenkisiana*, *Begonia rupicola*, *B. satrapis*, *B. sanctata*, *Lagerstroemia minuticarpa*, *Vanda spectabilis*, *Cyclogramma squanaestipes*, *Oreopteris elwesii*, *Christiopteris tripicuspis*, *Rhynchospora sikkimensis*, etc.

### Endemic plants

Endemics constitute another important element of biologically interesting plants. Being confined to narrow and restricted ecological niches, they are more prone to extinction due to adverse biotic or natural

factors. Sikkim as such has comparatively less number of endemics (which are confined to present political boundaries of Sikkim) because many of them range from Nepal to Bhutan. It is estimated that the total number of endemics truly confined to present Sikkim may be *ca* 2 percent of the total number in the flora elements. These include *Agrostis neodebilis*, *Calamagrostis tripilifera* var. *tripilifera*, *C. tripilifera* var. *cumminsi*, *Catabrosa aquatica*, *Cyathopus sikkimensis*, *Drepanostachyum intermedium*, *Poa gammieana*, *Trisetum sikkimense*, *Carex kingiana*, *Rhynchospora sikkimensis*, *Coelogyne treutleri*, *Anaphalis cavei*, *A. hookeri*, *A. subumbellata*, *Artemisia thellungiana*, *Blumea sikkimensis*, *Cremanthodium decaisnei* f. *clarkei*, *C. palmatum* ssp. *benthamii*, *Crepis atropappa*, *Gentiana glabriuscula*, *G. prainii*, *G. pluviarum*, *G. recurvata*, *Inula macrosperma*, *Jaeschkea microsperma*, *J. smithii*, *Ligularia dur*, *L. hookeri* ssp. *clarkei*, *L. pachycarpa*, *Saussurea forrestii*, *S. lineana*, *S. nimborum*, *S. obscura*, *S. pantlingiana*, *Swertia ramosa*, *S. rex*, etc. besides many more.

To conserve the depleting resources of this region, several attempts are being made. Kanchanjanga National Park, Fambongla Wildlife sanctuary and Kabi sacred grove are good examples where several endangered taxa are conserved. There are some botanical gardens viz. Jawaharlal Botanic Garden, Saramsta Botanic Garden and Orchid sanctuary, Rhododendron sanctuary near Yumthang, etc., wherein exist and insist conservation of many species is being attempted. Different sacred grooves situated in various parts of the state are playing a very positive role. But at present the main emphasis is to relocate or recollect the threatened taxa and attempts should be made for their *in-situ* conservation. However, in some cases the help of advance technologies viz. Tissue culture technique etc. can be used with advantage. In addition to this, the areas of diversity centre like Pangolekha range, Tendong ridge, Sakyong valley, Dongbong valley etc. should be brought under full protection.

### Medicinal plants

Sikkim Himalayan region is the abode of a large variety of medicinal plants. *Prezwalskia tangutica*, *Nardostachys jatamansi*, *Picrorrhiza kurrooa*, *Aconitum luridum*, *Podophyllum hexandrum*, *Dactylorrhiza hatagirea*, *Taxus wallichiana*, *Ephedra gerardiana* and *Lycopodium clavatum* constitute the most important medicinal plants of the alpine zone. Several medicinal plants like *Dichroa febrifuga*, *Houttuynia cordata*, *Artemisia vulgaris*, *Rubia cordifolia*, *Panax pseudoginseng*, *Dioscorea deltoidea*, *Digitalis purpurea*, *Bergenia ciliata* are quite common in temperate and sub-temperate zones.

Tropical zone is also quite rich in the medicinal flora wherein plants viz. *Costus speciosus*, *Vitex negundo*, *Solanum viarum*, *Cissampelos pariera*, *Woodfordia fruticosa*, *Oroxylum indicum*, *Alstonia scholaris*, *Abroma augusta* and to some extent *Rauvolfia serpentina*, *Terminalia chebula*, *Hollarhena pubescens* etc. grow in good number.

### Species of Horticultural importance

As the Flora of Sikkim includes plants of tropical, temperate and alpine characters in great diversity, a large number of plants found wild in this state (or the Eastern Himalayas as such), are of great horticultural importance. Many of them have been introduced into the European gardens. These include the species like : *Hedychium gardenerianum*, *Luculia gratissima*, *Allium wallichii*, *Acer oblongum*, *Anemone vitifolia*, *Arisaema griffithii*, *Berberis aristata*, *B. asiatica*, *B. sikkimensis*, *Bergina ciliata*, *Betula utilis*, *Boenninghausenia albiflora*, *Cautleya gracilis*, *C. spicata*, *Cymbidium cyperifolium*, *Daphne bholua*, *Juniperus recurva*, *Mahonia acanthifolia*, *Meconopsis bella*, *Meillia thyrsiflora*, *Paris polyphylla*, *Pleione praecox*, *Polygonatum oppositifolium*, *Prunus cerasoides*, *Rhododendron anthopogon*, *R. arboreum*, *R. barbatum*, *R. hodgsonii*, *R. nivale*, *Rosa macrophylla*, *R. sericea*, *Vandopsis undulata*, *Viburnum cordifolium*, *Primula* spp. and many others. But still several species of *Corydalis*, *Gentiana* and *Primula* being of interest and beauty, await introduction.

### Food plants

There are over 350 species of flowering plants and Pteridophytes found wild in diverse localities of Sikkim which may serve as emergency life-saving food-products. These include : flowers of *Urtica dioica*, *U. parviflora* (Sisnoo-Nep.) ; rhizomes of *Dioscorea* species (Tarul-Nep.) ; fruits of *Aesandra butyracea* (Chiwari-Nep, Yelkung-Lep.) ; *Calamus erectus* (Betfal-Nep., Rue-Lep.) ; *Elaeagnus conferta* (Malindo-Nep.) ; *Heracleum lanatum* (Chimpin-Nep.) ; *Podophyllum hexandrum* (Papri-Nep.) ; *Machilus edulis* (Lepcha-Kawla, Phunchey-Nep., Phom-Kung-Lep.) ; *Melia eubia* (Lapsi-Nep., Silot-Kung-Lep.) ; *Morus australis* (Sanukimbu-Nep., Mekrape Kung-Lep.), *Terminalia chebula* (Hara-Nep., selim pot-Lep.), *Zanthoxylum acanthopodium* (Bogay Timur-Nep., Nangryupot-Lep.) ; leaves of *Phytolacca acinosa* (Jaringo-Nep.) ; young shoots of *Rheum nobile* (Tohuka-Nep.) *Diplazium esculentum*, sheath from young shoots of *Polygonum molle* and *Ficus virens*; tubers of *Satyrium ciliatum* (Khiru-Tibetan) ; flower buds of *Bauhinia purpurea* ; inflorescence of *Tupistra natans* (Nakima-Nep.). Leaves of *Camellia*

*kissii* and bark of *Betula* spp. are used for making tea, white millet. *Rhododendron* (Flowers), Junipers, corn, East Himalayan cherry etc. are brewed as local wine which are named after the source plant viz. Guras wine, Cherry brandy, Juniper wine etc.

### Fire-wood yielding species

Due to the total dependence of the rural folk on fire wood for cooking and warming of the houses, any woody plant is cut and used as a fire wood ; yet some important firewood yielding species include : *Alnus nepalensis* (Uti-Nep.), *Betula cylindrostachys* (Saur-Nep.) *Castanopsis indica*, *Engelhardtia spicata* (Mauwa-Nep.), *Toona ciliata* (Tooni-Nep.), *Cryptomeria japonica* (Dhupi-Nep.), *Acer campbellii* (Kapasey-Nep.), *Schima wallichii* (Chilaune-Nep.), etc. At higher elevations even the plants like *Abies densa*, *Tsuga dumosa*, *Picea smithiana*, *Rhododendron* spp. *Larix griffithiana* are also used.

### Timber yielding species

Most important timber yielding species of the State include *Shorea robusta*, *Tectona grandis*, *Juglans regia*, *Castanopsis indica*, *Quercus lamellosa*, *Toona ciliata*, *Cryptomeria japonica* and *Terminalia myriocarpa*.

### Dye yielding plants

Most important plants used on commercial scale include : roots of *Rumex nepalensis* (Halhale-Nep.), stem of *Ruia manjith* (Majitho-Nep.); bark of *Mahonia nepalensis* (Kerapsing-Bhutia) ; fruits of *Dichroa febrifuja* (Basak-Nep., Gebokhamok-Lep.); leaves of *Symplocos glomerata* (Sungji-Nep.) ; bark of *Juglans regia* (Okhar-Nep.) etc. In addition to these several other dye yielding plants viz. *Byxa orellena*, *Mallotus philippensis*, several spp. of *Indigofera* etc. occur wild in the state.

### Fodder yielding species

Although a large number of species are employed for feeding the livestock, yet the preferred ones include *Ficus auriculata*, *F. oligiodon*, *F. hirta*, *F. hispida*, *F. virens*, *F. clavata*, *F. nemoralis*, *Sauria nepalensis*, *Morus alba*, *Brasssiopsis mitis*, *Artocarpus lakoocha*, *Grewia oppositifolio*, *Litsea polyantha* etc.

### Botanical curiosities

Several examples of biologically very interesting plants in Sikkim Flora include the insectivorous plants like *Drosera burmanii*, *Pinguicula alpina*, *Utricularia* spp. (*Lentibulariaceae*), beautiful parasites like *Aeginetia indica* (*Orobanchaceae*) etc. Several plants, which grow especially in the high alpine meadows, survive extreme adverse ecological conditions by special adaptations; e.g. woolly species of *Saussurea* (*S. gassypiphora*) or cushion like or bushy habit (species of *Arenaria*, *Festuca*, *Juniperus*, *Gaultheria*, *Saxifraga* etc.). Some of the very ancient living angiosperms viz. *Magnolia pterocarpa* (*Magnoliaceae*), *Tetracentron sinense* var. *himalayana* (*Tetracentraceae*), *Talauma hodgsonii* (*Magnoliaceae*) occur in this state. Several medicinal plants like *Podophyllum hexandrum*, *Panax pseudoginseng*, *Dactylorrhiza hatagirea*, *Picrorrhiza kurrooa*, *Nardostachys grandiflora*, *Berberis aristata*, *B. asiatica*, *Valeriana wallichii*, *Ephedra gerardiana* var. *sikkimensis*, *Taxus wallichiana*, *Mandragora caulescense*, *Aconitum ferox*, *A. spicatum*, *Dioscorea deltoidea*, *Rauvolfia serpentina* etc. which created sensational news are natural components of Sikkim Flora.

A large number of epiphytes such as foliose lichen; a variety of mosses and ferns cover available space on the bark of the roots suspended in the air with the ability to absorb moisture from the mist and the clouds. Some species of *Rhododendron*, *Impatiens* (1 sp.) *Aeschennanthes*, *Polygonatum*, *Cautleya*, *Hedychium*, *Gonatanthus* and many orchids and aroids are epiphytic in these forests.

### Sacred groves

Sacred groves are playing important role in 'in-situ' conservation of the indigenous elements of the Flora and Fauna of Sikkim. Most of these are the place of worship and have Monastery at the summit. A few like Kabi-sacred grove being the place of union of Lepchas and Bhutias, are of historical importance. Many of them are declared as 'rearserve forests' and are well protected from the biotic pressure. Khetchipuri Sacred-grove in West district, Mt. Mainam, Rabong, Tendong Sacred groves in South district, Churten Sacred grove in East district and Kabi Sacred-grove in North district are a few good examples where a variety of precious elements of Flora and Fauna are well protected. *Cyathea spinulosa* and *C. gigantea* the tree-ferns which are under threat due to demand of their trunks in orchid-culture and trade, are well protected in Churten Sacred-grove. *Camellia kissi* the wild-tea is common in the protected woods around Khetchipheri lake. 'Red-Panda' (*Ailurus fulgens*) the State-Animal of Sikkim-finds the dense

thickets of Kabi Sacred-grove quite suitable for its inhabitation. *Dendrobium nobile* the State-Flower of Sikkim is also quite common here.

### Conservation aspects

Vavilov (1951) was very correct in saying that "many of the areas of centre of origin of crop plants are the areas where the tribal people live, and sooner or later the Governments of these regions, are bound to uplift them socially and economically. Once these communities are in different socio-economic milieu, the working of thousands of years of natural selection will be lost because the people would like to go in for high out-put agriculture." This statement is very true in case of Sikkim.

During the recent past a great deal of damage has been done to the richness of the biodiversity of Sikkim Himalayas. The forests have been denuded by the haphazard felling of trees for timber, through unmanaged grazing, road-construction activities etc. Rural folk of Sikkim still depend totally on firewood for cooking and also for warming their houses. Frequent landslides resulting from deforestation are swallowing several habitats of many biologically and economically important plants even before they or their utility is known to the society.

Not only deforestation, but even afforestation programmes are also responsible to a greater extent for the loss of biodiversity of Sikkim Flora. Plantation of exotic trees like *Cryptomeria japonica*, *Pinus patula* etc. may have added to the glamorous green-cover but the fact is that because of its impact on soil, several precious elements of the ground flora are getting lost. Actually the indigenous species like *Alnus nepalensis*, *Duabanga grandiflora*, *Terminalia myriocarpa* etc. should be included in afforestation programme. Now a days great emphasis is being paid on promotion of Tourism in the State which is showing a disruptive influence on local traditional and social mores by introducing new and not necessary desirable life-styles, and has destructive effect on biodiversity as well.

Because of large scale cultivation of large-cardamom which is a major revenue yielding crop of the State, several precious elements of ground Flora (e.g. *Paphiopedilum venustum*-the lady's slipper orchid) are getting lost.

Another major threat to the floristic diversity is the mushroom growth of small and large scale Hydel-power projects. These are causing an irreparable damage to Flora of the State.

Being the border line state defence set-ups in Sikkim cannot be avoided. But it has definitely resulted in a large scale deforestation and soil erosion because the impact of army activities on the fragile ecosystem and geological aspects have not been taken into consideration.

Although several botanical expeditions have been made to Sikkim since 1843, yet even today any serious botanical exploration yields a number of novelties such as new taxa, new records, and many interesting plants, some of which are of great economic and botanical importance. Therefore, our present knowledge about the plant resources of Sikkim is not the last word on the real situation in this region. Still much is to be done and much is to be known about the hidden 'Green-Gold' treasure of the State.

The strategy of utilization of plant resources of the Sikkim Himalayas is to be drawn after taking into consideration all the factors and to ensure that the large variety of flora of this region not only continues to survive but maintains conditions for the evolution of the flora i.e. for speciation or origin of new taxa.

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## PLAN OF ENUMERATION

The families are arranged in the sequence of Bentham & Hooker's *Genera Plantarum* (1862 - 63) which was adopted in J.D. Hooker's *Flora of British India* (1872 - 97), but their delimitations have sometimes been amended in accordance with later concepts. For example Scitamineae of *Flora of British India* (FBI) is here divided into Zingiberaceae, Cannaceae, Marantaceae and Musaceae. Genera and species are listed alphabetically. A good number of exotic taxa have been included, especially those which have become or are becoming naturalised or have become prominent feature of the general vegetation. For each species, the accepted correct name with its place and date of publication, basionym, if any, and a few synonyms relevant to nomenclature or to earlier important regional publications are given. The local names are given in capital letters followed by the name of the languages in brackets. The local language are abbreviated as Lep. (Lepcha), Nep. (Nepali), and Bhut. (Bhutia), Tib. (Tibetan). Other abbreviations used in literature citations are listed separately.

Only brief distinguishing characters are mentioned. The information about the distribution within Sikkim is provided. The localities of recorded occurrence are followed by the altitudes of occurrence. The period of flowering/fruiting is also provided in most of the cases. Additional information regarding economic importance or any other peculiarity is sometimes given under notes.

### BURMANNIACEAE

(R.C. Srivastava)

#### BURMANNIA L.

**Burmannia coelestis** D. Don, Prodr. Fl. Nep. 44. 1825; Hook. f., F.B.I. 5: 665. 1888 ; Hajra in Fasci. Fl. India 19 : 9. 1988.

Herbs, up to 20 cm tall. Leaves linear-lanceolate, acute or acuminate. Flowers blue or purplish with yellow lobes.

Sikkim, *s. l.* ; up to 1500 m.

*Fl. & Fr.* : June - Nov. In marshy habitats.

**B. disticha** L., Sp. Pl. 1 : 287. 1753; Hook. f., F.B.I. 5 : 644. 1888 ; Hajra, *l. c.* 11.

Herbs, up to 50 cm tall. Leaves linear or lanceolate, 2 - 12 x 0.5 - 1.5 cm, acute or acuminate at apices. Flowers blue or purple with yellow tipped greenish lobes.

Sikkim, *s.l.* ; 1000 - 1500 m.

*Fl. & Fr.* : June - Sept. In paddy fields.

**B. nepalensis** (Miers) Hook. *f.*, F.B. I. 5 : 666. 1888 ; Hajra, *l.c.* 12. *Gonyanthes nepalensis* Miers in Trans. Linn. Soc. London 18 : 537. t. 38. f. 1. 1841.

Herbs, up to 15 cm tall. Leaves reduced to scales, appressed to stem, elliptic. Flowers white with yellow tinge.

Sikkim, *s.l.* ; 1000 - 1500 m.

*Fl.* : July - Sept. In moist habitats.

## ORCHIDACEAE

(R.C. Srivastava)

### ACAMPE Lindl.

**Acampe ochracea** (Lindl.) Hochr. in Bull. New York Bot. Gard. 6 : 270. 1910. *Saccolabium ochraceum* Lindl. in Edw., Bot. Reg. Misc. 2. 1842 ; Hook. *f.*, F.B.I. 6 : 62. 1890.

Epiphytes. Leaves oblong. Flowers yellow, *ca* 10 mm across, borne on leaf-opposed 2 - 6-flowered panicles.

In valleys.

*Fl.* : Nov. - Dec.

**A. papillosa** (Lindl.) Lindl., Fol. Orchid. 2. 1853. *Saccolabium papillosum* Lindl. in Bot. Reg. t. 1552. 1841 ; Hook. *f.*, F.B.I. 6 : 63. 1890.

Epiphytes. Leaves coriaceous, curved, conduplicate, apically truncate or obliquely notched. Flowers yellow with brown base, *ca* 8 mm across.

Found at lower elevations.

*Fl.* : Oct. - Jan.

*Notes* : Roots tonic; said to have cooling effect, useful in rheumatism.

**A. rigida** (Buch. - Ham. ex J.E. Sm.) Hunt in Kew Bull. 24 : 98. 1970. *Aerides rigida* Buch. Ham. ex J.E. Sm. in Rees, Cyclop. 39, *Aerides* n. 12. 1819. *Saccolabium longifolium* (Lindl.) Hook. f., F.B.I. 6 : 62. 1890 ; King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 220. t. 292. 1898. *Acampe longifolia* (Lindl.) Lindl., Fol. Orch. *Acampe* 1. 1853. *Vanda longifolia* Lindl., Gen. & Sp. Orchid. 215. 1833.

Epiphytes. Leaves oblong, coriaceous. Inflorescence leaf opposed, much shorter than the leaves.

Found in tropical valleys ; up to 1500 m.

*Fl.* : June.

#### ACANTHEPHIPIUM BL.

**Acanthephippium striatum** Lindl. in Bot. Reg. 241. 45. 1838 ; Hook. f., F.B.I. 5 : 816. 1890.

Terrestrial herbs with ovoid pseudobulbs. Leaves subcoriaceous, plicate, elliptic. Flowers dull white, suffused and blotched with yellow, the apices of sepals and petals purplish.

Sikkim, *s.l.* 600 1200 m.

*Fl.* & *Fr.* : April May.

**A. sylhetense** Lindl., Gen. & Sp. Orchid. 117. 1833 ; Hook. f., F.B.I. 5 : 815. 1890.

Terrestrial herbs with elongate - obpyriform pseudobulbs. Leaves elliptic. Flowers pale pink with bold red lines ; lip yellow tinged.

Sikkim, *s. l.* ; 540 900 m.

*Fl.* : July Aug.

#### ACRIOPSIS Reinw. ex Bl.

**Acriopsis javanica** Reinw. ex Bl., Bijdr. 377. 1825 ; Hook f., F.B.I. 6 : 79. 1890. *Acriopsis harai* Tuyama in J. Jap. Bot. 39 : 129. 1964 ; Pradhan, Ind. Orch. 2 : 717. 1979.

Sympodial epiphytes. Rhizomes creeping. Pseudobulbs crowded. Flowers 2 - 40 mm apart, 8 14 mm across, lip 3 lobed.

In the vicinity of Gangtok ; *ca* 1000 m.

*Fl.* : April.

**ACROCHAENE** Lindl.

**Acrochaene punctata** Lindl., *Fol. Orchid.* 1. 1853 ; Hook *f.*, *F. B.I.* 5 : 783. 1890.

Epiphytic herbs with ovoid pseudobulbs. Leaf solitary, oblong, petiolate. Flowers pale yellowish green, dotted and streaked with purplish brown.

Sikkim, *s.l.* ; 1500 1800 m.

*Fl.* : Oct. Nov.

**AERIDES** Lour.

**Aerides multiflora** Roxb., *Pl. Corom.* 3 : 68. t. 271. 1820 ; Hook. *f.*, *F.B.I.* 6 : 44. 1890.

Epiphytic herbs with stout stem. Leaves narrowly oblong. Flowers white, marked with pink or purple.

In tropical valleys ; up to 1100 m.

*Fl.* : April.

**A. odorata** Lour., *Fl. Cochinch.*, 2 : 528. 1790 ; Hook. *f.*, *F. B.I.* 6 : 47. 1890.

Epiphytic herbs. Stems stout. Leaves flat, keeled oblong, unequally lobed at apex. Flowers white, spotted with pink.

Sikkim *s. l.* ; *ca* 1200 m.

*Fl.* : May June.

**AGROSTOPHYLLUM** Bl.

**Agrostophyllum brevipes** King & Pantl. in *Ann. Roy. Bot. Gard. Calc.* 8 : 156. t. 213. 1898.

Epiphytic herbs. Rhizomes narrow, covered with spreading subulate scales. Leaves linear-oblong, membranous. Flowers white, column and anther red.

Sikkim, *s.l.* ; *ca* 600 m.

*Fl.* : July.

**A. callosum** Reichb. *f.* in *Sem. Fl. Vit.* 296. 1868 ; Hook. *f.*, *F.B.I.* 5 : 824. 1890.

Epiphytic herbs. Rhizomes stout, branched, clothed with triangular scales. Leaves sessile, linear-oblong. Flowers reddish, borne in heads.

Sikkim, *s.l.* ; *ca* 1800 m.

*Fl.* : June July.

**A. khasianum** Griff. in Calc. J. Nat. Hist. 4 : 378. t. 19. 1844 ;  
Hook. *f.*, F.B.I. 5 : 824. 1890.

Epiphytic herbs with tufted double fusiform compressed, sheathed stem. Leaves narrowly oblong, subcoriaceous. Flowers white with pale yellow patches.

In tropical valleys.

*Fl.* : Aug.

**A. myrianthum** King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 :  
155. t. 211. 1898.

Epiphytic herbs. Rhizomes stout, clothed with adpressed lanceolate scales. Leaves linear-oblong, sub-coriaceous. Flowers yellow.

Teesta valley ; *ca* 3600 m.

*Fl.* : Aug.

#### AMITOSTIGMA Schltr.

**Amitostigma puberula** (King & Pantl.) Schltr. in Fedde Repert.  
4 : 92. 1919. *Orchis puberula* King & Pantl. in Ann. Roy. Bot. Gard.  
Calc. 8 : 304. 1898.

Terrestrial herbs, less than 15 cm tall. Leaf solitary, linear.  
Flowers white.

Lachung valley ; *ca* 3000 m.

*Fl.* : July.

#### ANOECTOCHILUS Bl.

**Anoectochilus crispus** Lindl. in J. Linn. Soc. 1 : 180. 1857.  
*Odontochilus crispus* (Lindl.) Hook. *f.*, F.B.I. 6 : 99. 1890.

Terrestrial herbs, up to 20 cm tall. Leaves ovate, acute. Sepals  
green ; petals and lip white with yellow tinges on sac.

Mahalderam Peak (?) ; *ca* 1800 m.

*Fl.* : Sept.

**A. elwesii** (Clarke *ex* Hook. *f.*) King & Pantl. in Ann. Roy. Bot.  
Gard. Calc. 8 : 296. t. 394. 1898. *Odontochilus elwesii* Clarke *ex* Hook.  
*f.*, F.B.I. 6 : 100. 1890.

Terrestrial herbs, up to 25 cm tall. Leaves ovate. Sepals green with white mid-ribs and brown tips. Petals white with brown tips. Lip white, teeth of claw brown, basal sac green.

Chungthang, Tendong ; 900 1800 m.

*Fl. & Fr.* July-Aug.

**A. grandiflorus** Lindl. in J. Linn. Soc. 1 : 179. 1857. *Odontochilus grandiflorus* (Lindl.) Benth. in Gen. Pl. 2 : 598. 1883 ; Hook. f., F.B.I. 6 : 100. 1890.

Terrestrial herbs, up to 45 cm tall. Leaves elliptic. Flowers green, mottled with white and tipped with pink.

Tendong ; 1200 1800 m.

*Fl.* : July.

**A. lanceolatus** Lindl., Gen. & Sp. Orchid. 499. 1840. *Odontochilus lanceolatus* (Lindl.) Bl., Orchid. Arch. Ind. 81 1858 ; Hook. f., F.B. I. 6 : 101. 1890.

Terrestrial herbs, up to 30 cm tall. Leaves ovate-lanceolate. Flowers pale green ; dorsal sepal brown-tinged ; lip bright yellow ; anthers pink.

Yoksum ; 1500 2100 m.

*Fl.* : July Sept.

**A. roxburghii** (Wall.) Lindl. in Royle, Illustr. Bot. Himal. 368. 1839 & Gen. & Sp. Orchid. 499. 1840 ; Hook. f., F.B.I. 6 : 95. 1890. *Chrysobaphus roxburghii* Wall., Tent. Fl. Nep. 37, t. 27. 1826.

Plants including inflorescence less than 30 cm tall. Leaves ovate or ovate-oblong, velvety, purplish red with golden reticulations. Flowers white.

In tropical valleys.

*Fl.* : Nov.

**A. sikkimensis** King & Pantl. in J. Asiat. Soc. Beng. 65 : 124. 1896.

Plants less than 23 cm tall. Leaves elliptic ovate, velvety, dark red, with golden yellow veins on upper surface, dull red beneath. Flowers olive green and white.

Sikkim, *s.l.*; 900 1500 m.

*Fl.* : Sept.

**ANTHOGONIUM** Wall. ex Lindl.

*Anthogonium gracile* Wall. ex Lindl., Gen. & Sp. Orchid. 426. 1840 ; Hook. f., F.B.I. 5 : 822. 1890.

Terrestrial herbs with small ovoid pseudobulbs. Leaves 2-5, linear, plicate, sessile, sheathing. Flowers white or rose coloured ; lip white with dark purple spots ; anthers bright yellow.

On way to Lachen ; 1200 - 2100 m.

*Fl.* : Sept.

**APHYLLORCHIS** Bl.

*Aphyllorchis alpina* King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 26. t. 347. 1898.

Terrestrial herbs up to 75 cm tall. Stems sheathed. Flowers yellowish red.

Singale La, Mon Lepcha (?) ; *ca* 4200 m.

*Fl.* : July - Aug.

*A. montana* (Thw.) Reichb. f. in Linnaea 41 : 57. 1876 ; Hook. f., F.B.I. 6 : 116. 1890. *Apturiamontana* Thw., Enum. Zeyl. 301. 1861. *Aphyllorchis prainii* Hook f., F.B.I. 6 : 117. 1890.

Terrestrial herbs, 60 cm tall. Whole plant pale brown except yellow pollinia.

Sikkim, *s.l.* ; *ca* 600 m.

*Fl.* Aug.

*A. pantlingii* W.W. Smith in Rec. B.S.I. 4 : 243. 1911. *A. parviflora* King & Pantl. in J. Asiat. Soc. Beng. 65 (2) : 128. 1896 *et* in Ann. Roy. Bot. Gard. Calc. 8 : 262. t. 348. 1898.

Terrestrial herbs, *ca* 35 cm tall. Almost all parts pale brown except white anthers and yellow pollinia.

Lachung ; *ca* 3000 m.

*Fl.* : July.

**APOSTASIA** Bl.

*Apostasia wallichii* R. Br. in Wall., Pl. Asiat. Rar. 1 : 75. t. 84. (*A. odorata*) 1830 ; Hook. f. F.B.I., 6 : 175. 1890.

Terrestrial herbs, 30-60 cm tall. Leaves linear, lanceolate. Flowers yellow.

Sikkim, *s. l.*; (*cf.* Hara *et al.* 1978).

#### APPENDICULA Bl.

**Appendicula cornuta** Bl., Bijdr. 7 : 302. 1825. *A. bifaria* Lindl. in Hook. *f.*, F.B.I. 6 : 84. 1890.

Herbs with tufted, slender, leafy, often compressed stem. Leaves many, lanceolate. Flowers white, flushed with yellow.

In tropical valleys.

*Fl.* : Aug.

#### ARACHNIS Bl.

**Arachnis cathcartii** (Lindl.) J.J. Smith in Naturw. Tijdrachr. Nederl. Ind. 72 : 75. 1912. *Vanda cathcartii* Lindl., Fol. Orchid. Vanda, 8 : 1853. *Arachnanthe cathcartii* (Lindl.) Benth. in Benth. & Hook. *f.*, Gen. Pl. 3 : 573. 1883 ; Hook. *f.*, F.B.I. 6 : 27. 1890.

Epiphytic herbs. Stems stout, pendulous. Leaves sessile, oblong, unequally and obliquely bifid at apex. Flowers brown-yellow on upper surface.

Sikkim, *s. l.* ; 900 1800 m.

*Fl.* : March April.

#### ARUNDINA Bl.

**Arundina graminifolia** (D. Don) Hochr. in Bull. New York Bot. Gard. 6 : 270. 1910. *Bletia graminifolia* D. Don., Prodr. Fl. Nep. 29. 1829. *Arundina chinensis* Bl., Bijdr. 8 : 502. 1825 ; Hook. *f.*, F.B.I. 5 : 857. 1890. *A. bambusifolia* Lindl., Gen. & Sp. Orchid. 125. 1830 ; Hook. *f.*, *l.c.*

Terrestrial herbs. Stems reed-like, up to 2 m tall. Leaves narrowly oblong-lanceolate. Flowers pinkishpurple.

Gangtok, Jorethang-Namchi, Teesta valley. Rangeet valley ; *ca* 1750 m.

*Fl. & Fr.* : April Sept.

#### ASCOCENTRUM Schltr.

**Ascocentrum ampullaceum** (Roxb.) Schltr. in Fedde Repert. 1 : 975. 1913. *Aerides ampullaceum* Roxb., Fl. Ind. 3 : 476. 1832.

*Saccolabium ampullaceum* (Roxb.) Lindl., Sert. Orchid. t. 17. 1838 ;  
Hook. f., F.B.I. 6 : 64. 1890.

Epiphytic herbs without pseudobulbs. Leaves narrowly oblong, keeled, coriaceous, mottled with brown. Flowers pink, except deep purple pollinia.

Sikkim, *s.l.* ; 300 1000 m.

*Fl.* : March April.

#### **BIERMANNIA** King & Pantl.

*Biermannia bimaculata* (King & Pantl.) King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 200. t. 267. 1898. *Sarcochilus bimaculatus* King & Pantl. in J. Asiat. Soc. Beng. 44 : 340. 1875.

Epiphytes. Leaves linear - oblong. Flowers white, with 2 brown blotches on the calli or lip.

Teesta valley ; *ca* 450 m.

*Fl.* : July.

#### **BRACHYCORYTHIS** Lindl.

*Brachycorythis obcordata* (Buch. - Ham. *ex* D. Don) Summerh. in Kew Bull. 243. 1955. *Orchis obcordata* Buch. - Ham. *ex* D. Don, Prodr. Fl. Nep. 23 : 1825, *non* Willem. 1796. *Habendria galeandra auct. non* Benth : Hook. f., F.B.I. 6 : 163. 1890.

Terrestrial herbs, with globose or oblong tubers. Leaves oblong. Flowers pale purple.

Sikkim, *s.l.* ; 1000 2000 m.

#### **BULBOPHYLLUM** Du. Petit Thouars.

*Bulbophyllum affine* Lindl., Gen. & Sp. Orchid. 48. 1830 ; Hook. f., F.B.I. 5 : 756. 1890 ; King & Pantl., Ann. Roy. Bot. Gard. Calc. 8 : 67. t. 91. 1898.

Epiphytes. Pseudobulbs cylindrical, *ca* 7.5 mm apart. Leaves narrowly oblong, obtuse at apex. Flowers pale green with purple nerves.

Teesta valley, Zemu, Tadong Rumtek ; 600 1000 m.

*Fl.* : June Sept.

*B. andersonii* (Hook. f.) J.J. Smith in Bull. Jard. Bot. Buitenz. 2, 8 : 22. 1912. *Cirrhopetalum andersonii* Hook. f., F.B.I. 5 : 777. 1890.

Epiphytes. Pseudobulbs elliptic-ovoid, fibrous at base. Leaf oblong, subacute. Flowers pink with minute dark spots.

Teesta valley ; *ca* 450 m.

*Fl.* : Oct.

**B. bisetum** Lindl. in Ann. Nat. Hist. 10 : 186. 1842 ; Hook. *f.*, F.B.I. 5 : 767. 1890.

Epiphytes. Pseudobulbs ovoid conic, with a fibrous sheath at base. Leaves narrowly oblong lanceolate, acuminate and obliquely bifid at apex. Flowers purplish.

Sikkim, *s.l.* ; 1500 1800 m.

*Fl.* Sept.

*Notes* : Flowers are remarkable for the spurs which run parallel to the dorsal sepal and the petals.

**B. bootanense** (Griff.) Par. & Reichb. *f.* in Trans. Linn. Soc. 30 : 153. t. 32. f. 2. 1874. *Cirrhopetalum bootanense* Griff., Notul. 3 : 297. 1851. & Ic. Pl. Asiat. t. 299. 1851 ; Hook. *f.*, F.B.I. 5 : 775. 1890.

Epiphytes. Pseudobulbs narrowly ovoid. Leaves fleshy, narrowly elliptic, obtuse or subacute. Flowers red with dark red spots.

Sikkim, *s.l.* ; tropical valleys.

*Fl.* : April.

**B. careyanum** (Hook.) Spr., Syst. Veg. 3 : 732. 1826 ; Hook. *f.*, F.B.I. 5 : 760. 1890. *Anisopetalon careyanum* Hook., Fl. Exot. 2 : t. 149. 1825.

Epiphytes. Pseudobulbs ovoid-subsessile. Flowers brownish.

Sikkim, *s.l.* ; 450 1200 m.

*Fl.* Oct. Dec.

**B. caudatum** Lindl., Gen. & Sp. Orchid. 56. 1830 ; Hook. *f.*, F.B.I. 5 : 759. 1890.

Epiphytes. Pseudobulbs ovoid, compressed, furrowed. Leaves ovate-lanceolate, acute, coriaceous. Flowers white.

Gangtok ; *ca* 1800 m.

*Fl.* : April July.

**B. cauliform** Hook. *f.* in Hook., *l.c.* Pl. t. 2036. 1890 & F.B.I. 5 : 758. 1890.

Epiphytes. Pseudobulbs cylindric-elliptic. Leaves oblong, obtuse. Flowers green, flushed with brown.

Sikkim, *s.l.* ; 1500 1800 m.

*Fl.* : July.

**B. clarkeanum** King & Pantl. in *J. Asiat. Soc. Beng.* 64 : 333. 1895.

Epiphytes. Pseudobulbs cylindric or ovoid. Leaves narrowly elliptic-oblong, notched at apices. Flowers white with orange-red tips.

Sikkim, *s.l.* ; 450 m.

*Fl.* : June.

**B. cornu-cervi** King & Pantl. in *J. Asiat. Soc. Beng.* 64 : 332. 1895.

Epiphytes without rhizomes. Pseudobulbs minute, 2 3 mm, crowded, globular. Leaves ovate - elliptic, sessile or subsessile. Flowers green with reddish brown margins ; lip yellow inside, reddish brown outside.

Sikkim, *s.l.* ; *ca* 759 m.

*Fl.* : July.

**B. cylindraceum** Lindl., *Gen. & Sp. Orchid.* 53 : 1830 ; King & Pantl., *l.c.* 70 : t. 96. 1898.

Epiphytes without pseudobulbs. Leaves oblong-elliptic, acute. Flowers blackish purple.

Sikkim, *s.l.* ; 1600 2400 m.

*Fl.* : Oct. Jan.

**B. ebulbum** King & Pantl. in *J. Asiat. Soc. Beng.* 64 : 334. 1895.

Epiphytes without pseudobulbs. Leaves solitary, oblong-lanceolate. Flowers pale green.

Sikkim, *s.l.*

**B. eublepharum** Reichb. *f.* in *Walp. Ann.* 6 : 252. 1861 ; Hook. *f.*, F.B.I. 5 : 746. 1890.

Epiphytes. Rhizomes lacking. Pseudobulbs cylindric, closely placed. Leaf oblong. Flowers green.

Sikkim, *s.l.* ; 1800 - 2100 m.

Fl. : Aug.

**B. elatum** (Hook. *f.*) J.J. Sm. in Bull. Jard. Bot. Buitenz. 3, 3 : 23. 1912. *Cirrhopetalum elatum* Hook. *f.*, F.B.I. 5 : 775. 1890.

Epiphytic caespitose herbs. Pseudobulbs cylindric. Leaves narrowly oblong, obtuse. Flowers dull yellow spotted.

Sikkim, *s.l.* ; 1500 - 1800 m.

Fl. : May.

**B. gamblei** (Hook. *f.*) Hook. *f.* in Hook. Ic. Pl. 3. t. 2039. 1890 & F.B.I. 6 : 188. 1890. *B. leptanthum* Hook. *f.* var. *gamblii* Hook. *f.*, *l.c.* 5 : 759.

Epiphytes. Pseudobulbs narrowly obpyriform or subcylindric. Leaves oblong-lanceolate, apically notched.

Sikkim, *s.l.* ; 1500 - 2100 m.

Fl. : July Aug.

**B. griffithii** (Lindl.) Reichb. *f.* in Walp. Ann. 6 : 247. 1881 ; Hook. *f.*, F.B.I. 756. 1890. *Sacropodius griffithii* Lindl., Fol. Orchid 6. 1855.

Epiphytes. Pseudobulbs caespitose, narrowly ovoid. Leaves sessile, narrowly oblong. Inflorescence 1 - flowered. Flowers yellowish with red - brown spots.

Lachung ; *ca* 2700 m.

Fl. : Aug.

**B. guttulatum** Wall. *ex* Hook. *f.*, F.B.I. 5 : 776. 1890. *Cirrhopetalum guttulatum* Hook. *f.*, *l.c.* *B. umbellatum* in Edw., Bot. Reg. 30. t. 44. 1844, *non* Lindl. 1830.

Epiphytes. Pseudobulbs caespitose, crowded, ovoid. Leaves elliptic-oblong, subacute. Flowers pale yellow, purple spotted.

Sikkim *s.l.* ; 600 - 1500 m.

Fl. : July Sept.

**B. gymnopus** Hook. *f.* in Hook. *f.*, Ic. Pl. 3, t. 2040. 1890 & F.B.I. 5 : 764. 1890.

Epiphytes. Pseudobulbs ovoid, sheathed at base. Leaves narrowly oblong, notched at apices. Flowers white.

Sikkim, *s.l.*

*Fl. & Fr.* : Nov. Dec.

**B. helenae** (O. Ktze.) J.J. Sm. in Bull. Bot. Gard. Buitenz. 2, 8 : 24. 1912. *Phyllorchis helenae* O Ktze., Rev. Gen. Pl. 2 : 676 1891. *Cirrhopetalum cornutum* Lindl. in Edw., Bot. Reg. 24 : Misc. 75. 1838 ; Hook. *f.*, F.B.I. 5 : 774. 1890.

Epiphytes. Pseudobulbs narrowly ovoid, compressed. Leaf narrowly oblong, obliquely notched. Flowers reddish brown.

Sikkim, *s.l.*

*Fl.* : May June.

**B. hirtum** (J. E. Sm.) Lindl., Gen. & Sp. Orchid. 51 : 1830 ; Hook. *f.*, F.B.I. 5 : 672. 1890. *Stelis hirta* J.E. Sm. in Res. Cyclop. 34. 1816.

Epiphytes. Pseudobulbs closely placed, ovoid oblong, terete with a scarious terminal collar, oblong oblanceolate, flaccid, absent during flowering time. Flowers yellow, green outside, white inside.

Sikkim, *s. l.* ; 900 1800 m.

*Fl.* : Oct. Jan.

**B. hymenanthum** Hook. *f.* in Hook., Ic. Pl. 3 : t. 2046. 1890 ; Hook. *f.*, F.B.I. 5 : 767. 1890.

Epiphytic herbs with thread like rhizomes. Pseudobulbs lacking. Leaves sessile, ovate - elliptic. Flowers yellowish, streaked with purple.

Lachung valley, Yoksum ; 1700 2400 m.

*Fl.* : May.

**B. leopardianum** (Wall.) Lindl., Gen. & Sp. Orchid. 48. 1830 ; Hook *f.*, F.B.I. 7 : 756. 1890. *Dendrobium leopardianum* Wall., Tent. Fl. Nepal 39 : t. 1826.

Epiphytes. Pseudobulbs obpyriform, crowded. Leaves elliptic-oblong. Flowers whitish or pale ochraceous, spotted with crimson.

Sikkim, *s.l.* ; 1700 2200 m.

*Fl.* : Oct. Nov.

**B. leptanthum** Hook. *f.*, F.B.I. 5 : 759. 1890.

Epiphytes. Pseudobulbs cylindric. Leaves narrowly oblong. Flowers yellowish green.

Sikkim, *s.l.* ; 900 m.

*Fl.* : July.

**B. histeri** King & Pantl. in J. Asiat. Soc. Beng. 64 : 34. 1895.

Epiphytes without rhizomes. Pseudobulbs narrowly ovoid, compressed. Leaves linear-oblong, tapering at both ends.

Ratong Chu ; 900 2100 m.

*Fl.* : May Sept.

**B. odoratissimum** (J.E. Sm.) Lindl., Gen. & Sp. Orchid. 55. 1830 ; Hook. *f.*, F.B.I. 5 : 758. 1890. *Stelis odoratissima* J.E. Sm. in Rees, Cyclop. 34 : Stelis no. 12. 1816.

Epiphytes. Pseudobulbs subcylindric. Leaves oblong-lanceolate, slightly notched at apex. Flowers white with yellow tinge.

Ratong Chu ; *ca* 100 m.

*Fl.* : May.

**B. ornatissimum** (Reichb. *f.*) J.J. Sm. in Bull. Jard. Bot. Buitenz. 2, 8 : 26. 1912. *Cirrhopetalum ornatissimum* Reichb. *f.* in Gard. Chron. 2 : 424. 1882 ; Hook. *f.*, F.B.I. 5 : 773. 1890.

Epiphytes. Pseudobulbs narrowly ellipsoid. Leaves oblong-obtuse and slightly notched at apices. Flowers yellowish green with purple markings.

Sikkim, *s.l.*

*Fl.* : Oct. Nov.

**B. pantlingii** Lucksom in J. Bombay Nat. Hist. Soc. 90 (3) : 551. 1993. *B. flavidum (flavida)* Lucksom *Ibid* 90 (1) : 71. 1993, *non* Lindl. 1840.

Epilithic herbs. Pseudobulbs ovoid, broadly ridged. Leaves 2, oblong-oblong-lanceolate, flaccid. Inflorescence solitary, from the base of pseudobulbs. Flowers orange yellow.

Phyangla R.F., Lachung valley R.F. ; 1000 2135 m.

*Fl. & Fr.* : July Dec.

**B. parvulum** Hook. *f.*, F.B.I. 5 : 778. 1890.

Epiphytes. Pseudobulbs ovoid. Leaves narrowly elliptic, subacute, sessile. Flowers drooping.

Sikkim, *s.l.* ; 2100 - 2700 m.

*Fl.* : Aug.

**B. piluliferum** King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 76. t. 104. 1898.

Epiphytes. Pseudobulbs caespitose, globose or depressed globose. Leaf fleshy, linear-oblong, obtuse. Flowers pale reddish brown with streaks of darker shade.

Sikkim, *s.l.* ; *ca* 300 m.

*Fl.* : May.

**B. polyrhizum** Lindl., Gen. & Sp. Orchid. 53. 1830 ; Hook. *f.*, F.B.I. 5 : 767. 1890.

Epiphytes. Pseudobulbs globular or ovoid. Leaves narrowly oblong, sessile. Flowers yellowish.

Teesta valley ; *ca* 450 m.

*Fl.* : April.

**B. protractum** Hook. *f.*, F.B.I. 5 : 758. 1890.

Epiphytes. Pseudobulbs cylindric. Leaves oblong, acute. Flowers pale yellow ; sepals orange in upper half.

Sikkim, *s.l.* ; 450 - 600 m.

*Fl.* : July.

**B. reptans** (Lindl.) Lindl., Gen. & Sp. Orchid. 51. 1830 ; Hook. *f.*, F.B.I. 5 : 768. 1890. *Tribrachia reptans* Lindl., Col. Bot. t. 41. a. 1825.

var. *reptans*

Epiphytes with thin, wiry branching rhizomes. Pseudobulbs obovate. Leaves linear-oblong. Flowers yellowish with purple spots.

Sikkim, *s.l.* ; 400 - 2400 m.

*Fl.*: Oct. - Nov.

var. **sub-racemosa** Hook. *f.*, F.B.I. 6: 769. 1890.

Sepals buff coloured, flushed with brown and spickled slightly with red ; petals coloured; lip yellow at tip.

Sikkim, s.l.

Fl.: Oct. Dec.

**B. retusiusculum** Reichb. f. in Gard. Chron. 1182. 1869. *Cirrhopetalum wallichii* Lindl., Gen. & Sp. Orchid. 59. 1830 ; Hook.f., F.B.I. 5: 776. 1890.

Epiphytes. Pseudobulbs ovoid. Leaves narrowly oblong, subacute, obliquely notched. Flowers deep violet, with darker spots.

Sikkim, s.l.; 1800 2250 m.

Fl.: July Aug.

**B. rigidum** King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 69. t. 94. 1898.

Epiphytes. Pseudobulbs lacking. Leaves rising direct from rhizome, each with a whorl of fibres at base. Flowers brownish yellow flushed with green, nerves purplish.

Sikkim, s.l. ;1800 m.

Fl. : May June.

**B. rolfei** (O.Ktze.) Seid. in Dansk. Bot. Ark. 33: 149. 1979. *Phyllorchis rolfei* O. Ktze., Rev. Gen. Pl. 677. 1891. *Cirrhopetalum parvulum* Hook. f., F.B.I. 5: 778. 1890.

Epiphytes. Pseudobulbs ovoid. Leaf narrowly elliptic, sub-acute. Flowers drooping.

Sikkim, s.l. ; 2100- 2700 m.

Fl.: Aug.

**B. sarcophyllum** ( King & Pantl. ) J.J. Sm. in Bull. Jard. Bot. Buitenz. 2, 8: 27. 1912. *Cirrhopetalum sarcophyllum* King & Pantl. in J. Asiat. Soc. Beng. 64 : 335. 1895.

Epiphytes. Pseudobulbs discoid. Leaves pendulous, fleshy, oblong, subfalcate, acute at apices. Flowers reddish brown, much mottled ; lip purple with dark purple blotches.

Sikkim, s.l. ; 900 1500 m.

Fl. : June Sept.

**B. scabratum** Reichb. f. in Walp. Ann. 6: 259. 1861 ; Seid. in Dansk. Bot. Ark. 29: 67. t. 24. 1973. *Cirrhopetalum caespitosum* Wall.

ex Lindl. in Edw. Bot. Reg. 24: Misc. 35. 1830 ; Hook. f., F.B.I. 5 : 775  
1890. *B. confertum* Hook.f., F.B.I. l.c. 757.

Epiphytic, caespitose herbs. Pseudobulbs much crowded, ovoid.  
Leaves linear-lanceolate, acute. Flowers ochraceous yellow.

Sikkim, *s.l.* ; 1200 m.

*Fl.* : April.

**B. secundum** Hook. f., F.B.I. 5: 764. 1890.

Epiphytes. Pseudobulbs crowded, turbinate, *ca* 7 mm in diam.  
Leaves narrowly oblong. Flowers pale purple with dark nerves.

Chungthang, Tendong ; 1800 2100 m.

*Fl.* : June July.

**B. sikkimense** (King & Pantl.) J.J. Sm. in Bull. Jard. Bot. Buitenz.  
2, 8: 12. 1912. *Cirrhopetalum sikkimensis* King & Pantl. in Ann. Roy.  
Bot. Gard. Calc. 8: 90. t. 125. 1898.

Epiphytes. Pseudobulbs ovoid-globose. Leaves oblanceolate, obtuse,  
obliquely notched, fleshy. Dorsal sepal greenish with few brownish red  
markings, lateral sepals ochraceous, minutely spotted with reddish  
brown. Petals ochraceous with three broad reddish brown nerves and  
purplish marginal cilia.

Sikkim, *s.l.*

*Fl.* : May.

**B. striatum** (Griff.) Reichb. f. in Walp. Ann. 6: 257. 1861. ;  
Hook. f., F.B.I. 5: 775. 1890. *Dendrobium striatum* Griff., Notul. 3:  
318. 1851.

Epiphytes. Pseudobulbs obpyriform. Leaf elliptic, retuse at apex,  
coriaceous. Flowers yellowish green with purple strips.

Sikkim, *s.l.* ; 2100 m.

*Fl.* : Oct.

**B. thomsonii** Hook.f., F.B.I. 5 : 764. 1890.

Epiphytes. Pseudobulbs subdiscoid. Leaf narrowly oblong, acute.  
Flowers yellowish white.

Sikkim, *s.l.* ; 1200 m.

*Fl.* : Sept.

**B. triste** Reichb. f. in Walp. Ann. 6: 253. 1861; Hook.f., F.B.I. 5: 768. 1890. *B. micranthum* Hook. f. l.c. ; S. Misra in Bull. Bot. Surv. India 22: 152. (1980) 1982. *B. alopecurum* Reichb. f. Gard. Chron. 2: 70. 1880; Hook.f., l.c. 770.

Epiphytes. Pseudobulbs turbinate with umbonate apices, closely placed or 1.2–2.5 cm apart; leafless during flowering. Leaves 2, from each pseudobulb, narrowly oblong, acute at apex. Flowers purplish, except for a yellow line on the edges of the lip and ovary.

Teesta valley; ca 450 m.

Fl. : March.

**B. viridiflorum** (Hook.f.) Schltr. in Orchids 4: 108. 1910. *Cirrhopetalum viridiflorum* Hook. f., F.B.I. 5 : 779. 1890.

Epiphytic, caespitose herbs. Pseudobulbs ovoid. Leaf in pairs on young pseudobulbs, narrowly oblong or oblong lanceolate, Flowers yellowish green turning to pale brown.

Sikkim, s.l. ; 1500–2100 m.

Fl. : Oct–Nov.

**B. umbellatum** Lindl., Gen. & Sp. Orchid. 56. 1830. *Cirrhopetalum maculosum* Lindl., Edw. Bot. Reg. 27. Misc. 81. 1841 ; Hook. f., F.B.I. 5 : 776. 1890.

Epiphytes. Pseudobulbs ovoid, only when dried. Leaf narrowly oblong, obtuse and notched at apex. Flowers cream coloured.

Tendong ; ca 1500 m.

Fl. : May.

**B. wallichii** Reichb.f. in Walp. Ann. 6: 259. 1861 ; Seid. in Dansk. Bot. Ark. 29: 234. t. 127. 1973. *Cirrhopetalum refractum sensu* Hook. f., F.B.I. 5: 779. 1890, *non* (Reichb. f.) Zoll. 1847.

Epiphytic, caespitose herbs. Pseudobulbs conical, wrinkled during flowering, crowded. Leaves 2, narrowly oblong, acute. Flowers pale green, turning pale brown.

Sikkim, s.l. ; 1200–1800 m.

Fl. : Oct–Nov.

**B. yoksunense** J.E. Sm. in Bull. Bot. Jard. Buitenz. 2, 8 : 29. 1912. *Cirrhopetalum brevipes* Hook.f., F.B.I. 5 : 777. 1890, *non* *B. brevipes* Ridl. 1903.

Epiphytes. Pseudobulbs oblong-cylindric. Leaves elliptic-oblong, coriaceous. Flowers rose coloured ; lips purple.

Sikkim, *s.l.* ; 1800 2400 m.

*Fl.* : Sept. Oct.

**B. xlophyllum** Par. & Reichb. *f.* in Trans. Linn. Soc. Bot. 151. 1847 ; Hook. *f.* F.B.I. 5 : 766. 1890. *B. gracilipes* King & Pantl. in J. Asiat. Soc. Beng. 65 : 119. 1896.

Epiphytes without pseudobulb. Leaves solitary, oblanceolate or elliptic-oblanceolate, obtuse, minutely bifid at apex. Flowers dull purple.

Teesta valley ; *ca* 450 m.

*Fl.* : Sept. Oct.

#### CALANTHE R. Br.

**Calanthe alismaefolia** Lindl., Fol. Orchid. 8. 1854 ; Hook. *f.*, F.B.I. 5 : 849. 1890.

Terrestrial herbs. Flowers white ; lip with a pale violet blotch

Teesta valley ; 600 900 m.

*Fl.* : May June.

**C. alpina** Hook. *f. ex* Lindl., Fol. Orchid. 4. 1854 ; Hook. *f.*, F.B.I. 5 : 850. 1890.

Terrestrial herbs. Leaves oblanceolate. Flowers white, tipped with green ; lip dull red with yellowish base.

Lachen, Zemu ; 1800 3200 m.

*Fl.* : July Aug.

**C. angusta** Lindl., Fol. Orchid. 7. 1854 ; Hook. *f.* F.B.I. 5 : 849. 1890.

Terrestrial herbs. Leaves narrow, elliptic. Flowers white.

Sikkim, *s.l.* ; *ca* 1050 m.

*Fl.* : April.

**C. biloba** Lindl., Fol. Orchid. 3. 1854 ; Hook. *f.*, F.B.I. 5 : 848. 1890.

Terrestrial herbs. Leaves broadly elliptic. Flowers ochraceous yellow, mottled with purplish brown ; lip pale violet.

Sikkim, *s.l.* ; 1050 2100 m.

*Fl.* : Sept. Oct.

**C. brevicornu** Lindl., Gen. & Sp. Orchid. 251. 1833 ; Hook. *f.*, F.B.I. 5 : 854. 1890.

Terrestrial herbs. Leaves 3, subequal, oblong-elliptic. Flowers dull purple to orange with white lines ; lamellae of lip with yellow steaks.

Sedonchen-Kibek ; 800 2600 m.

*Fl.* : May June.

**C. chloroleuca** Lindl., Fol. Orchid. 10. 1854 ; Hook. *f.*, F.B.I. 5 : 852. 1890.

Terrestrial herbs. Leaves 2, elliptic-lanceolate. Flowers yellowish green ; lip white with an elongated yellow patch in middle.

Sikkim, *s.l.* ; 1800 2400 m.

*Fl.* : April May.

**C. densiflora** Lindl., Gen. & Sp. Orchid. 250. 1833 ; Hook. *f.*, F.B.I. 5 : 855. 1890.

Terrestrial herbs. Leaves narrowly elliptic. Flowers yellow.

Sikkim, *s.l.* ; 900 m.

*Fl.* : Oct.

**C. gracilis** Lindl., Gen. & Sp. Orchid. 251. 1833 ; Hook. *f.*, F.B.I. 5 : 855. 1890.

Terrestrial herbs. Leaves 5-8, elliptic-oblong. Flowers white ; lip with yellow band in centre.

Sikkim, *s.l.* ; *ca* 1800 m.

*Fl.* : Oct.

**C. herbacea** Lindl., Fol. Orchid. 9. 1854 ; Hook. *f.*, F.B.I. 5 : 852. 1890.

Terrestrial herbs. Leaves elliptic. Flowers green or yellowish.

Sikkim, *s.l.* ; 1200 1800 m.

*Fl.* : June.

**C. mascua** (D. Don) Lindl., Gen. & Sp. Orchid. 249. 1833; Hook. f., F.B.I. 5 : 850 : 1890. *Bletta mascua* D. Don, Prodr. Fl. Nepal. 30. 1825.

var. **mascua**

Terrestrial herbs. Leaves elliptic. Flowers violet ; lip yellow.

Tingbong, Gangtok ; 2000 - 2800 m.

var. **fulgens** (Lindl.) Hook. f., F.B.I. 5 : 851 1890. *C. fulgens* Lindl., Fol. Orchid. 10. 1854.

Sikkim, *s. l.* (*cf.* Hooker 1890)

**C. puberula** Lindl., Gen. & Sp. Orchid. 252. 1833 ; Hook. f., F.B.I. 5 : 848. 1890.

Terrestrial herbs. Leaves 5 - 7, unequal, elliptic-oblong. Flowers pale lavender ; lip darker, whitish at base.

Sikkim, *s. l.* ; 1800 - 2100 m.

*Fl.* : July - Aug.

**C. tricarinata** Lindl., Gen. & Sp. Orchid. 252. 1833 ; Hook. f., F.B.I. 5 : 847. 1890.

Terrestrial herbs with small broadly ovoid pseudobulbs. Flowers green with white edges.

Lachen valley ; 1500 - 3200 m.

**C. treutleri** Hook. f., F.B.I. 5 : 848. 1890.

Herbs. Leaves sessile. Flowers solitary, *ca* 3.5 cm across.

Sikkim Himalaya (*Treutler* K.). Represented by the type specimen only.

**C. trulliformis** King & Pantl. in J. Asiat. Soc. Beng. 64 : 337. t. 2. 1895.

Terrestrial herbs. Leaves sessile, linear-lanceolate. Flowers brown ; lip white.

Sikkim, *s. l.* ; 1800 - 2600 m.

*Fl.* : July.

**C. uncata** Lindl., Fol. Orchid. 6. 1854 ; Hook. f., F.B.I. 5 : 853. 1890.

Terrestrial herbs. Leaves broadly elliptic. Scape longer than leaves.

Sikkim, *s.l.* ; Himalaya (*Griffith's* Collector).

**C. whiteana** King & Pantl. in *J. Asiat. Soc. Beng.* 65 : 121. 1895.  
Terrestrial herbs. Leaves linear-lanceolate. Flowers yellowish.

Chungthang ; *ca* 1800 m.

*Fl.* : May.

#### CEPHALANTHERA L.C. Rich.

**Cephalanthera longifolia** (L.) Fritsch in *Ost. Bot. Z.* 38 : 81. 1888. *Seraptas helleborine* L. var. *longifolia* L., *Sp. Pl.* 950. 1753. *Cephalanthera ensifolia* L.C. Rich. in *Mem. Mus. Hist. Nat. Paris.* 4 : 60. 1818 ; *Hook. f.*, *F.B.I.* 5 : 125. 1890.

Terrestrial, aphyllous herbs, 15–45 cm long. Roots tuberous. Flowers white, lip with a few yellow markings.

Near Gnathang ; 3600 m.

*Fl.* : July–Aug.

#### CEPHALANTHEROPSIS Guill.

**Cephalantheropsis gracilis** (Lindl.) Hu in *Quart. J. Taiwan Mus.* 25 : 213. 1972. *Calanthe gracilis* Lindl., *Gen. & Sp. Orchid.* 251. 1833 ; *Hook. f.*, *F.B.I.* 5 : 855. 1890.

Terrestrial herbs. Leaves 5-8, elliptic or elliptic-oblong. Flowers white ; lip with a yellow band along centre.

Sikkim, *s.l.* ; *ca* 1800m.

*Fl.* : Oct.

#### CERATOSTYLIS Bl.

**Ceratostylis subulata** Bl., *Bijdr.* 7 : 206. 1825. *Appendicula teres* Griff., *Notul.* 3 : 359. 1851. *Ceratostylis teres* (Griff.) Reichb. *f.* in *Bonaplant.* 2 : 89. 1854.

Epiphytic herbs. Stems crowded. Pseudobulbs lacking. Flowers white ; lip yellow at end.

Teesta valley ; *ca* 300 m.

*Fl.* : May–Junc.

**CHEIROSTYLIS Bl.**

**Cheirostylis griffithii** Lindl. in J. Linn. Soc. 1 : 188. 1857 ; Hook. f., F.B.I. 6 : 105. 1890.

Terrestrial herbs. Stems decumbent and succulent at base. Leaves ovate, membranous. Flowers white.

Near Saramsa ; ca 1100 m.

*Fl.* : June.

**CHILOSCHISTA Lindl.**

**Chiloschista lunifera** (Reichb. f.) J.J. Sm. ex Holttum in Kew Bull. 14 : 273. 1960. *Thrixspermum luniferum* Reichb. f. in Gard. Chron. 786. 1868. *Sarcochilus luniferus* (Reichb. f.) Benth. ex Hook. f. in Curtis Bot. Mag. 115 : 7044. 1898 ; Hook. f., F.B.I. 6 : 37. 1890.

Stemless, leafless herb. Inflorescence 7 - 37 cm long, lax racemes. Flowers yellow with brown spots.

In tropical valley.

*Fl.* : May.

**CHRYSOGLOSSUM Bl.**

**Chrysoglossum erraticum** Hook. f., F.B.I. 5 : 784. 1890.

Terrestrial herbs. Pseudo bulbs ovoid. Flowers green, minutely spotted with brown ; lip white with a yellow spot at base and reddish spots on edges.

Sikkim, *s.l.* ; 900 - 1500 m.

*Fl.* : June.

**CLEISOCENTRON Brühl**

**Cleisocentron trichromum** (Reichb. f.) Brühl, Guide Orchid. Sikkim 137. 1926. *Saccolabium trichromum* Reichb. f. in Hamb. Gaertn. Zeit. 51. 1859 ; Hook. f., F.B.I. 6 : 65. 1890.

Pendulous herbs, 30 - 130 cm long. Leaves narrow-oblong. Inflorescence supra-axillary, much shorter than leaves, one sided, few flowered. Flowers straw coloured with a pink band in centre.

Sikkim, *s.l.* ; 300 - 750 m.

### CLEISOSTOMA BL.

**Cleisostoma appendiculatum** (Lindl.) Benth. & Hook. *f. ex* Jackson, Index Kew. 1 : 555. 1895. *Aerides appendiculatum* Lindl., Gen. & Sp. Orchid. 242. 1833. *Sarcanthus appendiculatus* (Lindl.) Par. in Mason, Burma, its people & products 2, bot. 181. 1883 ; Hook. *f.*, F.B.I. 6 : 67. 1890.

Erect, epiphytic herbs, 20 - 40 cm tall. Leaves terete, spirally arranged. Flowers purplish.

In tropical valleys.

*Fl.* : Aug.

**C. aspersum** (Reichb. *f.*) Garay in Bot. Mus. Leaflet, Harv. Univ. 23(4) : 169. 1972. *Sarcanthus aspersus* Reichb. *f.* in Hamb. Gartenz. 21 : 297. 1865 ; Hook. *f.*, F.B.I. 6 : 70. 1890. *C. bicuspidatum* Hook. *f.*, *l.c.* 75. *Stereochilus bicuspidatum* (Hook. *f.*) King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 236. t. 314. 1898. *Sarcanthus bicuspidatus* (Hook. *f.*) J.J. Sm. in Nat. Tijds. Med. Ind. 72 : 84. 1912.

Epiphytic herbs. Leaves linear-oblong. Flowers yellowish, marked with pink along the midribs.

Sikkim, *s.l.* ; 600 m.

*Fl.* : July - Aug.

**C. filiforme** (Lindl.) Garay in Bot. Mus. Leaflet, Harv. Univ. 23 (4) : 171. 1972. *Sarcanthus filiformis* Lindl., Bot. Reg. 28 : Misc. 61. 1842 ; Hook. *f.*, F.B.I. 6 : 66. 1890, *non* Wight 1851.

Pendulous epiphytic herbs, 25 - 180 cm long. Leaves on one side. Flowers brown, edges and midribs yellow ; lip white flushed with pink on apical lobe.

Tropical valleys.

*Fl.* : Aug. - Sept.

**C. racemiferum** (Lindl.) Garay in Bot. Mus. Leaflet, Harv. Univ. 23 (4) : 173. 1972. *Saccolabium racemiferum* Lindl., Gen. & Sp. Orchid. 224. 1833. *Sarcanthus pallidus* Lindl. in Edw. Bot. Reg. Misc. 78. 1840 ; Hook. *f.*, F.B.I. 6 : 68. 1890.

Erect epiphytic herbs. Leaves strap like. Flowers light brown, edged with yellow ; lip white fleshy.

Sikkim, *s.l.* ; 600 - 1200 m.

*Fl.* : Aug.

**C. subulatum** Bl., Bijdr. 226. 1825. *Sarcanthus secundus* Griff., Notul. 3 : 362. 1851 ; Hook. *f.*, F.B.I. 6 : 67. 1890. *S. subulatus* (Bl.) Reichb. *f.* in Bonpland. 5 : 41. 1857.

Pendulous epiphytic herbs, 15-30 cm long. Leaves linear lanceolate. Flowers yellow with intramarginal brown bands.

In valleys.

**C. striatum** (Reichb. *f.*) Garay in Bot. Mus. Leaflet, Harv. Univ. 23(4) : 175. 1972. *Echinoglossum striatum* Reichb. *f.* in Gard. Chron. (n.s.) 12 : 390. 1879 ; Hook. *f.*, F.B.I. 6 : 76. 1890. *Cleisostoma brevipes* Hook. *f.*, F.B.I. 6 : 73. 1890.

Pendulous epiphytic herbs. Leaves lanceolate. Spikes extra axillary, much shorter than leaves. Flowers yellow with brown bands ; lip pale buff, apical lobe white.

Tropical valleys.

*Fl.* : Aug.

### COELOGYNE Lindl.

**Coelogyne corymbosa** Lindl., Fol. Orch. Coelog. 7. 1854 ; Hook. *f.*, F.B.I. 5 : 831. 1890 ; King & Pantl., *l.c.* 8 : 134. t. 185. 1898. Das & Jain, Fasc. Fl. India 5 : 9. 1980.

Epiphytic herbs. Pseudobulbs ovoid or obovoid. Leaves lanceolate. Flowers white.

Dzongu, 1500 - 2400 m.

*Fl. & Fr.* : April - May.

**C. cristata** Lindl., Coll. Bot. Sub. t. 33 (*Textus*) 1821 ; Hook. *f.*, F.B.I. 5 : 829. 1890 ; King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 133. t. 184. 1898 ; Das & Jain, *l.c.* 9.

Epiphytic herbs. Pseudobulbs ovoid-oblong. Leaves sessile, linear-oblong or linear-lanceolate. Flowers white.

Sikkim, *s.l.* ; 1500 - 2400 m.

*Fl. & Fr.* : April - June.

**C. fimbriata** Lindl., Bot. Reg. 11. t. 868. 1825 ; Hook. *f.*, F.B.I. 5 : 836. 1890 ; Das & Jain, *l.c.* 10.

Epiphytes. Pseudobulbs oblong to orbicular, cylindrical or fusiform. Flowers yellow.

Sikkim, *s.l.*

*Fl. & Fr.* : Aug. Dec.

**C. flaccida** Lindl., Gen. & Sp. Orchid. 39. 1830 ; Hook. *f.*, F.B.I. 5 : 829. 1890 ; King & Pantl., *l.c.* 133. t. 183 ; Das & Jain, *l.c.* 10.

Epiphytes. Pseudobulbs ridged, clustered. Flowers creamy white.

Sikkim, *s.l.* ; 750 1200 m.

*Fl.* : March May.

**C. fuscescens** Lindl., Gen. & Sp. Orchid 41. 1830 ; Hook. *f.*, *l.c.* 833 ; King & Pantl., *l.c.* 132. t. 181 ; Das & Jain, *l.c.* 13.

Epiphytes. Pseudobulbs cylindrical. Leaves elliptic. Flowers pale brown.

Sikkim, *s.l.* ; 600 1800 m.

*Fl.* : Oct. Nov.

**C. longipes** Lindl., Fol. Orch. Coelog. 10. 1854 ; Hook. *f.*, F.B.I. 5 : 839. 1890, *non* King & Pantl. 1898 ; Das & Jain, *l.c.* 16.

Epiphytes. Pseudobulbs cylindrical or ovoid. Flowers yellowish brown.

Sikkim, *s.l.* ; 1800 2100 m.

*Fl.* : May June.

**C. nitida** (Wall. *ex* D. Don) Lindl., Gen. & Sp. Orchid. 40. 1830. *Cymbidium nitidum* Wall. *ex* D. Don, Prodr. Fl. Nep. 35. 1825, *non* Roxb. *C. ochracea* Lindl., Bot. Reg. t. 69. 1846 ; Hook. *f.*, *l.c.* 831 ; King & Pantl., *l.c.* 132. t. 182 ; Das & Jain, *l.c.* 19.

Epiphytes. Pseudobulbs cylindrical. Leaves lanceolate. Flowers white.

Yoksam, Dikchu, Gangtok, Karponang, Kahi, Ratong Chu, Tingling bridge ; 1200 2100 m.

*Fl.* : May June.

**C. occultata** Hook. *f.*, F.B.I. 5 : 831. 1890 ; King & Pantl. *l.c.* 135. t. 186. 1898.

Epiphytic herbs. Pseudobulbs ellipsoid or bipyramidal. Flowers white with some yellow streaks and a yellow blotch.

Sikkim, *s.l.* ; 600 1800 m.

*Fl.* : Sept. Nov.

**C. ovalis** Lindl., Bot. Reg. 24 : 91. Misc. 191. 1838 ; Hook. *f.*, F.B.I. 5 : 836. 1890 ; King & Pantl., *l. c.* 135. t. 187. 1898 ; Das & Jain., *l. c.* 23.

Epiphytes. Pseudobulbs narrowly ovoid to fusiform. Flowers pale brown.

Sikkim, *s.l.* ; 600 1800 m.

*Fl.* : Sept. Nov.

**C. prolifera** Lindl., Gen. & Sp. Orchid. 40. 1830. *C. flavida* Wall. ex. Lindl., Fol. Orch. Coelog. 10 : 1854 ; Hook. *f.*, F.B.I. 5 : 838. 1890 ; Das & Jain, *l. c.* 23-24.

Epiphytes. Pseudobulbs oblong-ovoid. Leaves elliptic-oblong. Flowers yellow-brown.

Chungthang, Kaydoom (Lachung valley) Lachen ; 1800 2100 m.

*Fl.* : May July.

**C. punctulata** Lindl., Coll. Bot. 7. t. 33. 1821 ; Das & Jain, *l. c.* 24.

Epiphytic herbs. Pseudobulbs ovoid. Flowers white.

Gangtok ; up to 1800 m.

*Fl.* : May July.

**C. raizadae** Jain & Das in Proc. Ind. Acad. Sci. 87 B(5) : 119. 1978. *C. longipes auct. non* Lindl. 1854 ; King & Pantl., *l. c.* 136. t. 189. 1898.

Epiphytes. Leaves elliptic-lanceolate. Flowers pale green, flushed with yellow.

Raydong, 1800 2100 m.

*Fl.* : May.

**C. schultesii** Jain & Das in Proc. Ind. Acad. Sci. 87 B(5) : 119. 1978.

Epiphytes. Pseudobulbs ovoid to ellipsoid. Flowers yellowish brown.

Sikkim (*cf.* Das & Jain 1980).

*Fl.* : March June.

*C. stricta* Schtr. in Fedde Repert. Beit. 184. 1919. *C. elata* Lindl., Gen. & Sp. Orchid. 40. 1830 ; Hook. *f.*, *l.c.* 838 ; King & Pantl. *l.c.* 137. 1898.

Epiphytes. Pseudobulbs oblong-ovoid. Flowers white with ochre-yellowish tint.

Gangtok ; 1200 1800 m.

*Fl.* : May June.

*C. treutleri* Hook. *f.*, F.B.I. 5 : 837. 1890 ; Das & Jain, *l.c.* 30.

Epiphytes. Pseudobulbs ovoid. Flowers slightly produced.

Sikkim, *s.l.* Represented by the type specimen only.

*C. uniflora* Lindl., Gen. & Sp. Orchid. 42. 1830 ; Hook. *f.*, F.B.I. 5 : 842. 1890 ; King & Pantl., *l.c.* 138. 1898 ; Das & Jain, *l.c.* 30.

Epiphytes. Leaves narrow-lanceolate. Flowers brownish.

Sikkim, *s.l.* ; up to 1200 m.

*Fl.* : April May.

### CORYBAS Salisb.

*Corybas himalaicus* ( King & Pantl.) Schltr. in Fedde Repert. 19 : 19. 1924. *Corysanthes himalaica* King & Pantl. in J. Asiat. Soc. Beng. 65 : 128. 1896 ; Brühl, *l.c.* 158.

Terrestrial herbs, 5 - 7 cm tall. Flowers solitary, *ca* 1.5 cm long ; petals lacking ; lip and dorsal sepal transparent with purple markings.

Lachen valley at Lemteng ; *ca* 3000 m.

*Notes* : It grows on moist vertical rocks.

### CORYMBORKIS Thou.

*Corymborkis veratrifolia* (Reinw.) Bl., Coll. Orch. Arch. Ind. 125. tt. 42. & 43. 1859. *Hysteria veratrifolia* Reinw. in Bot. Zeit. 2 : 5. 1825. *Corymbis veratrifolia* (Reinw.) Bl., *l.c.* H 42, E. 43, f. 1 ; Hook. *f.*, F.B.I. 6 : 91. 1890 ; Brühl., *l.c.* 160.

Herbs, 90 - 120 cm tall. Leaves elliptic-lanceolate. Flowers white, fragrant.

Sikkim, *s. l.* ; 450 - 750 m.

#### CREMASTRA Lindl.

**Cremastra appendiculata** (D. Don ) Makino in Bot. Mag. Tokyo 18 : 24. 1904. *Cymbidium appendiculatum* D. Don, Prodr. Fl. Nepal. 36. 1825. *Cremastra wallichiana* Lindl., Gen. & Sp. Orchid. 173. 1833 ; Hook. *f.*, F.B.I. 6 : 16. 1890 ; Brühl, *l.c.* 112.

Herbs with large tubers covered with nodules. Leaves elliptic. Racemes conical. Flowers pink, crowded, drooping.

Sikkim, *s.l.* ; 1800 - 2400 m.

*Fl.* : May.

#### CRYPTOCHILUS Wall.

**Cryptochilus lutea** Lindl. in J. Linn. Soc. 3 : 21. 1859 ; Hook. *f.*, F.B.I. 5 : 827. 1890.

Epiphytes with cylindric pseudobulbs. Flowers *ca* 6 mm long, nodding, yellow.

Sikkim, *s.l.* ; 1500 - 2100 m.

*Fl.* : May - June.

**C. sanguineus** Wall., Tent. Fl. Nepal. 36. t. 26. 1824 ; Hook. *f.*, F.B.I. 5 : 827. 1890.

Epiphytes with oblong-ellipsoid or ovoid pseudobulbs. Flowers scarlet.

Sikkim, *s.l.* ; 1500 - 2100 m.

*Fl.* : June - Aug.

#### CYMBIDIUM Swartz

**Cymbidium aloifolium** (L.) Swartz in Nov. Act. Upsal. 2, 6 : 73. 1799 ; Hook. *f.*, F.B.I. 6 : 10. 1890. *Epidendrum aloifolium* L., Sp. Pl. 953. 1753.

Epiphytic herbs. Leaves loriform, up to 90 × 5 cm. Flowers brownish red.

Singtam ; 300 - 1000 m.

*Fl.* : April May.

Cult. in Deorali (Gangtok).

**C. bicolor** ssp. **obtusum** Du Puy & Cribb, The Genus *Cymbidium* 70.1988. *C. pendulum* (Roxb.) Swartz in Nov. Act. Upsal. 2, 6 : 73. 1799 ; Hook. f., F.B.I., 6 : 10. 1890. *Epidendrum pendulum* Roxb., Pl. Corom. 35. 1795.

Terrestrial herbs. Leaves 30-90 x 1.6-5 cm. Flowers dark purple-brown with yellowish margin.

Sikkim, *s.l.* ; ca 300 m.

*Fl.* : May.

**C. cochleare** Lindl. in J. Linn. Soc. 3 : 28. 1859. *Cyperorchis cochleare* (Lindl.) Benth. in J. Linn. Soc. 18 : 318. 1882 ; Hook. f., F.B.I. 6 : 15. 1889.

Terrestrial herbs. Flowers greenish brown.

Sikkim, *s.l.* ; 1200 1800 m.

*Fl.* : Oct. Nov.

**C. cyperifolium** Lindl., Gen. & Sp. Orchid. 163. 1833 ; Hook. f., F.B.I. 6 : 13. 1890.

Terrestrial herbs. Flowers green ; lip spotted with red.

Chungthang ; ca 1500 m.

*Fl.* : Nov.

**C. dayanum** Reichb. f. in Gard. Chron. 710. 1869. *C. eburneum* Lindl. var. *dayana* (Reichb. f.) Hook. f., l.c. 6 : 12. 1890. *C. simonsianum* King & Pantl. in J. Asiat. Soc. Beng. 64 : 239. 1895.

Terrestrial herbs. Flowers white with crimson lines.

Teesta valley ; ca 3000 m.

*Fl.* : Aug.

**C. devonianum** Paxt. in Mag. Bot. 10. 97. cum. Ic. 1843 ; Hook. f., F.B.I. 6 : 10. 1890.

Terrestrial herbs. Flowers olive green, spotted with crimson.

Sikkim, *s.l.* ; 1500 2100 m.

*Fl.* : May June.

**C. eburneum** Lindl. in Edw. Bot. Reg. n. s. 23. t. 67. 1847 ; Hook. f., F.B.I. 6 : 11. 1890.

Terrestrial herbs. Flowers white.

Sikkim, *s.l.* ; 300 - 900 m.

*Fl.* : March - April.

**C. elegans** Lindl., Gen. & Sp. Orchid. 161. 1833. *Cyperorchis elegans* (Lindl.) Bl., Rumph. 4 : 47. 1836 ; Fl. Jav. 4 : 93. t. 48c. 1858 ; Hook. f., F.B.I. 6 : 14. 1890.

Herbs. Leaves up to 60 × 2.5 cm. Racemes elongate ; flowers white.

Gangtok, Yoksam Bakhim, Ratong Chu Tingling Bridge ; 1500 - 1800 m.

*Fl.* : Oct - Nov.

**C. ensifolium** (L.) Swartz in Nov. Act. Upsal. 6 : 77. 1799 ; Hook. f., F.B.I. 6 : 13. 1890. *Epidendrum ensifolium* L., sp. pl. 90. 1753. *C. murnronianum* King & Pantl. in J. Asiat. Soc. Beng. 64 : 238. t. 2. 1895.

Terrestrial herbs. Flowers straw coloured, purple dotted.

Teesta valley ; *ca* 450 m.

*Fl.* : May.

*Notes* : Grows in dry knolls.

**C. gammieanum** King & Pantl. in J. Asiat. Soc. Beng. 64 : 330. 1895.

Terrestrial herbs. Flowers dull yellow, suffused with red flowers, flushed with brown lines.

Sikkim, *s.l.* ; 200 - 1200 m.

*Fl.* : Sept. - Oct.

**C. hookerianum** Reichb. f. in Gard. Chron. 1866. *C. grandiflorum* Griff., Notul. 3 : 321. 1851, *non* Swartz 1799 ; Hook. f., F.B.I. 6 : 12. 1890.

Terrestrial herbs. Flowers bright olive green, suffused with yellow.

Gangtok, Deorali ; 1500 - 2100 m.

*Fl.* : Feb.

*Notes* : Lip and column become red after fertilization.

**C. lancifolium** Hook., Exot. Fl. t. 51. 1823 ; Hook. f., F.B.I. 6 : 9. 1890.

Terrestrial herbs. Flowers greenish white with red stripes.

Gangtok (Deorali) ; up to 1800 m.

*Fl.* : June. Cult.

**C. longifolium** D. Don, Prodr. Fl. Nepal. 36. 1825 ; Hook. f., F.B.I. 6 : 13. 1890. *Cyperorchis longifolia* (D. Don) Schltr. in Seeds report 20 : 108. 1924.

Terrestrial herbs. Leaves 60 - 90 × 1.6 cm. Flowers greenish white with purple streaks.

Sikkim, *s.l.* ; 1500 - 2100 m.

*Fl.* : Sept. Oct.

*Notes* : It can be distinguished from *C. giganteum* Wall. by its narrower leaves, narrower and differently coloured sepals and the lip which differs in colour and shape as well.

**C. mastersii** Griff. ex Lindl. in Bot. Reg. t. 50. 1845. *Cyperorchis mastersii* (Griff. ex Lindl.) Benth. in J. Linn. Soc. 18 : 318. 1881 ; Hook. f., F.B.I. 6 : 15. 1890.

Terrestrial herbs. Leaves up to 50 × 2 cm. Racemes short, decurved at tip. Flowers white, flushed with pink.

Sikkim, *s.l.* ; 1500 - 2100 m.

*Fl.* : Oct. Nov.

**C. sikkimense** Hook. f., F.B.I. 6 : 9. 1890.

Epiphytic herbs. Racemes 10 - 20 cm long, somewhat decurved. Flowers white.

Lachen valley ; ca 1880 m.

*Fl.* : May.

**C. tridioides** D. Don, Prodr. Fl. Nepal. 36. 1825. *C. giganteum* Lindl., Gen. & Sp. Orchid. 163. 1833. *non* Swartz 1800 ; Hook. f., F.B.I. 6 : 12. 1890.

Terrestrial herbs. Flowers light yellow-green, suffused with red.

Sikkim, *s.l.* ; 1200 1800 m.

*Fl.* : Oct.- Nov.

*Notes* : Allied to *C. grandiflorum* but differs in size and colour of flowers and flowering time.

*C. whiteae* King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 193. t. 21. 258. 1898.

Terrestrial herbs. Flowers yellowish green, dull red-spotted.

Gangtok ; up to 1750 m.

*Fl.* : Nov.

### CYPRIPEDIUM L.

*Cypripedium elegans* Reichb. *f.* in Flora 69 : 561. 1886 ; Hook. *f.*, F.B.I. 6 : 169. 170. 1890.

Herbs, up to 10 cm tall. Leaves 2, opposite, orbicular. Flowers brownish with dark brown lines.

Lachen valley ; *ca* 3000 m.

*Fl.* : June Aug.

*C. himalaicum* Rolfe *apud*. Hemsl. in J. Linn. Soc. 29 : 317. 1893.

Herbs. Leaves 3-4, broadly elliptic to lanceolate. Flowers brownish ; lip pendant, forming a broadly obovoid purple tinged pouch.

Thangu, Lachen ; 3000 4500 m.

*Fl.* : June July.

*C. macranthos* Swartz in Act. Holm. 251. 1800 ; Hook. *f.*, F.B.I. 6 : 170. 1890. *C. tibeticum* King *ex* Hemsl. in J. Linn. Soc. 29 : 320. 1892.

### DENDROBIUM O. Swartz

*Dendrobium aduncum* Wall. in Bot. Reg. 1842. Misc. 62. 1846. t. 15. 1846 ; Hook. *f.* F.B.I. 5 : 730. 1890.

Epiphytic herbs. Leaves linear-lanceolate. Flowers pale purple, translucent, dark purple.

In Trop. valleys ; 600 m ;

*Fl.* : June Aug.

**D. aggregatum** var. **Jenkinsii** King & Pantl. in Ann. Roy Bot. Gard. Calc. Epiphytic herbs. Leaves solitary, oblong.

*Fl.* : March May.

**D. amoenum** Wall. in Lindl., Gen. & Sp. Orchid, 78. (excl. *syn D. aphyllum*) 1830 ; Hook. f., F.B.I. 5 : 738. 1890.

Epiphytic herbs. Leaves linear-lanceolate, acuminate. Flowers white, with purple spots.

In trop valleys ; upto 1750 m ;

*Fl.* : June ; Common.

**D. anceps** Sw. in Act. Holm. 246. 1800 ; Hook. f., F.B.I. 5 : 724. 1890.

Stems compressed. Leaves lanceolate or ovate-lanceolate acute. Flowers singly borne on sides of stem, yellowish green.

Melli ; ca 350 m ;

*Fl.* : April May.

**D. aphyllum** (Roxb.) C.E.C. Fischer in Gamble, Fl. Pres. Madras 1416. 1928. *D. pierardi* Roxb. in Hook., Exotic Flora t. 9. 1822 ; Hook. f., l.c. 738. *Limodorum aphyllum* Roxb., Pl. Corom. t. 41. 1795.

Epiphytic herbs. Leaves sessile, lanceolate-acuminate. Flowers rose coloured or pale purple ; lip yellow with radiating lines of purple at base.

In tropical valleys, Gangtok ; up to 1600 m.

*Fl.* : April May.

**D. bicameratum** Lindl. in Edw. Bot. Reg. 59. 1839. Misc. 85 ; Hook. f., F.B.I. 5 : 729. 1890. *D. bolboflorum* Falc. ex Hook. f., l.c.

Epiphytic herbs. Leaves linear-lanceolate. Flowers yellow with red strips.

Deorali ; 1200 1800 m.

*Fl.* : Aug. Sept.

**D. candidum** Wall. ex Lindl., Edw. Bot. Reg. 54. 1838 ; Hook. f., F.B.I. 5 : 735. 1890.

Epiphytic herbs. Leaves lanceolate. Flowers white with a yellow spot near the base.

In Lachen valley ; 1800 - 2100 m.

*Fl.* : May - June.

**D. cathcartii** Hook. *f.*, F.B.I. 5 : 727. 1890.

Epiphytic herbs. Leaves linear-lanceolate, unequally 2-fid. Flowers golden yellow ; lip marked with purple.

In tropical valleys ; ascending to 750 m.

*Fl.* : April - Sept.

**D. chrysanthum** Wall. *ex* Lindl., Gen. & Sp. Orchid. 80. 1830 & in Edw. Bot. Reg. 15. t. 1299. 1830 ; Hook. *f.*, F.B.I. 5 : 747. 1890.

Epiphytic herbs. Leaves lanceolate, acuminate. Flowers yellow ; lip with 2 dark, suborbicular brownish purple spots.

Sikkim, *s.l.* ; 900 - 1800 m.

*Fl.* : July - Oct.

**D. crepidatum** Lindl. in Paxt., Fl. Gard. 1. 63. f. 45. 1850 ; Hook. *f.*, F.B.I. 5 : 740. 1890.

Epiphytic herbs. Leaves linear-lanceolate, acute. Flowers pink or white ; lip with a large spot.

In tropical valleys, up to 1050 m.

*Fl.* : April - May. Cult. at Gangtok (Deorali).

**D. cumulatum** Lindl. in Gard. Chron. 1855. Hook. *f.*, F.B.I. 5 : 731. 1890.

Epiphytic herbs. Leaves oblong-lanceolate, acuminate. Flowers pale purple.

In tropical valleys ; up to 900 m.

*Fl.* : June - July.

Cult. at Deorali.

**D. denneanum** A.F.G. Kerr in J. Stam. Soc. Nat. Hist. Suppl. 9 : 229. 1933. *D. clavatum* Wall. *ex* Lindl. in Lindl. & Paxt., Fl. Gard. 2 : 104. t. 189. 1852, *non* Roxb. 1832 ; Hook. *f.*, F.B.I. 5 : 746. 1890.

Epiphytic herbs. Leaves linear-oblong, obtuse. Flowers dark yellow, lip with a large purple blotch near centre, edges pale yellow.

Tadong ; *ca* 900 m.

*Fl.* : May June.

**D. densiflorum** Wall. ex Lindl. in Wall., Pl. As. Rar. 1 : 34. t. 40. 1830 ; Hook, *f.*, F.B.I. 5 : 748. 1890.

Epiphytic herbs. Leaves subterminal, acute. Flowers yellow ; lip orange-yellow, paler towards margins.

Pamianchi, Saramsa-Gangtok ; up to 1800 m.

*Fl.* : April May.

*Notes* : Unexpanded racemes have a cone-like appearance which is not found in any other species.

**D. denudans** D. Don, Prodr. Fl. Nep. 34. 1825 ; Hook, *f.*, F.B.I. 5 : 715. 1890.

Epiphytic herbs. Leaves linear, oblong. Flowers pale green or whitish ; lip with a band of radiating red lines around its crisped or serrate edges ; foot or column red.

Sikkim, *s.l.* ; 900 1500 m. Common.

*Fl.* : Sept. Oct.

**D. eriaeflorum** Griff., Notul. III. 316. 1851 ; Hook, *f.*, F.B.I. 5 : 715. 1890.

Epiphytic herbs. Leaves linear-lanceolate. Flowers green ; lip spotted with dull purple.

Sikkim, *s.l.* ; Deorali 900 1800 m.

*Fl.* : Sept. Oct.

**D. falconeri** Hook, *f.* in Bot. Mag. 5 : 4944. 1856 ; Hook, *f.*, F.B.I. 5 : 742. 1890.

Epiphytic herbs. Flowers white suffused with amethyst.

Deorali (Cult.) ; *ca* 1500 m.

*Fl.* : Feb. May.

**D. farmeri** Paxt., Mag. Bot. 15 : 241. 1849 ; Hook, *f.*, F.B.I. 5 : 750. 1890.

Epiphytes. Leaves 2 4, elliptic or oblong. Flowers pale mauve, changing to pure white after opening ; lip deep yellow, pale on margins.

Sikkim, *s.l.* ; 300 700 m.

*Fl.* : April May.

**D. formosum** Roxb. (Wall. Cat. 1898) Fl. Ind. 3. 485. 1832 ;  
Hook. *f.*, F.B.I. 5 : 721. 1890.

Epiphytic herbs. Leaves oblong. Flowers white ; lip yellow.

Sikkim, *s.l.* ; 350 1500 m.

*Fl.* : May. Cult. at Deorali.

**D. gibsoni** Lindl. in Paxt. Bot. Mag. 5 : 169. 1838 ; Hook. *f.*, F.B.I.  
5 : 746. 1890.

Epiphytic herbs. Leaves lanceolate, acuminate. Flowers saffron  
yellow to orange.

Deorali ; 750 1200 m.

*Fl.* : July Aug.

**D. heterocarpum** Wall. in Lindl., Gen. & Sp. Orchid. 78. 1830 ;  
Hook. *f.*, F.B.I. 5 : 737. 1890.

Epiphytic herbs. Leaves oblong-lanceolate. Flowers faintly  
fragrant, white or pale ochraceous, often tinged with green ; lip yellow  
or white.

In tropical valleys ; 900 m.

*Fl.* : April.

**D. hookerianum** Lindl., Gen. & Sp. Orchid. 78. 1830 ; Hook. *f.*,  
F.B.I. 5 : 745. 1890.

Epiphytes. Leaves oblong-lanceolate. Flowers golden yellow  
with 2 oblique dark purple patches on lip.

Sikkim, *s.l.* ; 1000 1500 m.

*Fl. & Fr.* : Sept.

**D. longicornu** Lindl. in Bot. Reg. 16 : t. 1315. 1830 ; Hook. *f.*,  
F.B.I. 5 : 720. 1890.

Epiphytes. Leaves linear-lanceolate, unequally obtusely bifid.  
Flowers white.

Sikkim, *s.l.* ; 1200 2400 m.

*Fl.* : Sept. Nov.

**D. nobile** Lindl., Gen. & Sp. Orchid. 24. 1830 ; Hook. *f.*, F.B.I. 5 : 740. 1890.

Epiphytic herbs. Leaves oblong, obliquely notched. Flowers purple-white.

Kabi, Phodong, Gangtok, Pamianchi ; up to 1800 m.

*Fl.* : April May.

**D. ochreatum** Lindl. in Bot. Reg. t. 1765. 1835 ; Hook. *f.*, F.B.I. 5 : 747-748, 1890.

Epiphytic herbs. Leaves ovate-lanceolate, acuminate. Flowers golden yellow with a large maroon blotch.

Dcorali (cf. Raju *et al* 1987-89).

*Fl.* : Feb. April.

**D. parishii** Reichb. *f.* in Botl. Zeit. 21 : 237. 1863 ; Hook. *f.*, F.B.I. 5 : 740. 1890.

Epiphytic herbs. Leaves oblong-lanceolate. Flowers purplish.

Dcorali (Cult.) ; 700-1300 m.

*Fl.* : June.

**D. pauciflorum** King & Pantl. in J. Asiat. Soc. Beng. 64(2) ; 332 t. 2. 1895.

Epiphytes. Flowers golden yellow ; sepals and petals broadly margined with purple ; apical lobe of lip red spotted.

Teesta valley ; 600-1200 m.

*Fl.* : June.

**D. porphyrochilum** Lindl. in J. Linn. Soc. III. 18. 1859 ; Hook. *f.*, F.B. I. 5 : 716. 1890. *D. caespitosum* King & Pantl. in J. Asiat. Soc. Beng. 64 : 332. 1895.

Epiphytic herbs. Leaves obtuse or obliquely notched. Flowers yellow.

Dentam-Pamianchi ; 1500-2100 m.

*Fl.* : April May.

**D. primulinum** Lindl. in Gard. Chron. 400. 1858 ; Hook. *f.*, F.B.I. 5 : 735. 1890.

Epiphytes. Leaves broadly oblong. Flowers whitish pink.

Deorali (Cult.) ; up to 1200 m.

*Fl.* : April.

**D. peguanum** Lindl. in J. Proc. Linn. Soc. 3 : 19. 1859. *D. pygmaeum* Lindl., Gen. & Sp. Orchid. 85. 1830, *non* Sm. ex Rees 1808 ; Hook. *f.*, *l.c.* 717. 1890.

Epiphytic herbs. Leaves 2-3, linear. Flowers white or purplish.

Sikkim, *s.l.* ; *ca* 300 m.

*Fl.* : Dec. - March.

**D. ramosum** Lindl., Gen. & Sp. Orchid. 82. 1830 ; Hook. *f.*, F.B.I. 5 : 736. 1890.

Epiphytic herbs. Leaves lanceolate, acuminate. Flowers primrose yellow ; lip with numerous radiating brownish purple streaks.

Sikkim, *s.l.* ; 1200-1500 m.

*Fl.* : April - May.

**D. stuposum** Lindl. in Bot. Reg. 52. 1838 ; Hook. *f.*, F.B.I. 5 : 737. 1890.

Epiphytic herbs. Leaves linear-oblong. Flowers white with a blotch of dull yellow on the lip.

Teesta valley ; *ca* 3600 m.

*Fl.* : June.

**D. sulcatum** Lindl. in Bot. Reg. n.s. 24. t. 65. 1838 ; Hook. *f.*, F.B.I. 5 : 749. 1890.

Epiphytic herbs. Leaves subterminal, oblong, acuminate. Flowers dingy yellow with lines of a darker shade ; lip orange yellow with 2 patches of brown nerves near base.

Common in tropical valleys.

*Fl.* : April - May.

**D. terminale** Par. & Reichb. *f.* in Trans. Linn. Soc. 30 : 149. 1859 ; Hook. *f.*, *l.c.* 5 : 725. 1890.

Epiphytic herbs. Leaves ovate-oblong, acute. Flowers whitish or pale pink.

Tropical valleys ; up to 1500 m.

*Fl.* : Sept. Oct.

**D. transprens** Lindl., Gen. & Sp. Orchid. 79. 1830 ; Hook. *f.*, *l.c.* 5 : 738. 1890.

Epiphytes. Leaves linear-lanceolate. Flowers white, sometimes suffused with pink ; lip with a large purple patch in middle and purple lines towards base ; column greenish yellow with a purple patch at lower end ; stigma red-lined.

Commonly found at foothills extending up to 900 m.

*Fl.* : May.

**D. wardianum** Warner, Sel. Orchid. 1, t. 19. 1862 ; Hook. *f.*, F.B.I. 5 : 742. 1890.

Epiphytes. Leaves linear-lanceolate. Flowers reddish white ; lip ochraceous with maroon blotches.

Deorali (*cf.* Raju *et al.* 1987 89) ; 750 1200 m.

*Fl. & Fr.* : Feb. March.

**D. williamsoni** Day & Reichb. *f.* in Gard. Chron. 78 : 1869 ; Hook. *f.*, F.B.I. 5 : 721. 1890.

Epiphytes. Leaves oblong or lanceolate. Flowers yellowish white ; lip yellow, often dashed with red within.

Deorali (Cult.) ; 750 m.

*Fl.* : Feb. March.

### **DIDICIEA** King & Prain

**Didiciea cunniighnami** King & Pantl. in J. Asiat. Soc. Beng. 64 (2) : 119. 1895.

Terrestrial herbs. Pseudobulbs with a single ovate leaf arising from sides. Spikes lax flowered, 2.5 3.8 cm long.

Lachen valley ; *ca* 3600 m.

*Fl.* : July.

**DIDYMOPLEXIS** Griff.

**Didymoplexis pallens** Griff. in Calc. J. Nat. Hist. 4 : 383. t. 17. 1843 ; Hook. f., F.B.I. 6 : 122. 1890.

Terrestrial aphyllous herbs. Flowers ochraceous white, tinged with brown.

In valleys.

*Fl.* : May June.

**DIGLYPHOSA** Bl.

**Diglyphosa macrophylla** (King & Pantl.) King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 98. 1898. *Chrysoglossum macrophyllum* King & Pantl. in J. Asiat. Soc. Beng. 64. 335. 1895.

Terrestrial herbs. Pseudobulbs subcylindric, broadly elliptic. Leaves elliptic, plicate. Flowers golden brown ; rachis purple.

Sikkim (?) ; ca 1200 m.

*Fl.* : May.

**DIPHYLAX** Hook. f.

**Diphylax urceolata** (Clarke) Hook. f. in Hook. Ic. Pl. 19, t. 1865. 1889. *Habenaria urceolata* Clarke in J. Linn. Soc. 25 : 73, t. 30. 1889 ; Hook. f., F.B.I. 6 : 165. 1890.

Terrestrial herbs, 5 - 15 cm tall. Leaves usually solitary, narrowly elliptic-oblong. Flowers white.

Yakla ; 3000 m.

**DIPLOMERIS** D. Don

**Diplomeris hirsuta** (Lindl.) Lindl., Gen. & Sp. Orchid. 330. 1835 ; Hook. f., F.B.I. 5 : 167. 1890. *Diplochilos hirsutus* Lindl. in Edw. Bot. Reg. 18. sub. t. 1499. 1832. 'Snow Orchid' (Eng.).

Small terrestrial herbs with globose tubers. Leaf solitary, sometimes with a much smaller one inserted at the base, linear-oblong, hirsute. Flowers white.

Near Phodong (on hill side walls).

*Fl.* : July Aug., *Fr.* : Sept. Oct.

**DIPLOPRORA** Hook. f.

**Diploprora championii** (Lindl.) Hook. f., F.B.I. 6 : 26. 1890.  
*Cottonia thampionii* Lindl. in Hook., J. Bot. 7 : 35. 1855.

Pendulous herbs. Leaves flaccidly fleshy, oblong-lanceolate. Flowers yellow ; lip white ; column white marked with cinnamon brown.

Sikkim ; ca 600 m.

Fl. : July Aug.

**EPIGENEIUM** Gagnep.

**Epigeneium amplum** (Lindl.) Summerh. in Kew Bull. 1957 ; 260. 1957. *Dendrobium amplum* Lindl. in Wall., Pl. As. Rar. 1 : 25, t. 29. 1830 ; Hook. f., F.B.I. 5 : 711. 1890 ; Brühl, l.c. 66.

Epiphytic herbs with pendulous rhizomes. Leaves 2, oblong or elliptic-oblong. Flowers pale greenish brown.

Sikkim, s.l. ; 1200 1800 m.

Fl. : Nov.

**E. fuscescens** (Griff.) Summerh. in Kew Bull. 1957 ; 264. 1957. *Dendrobium fuscescens* Griff., Notul. 3 : 308. 1851 ; Hook. f., F.B.I. 5 : 712. 1890.

Epiphytes with pendulous rhizomes. Leaves 2, narrowly oblong-lanceolate. Flowers dull greyish brown.

Sikkim Himalaya ; 1500 2100 m.

Fl. : Oct.

**E. rotundatum** (Lindl.) Summerh. in Kew Bull. 1957. *Sacropodium rotundatum* Lindl., Fol. Orchid Sacropodium 2. 1853. *Dendrobium rotundatum* (Lindl.) Hook. f., F.B.I. 5 : 712. 1890.

Epiphytes with pendulous rhizomes. Leaves 2, elliptic-oblong, notched at apex. Flowers brown.

Sikkim, s.l. ; 1800 2100 m.

Fl. : April.

**EPIPACTIS** Zinn

**Epipactis helleborine** (L.) Crantz, Strip. Austr. ed. 2 : 467. 1769. *emend.* Watson & Coulter in Asa Gray, Manual ed. 6 : 504. 1890.

*Serapias helleborine* L., Sp. Pl. 949. 1753. *Epipactis latifolia* Allioni, Fl. Ped. Mont. 2 : 151. 1785 ; Hook. f., F.B.I. 6 : 125. 1890.

Terrestrial herbs, up to 90 cm tall. Leaves broadly elliptic. Flowers green.

Gnathang ; ca 3300 m.

Fl. : July.

*E. veratrifolia* Boiss., Diagn. Pl. Orient. Nov. 1. 131. 11. 1854. *Epipactis consimilis* Wall. ex Hook. f., F.B.I. 6 : 126. 1890, non D. Don 1825.

Terrestrial herbs, up to 60 cm tall. Leaves lanceolate. Flowers lavender coloured.

Teesta valley ; ca 300 m.

Fl. : Feb. March.

In damp soil.

#### **EPIPOGIUM** Gmelin ex Borkhausen

*Epipogium aphyllum* (F. W. Schmidt) Swartz, Summ. Veg. Scand. 32. 1814 ; Hook. f., l.c. 6 : 124. 1890. *Orchis aphylla* F.W. Schmidt in Mayer, Samml. Phys. Aufs. 240. 1791.

Terrestrial leafless yellowish herbs, up to 20 cm tall. Roots coralloid. Flowers white ; lip with red streaks on spur.

Lachen valley ; ca 3600 m.

*E. roseum* (D. Don) Lindl. in J. Linn. Soc. 1 : 177. 1857. *Limodorum roseum* D. Don, Prodr. Fl. Nep. 30. 1825. *Epipogium nutans* Reichb. f. in Bonpland. 36. 1857 ; Hook. f., F.B.I. 6 : 124. 1890.

Terrestrial herbs, up to 40 cm tall. Roots tuberous. Stem yellow. Flowers white ; lip with red-brown spots on upper surface.

In hot valleys ; up to 1200 m.

Fl. : April June.

#### **ERIA** Lindl.

*Eria acervata* Lindl. in Paxt., Fl. Gard. 1 : 170. 1850 ; Hook. f., F.B.I. 5 : 796. 1890.

Epiphytic herbs. Pseudobulbs crowded, narrowly ellipsoid. Leaves 3-5, oblong-oblongate. Flowers white, with yellow tinge on lip.

Deorali (Cult.) ; 550 - 750 m.

*Fl.* : June - July.

**E. alba** Lindl., Gen. & Sp. Orchid. 67. 1830 ; Hook. *f.*, F.B.I. 5: 795. 1890.

Epiphytic herbs. Flowers yellowish white.

Deorali (Cult.) ; up to 1800 m.

*Fl.* : July - Aug.

**E. amica** Reichb. *f.*, Gen. Orchid. 2 : 162. t. 168. f. 6 - 9. 1870 ; Hook. *f.*, F.B.I. 5 : 800. 1890. **E. andersonii** Hook. *f.*, *l.c.* 795. **E. confusa** Hook. *f.* in Hook., Ic. Pl. t. 1850, 1889 & *l.c.* 796.

Epiphytic herbs. Pseudobulbs clavate. Leaves 3 or more, oblong-lanceolate. Flowers dull yellow with reddish brown nerves.

Teesta valley ; *ca* 900 m.

*Fl.* : April.

**E. bambusifolia** Lindl. in J. Linn. Soc. 3 : 61. 1859 ; Hook. *f.*, F.B.I. 5: 800. 1890.

Epiphytes, up to 90 cm long. Leaves many, elliptic-oblong. Flowers pale brown with darker lines.

Rissisoom ; *ca* 1800 m.

*Fl.* : Oct. - Dec.

**E. biflora** Griff., Notul. 3 : 302. 1851 ; Hook. *f.*, *l.c.* 5 : 800. 1890.

Epiphytic herbs. Pseudobulbs tufted, stem like. Leaves 3 - 5, narrowly elliptic. Flowers pale yellow.

Deorali (Cult.) ; 350 - 1200 m.

*Fl.* : Sept.

**E. bractescens** Lindl. in Edw. Bot. Reg. 27. 1841 & Misc. 18 : 30, t. 29. 1844 ; Hook. *f.*, F.B.I. 5 : 796. 1890.

Epiphytic herbs. Pseudobulbs narrowly cylindrical. Leaves (2-) 3 - 6, elliptic-oblong. Flowers pale yellow.

Deorali (Cult.) ; 300 - 1000 m.

*Fl.* : April.

**E. carinata** Gibs. in Calc. J. Nat. Hist. 5 : 365. 1865 ; Hook. *f.*, F.B.I. 5 : 796. 1890.

Epiphytic herbs. Pseudobulbs oblong-ovoid, furrowed on maturity. Leaves elliptic - oblong. Flowers yellowish green and crimson veined.

Deorali (Cult.) ; 500 - 1200 m.

*Fl.* : Nov. - Jan.

**E. clausa** King & Pantl. in J. Asiat. Soc. Beng. 65 : 121. 1896.

Epiphytes. Pseudobulbs ovoid - ellipsoid. Leaves 2 - 3, narrowly lanceolate. Flowers green with brown stripes.

Deorali (Cult.) ; 1000 - 1500 m.

*Fl.* : Feb. - March.

**E. coronaria** (Lindl.) Reichb. *f.* in Walp. Ann. 272. 1861. *Codogyne coronaria* Lindl. in Bot. Reg. Misc. 83. 1841. *Trichosma suavis* Lindl. in Bot. Reg. 28. t. 21. 1842 ; Hook. *f.*, F.B.I. 5 : 827. 1890.

Epiphytic herbs. Pseudobulbs tufted, thin, cylindric. Leaves 2, terminal, elliptic to ovate - lanceolate. Flowers white.

Deorali (Cult.) ; 1500 - 2000 m.

*Fl.* : Nov.

**E. excavata** Lindl., Gen. & Sp. Orchid. 67. 1830 ; Hook. *f.*, F.B.I. 5 : 795. 1890.

Epiphytic herbs. Pseudobulbs oblong. Leaves 6, elliptic-lanceolate. Flowers dull white, with apical lobe of lip yellow.

Deorali (Cult.) ; 1200 - 2000 m.

*Fl.* : June.

**E. ferruginea** Lindl. in Edw. Bot. Reg. n.s.25 : t. 35. 1839 ; Hook. *f.*, F.B.I. 5 : 804. 1890.

Epiphytic herbs. Leaves lanceolate, coriaceous. Flowers white.

Deorali (Gangtok). Cult. (*cf.* Raju *et al.* 1987)

**E. graminifolia** Lindl. in J. Proc. Linn. Soc. 3 : 54. 1859 ; Hook. *f.*, F.B.I. 5 : 794. 1890.

Epiphytes. Pseudobulbs narrowly cylindrical. Leaves 2-6, linear lanceolate. Flowers white.

Sikkim, *s.l.* ; 1500-1800 m.

*E. javanica* Bl., Rumph. 2 : 23. 1836. *E. fragrans* Reichb. *f.* in Bot. Zeit. 22 : 415. 1864 ; Hook. *f.*, F.B.I. 5 : 794. 1890.

Epiphytes. Pseudobulbs ellipsoid. Leaves in pairs, elliptic-oblong. Flowers white with some red spots in the apex of the column and side-lobes of lip.

Sikkim, *s.l.*

*Fl.* : July-Aug.

*E. laniceps* Reichb. *f.* in Hamb. Gratenzeit. 19 : 10. 1863. *E. elongata* Lindl. in J. Linn. Soc. 3 : 49. 1858 ; Hook. *f.*, F.B.I. 5 : 801. 1890.

Epiphytes. Leaves 3-5, narrowly oblong. Flowers green ; lip purple in lower half.

Sikkim, *s.l.*

*Fl.* : April.

*E. muscicola* (Lindl.) Lindl. in J. Proc. Linn. Soc. 3 : 47. 1859 ; Hook. *f.*, F.B.I. 5 : 789. 1890. *Dendrobium muscicola* Lindl., Gen. & Sp. Orchid. 75. 1830.

Epiphytic herbs, less than 5 cm tall. Pseudobulbs caespitose, depressed-globose. Leaves 2-4, oblanceolate. Flowers pale green.

Sikkim, *s.l.*

*Fl.* : April.

*E. paniculata* Lindl. in Wall., Pl. Asiat. Rar. 1 : 32. t. 36. 1830 ; Hook. *f.*, F.B.I. 5 : 789. 1890.

Pendulous epiphytes. Stems caespitose, 30-60 cm long. Leaves many, fleshy, linear. Flowers yellowish green.

Sikkim, *s.l.*

*Fl.* : April-May.

*E. pannea* Lindl. in Bot. Reg. 64. Misc. 79. 1842 ; Hook. *f.*, F.B.I. 5 : 804. 1890.

Epiphytic woolly herbs. Leaves 1 - 4, cylindric. Sepals and petals white woolly outside ; lip brown.

Tropical valleys.

*Fl.* : May.

**E. pubescens** (Hook.) Lindl. in Edw. Bot. Reg. 11 : t. 904. 1825. *Dendrobium pubescens* Hook., Exot. Fl. 2 : t. 124. 1824. *E. flava* Lindl., Gen. & Sp. Orchid. 65. 1830 ; Hook. f., F.B.I. 5 : 801. 1890.

Epiphytes. Pseudobulbs furrowed, sheathed at base. Leaves 3 - 5, narrowly oblong. Flowers green, lip purple in basal portion.

In warm valleys.

*Fl.* : April.

**E. pumila** Lindl., Gen. & Sp. Orchid. 68. 1830 ; Hook. f., F.B.I. 5 : 791. 1890.

Epiphytes. Pseudobulbs crowded, subcylindric. Leaves 3 - 4, linear-lanceolate. Flowers white, flushed with pink.

In tropical valleys.

**E. pusilla** (Griff.) Lindl. in J. Linn. Soc. 3 : 48. 1859 ; Hook. f., l.c. 787. *Conchidium pusillum* Griff., Notul. 321. 1851.

Epiphytic herbs with solitary small flowers.

Deorali (Cult.) ; 1300 - 1800 m.

*Fl.* : May.

**E. stricta** Lindl., Coll. Bot. t. 41 B. 1825 ; Hook. f., F.B.I. 5 : 791. 1890.

Epiphytes. Pseudobulbs crowded, cylindric. Leaves 2, oblong-elliptic, sessile. Flowers white flushed with pink, column yellow.

Sikkim, *s.l.* ; 300 - 1200 m.

**E. spicata** (D. Don) Hand-Mazz., Symb. Sin. 7 : 352. 1936. *Octomeris spicata* D. Don, Prodr. Fl. Nep. 31. 1825. *E. convallarioides* Lindl., Gen. & Sp. Orchid. 70. 1830 ; Hook. f., F.B.I. 5 : 791. 1890.

Epiphytes. Pseudobulbs flattened, tufted. Leaves 4 - 6, elliptic lanceolate. Flowers white.

Sikkim, *s.l.* ; 1500 - 1800 m.

*Fl.* : March - April.

*E. vittata* Lindl. in J. Linn. Soc. 3 : 51. 1859 ; Hook. *f.*, F.B.I. 5 : 794. 1890.

Epiphytes. Pseudobulbs cylindric. Leaves 2, elliptic - lanceolate. Flowers pale green, fragrant.

Sikkim, *s.l.* ; 1500 - 1800 m.

*Fl.* : March - April.

### ESMERALDA Reichb. *f.*

*Esmeralda clarkei* Reichb. *f.* in Gard. Chron. 2 : 26. 552. 1886. *Arachnanthe clarkei* (Reichb. *f.*) Rolfe in Gard. Chron. 2 : 567. 1888 ; Hook. *f.*, F.B.I. 6 : 28. 1890.

Epiphytic pendulous herbs. Flowers white outside, yellow - brown inside.

Sikkim *s.l.* ; 1800 - 2400 m.

*Fl.* : Nov.

### EULOPHIA R. Br.

*Eulophia bicallosa* (D. Don) P.F. Hunt. & Summerh. in Kew Bull. 20 : 10. 1966. *Bletia bicallosa* D. Don, Prodr. Fl. Nep. 30. 1825. *Cyrtopera bicarinata* Lindl., Gen. & Sp Orchid. 190. 1833. *Eulophia bicarinata* (Lindl.) Hook. *f.*, F.B.I. 6 : 6. 1890.

#### var. *bicallosa*

Terrestrial herbs. Leaves linear, appearing after flowering. Flowers yellowish green, often streaked with pink, midlobe of lip orbicular, crisped.

Sikkim, *s.l.* ; 600 - 900 m.

*Fl.* : March - April.

var. *major* (King & Pantl.) Sarkar in J. Econ. Tax. Bot. 5 : 1007. 1984. *E. bicarinata* var. *major* King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 181. t. 244. 1898.

Differs from var. *bicallosa* in having flowers *ca* 3 cm across, pale yellowish green : middle part of lip with 10 - 13 closely set tuberculate ridges of nearly equal length.

Foothills.

*Fl.* : March - April.

**E. candida** (Lindl.) Hook. *f.*, F.B.I. 6 : 6. 1890. *Cyrtopera candida* Lindl. in J. Linn. Soc. 3 : 31 1858.

Terrestrial herbs. Leaves elliptic-lanceolate. Flowers white or greenish.

Sikkim, *s.l.* ; 900 - 1200 m (*cf.* Hooker 1890).

**E. densiflora** Lindl. in J. Linn. Soc. 3 : 25. 1858 ; Hook. *f.*, F.B.I. 6 : 5. 1890.

Terrestrial herbs. Scape robust. Racemes many flowered.

Foot hills (*cf.* Hooker *f.* 1890).

**E. geniculata** King & Pantl. in J. Asiat. Soc. Beng. 64 : 337. 1895.

Terrestrial herbs. Leaves narrowly elliptic. Sepals brown ; petals and lip yellow.

Teesta valley ; *ca* 300 m.

*Fl.* : Aug.

**E. graminea** Lindl., Gen. & Sp. Orchid. 182. 1833 ; Hook. *f.*, F.B.I. 6 : 2. 1890.

Terrestrial herbs. Pseudobulbs obpyriform. Leaves linear. Flowers green with reddish nerves ; lip white, red on ridges.

Foot hills.

*Fl.* : March.

**E. mannii** (Reichb. *f.*) Hook. *f.*, F.B.I. 6 : 4. 1890. *Cyrtopera mannii* Reichb. *f.* in Flora 1872 : 274. 1872.

Terrestrial herbs, up to 2.2 m tall. Leaves linear. Flowers yellow, petals streaked with dull brown.

In tropical valleys.

*Fl.* : July - Aug.

**E. macrobulbon** Par. & Reichb. *f.* in Trans. Linn. Soc. 30 : 144. 1878 ; Hook. *f.*, F.B.I. 6 : 7. 1890.

Terrestrial herbs. Leaves sessile. Flowers yellow, petals streaked with dull brown.

In tropical valleys.

*Fl.* : July Aug.

***E. nuda*** Lindl., *Gen. & Sp. Orchid.* 180. 1833 ; Hook. *f.*, *F.B.I.* 6 : 5. 1890.

Terrestrial herbs. Leaves elliptic lanceolate. Flowers green, sepals with brown markings outside ; lip pale green at base, white in middle, pink flushed at apex.

In tropical valleys ; up to 450 m.

*Fl.* : April July.

***E. sanguinea*** (Lindl.) Hook. *f.*, *F.B.I.* 6 : 8. 1890. *Cyrtopera sanguinea* Lindl. in *J. Linn. Soc.* 3 : 32. 1858. *E. macrorhizon* Hook. *f.*, *F.B.I.* 6 : 7. 1890 ; King & Pantl., *l.c.* 179. 1898.

Terrestrial herbs. Leaves absent. Flowers dull brown ; lip white, pink or green.

Sikkim, *s.l.* ; *ca* 600 m.

*Fl.* : May June.

#### FLICKINGERIA A.D. Hawkes

***Flickingeria macraei*** (Lindl.) Seid. in *Dansk. Bot. Ark.* 34 : 39. 1980. *Dendrobium macraei* Lindl., *Gen. & Sp. Orchid.* 75. 1833 ; Hook. *f.*, *l.c.* 5. 714. *p.p.* ; Brühl, *l.c.* 66.

Epiphytes. Leaf terminal, sessile linear-oblong. Flowers 1 2 near leaf base, white.

In tropical valleys.

*Fl.* : May.

#### GALEOLA Lour.

***Galeola cathcartii*** Hook. *f.*, *F.B.I.* 6 : 89. 1890 ; King & Pantl., *l.c.* 263.

Scandant leafless herbs. Flowers yellow ; lip with red lines at base.

Rangpet valley ; *ca* 450 m.

*Fl.* : June.

Rare.

**G. falconeri** Hook. *f.*, F.B.I. 6 : 88. 1890.

Erect, leafless herbs. Flowers bright yellow.

Sikkim, *s.l.* ; 1500 2100 m.

*Fl.* : July Aug.

**G. lindleyana** (Reichb. *f.*) Reichb. *f.*, Xen. Orch. 2 : 78. 1865 ; Hook. *f.*, F.B.I. 6 : 88. 1890. *Erythrorchis lindleyana* Reichb. *f.* in Bonplandia 5 : 37. 1857.

Erect herbs. Stems brownish purple below, pale yellowish upwards. Flowers yellow with a reddish patch on the lip.

Sikkim *s.l.* ; 1500 2100 m.

**G. nudiflora** Lour., Fl. Cochinch. 2 : 520. 1790. *Galeola hydra* Reichb. *f.*, Xen. Orchid. 2 : 77. 1865 ; Hook. *f.*, F.B.I. 6 : 89. 1890.

Extensive leafless climber. Flowers yellow with red markings at the base of the lip.

Rishap valley.

*Fl.* : July.

### GASTROCHILUS D. Don

**Gastrochilus acutifolius** (Lindl.) O. Ktze., Rev. Gen. Pl. 2 : 661. 1891. *Saccolabium acutifolium* Lindl., Gen. & Sp. Orchid. 223. 1833 ; Hook. *f.*, F.B.I. 6 : 61. 1890 ; King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 228. t. 304. 1898.

Epiphytes without pseudobulbs. Leaves fleshy, oblong-lanceolate. Flowers pale green, flushed and mottled with dull brown or uniformly yellow ; lip white.

Sikkim, *s.l.*, ca 900 m.

*Fl.* : Nov. Dec.

**G. affinis** (King & Pantl.) Schltr. in Fedde Repert. 12 : 314. 1913. *Saccolabium affine* King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 228. t. 304. 1898.

Epiphytes. Flowers green, flushed with brown ; lip yellowish.

Above Pemiongtsi ; ca 2400 m.

*Fl.* : June.

**G. calceolaris** (J.E. Smith) D. Don, Prodr. Fl. Nep. 32. 1825. *Saccolabium calceolare* (J.E. Smith) Lindl., Gen. & Sp. Orchid. 223. 1833 ; King & Pantl., *l.c.* 277. 1898.

Pendulous epiphytes. Leaves narrowly oblong, with unequally bifid apices. Flowers pale green with large brown markings ; lip-sac yellow with brown red markings.

Sikkim, *s.l.* ; 1200 1800 m.

*Fl.* : March April.

**G. dasypogon** (J.E. Smith) O. Ktze., Rev. Gen. Pl. 2 : 66. 1891. *Aerides dasypogon* J.E. Smith in Rees. Cyclop. 39 : 10. 1819. *Saccolabium dasypogon* (J.E. Smith) Lindl., Gen. & Sp. Orchid. 222. 1833 ; Hook. f., F.B.I. 6 : 66. 1890 ; King & Pantl., *l.c.* 224.

Pendulous epiphytes. Leaves narrowly oblong. Flowers bright yellow.

Sikkim, *s.l.* ; ca 300 m.

*Fl.* : Nov. Dec.

**G. distichus** (Lindl.) O. Ktze., Rev. Gen. Pl. 2 : 661. 1891. *Saccolabium distichum* Lindl. in J. Proc. Linn. Soc. 3 : 36. 1859 ; Hook. f., F.B.I. 6 : 64. 1890.

Epiphytes. Leaves fleshy, lanceolate. Flowers green, with irregular brown markings ; apical lobe of lip yellow.

Sikkim, *s.l.* ; 1800 2400 m.

*Fl.* : March May.

**G. intermedius** (Griff. ex Lindl.) O. Ktze., Rev. Gen. Pl. 2 : 661. 1891. *Saccolabium intermedium* Griff. ex Lindl. in J. Linn. Soc. 3 : 33. 1858 ; Hook. f., F.B.I. 6 : 61. 1890.

Epiphytic herbs. Leaves linear. Flowers yellow, spotted with brownish purple.

Sikkim, *s.l.* ; 900 m.

*Fl.* : Aug.

**G. pseudodistichus** (King & Pantl.) Seid., Orch. Fl. Camb. Laos & Vietn. 1 : 65. 1975. *Saccolabium pseudodistichum* King & Pantl. in J. Asiat. Soc. Beng. 64 : 341. 1895.

Terrestrial herbs. Leaves lanceolate. Flowers greenish with brownish purple spots.

Sikkim, *s.l.* ; 1800 2400 m.

*Fl.* : Aug. Oct.

#### GASTRODIA R. Br.

**Gastrodia dyeriana** King & Pantl. in J. Asiat. Soc. Beng. 64 : 342. 1895.

Terrestrial leafless herbs. All parts brown except the yellowish white lip.

Sikkim, *s.l.* ; ca 2100 m.

*Fl.* : Aug.

#### GEODORUM G. Jacks

**Geodorum densiflorum** (Lam.) Schltr. in Fedde Repert. 4 : 259. 1929. *Limodorum densiflorum* Lam., Encycl. 3 : 516. 1791 92. *Geodorum dilatatum sensu* Hook. f., F.B.I. 6 : 17. 1890, *non* R. Br. 1813. *G. purpureum* R. Br. in Hort. Kew. ed. 295 : 207. 1813 ; Hook. f., *l.c.* 16 ; Brühl, *l.c.* 112.

Terrestrial herbs. Tubers globular, apiculate. Leaves elliptic. Flowers white or pale purple ; calli on the lip yellow.

Found at lower elevations.

*Fl.* : April May.

#### GOODYERA R. Br.

**Goodyera foliosa** (Lindl.) Benth. *ex* Clarke in J. Linn. Soc. (Bot.) 25 : 73. 1889 ; Hook. f., F.B.I. 6 : 113. 1890. *Georchis foliosa* Lindl., Gen. & Sp. Orchid. 496. 1840.

Terrestrial herbs, up to 30 cm tall. Leaves ovate-lanceolate. Flowers pink or orange ; lip yellow.

Sikkim, *s.l.* ; 1500 1800 m.

*Fl.* : Oct. Nov.

**G. fumata** Thw., Enum. Pl. Zeyl. 314. 1864 ; Hook. f., F.B.I. 6 : 111. 1890.

Terrestrial herbs, up to 1.2 m tall. Leaves obliquely oblong-elliptic. Flowers pale green ; lip and column pale brown.

Sikkim (?) ; ca 1800 m.

*Fl.* : March.

**G. fusca** (Lindl.) Hook. f., F.B.I. 6 : 112. 1890. *Aetheria fusca* Lindl., Gen. & Sp. Orchid. 491. 1840.

Terrestrial herbs, up to 30 cm tall. Leaves ovate. Flowers white ; apex of lip green, sac flushed with pinkish yellow.

Lachung valley ; ca 3600 m.

*Fl.* : Aug.

**G. grandis** King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 284. 1898.

Terrestrial herbs, up to 50 cm tall. Leaves ovate. Flowers dull red.

Rumtek ; ca 1200 m.

*Fl.* : Aug.

**G. hemsleyana** King & Pantl. in J. Asiat. Soc. Beng. 64 : 342. 1895.

Terrestrial herbs, up to 25 cm tall. Leaves 3 - 5, unequal, broadly ovate. Flowers white ; sepals tipped with pink.

Sikkim, *s.l.* ; 2100 m.

*Fl.* : July.

**G. hispida** Lindl. in J. Linn. Soc. 1 : 183. 1857 ; Hook. f., F.B.I. 6 : 114. 1890.

Terrestrial herbs, 10 - 15 cm tall. Leaves elliptic lanceolate. Flowers greenish white.

Teesta valley ; ca 300 m.

*Fl.* : Sept.

**G. procera** (Wall. ex Ker-Gawl.) Hook., Exot. Fl. 1 : t. 39. 1823 ; Hook. f., F.B.I. 6 : 111. 1890. *Neottia procera* Wall. ex Kar. - Gawl. in Edw. Bot. Reg. 8 : t. 639. 1822.

Terrestrial herbs, 25 - 75 cm tall. Leaves narrowly elliptic or ovate-elliptic. Flowers white, faintly tinged with green.

Sikkim, *s.l.* ; up to 1200 m.

*Fl.* : May.

**G. repens** (L.) R. Br. in Ait., Hort. Kew., ed. 2. 5 : 198. 1813 ;  
Hook. *f.*, F.B.I. 6 : 111. 1890. *Satyrium repens* L., Sp. Pl. 945. 1753.

Terrestrial herbs, up to 20 cm tall. Leaves ovate-elliptic, green,  
reticulated with white. Flowers white flushed with brownish pink.

Sikkim, *s.l.* ; 2400 3300 m.

*Fl.* : July Aug.

**G. schlechtendaliana** Reichb. *f.* in Linnaea 22 : 861. 1849.  
*Goodyera secundiflora* Lindl. in J. Linn. Soc. 1 : 82. 1853 ; Hook. *f.*,  
F.B.I. 6 : 113. 1890.

Terrestrial herbs, 15 30 cm tall. Leaves ovate-lanceolate.  
Flowers yellowish pink ; lip white, tipped with green.

Sikkim, *s.l.* ; *ca* 1800 m.

*Fl.* : Sept. Jan.

**G. vittata** Benth. *ex* Hook. *f.*, F.B.I. 6 : 113. 1890 ; Brühl. *l.c.*  
165.

Terrestrial herbs, up to 20 cm tall. Leaves ovate-lanceolate.  
Flowers pink.

Lachung valley, 1800 3000 m.

*Fl.* : July Sept.

#### GYMNADENIA R. Br.

**Gymnadenia orchidis** Lindl., Gen. & Sp. Orchid. 278. 1835.  
*Habenaria orchidis* (Lindl.) Hook. *f.*, F.B.I. 6 : 142. 1890. *Orchis*  
*habenarioides* King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 302. t.  
401. 1898.

Terrestrial herbs, up to 50 cm tall. Leaves 4 5, elliptic-oblong  
to linear-oblong, sessile. Flowers pinkish or violet, rarely white.

Lachung valley ; *ca* 3600 m.

*Fl.* : Aug.

#### HABENARIA Willd.

**Habenaria aitchisoni** Reichb. *f. apud* Aitch. in Trans. Linn. Soc.  
2. Bot. 3. 113. 1888 ; Hook. *f.*, F.B.I. 6 : 152. 1890.

Terrestrial herbs, up to 12.5 cm tall. Leaves 2, sessile, orbicular. Flowers greenish.

Lachen valley ; 3000 - 3300 m.

*Fl.* : July.

**H. albomarginata** King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 322. t. 425. 1898.

Terrestrial herbs, less than 20 cm tall. Leaves 2, unequal, orbicular-elliptic to oblong. Flowers green with white margins.

Near Dzongri ; ca 3900 m.

*Fl.* : June.

**H. arietina** Hook. f., F.B.I. 6 : 138. 1890.

Terrestrial herbs. Leaves narrowly elliptic. Flowers green.

Tumlong, Pemiongchi, Re chi la ; 1800 - 2700 m.

*Fl.* : July - Aug.

**H. cumminsiana** King & Pantl. in J. Asiat. Soc. Beng. 64 : 343. t. 2. 1895.

Terrestrial herbs, 15 -25 cm tall. Leaves 2 - 4, unequal, broadly elliptic to lanceolate. Flowers green.

Gnathang, Lachung valley ; ca 3300 m.

*Fl.* : July.

**H. dentata** (Swartz) Schltr. in Fedde Repert. 4 : 125. 1919.  
*Orchis dentata* Swartz in Vet. Acad. Handl. Stockh. 21 : 207. 1800.  
*Habenaria geniculata* D. Don, Prodr. Fl. Nep. 25. 1825 ; Hook. f., l.c. 6 : 138. 1890.

**f. dentata**

Terrestrial herbs, 30 - 75 cm tall. Leaves oblong-elliptic. Flowers white.

Sikkim, *s.l.* ; 750 - 1500 m.

**f. ecalcarata** (King & Pantl.) Tuyama in Hara, Fl. E. Himal. 438. 1966. *H. geniculata* var. *ecalcarata* King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 320. t. 405, f. 4 - 5. 1898.

Differs from *f. dentata* in having united stigmas, lanceolate-oblong lip and spur being absent.

Sikkim, *s.l.* ; 750 1500 m.

**H. malleifera** Hook. *f.*, F.B.I. 6 : 143. 1890. *H. furfuracea* Hook. *f.*, *l.c.* 144.

Terrestrial herbs, 37 60 cm tall. Leaves narrowly elliptic. Flowers green.

Sikkim, *s.l.* ; 1500 1800 m.

*Fl.* : Aug. Sept.

**H. nematocaulon** Hook. *f.*, F.B.I. 6 : 154. 1890.

Terrestrial herbs, 6.5 22.5 cm tall. Leaves elliptic. Flowers white.

Rechi la ; *ca* 2700 m.

*Fl.* : Aug.

**H. pectinata** (J.E. Smith) D. Don, Prodr. Fl. Nepal. 24 : 1825 ; Hook. *f.*, F.B.I. 6 : 137. 1890. *Orchis pectinata* J.E. Smith, Exot. Bot. t. 99. 1804.

Terrestrial herbs, 30 75 cm tall. Leaves linear lanceolate, distributed in upper part of the stem.

North Sikkim ; *ca* 1500 m.

*Fl.* : Aug.

**H. stenopetala** Lindl., Gen. & Sp. Orchid. 319. 1835 ; Hook. *f.*, F.B.I. 6 : 134. 1890.

Terrestrial herbs, 30 105 cm tall ; stem sheathed at lower portion. Leaves distributed above, oblong-lanceolate or ovate-lanceolate. Flowers pale green ; lip brown.

Sikkim, *s.l.* ; 600 1800 m.

*Fl.* : Aug. Oct.

**H. seshagiriana** A.N. Rao in J. Econ. Tax. Bot. 6 : 223. 1895. *H. stenopetala* var. *polytricha* Hook. *f.* in Ann. Roy. Bot. Gard. Calc. 5 : 64. t. 96. 1895. *H. polytricha* (Hook. *f.*) Pradhan in Ind. Orchid. 1 : 68. 1976, *non* Rolfe 1896.

Terrestrial herbs. Sepals and petals produced into long capillary tails.

Sikkim, *s.l.* ; *ca* 1500 m.

*Fl.* : Aug. Sept.

## HERMINIUM L.

**Herminium angustibre** King & Pantl. in J. Asiat. Soc. Beng. 65 : 131. 1896 ; Brühl, *L.c.* 191. 1926.

Terrestrial herbs, up to 10 cm tall. Leaf solitary, sessile, elliptic. Flowers green.

Lingtu, Singa le la ; 3300 - 3600 m.

*Fl.* : July.

**H. jeffreyanum** King & Pantl. in J. Asiat. Soc. Beng. 65 : 130. 1896.

Terrestrial herbs, 10 - 20 cm tall. Leaves 2, narrowly oblong. Flowers green.

Sikkim, *s.l.* ; 2400 - 3000 m.

*Fl.* : Aug.

**H. josephii** Reichb. *f.* in Flora 55 : 276. 1872 ; Hook. *f.*, F.B.I. 6 : 129. 1890.

Terrestrial herbs, 10 - 25 cm tall. Leaves 2, sub-opposite, narrowly elliptic-oblong. Flowers green.

Lachen valley ; 3300 - 3600 m.

*Fl.* : June - July.

**H. lanceum** (Thunb. *ex* Swartz) J. Vuijk. in Blumea 11 : 228. 1961. *Ophrys lancea* Thunb. *ex* Swartz in Kongl., Vet. Akad. Handl. Stockh. 21 : 223. 1800. *Aceras angustifolia* Lindl. in Edw. Bot. Reg. 10 : t. 1525. 1832. *Herminium angustifolium* (Lindl.) Benth. *ex* Hook. *f.*, F.B.I. 6 : 129. 1890.

Terrestrial herbs, 25 - 75 cm tall. Leaves 2 - 3, linear, acuminate. Flowers green.

Sikkim, *s.l.* ; 1350 - 2700 m.

*Fl.* : July - Aug.

**H. macrophyllum** (D. Don) Dandy in J. Bot. 70 : 328. 1930. *Neottia macrophylla* D. Don, Prodr. Fl. Nepal. 27. 1825. *Herminium congestum* Lindl. in Edw. Bot. Reg. 18 : Sub. t. 1499. 1832 ; Hook. *f.*, F.B.I. 6 : 130. 1890 ; Brühl, *L.c.* 193.

Terrestrial herbs, 7.5 - 17.5 cm tall. Leaves 2 - 3, narrowly oblong-elliptic. Flowers green.

Sikkim, *s.l.* ; 3000 - 3750 m.

*Fl.* : July - Aug.

**H. orbiculare** Hook. *f.*, F.B.I. 6 : 130. 1890 ; Brühl, *l.c.* 191.

Terrestrial herbs, 7 - 15 cm tall. Leaves variable, elliptic-oblong, or linear-lanceolate. Flowers green.

Singale - Ia ; 3600 m.

*Fl.* : July.

**H. pugioniformae** Lindl. *ex* Hook. *f.*, F.B.I. 6 : 130. 1890 ; Brühl, *l.c.* 191.

Terrestrial herbs, 5 - 18 cm tall. Leaf solitary, oblong-ob lanceolate. Flowers minute, green.

Singale - Ia ; 3600 m.

*Fl.* : July.

**H. quinquelobium** King & Pantl. in J. Asiat. Soc. Beng. 65 : 130. 1896 ; Brühl, *l.c.* 193.

Terrestrial herbs, 10 - 30 cm tall. Leaves 2, linear-oblong. Flowers green ; lip 5-lobed.

Tankrala, Tendong ; 2100 - 2850 m.

*Fl.* : Aug.

#### HERPYSMA Lindl.

**Herpysma longicaulis** Lindl., Gen. & Sp. Orchid. 506. 1840 ; Hook. *f.*, F.B.I. 6 : 98. 1890.

Terrestrial herbs. Leaves ovate - lanceolate or narrowly elliptic. Flowers white.

Sikkim, *s.l.* ; 1500 m.

*Fl.* : Aug.

#### HETAERIA Bl.

**Hetaeria rubens** (Lindl.) Benth. in Benth. & Hook. *f.*, Gen. Pl. 3 : 164. 1880 ; Hook. *f.*, F.B.I. 6 : 115. 1890 ; Brühl, *l.c.* 174.

Terrestrial herbs, 25 - 45 cm tall. Leaves ovate-elliptic, sub-oblique. Flowers green, tipped with pink ; lip white tipped.

Sikkim, *s.l.* ; 450 900 m.

*Fl.* : Jan Feb.

### KINGIDIUM P.F. Hunt.

**Kingidium deliciosum** (Reichb. *f.*) Sweet in Amer. Orchid. Soc. Bull. 39 : 1095. 1970. *Phalaenopsis deliciosa* Reichb. *f.* in Bonplandia 2 : 93. 1854. *P. wightii* Reichb. *f.* in Bot. Zeit. 214. 1854. *Aerides decumbens* Griff., Notul. 3 : 365. 1851 & Ic. Pl. Asiat. t. 320. 1851. *Doritis wightii* (Reichb. *f.*) Benth. in Benth. & Hook. *f.*, Gen. Pl. 3 : 574. 1883 ; Hook. *f.*, F.B.I. 6 : 32. 1890 ; King & Pantl. in Ann. Roy Bot. Gard. Calc. 8 : 198. 1898.

Epiphytic herbs. Leaves *ca* 3, pendulous, broadly oblanceolate, blunt, 15 20 x 3 5 cm. Flowers *ca* 15 mm across, pale orchraceous yellow with purple markings on lip and column, base of perianth slightly mottled with pink.

Teesta valley, at lower elevations.

*Fl.* : July.

**K. taenialis** (Lindl.) P.F. Hunt. in Kew Bull. 24 : 98. 1970. *Aerides taeniale* Lindl., Gen. & Sp. Orchid. 239. 1833. *Doritis taenialis* (Lindl.) Hook. *f.*, F.B.I. 6 : 31. 1890 ; King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 199. 1898.

Epiphytic herbs. Leaves 1 or more, pendulous narrowly elliptic-oblong, 70 - 130 x 15 20 mm, acute. Flowers pale purple, *ca* 20 mm across.

Gangtok (Baluakhani) ; 900 1800 m.

*Fl.* : May July.

### LIPARIS L.C. Rich.

**Liparis bhootanensis** Griff., Ilin. Notes 98. 1848 ; Hook. *f.*, F.B.I. 5 : 700. 1890.

Epiphytes. Pseudobulbs narrowly oblong. Leaf solitary, linear-oblong to lanceolate. Flowers *ca* 16 mm long, pale brown.

Sikkim, *s.l.* ; *ca* 1340 m.

*Fl.* : Aug.

**L. bistrata** Parish & Reichb. *f.* in Trans. Linn. Soc. 30 : 155. 1874 ; Hook. *f.*, F.B.I. 5 : 702. 1890.

Epiphytes. Pseudobulbs elongated, 7.5–15 cm long, tufted. Leaves 2, elliptic-lanceolate or elliptic-oblong. Flowers ca 12 mm long, pale green.

Rishap ; ca 2100 m.

*Fl.* : July–Aug.

*L. caespitosa* (Thou.) Lindl., Bot. Ref. 11. subt. 882. 1825. *Malaxis caespitosa* Thou., Orch. Ill. Afr. t. 89. 1882. *L. pusilla* Ridley in J. Linn. Soc. 22 : 294. 1886 ; Hook. f., F.B.I. 5 : 701. 1890. *L. obscura* Hook. f., F.B.I. 5 : 701. 1890.

Epiphytes. Pseudobulbs tufted, ellipsoid or ovoid, ca 12 mm long. Leaf solitary, linear-lanceolate or linear-oblong. Flowers pale green, ca 3 mm long.

Teesta valley ; 1200–2100 m.

*Fl.* : Aug.–Oct.

*L. cathcartii* Hook. f. in Hook., Ic. Pl. 19 : f. 1808. 1889 & F.B.I. 5 : 694. 1890.

Terrestrial herbs. Pseudobulbs narrowly ovoid. Leaves 2, subopposite, broadly ovate or elliptic ovate. Flowers ca 2 cm long, purplish green.

Lachen valley ; 2100–3000 m.

*L. cordifolia* Hook. f. in Hook., Ic. Pl. 19 : t. 1811. 1889 & F.B.I. 5 : 692. 1890.

Terrestrial herbs, dark green. Pseudobulbs crowded, compressed, ovoid. Leaf large, solitary, broadly ovate. Flowers ca 18 mm ; lip almost deltoid, broad at apex.

Sikkim, *s.l.* ; 1500–1800 m.

*Fl.* : Oct.–Nov.

*L. deflexa* Hook. f., F.B.I. 5 : 697. 1890.

Terrestrial herbs. Leaves 2, subopposite, elliptic. Flowers ca 7 mm long, yellow.

Sikkim, *s.l.* ; ca 600 m.

*Fl.* : Aug.

*L. deliculata* Hook. f., Ic. Pl. t. 1889 & F.B.I. 5 : 705. 1890.

Epiphytes. Pseudobulbs ovoid or oblong. Leaves 2, narrowly elliptic. Flowers *ca* 6 mm long., ochraceous.

Sikkim, *s.l.* ; 1800 m.

*Fl.* : Aug. Sept.

**L. gamblei** Hook. *f.*, Ic. Pl. t. 1812. 1889 & F.B.I. 5 : 693. 1890.

Epiphytes. Pseudobulbs in clusters, suborbicular, flattened, green. Leaf solitary, elliptic or elliptic-oblong. Flowers dark green ; lip with brown-purple margins and nerves.

Sikkim *s.l.* ; 1800 - 1950 m.

*Fl.* : June.

**L. glossula** Reichb. *f.* in Linnaea 41 : 44. 1876 ; Hook. *f.*, F.B.I. 5 : 693. 1890.

Terrestrial herbs. Pseudobulbs ovoid, tufted. Leaf solitary, oblong. Flowers *ca* 18 mm long, green ; lip purple.

Sikkim, *s.l.* ; 1800 4300 m.

**L. nervosa** (Thunb.) Lindl., Gen. & Sp. Orchid. 26. 1830. *Ophrys nervosa* Thunb., Fl. Japon. 27 : 1784. *L. bituberculata* Lindl. in Edw. Bot. Reg. 11. sub f. t. 882. 1825 ; Hook. *f.*, F.B.I. 5 : 696. 1890.

Terrestrial herbs. Stems tufted, up to 25 cm tall. Leaves 4 5, ovate-elliptic or lanceolate, opposite, oblique, plicate. Flowers *ca* 18 mm long, brownish purple.

Chunghang, Lachen valley ; *ca* 1800 m.

*Fl.* : June July.

**L. paradoxa** (Lindl.) Reichb. *f.*, Walp. Ann. 6 : 218. 1861 ; Hook. *f.*, F.B.I. 5 : 697. 1890. *Empusa paradoxa* Lindl., Bot. Reg. 10. Subt. 825. 1824.

Terrestrial herbs. Pseudobulbs ovoid. Leaves 2 3, alternate, elliptic-lanceolate. Flowers *ca* 12 mm long, green ; lip purplish.

Tropical valleys ; up to 1800 m.

*Fl.* : July Sept.

**L. perpusilla** Hook. *f.* in Hook. *f.* Ic. Pl. 19. t. 1856 B. 1889 & F.B.I. 5 : 706. 1890. *L. togashii* Tuyama *ex* Hara, Fl. E. Himal. 441. 1966.

Epiphytes. Pseudobulbs tufted, ovoid-oblong. Leaves 3 - 4, linear or linear-oblong. Flowers yellow, *ca* 3.5 mm long.

Chungthang ; 1800 - 2900 m.

**L. petiolata** (D. Don) P.F. Hunt. & Summerh. in Kew Bull. 20 : 52. 1966. *Acianthus petiolatus* D. Don, Prodr. Fl. Nep. 29 : 1825. *Liparis nepalensis* Lindl., Bot. Reg. Sub. f. 882. 1825 ; Hook. f., *l.c.* 693.

Terrestrial herbs. Pseudobulbs ovate-acuminate, compressed, striate. Leaves 2, broadly ovate to suborbicular. Flowers purplish green ; lip purple.

Sikkim, *s.l.* ; 1050 - 1500 m.

*Fl.* : May.

**L. plantaginea** Lindl., Gen. & Sp. Orchid. 29. 1830 ; Hook. f., F.B.I. 5 : 702. 1890.

Epiphytes. Pseudobulbs large, narrowly ovoid-oblong, compressed, smooth, pale green. Leaves subopposite, linear-oblong or oblanceolate. Flowers green, up to 2.5 cm long.

Sikkim, *s.l.* ; 300 - 600 m.

*Fl.* : June - Aug.

**L. platyrhachis** Hook. f. in Hook., *l.c.* Pl. 19. t. 1890. 1899 & F.B.I. 5 : 706. 1890.

Epiphytes. Pseudobulbs tufted, oblong, compressed, *ca* 12 cm long, each bearing 3 - 5 linear-lanceolate leaves. Flowers pale ochraceous.

Chungthang ; 1200 - 1800 m.

*Fl.* : Sept.

**L. pygmaea** King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 34. t. 44. 1898.

Terrestrial herbs, up to 3.5 cm tall. Pseudobulbs up to 1.2 cm long, narrowly ovoid, loosely sheathed. Leaves 2, subopposite, ovate. Flowers yellowish, *ca* 6 mm long.

Below Dzongri ; 3900 m.

*Fl.* : June.

**L. resupinata** Ridley in J. Linn. Soc. Bot. 22 : 290. 1886. Hook. f., F.B.I. 5 : 705. 1890.

**var. resupinata**

Epiphytes. Pseudobulbs tufted, ovoid, cylindric, sheathed. Leaves 2-4, linear-lanceolate, sessile. Inflorescence 15-30 cm long, many flowered; flowers golden brownish; lip broadly oblong or ovate, sagittate at base.

Sikkim, *s.l.*; 1200-1800 m.

*Fl.*: Oct. Dec.

var. **ridleyi** Hook. *f.* in Hook.,  *Ic. Pl.* t. 1887. 1889 & *F.B.I.* 5 : 705. 1890.

Pseudobulbs, leaves and flowers larger than in var. *resupinata*. Racemes flowerless in upper part.

Sikkim, *s.l.*; 1200-1800 m.

*Fl.*: Oct. Dec.

**L. stricklandiana** Reichb. *f.* in *Gard. Chron.* 1 : 232. 1880; Hook. *f.*, *l.c.* 707. **L. griffithii** Ridley in *J. Linn. Soc.* 22 : 285. 1886; Hook. *f.*, *l.c.* 700.

Epiphytes. Pseudobulbs ovoid or oblong, compressed. Leaves 2, narrowly oblanceolate. Flowers yellowish green.

Pemiongtchi; 1500 m.

*Fl.*: Nov.

**L. viridiflora** (Bl.) Lindl., *Gen. & Sp. Orchid.* 31. 1830; Hook. *f.*, *F.B.I.* 5 : 704. 1890. **Malaxis viridiflora** Bl., *Bijdr.* 392. t. 54. 1825. **L. longipes** Lindl. in *Wall., Pl. As. Rar.* 1 : 31. t. 35. 1829.

Epiphytes. Pseudobulbs closely arranged in a row, cylindric, stem like. Leaves 2, oblanceolate-oblong. Flowers ca 7 mm, pale yellowish green.

In tropical valleys; 300-1200 m.

*Fl.*: Oct. Dec.

**LISTERA** R. Br. (*nom. cons.*)

**Listera alternifolia** King & Pantl. in *J. Asiat. Soc. Beng.* 65 : 126. 1896.

Terrestrial herbs, 16-25 cm tall. Leaves 2, alternate (to sub-opposite), obovate or elliptic. Flowers green.

Lachen valley ; 3000 m.

*Fl.* : July.

***L. brevicaulis*** King & Pantl. in J. Asiat. Soc. Beng. 65 : 126. 1896.

Terrestrial herbs, 15 - 23 cm tall. Leaves 2, ovate-rotund. Flowers dull olivaceous green ; lip with brown central edge.

Lachen valley ; *ca* 2700 m.

*Fl.* : July.

***L. dentata*** King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 257. 1898.

Terrestrial herbs, 20 - 30 cm tall. Leaves 2, opposite. Flowers green.

Dzongri ; *ca* 3900 m.

*Fl.* : July.

***L. longicaulis*** King & Pantl. in J. Asiat. Soc. Beng. 65 : 126. 1896.

Terrestrial herbs, 15 - 35 cm tall. Leaves 2, orbicular-ovate to reniform. Flowers green, with darker veins.

Lachen valley ; *ca* 2100 m.

*Fl.* : July.

***L. micrantha*** Lindl. in J. Linn. Soc. 1 : 176. 1857 ; Hook. *f.*, F.B.I. 6 : 104. 1890.

Terrestrial herbs, 7.5 - 12.5 cm tall. Leaves 2, opposite, orbicular or cuneate-ovate. Flowers pale green ; lip 3 fid.

Lachen, Lachung valley ; 3000 - 3300 m.

*Fl.* : July.

***L. pinetorum*** Lindl. in J. Linn. Soc. 1 : 175. 1857 ; Hook. *f.*, F.B.I. 6 : 104. 1890. *L. mucronata* Panigr. & J.J. Wood in Kew Bull. 29 : 731. 1974.

Terrestrial herbs. Leaves broadly cordate or reniform. Flowers pale olivaceous green, flushed with brown ; lip pale brown with a dark band along central ridge.

Lachen valley ; 3000 - 3300 m.

*Fl.* : July.

*L. tenuis* Lindl. in J. Linn. Soc. 1 : 176. 1857 ; Hook. *f.*, F.B.I. 6 : 104. 1890.

Terrestrial herbs, 10 - 15 cm tall. Leaves 2, elliptic, ovate. Flowers olivaceous green ; lip pale brown with dark mid rib and faint oblique lines.

Lachen valley ; 3300 - 3600 m.

*Fl.* : July.

### LUISIA Gaud.

*Luisia brachystachys* Bl., Rumph. 4 : 50. 1849 ; Hook. *f.*, F.B.I. 6 : 23. 1890. *L. indivisa* King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 210. 1898.

Epiphytes without pseudobulbs, 12.5 - 17 cm tall. Flowers pale green ; lip entire.

Sikkim, *s.l.*

*Fl.* : March.

*L. trichorhiza* (Hook.) Bl., Mus. Bot. 1 : 63. 1849 ; Hook. *f.*, F.B.I. 6 : 23 : 1890. *Vanda trichorhiza* Hook., Exot. Fl. 1 : t. 72. 1823.

Epiphytes, 10 - 25 cm tall. Leaves fleshy. Flowers produced on short thick tubercles ; sepals pale green with faint purple lines ; lip dark purple.

Sikkim, *s.l.* ; lower elevations.

*Fl.* : March - April.

*L. volucris* Lindl., Fol. Orchid. 1. 1852 ; Hook. *f.*, F.B.I. 6 : 25. 1890.

Pendulous epiphytes, 60 - 150 cm tall. Leaves inserted on one side of stem. Flowers pale green ; lip pale green to purplish brown.

At lower elevations.

*Fl.* : March - April.

*L. zeylanica* Lindl., Fol. Orchid. Luisia 3. 1853. *L. teretifolia sensu* Hook. *f.*, F.B.I. 6 : 22. 1890, *non* Gaud. 1829.

Epiphytes, 15 - 30 cm tall. Leaves terete, spreading. Flowers green ; lip and columns purple ; anthers pale yellow.

Sikkim, *s.l.* ; up to 900 m.

*Fl.* : May.

#### MALAXIS Soland *ex* Swartz

**Malaxis acuminata** D. Don, Prodr. Fl. Nepal. 29. 1825. *Microstylis wallichii* Lindl., Gen. & Sp. Orchid. 20. 1830 ; Hook. *f.*, F.B.I. 5 : 686. 1888 ; King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 16. 1898.

##### *f. acuminata*

Terrestrial herbs, *ca* 7.5 cm tall. Leaves 3 - 4, ovate - lanceolate. Flowers yellowish.

Teesta valley, Rangeet valley, Singhik, Rangpo ; 900 - 2100 m.

*Fl.* : June - Aug. - Sept.

*f. biloba* (Lindl.) Tuyama in Hara, Fl. E. Himalaya 443. 1966. *Microstylis biloba* Lindl., Gen. & Sp. Orchid. 20. 1830. *Microstylis wallichii* var. *biloba* (Lindl.) Hook. *f.*, F.B.I. 5 : 606. 1888 ; King & Pantl., *l.c.* 8 : 16. t. 19. 1898.

Differs from *f. acuminata* in end-lobe of lip being divided up to middle into 2 oblong rounded lobules.

Sikkim, *s.l.* ; *ca* 1800 m.

*Fl.* : July - Sept.

**M. aphylla** (King & Pantl.) Tang & Wang in Act. Phytotax. Sin. 1 : 1. 1951 *Microstylis aphylla* King & Pantl., *l.c.* 8 : 18. 1898.

Terrestrial leafless root-parasitic herbs, 17.5 - 22.5 cm tall. Flowers yellowish, flushed with dark purple.

Teesta valley ; up to *ca* 300 m.

*Fl.* : July.

**M. calophylla** (Reichb. *f.*) O. Ktze., Rev. Gen. Pl. 2 : 673. 1891. *Microstylis calophylla* Reichb. *f.* in Gard. Chron. 2 : 718. 1879. *M. scottii* Hook. *f.*, F.B.I. 5 : 687. 1890. *M. wallichii* var. *brachycheila* Hook. *f.*, F.B.I. 5 : 686. 1888.

Herbs. Leaves 2 - 5, sessile, obliquely ovate, acuminate, crenate, blackish brown with a broad pale dotted border. Scape red, lip green.

Teesta valley ; 300 - 750 m.

*Fl.* : July.

**M. cylindrostachya** (Lindl.) O. Ktze., Rev. Gen. Pl. 2 : 673. 1891. *Dienia cylindrostachya* Lindl., Gen. & Sp. Orchid. 22. 1830. *Microstylis cylindrostachya* (Lindl.) Reichb. f. in Walp. Ann. 6 : 207. 1861 ; Hook. f., F.B.I. 5 : 689. 1890.

Terrestrial herbs. Leaf solitary, oblong-elliptic. Flowers yellowish ; green.

Lachen valley ; 3000 - 3600 m.

*Fl.* : July.

**M. josephiana** (Reichb. f.) O. Ktze., Rev. Gen. Pl. 2 : 673. 1891. *Microstylis josephiana* Reichb. f. in Bot. Mag. 6325. 1877 ; Hook. f., F.B.I. 5 : 687. 1890.

Terrestrial herbs, ca 5 cm tall. Leaves 3 - 5, oblong or elliptic-lanceolate. Flowers ochre-yellow, shaded with brown or yellow with red blotches near the column ; 2 - 3 opening at a time.

Sikkim, *s.l.* ; 450 - 900 m.

*Fl.* : May.

**M. khasiana** (Hook. f.) O. Ktze., Rev. Gen. Pl. 673. 1891. *Microstylis khasiana* Hook. f., F.B.I. 5 : 686. 1888.

Terrestrial herbs, ca 7.5 cm tall. Leaves 3 - 4, ovate-elliptic, sub-oblique, shining greyish green flushed with purple. Flowers purple.

Sikkim, *s.l.* ; 900 - 1800 m.

*Fl.* : May - July.

**M. latifolia** J.E. Sm. in Rees, Cyclop. 22. 40. 3. 1819. *Dienia congesta* (Lindl.) Reichb. f. in Walp. Ann. 6 : 206. 1861 ; Hook. f., F.B.I. 6 : 689. 1890. *Microstylis latifolia* (J.E. Sm.) J.J. Sm., Fl. Buít. 6 : 248. t. 185. 1905.

Terrestrial herbs, 10 - 25 cm tall. Leaves 3 - 6, elliptic-lanceolate, oblique. Flowers red or yellow.

Sikkim, *s.l.* ; up to 750 m.

*Fl.* : July.

**M. maximowicziana** (King & Pantl.) Tang & Wang in Act. Phytotax. Sin. 1 : 1. 1951. *Microstylis maximowicziana* King & Pantl. in J. Asiat. Soc. Beng. 64 : 329. 1895.

Terrestrial herbs. Leaves 4-5, elliptic to elliptic-lanceolate. Flowers green.

Sikkim, *s.l.* ; 600-1200 m.

*Fl.* : July.

**M. muscifera** (Lindl.) O. Ktze., *Rev. Gen. Pl.* 2 : 673. 1891. *Dienia muscifera* Lindl., *Gen. & Sp. Orchid.* 23. 1830. *Microstylis muscifera* (Lindl.) Ridl. in *J. Linn. Soc.* 24 : 333. 1888 ; Hook. *f.*, *F.B.I.* 5 : 689. 1890.

Terrestrial herbs. Leaves 2, one broadly elliptic, the other ovate-lanceolate. Flowers *ca* 4 mm long, yellowish green.

Lachung, Thangu, Thegu, Zemu valley ; 2250-4050 m.

*Fl.* : July-Sept.

**M. saprophyta** (King & Pantl.) Tang & Wang in *Act. Phytotax. Sin.* 1 : 1. 1951. *Microstylis saprophyta* King & Pantl. in *J. Asiat. Soc. Beng.* 65 : 118. 1896.

Terrestrial, leafless, saprophytic herbs, 7.5-15 cm tall. Flowers greenish.

Chungthang, Lachen ; *ca* 1800 m.

*Fl.* : July.

#### MICROPERA Lindl.

**Micropera obtusa** (Lindl.) Tang & Wang in *Act. Phytotax. Sin.* 1 (1) : 94. 1951. *Camarotis obtusa* Lindl. in *Bot. Reg. Misc.* 73. 1884 ; Chowdhury & Baruah in *Ind. Forester* 102 : 614. *f.* 1. 1976. *Sarcochilus obtusus* (Lindl.) Benth. *ex* Hook. *f.*, *F.B.I.* 6 : 36. 1890.

Epiphytic herbs. Leaves linear-oblong, coriaceous. Flowers white ; lip with a large yellow spot.

Sikkim, *s.l.* ; Tropical valleys.

*Fl.* : Aug.

#### MONOMERIA Lindl.

**Monomeria barbata** Lindl., *Gen. & Sp. Orclind.* 61. 1830 ; Hook. *f.*, *F.B.I.* 5 : 781. 1890.

Epiphytic herbs with woody *ca* 6 mm thick rhizomes. Pseudobulbs ovoid or ellipsoid, 4-5 cm long, 5-8 cm apart from each other,

shrivelled during flowering. Leaf solitary, oblong. Flowers yellow with brown markings.

Sikkim *s. l.* ; tropical valleys.

*Fl.* : Feb.

#### MYRMECHIS (Lindl.) Bl.

**Myrmechis pumila** (Hook. *f.*) Tang & Wang in *Acta Phytotax.* Sin. 1 : 69. 1951. *Odontochilus pumilis* Hook. *f.*, *F.B.I.* 6 : 99. 1890. *Zeuxine pumila* (Hook. *f.*) King & Pantl. in *Ann. Roy. Bot. Gard. Calc.* 8 : 291. t. 389. 1898.

Terrestrial herbs, 7.5–12.5 cm tall. Leaves ovate, acute. Flowers white with green tinge on the claw of lip.

Tendong ; *ca* 1800 m.

*Fl.* : July.

#### NEPHELAPHYLLUM Bl.

**Nephelaphyllum nudum** Hook. *f.*, *F.B.I.* 6 : 191. 1890.

Terrestrial creeping herbs. Leaves distant, ovate, acuminate, coriaceous. Scape *ca* 15 cm long.

Sikkim Himalaya (*vide* Hook. *f.* 1890.)

#### NEOTTANTHE (Reichb.) Schltr.

**Neottianthe secundiflora** (Hook. *f.*) Schultr. in *Fedde Repert.* 16 : 291. 1919. *Habenaria secundiflora* Hook. *f.*, *F.B.I.* 6 : 165. 1890, *p.p.*

Terrestrial herbs, 10–25 cm tall. Leaves 2–3, linear-oblong to linear. Flowers pink.

Lachung valley ; 2700–3300 m.

*Fl.* : Aug.-Sept.

#### NEOTTIA Guettard (*nom. cons.*)

**Neottia listeroides** Lindl. in *Royle, Illus. Bot. Himal.* 368. 1839 ; Hook. *f.*, *F.B.I.* 6 : 103. 1890. *Litsera lindleyana* King & Pantl. in *Ann. Roy. Bot. Gard. Calc.* 8 : 258. t. 343. 1898.

Terrestrial herbs, 20–35 cm tall. Flowers reddish brown.

Lachen valley ; *ca* 3000 m.

*Fl.* : July.

### OBERONIA Lindl.

**Oberonia acaulis** Griff., *Itin. Nat.* 76. 1848. *O. myriantha* Lindl., *Fol. Orch. Oberon* 4. 1859; Hook. *f.*, *F.B.I.* 5 : 679. 1888; King & Pantl. in *Ann. Roy. Bot. Gard. Calc.* 8 : 10. 1898.

Pendulous epiphytes, acaulescent. Leaves ensiform. Inflorescence much longer than leaves. Flowers *ca* 2.5 mm long.

Penlong ; 1300 2300 m.

*Fl. & Fr.* : Oct. Dec.

**O. brachystachys** Lindl., *Sert. Orch. Sub.* t. 8. 1838 *et* *Fol. Orch. Oberon.* 4. 1859; Hook. *f.*, *F.B.I.* 5 : 677. 1888. *O. demissa* Lindl., *Fol. Orch. Oberon.* 4. 1859; Hook. *f.*, *F.B.I.* 5 : 680. 1888; King & Pantl. in *Ann. Roy. Bot. Gard. Calc.* 8 : 9. 1898.

Erect, acaulescent epiphytes. Leaves oblong. Inflorescence up to 5 cm long. Flowers *ca* 1.3 mm long.

In tropical valleys.

*Fl.* : July Oct.

**O. caulescens** Wall. *ex* Lindl., *Gen. & Sp. Orchid.* 15. 1830; Hook. *f.*, *F.B.I.* 5 : 682. 1888; King & Pantl., *l.c.* 8 : 133 B. 1898 (*quoad nom.*). *O. longilabris* King & Pantl. in *J. Asiat. Soc. Beng.* 64 : 330. 1895 *et* in *Ann. Roy. Bot. Gard. Calc.* 8 : 13, pl. 16 A. 1898.

Erect epiphytes, up to 3.5 cm long. Leaves linear, ensiform. Inflorescence up to 9 cm long. Flowers *ca* 3 mm long.

Song, Chongloo, 1200 2500 m.

*Fl.* : July Aug.

**O. denticulata** Wight, *Icon.* 5 (1) : 3, t. 1625. 1851. *O. iridifolia* Lindl., *Gen. & Sp. Orchid.* 15. 1830, *p.p.* (*nom. superfl. et illeg.*) ; *et* *Fol. Orch. Oberon.* 1. 1859; Hook. *f.*, *F.B.I.* 5 : 675. 1888 (incl. var. *denticulata* Hook. *f.*, *angustifolia* Hook. *f.* and var. *brevifolia* Hook. *f.*) ; King & Pantl. in *Ann. Roy. Bot. Gard. Calc.* 8 : t. 8. 1898. *O. gammiei* King & Pantl. in *J. Asiat. Soc. Beng.* II. 66 : 579. 1897.

Acaulescent epiphytes. Leaves oblong, ensiform. Spikes up to 30 cm long. Flowers pale brownish to yellow, in verticles.

Sikkim *s.l.* ; *ca* 1400 m.

*Fl.* : Sept. Nov.

**O. emarginata** King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 6. pl. 2A. 1898. *O. micrantha* King & Pantl., *L.c.* 8 : 6, pl. 5. 1898, *non* A. Rich. 1834.

Epiphytes, acaulescent. Leaves linear. Flowers *ca* 0.5 – 1 m long, in whorls.

Namgah, Tendong ; *ca* 2000 m.

*Fl.* : July Sept.

**O. ensiformis** (Smith) Lindl., Fol. Orch. Oberon. 4. 1859 ; Hook. *f.*, F.B.I. 5 : 679. 1888. *Malaxis ensiformis* Smith, Rees. Cyclop. 22, no. 14. 1812.

Pendulous, acaulescent, epiphytic herbs. Leaves linear, ensiform. Flowers *ca* 3.5 mm long, brownish yellow.

Teesta valley ; *ca* 450 m.

*Fl.* : Sept. Jan.

**O. falcata** King & Pantl. in J. As. Soc. Beng. II, 64 : 329. 1895 & in Ann. Roy. Bot. Gard. Calc. 8 : 12. pl.14. 1898.

Pendulous epiphytes, caulescent, up to 15 cm long. Leaves linear. Flowers pedicelled, *ca* 2.2 mm long.

Sikkim, *s.l.* ; 3000 m.

*Fl.* : June Aug.

**O. falconeri** Hook. *f.*, Icon. t. 1780. 1888 ; Hook. *f.*, F.B.I. 5 : 678. 1888.

Erect epiphytes, acaulescent. Leaves oblong-lanceolate. Flowers pedicelled, *ca* 2.5 mm long.

Sikkim, *s.l.* ; 500 – 2000 m.

*Fl.* : Aug. Sept.

**O. jenkinsiana** Lindl., Fol. Orch. 20. 1859 ; Hook. *f.*, F.B.I. 5 : 676. 1888 ; King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 7, pl. 7. 1898.

Erect or pendulous epiphytes, acaulescent. Leaves linear. Flowers subsessile, *ca* 1.7 mm long.

Teesta valley ; up to 1200 m.

*Fl.* ; Sept. Nov.

**C. lobulata** King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 4. 1898.

Erect or pendulous epiphytic, acaulescent herbs. Leaves oblong-elliptic. Flowers pedicelled, green.

Teesta valley ; *ca* 300 m.

*Fl.* : Oct.

**O. obcordata** Lindl., Fol. Orch. Oberon. 7. 1859 ; Hook. *f.*, F.B.I. 5 : 684. 1888 ; King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 9, pl. 11. 1898. *Oberonia treutleri* Hook. *f.*, Icon. t. 1786. 1888 *et* F.B.I. 5 : 683. 1888.

Erect or pendulous epiphytes, acaulescent. Leaves linear or lanceolate. Flowers pedicelled, *ca* 1.5 mm long.

Sikkim, *s.l.* ; *ca* 2000 m.

**O. pachyrachis** Reichb. *f. ex* Hook. *f.*, F.B.I. 5 : 681. 1888 ; King & Pantl., Ann. Roy. Bot. Gard. Calc. 8 : 4, pl. 3. 1898.

Pendulous epiphytes, acaulescent. Leaves oblong-ensiform. Flowers sessile, *ca* 1.2 mm long, greenish yellow to orange-brown.

Teesta valley ; 1000 1800 m.

*Fl.* : Sept. March.

**O. prainiana** King & Pantl. in J. As. Soc. Beng. II. 64 : 331. 1895 & Ann. Roy. Bot. Gard. Calc. 8 : 3, pl. 1. 1898.

Erect or pendulous epiphytes, acaulescent. Leaves oblong-ovate. Flowers pedicelled, *ca* 1.2 mm long.

Dumsong ; up to 1500 m.

*Fl.* : April June.

**O. pyrulifera** Lindl., Fol. Orch. Oberon. 3. 1859 ; Hook. *f.*, F.B.I. 5 : 678. 1888 ; King & Pantl., Ann. Roy. Bot. Gard. Calc. 8 : 14. pl. 16B. 1898.

Epiphytes, erect, acaulescent. Leaves linear. Flowers pedicelled, 2 mm long, pale or orange yellow.

Tropical valleys ; up to 2000 m.

*Fl.* : Sept. Oct.

**O. recurva** Lindl. in Bot. Reg. 25, Misc. no. 8. 1839 & Fol. Orch. Oberon. 5. 1859 ; Hook. f., F.B.I. 5 : 680. 1888. *O. parvula* King & Pantl., J. As. Soc. Beng. 64 : 330. 1895. *O. croftiana* King & Pantl., Ann. Roy. Bot. Gard. Calc. 8 : 7. 1898.

Erect or pendulous epiphytes, acaulescent. Leaves linear-ensiform. Flowers pedicelled, 1-2 mm long, brown or orange, in verticles.

Tropical valley ; 900-2000 m.

Fl. : Oct. - Mar.

### OREORCHIS Lindl.

**Oreorchis foliosa** (Lindl.) Lindl. in J. Proc. Linn. Soc. Bot. 3 : 27. 1858 ; Hook. f., F.B.I. 5 : 709. 1890. *Corallorhiza foliosa* Lindl., Gen. & Sp. Orchid. 535. 1840.

Terrestrial herbs with corm like pseudobulbs. Leaf solitary, terminal, oblong-lanceolate, acuminate. Flowers reddish.

Lachen valley ; ca 3000 m.

Fl. : July.

**O. micrantha** Lindl. in J. Linn. Soc. 3 : 27. 1858 ; Hook. f., F.B.I. 5 : 709. 1890.

Terrestrial herbs with corm like pseudobulbs. Leaves usually 2, linear. Flowers pale yellow ; lip red spotted.

Lachen valley ; ca 3000 m.

Fl. : July.

### ORNITHOCHILUS (Lindl.) Wall.

**Ornithochilus difformis** (Wall. ex Lindl.) Schltr. in Fedde Repert. 4 : 277. 1919. *Aerides difformis* Wall. ex Lindl., Gen. & Sp. Orchid. 242. 1833. *O. fuscus* Wall. ex Hook. f., F.B.I. 6 : 76. 1890.

Epiphytes without pseudobulbs. Leaves broadly oblong, flat. Flowers greenish yellow, with brown bands on sepals and petals.

Sikkim, s.l. ; 1200-1800 m.

Fl. : July - Aug.

### OTOCHILUS L.

**Otochilus albus** Lindl., Gen. & Sp. Orchid. 35. 1830 ; Hook. f., F.B.I. 5 : 843. 1890.

Epiphytes. Stems jointed, branched. Leaves in pairs arising from apex of the terminal node, elliptic-oblong. Flowers white.

Sikkim, *s.l.* ; 900 1500 m.

*Fl.* : June.

**O. fuscus** Lindl., Gen. & Sp. Orchid. 35. 1830 ; Hook. *f.*, F.B.I. 5 : 844. 1890.

Pendulous epiphytes with cylindric or fusiform internodes. Leaves linear-oblong. Flowers white with brown saccate base of the lip.

Sikkim, *s.l.* ; 900 1800 m.

*Fl.* : Dec.

**O. porrectus** Lindl., Gen. & Sp. Orchid. 36. 1830 ; Hook. *f.*, F.B.I. 5 : 844. 1890, *p.p.*

Epiphytic herbs with jointed stem. Leaves narrowly elliptic. Flowers white with a brown patch on sac of the lip and column.

Sikkim, *s.l.* ; 1200 1800 m.

*Fl.* : Oct. Jan.

### PACHYSTOMA Bl.

**Pachystoma senile** (Lindl.) Reichb. *f.* in Bonplandia 3 : 250. 1858 ; Hook. *f.*, F.B.I. 5 : 812. 1890. *Apatura senilis* Lindl., Gen. & Sp. Orchid. 130. 1831. *A. lindleyana* Wt., Ic. t. 1662. 1851.

Terrestrial, rhizomatous herbs. Leaf appearing after flowering, solitary, linear, *ca* 30 cm long. Flowers greenish white, flushed with pink.

Sikkim, *s.l.*

*Fl.* : March.

### PANISEA (Lindl.) Lindl.

**Panisea demissa** (D. Don) Pfitz. in Engl. Pflanzenr. 32 : 141. t. 49. 1907. *Dendrobium demissum* D. Don, Prodr. Fl. Nepal. 34. 1825. *Coelogyne parviflora* Lindl., Gen. & Sp. Orchid. 44. 1830. *Panisea parviflora* (Lindl.) Lindl., Fol. Orchid. 1. 1824 ; Hook. *f.*, F.B.I. 5 : 783. 1890.

Epiphytes with narrow ovoid pseudobulbs. Leaves narrowly elliptic-lanceolate, acute. Flowers white with brown streaks.

Sikkim, *s.l.* ; 1800 m.

*Fl.* : Oct.

### PANTLINGIA Prain

***Pantlingia paradoxa*** Prain in J. Asiat. Soc. Beng. 65 : 107. 1896.

Terrestrial saprophytic, aphyllous, rhizomatous herbs, up to 10 cm tall. Stem with a ovate bract in the middle. Flowers pale yellow with a purple blotch on the lip.

Chungthang ; *ca* 1800 m.

*Fl.* : Sept.

### PAPHIOPEDILUM Pfitz.

***Paphiopedilum venustum*** (Sims) Pritz. in Engl., Bot. Jahrb. 19 : 41. 1849. *Cypripedium venustum* Sims in Curtis Bot. Mag. 47. t. 2129. 1820 ; Hook. *f.*, F.B.I. 6 : 173. 1890.

Terrestrial herbs. Leaves 5 - 7, elliptic-oblong, somewhat loriform, acute and minutely bifid at apex, dark green, marbled with pale green above and dull purple beneath. Flowers 5 - 6.25 cm in diam., dorsal sepal white with dark green vertical stripes ; petals green and purplish with a few black spots ; lips yellowish green flushed with pink ; lateral edges yellow.

Tropical valleys ; up to 1200 m.

*Fl.* : Sept. Oct.

### PAPILIONANTHE Schltr.

***Papilionanthe teres*** (Roxb.) Schltr. in Orchis 9 : 78. 1915. *Dendrobium teres* Roxb., Fl. Ind. 3 : 485. 1832. *Vanda teres* (Roxb.) Lindl., Gen. & Sp. Orchid. 217. 1833 ; Hook. *f.*, F.B.I. 6 : 49. 1890.

Epiphytic herbs. Leaves fleshy, terete. Flowers pink (rarely white) ; spur yellow or ferruginous, marked with purplish brown lines.

Gangtok, Melli, Phodong, Rangpo, Singtam. up to 1700 m.

*Fl.* : July Aug. ; *Fr.* : Sept. Oct.

***P. uniflora*** (Lindl.) Garay in Bot. Mus. Leaflet. Harvard Univ. 23 : 370. 1974. *Aerides uniflora* (Lindl.) Summerh. in Kew Bull. 1955 ; 558. 1956. *Mesoclastis uniflora* Lindl., Gen. & Sp. Orchid. 45. 1830. *Aerides longicornu* Hook. *f.*, F.B.I. 6 : 44. 1890.

Epiphytes with leafy stem. Leaves terete. Flowers white with a flush of pink on the spur.

Sikkim, *s.l.* (*cf.* Hara *et al.* 1978) ; *ca* 1650 m.

*Fl.* : Sept.

**P. vandarum** (Reichb. *f.*) Garay in Bot. Mus. Leafl. Harvard Univ. 23 : 370. 1974. *Aerides vandarum* Reichb. *f.* in Gard. Chron. 1867 ; 997. 1867 ; Hook. *f.*, F.B.I. 6 : 44. 1890.

Epiphytes. Leaves 15 - 25 cm long. Flowers white.

Sikkim (*cf.* Hara *et al.* 1978).

### PERISTYLUS Bl.

**Peristylus affinis** (D. Don) Seid. in Dansk. Bot. Ark. 31 (3) : 48. 1977. *Habenaria affinis* D. Don, Prodr. Fl. Nepal. 25. 1825 ; Hook. *f.*, *l.c.* 6 : 166. 1890. *Habenaria goodyeroides* var. *affinis* (D. Don) Lindl., Gen. & Sp. Orchid. 299. 1835.

Terrestrial herbs. Leaves ovate-elliptic. Flowers greenish white or cream coloured.

West Sikkim ; *ca* 600 m.

*Fl.* : June.

**P. aristatus** Lindl., Gen. & Sp. Orchid. 300. 1835. *Habenaria aristata* (Lindl.) Trin. in J. Ceylon. Branch. Roy. Asiat. Soc. 9 : 91. 1885 ; Hook. *f.*, F.B.I. 6 : 158. 1890.

Terrestrial herbs, 30 - 50 cm tall. Leaves 3 - 5, unequal, elliptic-lanceolate. Flowers green.

Chungthang, Tumlong, Pashating ; 1800 - 2100 m.

*Fl.* : Aug.

**P. constrictus** (Lindl.) Lindl., Gen. & Sp. Orchid. 300. 1835. *Herminium constrictum* Lindl. in Edw. Bot. Reg. 18, Sub. t. 1499. 1832. *Habenaria constricta* (Lindl.) Hook. *f.*, F.B.I. 6 : 161. 1890.

Terrestrial herbs, 50 - 75 cm tall. Leaves 5 - 6, in a whorl near stem tip, ovate-elliptic. Flowers brown ; lip white.

Teesta valley ; *ca* 450 m.

*Fl.* : June - July.

**P. fallax** Lindl., Gen. & Sp. Orchid. 298. 1835. *Herminium fallax* (Lindl.) Hook. f., F.B.I. 6 : 129. 1890. *Habenaria fallax* (Lindl.) King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 325. t. 428. 1898.

Terrestrial herbs, 10 - 30 cm tall. Leaf solitary, narrowly elliptic, acute. Flowers green.

Lachen & Lachung valleys, Gnathang ; 3000 - 3600 m.

Fl. : July.

**P. goodyeroides** (D. Don) Lindl., Gen. & Sp. Orchid. 299. 1835. *Habenaria goodyeroides* D. Don, Prodr. Fl. Nep. 25. 1825 ; Hook. f., F.B.I. 6 : 161. 1890.

Terrestrial herbs, 30 - 60 cm tall. Leaves close below the apex but not whorled, ovate-elliptic, acute. Flowers white or cream coloured.

Sikkim Himalaya ; ca 900 m.

Fl. : May - July.

**P. parishii** Reichb. f. in Trans. Linn. Soc. 30 : 139. 1874. *Habenaria parishii* (Reichb. f.) Hook. f., F.B.I. 6 : 161. 1890.

Terrestrial herbs, 30 - 45 cm tall. Leaves 3 - 5, ovate or oblong. Flowers brownish green.

Sikkim, *s.l.* ; ca 1050 m.

Fl. : Aug.

**P. prainii** (Hook. f.) Kranz., Orchid. Gen. Sp. 514. 1898. *Habenaria prainii* Hook. f., F.B.I. 6 : 159. 1890.

Terrestrial herbs, 30 - 45 cm tall. Leaves 3 - 5, oblong to ovate-oblong. Flowers brownish green.

Sikkim, *s.l.* ; 1500 m.

**P. pseudophrys** (King & Pantl.) Mitra, Fl. Pl. E. India 1 : 274. 1958. *Habenaria pseudophrys* King & Pantl. in J. Asiat. Soc. Beng. 65 : 133. 1896.

Terrestrial herbs, 45 - 70 cm tall. Leaves 4, elliptic-oblong.

Chunghang ; 1650 m.

Fl. : July.

**P. tentaculatus** (Lindl.) J.J. Smith, Orch. Java. 35. 1905. *Glossula tentaculata* Lindl., Bot. Reg. t. 862. 1824. *Habenaria tentaculata* (Lindl.) Reichb. f., Ota. Bot. Hamb. 34. 1878.

Terrestrial herbs, 15 - 45 cm. Leaves 2 - 3, unequal, oblong - elliptic or linear-oblong. Flowers green.

Gorubathan (South Sikkim Dist.) ; 450 m.

*Fl.* : Aug.

### PHAIUS Lour.

**Phaius flavus** (Bl.) Lindl., Gen. & Sp. Orchid. 128. 1831. *Limodorum flavum* Bl., Bijdr. 8 : 375. 1825. *Phaius maculatus* Lindl., Gen. & Sp. Orchid. 127. 1831 ; Hook. f., F.B.I. 5 : 817. 1890.

Herbs, up to 60 cm tall. Pseudobulbs ovoid cylindrical. Leaves 4 - 6, elliptic to lanceolate, plicate. Flowers yellow with darker stripes ; terminal lobe of lip brown.

Tropical valleys.

*Fl.* : April.

**P. mishmensis** Reichb. f. in Bonplandia 5 : 43. 1857 ; Hook. f., F.B.I. 5 : 817. 1890.

Herbs, up to 1.2 m tall. Pseudobulbs naked below. Leaves elliptic-lanceolate, acute. Flowers rose coloured ; spur yellow.

Sikkim, *s.l.* ; 1700 - 1800 m.

*Fl.* : Sept. Oct.

**P. tancarvilleae** (Banks ex L. Herit.) Bl., Mus. Bot. Lugd. Bat. 2 : 177. 1856 ("*tankervillii*"). *Limodorum tancarvilleae* Bank ex L. Herit., Sert. Angl. 28. 1789. *Phaius walliichii* Lindl. in Wall. Pl. Asiat. Rar. 2 : 46, t. 158. 1831 ; Hook. f., F. B.I. 5 : 816. 1890.

#### var. **tancarvilleae**

Herbs 60 - 105 cm tall. Pseudobulbs conical, sheathed. Leaves elliptic-lanceolate, acute. Sepals and petals brown inside, white outside ; lip pale purple passing into white on edges and yellow on tube.

Tropical valleys.

*Fl.* : March - April.

var. **pulchra** (King & Pantl.) Karthik. in Karthik. *et al.*, Fl. Ind. Enum. Monocot. 170. 1989. *Phaius blumei* var. *pulchra* King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 108. 1898.

Differs from. var. *tancarvilleae* in spur being less than 6 mm and the mouth of lip contracted and trilobulate.

Tropical valleys.

*Fl.* : March - April.

**P. woodfordii** (Hook.) Merr. in J. Arn. Arbor. 24 : 211. 1948. *Bletia woodfordii* Hook., Bot. Mag. t. 2719. *Phalus maculatus sensu* Hook. f., F.B.I. 5 : 817. 1890, *p.p.non* Lindl. 1831.

Herbs with ovoid-cylindric pseudobulbs. Leaves 4 - 6, elliptic lanceolate. Flowers yellow.

Sikkim, *s.l.*

*Fl.* : April.

### PHALAEOPSIS BL.

**Phalaenopsis mannii** Reichb. f. in Gard. Chron. 902. 1871 ; Hook. f., F.B.I. 6 : 30. 1890.

Epiphytes without pseudobulbs. Leaves oblong lanceolate, obtuse. Flowers yellow.

Teesta valley ; up to 1200 m.

*Fl.* : May.

**P. lobbii** (Reichb. f.) Sweet, Genus Phalaenopsis (The Orchid Digest) 53. 1980. *P. parishii* var. *lobbii* Reichb. f. in Saunders Refug. Bot. 2. sub. t. 85. 1870. *P. listeri* Berkeley in Gard. Chron. ser. 3. 1 : 280. 1887.

Epiphytic herbs without pseudobulbs. Leaves broadly elliptic, obliquely notched at apex. Flowers white with yellow and brown spots on column.

Teesta valley ; 360 - 1200 m.

*Fl.* : March - April.

### PHOLIDOTA Lindl. ex Hook. f.

**Pholidota articulata** Lindl., Gen. & Sp. Orchid. 38. 1830 ; Hook. f., F.B.I. 5 : 844. 1890. var. *griffithii* King & Pantl., *l.c.* 8 : 147. 1898. *Pholidota griffithii* Hook. f., *l.c.* Pl. t. 1881. 1889 & F.B.I. 5. 845. 890.

Epiphytes. Stems jointed. Leaves narrowly oblong. Flowers white, tinged with brownish pink ; floral bracts pale brown.

Sikkim, *s.l.* ; 1200 m.

*Fl.* : June - Aug.

**P. imbricata** (Roxb.) Lindl. in Hook. *f.*, Fl. Exot. 2. t. 138. 1825 ; Hook. *f.*, F.B.I. 5 : 845. 1890. *Cymbidium imbricatum* Roxb., Fl. Ind. 3 : 460. 1832.

Epiphytes with jointed stem. Pseudobulbs caespitose, cylindrical. Flowers pale brown.

Gangtok ; 1000 - 1500 m.

*Fl.* : May - Aug.

**P. protracta** Hook. *f.* in Hook., Ic. Pl. 19 : t. 1877. 1889 & F.B.I. 5 : 845. 1890.

Epiphytes. Stem elongate, clothed with long scarious sheaths. Flowers green ; lip with 4 small bright patches of dull yellow on its anterior lobe.

Dentam Pamianchi ; 1500 - 2250 m.

*Fl.* : Oct. - Dec.

**P. recurva** Lindl., Gen. & Sp. Orchid. 37. 1830 ; Hook. *f.*, F.B.I. 5 : 844. 1890.

Epiphytes, stem jointed ; internodes yellowish, angled. Leaves elliptic-oblong, acute. Flowers pale brown.

Sikkim, *s.l.* ; 600 - 1200 m.

*Fl.* : Aug. - Sept.

**P. undulata** Lindl. in Edw. Bot. Reg. 14 : t. 1213. 1829. *P. rubra* Lindl., Gen. & Sp. Orchid. 37. 1830. Hook. *f.*, F.B.I. 5 : 847. 1890.

Epiphytes. Leaves elliptic-lanceolate. Racemes decurved, lax.

Sikkim, *s.l.* ; 1200 - 1800 m.

### PHREATIA Lindl.

**Phreatia elegans** Lindl., Gen. & Sp. Orchid. 63. 1830 ; Hook. *f.*, F.B.I. 5 : 810. 1890.

Plants caespitose. Pseudobulbs tufted, ovoid, compressed. Leaves narrowly elliptic, subacute, or acute. Flowers minute, white.

Chungthang, *ca.* 1800 m.

*Fl.* : Aug.

## PLATANThERA L.C. Rich.

**Platanthera backertana** (King & Pantl.) Kranzl., Orchid. Gen. Sp. 1 : 632. 1898. *Habenaria backeriana* King & Pantl. in J. Asiat. Soc. Beng. 65 : 132. 1896 ; Bruhl, *l.c.* 182.

Terrestrial herbs, 22 - 45 cm tall. Leaves several, scattered, sessile ; lower one oblong, upper 3 - 4 linear-lanceolate. Flowers green.

Lachen valley, Singalela range ; 2700 - 3600 m.

*Fl.* : July.

**P. biermanniana** (King & Pantl.) Kranzl., Orchid. Gen. Sp. 1 : 636. 1898. *Habenaria biermanniana* King & Pantl., *l.c.* 64 : 343. 1895.

Terrestrial herbs. Leaves 4 - 5, cauline, amplexicaule, lanceolate.

Singa - le - la ; *ca* 3000 m.

*Fl.* : July.

**P. clavigera** Lindl., Gen. & Sp. Orchid. 289. 1835. *Habenaria densa* Wall. *ex* Lindl., *l.c.* 326. 1835; Hook. *f.*, F.B.I. 6 : 153. 1890.

Terrestrial herbs. Leaves 3 - 5, narrowly elliptic. Flowers green.

Lachung valley, Singa - le la range ; 2400 - 3600 m.

*Fl.* : July - Aug.

**P. dyeriana** King & Pantl. in J. Asiat. Soc. Beng. 65 : 133. 1896. *Habenaria dyeriana* King & Pantl. in J. Asiat. Soc. Beng. 65 : 133. 1896.

Terrestrial herbs, less than 30 cm tall. Leaves 3 - 4, sessile, scattered along the stem. Flowers green.

Lachen valley ; *ca* 3300 m.

*Fl.* : Aug.

**P. excelliana** Soo in Ann. Hist. Nat. Mus. Natl. Hung. 26 : 259. 1929. *Habenaria oligantha* Hook. *f.*, F.B.I. 6 : 154. 1890.

Terrestrial herbs, 7.5 - 30 cm tall. Leaves usually solitary, oblong-ob lanceolate. Flowers green.

Lachen valley, Gnathang, Dzungri ; 3000 - 3600 m.

*Fl.* : July - Sept.

**P. juncea** (King & Pantl.) Kranzl., Orchid. Gen. Sp. 1 : 942. 1901. *Habenaria juncea* King & Pantl. in J. Asiat. Soc. Beng. 65 : 132. 1896.

Terrestrial herbs, *ca* 30 cm tall. Leaf solitary, narrowly oblong.

Lachen, Lachung, Gnathang, Singa - le - la range ; 3300 - 3600 m.

*Fl.* : Aug.

***P. latilabris*** Lindl., Gen. & Sp. Orchid. 289. 1835. *Habenaria latilabris* (Lindl.) Hook. f., F.B.I. 6 : 153. 1890.

Terrestrial herbs, 20 - 45 cm tall. Leaves 5 - elliptic-oblong. Flowers green ; lip greenish yellow.

Lachung, Lachen valley ; 2400 - 3000 m.

*Fl.* : July - Sept.

***P. leptocaulon*** (Hook. f.) Soo in Ann. Nat. Hist. Mus. Hung. 26 : 360 . 1929. *Habenaria leptocaulon* Hook. f., F.B.I. 6 : 154. 1890.

Terrestrial herbs, 20 - 40 cm tall. Leaves 2, unequal, narrowly elliptic. Flowers green.

Lachung valley ; 2700 - 3300 m.

*Fl.* : July - Sept.

***P. sikkimensis*** (Hook. f.) Kranzl., Orchid. Gen. Sp. 1 : 621. 1899. *Habenaria sikkimensis* Hook. f., F.B.I. 6 : 155. 1890.

Terrestrial herbs, 25 - 30 cm tall. Leaves narrowly elliptic - oblong. Flowers green.

Lachung valley, Lingtoo - Zelap la, Singa - le - la ; *ca* 3600 m.

*Fl.* : Aug. - Sept.

***P. stenantha*** (Hook. f.) Soo in Ann. Hist. Nat. Mus. Natl. Hung. 26 : 363. 1929. *H. stenantha* Hook. f., F.B.I. 6 : 153. 1890.

Terrestrial herbs, 30 - 60 cm tall. Leaves 3 - 4, oblong-lanceolate. Flowers green ; lip yellowish.

Sikkim, *s.l.* ; 2400 - 3600 m.

*Fl.* : July - Sept.

#### PLEIONE D. Don

***Pleione hookeriana*** (Lindl.) Williams, Orchid Grow. Man. ed. 6 : 548. 1885. *Coelogyne hookeriana* Lindl., Fol. Orchid. Coelogyne 14 : 1854 ; Hook. f., F.B.I. 5 : 842. 1890.

Pseudobulbs ovoid or ellipsoidal. Flowers white flushed with violet ; lip with 5 - 7 thin parallel longitudinal ridges and reddish mottlings.

Dombong valley ; up to 3600 m.

*Fl.* : June.

**P. humilis** (J.E. Smith) D. Don, Prodr. Fl. Nep. 37. 1825. *Epidendrum humile* J.E. Smith, Exot. Bot. 2 : 75. t. 98. 1806. *Coelogyne humilis* (J.E. Smith) Lindl., Coll. Bot. Sub. t. 37. 1825 ; Hook. f., F.B.I. 5 : 840. 1890.

Pseudobulbs ovoid-oblong. Flowers white ; central part of lip yellow with brown spots, margins purple speckled.

Tendong Peak ; 2100 - 2550 m.

*Fl.* : May - June.

**P. maculata** (Lindl.) Lindl. in Paxt., Fl. Gard. 2 : 5. t. 39. f. 1. 1851. *Coelogyne maculata* Lindl., Gen. & Sp. Orchid. 43. 1830 ; Hook. f., F.B.I. 5 : 841. 1890.

Pseudobulbs enclosed in a dense network of fibres. Leaves broadly oblanceolate, appearing after flowering. Flowers white, some times with pink lines ; lip with purple yellow markings.

Sikkim, *s.l.* ; 480 - 900 m.

*Fl.* : May.

**P. praecox** (J.E. Smith) D. Don, Prodr. Fl. Nepal. 37. 1825. *Epidendrum praecox* J.E. Smith, Exot. Bot. 2 : 73. 1806. *Coelogyne praecox* (J.E. Smith) Lindl., Coll. Bot. Sub. t. 37. 1825 ; Hook. f., F.B.I. 5 : 840. 1890.

Pseudobulbs, 2.5 - 4 cm in diam., sparsely sheathed by loose fibres. Flowers rose coloured, rarely white.

Dentam - Pamianchi ; 1800 - 2400 m.

*Fl.* : Oct. - Nov. (-May).

### PODOCHILUS Bl.

**Podochilus cultratus** Lindl., Gen. & Sp. Orchid. 234. 1833 ; Hook. f., F.B.I. 6 : 80. 1890.

Plants up to 15 cm long, clothed with equitant flattend, falcately lanceolate, acute leaves. Racemes slender, terminal, 2 - 4 flowered. Flowers white, slightly flushed with pink.

Singtam - Rangpo ; 600 - 900 m.

*Fl.* : Sept. - Oct.

**P. khasianus** Hook. *f.*, F.B.I. 6 : 81. 1890.

Plants up to 15 cm tall. Leaves linear-lanceolate, acute, coriaceous. Racemes terminal, erect. Flowers 3 - 4, distichous, white, flushed with yellow.

Sikkim, *s.l.* ; 1500 - 1800 m.

*Fl.* : Sept.

### POMATOCALPA Breda

**Pomatocalpa armigerum** (King & Pantl.) Tang & Wang in Acta Phytotax. Sin. 1 : 98. 1951. *Cleisostoma armigera* King & Pantl. in J. Asiat. Soc. Beng. 65 : 123. 1896.

Epiphytes without pseudobulbs. Leaves fleshy, semiterete, channelled in front. Flowers pale straw coloured, flushed with pink.

Sikkim, *s.l.*

*Fl.* : Sept.

**P. wendlandorum** (Reichb. *f.*) J. J. Sm. in Nat. Tijdschr. Med. Ind. 72 : 108. 1912. *Cleisostoma wendlandorum* Reichb. *f.* in Otto. & Dietr., Allg. Gart. 219. 1956 ; Hook. *f.*, F.B.I. 6 : 74. 1890.

Epiphytes with very short stem. Leaves crowded, pendulous, obtuse and obliquely 2-lobed at apex. Flowers yellow, flushed with pink.

Sikkim, *s.l.* ; 450 m.

*Fl.* : May - June.

### PONERORCHIS Reichb. *f.*

**Ponerorchis chusua** (D. Don) Soo in Acta Bot. Acad. Sci. Hung. 12 : 352. 1966. *Orchis chusua* D. Don, Prodr. Fl. Nepal. 23. 1825 ; Hook. *f.*, F.B.I. 6 : 127. 1890.

var. **chusua**

Terrestrial herbs, 10 - 25 cm tall. Leaves 1 - 2 ; narrowly oblong. Flowers dark purple.

Singa-le-la range, Taliun Samdong in Lachen Valley ; 3000 - 3900 m.

*Fl.* : July - Aug.

var. *nana* (King & Pantl.) R.C. Srivastava *Ponerorchis nana* (King & Pantl.) Soo in Acta Sci. Hung. 12 : 353. 1966. *Orchis chusua* var. *nana* King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 303. t. 402 A. 1898. *Chusua roborowskyi* (Maxim.) P.F. Hunt. var. *nana* (King & Pantl.) P.F. Hunt. in Kew Bull. 26 : 176. 1971.

Terrestrial herbs, 5 - 7.5 cm tall. Leaf solitary. Flowers dark purple : middle lobe of lip shallowly lobed ; spur subcompressed.

Singa-le-la range, Lachen valley ; 3000 - 3900 m.

*Fl. & Fr.* : July - Aug.

### PORPAX Lindl.

*Porpax fibuliformis* (King & Pantl.) King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 114. t. 159. 1898. *Eria fibuliformis* King & Pantl. in J. Asiat. Soc. Beng. 64 : 336. 1895.

Small epiphytic herbs with crowded or overlapping pseudobulbs. Leaves in pairs, oblanceolate, sessile. Flowers dull red.

In tropical valleys.

*Fl.* : Oct.

*P. meirax* (Par. & Reichb. f.) King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 114. t. 158. 1898. *Cryptochilus meirax* Par. & Reichb. f. in Trans. Linn. Soc. 30 : 148. 1874. *Eria meirax* Hook. f., F.B.I. 5 : 786. 1890. *p.p.*, non N.E. Br. 1880.

Small epiphytes with clustered, depressed-turbinate, subdiscoid pseudobulbs. Leaves 2, elliptic-oblong, shortly petiolate. Flowers dull brown.

Sikkim, *s.l.* ; 450 - 750 m.

*Fl.* : Oct.

### PTEROCERAS Hasselt ex Hassk.

*Pteroceras suaveolens* (Roxb.) Holttum in Kew Bull. 14 : 271. 1960. *Aerides suaveolens* Roxb., Fl. Ind. 3 : 473. 1832. *Sarcochilus suaveolens* (Roxb.) Hook. f., F.B.I. 6 : 33. 1890 ; Smith & Cave in Rec. BSI 5 : 243. 1911. *Ornitharium striatulum* Lindl. in Pat., Fl. Gard. 1 : 188 f. 117. 1853. *Thrixspermum teres* Reichb. f., Xen. Orch. II. 121. 123 (excl. syns).

Epiphytes without pseudobulbs. Leaves distichous or absent during flowering time. Flowers yellow, speckled with red, fragrant.

Teesta valley ; *ca* 1200 m.

### RHYNCHOSTYLIS Bl.

**Rhynchostylis retusa** (L.) Bl., Bijdr. 286. t. 49. 1825 ; Hook. f., F.B.I. 6 : 32. 1890. *Epidendrum retusum* L., Sp. Pl. 953. 1753. *Saccolabium rheedi* Wt., Ic. t. 1745-46. 1851. DROUPADI MALA (Hindi).

Epiphytes. Leaves curved, keeled. Flowers pink, variously marked with purple or violet.

Gangtok-Saramsa, Rumtek ; ascending to 1200 m.

*Fl.* : June - July.

### RISLEYA King & Pantl.

**Risleya atropurpurea** King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 246. 1898.

Terrestrial, aphyllous herbs. Flowers minute, deep blackish purple.

Dzongri ; *ca* 3900 m.

*Fl.* : June - July.

### RITALA King & Pantl.

**Ritala himalaica** (Hook. f.) King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 157. t. 214. 1898. *Ceratostylis himalaica* Hook. f., F.B.I. 5 : 826. 1890.

Pendulous epiphytes. Leaf solitary, linear-oblong, obliquely notched and acute at apices. Flowers pale yellow.

Tendong ; *ca* 1500 m.

*Fl.* : May.

### ROBIQUETIA Gaud.

**Robiquetia spathulata** (Bl.) J.J. Smith in Nat. Tijdschr. Ned. Ind. 72 : 115. 1912. *Cleisostoma spathulatum* Bl., Bijdr. 364 : 1825. *C. spicatum* Lindl. in Bot. Reg. t. 32. 1847.

Pendulous epiphytes. Leaves oblong, coriaceous. Flowers yellow, mottled and banded with brownish purple ; column white.

Teesta valley ; 300 m.

*Fl.* : June.

**R. succisa** (Lindl.) Seid. & Garay in Bot. Tidsskr. 67 : 119. 1972. *Sarcanthus succisus* Lindl. in Bot. Reg. t. 1014. *Saccolabium buccosum* Reichb. f. in Gard. Chron. 938. 1871 ; Hook. f., F.B.I. 6 : 58. 1890.

Pendulous, epiphytic herbs. Leaves narrowly oblong, obliquely lobed at apex. Flowers lax.

Sikkim, *s.l.* ; 600 m.

*Fl.* : May - June.

### SACCOLABIOPSIS J.J. Sm.

**Saccolabiopsis pusilla** (Lindl.) Seid & Garay in Bot. Tidsskr. 67 : 118. t. 33. 1972 ; Hook. f., F.B.I. 6 : 56. 1890. *Saccolabium pusillum* Lindl. in J. Linn. Soc. 3 : 36. 1858. *Saccolabium pumilio* Reichb. f. in Walp. Ann. 6 : 886. 1861 ; Hook. f., F.B.I. 6 : 56. 1890.

Epiphytes. Leaves linear-oblong. Flowers cream coloured.

Sikkim, *s.l.* ; ca 450 m.

### SATYRIUM Swartz (*nom. cons.*)

**Satyrium ciliatum** Lindl., Sp. Orchid. 341. 1838. *S. nepalense* var. *ciliata* (Lindl.) Hook. f., F.B.I. 6 : 168. 1890 ; King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 338 - 339. 1898. KHIRU (Tibetan).

Terrestrial herbs, up to 28 cm tall. Leaves oblong-lanceolate. Flowers rose coloured.

Lachung, 2400 - 3000 m.

*Fl.* : Sept. Oct.

Uses : Tubers are eaten by Lepcha & Bhutia people after roasting (*cf.* Raju & Srivastava 1990).

**S. nepalense** D. Don, Prodr. Fl. Nep. 26. 1825 ; Hook. f., F.B.I. 6 : 168. 1890 ; King & Pantl., *l.c.* 8 : 338 - 390. 1898. *S. nepalense* f. *albiflorum* Tuyama in Hara, Fl. E. Himal. 450. 1966.

Terrestrial herbs, 50 - 75 cm tall. Tubers ellipsoidal, singly borne at the end of stolons. Leaves almost fleshy, narrowly elliptic, subacute. Spikes 5 - 15 cm long. Flowers rose-pink, rarely white.

Karponang - Changu ; 2400 - 3000 m.

*Fl.* : Sept. - Oct.

*Notes* : The flowers posses faint musk odour.

### SCHOENORCHIS Bl.

**Schoenorchis gemmata** (Lindl.) J.J. Sm. in Nat. Tijds. Ned. Ind. 72 : 100. 1912. *Saccolabium gemmatum* Lindl. in Edw. Bot. Reg. 24, Misc. 50. 1838 ; Hook. f., F.B.I. 6 : 55. 1890. *Cleisostema gemmata* (Lindl.) King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 234. t. 313. 1898.

Pendulous, epiphytes without pseudobulbs. Leaves linear, curved, margins infolded, minutely 3-toothed at apex. Flowers purple.

Gangtok, Ratong - chu Tingling bridge ; 600 - 1800 m.

*Fl.* : May - July (-Aug.).

### SMITINANDIA Holttum

**Smitinandia micrantha** (Lindl.) Holttum in Gard. Bull. Singapore 25 : 106. 1969. *Saccolabium micranthum* Lindl., Gen. & Sp. Orchid. 220. 1833 ; Hook. f., F.B.I. 6 : 59. 1890. *Cleisostoma micrantha* (Lindl.) King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 234. t. 312. 1898. *Ascocentrum micranthum* (Lindl.) Holttum in Gard. Bull. Singapore 11 : 275. 1947.

Epiphytes with stout compressed stem, up to 20 cm long, covered by leaf sheaths. Leaves narrowly oblong, keeled, obliquely truncate and bifid at apex. Flowers white with large pink spots ; lip pink or purple.

Teesta valley, up to 900 m.

*Fl.* : July - Aug.

### SPATHOGLOTTIS Bl.

**Spathoglottis ixiioides** (D. Don) Lindl., Gen. & Sp. Orchid. 120. 1831 ; Hook. f., F.B.I. 5 : 814. 1890. *Cymbidium ixiioides* D. Don, Prodr. Fl. Nep. 36. 1825.

Terrestrial herbs. Pseudobulbs globular, ovoid, ca 1.5 cm long. Leaves 2 - 3, linear, acuminate. Flowers yellow.

Lachung valley ; ca 3000 m.

*Fl.* : July - Aug.

### SPIRANTHES L.C. Rich.

**Spiranthes sinensis** (Pers.) Ames, Orch. 2 : 53. 1908. *Neottia sinensis* Pers., Syn. Pl. 2 : 511. 1807. *N. australis* R. Br., Prodr. 319. 1810. *S. australis* (R. Br.) Lindl. in Bot. Rep. 10 : 5. 823. 1824.

Terrestrial herbs, 15 - 45 cm tall. Roots tuberous. Leaves 4 - 5, alternate, clustered near the base of stem, linear. Flowers pink.

Kyongsla, Phodong, Lachen ; 600 - 2700 m.

*Fl.* : April - May & Aug. - Sept.

### STEREOCHILUS Lindl.

***Stereochilus hirtus*** Lindl. in J. Proc. Linn. Soc. 3 : 58. 1858. *Sarcochilus hirtus* (Lindl.) Benth. in Benth. & Hook. f., Gen. Pl. 3 : 576. 1883 ; Hook. f., F.B.I. 6 : 35. 1890.

Epiphytes. Leaves narrowly oblong, apically bifid. Flowers pink ; lip white and pink.

Tendong ; 1800 m.

*Fl.* : June.

### SUNIPIA Lindl.

***Sunipia andersonii*** (King & Pantl.) P.F. Hunt. in Kew Bull. 26 : 183. 1971. *Ione andersonii* King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 159. t. 217. 1898.

Epiphytes with ovoid pseudobulbs. Leaves sessile, narrowly elliptic - oblong, apices obtuse, shallowly notched. Flowers yellowish.

Sikkim, *s.l.* ; ca 1800 m.

***S. bicolor*** Lindl., Gen. & Sp. Orchid. 179. 1833. *Ione bicolor* (Lindl.) Lindl., Fol. Orchid. 3 : 1853 ; Bruhl, *l.c.* 207. *Bulbophyllum bicolor* (Lindl.) Hook. f., F.B.I. 5 : 770. 1890.

Epiphytes. Pseudobulbs obpyriform. Leaf linear, obliquely bifid at apex. Flowers ca 6 mm long.

Sikkim, *s.l.* ; 1800 - 2100 m.

*Fl.* : Oct. - Dec.

***S. intermedia*** (King & Pantl.) P.F. Hunt. in Kew Bull. 26 : 184. 1971. *Ione intermedia* King & Pantl. in J. Asiat. Soc. Beng. 65 : 120. 1896.

Terrestrial herbs. Pseudobulbs ovoid. Leaf linear, apically notched. Flowers pale green.

Tendong ; 1800 m.

***S. paleacea*** (Lindl.) P.F. Hunt. in Kew Bull. 26 : 184. 1971. *Ione paleacea* Lindl., Fol. Orchid. 2. 1853. *Bulbophyllum paleaceum* (Lindl.) Hook. f., F.B.I. 5 : 769. 1890 ; Bruhl, *l.c.* 208.

Terrestrial herbs. Pseudobulbs ovoid or obpyriform. Leaf narrowly oblong. Flowers translucent, greenish white, pink nerved ; lip purple.

Sikkim, *s.l.* ; 1800 m.

*Fl.* : Oct. - Nov.

***S. racemosa*** (J.E. Smith) Tang & Wang in Acta Phytotax. Sin. 1 : 90. 1951. *Stelis racemosa* J. E. Smith in Rees, Cyclop. 34. *Stelis* No. 10. 1816. *Sunipia scarisa* Lindl., Gen. & Sp. Orchid. 179. 1833 ; Hook. *f.*, F.B.I. 5 : 722. 1890. *Ione scariosa* (Lindl.) King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 161. t. 219. 1898.

Pseudobulbs ovoid, spongy. Leaves broadly lanceolate. Flowers in two rows, greenish, flushed with purple.

Sikkim, *s.l.* ; 1080 - 1200 m.

*Fl.* : April - May.

#### THRIXSPERMUM Lour.

***ThrixspERMUM pygmaeum*** (King & Pantl.) Holt. in Kew Bull. 14 : 275. 1960. *Sarcochilus pygmaeus* King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 207. t. 277. 1898 ; Brühl, Guide Orch. Sikkim 125. 1926.

Pendulous epiphytes, *ca* 2.5 cm long. Leaves 2 - 3, fleshy, linear-oblong, acuminate.

Near Dentam, Pemiongtsi (Pemianchi) ; *ca* 900 m.

*Fl.* : April - May Rare.

#### TROPIDIA Lindl.

***Tropidia angulosa*** (Lindl.) Bl., Coll. Orchid. 122. 1858 ; Hook. *f.*, F.B.I. 6 : 92. 1890. *Cnemidia angulosa* Lindl., Gen. & Sp. Orchid. 463. 1840. *Govindovia nervosa* Wt., Ic. t. 2090. 1853. *Tropidia bellii* Blatt. & McC. in J. Bombay Nat. Hist. Soc. 35 : 730. 1932.

Terrestrial herbs, 20 - 30 cm tall. Leaves 2, broadly elliptic, plicate. Flowers white, flushed with pale ochre-colour.

Teesta valley ; 300 - 600 m.

***T. curculigoides*** Lindl., Gen. & Sp. Orchid. 497. 1840 ; Hook. *f.*, F.B.I. 6 : 93. 1890.

Terrestrial herbs. Stem 30 - 60 cm tall. Leaves narrowly elliptic, acuminate. Flowers white, tinged with yellow.

Sikkim, *s.l.* ; 300 m.

*Fl.* : Nov.

### TAENIOPHYLLUM Bl.

**Taeniophyllum crepidiforme** (King & Pantl.) King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 245. 1898. *Sarcochilus crepidiformis* King & Pantl. in J. Asiat. Soc. Beng. 64 : 340. 1895.

Minute leafless epiphytic herbs. Racemes erect, ca 7 mm long. Flowers greenish ; lip white, stigma purple margined.

In tropical valleys.

*Fl.* : Sept.

**T. retrospiculatum** (King & Pantl.) King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 244. 1898. *Sarcochilus retrospiculatus* King & Pantl. in J. Asiat. Soc. Beng. 64 : 340. 1895.

Small, leafless, epiphytic herbs. Flowers green.

Sikkim, *s.l.* ; 1500 m.

*Fl.* : June.

### TAINIA Bl.

**Tainia cordata** Hook. *f.*, F.B.I. 6 : 193. 1890 ; Karthik. *et al.*, Fl. Ind. Enum. Monocot. 172. 1989.

Terrestrial herbs. Pseudobulbs dark purple. Leaf 30 x 11.5 cm, 7-nerved, oblique at base ; petiole dark purple. Flowers dark brown and red ; lip yellow.

Sikkim Himalaya (Ic. in Hort. Calcutta).

*Notes* : Karthikeyan *et al.* (1989) mentioned its distribution 'E. Himalaya' probably on the basis of Hooker (1890). There is no further record of its re-collection from any other locality.

**T. hookeriana** King & Pantl. in J. Asiat. Soc. Beng. 64 : 336. 1895.

Terrestrial herbs. Pseudobulbs ovoid. Leaf plicate, oblong-lanceolate. Flowers greenish with brown lines ; lip white, oblong, lamellate ; lamellae yellow, spotted with pink.

*Fl.* : April.

**T. latifolia** (Lindl.) Benth. *ex* Hook. *f.*, F.B.I. 5 : 820. 1890 ; King & Pantl., *l.c.* 8 : 103. 1898. *Amia latifolia* Lindl., Gen. & Sp. Orchid. 130. 1831.

Terrestrial herbs. Pseudobulbs olive green, narrowly fusiform. Leaf plicate, elliptic, acute ; petioles 8.7 - 12.5 cm, channelled. Flowers dark brown ; lip yellow.

In tropical valleys ascending to 750 m.

*Fl.* : March - April.

**T. minor** Hook. *f.*, F.B.I. 5 : 821. 1890.

Terrestrial herbs. Pseudobulbs narrowly fusiform. Leaves plicate, elliptic. Flowers purplish brown with darker streaks, lip white speckled brown purple at lower half, yellow towards tip, column green.

Chungthang ; 1200 - 1800 m.

*Fl.* July.

**T. wrayana** (Hook. *f.*) J.J. Sm. in Bull. Jard. Bot. Buitzen. 2, 8 : 6. 1912. *Ipssea wrayana* Hook. *f.*, F.B.I. 5 : 812. 1890. *Nephelaphyllum grandiflorum* Hook. *f.*, F.B.I. 6 : 192. 1890.

Terrestrial herbs. Pseudobulbs narrowly fusiform, *ca* 7.5 cm long. Leaves ovate-elliptic ; petioles not distinguishable from the pseudobulbs. Flowers *ca* 2.5 cm long ; floral bracts linear-lanceolate, nerves dark brown ; lip subpanudriform, white, pink dotted with an yellow blotch at base and tip, mentum and column yellow.

Teesta valley ; 300 - 450 m.

*Fl.* : March.

### THELASIS Bl.

**Thelasis longifolia** Hook. *f.*, F.B.I. 6 : 87. 1890.

Epiphytes. Pseudobulbs conical. Leaves oblanceolate, blunt and shallowly bifid at apex. Flowers green.

In tropical valleys.

*Fl.* : July - Aug.

**T. pygmaea** (Griff.) Lindl. in J. Proc. Linn. Soc. 3 : 63. 1859 ; Hook. *f.*, F.B.I. 6 : 86. 1890. *Euprobosus pygmaea* Griff. in Calcutta J. Nat. Hist. 5 : 372. t. 26. 1844 ; Wt., Ic. t. 1732. 1851.

Epiphytes. Pseudobulbs ovoid-globose. Leaves linear-oblong, fleshy. Flowers pale green.

Sikkim, *s.l.*

*Fl.* : Aug. - Sept.

### THUNIA Reichb. f.

**Thunia alba** (Lindl.) Reichb. f. in Bot. Zeit. (Berlin) 10 : 64. 1852.  
*Phaius albus* Lindl., Gen. & Sp. Orchid. 128. 1830 ; Hook. f., F.B.I. 5 :  
818. 1890, *p.p.*

Terrestrial herbs, without pseudobulbs, 30 - 90 cm. Leaves many, sessile, elliptic or oblong, linear, lanceolate. Racemes terminal, drooping, 4 - 6-flowered. Flowers with white or yellow lip having purple or orange veins and 7 - 9 orange ridges on upper surface.

Rangeet valley ; 600 - 1200 m.

*Fl.* : May.

### TIPULARIA Hutt.

**Tipularia josephii** Reichb. f. *ex* Lindl. in J. Linn. Soc. 1 : 174. 1857 ; Hook. f., F.B.I. 5 : 708. 1890 ; King & Pantl., *l.c.* 151 - 152.

Pseudobulbs subglobular, pointed, *ca* 4.5 mm long. Leaf solitary, broadly ovate, acute, plaited, 7 - nerved. Racemes erect, arising from the base of pseudobulbs, 20 - 30 cm long. Flowers *ca* 8 mm long, lateral lobes of lip with thick oblong calli.

Sikkim, *s.l.* ; 2200 - 2900 m.

*Fl.* : Aug. - Oct.

### TRICHOTOSIA Bl.

**Trichotosia dasyphylla** (Par. & Reichb. f.) Kranzl. in Pflanzenr. 50 : 138. 1911. *Eria dasyphylla* Par. & Reichb. f. in Trans. Linn. 30 : 147. 1874 ; Hook. f., *l.c.* 808.

Epiphytic herbs. Flowers yellowish green.

Deorali (Cult.) ; 300 - 600 m (-1400 m).

*Fl.* : May - June.

**T. pulvinata** (Lindl.) Kranzl. in Pflanzenr. 50 : 138. 1911. *Eria pulvinata* Lindl. in J. Linn. Soc. 3 : 56. 1858 ; Hook. f., *l.c.* 807. *E. rufinula* Reichb. f. in Bamb. Gartenzeit. 19 : 13. 1863 ; Hook. f., *l.c.* 807.

Epiphytic herbs. Flowers whitish pink.

Deorali (Cult.) ; 800 - 1400 m.

*Fl.* : May.

## TYLOSTYLIS Bl.

**Tylostylis discolor** (Lindl.) Hook. f. in Ann. Roy. Bot. Gard. Calc. 5 : 22. 1895. *Eria discolor* Lindl. in J. Linn. Soc. 3 : 51. 1858. *E. pulchella sensu* Hook. f., F.B.I. 5 : 802. 1890, *p.p.* non Lindl. 1841.

Herbs. Stem consisting of 4 - 6 pseudobulbs in series. Leaves arising at the joints, coriaceous, sessile. Racemes few flowered. Flowers ochre-yellow, dull white outside ; lip with a purplish brown basal patch.

Sikkim, *s.l.* ; up to 1050 m.

*Fl.* : Feb.

## UNCIFERA Lindl.

**Uncifera acuminata** Lindl. in J. Linn. Soc. (Bot.) 3 : 40. 1858. *Saccolabium acuminatum* (Lindl.) Hook. f., F.B.I. 6 : 65. 1890.

Epiphytic herbs. Leaves ovate or elliptic-lanceolate. Flowers pale green.

Sikkim, *s.l.* ; 1800 - 2100 m.

**U. lancifolia** (King & Pantl.) Schltr. in Orch. 583. 1914. *Saccolabium lancifolium* King & Pantl. in J. Asiat. Soc. Beng. 65 : 122. 1896.

Epiphytic herbs. Leaves linear. Flowers pale yellow.

Rissisum ; *ca* 1800 m.

**U. obtusifolia** Lindl. in J. Linn. Soc. 3 : 40. 1858. *Saccolabium obtusifolium* (Lindl.) Hook. f., F.B.I. 6 : 65. 1890. *Gastrochilus obtusifolius* (Lindl.) A.S. Rao & Mukherjee in Rec. B.S.I. 20 (2) : 213. 1973.

Epiphytic herbs. Leaves linear-oblong. Flowers pale yellow.

Sikkim, *s.l.* ; 1050 - 1500 m.

## VANDA W. Jones ex R. Brown

**Vanda alpina** Lindl., Fol. Orchid. Vanda 10. 1853 ; Hook. f., F.B.I. 6 : 53. 1890.

Epiphytic herbs. Leaves flat, folded inwards. Flowers greenish or yellowish ; lip without spur.

Gangtok, Namste, Tendong ; 1000 - 1800 m.

*Fl.* : July.

**V. cristata** Lindl., Gen. & Sp. Orch. 216. 1833 ; Hook. *f.*, *l.c.* 53 ; King & Pantl., *l.c.* 8 : 216. t. 287. 1898.

Epiphytes. Leaves narrowly oblong, conduplicate, truncate and bilobed at apex. Flowers yellowish or olive-green with purplish brown blotches.

Gangtok, Namthang, Tendong ; *ca* 1500 m.

*Fl.* : May - June

**V. testacea** (Lindl.) Reichb. *f.* in Gard. Chron. 2 : 166. 1877. *Aerides testaceum* Lindl., Gen. & Sp. Orchid. 238. 1833. *V. parviflora* Lindl. in Edw. Bot. Reg. 30. Misc. 45. 1844 ; Hook. *f.*, *l.c.* 6 : 50. 1890 ; King & Pantl., *l.c.* 215. 1898.

Epiphytic herbs. Leaves distichous, linear. Lip spurred, bluish purple.

Rangpo ; 350 - 700 m.

**V. pumila** Hook. *f.*, F.B.I. 6 : 53. 1890.

Epiphytic herbs. Leaves narrowly oblong, unequally bilobed at apex, dilated towards base. Flowers pale yellowish or white ; midlobe of lip pale streaked with purple.

Sikkim, *s.l.* ; *ca* 600 m.

#### VANDOPSIS Pfitz.

**Vandopsis undulata** (Lindl.) J.J. Smith in Nat. Tijdschr. Ned. Ind. 72 : 77. 1912. *Vanda undulata* Lindl. in J. Linn. Soc. 3 : 42. 1859. *Stauroopsis undulatus* (Lindl.) Benth. *ex* Hook. *f.*, F.B.I. 6 : 27. 1890.

Epiphytes. Leaves narrowly oblong, blunt, retuse. Flowers white flushed with pink, yellowish green striped with pink.

Dentam ; 1500 - 2100 m.

*Fl.* : April - May.

*Notes* : Young shoots, rachis and peduncle are green and spotted with purplish brown.

#### YOANIA Maxim.

**Yuania prainii** King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 175. 1898.

Saprophytic, aphyllous, succulent, 5 - 10 cm tall, erect, herbs. Rhizomes densely clothed with small scales. Flowers white.

Chungthang ; *ca* 1800 m.

**ZEUXINE** Lindl. *nom. cons.*

**Zeuxine affinis** (Lindl.) Benth. *ex* Hook. *f.*, F. B. I. 6 : 108 . 1890. *Monochilus affine* Lindl., Gen. & Sp. Orchid. 487. 1840.

Terrestrial herbs, 15 - 30 cm tall. Leaves ovate-lanceolate. Flowers whitish green ; lip yellow ; anthers pink.

Rangcet valley ; *ca* 450 m.

*Fl.* : April.

**Z. flava** (Lindl.) Trimen in J. Ceylon Br. Roy. Asiat. Soc. 9 : 90. 1885 ; Hook. *f.*, F.B.I. 6 : 108. 1890. *Monochilus flavum* Wall. *ex* Lindl., Gen. & Sp. Orchid . 487. 1840. *Hetaeria flava* Lindl. *ex* Wall., Numer. List. 247. 1840.

Terrestrial herbs, 15 - 25 cm tall. Leaves ovate or ovate-lanceolate, clustered at top of the stem.. Petals white ; lip pink at base, yellow at apex.

Dentam - Pamianchi ; 1500 - 2000 m.

*Fl.* : May - June.

**Z. franchetiana** King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 292. 1898.

Terrestrial herbs, 15 - 22 cm tall. Leaves few, scattered, linear-lanceolate. Flowers white with a green dash near the base of lip.

Sikkim (?) ; *ca* 1950 m.

*Fl.* : Aug.

**Z. goodyeroides** Lindl., Gen. & Sp. Orchid. 486. 1840 ; Hook. *f.*, F.B.I. 6 : 107. 1890. *Monochilus goodyeroides* (Lindl.) Lindl. in J. Proc. Linn. Soc. Bot. 1 : 187. 1857.

Terrestrial herbs, 10 - 22 cm tall. Leaves 2 - 4, oblong-ovate, acute, green, midrib white. Flowers pink, turning to white.

Sikkim, *s.l.* ; 1800 m.

*Fl.* : Sept. - Oct.

**Z. nervosa** (Wall. *ex* Lindl.) Trimen in J. Ceylon Br. Roy. Asiat. Soc. 9 : 90. 1885 ; Hook. *f.*, F.B.I. 6 : 108. 1890. King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8. 289. t. 385. 1898. *Monochilus nervosum* Wall. *ex* Lindl., Gen. & Sp. Orchid. 487. 1840.

Terrestrial herbs, 15–22 cm tall. Leaves 2–3, obliquely ovate-lanceolate, acute. Sepals green, petals white; lobes of lip yellow.

Sikkim, *s.l.*; ca 600 m.

*Fl.*: April.

**Z. pulchra** King & Pantl. in J. As. Soc. Beng. 65 : 127. 1896.

Terrestrial herbs, 15–20 cm tall. Leaves 3–4, crowded, ovate, subacute, coriaceous, blackish purple above, midrib white. Flowers pale brown; lip white above, yellow below.

Lachung valley; ca 2250 m.

*Fl.*: Aug.

**Z. reflexa** King & Pantl. in Ann. Roy. Bot. Gard. Calc. 8 : 291. 1898.

Terrestrial herbs, 17–22 cm tall. Leaves narrowly ovate, acute. Sepals green, petals white; lip yellow, sac white.

Sikkim (?); 1050 m.

*Fl.*: April.

**Z. strateumatica** (L.) Schlechter in Fedde Repert. Beih. 1 : 77. 1911. *Orchis strateumatica* L., Sp. Pl. 943. 1753. *Pterygodium sulcatum* Roxb., Fl. Ind. 3 : 452. 1832. *Zeuxine sulcata* (Roxb.) Lindl. in Royle, Ill. Bot. Himal. Mount. 1 : 368. 1839; Hook. f., F.B.I. 6 : 106. 1890; King & Pantl. in *l.c.* 8 : 286. t. 381. 1898.

Terrestrial herbs, 5–25 cm tall. Leaves linear, acuminate. Flowers white or pink; lip purple at base, yellow at apex.

Sikkim, *s.l.*; up to 1200 m.

*Fl.*: Jan.

## ZINGIBERACEAE

(S. Kumar)

**Alpinia** Roxb. *nom. cons.*

**Alpinia bracteata** Roxb., Fl. Ind. 1 : 63. 1820; Baker in Hook. f., F.B.I. 6 : 255. 1892.

Herbs. Leaves oblong-lanceolate, villous beneath. Brancheoles pale green. Flowers with white lip with variegated red and yellow centre. Capsules globose.

Sikkim, *s.l.* ; *ca* 300 m.

*Fl. & Fr.* : May Oct.

**A. nigra** (Gaertn.) Burt in Notes Roy. Bot. Gard. Edinb. 35 : 213. 1977. *Zingiber nigrum* Gaertn., Fruct. 1 : 35. 5. 12. 1788. *Alpinia allughas* (Retz.) Rosc. in Trans. Linn. Soc. London 8 : 346. 1807 ; Baker in Hook. *f.*, F.B.I. 6 : 253. 1892.

Biennial or perennial herbs with tuberous rhizomes. Leaves glabrous, acuminate. Brancheoles small, sessile oblong-lanceolate, glabrous. Flowers with white bilobed lip having a pair of pink lines at centre. Capsules globose, up to 5 cm in diam.

Teesta valley.

*Fl. & Fr.* : May Oct.

*Notes* : Young roots are eaten as vegetable.

**A. malaccensis** (Burm. *f.*) Rosc. in Trans. Linn. Soc. 8 : 345. 1807 ; Baker in Hook. *f.*, F.B.I. 6 : 255. 1892. *Maranta malaccensis* Burm. *f.*, Fl. Ind. 2. 1768.

Herbs with several stout stems. Leaves long petioled, oblong-lanceolate, villous beneath. Brancheoles white or pale brownish. Flowers with yellow lip having deep red and yellow centre. Capsules globose, yellowish to orange-red.

Dikchu, Chungthang ; up to 1350 m.

*Fl. & Fr.* : March May.

*Notes* : An essential oil viz. 'Amadi' is obtained from rhizomes.

#### AMOMUM Roxb. *nom. cons.*

**Amomum aromaticum** Roxb., Fl. Ind. 1 : 44. 1820 ; Baker in Hook. *f.*, F.B.I. 6 : 241. 1892. MORANG HATCHI (Hindi, Beng.).

Herbs. Rhizomes faintly aromatic, white. Leaves linear-lanceolate, caudate-acuminate, glabrous, aromatic. Flowers white, yellow and white with a medium yellow stripe and few pinkish veins radiating towards base. Capsules trigonous, smooth, fleshy.

Rishap, Melli.

*Fl. & Fr.* : Throughout the year.

*Notes* : Seeds are used as a condiment and for flavouring food.

**A. corynostachyum** Wall., Pl. Asiat. Rar. 1 : 48. t. 58. 1830 ; Baker in Hook. f., F.B.I. 6 : 238. 1892.

Herbs. Leaves petioled, lanceolate, glabrous. Spikes globose. Flowers with white subrhomboid lip having yellow median band and red streaks at the base. Capsules ellipsoid, faintly many ridged, hairy.

Sikkim, *s.l.* ; ca 750 m.

*Fl. & Fr.* : June July.

**A. dealbatum** Roxb., Fl. Ind. 1 : 43. 1820 ; Baker in Hook. f., F.B.I. 6 : 239. 1892.

var. **dealbatum**

Perennial herbs with aromatic rhizomes and leafy stems. Leaves subsessile, oblong lanceolate. Bracts red. Flowers with a white lip having yellow blotch at the base. Capsules oblong-subglobose, with 9-crenulate winged ribs, pinkish red at maturity.

Sithong, Singhik, Dikchu, Jinglam ; 500 1500 m.

*Fl. : & Fr.* : April May.

*Notes* : It is used as a substitute for large cardamom.

var. **sericeum** (Roxb.) Baker in Hook. f., F.B. I. 6 : 239. 1892.  
*A. sericeum* Roxb., Fl. Ind. 1 : 46. 1820.

Herbs. Leaves white, sericeous beneath. Flowers white, lip variegated with pink veins on a yellow ground. Capsules ovate-oblong, not winged.

Rangpo valley, up to 1000 m.

*Fl. & Fr.* : April May.

**A. kingii** Baker in Hook. f., F.B.I. 6 : 241. 1892.

Herbs with stout leafy stems. Leaves oblong-lanceolate. Flowers white. Lip obscurely 3-lobed, tinged with yellow, narrowed suddenly to a claw.

Sikkim, *s.l.*

*Fl. & Fr.* : June July. Endemic (?)

*Notes* : It is represented by a single collection available at CAL.

**A. subulatum** Roxb., Pl. Corom. 3 : 75. t. 277. 1819 ; Baker in Hook. f., F.B.I. 6 : 240. 1892.

Herbs with leafy stem. Leaves subsessile, oblong-lanceolate, glabrous. Flowers white. Lip yellow with deep yellow veins. Capsules ellipsoid, flattened, longitudinally striate with crenulate wings, red brown.

Cultivated throughout tropical and subtropical regions ; up to 1800 m.

*Fl. & Fr.* : April May.

*Notes* : It is one of the major cash crops of Sikkim. Seeds are used for flavouring food.

### CAULOKAEMPFERIA K. Larsen

**Caulokaempferia secunda** (Wall.) K. Larsen in Bot. Tidssk. 60 : 170. 1964 ; Rao & Verma in Bull. Bot. Surv. India 14 : 125. 1972. *Kaempferia secunda* Wall. in Roxb., Fl. Ind. 1 : 19. 1820 ; Baker in Hook. f. F.B.I. 6 : 223. 1892.

Small herbs with leafy stem. Leaves sessile-subsessile, oblong-ovate, glabrous. Flowers pink or red. Lips notched. Capsules 1 cm long ; seeds whitish.

Sikkim, *s.l.* ; up to 1200 m.

**C. sikkimensis** (King ex Baker) K. Larsen in Saert. Bot. Tidssk. 60 : 169. 1964. *Kaempferia sikkimensis* King ex Baker in Hook. f., F.B.I. 6 : 223. 1892.

Small herbs with slender leafy stem. Leaves sessile, lanceolate. Spikes 1-flowered. Flowers white ; corolla lobes dark lilac ; lip suborbicular, white.

Ranipool, Rangpo, Gangtok.

*Fl. & Fr.* : July Aug.

### CAUTLEYA (Benth.) Hook. f.

**Cautleya cathcartii** Baker in Hook. f., F.B.I. 6 : 208. 1890.

Perennial robust herbs. Leaves sessile, linear-lanceolate - oblong, acuminate, glabrous. Spikes 15 - 20 flowered. Bracts green. Flowers bright yellow. Capsule red. Seeds white.

Sikkim, *s.l.*

*Fl. & Fr.* : May July.

**C. gracilis** (J.E. Smith) Dandy in Journ. Bot. 70 : 328. 1954. *Roscoeia gracilis* J.E. Smith in Trans. Linn. Soc. 13 : 460. 1812. *C. lutea*

(Royle) Hook. *f.* in Bot. Mag. t. 699. 1888 ; Baker in Hook. *f.*, F.B.I. 6 : 208. 1890. *Roscoea lutea* Royle, Illustr. Bot. Himal. 361, t. 89, f.2. 1839.

Herbs with thick rhizomes. Leaves sessile, lanceolate. Spikes terminal, lax. Bracts purplish green. Flowers yellow. Capsules red. Seeds conical, ridged, dark blue or black.

Lachung, Chungthang, Dikchu.

*Fl. & Fr.* : June Oct.

**C. robusta** Baker in Hook. *f.*, F.B.I. 6 : 208. 1890.

Perennial robust herbs. Leaves sessile, oblong, acute. Spikes dense, many-flowered. Bracts reddish. Flowers deep orange-yellow. Capsule depressed globose. Seeds ovoid or compressed, pink, enclosed in red or yellow aril.

Sikkim, *s.l.*

*Fl. & Fr.* : June Oct.

**C. spicata** (J.E. Smith) Baker in Hook. *f.*, F.B.I. 6 : 209. 1890. *Roscoea spicata* J.E. Smith in Trans. Linn. Soc. 13 : 461. 1812.

Perennial herbs. Leaves up to 10 cm broad. Spikes shortly peduncled. Bracts red, tubular. Flowers bright yellow. Capsule globose, red. Seeds black.

*Fl. & Fr.* : June Nov.

### COSTUS L.

**Costus lacerus** Gagnep. in Bull. Soc. Bot. France 3, 50 : 261. 1903 ; Hara *et al.*, Enum. Fl. Pl. Nepal 1 : 59. 1978.

Robust herbs. Leaves sessile, ovate-lanceolate, subacuminate. Spikes sessile, oviform. Bracts coarsely hairy, ciliate, margins torn. Flowers creamy white. Seeds 4-5 angled, sky-blue.

Teesta valley.

*Fl. & Fr.* : July Oct.

**C. speciosus** (Koen.) J.E. Smith in Trans. Linn. Soc. London 1 : 249. 1800 ; Baker in Hook. *f.*, F.B.I. 6 : 249. 1892. *Banksia speciosa* Koen. *apud* Retz., Obs. Bot. 3 : 75. 1783.

Robust herbs. Leaves petioled, oblanceolate-obovate. Spikes compact. Bracts ovate, cuspidate. Flowers white ; lip white with a

median yellow band and crimped margins. Capsule globose-oblong, red. Seeds 4-5 angled black.

Rangect, Rangpo, Riang, Gangtok ; up to 1700 m.

*Fl. & Fr.* : June - Oct.

*Notes* : Roots edible, bitter, and used in medicine. Plants are of ornamental value as well.

### **CURCUMA** Roxb. *nom. cons.*

**Curcuma angustifolia** Roxb. in *Asiat. Res.* 11 : 338. t. 3. 1810 ; Baker in *Hook. f.*, *F.B.I.* 6 : 210. 1890.

Perennial herbs. Rhizomes small, globose, pale yellow inside. Leaves petioled, up to 8 cm broad. Coma-bracts purple, forming a cupule. Flowers bright yellow.

Sikkim, *s.l.* ; up to 1700 m.

*Notes* : It is cultivated for production of East Indian Arrowroot starch.

**C. aromatica** Salisb., *Parad. London* 20 : t. 96. 1808 ; Baker in *Hook. f.*, *F.B.I.* 6 : 210. 1890.

Perennial herbs. Rhizomes tuberous, strongly aromatic, pale yellow inside. Leaves petioled, oblong. Coma-bracts pink. Flowers green.

Teesta valley, Rongsong.

*Fl. & Fr.* : May - June.

*Notes* : It is used in medicine and perfume and is cultivated.

**C. caesia** Roxb. in *Asiat. Res.* 11 : 334. 1810 ; Baker in *Hook. f.*, *F.B.I.* 6 : 212. 1890.

Herbs. Rootstocks large, ovoid ; tubers sessile, pale grey inside. Leaves petioled, green with a broad purple-brown band in middle. Spikes densely flowered. Coma-bracts red. Flowers pale yellow. Capsules trigonous ; seeds arillate, white.

Sikkim, *s.l.* ; ca 600 m.

*Fl. & Fr.* : May - June.

*Notes* : It is cultivated for perfume industry.

**C. longa** L., *Sp. Pl.* 1 : 2. 1753 ; Baker in *Hook. f.*, *F.B.I.* 6 : 214. 1890.

Herbs. Rhizomes tuberous, strongly aromatic, pale yellow to deep orange, yellow inside. Coma-bracts pinkish white. Flowers white with creamy white top having deep yellow band.

Cultivated up to 1700 m.

*Fl. & Fr.* : June Nov.

**C. zedoaria** (Berg.) Rosc. *Monandv.* Pl. t. 109. 1828 ; Baker in Hook. *f.*, F.B.I. 6 : 210. 1890. *Amomum zedoaria* Berg. *Mat. Med.* 41. 1788.

Herbs. Rhizomes pale yellow, faintly aromatic inside. Leaves petioled, oblong with purple tinge on both surfaces. Coma-bracts bright red. Flowers pale yellow.

Ranipol, Teesta valley ; up to 2000 m.

*Fl. & Fr.* : April May.

*Notes* : Cultivated throughout India for Starch production.

#### CURCUMORPHA Rao & Verma

**Curcumorpha longiflora** (Wall.) Rao & Verma in Bull. Bot. Surv. India 13 : 339. 1971. *Gastrochilus longiflora* Wall., Pl. Asiat. Rar. 1 : 22. t. 25. 1829 ; Baker in Hook. *f.*, F.B.I. 6 : 251. 1892.

Herbs. Rhizome short, faintly aromatic. Leaves oblong-lanceolate, petioled. Spikes purplish green. Flowers white.

Teesta valley.

*Fl. & Fr.* : July Sept.

#### GLOBBA L.

**Globba andersonii** Clarke *ex* Baker in Hook. *f.*, F.B.I. 6 : 202. 1890.

Perennial herbs with leafy stem. Leaves oblong-lanceolate, caudate, pubescent beneath. Panicle lax, rhachis hairy. Flowers bright yellow. Capsule warted.

Sikkim, *s.l.*

*Fl. & Fr.* : July Oct.

**G. clarkel** Baker in Hook. *f.*, F.B.I. 6 : 201. 1890 ; Rao & Verma, *l.c.* 11 : 246. 1969.

Perennial herbs. Leaves lanceolate, caudate, hairy at base beneath. Rhachis glabrous. Flowers orange yellow. Capsules wrinkled, faintly 3-lobed, oblong. Bulbils tiny, white or brownish replacing flowers at apex.

Sikkim, *s.l.* ; up to 2400 m.

*Fl. & Fr.* : June Oct.

*G. multiflora* Wall. *ex* Baker in Hook. *f.*, F.B.I. 6 : 202. 1890 ; Rao & Verma, *l.c.* 14 : 118. 1972.

Perennial herbs. Leaves oblong-lanceolate, caudate hairy beneath. Panicles with hairy rachis. Flowers yellow. Capsules subglobose.

Sikkim, *s.l.* ; *ca* 1200 m.

*Fl & Fr.* : May Sept.

*G. racemosa* J. E. Smith, *Exot. Bot.* 2 : 115. t. 117. 1804 ; Rao & Verma, *l.c.* 14 : 118. 1972. *G. orixensis* Roxb. in *Asiat. Res.* 11: 358. 1810.

var. **racemosa**

Perennial herbs. Leaves oblong-lanceolate, subcaudate. Rachis glabrous. Flowers yellow or orange with dark yellow or purple tinged tips. Capsules globose.

Rhenock, Riang, Gangtok.

*Fl. & Fr.* : May Oct.

var. **hookeri** (Clarke *ex* Baker) S. Kumar, *stat. et comb. nov.* *G. hookeri* Clarke *ex* Baker in Hook. *f.*, F.B.I. 6 : 202. 1890.

Differs from var. *racemosa* in having broader leaves, very hairy on the midrib beneath ; bright yellow flowers with unspotted lip.

Kolbong, Riang, Rangsong, Dikchu.

*Fl. & Fr.* : May Sept.

*G. siamensium* (Koen.) Rao & Verma in *Bull. Bot. Surv. India* 14 : 118. 1972. *Hura siamensium* Koen. in *Retz.*, *Obs. Bot.* 3 : 49. 1783. *G. versicolor* J.E. Smith, *Exot. Bot.* f. 117 ABC. 1804 ; Baker in Hook. *f.*, F.B.I. 6 : 205. 1890. *G. expansa* Wall. *ex* Baker, *l.c.*

Perennial herbs. Leaves oblong, caudate. Branches and rhachis slender. Flowers yellow tinged with lilac smaller corolla tube. Capsules cylindric smooth.

Sikkim, *s.l.*

*Fl. & Fr.* : June Oct.

### HEDYCHIUM Koen.

**Hedychium aurantiacum** Wall. *ex* Rosc., Monanar. Pl. t. 39. 1828 ; Baker in Hook. *f.*, F.B.I. 6 : 232. 1892.

Perennial rhizomatous aromatic herbs. Leaves lanceolate, acuminate. Spikes lax. Flowers bright orange-yellow, with a deep orange blotch at mouth.

Rhenock; *ca* 600 m.

*Fl. & Fr.* : July Feb.

**H. coccineum** Buch. - Ham. *ex* J.E. Smith in Rees., Cyclop. 17 : 5. 1811 ; Baker in Hook. *f.*, F.B.I. 6 : 231. 1892. *H. coccineum* var. *longifolium* Baker, *l.c.*

var. **coccineum**

Perennial herbs. Leaves linear-lanceolate, purplish villous beneath. Flowers small, bright crimson.

Riang, Chungthang, Great Rangeet.

*Fl. & Fr.* : June Dec.

var. **squarrosum** (Buch.-Ham. *ex* Wall.) Baker in Hook. *f.*, F.B.I. 6 : 231. 1892. *H. squarrosum* Buch. - Ham. *ex* Wall. in Hook., Kew J. Bot. 5 : 372. 1853.

Differs from var. *coccineum* in having glabrous narrow leaves and small flowers.

Sikkim, *s.l.* ; 2400 2700 m.

*Fl. & Fr.* : June Dec.

**H. coronarium** Koen. in Retz., Obs. Bot. 3 : 73. 1783 ; Baker in Hook. *f.*, F.B.I. 6 : 225. 1892 ; Rao & Verma, *l.c.* 11 : 121. 1971.

Perennial sweet scented herbs. Leaves oblong-lanceolate, acuminate, appressed hairy beneath. Spikes densely flowered. Flowers white with a yellow blotch at mouth.

Sikkim, *s.l.* ; up to 130 m.

*Fl. & Fr.* : June Oct.

*Notes* : Very variable in shape of staminodes and flowers. Ornamental.

**H. densiflorum** Wall. in Hook., Kew Journ. Bot. 5 : 368. 1853 ; Baker in Hook. f., F.B.I. 6 : 227. 1892 ; Rao & Verma, *l.c.* 14 : 130. 1972.

Perennial herbs. Leaves linear-lanceolate, glabrous beneath. Spikes moderately dense flowered, sessile. Flowers small, orange-yellow, turning reddish at maturity.

Lachen ; up to 2400 m.

*Fl. & Fr.* : June Oct.

**H. ellipticum** Buch.-Ham. ex J. E. Smith in Rees Cyclop. 17. n. 2. 1811 ; Baker in Hook. f., F.B.I. 6 : 228. 1892 ; Rao & Verma in Bull. Bot. Surv. India 14 : 131. 1972.

Perennial, terrestrial or epiphytic herbs. Leaves oblong, glabrous. Spikes dense flowered. Flowers fragrant, white, turning yellow with age.

Chungthang, Teesta valley, Rhenock, Dikchu ; 600 1500 m.

*Fl. & Fr.* : June Sept.

*Notes* : Ornamental.

**H. gardnerianum** Sheppard ex Ker.-Gawl. in Edw. Bot. Reg. 8. t. 774. 1824 ; Baker in Hook. f., F.B.I. 6 : 230 1892 ; Rao & Verma, *l.c.* 14 : 133. 1972.

Perennial herbs with leafy stems. Leaves subsessile, oblong, caudate, white puberulent beneath. Spikes lax-flowered. Flowers bright yellow. Capsules persistent. orange-red within.

Sikkim, *s.l.* ; 900 2400 m.

*Fl. & Fr.* : July Dec.

**H. gracile** Roxb., Fl. Ind. 1 : 14. 1820 ; Baker in Hook. f., F.B.I. 6 : 229. 1892 ; Rao & Verma, *l.c.*; *H. gracile* var *glacum* Baker, *l.c.*

Perennial herbs. Leaves subsessile, oblong-lanceolate. Spikes moderately dense-flowered. Flowers white or pale yellow tinged. Capsules globose, glabrous.

Lachung, Gangtok, Great Rangeet.

*Fl. & Fr.* : May Dec.

**H. greenii** W.W. Smith in Rec. B.S.I. 4 : 272. 1913 ; Rao & Verma, *l.c.* 14 : 130. 1972..

Perennial herbs. Leaves oblong, sparsely hairy. Spikes purplish red. Flowers red. Bulbils present.

Sikkim, *s.l.*

*Fl. & Fr.* : July Sept.

**H. spicatum** Buch.-Ham. ex J.E. Smith in Rees Cyclop. 17 : 3. 1811 ; Baker in Hook. *f.*, F.B.I. 6 : 227. 1892.

var. **spicatum**

Perennial herbs. Leaves oblong-lanceolate, glabrous. Spikes densely flowered. Flowers white, with deeply bifid lip. Capsules subglobose, glabrous.

Sikkim, *s.l.* ; up to 3000 m.

*Fl. & Fr.* : July Sept.

var. **acuminatum** (Rosc.) Wall. in Hook., Kew Journ. Bot. 5 : 328. 1853 ; Baker in Hook. *f.*, F.B.I. 6 : 227. 1892 ; Rao & Verma in Bull. Bot. Surv. India 14 : 130. 1972. *H. acuminatum* Rosc., Monandr.Pl. t. 47. 1828.

Differs from var *spicatum* in having abruptly acuminate leaves, lax few flowered spikes and convolute bracts.

Phodonchen, Lepcha Zagat (Dzongu).

**H. thyriforme** Buch.-Ham. ex J.E. Smith in Rees Cyclop. 17. 1811 ; Baker in Hook. *f.*, F.B.I. 6 : 230. 1892 ; Rao & Verma, *l.c.* 14 : 132. 1972.

Perennial aromatic herbs. Leaves oblong-lanceolate, villous beneath. Spikes compact, densely flowered. Flowers white, fragrant ; lip deeply bifid with a yellow blotch at base.

Rangiet valley ; up to 1200 m.

*Fl. & Fr.* : Aug. Sept.

### HEMIORCHIS Kurz

**Hemiorchis pantlingii** King in Ann. Roy. Bot. Gard. Calc. 5 : 163. t. 198 199. 1896 ; Rao & Verma, *l.c.* 14 : 119. 1972.

Perennial, rhizomatous herbs. Leaves oblong-lanceolate, produced after flowering. Peduncles sheathed. Hispidulous corolla and

yellow lip with purplish median line and orange tip. Capsules puberulous, 3 valved.

Sikkim, *s.l.* ; up to 1200 m.

*Fl. & Fr.* : March April.

### HORNSTEDTIA Retz.

**Hornstedtia linguiformia** K. Schum. in Engl. Pflanzenr. 20 : 196. 1904. *Amomum linguiforme* (Shult.) Baker in Hook. *f.*, F.B.I. 6 : 235. 1892. *Elettaria linguiformis* Schult., Mant. Pl. 1 : 24. 1822.

Perennial herbs with creeping rhizomes. Leaves subsessile, lanceolate, acuminate, glabrous. Spikes ellipsoid. Flowers red ; lip yellow having a red median band.

Sikkim, *s.l.* ; up to 1500 m.

*Fl. & Fr.* : March Aug.

### KAEMPFERIA L.

**Kaempferia angustifolia** Rosc. in Trans. Linn. Soc. 8 : 351. 1807 ; Baker in Hook. *f.*, F.B.I. 6 : 219. 1890.

Herbs with tuberous rootstock. Leaves sessile, lanceolate. Spikes sessile. Flowers white with small bracts and lilac lip.

Sikkim, *s.l.*

*Fl.* : May June.

**K. involucrata** King *ex* Baker in Hook. *f.*, F.B.I. 6 : 221. 1890 ; Rao & Verma, *l.c.* 14 : 124. 1972.

Herbs with subglobose tubers. Leaves petioled, oblanceolate. Flowers white, enclosed in cup-like structure formed of two bracts on a flat receptacle ; lip white with a yellow blotch in the centre.

Sikkim, *s.l.* ; up to 1000 m.

*Fl.* : May June.

**K. rotunda** L., Sp. Pl. 3. 1753 ; Baker in Hook. *f.*, F.B.I. 6 : 222. 1890 ; Rao & Verma, *l.c.* 14 : 124. 1972. BHUICHAMPA (Nep.).

Herbs with aromatic rhizomes. Leaves lanceolate, appressed hairy beneath. Spikes subsessile. Bracts purplish white. Calyx purplish-dotted. Corolla white ; lip lilac or red, bilobed.

Rishap.

*Fl.* : March May.

### ROSCOEIA J.E. Smith

**Roscoeia alpina** Royle, III. Bot. Himal. 361. t. 89. 1839 ; Baker in Hook. f., F.B.I. 6 : 207. 1890. *R. alpina* var. *minor* Royle, l.c. t. 89. *R. longifolia* Baker, l.c. 208.

Herbs with small, slender stem. Leaves 2 - 3, sessile, sublinear - lanceolate-oblong, acuminate. Flowers purple, in 2 - 5 - flowered sessile spikes.

Sikkim, *s.l.* ; 2400 3200 m.

*Fl. & Fr.* : July Oct.

**R. auriculata** K. Schum. in Engl., Pflanz. 4 : 118. 1904 ; Cowley in Kew Bull. 36 : 757. 1982.

Herbs. Leaves linear to broadly elliptic, auriculate at base. Flowers deep purple with some parts white, deflexed lip and staminodes with V shaped purple marking at base. Seeds brownish, slightly contracted near middle.

Lachung, Chungthang, Panthgang, Bakhim, Lamteng.

*Fl. & Fr.* : May Sept.

**R. purpurea** J.E. Smith, Exot. Bot. 11 : 97. t. 108. 1804 ; Baker in Hook. f., F.B.I. 6 : 207. 1890 ; Rao & Verma, l.c. 14 : 119. 1972 ; Cowley in Kew Bull. 36 : 752. 1982. *R. purpurea* var. *exilis* Baker, l.c. 206. *R. purpurea* var. *procera* (Wall.) Baker, l.c. 208.

Herbs with fusiform root. Stem leafy. Leaves oblong-lanceolate. Spikes sessile, terminal, 2 4 flowered. Flowers purple.

Lachung, Bakhim, Lamteng ;

*Fl. & Fr.* : May Sept.

### ZINGIBER Boehm.

**Zingiber capitatum** Roxb. in Asiat. Res. 11 : 348. 1810 ; Baker in Hook. f., F.B.I. 6 : 248. 1892 ; Rao & Verma, l.c. 14 : 135. 1972.

var. **capitatum**

Perennial rhizomatous herbs with leafy stem. Leaves sessile, linear-lanceolate, pubescent beneath. Spike terminal dense-flowered.

Flowers yellow with pale yellow unspotted lip. Capsule oblong, bright red. Seeds brownish black.

Sikkim terai.

*Fl. & Fr.* : July Sept.

var. **elatum** (Roxb.) Baker in Hook. *f.*, F.B.I. 6 : 249. 1892.  
*Zingiber elatum* Roxb., Fl. Ind. 1 : 57. 1820.

Differs from var. *capitatum* in having thin linear grasslike leaves ; stouter spikes ; larger flowers and yellow lip with brownish tinge ; lateral staminodes very short, free.

Sikkim, *s.l.*

**Z. clarkei** King *ex* Benth. in Benth. & Hook. *f.*, Gen. Pl. 3 : 646. 1882 ; Hook. *f.*, F.B.I. 6 : 248. 1892.

Perennial herbs with leafy stem. Leaves oblong-lanceolate, finely pubescent beneath. Spikes lateral, cernuous. Flowers yellow with purple brown tinge.

Sikkim *s.l.* ; up to 1600 m.

*Fl. & Fr.* : Aug. Dec.

**Z. chrysanthum** Rosc., Monandr. Fl. t. 86. 1827 ; Baker in Hook. *f.*, F.B.I. 6 : 243. 1892.

Very large herbs. Leaves oblong-lanceolate, pubescent beneath. Spikes globose-ovoid with very short peduncles. Corolla tube bright red. Lip yellow unspotted. Capsules ellipsoid-oblong. Seeds brown, subglobose.

Sikkim, *s.l.* ; *ca* 1800 m.

*Fl. & Fr.* : July Sept.

**Z. officinale** Rosc. in Trans. Linn. Soc. 8 : 348. 1807 ; Baker in Hook. *f.*, F.B.I. 6 : 248. 1892.

Herbs. Rhizomes aromatic, pale yellow inside, bearing sessile tubers. Stems leafy. Leaves linear-lanceolate. Corolla tube greenish. Lip purplish black.

Sikkim, *s.l.* ; up to 1200 m.

*Fl.* : Sept. Oct.

*Notes* : Cultivated. It is an important cash crop of Sikkim.

**Z. purpureum** Rosc. in Trans. Linn. Soc. 8 : 348. 1807. **Z. cassumunar** Roxb. in Asiat. Res. 11 : 347. t. 5. 1810 ; Baker in Hook. f., F.B.I. 6 : 248. 1892.

Herbs. Rhizomes aromatic, deep yellow inside. Stems leafy. Leaves sessile, lanceolate-linear, acuminate, pubescent along midrib beneath. Spikes ellipsoid. Flowers yellow. Capsules globose.

Sikkim, *s.l.* ; up to 1500 m.

*Fl. & Fr.* : July Aug.

**Z. rubens** Roxb. in Asiat. Res. 11 : 348. 1810 ; Baker in Hook. f., F.B.I. 6 : 243. 1892.

Herbs with stout leafy stem. Leaves sessile, oblong-lanceolate, acuminate, puberulous beneath along midrib. Spikes subglobose. Corolla lobes red ; lip yellowish white with red spots and streaks. Capsules ellipsoid, reddish.

Sikkim, *s.l.* ; up to 1500 m.

*Fl. & Fr.* : Aug. Sept.

**Z. zerumbet** (L.) Rosc. ex J.E. Smith, Exot. Bot. 2 : 105. t. 112. 1804. *Amomum zerumbet* L., Sp. Pl. 1. 1753 ; Hook. f., F.B.I. 6 : 247. 1892.

Herbs with tuberous rhizomes and stout leafy stem. Leaves oblong-lanceolate, glabrous beneath. Spikes very dense, oblong. Flowers with bright yellow lip. Capsules white, oblong.

Sikkim, *s.l.*

*Fl. & Fr.* : Aug. Oct.

## CANNACEAE

(R.C. Srivastava)

### CANNA L.

**Canna edulis** Ker-Gawler in Edw. Bot. Regist. 9 : t. 775. 1824. PHUL-TARUL (Nep.).

Stout herbs, up to 60 cm tall. Leaves tinge purple. Flowers red or yellow.

Jorethang, near Legship, Yoksum, Phamtam, Namthang ; 1200 - 1800 m.

*Fl. & Fr.* : April June.

Cultivated for its edible rhizomes.

*C. indica* L., Sp. Pl. 1 : 1753. *C. orientalis* Roscoe, Monandr. Pl. t. 12. 1828. *C. indica* var. *orientalis* (Roscoe) Baker in Hook. f., F.B.I. 6 : 260. 1892.

**var. indica**

Stout herbs, up to 1.5 m tall. Leaves elliptic-oblong, pale green. Flowers red or yellow, with 3 outer staminodes, *ca* 4 x 0.5 cm.

Singtam, Rangpo, Jorethan, Gangtok, Tadong : up to 1000 m.

*Fl. & Fr.* : April June. Cult.

var. *speciosa* (Sims) Baker in Hook. f., F.B.I. 6 : 261. 1892. *C. speciosa* Sims in Curtis Bot. Mag. 49 : t. 2317. 1822.

Herbs, up to 1.5 m high. Leaves broadly lanceolate, with abruptly contracted to cuspidate apex. Inflorescence *ca* 30 cm, with short, suberect branches. Flowers dull crimson, orange streaked.

Jorethang, Gangtok ; 500 1750 m.

*Fl. & Fr.* : June Sept.

*Canna x generalis* L.H. Bailey is cultivated at Gangtok, Yoksum, Legship etc.

## MUSACEAE

(B. Krishna)

### MUSA L.

*Musa balbisiana* Colla, Mem. Gen. Musa. 56. 1820. *M. sapientum sensu* Baker in Hook. f., F.B.I. 6 : 262. 1892, *p.p. non* L. 1753. *M. paradisiaca* ssp. *sapientum* (L.) K. Schum. in Engl. Pflanzenr. 45 : 20. 1900.

Perennial large herbs with branching rhizomes. Pseudostems 2 - 6 m high. Flowers 10 - 20, in a single row, pruinose, yellow. Fruits pale yellow.

Cultivated throughout Sikkim up to 1750 m.

*Fl. & Fr.* : Jan. Nov.

*M. hookeri* King ex Cowan & Cowan, Trees Bengal 135. 1929.

Large perennial herbs with branching rhizomes. Pseudostems 3.6 - 4.5 m tall. Fruits compact, few, 4 - 5 cm long.

Sikkim, *s.l.* ; *ca* 1667 m.

*Fl. & Fr.* : March - Sept.

*M. sikkimensis* Kurz in J. Agri. Hort. Soc. India 14 : 164. 1867 ; Baker in Hook. *f.*, *l.c.* 262. 1892.

Perennial herbs with stolons. Pseudostems short, 1 - 1.5 m long. Flowers 6 - 8 in two rows, yellow. Fruits 7 - 10 cm long.

Throughout Sikkim on hill slopes.

*Fl. & Fr.* : Feb. - Oct.

*M. velutina* Wendl. & Drude in Regel Garten. Flora 24 : 65. t. 823. 1875 ; Baker in Hook. *f.*, *l.c.* 263. *M. dasycarpa* Kurz in J. Agri. Hort. Soc. India 14 : 301. 1867 ; Baker in Hook. *f.*, *l.c.* 263.

Perennial large herbs with branched rhizomes. Pseudostems 1.2 - 1.6 m high. Flowers 2 - 3, in a single row, orange-yellow. Fruits subsessile, pinkish red, hairy.

In Tessta valley, Singtam.

*Fl. & Fr.* : Jan. - Nov. Ornamental.

## IRIDACEAE

(R.C. Srivastava)

### BELAMCANDA A. Adans.

*Belamcanda chinensis* (L.) DC. in Redoute, Liliac. 3 : t. 121. 1857 ; Hook. *f.*, F.B.I. 6 : 277. 1892. *Ixia chinensis* L., Sp. Pl. 36. 1753.

Herbs, up to 1.5 m tall, with brown spotted orange flowers.

Jorethang, Yoksum, N. of Tashiding, Tinghong ; up to 2200 m.

*Fl. & Fr.* : June - Aug. Cult.

### CROCOSMIA Planch.

*Crocasmia x crocosmiflora* (Lemoine) N.E. Br. is grown in gardens at Gangtok, Yoksum etc. localities.

### GLADIOLUS L.

*Gladiolus callianthus* Marais, *G. natalensis* (Ecklon) Hooker, *G. undulatus* L. and many hybrids of *G. insignis* Paxt. & *G. hortulamus* L.H. Bailey are grown in gardens.

**IRIS L.**

**Iris clarkei** Baker *ex* Hook. *f.*, F.B.I. 6 : 275. 1892. *I. himalaica* Dykes in Gard. Chron. 45 : 3, 36. 1909.

Herbs, up to 60 cm tall. Leaves linear or ensiform. Flowers lilac, blotched with violet ; throat yellow.

Changu, Dikchu, Gnathong, Kyangosla, Kupup, Karponang, Laghep, Padamchan, Yakla ; 3000 3500 m.

*Fl. & Fr.* : April May.

**I. decora** Wall., Pl. Asiat. Rar. 1 : 77. t. 86. 1830. *I. nepalensis* D. Don, Prodr. Fl. Nep. 54. 1825 ; Hook. *f.*, F.B.I. 6 : 273. 1892.

Herbs up to 30 cm tall. Leaves linear. Flowers pale-lilac.

Chungthang ; 1800 4000 m.

*Fl. & Fr.* : June- Aug.

**I. goniocarpa** Baker in Gard. Chron. 2 : 710. 1876 ; Hook. *f.*, F.B.I. 6 : 274. 1892.

Herbs, up to 15 cm tall. Leaves narrow linear. Flower heads solitary.

Lachung, Thangu, Yatung ; 3600 4400 m.

*Fl.* : June July.

**I. tectorum** Maxim.

Herbs, vegetative shoots with fans of 3 4 curved, ensiform, acute leaves. Flower blue violet.

Yoksum ; 2370 2750 m.

*Fl. & Fr.* : April May.

**AMARYLLIDACEAE**

(D.C.S. Raju, R.C. Srivastava & S. Singh)

**CRINUM L.**

**Crinum amoenum** Roxb. *ex* Ker - Gawler in J. Sci. Arts. London 3 : 106. 1817 ; Hook. *f.*, F.B.I. 6 : 282. 1892.

Bulbous herbs. Leaves ensiform. Scape up to 60 cm long. Umbels 6 12 flowered.

Yoksum, Sedonchen to Rongli ; 700 - 2100 m.

*Fl. & Fr.* : April - June (-Aug.).

*C. powellii* Baker is grown as an ornamental.

### **HYMENOCALLIS** Salisb.

*Hymenocallis littoralis* Salisb. in Trans. Hort. Soc. London 1 : 338. 1812.

Herbs, up to 60 cm tall. Flowers white with a corona.

Namli ; ca 1000 m.

*Fl.* : July - Aug. Cult.

### **PANCRATIUM** L.

*Pancratium verecundum* Aiton, Hort. Kew. 1 : 412. 1789 ; Hook. f., F.B.I. 6 : 285. 1892.

Bulbous herbs. Leaves thin, lanceolate. Scape longer or almost equalling leaves, 2 - 6 - flowered. Spathe lanceolate. Corolla lobes joined by corona.

Namli ; ca 500 m.

*Fl.* : Aug.

### **ZEPHYRANTHES** Herb.

*Zephyranthes candida* Herb. in Bot. Mag. t. 2607. 1826.

Herbs. Leaves linear. Flowers large, solitary, funnel-shaped, white.

Gangtok, ca 1750 m.

*Fl.* : -Aug.

*Z. carinata* Herbert in Bot. Mag. 51 : t. 2594. 1825.

Herbs. Leaves several, flat. Flowers large, solitary, funnel-shaped, usually pink, borne on a leafless stalk.

Gangtok, Yoksum, Sambuk, Legship, Tendang, Namthang ; 600 - 2500 m.

*Fl. & Fr.* : April - July.

**HYPOXIDACEAE**

(B. Krishna)

**CURCULIGO Gaertn.**

**Curculigo capitulata** (Lour.) O. Kuntze, Rev. Gen. Pl. 2 : 703, 1891. *Leucoium capitulatum* Lour., Fl. Cochinch. 199, 1790. *Curculigo recurvata* Dryand in Ait., Hort. Kew. ed. 2 : 253. 1811 ; Hook. f., F.B.I. 6 : 278. 1892.

Stout herbs. Leaves variable, lanceolate. Flowers yellow.

Burtuk basti, Lower Sichey Basti, Saramsa.

*Fl. & Fr.* : May July.

**C. crassifolia** (Baker) Hook. f. F.B.I. 6 : 279. 1892. *Molineria crassifolia* Baker in J. Linn. Soc. Bot. 17 : 121. 1879.

Stout herbs. Leaves elliptic-lanceolate. Flowers creamy yellow.

Silign Tzokupa (North Sikkim).

*Fl. & Fr.* : May June.

**C. gracilis** (Kurz) Wall. ex Hook. f., F.B.I. 6 : 278. 1892. *Molineria gracilis* Kurz in Ann. Mus. Bot. Lugd. Bat. 4 : 177. 1867.

Stout herbs. Leaves lanceolate. Flowers light yellow.

Samdong.

*Fl. & Fr.* : May June.

**C. orchiodies** Gaert., Fruct. 1 : 63. t. 13. 1788 ; Hook. f. F.B.I. 6 : 279. 1892. *Curculigo brevifolia* Dryand in Ait., Hort. Kew. ed. 2. 2 : 253. 1811.

Small herbs. Leaves linear or linear-lanceolate. Flowers yellow or orange.

Teesta valley.

*Fl. & Fr.* : Aug. Oct.

**AGAVACEAE**

(R.C. Srivastava)

**AGAVE L.**

**A. sislana** Persine in U.S. Senate Document 300 : 36. 1838. HATHIBAR (Nep.).

Robust shrubs. Leaves fleshy, linear - lanceolate, dark green, with tiny recurved spines at margins and a blackish brown, *ca* 2 mm long apical spine. Inflorescence 3 - 4 m tall.

Saramsha, on way to Pakyong, Turung, Rangpo, Singtam.

*Fl. & Fr.* : Feb. - April.

**A. vera-cruz** Miller., Dict. ed. n. 7. 1768. HATIBAR (Nep.).

Robust shrubs with large leaves. Inflorescence appearing periodically, 3 - 4 m tall. Flowers white.

Tarku, Namthi, Singtam, Yoksum, Jorethang ; up to 1500 m.

*Fl. & Fr.* : June.

*Notes* : Planted.

#### DRACAENA Vandelli *ex* L.

**Dracaena angustifolia** Roxb., Fl. Ind. 2 : 155. 1832 ; Hook. *f.*, F.B.I. 6 : 327. 1892. MAKAI PATE (Nep.).

Erect, woody shrubs, up to 3 m tall, white. Leaves erect or patent, linear - lanceolate with broad sheathing base. Flowers pale yellow.

Saramsa ; up to 1400 m.

*Fl. & Fr.* : April - May.

#### FURCRAEA Vent.

**Furcraea foetida** (L.) Haw., Syn. Pl. Succ. 73. 1812. *Agave foetida* L., Sp. Pl. 323. 1753.

Large succulent shrubs. Leaves in rosettes of 30 - 40, lanceolate, up to 90 x 7.5 cm, coriaceous, more or less fleshy. Inflorescence up to 4.5 m tall. Flowers greenish, in loose panicles with drooping branches. Bulbils usually borne on flower clusters.

Jorethang (on the foothills of Salgiri) ; *ca* 550 m.

*Fl. & Fr.* : Sept. - Oct.

*Notes* : A variegated horticultural variety is also planted around Jorethang town.

#### YUCCA Dill. *ex* L.

**Yucca aloifolia** L., Sp. Pl. 319. 1753.

Large shrubs. Leaves hard, flattened, tipped with a needle like thorn. Flowering stems up to 3 m tall. Flowers white, hanging like bells from the erect flowering stem.

Gangtok (near Paljour Stadium) ; *ca* 1700 m. Cult.

## DIOSCOREACEAE

(B. Mitra)

### DIOSCOREA L.

***Dioscorea alata* L.**, Sp. Pl. 1035. 1753 ; Hook. *f.*, F.B.I. 6 : 296. 1892. BOK (Lep.)

Twiners. Stem twining to the right, glabrous, prickly at the base. Leaves mostly opposite, broadly ovate ; basal nerves 5.

Cultivated throughout Sikkim ; up to 2500 m.

***D. esculenta* (Lour.) Burkill** in Gard. Bull. Singap. 1 : 396. 1917 ; Prain & Burkill in Ann. Roy. Bot. Gard. Calc. 14 : 80. t. 35-36: 1936. *Oncus esculentus* Lour., Fl. Cochinch. 194. 1790. *Dioscorea sativa* L., Sp. Pl. 1033. 1753, *p.p.* ; Hook *f.*, F.B.I. 6 : 295. 1892.

Twiners. Stem twining to the left, glabrous, purple with prickles. Leaves alternate, broadly cordate ; basal nerves 5-7. Capsules oblong, membranous.

Sikkim *s.l.* ; up to 912 m. cultivated.

***D. glabra* Roxb.**, Fl. Ind. ed. 2, 3 : 804. 1832.

Twiners. Stems twining to the right, glabrous, abundantly prickly at base. Leaves 7-9, broad oblong-lanceolate, rounded or cordate at base, basal nerves usually 7.

Sikkim *s.l.* ; up to 1216 m.

*Fl. & Fr.* : Aug. - Dec.

***D. hamiltonii* Hook. *f.***, F.B.I. 6 : 295. 1892 ; Prain & Burkill in Ann. Roy. Bot. Gard. Calc. 14 : 301. t. 122. 1938. PUUMBOK ; (Lep.)

Twiners. Stems twining to the right, glabrous, not prickly at base. Leaves opposite, cordate or often subsagittate ; basal nerves 7-9. Capsules oblong.

Sikkim, *s.l.* ; *ca* 1200 m.

*Fl. & Fr.* : Aug. - Dec.

**D. hispida** Dennst., Schless. Hort. Malabr. 15. 1818. *Dioscorea deamona* Roxb., Fl. Ind. 3 : 805. 1832 ; Hook f., F.B.I. 6 : 289. 1892. RUKLOO (Lep.).

Twiners. Stems twining to the left, prickly. Leaves trifoliolate ; leaflets elliptic-oblong or obovate. Capsules pale brown, wings semi-elliptic ; bulbils absent.

Pakyong Rhenock, S. of Peminagsti ; up to 2000 m.

*Fl. & Fr.* : July-April.

**D. kamoonsensis** Kunth, Enum. Pl. 5 : 395. 1850 ; Hook. f., F.B.I. 6 : 290. 1892.

Twiners. Stems twining to the left, unarmed, dark brownish red, white hairy when young. Leaves alternate, 3-5-foliolate ; leaflets 7-12 cm long, basal nerves 2-3. Capsules oblong, hairy till fully ripened.

Lachung valley, Chungthang, Rangpo valley ; 1200-1800 m.

*Fl. & Fr.* : Aug.

**D. prazeri** Prain & Burkill in J. Asiat. Soc. Beng. 73. 2, suppl. : 2. 1904 & in Ann. Roy. Bot. Gard. Calc. 14 : 29. 202. t. 5. 1936. *Dioscorea sikkimensis* Prain & Burkill in Rec. B.S.I. 4 : 77. 84. 134. 1910.

Twiners. Stems twining to the left, unarmed. Leaves alternate, ovate-lanceolate, basal nerves 7-9. Capsules orbicular.

Sikkim, *s.l.* ; ca 1700 m.

## LILIACEAE

(R.C. Srivastava)

### ALETTRIS L.

(Sometimes treated under Melanthiaceae)

**Aletris gracilis** Rendle in J. Bot. 44 : 41. 1906.

Small herbs. Leaves linear, 7-10 in rosettes. Flowers pink ; pedicels glabrous.

Yakla, Latong, Maimaichu Lake ; 3000-3900 m.

*Fl. & Fr.* : Aug.

**A. pauciflora** (Klotzsch.) Hand-Mazz., Symb. Sin. 7 : 1220. 1936. *Stachyopogon pauciflorus* Klotzsch. in Klotzsch. & Garcke, Bot.

Reise Pr. Waldemar 49. t. 94. 1862. *A. nepalensis* Hook. f., F.B.I. 6 : 264. 1898, *nom. illegit*

Small, scapose herbs. Leaves linear, 5 - 10 in rosettes. Flowers pinkish white ; pedicels hairy.

Chola range, Lachen, Zemu valley, Dzungri, Changu ; 2500 - 4900 m.

*Fl. & Fr.* : June - Sept.

***A. sikkimensis*** Hook. f., F.B.I. 6 : 265. 1892.

Herbs, much larger than *A. pauchiflora* with short narrowed leaves and leafy scape with 30 - 60 cm long raceme. Flowers greenish - white to orange-green.

Thangu, Yumthang, Karponang, Lachem, Zemu, Lilonakh ; 2400 - 4200 m.

*Fl. & Fr.* : July - Sept.

### ALLIUM L.

***A. cepa*** L., Sp. Pl. 300. 1753 ; Hook f., F.B.I 6 : 377. 1892. PYAJ (Nep., Hindi), ONION (Eng.).

Bulbous herbs. Leaves subdistichous, fistular. Flowers white.

Yumthang ; cultivated up to 1750 m.

*Fl. & Fr.* : April - July.

***A. fasciculatum*** Rendel in J. Bot. 44 : 42. 1906. *A. gageanum* W.W. Smith *apud* W.W. Smith & Cave in Rec. BSI 4 : 248. 1911.

Herbs, up to 30 cm tall. Bulbs narrowly cylindrical, 2 - 5 mm wide. Leaves linear, flat. Flowers white or greenish yellow.

Dongbong, Nathula, Kupup, Jelep-la, Thanka-la, upper valley of Lilonakh ; 2400 - 4800 m.

*Fl. & Fr.* : Aug. - Oct.

*Notes* : Found in loose alluvial soil, by the side of streams.

***A. hookeri*** Thw., Enum. Pl. Zeyl. 339. 1864 ; Hook. f., F.B.I. 6 : 341. 1892.

Herbs, up to 50 cm high. Bulbs narrowly cylindrical. Leaves 4-5, linear, flat. Spathe deciduous. Umbels subglobose, many flowered, lax, up to 5 cm in diam. Flowers white.

Bitu (on way to Kabi from Gangtok) ; 1900 3050 m.

*Fl. & Fr.* : July Aug. Cult.

**A. macranthum** Baker in J. Bot. 3 : 293. 1847 ; Hook. f., F.B.I. 6 : 345. 1892.

Small erect herbs with narrow bulbs. Leaves linear, gradually acuminate, keeled. Flowers purple.

Thangu, Lachen, Serbathang ; 3600 4200 m.

*Fl. & Fr.* : July Aug.

**A. prattii** C.H. Wright *apud* Forbes Hemsley in J. Linn. Soc. Bot. 36 : 124. 1903. *A. victorialis auct. non. L.* : Hook. f., F.B.I. 6 : 342. 1892, *p.p.* *A. victorialis* var. *angustifolium* Hook. f., *tom. cit.* 343. 1892. *A. prattii* var. *ellipticum*. Wang. & Tang. in Bull. Fam. Mem. Inst. Priol. Ser. 2 : 297. 1937. KOK PA (Sikkimese).

Bulbous herbs. Leaves flat, elliptic. Flowers pinkish purple.

Changu, Kalep to Thangu, Zemu, Llonakh, Laghep, Bikbari, Giagong, Dzungri, Yumthang ; 2400 4500 m.

*Fl. & Fr.* : May Oct.

**A. prezealaskianum** Regel., Allior. Monogr. 164. 1875. *A. jacquemontii* Regel. *Op. Cit.* 162. 1875 ; Hook. f., F.B.I. 6 : 342. 1892.

Herbs with linear leaves. Heads globose or subglobose. Flowers lilac.

Sikkim, *s.l.* ; 3900 4200 m.

*Fl. & Fr.* : May Sept.

**A. sativum** L., Sp. Pl. 296. 1753 ; Hook. f., F.B.I. 6 : 37. 1892 ; LAHSUN (Nep.), GARLIC (Eng.).

Herbs with flat leaves. Scales slender. Spathes long beaked.

Cultivated up to 1400 m.

*Fl. & Fr.* : June Sept.

**A. sikkimense** Baker in J. Bot. 12 : 292. 1874 ; Hook. f., F.B.I. 6 : 341. 1892.

Herbs with cylindric bulbs. Leaves linear. Flowers blue.

Kareng Chholamo Kongralama, Thangu, Llonakh ; 3400 - 4800 m.

*Fl. & Fr.* : July Sept.

**A. wallichii** Kunth, Enum. Pl. 4 : 443. 1834 ; Hook. *f.*, F.B.I. 6 : 341. 1892.

Herbs with small clustered bulbs. Leaves 2, oblong-linear. Flowers purple-pink.

Chamnago, Gnathang, Lachung, Karponang, Dzungri, Laghep, Manamitso Lake, Changu, Lachen Thangu ; 2400 4650 m.

*Fl. & Fr.* : June Oct.

#### ALOE L.

**Aloe vera** Burm. *f.*, Fl. Ind. 83. 1768. GHEWKUMARI (Nep.).

Herbs with fleshy leaves and orange flowers.

Gangtok, Tadong ; 1200 1600 m.

*Fl. & Fr.* : April May. Planted.

*Notes* : Medicinal herb.

#### ASPARAGUS L.

**Asparagus filicinus** Buch. - Ham. *apud* D. Don, Prodr. Fl. Nepal. 49. 1825 ; Hook. *f.*, F.B.I. 6 : 314. 1892.

Herbs profusely branched. Stems unarmed. Cladodes 6 8 mm. Pedicels slender.

Dongbong, Yoksum ; up to 1800 m.

*Fl. & Fr.* : May July.

**Asparagus racemosus** Willd, Sp. Pl. 2 : 152. 1799 ; Hook. *f.*, F.B.I. 6 : 316. 1892. SATAWARI, SATMULA (Nep.).

var. **racemosus**

Profusely branched climbing shrubs with recurved spines. Cladodes terete, curved. Flowers small, white.

Namli, Gangtok, North of Jorethang ; 600 1800 m.

*Fl. & Fr.* : April Aug.

var. **subacerosa** Baker in J. Linn. Soc. Bot. 14 : 624. 1875 ; Hook. *f.*, F.B.I. 6 : 315. 1892.

Climbing undershrubs. Cladodes stout. Racemes small, few-flowered. Rachis and pedicels axillary.

Sikkim, *s.l.* ; up to 1200 m.

*Fl. & Fr.* : April June.

### ASPHODELUS L.

**Asphodelus tenuifolius** Cav. in Anal. Cienc. Nat. 3 : 46. t. 27. 1801; Hook. *f.*, F.B.I. 6 : 322. 1892.

Herbs. Leaves radical, linear. Flowers greenish white.

Turung, Sada ; up to 1200 m.

*Fl. & Fr.* : July Oct.

### CAMPYLANDRA Baker

**Campylandra aurantiaca** Baker in J. Linn. Soc. Bot. 14 : 582. t. 20. 1875. *Tupistra aurantiaca* (Baker) Wall. *ex* Hook. *f.*, F.B.I. 6 : 325. 1892.

Herbs with long stout roots. Leaves flaccid, coriaceous, sessile. Flowers yellow, in spike.

Yoksum Bakhim, Damthang to Temi, Rabong la ; 1200 2450 m.

*Fl. & Fr.* : Oct. May

### CARDIOCRINUM Lindl.

**Cardiocrinum giganteum** (Wall.) Makino in Bot. Mag. Tokyo 27 : 125. 1913. *Lilium giganteum* Wall., Tent. Fl. Nepal. 21, t. 12 13. 1824, excl. syn. ; Hook. *f.*, F.B.I. 6 : 349. 1892.

Herbs, up to 2 m tall. Leaves broadly cordate-ovate. Flowers purple-white, borne in racemes.

Lower Chakung Chu, Zemu, Lachung-Yumthang, Bakhim, Lachen, Thomba, Muguthang ; 1800 3300 m.

*Fl. & Fr.* : May Aug.

### CHLOROPHYTUM Ker-Gawler

**Chlorophytum arundinaceum** Baker in J. Linn. Soc. Bot. 15 : 323. 1876 ; Hook. *f.*, F.B.I. 6 : 333. 1892. *C. breviscapum auct. non* Dalz : Hook. *f.*, *l.c.* 333. 1892, *p.p.*

Herbs. Leaves oblanceolate. Scapes 15 50 cm long, stout. Flowers white.

Melli Teesta ; 500 - 1200 m.

*Fl. & Fr.* : July - Aug.

**C. breviscapum** Dalz. in Hook., Kew J. Bot. 2 : 141. 1850 ; Hook. f., F.B.I. 6 : 353. 1892.

Herbs. Leaves linear-lanceolate, crispulate. Scapes stout, 7.5 - 15 cm, rarely branched, naked, shorter than leaves. Flowers in dense racemes.

Melli Teesta ; ca 900 m.

*Fl.* : June - Aug.

**C. khasianum** Hook. f., F.B.I. 6 : 334. 1892. *C. nepalense* Baker in J. Linn. Soc. Bot. 15 : 330. 1876, *p.p.*

Herbs. Leaves sessile, linear, flat. Flowers white, in dense-flowered racemes.

Sikkim, *s.l.* ; 1200 - 3200 m.

*Fl. & Fr.* : July - Sept.

**C. nepalense** (Lindl.) Baker in J. Linn. Soc. Bot. 15 : 330. 1876, *p.p.* *Phalanquium nepalense* Lindl. in Trans. Hort. Bot. London. 6 : 276. 1826. *Chlorophytum undulatum* Wall. *ex* Hook. f., F.B.I. 6 : 335. 1892, *nom. illegit.*

Herbs. Leaves linear. Scapes naked, 30 - 90 cm long, paniculately branched. Flowers white, drooping, solitary or in clusters.

Chungthang, Namchi, Yoksum, Reshi, Lachung, Lachen, Kabi ; 1400 - 2500 m.

*Fl. & Fr.* : July - Aug.

**C. comosum** (Thunb.) Jacques **variegatum** (Eng. - Spider plant) is cultivated at Legship, Yoksum, Tashiding localities and is characterised by its variegated leaves and arching scapes bearing plantlets.

#### CLINTONIA Rafin.

(Sometimes treated under Uvulariaceae)

**Clintonia undensis** Trautv. & Meyer **var. alpina** (Kunth *ex* Baker) Hara in J. Jap. Bot. 38 : 72. 1963. *C. alpina* Kunth *ex*

Baker in J. Linn. Soc. Bot. 14 : 585. 1875 ; Hook. f., F.B.I. 6 : 361. 1892.

Herbs, with creeping rootstocks. Leaves narrow costate. Flowers white.

Tsoka, Bakhim - Dzongri, Chola, Dikchu, Zemu valley, Lachen, Lachung, Kupup ; 2200 - 3600 m.

*Fl. & Fr.* : May - Aug.

**CORDYLINE** Comm. ex A.L. Juss. *nom. cons.*

**Cordyline terminalis** Kunth, Enum. Pl. 5 : 25. 1825 ; Hook. f., F.B.I. 6 : 331 - 1892.

Gangtok ; ca 1700 m.

*Fl. & Fr.* : Aug. - Sept.

#### DIANELLA Lamk.

(Sometimes included in Phormiaceae)

**Dianella ensifolia** (L.) DC. in Redoute, Lil. 1 : t. 1. 1802 ; Hook. f., F.B.I. 6 : 337. 1892. *Dracaena ensifolia* L., Mant. Pl. 1 : 63. 1767.

Herbs, up to 1 m high. Leaves gradually tapering to acute at apex, midrib keeled. Scapes 30 - 60 cm long. Flowers white or yellowish.

Sikkim, *s.l.* ; up to 1800 m.

*Fl.* : April - July.

**D. caerulea** Sims.

Herbs up to 1 m high. Ultimate partial inflorescence spikelike, bearing more than 20 flowers on an elongate axis.

Cultivated at Namli ; up to 150 m.

*Fl.* : April - June.

#### DISPORUM Salisb. ex D. Don

(Sometimes treated under Uvulariaceae)

**Disporum calcaratum** D. Don in Trans. Linn. Soc. Lond. 18 : 516. 1841 ; Hook. f., F.B.I. 6 : 359. 1892. *Disporum wallichii* D. Don. *tom. cit.* 516. 1841.

Erect herbs, up to 70 cm tall. Leaves ovate-lanceolate. Umbels 4 - 6 - flowered. Flowers pale yellow ; tepal spurs 4 - 5 mm long.

Karponang ; 2100 - 2500 m.

*Fl. & Fr.* : May - Sept.

**D. cantoniense** var. **parviflorum** (Wall.) Hara, Fl. E. Himal. 407. 1966. *Uvularia parviflora* Wall. in Asiat. Res. 13 : 378. 1820.

Erect herbs, up to 1 m tall. Leaves ovate-lanceolate. Umbels 4-9-flowered. Flowers pale violet with yellow anthers ; tepal spurs up to 1.5 cm long.

Yumcho La, Zemu, Llonakh, Latong, Singhik, Chungthang, Changu, Gnathang ; 2700-4800 m.

*Fl. & Fr.* : May-June.

**D. leucanthum** Hara in J. Jap Bot. 47 : 114. 1972.

Herbs, up to 40 cm high. Leaves ovate, acute to cuspidate. Flowers white.

Chungthang ; 1530-2800 m.

*Fl.* : April-May.

### FRITILLARIA L.

**Fritillaria cirrhosa** D. Don, Prodr. Fl. Nepal. 51. 1825 ; Hook.f., F.B.I. 6 : 353. 1892.

Herbs. Leaves scattered, lanceolate. Flowers greenish yellow, tessellated.

Changu, West of Tankra-la, Thangshing, Lingtoo, Dzongri, Bikbari, Alukthang ; 1500-4800 m.

*Fl. & Fr.* : April-October.

**F. delavayii** Franch. in J. Bot. Paris 12 : 222. 1898.

Herbs. Bulbs globose. Leaves 4-5, crowded at 2-3 cm above stem-base, sessile. Flowers yellowish green, with or without red spots.

Lachung, Tankra-la ; 3000-5000 m.

*Fl. & Fr.* July-Aug.

*Notes* : Roasted bulbs are eaten in Sikkim.

### GAGEA Salisb.

**Gagea lutea** (L.) Ker Gawl. in Curtis Bot. Mag. 30 t. 1200. 1809 ; Hook.f., F.B.I. 6 : 355. 1892. *Ornithogalum luteum* L., Sp. Pl. 306. 1753. *Gagea elegans* Wall. ex D. Don in Royle, Ill. Bot. Himal.

1. t. 75. f. 2. 1839. *G. lutea auct. non Schultes f.* : Hook.f., F.B.I. 6 : 35. 1892.

Small, bulbiferous herbs with lanceolate leaves and yellow flowers.

Zemu - chu, Thangu, Soonderdurya glacier, Lachen, Pentong ; up to 4300 m.

*Fl. & Fr.* : May Aug.

### GLORIOSA L.

*Gloriosa superba* L., Sp. Pl. 305. 1753 ; Hook.f., F.B.I. 6 : 358. 1892.

Climbing herbs. Leaves lanceolate, with cirrhose apices. Flowers bright yellow-red, large.

Sarmasa ; 400 2200 m.

*Fl. & Fr.* : Aug. Sept. Probably grown.

### HEMEROCALLIS L.

*Hemerocallis fulva* L., Sp. Pl. ed. 2, 1 : 462. 1762 ; Hook. f., F.B.I. 6 : 326. 1892.

Herbs with costate, linear leaves and large yellow, orange or red flowers.

Gangtok ; up to 3600 m.

*Fl. & Fr.* : May Aug. Cultivated ; also as an escape.

### IPHIGENIA Kunth

*Iphigenia indica* (L.) Kunth, Enum. Pl. 4 : 213 1843 ; Hook. f., F.B.I. 6 : 357. 1892. *Melanthium indicum* L., Mant. Pl. Alt. 226. 1771. *Anguillaria indica* (L.) R. Br., Prodr. Fl. Nov. Holl. 1 : 273. 1810.

Erect, bulbous herbs. Leaves few, scattered, linear. Flowers purple.

Sikkim, s.l. ; 1800 2000 m.

*Fl. & Fr.* : June Sept.

### KNIPHOFIA Moench.

Several species of *Kniphofia* are grown as ornamental of Yoksum, Rabong la, Singtam.

**LILIUM L.**

**Lilium nepalense** D. Don in Mem. Werner. Nat. Hist. Soc. 3 : 412. 1821 ; Hook. f., F.B.I. 6 : 350. 1892. BHANGOO (Nep.).

Slender herbs, up to 1 m tall. Leaves lanceolate. Flowers drooping, sweet scented, orange-yellow, purple dotted.

Sikkim, *s.l.* ; 2300 3400 m.

*Fl. & Fr.* : June Aug.

**L. wallichianum** J.A. & J.H. Schultes, Syst. Veg. 7 (2) : 1689. 1830 ; Hook.f., F.B.I. 6 : 349. 1892.

Bulbous herbs, up to 2 m tall. Leaves linear. Flowers 1 2, infundibuliform, white.

Singhik ; 1100 3000 m.

*Fl. & Fr.* : May Sept.

*Notes* : Bulbs are eaten as vegetable by the local people.

**Lilium lancifolium** (*L. tigrinum* Ker Gawler) is grown as an ornamental at Gangtok, Rumtek, near Tashiding and various other parts of the state.

**LLOYDIA Salisb.**

**Lloydia delavayi** Franch. in J. de. Bot. 12 : 193 & 195. 1898.

Herbs, up to 12 cm tall. Bulbs formed of needle like radical-leaf bases. Flowers solitary, terminal, yellow.

North of Dzungri, Momay Samdong Changu, Thangu, Jelep-la, Bikbari ; 4000 4500 m.

*Fl. & Fr.* : May June.

**L. deliculata** Noltie

Herbs, up to 5 cm high. Bulbs narrowly ovoid. Leaf solitary, basal, filiform, long than stems. Flowers white with purplish midrib and yellowish nectory.

Changu Kupup Nathula, Lachen, Samiti ; 3650 4450 m.

*Fl.* : June July.

**L. flaventans** Hara in J. Jap. Bot. 49 : 202. 1974. *L. serotina* auct. non Reich. ex Hook. f., F.B.I. 6 : 354. 1892, *p.p.*

Herbs, up to 24 cm tall. Bulbs narrowly ovoid with long neck, formed of 2 - 8 existing radical leaves. Flowers 1 or 2, nodding, yellow.

Jelep-la, Migothang, Mome Samdong, Gamothang, Thangshing-Lam Pokhri, Nathula, Changu Kupup, Thangu, Muguthang, Llonak-la ; 3800 - 4700 m.

*Fl. & Fr.* : May - Sept.

**C. longiscapa** Hook. f., *Icon. Pl.* 9 : t. 834. 1852. *L. serotina* auct. non L. : Hook. f., *F.B.I.* 6 : 354. 1892, *p.p.*

Herbs up to 20 cm tall. Bulbs narrowly ovoid. Leaves filiform. Flowers white with violet veins.

Semthang, Yampung, Yumtso la ; 4000 - 5000 m.

*Fl. & Fr.* : May - Aug.

**L. serotina** (L.) Reichb., *Fl. German. Excur.* 1 : 102. 1830 ; Hook. f., *F.B.I.* 6 : 354. 1892, *p.p.* *Bulbocodium serotinum* L., *Sp. Pl.* 294. 1753. *Lloydia himalensis* Royle, *Ill. Bot. Himal.* t. 93. f. 2. 1839. 338. 1840.

var. **serotina**

Small, bulbous herbs with 1 - 2 m, erect, campanulate white flowers with violet veins.

Lachen, Thangu, Zemu, Llonakh valley ; 3500 - 5100 m.

*Fl. & Fr.* : May - Aug.

var. **parva** (Marquand & Shaw) Hara, *Fl. E. Himal.* 2 : 166. 1971. *L. serotina* f. *parva* Marquand & Shaw in *J. Linn. Soc. Bot.* 48 : 228. 1919.

Herbs, smaller than var. *serotina*. Scape 2 - 6 cm. Perianth 6.5 - 8 mm ; filaments up to 3.5 mm, anthers more or less circular, ca 1 mm.

Muguthang, Lower Eastern Lungnak ; 4100 - 4700 m.

*Fl. & Fr.* : May - Aug.

var. **sikkimensis**

Changu, Nathula ; 3900 - 4200 m.

**L. yunnanensis** Franch. *L. himalensis sensu* Dasgupta & Deb in *Ind. J. For.* 9 : 108. 1986, *p.p.* non Royle 1840.

Herbs, up to 10 cm high. Leafy bracts up to 6. Flower solitary, drooping, white, with reddish brown veins.

Changu, Bikbari, Dzungri, Namdee, Onglathang ; 3050 - 4400 m.

*Fl.* : May - July.

**MAIANTHEMUM** G.H. Weber *ex* Wiggers

***Maianthemum fuscum*** (Wall.) La Frankie in Taxon 35 : 588. 1986. ***Smilacina fusca*** Wall., Pl. Asiat. Rar. 3 : 37. t. 257. 1832 ; Hook.f., F.B.I. 6 : 323. 1892. ***Tovaria fusca*** Baker in J. Linn. Soc. 14 : 568. 1875.

Herbs, up to 50 cm tall, slender. Leaves ovate-cordate, petioled. Panicles deltoid, 7 - 15 cm long. Perianth brown purple.

Bakhim, Thangu, Zemu ; 2400 - 3300 m.

*Fl. & Fr.* : May - June.

***M. oleraceum*** (Baker) La Frankie in Taxon 35 : 589. 1986. ***Tovaria oleracea*** Baker in J. Linn. Soc. Bot. 14 : 569. 1875. ***Smilacina oleracea*** (Baker) Hook.f., F.B.I. 6 : 323. 1893.

var. ***oleraceum***

Pendulous herbs. Flowers pink.

Lachen, Phodonchen, Sedonchen to Kabi, Lingtu, Tsoka to Yoksum, Zemu, Prag Chu, Karponang ; 2500 - 4000 m.

*Fl. & Fr.* : May - June.

*Notes* : It is a favourite pot herb of Lepchas.

var. ***acuminatum*** (Wang & Tang) Karthik, *l.c.* 97. ***Smilacina acuminata*** (Wang & Tang) Hara in Hara *et al.*, Enum. Fl. Nepal. 1 : 78. 1978. ***O. oleracea*** var. ***acuminata*** Wang & Tang in Bull. Fam. Mem. Inst. Biol. 7 : 288. 1937.

Herbs, up to 1 m high. Leaves lanceolate, acuminate. Flowers deep wine-red to blackish. Inflorescence lax, axis zigzag ; pedicels long.

Tsoka to Jamlingthang, Lingtu ; ca 3200 m.

*Fl. & Fr.* : May - June.

***M. oligophylla*** (Baker) Karthik. in Karthik. *et al.*, Fl. Ind. Enum. Monocot. 97. 1989. ***Tovaria oligophylla*** Baker in J. Linn. Soc. 14 : 565. 1875. ***Smilacina oligophylla*** (Baker) Hook. f., F.B.I. 6 : 323. 1892.

Perennial herbs, up to 30 cm tall, with an underground rhizome, oblong leaves and purple flowers.

Lachen, Gnathang to Sedonchen ; 3000 - 4000 m.

*Fl. & Fr.* : May - June.

**M. pallidum** (Royle) Karthik., *l.c.* 97. *Smilacina pallida* Royle, *Illus. Bot. Himal.* 1 : 380. 1839 ; *Hook. f.*, *F.B.I.* 6 : 323. 1892. *Tovaria pallida* (Royle) Baker in *J. Linn. Soc.* 14 : 566. 1875.

Herbs 60 - 90 cm tall. Leaves 8 - 12, oblong, 10 - 15 cm long. Flowers white or purple.

Zemu ; 2400 - 3900 m.

*Fl. & Fr.* : May - July.

**M. purpureum** (Wall.) La Frankie in *Taxon* 35 : 589. 1986. *Smilacina purpurea* Wall., *Pl. Asiat. Rar.* 2 : 38, t. 144. 1831. *S. pallidia auct. non Royle* : *Hook. f.*, *F.B.I.* 6 : 323. 1892, *p.p.* *Tovaria purpurea* (Wall.) Baker in *J. Linn. Soc. Bot.* 14 : 566. 1875.

Stout herbs with creeping rootstocks. Leaves 8 - 12, oblong, up to 15 cm long, densely pubescent beneath. Flowers white.

Zemu, Lingtu, Yumthang, Dzongri Changu ; 2600 - 4200 m.

*Fl. & Fr.* : April - Aug.

#### NOMOCHARIS Franch.

**Nomocharis flavidum** (Rendle) Hara in *Ohashi, Fl. E. Himal.* 3 : 132. 1975. *Fritillaria flavida* Rendle in *J. Bot.* 44 : 45. 1906.

Bulbous herbs. Flowers creamy-white, streaked with yellow or green.

Thangshing, Jamlingthang, Yatung, Bikbari, Sarniti, Thangu ; ca 4500 m.

*Fl. & Fr.* : June - Sept.

**N. nana** (Klotz.) Wilson, *Lilies E. Asia* 13. 1925. *Lilium nanum* Klotz. in *Bot. Ergeb. Veldem. Reise* 53. 1862 ; *Hook. f.*, *F.B.I.* 6 : 352. 1892.

Bulbous herbs. Leaves linear, blunt. Flowers small, drooping, campanulate, deep reddish purple.

West of Dzongri, Cham nags, Chemathang, Gnathong, Yumchhola, Zemu, Llonakh ; 3700 - 4800 m.

*Fl. & Fr.* : June - Sept.

**NOTHOLIRION** Wall.

**Notholirion bulbuliferum** (Ling.) Stearn in Kew Bull. 1950. 421. 1950. *Paradisea bulbulifera* Ling. in Limper. f. in Fedde Repert., Beih. 12 : 316. 1992.

Herbs, up to 1 m high. Leaves linear-lanceolate. Flowers lilac, mauve or pale purple.

Chamnago, Dikchu valley ; 3200 - 4100 m.

**N. macrophyllum** (D. Don) Boiss., Fl. Orient. 5 : 190. 1882. *Fritillaria macrophylla* D. Don, Prodr. Fl. Nepal. 51. 1825. *Lilium roseum* Wall. ex Hook. f., F.B.I. 6 : 352. 1892, p.p.

Small herbs, 30 - 50 cm tall. Leaflets oblong or linear.

Dikchu, Lachung, Tankra, Chungthang, Lachen ; 2100 - 5400 m.

*Fl. & Fr.* : May - Nov.

**N. thomsonianum** (Royle) Stapf. in Kew Bull. 1934 : 95. 1934. *Fritillaria thomsonianum* Royle, Illus. Bot. Himal. t. 92. f. 1. 1839. *Lilium roseum* Wall. ex Hook. f. in Curtis Bot. Mag. 79. t. 4725. 1853 ; Hook. f., F.B.I. 6 : 352. 1892, p.p.

Small, bulbous herbs. Flower pink to pale lilac.

Sikkim, *s.l.* ; 2700 - 3000 m.

**OPHIOPOGON** Ker - Gawler

(Sometimes included in Haemodoraceae)

**Ophiopogon clarkei** Hook. f., F.B.I. 6 : 268. 1892.

Scapigerous herbs. Stems prostrate, stout. Leaves lanceolate. Flowers white or pale lilac, with a terminal tuft of secundly curved linear leaves. Scape short, few-flowered.

Sikkim, *s.l.* ; 2400 - 2800 m.

**O dracaenoides** (Baker) Hook. f., F.B.I. 6 : 268. 1892. *Fluggea dracaenoides* Baker in Trimen, J. Bot. 174. 1874.

Scapigerous herbs. Stems prostrate, stout. Leaves lanceolate. Flowers white or pale lilac.

Sikkim, *s.l.* ; 1200 - 1800 m.

*Fl. & Fr.* : July - Sept.

**O. intermedius** D. Don, Prodr. Fl. Nep. 48. 1825 ; Hook. f., F.B.I. 6 : 269. 1892.

Short stemmed, scapigerous herbs. Leaves tufted, linear, toothed margined. Flowers lilac tinged white.

Yoksum Bakhim - Tsoka, Gangtok, Karponang, Thangu, Zemu, Changu, Lachen ; 1200 - 3000 m.

*Fl. & Fr.* : July - Sept.

**O. wallichianus** (Kunth) Hook. f., F.B.I. 6 : 269. 1892. *Fluggea wallichiana* Kunth, Enum. Pl. 5 : 303. 1850. *Ophiopogon intermedium* D. Don var. *parviflora* Hook. f., F.B.I. 6 : 269. 1892. *O. parviflorus* (Hook. f.) Hara in J. Jap. Bot. 40 : 21. 1965.

Scapigerous herbs. Leaves very narrow, secundly curved. Scape very slender, decurved. Flowers white or pale purplish.

Lachen, Phedang - Choka, Karponang, Burmiok, Kabi, Yoksum to Bakhim ; 2000 - 2800 m.

*Fl. & Fr.* : June - Aug.

#### PARIS L.

**Paris polyphylla** Smith in Rees. Cyclop. 26 : Paris n. 2. 1813 ; Hook.f., F.B.I. 6 : 362. 1892. SATUWA (Nep.).

ssp. **polyphylla** var. **polyphylla**

Erect, unbranched herbs. Leaves whorled, long pointed. Flowers yellow-green.

Penlong - La, Chungthang - Lachen, Fungong, Bakhim - Dzongri, Changu, Sada ; 1800 - 3300 m.

*Fl. & Fr.* : April - July.

ssp. **polyphylla** var. **appendiculata** Hara, Fl. E. Himal. 410. 1966.

Differs from var. *polyphylla* in having long apiculi to the anther connectives (3.5 mm or more).

Bikbari, Migothang - Nayathang, above Tsoka, Bakhim - Dzongri ; 2500 - 4000 m.

*Fl. & Fr.* : May - June.

ssp. **polyphylla** var. **wallichii** Hara in Ohashi, Fl. E. Himal. 3 : 134. f. 14b. 1975.

Differs in its leaves which are ovate-lanceolate, 3.5 - 6 cm wide, with truncate base and 1.2 - 4 cm long petioles.

Penlong La ; 1800 - 3000 m.

Fl. & Fr. : May - June.

var. **stenophylla** Franchet in Nouv. Arch. Mus. Paris 2, 10 : 97. 1888.

Differs in its leaves which are sessile, 10-15 in number and *ca* 12 mm wide.

Draigchu ; *ca* 2500 m.

Fl. & Fr. : July - Aug.

ssp. **marmorata** (Stearn) Hara in J. Fac. Sci. Univ. Tokyo Bot. 10 : 176. t. 2B-C, 6C. 1969. *Paris marmorata* Stearn in Bull. Br. Mus. Nat. Hist. (Bot.) 2 : 79. f. 11, t. 8. 1956. *P. polyphylla* var. *brachysteamon* Franchet in J. de. Bot. 12 : 191. 1898.

Herbs, similar to ssp. *polyphylla* but smaller in all parts.

Bakhim - Dzongri ; 2500 - 3000 m.

Fl. & Fr. : May - June.

#### PELIOSANTHES Andrews

**Peliosanthes griffithii** Baker in J. Linn. Soc. Bot. 17 : 506. 1879 ; Hook. f., F.B.I. 6 : 266. 1892.

Scapigerous herbs. Leaves long petioled, strongly 5-nerved. Scape very short. Racemes many-flowered. Flowers yellow.

Sikkim, *s.l.* ; 300 - 700 m.

Fl. & Fr. : Dec. - April.

**P. macrophylla** Wall. *ex* Baker in J. Linn. Soc. 17 : 505. 1879 ; Hook. f., F.B.I. 6 : 266. 1892. CHILLEDHOTISARA (Nep.).

Large, stout herbs. Leaves elliptic-lanceolate, 13 - 15 - nerved. Scape long or short. Racemes many flowered. Flowers greenish or purple.

Sikkim, *s.l.* ; 300 - 700 m.

Fl. & Fr. : Nov. - Dec.

**P. teta** Andrews in Bot. Rep. 10 : t. 605. 1808.

Herbs differing from the above 2 species in having more than one flower per bract.

Sikkim, *s.l.*

### POLYGONATUM Mill.

**Polygonatum brevistylum** Baker in J. Linn. Soc. Bot. 14 : 556. 1875 ; Hook. *f.*, F.B.I. 5 : 319. 1892. *P. oppositifolium* var. *decipiens* Baker in F.B.I. 6 : 320. 1892.

Herbs. Stem grooved. Leaves usually all alternate, oblong, subcoriaceous. Peduncles 2 - 4 - flowered. Flowers yellow ; lobes green. Berries (fruits) ellipsoid.

Chola, Bakhim ; 2100 - 3000 m.

*Fl. & Fr.* : June - Sept.

**P. cathcartii** Baker in J. Linn. Soc. Bot. 14 : 559. 1875 ; Hook. *f.*, F.B.I. 6 : 320. 1892.

Herbs. Stem tall, glabrous, terete. Leaves all opposite, subpetioled, ovate-oblong or lanceolate. Peduncle 2 - 4 - flowered. Flowers green or yellowish.

Bakhim to Tsoka, Lachen ; 2400 - 3200 m.

*Fl. & Fr.* : May - Aug.

**P. cirrhifolium** (Wall.) Royle, Ill. Bot. Himal. 1 : 380. 1839 ; Hook. *f.*, F.B.I. 6 : 322. 1892. *Convallaria cirrhifolia* Wall. in Asiat. Res. 13 : 382. t. 1820.

Weak, flexuous, climbing herbs with whorled sessile leaves and white (tinged with purple) flowers.

Chungthang, Changu, Chola, Dentam, Pamianchi, Dzungri, Gamothang, Zemu, Lachen ; 1700 - 4400 m.

*Fl. & Fr.* : May - Sept.

**P. hookeri** Baker in J. Linn. Soc. (Bot.) 14 : 550. 1875 ; Hook. *f.*, F.B.I. 6 : 320. 1892.

Dwarf herbs. Leaves opposite or lower ones alternate, crowded, sessile, linear. Flowers solitary, violet.

Yumthang, Samiti, Legep, Changu, Thangu, Thela, Llohnak, Lachen, Dzungri, above Thangsheng, Chaunrikiang ; 2900 - 5790 m.

*Fl.* : April - July.

**P. Kansuense** Maximowicz ex Batalin.

*P. curvistylum* Hua in J. de. Bot. 6: 434. 1892.

Herbs 20 - 40 cm high. Leaves in whorls, 1 - 4 in each whorl, 2.9 - 10 mm wide, hooked when young. Flowers purple.

Dzongri, Sherabthang, Lamtung, Laghep, Bikbari ; 2700 - 4300 m.

*Fl.* May - July.

**P. leptophyllum** (D. Don) Royle.

Herbs. Leaves 3.3 - 12 mm wide, gradually tapering to very fine, acute apex. Peduncles 7 - 21 mm long. Pedicels 4 - 10 mm long. Berries up to 7 mm.

Lachen, Yampung, Zemu valley, Yakla, Matong, Tumbok; 2400 - 4250 m.

*Fl.* : June - July.

**P. nervulosum** Baker in J. Linn. Soc. 14 : 557. 1875; Hook. f., F.B.I. 6 : 319. 1892.

Herbs. Stems up to 55 cm high, zigzag above, leafless below. Scales oblong, whitish. Leaves alternate, lanceolate to elliptic, abruptly caudate. Flowers yellow.

Lachung ; 2100 - 3000 m.

*Fl.* : June - July.

**P. oppositifolium** (Wall.) Royle, Ill. Bot. Himal. 1 : 380. 1839 ; Hook. f., F.B.I. 6 : 320. 1892. *Convallaria oppositifolia* Wall. in Asiat. Res. 13 : 380. t. 1820. RUKKHIROLA (Sikkimese name).

Herbs, up to 1 m tall. Leaves oblong-lanceolate. Flowers many, axillary, light-pink.

Dentam ; ca 1500 m.

*Fl. & Fr.* : April - June.

**P. punctatum** Royle, Ill. Bot. Himal. 1 : 380. 1839 ; Hook. f., F.B.I. 6 : 321. 1892.

Epiphytic herbs with angled and grooved stems. Leaves oblong-lanceolate. Flowers white, spotted with lilac.

Jorpokree, Chola, Latong, Lachen, Tendong Peak ; 2000 - 2600 m.

*Fl. & Fr.* : April - June.

**P. Sibiricum** F. Delaroche

Herbs. Leaves in whorls of 3 - 9, linear-lanceolate, coiled at tips. Flowers purple tinged.

Laghep, Lachen, Lachung, Yumthang, Latong, Dzungri, Pemiongsti, Chungthang, Yakthang, Jamlingthang to Bikbari, Thangshing to Lampokri ; 1800 - 4200 m.

*Fl. & Fr.* : March - July.

**P. singalilense** Hara in J. Jap. Bot. 40 : 102. 1965.

Herbs. Stems up to 45-cm high. Leaves opposite or in groups of 3 upwards, lowest solitary, lanceolate, contracted below apices. Flowers yellow-greenish-white.

Laghep, Thangsing to Lampokri Dzungri, Lingtoo, Jamlingthang to Bikbari, Muguthang, Nayathang ; 3700 - 4400 m.

*Fl. & Fr.* : April - June.

**P. verticillatum** (L.) All., Fl. Pedemont. 1 : 131. 1785 ; Hook. f., F.B.I. 6 : 321. 1892. *Gonvallaria verticillata* L., Sp. Pl. 315. 1753.

Erect herbs with sessile, whorled leaves. Flowers greenish white.

Changu, Thangu, Chola Range, Lachen, Jambingthang Zemu valley ; 2700 - 4200 m.

*Fl. & Fr.* : May - Sept.

### SANSEVIERIA Thumb.

**Sansevieria cylindrica** Boj. in Hort. Maurit. 349. 1839.

Perennial herbs. Leaves cylindrical, in a basal rosette, thick cartilaginous, 90 - 100 cm long, dark green, often banded with paler lines, acuminate. Scapes with inflorescence, shorter than leaves, racemose, up to 30 cm long. Flowers ca 18 mm long, creamy white, tinged with pink.

Jorethang, Rangpo ; up to 1500 m. Cult.

**S. trifasciata** Hort. ex Prain, Bengal Pl. 2 : 1054. 1903.

Perennial herbs. Leaves in a basal rosette, tufted, linear - lanceolate, wide ensiform, flat. Flowers ca 12 mm long.

Jorethang, Gangtok, Mamli, Rangpo ; up to 1500 m. Cult.

**STREPTOPUS** Michaux.

**Streptopus parasimplex** Hara & Ohashi in J. Jap. Bot. 48 : 101. f. 2 B. 1973.

Herbs, stoloniferous, up to 20 cm high, unbranched. Flowers white ; filaments equalling anthers.

Near Dzungri, Migothang to Nayathong ; 3100 - 4000 m.

*Fl. & Fr.* : June - July.

**S. simplex** D. Don, Prodr. Fl. Nepal. 48. 1825 ; Hook. *f.*, F.B.I. 6 : 322 1892. GARI - MUCHI (Nep.).

Herbs with creeping rootstock. Leaves amplexicaul, ovate-cordate. Flowers solitary or 2 nate, axillary, white ; filaments shorter than anthers.

Chola, Changu, Phadomchen, Gnathang, Lachen to Naram village, Tsoka to Dzungri, Lingtu, Zemu ; 2400 - 4200 m.

*Notes* : Found among moss on rocks in shade. Eaten as vegetable.

**THEROPOGON** Maxim.

**Theropogon pallidus** (Kunth) Maxim. in Bull. Acad. Imp. Sci. St. Petersb. 15 : 90. 1870 ; Hook. *f.*, F.B.I. 6 : 324. 1892. *Ophipogon pallidus* Wall. ex Kunth, Enum. Pl. 5 : 300. 1850. JUNGLI-PIAZ (Nep.).

Herbs with radical, recurved, glossy leaves. Flowers in terminal racemes, drooping, pink with white-tinge.

Lachung - Thanka La, Lachen, Zemu, Chungthang ; 1800 - 2700 m.

*Fl. & Fr.* : June - Sept.

**TOFIELDIA** Huds.

(Sometimes treated under Melanthiaceae)

**Tofieldia himalaica** Baker in J. Linn. Soc. Bot. 17 : 489. 1879 ; Hook. *f.*, F.B.I. 6 : 358. 1812.

Herbs, with creeping rootstock. Leaves radical, equitant, narrowly linear. Flowers greenish white.

Dikchu, Leghep, Yumchoo La, Zemu, Lachung, Yakla, Changu ; 3200 - 3900 m. Occasional.

*Fl. & Fr.* : May - Sept.

**TRICYRTIS** Wall. *nom. cons.*

(Sometimes treated under Uvulariaceae)

**Tricyrtis maculata** (D. Don) J.F. Macbr. in Contr. Gray Herb., n.s. 3, 53 : 5, 1918. *Composita maculata* D. Don, Prodr. Fl. Nepal. 51. 1825. *Tricyrtis pilosa* Wall., Tent. Fl. Nep. 62, t. 46. 1826 ; Hook. f., F.B.I. 6 : 359. 1892.

Glandular-pubescent herbs with creeping rootstock. Leaves apexicaul. Flowers white, spotted with purple.

Lachen, Lachung, Chungthang ; 1300 - 2500 m.

*Fl. & Fr.* : July - Aug.

**TRILLIDIUM** Kunth

**Trillidium govanianum** (D. Don) Kunth, Enum. Pl. 5 : 120. 1850. *Trillium govanianum* D. Don in Royle, Ill. Bot. Himal. 348. t. 93. f. 1. 1839 ; Hook. f., F.B.I. 6 : 361. 1892.

Herbs with radical leaves and drooping, purple flowers.

Gnathang, Lachen, Migothang to Nayathang Zemu valley ; 2700 - 4000 m.

*Fl. & Fr.* : July - Aug.

**TRILLIUM** L.

**Trillium tschonoskii** Maxim. in Bull. Acad. St. Petersb. 29 : 218. 1884 ; Hook. f., F.B.I. 6 : 361. 1892. *T. obovatum* Pursh. *sensu* Rao in Bull. Bot. Surv. India 5 : 165 - 205. 1964.

Perennial herbs with underground rhizome. Leaves sessile, broadly subrhomboidally ovate or orbicular. Flowers light purple.

Lachen to Naram village, Rookah, Lachung, Lachen - Zemu valley ; 2700 - 4000 m.

*Fl. & Fr.* : July - Sept. Common at moist places.

**TUPISTRA** Ker - Gawl.

**Tupistra clarkei** Hook. f., F.B.I. 6 : 325. 1892.

Plants larger than *T. nutans*. Leaves 10 - 12.5 x 5 - 8 cm. Spikes decurved. Flowers pale greenish yellow or purplish ; mouth of perianth lobes not closed by stigma.

Sikkim, *s.l.* ; 600 - 1500 m.

**T. nutans** Wall. ex Lindl. in Edw., Bot. Reg. 15 : t. 1223. 1829 ; Hook. f., F.B.I. 6 : 324. 1892. NAKIMA (Nep.).

Herbs. Leaves radical, oblanceolate. Flowers dull brown-purple, borne in 7-15 cm long spikes, peduncles decurved ; mouth of perianth lobes closed by stigma.

Pemiangsti - Tingling bridge, on way to Phodong ; up to 1500 m.

*Fl. & Fr.* : March - April.

*Notes* : Inflorescence is eaten cooked.

#### YPSILANDRA Franch.

**Ypsilandra yunnanensis** W.W. Smith & Jeffrey var. **himalaica** Hara in Hara *et al.*, Enum. Fl. Pl. Nepal 1 : 80. 1978.

Herbs. Leaves in basal rosettes, oblanceolate. Flowers pale blue.

Sikkim, *s.l.* ; 4000 - 4300 m (*cf.* Hara *et al.* 1978)

#### SMILACACEAE

(R.C. Srivastava)

##### Smilax L.

**Smilax aspera** L., Sp. Pl. 1028. 1753 ; Hook. f., F.B.I. 6 : 306. 1892.

Large prickly climbing shrubs with small white fragrant flowers and blue - black berries.

Tingling ; 1200 - 2600 m.

*Fl. & Fr.* : Oct. - June.

**S. aspericaulis** Wall. ex DC., Monogr. Phan. 1 : 195. 1878 ; Hook. f., F.B.I. 6 : 306. 1892. **Smilax verruculosa** Merr. in Philipp. J. Sci. 5 : 173. 1910 & Enum. Fl. Pl. 1 : 209. 1922. **S. bracteata** Presl. var. **verruculosa** (Merr.) T. Koyama in Quart. J. Taiwan Mus. 10 : 18. 1957. DATUM (Nep.).

Climbing shrubs. Leaves oblong-lanceolate, cuspidate. Flowers creamy white.

Gangtok, Singhik to Mangan, Yoksum to Mintok - Khola ; 1200 - 2600 m.

*Fl. & Fr.* : Oct. - May.

**S. elegans** Wall. ex Kunth, Enum. Pl. 5 : 163. 1850. **S. galucophylla** Klotzsch in Klotzsch & Gareke, Bot. Reise Pr. Waldemar 45, t. 91. 1862.

*S. parviflora* Wall. ex Hook. f., F.B.I. 6 : 304. 1892. *Smilax longibracteata* Hook. f. *tom. cit.* 305. 1892.

Slender, terete, smooth, unarmed herbs. Leaves ovate-cordate or lanceolate, 2.5 - 7.5 cm long, acuminate. Flowers minute, purple.

Lachen ; 1800 - 3100 m.

*Fl. & Fr.* : May - Aug.

*S. ferox* Wall. ex Kunth, Enum. Pl. 5 : 251. 1850 ; Hook. f., F.B.I. 6 : 307. 1892.

Shrubs up to 2 m tall. Leaves elliptic, ovate-obovate-oblong. Berries green-purple.

Sikkim, *s.l.*; 1100 - 2700 m.

*Fl. & Fr.* : April - June.

*S. hajrae* R.C. Srivastava, *nom. nov.* *S. rigida* Wall. ex Kunth, Enum. Pl. 5 : 164. 1850, *nom. illegit., non* Solander in Russel, Nat. Hist. Aleppo (ed. 2) 27.1794. Hook. f., F.B.I. 6 : 304. 1892.

Scandent shrubs. Leaves subsessile, orbicular-ovate or ovate-cordate. Flowers small pale-brown, in 1 - 4 - flowered umbels. Berries up to 12 mm in diam, black.

Gnathang to Phodonchen, Lachen, Bakhim - Dzungri, Yoksum. 2100 - 2900 m.

*Fl. & Fr.* : May - Oct.

*S. lanceifolia* Roxb., Fl. Ind. 3 : 792. 1832. Hook. f., F.B.I. 6 : 308. 1892.

Climbing shrubs. Leaves orbicular, oblong or lanceolate. Flowers *ca* 6 mm in diam.

Yoksum, Burmiok, Rishi - Rinchinpong, Rhenok ; 900 - 2100 m.

*Fl. & Fr.* : Nov. - March.

*S. menispermoidea* A. DC., Mongr. Phan. 1 : 108. 1878. *S. elegans* Wall. ex Hook. f., F.B.I. 6 : 305. 1892, *non* Wall. ex A. DC. 1878.

Slender, terete, small herbs. Leaves variable, ovate-cordate ; petiole sheaths 1.2 - 2.5 cm long. Umbels few-flowered. Berries *ca* 8 mm in diam., blue-black.

Lachen, Chungthang, Lachung, Dzungri, Yakla, Karponang ; 1800 - 3400 m.

*Fl. & Fr.* : May - Aug.

**S. ocreata** A.D.C., Mongr. Phan. 1 : 193. 1878. *S. roxburghiana* Wall. ex Hook.f., F.B.I. 6 : 311. 1892, *p.p. excl. syn. S. orthoptera*.

Climbing shrubs. Stems more or less prickly, branches smooth. Leaves polymorphous, oblong, ovate or ovate-lanceolate. Umbels solitary or 2 - 3 on a common peduncle, many flowered. Berries *ca* 8 mm in diam.

Gangtok (Deorali) ; 1200 - 1700 m.

*Fl. & Fr.* : May - Nov.

**S. osmastonii** Wang & Tang in Bull. Fan. Mem. Inst. Biol. 7 : 298. 1937.

Shrubs. Leaves coriaceous, with densely reticulate veins on upper surface, papillose beneath.

Sikkim, *s.l.* ; 1500 - 2100 m.

**S. ovalifolia** Roxb. ex D. Don, Prodr. Fl. Nepal. 49. 1825. *S. macrophylla* Roxb., Fl. Ind. 3 : 793. 1892 ; Hook.f., F.B.I. 6 : 310. 1892. KUKUR - DYOTI (Nep.).

Stout, scandent, prickly shrubs. Leaves orbicular or broadly oblong. Umbels 2 - 3 on a short peduncle. Berries 2 - 3.7 cm in diam.

Melli - Teesta ; 300 - 1000 m.

*Fl. & Fr.* : May - July.

**S. perfoliata** Lour., Fl. Cochin. 622. 1790. *S. prolifera* Roxb., Fl. Ind. 3 : 795. 1832, *p.p.* ; Hook.f., F.B.I. 6 : 312. 1892. *S. laurifolia auct. non Willd.* : Roxb., Fl. Ind. 3 : 292. 1832.

Scandent, prickly herbs. Leaves ovate-lanceolate. Umbels solitary.

Yoksum, Gangtok ; 500 - 2000 m.

*Fl. & Fr.* : April.

**S. wallichii** Kunth, Enum. Pl. 5 : 246. 1850.

Twiners. Petiole-wings oblong to sublanceolate, up to 4 mm wide. Peduncles stout and long. Umbels 35 - 80-flowered.

Mamring ; 1200 - 1500 m.

*Fl. & Fr.* : Feb. - May.

**S. wightii** A.D.C., Mongr. Phan. 11 : 174. 1878 ; Hook.f., F.B.I. 6 : 310. 1892.

Large climbing shrubs. Branches sparsely prickly. Leaves orbicular or broadly ovate or elliptic. Umbels solitary or 2 - 3 on a common peduncle, many flowered. Berries *ca* 12 mm in diam.

**S. zeylanica** L., Sp. Pl. 1029. 1753 ; Hook. *f.*, F.B.I. 6 : 309. 1892.

Shrubs with slender and more or less 4 - angled branches. Leaves elliptic or broadly oblong or ovate-oblong. Umbels 20 - 30 - flowered. Berries *ca* 12 mm in diam.

Sikkim, *s.l.* ; up to 1500 m.

### PONTERIACEAE

(R.C. Srivastava)

**Eichhornia crassipes** (Mart.) Solms in A.DC., Monogr. Phan. 4 : 527. 1883. *Pontederia crassipes* Mart., Nov. Gen. Sp. 9, t. 1823.

Floating aquatic herbs. Petioles swollen, spongy. Flowers purple - white or bluish.

Gangtok, Phodong, Luing Busty area ; up to 1800 m.

*Fl. & Fr.* : Almost throughout the year.

### MONOCHORIA C. Presl.

**Monochoria vaginalis** (Burm.*f.*) C. Presl., Rel. Haenk 1 : 128. 1827 ; Hook. *f.*, F.B.I. 6 : 363. 1892. *Pontederia vaginalis* Burm. *f.*, Fl. Ind. 80. 1768.

Herbs. Rootstock short. Leaves linear to ovate - cordate. Flowers blue, sprinkled with red.

On way to Rumtek, Ranipool ; up to 1800 m.

*Fl. & Fr.* : Aug. - Sept.

In marshy places, rice fields.

### XYRIDACEAE

(R.C. Srivastava)

### XYRIS L.

**Xyris indica** L., Sp. Pl. 62. 1753 ; Hook. *f.*, F.B.I. 6 : 365 1892.

Perennial, tufted herbs. Leaves 6 - 8 mm wide Scapes stout, deeply grooved. Spikes ovoid or globose ; bracts orbicular or cuneately obovate, dark reddish brown.

Sikkim (cf. Hooker 1892).

*Fl. & Fr.* : June - Aug.

**X. pauciflora** Willd., *Phytogr.* 1. 2, t. 1, f. 1. 1974 ; Hook. *f.*, *F.B.I.* 6 : 365. 1892.

Perennial tufted herbs. Leaves narrowly linear, shorter than scape. Spikes globose or ovoid, bracts broadly oblong.

Sikkim, *s.l.*

*Fl. & Fr.* : June - Aug.

**X. schoenoides** Mart. in Wall., *Pl. Asiat. Rar.* 3 : 30. 1832 ; Hook. *f.*, *F. B.I.* 6 : 365. 1892.

Perennial tufted herbs, up to 70 cm tall, with linear, acuminate or subacute leaves. Heads reddish brown ; corolla yellow.

Sikkim, *s.l.* ; up to 1800 - 2700 m.

*Fl. & Fr.* : June - Sept.

## COMMELINACEAE

( N. R. Mandal)

### AMISCHOPHACELUS Rolla Rao & Kammathy

**Amischophacelus axillaris** (L.) Rolla Rao & Kammathy in *J. Linn. Soc. Bot.* 59 : 306. 1966. *Commelina axillaris* L., *Sp. Pl.* 42. 1753. *Cyanotis axillaris* (L.) J.A. & J.H. Schultes, *Syst. Veg.* 7 (2) : 1154. 1830 ; Hook. *f.*, *F.B.I.* 6 : 388. 1892.

Annual herbs with slender branches. Leaves sessile. Inflorescence axillary.

Sikkim, *s.l.* ; ca 500 m.

*Fl. & Fr.* : Aug. - Nov.

### AMISCHOTOLYPE Hassk.

**Amischotolype hookeri** (Hassk.) Hara, *Fl. E. Himal.* 399. 1966. *Forrestia hookeri* Hassk. in *Flora* 47 : 629. 1864 ; Hook. *f.*, *F.B.I.* 6 : 384. 1892.

Annual herb. Leaves petioled, elliptic, oblanceolate, acuminate. Flowers small. Capsules oblanceolate.

Sikkim, *s.l.* ; 500 - 800 m.

*Fl. & Fr.* : July - Sept.

**A. mollissima** (Bl.) Hassk. in Flora 46 : 392. 1864. *Campelia mollissima* Bl., Enum. Pl. Jav. 1 : 7. 1827. *Forrestia mollis* Hassk. in Flora 47 : 630. 1864. *F. glabrata* Hassk., l.c. *F. marginata* var. *rostrata* Clarke in DC., Mongr. Phan. 3 : 237. 1881. *F. mollissima* (Bl.) Kds., Exk. Fl. Jav. 1 : 282. 1911.

Stout annual herbs. Leaves elliptic to ovate, oblanceolate. Flowers 6 - 12, subsessile, in capitate cymes, white or pink.

Dikchu, Sakyong valley ; 915 - 1520 m.

*Fl. & Fr.* : July - Aug.

### COMMELINA L.

**Commelina appendiculata** Clarke in Commel. & Syst. Beng. 113. 1874 ; Hook. f., F.B.I. 6 : 374. 1892.

Diffusely branched annual herb, up to 90 cm tall. Leaves sessile, linear-lanceolate. Cymes bifid. Petals blue or white.

Sikkim, s.l. : 1000 m.

*Fl. & Fr.* : July - Sept.

**C. benghalensis** L., Sp. Pl. 41. 1753 ; Hook. f., F.B.I. 6 : 370. 1892.

Scandent or creeping decumbent herbs. Leaves elliptic-ovate, obtuse. Flowers blue.

Sikkim, s.l. ; 900 - 1600 m.

*Fl. & Fr.* : July - Oct.

**C. diffusa** Burm. f., Fl. Ind. 18. t. 7, f. 2. 1768. *C. communis* Dalz. & Gibs., Bombay Fl. 252. 1861. *Commelina nudiflora sensu* Hook. f., F.B.I. 6 : 369. 1892, non L. 1753.

Diffused, glabrous herbs, rooting at the lower nodes. Leaves sessile, lanceolate or ovate-lanceolate. Cymes 1 - 3 - flowered. Flowers pale blue or white.

*Fl. & Fr.* : July - Aug.

**C. hasskarlii** Clarke, Commel. & Syst. Beng. 13. t. 3. 1874 & in DC., Mongr. Phan. 3 : 157. 1881 ; Hook. f., F.B.I. 6 : 370. 1892.

Suberect annual herbs. Leaves sessile, narrowly lanceolate, subacute. Cymes bifid, 1 - 2 - flowered. Petals blue.

Burtuk Basti ; 1000 - 1500 m.

*Fl. & Fr.* : Aug. - Nov.

**C. paludosa** Bl., Enum. Pl. Jav. 1 : 2. 1827 ; Rolla Rao & Kammathy in J. Bombay Nat. Hist. Soc. 59 : 60. 1962. *C. obliqua* Buch. ex D. Don, Prodr. Fl. Nepal. 45. 1825, non Vahl 1806 ; Hook. f., F.B.I. 6 : 372. 1892. *Commelina obliqua* var. *viscida* Clarke in DC., Mongr. 3 : 178. 1881.

Annual herbs. Leaves very variable. Cymes usually simple. Petals blue.

Sikkim, *s.l.* ; *ca* 1800 m.

*Fl. & Fr.* : Aug. - Oct.

**C. sikkimensis** Clarke, Commel. & Syst. Beng. t. f. 1874. in DC., Mongr. Phan. 3 : 147. 1881 ; Hook. f., F.B.I. 6 : 369. 1892.

Succulent trailing herbs. Leaves lanceolate. Inflorescence a bifid cyme, 6 - 12 - flowered. Petals blue.

Gangtok ; *ca* 1700 - 1830 m.

*Fl. & Fr.* : Sept. - May.

**C. suffruticosa** Bl., Enum. Pl. Jav. 1 : 3. 1827 ; Hook. f., F.B.I. 6 : 374. 1892.

Annual herbs, with stout, branched, glabrous stem. Leaves lanceolate.

Sikkim, *s.l.* ; *ca* 1800 m.

*Fl. & Fr.* : Aug. - Nov.

#### CYANOTIS D. Don

**Cyanotis cristata** (L.) D. Don, Prodr. Fl. Nepal. 46. 1825 ; Hook f., F.B.I. 6 : 385. 1892. *Tradescantia cristata* L., Sp. Pl. 42. 1753.

Creeping, reddish purple herbs, up to 45 cm long. Leaves distant, sessile, ovate-oblong-lanceolate or obtuse. Inflorescence a scorpioid cyme. Petals purple.

Dikchu valley ; *ca* 915 m.

*Fl. & Fr.* : Sept. - Nov.

**C. vaga** (Lour.) J.A. & J.H. Schult. in R. & S., Syst. Veg. 7 : 1153. 1830. *Tradescantia vaga* Lour., Fl. Cochinch. 193. 1790. *Cyanotis barbata* D. Don, Prodr. Fl. Nepal. 46. 1825 ; Hook. f., F.B.I. 6 : 385. 1892.

Annual decumbent herbs, up to 50 cm long. Leaves sessile, oblong or linear-lanceolate, acute, falcate or straight. Flowers subsessile, small.

Sichey busty ; 915 - 1700 m.

*Fl. & Fr.* : July - Sept.

#### FLOSCOPA Lour.

*Floscopa scandens* Lour., Fl. Cochinch. 193. 1790 ; Hook. f., F.B.I. 6 : 390. 1892.

Annual herbs, erect or subscaudent. Leaves subsessile, elliptic-lanceolate, cuneate. Inflorescence axillary or terminal. Petals white, lilac or pink.

East Sikkim Dist. ; 900 - 1800 m.

*Fl. & Fr.* : Aug. - Nov.

#### MURDANNIA Royle

*Murdannia divergens* (Clarke) Buck. in Eng. & Prantl., Pflanzenfam. ed. 2, 15 a, 173. 1930. *Aneilena herbaceum* var. *divergens* Clarke in J.Linn.Soc. 6 : 448. 1871 & Cyrt. Beng. t. 16. 1847 & DC., Mongr. Phan. 3 : 203. 1881 ; Hook. f., F.B.I. 6 : 376. 1892.

Erect annual herbs. Leaves sessile, ovate, acute, inflorescence paniced. Petals blue.

Sikkim, *s.l.* ; *ca* 600 - 1800 m.

*Fl. & Fr.* : July - Sept.

*M. edulis* (Stokes) Faden in Taxon 29 : 77. 1980. *Commelina edulis* Stokes, Bot. Materia Med. 1 : 184. 1812. *Aneilema scapiflorum* (Roxb.) Kostel, Alleg. Med. Pharm. Fl. 1 : 127. 1831 ; Hook. f., F.B.I. 6 : 375. 1892. *Commelina scapiflora* Roxb., Fl. Ind. 1 : 178. 1820.

Annual herbs. Radical leaves lanceolate ; cauline leaves reduced to sheaths. Flowes blue-mauve.

Sikkim, *s.l.* ; *ca* 600 - 1800 m.

*Fl. & Fr.* : May - July.

*M. japonica* (Thunb.) Faden in Taxon 26 : 142. 1977. *Commelina japonica* Thunb. in Trans. Linn. Soc. London 2 : 332. 1794. *Aneilema lineolatum* Kunth, Enum. Pl. 4 : 69. 1843 ; Hook. f., F.B.I. 6 : 376. 1892. *Commelina elata* Vahl, Enum. Pl. 2 : 178. 1806. *M. elata* (Vahl) Brueck in Eng. & Prantl., Pflanzenfam. ed. 2. 15 : 173. 1930.

Annual herbs. Stems stout. Leaves oblong, acuminate. Flowers blue.

Sikkim, *s.l.* ; *ca* 600 - 1800 m.

*Fl. & Fr.* : July - Sept.

**M. nudiflora** (L.) Brenan in Kew Bull. 1952. 189. 1952. *Commelina nudiflora* L., Sp. Pl. 41. 1753, *p.p.* *Tradescantia malabarica* L., Sp. Pl. ed. 2, 412. 1762. *Aneilema nudiflorum* (L.) R. Br., Prodr. 271. 1810 ; Hook. *f.*, F.B.I. 6 : 278. 1892. *Aneilema compressa* Dalz. in Hook., Kew J. Bot. 3 : 318. 1851. *A. nudiflorum* var. *compressa* (Dalz.) Clarke in DC., Mongr. Phan. 3 : 211. 1831. *Murdannia malabarica* (L.) Brueck. in Engl. & Prantl., Pflanzenfam., ed. 2, 15 a : 173. 1930. *Aneilema malabaricum* (L.) Narayanswamy & Biswas in Indian For. Rec. (n.s.), 3 : 5. 1941. *M. malabarica* (L.) Brueck. var. *compressa* (Dalz.) Sant. & Jain in Ind. Forester 92 : 643. 1966.

Erect or decumbent herbs, 10 - 25 cm long. Leaves sessile, linear to oblanceolate. Petals purplish.

East Sikkim Distt. Siche Basti.

*Fl. & Fr.* : Sept. - Nov.

**M. vaginata** (L.) Brueck. in Engl. & Prantl., Pflanzenfam. ed. 2, 15 a : 173. 1930. *Commelina vaginata* L., Mant. Pl. 2 : 77. 1767. *Aneilema vaginatum* (L.) R. Br., Prodr. 271. 1810 ; Hook. *f.*, F.B.I. 6 : 381. 1892.

Annual decumbent herbs. Leaves 9 - 20 x 0.5 - 1 cm, acute. Stamens 6, 2 fertile.

Gangtok ; 515 - 1800 m.

*Fl. & Fr.* : July - Sept.

### POLLIA Thunb.

**Pollia hasskarlii** Rolla Rao in Notes Roy. Bot. Gard. Edinb. 25 : 188. 1964. *Pollia aclisia* Hassk. in Miq., Pl. Jungh. 1 : 145. 1852, *nom. illegit.* ; Hook. *f.*, F.B.I. 6 : 367. 1892.

Annual, stout, erect, herbs. Leaves lanceolate or oblanceolate. Inflorescence an erect panicle. Petals white.

East Sikkim Distt. ; *ca* 915 m.

*Fl. & Fr.* : Sept. - Nov.

**P. subumbellata** Clarke in J. Linn. Soc. Bot. 11 : 451. 1870 ; Hook. *f.*, F.B.I. 6 : 368. 1892. *Aclisia subumbellata* (Clarke) Brueck. in Engl. & Prantl., Pflanzenfam. 2, 15 a : 176. 1930.

Annual suberect herb, 20 - 40 cm tall. Leaves elliptic-lanceolate, caudate - acuminate. Petals white. Mature fruits deep glossy blue.

East Sikkim Distt. ; ca 915 m.

*Fl. & Fr.* : Sept. - Nov.

### RHOPALEPHORA Hassk.

**Rhopalephora scaberrima** (Bl.) Faden in *Phytologia* 37 : 480. 1977. *Commelina scaberrima* Bl., *Enum. Pl. Jav.* 1 : 4 : 1827. *Aneilema scaberrimum* (Bl.) Kunth, *Enum. Pl.* 4 : 69. 1843 ; *Hook. f.*, *F.B.I.* 6 : 382. 1892. *Dictyospermum scaberrimum* (Bl.) Morton ex Pagr. in *Phytologia* 29 : 338. 1976.

Erect annual herbs, 0.5 - 1 cm tall. Leaves lanceolate, acuminate.

East Sikkim Distt. ; ca 915 m.

*Fl. & Fr.* : Sept. - Nov.

### STREPTOLIRION Edgew.

**Streptolirion volubile** Edgew. in *Proc. Linn. Soc. London* 1 : 254. 1854 ; *Hook. f.*, *F.B.I.* 6 : 389. 1892. *Tradescantia cordifolia* Griff., *Priv. J.* 208. 1847, *non* Swartz 1788. *S. cordifolium* (Griff.) O. Ktze., *Rev. Gen. Pl.* 2 : 722. 1891.

An annual stem twiner. Leaves deeply bilobed. Flowers white.

Gangtok, Rabong - la ; 1000 - 2750 m.

*Fl. & Fr.* : Aug. - Oct.

## JUNCACEAE

(N.R. Mandal)

### **Juncus** L.

**Juncus allioides** Franch. in *Nouv. Arch. Mus. Hist. Nat. Paris* 10 : 99. 1887.

Tufted annual herbs. Stems slender, more or less leafy from base upwards. Leaves tubular, filiform or rarely more or less flat.

Sikkim, *s.l.*

*Fl. & Fr.* : July - Oct.

**J. benghalensis** Kunth, *Enum. Pl.* 3 : 360. 1841. *J. membranaceus sensu* *Hook. f.*, *F.B.I.* 6 : 397. 1892, *p.p. non* Royle ex D. Don 1839. *J. sphenostemon* Buchen in *Engl., Bot. Jahrb.* 6 : 233, t. 3. 1885.

Perennial herbs, 12.5 - 50 cm tall. Stem stoloniferous. Leaves slender, channeled or flattened above or tubular; sheaths long, auricled. Flowers shortly pedicelled. Seeds tailed.

Sikkim, *s.l.*; 1820 - 3950 m.

*Fl. & Fr.* : July - Oct.

**J. bhutanensis** Satake in J. Jap. Bot. 43 : 382. f. 1 - 2. 1968.

Annual or perennial herbs. Leaves slender. Capsules elliptic or oblong, rostrate at apex, 4 x 1.5 mm.

**J. brachystigma** Samuels. in Hand. - Mazz., Symb. Sin. 7 : 1236. 1936.

Herbs. Leaves subbasal, blunt, auricles short. Capsules narrowly ellipsoid.

Sikkim *s.l.*

*Fl. & Fr.* : July - Oct.

**J. bracteatus** Buchen. in Engl., Bot. Jahrb. 6 : 220. 1885; Hook. *f.*, F.B.I. 6 : 397. 1892.

Herbs. Stem very slender, tufted, 15 - 20 cm long, with basal soft sheaths. Leaves subcompressed, few, short, filiform, tubular. Flowers pale or dark. Capsule beaked, ovoid, 1-celled.

Sikkim, *s.l.*; 3040 - 4250 m.

*Fl. & Fr.* : July - Oct.

**J. cephalostigma** Samuels. in Hand.-Mazz., Symb. Sin. 7 : 1233. 1936.

Herbs, up to 20 cm high. Leaves linear, cylindrical, nonseptate. Flowers pale brown.

Sikkim, *s.l.*

*Fl. & Fr.* : July - Oct.

**J. chrysocarpus** Buchen. in Engl., Bot. Jahrb. 6 : 201. 1885; Hook. *f.*, F.B.I. 6 : 394. 1892.

Perennial herbs with tufted, very slender stems. Leaves 1 - 2, filiform, equalling or exceeding the stem. Cyme a solitary, many-flowered, pale yellow globose head, 1.2 - 1.7 cm in diam. Flowers sessile.

Sikkim, *s.l.*; 3040 - 3650 m.

*Fl. & Fr.* : July - Oct.

**J. clarkei** Buchen. in Engl., Bot. Jahrb. 6 : 210. 1885 ; Hook. f., F.B.I. 6 : 400. 1892.

Stoloniferous perennial herbs with broad leaves longer than stem. Cymes 1-many flowered heads.

Sikkim, *s.l.* ; 3040 - 4050 m.

*Fl. & Fr.* : July-Oct.

**J. concinnus** D. Don, Prodr. Fl. Nepal. 44. 1825 ; Hook. f., F.B.I. 6 : 339. 1892. *Juncus elegans* Royle ex D. Don in Trans. Linn. Soc. Lond. 18 : 321. 1840, *pro syn.* *Juncus elegans* Samuels. in Hand - Mazz., Symb. Sin. 1232. 1936. *J. luteocarpus* Satake in J. Jap. Bot. 43 : 384. f. 3-4, 1968.

Herbs with tuberous rootstock. Leaves flat, channelled, few, variable, filiform. Sheaths membranous. Flowers subsessile, white or creamy yellow.

Sikkim, *s.l.* ; 2128 - 3950 m.

*Fl. & Fr.* : July - Oct.

**J. grisenbachii** Buchen. in Abhandl. Nat. Verein. Bremen 3 : 295. 1872 ; Hook. f., F.B.I. 6 : 394. 1892.

Stoloniferous perennial herbs. Leaves equalling stem, terete channelled, septate. Cymes with spreading branches of many-flowered pale yellow globose heads. Seeds very pale, fusiform, with lax testa and small tails.

Sikkim, *s.l.* ; 3040 - 4355 m.

*Fl. & Fr.* : June - Oct.

**J. himalensis** Klotz. & Garcke in Die Bot. Ehreb. Der. Reis. Prim. Waldem. 60, t. 97. 1892 ; Hook. f., F.B.I. 6 : 398. 1892.

Perennial herbs. Stem 20 - 50 cm, stout, rigid, leafy below. Cymes irregularly branched, 2 to more, dark brown, 3 - 8 flowered. Flowers shortly pedicelled, brown. Capsule beaked, dark brown. Seeds long tailed.

Sikkim, *s.l.* ; 218 - 4256 m.

*Fl. & Fr.* : July - Oct.

**J. inflexus** L. Sp. Pl. 326. 1753. *Juncus glaucus* Ehrh. ex Sibth., Fl. Oxon. 113. 1794 ; Hook. f., F.B.I. 6 : 393 1892.

**Var. inflexus**

Perennial herbs with rigid, glaucous, deeply striate, interrupted pithed, dark green stems.

Sikkim, *s.l.*

*Fl. & Fr.* : July - Oct.

var. **leptocarpus** (Buchen.) Sanjappa in Karthik. *et al.*, Fl. Indic. Enum. Monoc. 85. 1989. *Juncus leptocarpus* Buchen. in Nachr. Ges. Wiss. Gottingen 244. 1869. *Juncus glaucus* Ehrb. var. *leptocarpus* (Buchen.) Buchen. in Engl., Bot. Jahrb. 6 : 20. 1885.

Perennial herbs.

Sikkim, *s.l.*

*Fl. & Fr.* : July - Oct.

**J. kingii** Rendle in J. Bot. 44 : 45. 1906.

Perennial glabrous herbs. Stem terete, stoloniferous. Leaf solitary, half to three fourth of stem.

Sikkim, *s.l.*

*Fl. & Fr.* : July - Oct.

**J. leschenaultii** Gay in Laharpe, Monogr. Junc. 137. 1827 ; Karthik. *et al.*, l.c. 84. 1989. *Juncus prismatocarpus sensu* Hook. f., F.B.I. 6 : 395. 1892, *p.p.* R. Br. 1810. *J. latior auct. non* Satake 1936 : Karthik. *et al.*, l.c. 85.

Very variable herbs. Stems 45 - 61 mm long, leafy, not septate, shorter than stem. Flowers green or brown, sessile.

Sikkim, *s.l.*

*Fl. & Fr.* : April - July.

**J. leucanthus** Royle *ex* D. Don in Trans. Linn. Soc. Lond. 18 : 318. 1840 ; Hook. f., F.B.I. 6 : 397. 1892.

var. **leucanthus**

Perennial herbs with 15 - 23 cm long stem, slender, tufted at length hollow ; basal sheaths hard, brown. Cymes 0.6 - 0.8 cm in diam. 6 - 10-flowered, pale yellow. Flowers shortly pedicelled ; style exserted. Seeds shortly tailed.

Sikkim, *s.l.*

*Fl. & Fr.* : May - July.

var. **alpinus** Buchen., Mongr. Junc. 396. 1890.

Sikkim, *s.l.*

*Fl. & Fr.* : July - Oct.

**J. leucomelas** Royle *ex* D. Don in Trans. Linn. Soc. Lond. 18 : 319. 1840 ; Hook. *f.*, F.B.I. 6 : 397. 1892.

Herbs with nonstoloniferous, naked, hollow stems. Leaves 1 -2, short, filiform, tubular. Cymes 3 - 8 flowered solitary head. Anthers exserted. Seeds long - tailed.

Sikkim ; 3650 - 4870 m.

*Fl. & Fr.* : June - Aug.

**J. membranceus** Royle *ex* D. Don in Trans. Linn. Soc. Lond. 18 : 320. 1840 ; Hook. *f.*, F.B.I. 6 : 397. 1892.

Perennial herbs. Stems up to 50 cm high. Cymes many flowered. Flowers white. Capsules beaked.

Sikkim, *s.l.*

*Fl. & Fr.* : July - Oct.

**J. minimus** Buchen. in Bot. Zeit. 25 : 145. 1867 ; Hook. *f.*, F.B.I. 6 : 400. 1892.

Perennial herbs. Rootstocks short, stout. Stems up to 10.5 cm long, tufted or one leaved, grooved. Cymes of 1 - 2 dark chestnut coloured sessile heads, 3 - 6-flowered ; stamens included. Seeds *ca* 2 mm long, testa white.

Sikkim, *s.l.* ; 4868 - 5470 m.

*Fl. & Fr.* : July - Oct.

**J. minticola** Steud., Syn. Pl. Glum. 2 : 301. 1855. *Juncus prismatocarpus sensu* Hook. *f.*, F.B.I. 6 : 395. 1892, *p.p. non* R. Br. 1810.

Herbs. Rootstock very short. Stems 45 - 60 cm tall, decumbent and rooting at the nodes. Leaves 5 - 25 x 0.15 - 0.3 cm, shorter than stem, cymes erect. Flowers green or brown, sessile. Seeds very minute, apiculate.

Sikkim, *s.l.*

*Fl. & Fr.* : May - Aug.

**J. ochraceus** Buchen in. Abh. Nat. Ver. Brem. 3 : 292. 1872 & Engl. Bot. Jahrb. 4 : 207. t. 2. 1855 ; Hook. *f.*, F.B.I. 6 : 394. 1892.

Densely tufted perennial herbs, 20.3 - 30.5 cm high. Stems grooved, slender. Leaves shorter or equalling the stem, channelled, wiry. Cymes compound. Capsules ca 3 mm long, exserted, narrowly ovoid, triquetrous, cuspidate.

Sikkim, *s.l.* ; 1520 - 2740 m.

*Fl. & Fr.* : July - Sept.

**J. pseudocastaneus** (Lingelsh.) Samuels. in Hand. - Mazz., Symb. Sin. 7 : 1230. 1936. *Juncus sikkimensis* var. *pseudocastaneus* Lingelsh. *apud* Limpr. f. in Fedde Repert. 12 : 316. 1922.

Herbs.

Sikkim, *s.l.*

*Fl. & Fr.* : July - Oct.

**J. sikkimensis** Hook. f., F.B.I. 6 : 399. 1892 *et* Ic. Pl. 23 : t. 2235.

Perennial herbs. Stem stout, clothed at base with red-brown rigid sheaths. Cymes of two dark brown, unilateral, sessile, 4 - 6-flowered heads. Flowers sessile. Seeds with short thick white tails.

Sikkim, *s.l.* ; 3364 - 4256 m.

*Fl. & Fr.* : Aug. - Oct.

**J. sphacelatus** Decne. in Jacquem, Voy 4, Bot. 172. t. 172. 1835 ; Hook. f., F.B.I. 6 : 398. 1892.

Perennial herbs, 20 - 50 cm tall. Stems tufted, smooth. Leaves involute, obtuse or acute, unitubular, obscurely septate. Cymes of 2 - 5 -flowered heads. Capsules dark brown.

Sikkim, *s.l.* ; 3648 - 4864 m.

*Fl. & Fr.* : July - Sept.

**J. thomsonii** Buchen. in Bot. Zeit. 25 : 148. 1867 & in Engl., Pflriech - IV. 36. Ht. 25 : 24. 1906 ; W.W. Smith in Rec. B.S.I. 4 : 421. 1913. *Juncus leucomelas sensu* Hook. f., F.B.I. 6 : 397. 1892, *p.p. non* Royle *apud* D. Don 1840.

Perennial herbs. Stems 5 - 15 cm long. Cymes solitary. Anthers shorter than filaments. Capsules one celled.

Sherabthang ; ca 3900 m (*cf.* Smith 1913).

**J. trichophyllus** W.W. Smith in Rec. B.S.I. 6 : 103. 1914.

Annual herbs with very slender stem, tufted, 8 - 10 cm high, basal sheaths poorly developed, chestnut brown in colour. Cymes solitary, 1 2-flowered. Capsules obovoid-oblong, cuspidately beaked.

Sikkim, *s.l.*

*Fl. & Fr.* : July - Sept.

**J. triglumis** L., Sp. Pl. 328. 1753 ; Hook. *f.*, F.B.I. 6 : 396. 1892.

Slender stiff naked stemmed herbs. Stems 5 - 15 cm long. Cymes terminal 3 4-flowered, dark brown.

Sikkim, *s.l.*

*Fl. & Fr.* : July - Oct.

**J. uniflorus** W.W. Smith in Rec. B.S.I. 6(4) : 104. 1914 ; Karthik. *et al.*, *l.c.* 86. 1989.

Annual herbs, 2 3 (-10) cm high, densely caespitose. Stems filiform, clothed at base with few sheaths. Leaves solitary or few. Flowers solitary, terminal, blackish brown ; stamens purplish slightly longer than style. Capsules equalling the sepals, more or less beaked, dark brown, shining, 3-septate. Seeds few.

Sikkim, *s.l.* ; 3202 - 4256 m.

*Fl. & Fr.* : June - Sept.

**J. wallichianus** Laharpe, Monogr. Junc. 139. 1829 ; Karthik. *et al.*, *l.c.* 86.

Herbs. Leaves tubular, septate. Capsules short, up to 4 mm.

Gangtok ; 1100 - 3100 m.

*Fl.* : May - Aug.

**J. yoskisukei** Goel in J. Econ. Tax. Bot. 7 : 208. 1985. *Juncus albescens* Clarke in Univ. Mus. Univ. Tokyo Bull. 2 : 161. 1971, *non* Fernald. 1924.

Caespitose, glabrous rushes. Stems 5 - 16 cm high. Heads single, 3 - 10-flowered. Flowers white ; stamens 6, 3-alternipetalous, outer 3 antipetalous.

Sikkim, *s.l.* ; 3000 - 4300 m.

*Fl. & Fr.* : June - July.

## LUZULA DC.

**Luzula campestris** (L.) DC., Fl. Franc. 3 : 161. 1805 ; Hook. f., F.B.I. 6 : 401. 1892, *p.p.* ; Karthik. *et al.*, Fl. Indic. Enum. Monoc. 86. 1989. *Juncus campestris* L., Sp. Pl. 329. 1753.

var. **campestris**

Perennial herbs, 15.2 - 45.7 cm high. Flowers sessile in peduncled capitate clusters.

Sikkim, *s.l.*

*Fl. & Fr.* : July - Sept.

**L. chinensis** N.E. Br. in J. Linn. Soc. 36 : 161. 1903 ; Mitra, Fl. Pl. E. India 2 : 93. 1985. *Luzula parivflora* Buchen., Mongr. Junc. 463. 1890, *non* Desv. 1808.

Herbs.

Sikkim, *s.l.* ; 3040 - 3344 m.

*Fl. & Fr.* : June - Sept.

**L. effusa** Buchen. in Krit. Ver. Aller. Junc. 53 : 88. 1880 ; Hook. f., F.B.I. 6 : 401. 1892.

Perennial herbs, up to 61 cm high. Leaves linear, glabrous or sparsely ciliate below. Flowers solitary, pale or dark brown. Capsules oblong, longer than the sepals, obtuse, mucronate.

Sikkim, *s.l.* ; 2736 - 3040 m.

*Fl. & Fr.* : July - Sept.

**L. multiflora** (Retz.) Lejeune, Fl. Env. Spa. 1 : 169. 1811. *Juncus multiflorus* Retz., Fl. Scand. Prodr. ed. 2. 82. 1795. *L. sudetica* DC., Fl. France. 6 : 306 1815 ; Kartik. *et al.*, *l.c.* 87.

Herbs, up to 20 cm high. Leaves narrowly lanceolate. Flowers sessile. Capsules ellipsoid, trigonous.

Sikkim, *s.l.*

*Fl. & Fr.* : May - Sept.

**L. obligantha** Samuels. in Hulten. Fl. Kamt. 1 : 227. 1927.

Herbs, up to 20 cm high. Leaves long, narrow, Flowers small. Capsules equalling perianth.

Lachen ; 3000 - 3600 m.

*Fl. & Fr.* : May - Aug.

***L. plumosa*** E. Meyer in *Linnaea* 22 : 387. 1849 ; Hook. *f.*, *F.B.I.* 6 : 401. 1892.

Perennial herbs, up to 45.5 cm high. Leaves linear, acuminate, glabrous or sparsely ciliate with very long hairs. Cymes subumbellate. Capsule oblong-obtuse or apiculate, length as sepals.

Chungthang ; 2736 - 3040 m.

*Fl. & Fr.* : July - Sept.

***L. rostrata*** Muchen. ssp. ***darjeelingensis*** Satake in Hara, *Fl. E. Himal.* 404. 1966.

Perennial herbs, caespitose, 25 - 35 cm high. Radical leaves linear, sparsely ciliate ; cauline leaves 2, much shorter and narrower. Inflorescence many flowered. Seeds ellipsoid.

Sikkim, *s.l.*

*Fl. & Fr.* : May - June.

Perennial herbs, 5 - 25.5 cm high. Leaves densely fascicled, channeled. Bracts brown with broad, white, membranous, ciliate margins and tips. Stamens 6. Capsules oblong, obtuse, shorter than sepals.

Sikkim, *s.l.* ; 3648 - 4409 m.

*Fl. & Fr.* : July - Sept.

## ARECACEAE

(R.C. Srivastava)

### ARECA L.

***Areca catechu*** L., Sp. Pl. 1189. 1753. SUPARI (Nep.), BETEL NUT (Eng.).

A slender graceful palm, 12-24 m tall, with much branched spadix and ovoid orange fruits.

Majhitar - Singtam; ca 400 m. Planted.

*Fl. & Fr.* : April - June.

## CALAMUS L.

**Calamus acanthospathus** Griff. in Cal. J. Nat. Hist. 5 : 39. 1844; Becc. & Hook. f., F.B.I. 6: 48. 1892.

Perennial climbers. Leaves 60 - 90 cm long; leaflets few, elliptic-lanceolate. Spadices stout, flagelliferous. Fruits obovoid to globose, shortly beaked, brown.

Sikkim (?); 400 - 1800 m.

*Fl. & Fr.* : March - Oct.

**C. erectus** Roxb., Fl. Ind. 3 : 774. 1832; Becc. & Hook. f., F.B.I. 6 : 438. 1892.

Shrubs with erect, stout stem and remotely ciliolate margins of leaf segments. Spadices branched, elongate, ending in a flagellum. Fruits ovoid-oblong, ca 2.5 cm long.

Sikkim, *s.l.* : up to 1200 m.

*Fl. & Fr.* : Dec. - Jan.

**C. flagellum** Griff. in Mart., Hist. Nat. Palm. 333. t. 176. f. 9. 1849; Becc. & Hook. f., F.B.I. 6 : 439. 1892.

Shrubs. Leaves 1.8 - 2 m long ; leaflets subopposite, linear lanceolate. Spadix 2.5 - 3 m. Fruits ovoid-oblong, cuspidately beaked, pale, with a dark band in lower half.

Sikkim *s.l.* ; up to 4000 m.

**C. latifolius** Roxb., Fl. Ind. ed 2, 3 : 775. 1832; Becc. & Hook. f., F.B.I. 6 : 455. 1892. KORAK - BET (Nep.).

Large climbers. Leaves 3 - 4.5 m long ; leaflets few, large, elliptic - lanceolate. Spadix decomposed. Fruits subglobose, pale.

Sikkim, *s.l.* ; ca 600 m.

*Fl. & Fr.* : April - Oct.

**C. leptospadix** Griff. in Calc. J. Nat. Hist. 5 : 49. 1844; Becc. & Hook. f., F.B.I. 6 : 441. 1892.

Shrubs with very long spinous sheath terminating with a coiled flagellum. Flowers small. Fruits small, globose, mucronate.

Sikkim, *s.l.* ; up to 1200 m.

*Fl. & Fr.* : April - Nov.

**CARYOTA L.**

**Caryota urens** L., Fl. Zeyl. 187. 1757 ; Becc. & Hook. f., F.B.I. 6 : 422. 1892. BANSUPARI (Nep.).

Trunk, up to 10 m high, annulate. Leaflets cuniform, obliquely truncate, acutely serrate-toothed. Fruits reddish.

Namprikdong (in the forest along river) ; up to 800 m.

*Fl.* : Feb.

**COCCUS L.**

**Coccus nucifera** L., Sp. Pl. 1188. 1753; Hook. f., F.B.I. 6 : 482. 1893. NARIYAL (Nep.).

A large palm, up to 12 m high. Leaves up to 3 m long; leaflets up to 1 m long, coriaceous, flaccid ; petioles stout. Fruit a drupe, 12 - 30 cm long, obovoid, greenish or yellowish.

Majhitar - Singtam, Jorethang ; ca 400 m. Planted.

*Fl. & Fr.* : March - June.

**DAEMONOROPS Bl.**

**Daemonorops jenkinsiana.** (Griff.) Mart., Hist. Nat. Palm. 327. 1850 ; Becc. & Hook. f., F.B.I. 6 : 462. 1893. *Calamus jenkinsianus* Griff. in Calc. J. Nat. Hist. 5 : 81. 1850.

Stout, spiny climbers. Leaves pinnate, upper serrate. Fruits subspherical, shortly apiculate.

Sikkim, *s.l.*

*Fl. & Fr.* : Nov. - Feb.

**PHOENIX L.**

**Phoenix acaulis** Roxb. ex Buch.-Ham. in Trans. Linn. Soc. London 15 : 87. 1826 ; Becc. & Hook. f., F.B.I. 6 : 426. 1892.

Tall palms. Leaves 1 - 2 m long, subglaucous; lower leaflets spiny; upper ones scattered and interruptedly fascicled, linear. Fruits ovoid, ca 1.5 cm, orange-red.

Sikkim, *s.l.* ; up to 1600 m.

*Fl. & Fr.* : April - Nov.

**P. lourierii** Kunth, Enum. Pl. 3 : 257. 1841. *P. humilis* Royle ex Becc. & Hook. f., F.B.I. 6 : 426. 1892.

Plants with short tufted, rarely elongate stem. Leaves subglaucous ; leaflets interruptedly scattered. Fruits oblong with broad groove.

Jorethang : *ca* 500 m.

*Fl. & Fr.* : May - June.

***P. rupicola*** T. Anders. in J. Linn. Soc. Bot 11 : 13. 1870 ; Becc. & Hook. *f.*, F.B.I. 6 : 425. 1892.

Tall palms ; trunk naked. Leaves up to 3 m long ; leaflets *ca* 45 cm long, bifarious (not fascicled). Fruits oblong.

Sikkim, *s.l.* ; up to 450 m.

*Fl. & Fr.* : Sept. - Nov.

***P. sylvestris*** (L.) Roxb., Fl. Ind. 3 : 787. 1832 ; Becc. & Hook. *f.*, F.B.I. 6 : 425. 1892. *Elate sylvestris* L., Sp. Pl. 1189. 1753.

Tall palms, 7.5 - 12 m high, clothed with persistent bases of petioles. Leaves 3 - 4.5 m long, glabrous; leaflets 30 - 60 cm long, fascicled. Fruits orange-yellow.

Jorethang ; *ca* 500 m.

#### PINANGA Bl.

***Pinnaga gracilis*** (Roxb.) Bl., Rumphia 2 : 77. 1839 ; Becc. & Hook. *f.*, F.B.I. 6 : 407. 1892. *Areca gracilis* Roxb., Fl. Ind. ed. 2, 3 : 619. 1832.

Stems slender, gregarious, 6 - 8 mm in diam., up to 6m tall, erect, thickened upwards. Leaves sparingly pinnate ; petiole scurfy. Spadix, white or scarlet, reflexed ; fruiting spadix pendulous. Fruits ellipsoidly fusiform, scarlet or orange.

Sikkim, *s.l.* : up to 900 m.

*Fl. & Fr.* : Nov. - April.

#### PLECTOCOMIA Mart. & Bl.

***Plectocomia himalayana*** Griff. in Calc. J. Nat. Hist. 5 : 97. 1854 ; Becc. & Hook. *f.*, F.B.I. 6 : 478. 1892.

Climbing shrubs. Stems *ca* 2.5 cm in diam. Leaves 1.8 - 2.4 cm long ; leaflets concolourous, tips filiform. Spadix and spikelets scurfly tomentose. Fruits depressed globose, *ca* 12 mm in diam.

Sikkim, *s.l.* ; 1200 - 2100 m (*cf.* Mitra 1958).

**TRCHYCARPUS** Wendl.

**Trachycarpus martianus** (Wall.) Wendl. in Bull. Soc. Bot. France 8 : 429. 1862 ; Becc. & Hook.f., F.B.I. 6 : 436. 1892. *Chamaerops martiana* Wall., Asiat. Rar. 3 : 5, t. 211. 1832.

Tall palms, 6 - 15 m, trunk naked for most part except beneath the crown. Leaves 1.2 - 1.5 m in diam., cut about half way down into linear 2 - lobed segments, margin denticulate. Flowers yellow. Fruits (drupes) bluish.

Gangtok ; up to 1650 m. Planted (?).

**WALLICHIA** Roxb.

**Wallichia densiflora** Mart., Hist. Palm. 3 : 190. 1838 ; Becc. & Hook.f., F.B.I. 6 : 419. 1892. *W. oblongifolia* Griff. in Calc. J. Nat. Hist. 5 : 486. 1844.

Apparently stemless or short-stemmed palm. Leaves 30 - 60 cm long ; leaflets oblong or linear-oblong, sinuately lobed, acutely toothed, white beneath.

Teesta valley, Singtam (on hill-slopes) ; up to 1400 m.

*Fl. & Fr.* : Not seen.

**W. disticha** T. Anders. in J. Linn. Soc. Bot. 11 : 6. 1969 ; Becc. & Hook.f., F.B.I. 6 : 419. 1892.

A tall palm. Stems 3 - 4.5 m high, 12.5 - 15 cm in diam., naked, annualate. Leaves 1.8 - 3 m, alternate, erect ; leaflets fascicled, linear, narrowed to base, praemorse denticulate.

Sikkim Himalaya (*cf.* Mitra 1958 ; Hook.f. 1892).

**PANDANACEAE**

(B. Mitra)

**PANDANUS** Parkinson

**Pandanus nepalensis** St. John in Bot. Mag. Tokyo 85 : 254, f. 7 - 8. 1972. *P. furcatus* var. *indica* Kurz in J. Bot. 5 : 102. 1867, *p.p.* ; Burkill in Rec. B.S.I. 4 : 135. 1910. *P. furcatus auct. non* Roxb. ; Hook.f., F.B.I. 6 : 484. 1893, *p.p.* BORKUNG, TARIKA (Nep.).

Medium sized trees. Leaves up to 1 m long, up to 4 cm wide, keeled, spiny along margins and keel. Fruits cone like drupes, orange when ripe.

Gangtok, Singtam, Rabangla, Gylshing, Sankhalang, Jorethang ; up to 1752 m. Common.

*Fl.* : Aug. Sept. ; *Fr.* : Almost throughout the year.

*Uses* : Young leaves from the upper part of the stem are employed as a native medicine for antidote to snake poison. Leaves are also used for making mats and for thatching purpose.

**P. sikkimensis** St. John, recorded from Teesta, also refers probably to the same common species found almost throughout the State from *ca* 400 - 1500 m (- 1752 m), **Pandus unguifer** Hook. *f.* (syn. *P. minor* Hook. *f.*) is not seen in Sikkim. It is restricted to Mungpoo district of West Bengal only (R.C.S.)

## ACORACEAE

(R.C. Srivastava)

### ACORUS L.

**Acorus calamus** L., Sp. Pl. 324. 1753 ; Hook. *f.*, F.B.I. 6 : 555. 1893. BOJO (Nep.).

Herbs. Leaves with prominent midrib. Berries redish.

Yoksum, Dikchu, near Rumtek, Phodong ; 1700 - 2300 m.

*Fl. & Fr.* : Aug. - Oct.

**A. gramineus** Aiton, Hort. Kew. 1 : 474. 1789 ; Hook *f.*, F.B.I. 6 : 556. 1893

Differs from *A. calamus* in having a very slender rhizome (*ca* 0.5 cm in diam. ; leaves without prominent midrib and longer spadix.

Sikkim, *s.l.*

*Fl. & Fr.* : Aug. - Oct.

## ARACEAE

(R.C. Srivastava)

### ALOCASIA (Schott) D. Don *nom. cons.*

**Alocasia fallax** Schott in Bonplandia 7 : 28. 1859 ; Hook. *f.*, F.B.I. 6 : 527. 1893.

Herbs. Leaves broadly ovate or orbicular -ovate, sagittate. Spathe 12.5 - 15 cm long, yellow.

Rangpo, near Jorethang, Phensang ; 600 - 1200 m.

*Fl. & Fr.* : Aug.

**A. macrorrhizos** (L.) G. Don in R. Sweet, Hort. Brit. ed. 3, 631. 1839; Hook f., F.B.I. 6 : 526. 1893. *Arum macrorrhizon* L., Sp. Pl. 965. 1753.

Herbs with massive stems. Leaves ovate, up to 125 x 75 cm, basal lobes rounded, deeply cordate, glossy, not peltate.

Rangpo - Teesta, Gangtok ; 600 - 1800 m.

**A. navicularis** (Koch. & Bouche) Koch. & Bouche in Index Sem. Hort. Berol. 1855. App. 2. 1855; Hook f., F.B.I. 6 : 527. 1893. *Colocasia navicularis* Koch. & Bouche in Index Sem. Hort. Berol. 1853 ; 13. 1853.

Herbs. Leaves broadly oblong, sagittate. Spathe 10-12.5 cm long. Spathe tube ovate-globose. Spadix ca 7.5 cm long, appendage equal to or longer than the inflorescence.

Jorethang ; 450 m.

Fl. & Fr. : July - Aug.

**A. odora** (Roxb.) Koch. & Bouche in Index Sem. Hort. Berol. App. 5. 1855. *Arum odorum* Roxb., Fl. Ind. 3 : 499. 1832.

Herbs. Leaves ovate, cordate. Spathe tube ovoid. Spadix white.

Melli-Teesta (on way to Peshok) ; ca 400 m.

Fl. : Aug.

#### **AMORPHOPHALLUS** Bl. ex Decne. *nom. cons.*

**Amorphophallus bulbifer** (Schott) Bl., Rumphia 1 : 148. 1837; Hook. f., F.B.I. 6 : 515. 1893. *Arum bulbiferum* Roxb. apud Sims in Curtis Bot. Mag. 46. t. 2072. 1819. *Pythonium bulbiferum* Schott in Schott & Endl., Melet. Bot. 18. 1832.

Tuberous herbs, up to 60 cm tall. Leaf solitary, many lobed, 30 - 45 cm in diam., ultimately bulbiferous at base of petiolules ; leaflets ovate or lanceolate. Spathe erect, pale pink or yellowish, appendage white or flesh-coloured.

Rangpo - Teesta, N. of Jorethang, Central Pandim - Singtam Road ; 300 - 1500 m.

Fl. & Fr. : May - Nov.

Notes : Tubers edible.

**A. nepalensis** Bogner & Mayo, Avoideava 8(1) : 9. 1985.

Tuberous herbs. Leaves 30 - 45 cm (or more) in diam. ; leaflets ovate or oblong-lanceolate. Appendage clothed below with depressed neuters and all over above with tubercles.

Yoksum, Legship, Rinching pong - Pemiongsti ; 700 - 1800 m.

*Fl. & Fr.* : May - Dec.

### ARIOPSIS Nimmo

*Ariopsis peltata* Nimmo in Graham. Cat. Pl. Bombay & Civin. (Add. & Corr.) 252. 1839 ; Hook. f., F.B.I. 6 : 519. 1893.

Perennial herbs. Tubers small, clustered. Leaves ovate, 2.5 - 15 cm in diam. Spathe *ca* 2.5 cm long, nodding, violet with a green dorsal ridge, paler inside. Spadix decurved ; male flowers dark purple ; female flowers greenish.

Dikchu to Gangtok ; 900 - 2100 m.

*Fl. & Fr.* : May - June.

### ARISAEMA Mart.

(R.C. Srivastava & P. Basu)

*Arisaema concinnum* Schott in Bonplandia 7 : 27. 1859 ; Hook. f., F.B.I. 6 : 505. 1893.

Herbs with globose tubers. Leaf solitary; leaflets 7 - 11, subsessile, narrowly lanceolate or oblanceolate. Spathe green on purple, striped with white.

Lachen, Kabi, Pemiongsti, above Dentam, Yoksum, Chungthang, Gnagtok ; up to 1800 m.

*Fl. & Fr.* : May - June.

*A. consanguineum* Schott, *l.c.* 27 ; Hook. f., *l.c.* 505

Herbs with depressed globose tubers. Leaf solitary ; leaflets 10 - 20, usually 15, narrowly linear-lanceolate. Spathe green. Peduncle mottled red-brown.

Chungthang ; 1500 - 2900 m.

*Fl. & Fr.* : July - Oct.

*A. costatum* (Wall.) Mart. *ex* Schott in Melet. Bot. 1 : 17. 1832 ; Hook. f., *l.c.* 501. *Arum costatum* Wall., Tent. Fl. Nep. 28 : t. 19. 1824. GURBO (Nep.).

Herbs with depressed tubers. Leaf solitary, leaflets dark green. Spathe reddish purple with striped with white.

Changu ; 2000 - 3000 m.

*Fl.* : May - June.

*A. echinatum* (Wall.) Schott in Melet. 1 : 7. 1832 ; Hook. *f.*, *l.c.* 506. *Arum echinatum* Wall., Pl. Asiat. Rar. 2 : 30. 1831.

Herbs with small globose tubers. Leaf solitary ; leaflets 7 - 9, narrowly lanceolate. Spathe greenish, striped with white and brown or purple within ; tip of spadix appendage echinate.

Lachung ; 2700 - 3300 m. (*cf.* Hook. *f.* 1893).

*Fl.* : June.

*A. erubescens* (Wall.) Schott, *l.c.* 17 ; Hook. *f.*, *l.c.* 506. *Arum erubescens* Wall., Pl. Asiat. Rar. 2 : 30. t. 135. 1831.

Herbs. Leaf solitary ; leaflets 9 - 12, narrowly lanceolate. Peduncle rose-coloured, streaked with red at base. Spathe white, striped with reddish purple.

Sikkim, *s.l.* ; 1800 - 2400 m.

*Fl.* : May - June.

*A. flavum* (Forssk.) Schott in Prodr. 40. 1860 ; Hook. *f.*, *l.c.* 503. *Arum flavum* Forssk., Fl. Aeg. Arab. 157. 1775. MANE (Nep.).

Herbs. Leaves 2 ; leaflets 9 - 11, oblong or lanceolate. Spathe 2.5 - 5 cm long, yellow.

Sikkim, *s.l.* ; 1700 - 3600 m.

*Fl. & Fr.* : May - Aug.

*A. galeatum* Schott in Syn. Aroid. 26. 1856 ; Hook. *f.*, F.B.I. 6 : 499. 1893.

Herbs. Leaf solitary ; leaflets ovate or cordate-acuminate, crenulate. Spathe green, striped with white.

Sikkim, *s.l.* ; 1800 - 2100 m.

*Fl.* : May - June.

*A. griffithii* Schott in Syn. Aroid. 26 : 1856 ; Hook. *f.*, *l.c.* 499. *A. hookerianum* Schott in Oester. Bot. Wochenbl. 7 : 334. 1857. *Arisaema griffithii* Schott var. *verrucosum* (Schott) Hara, Fl. E. Himal. 2 : 340. f. 6

B. 1971. *Arisaema verrucosum* Schott in Oester. Bot. Woechenbl. 7 : 341. 1857 ; Hook. f., l.c. GURBO (Nep.).

Herbs. Leaves 2, trifoliolate ; leaflets rhomboid-orbicular. Spathe very large, dark purple, limb much broader than the tube, deeply 2 - lobed.

Lachen, Yumthang, Yakla, Dentam, Phedang to Bakhim, Tsoka, Jalook, Karponang - Changu - Thegu ; 2300 - 3900 m.

*Fl. & Fr.* : April - Aug.

*Notes* : Verrucosity on petioles and peduncles are quite variable with intermediate forms and hence can not be considered as a stable character for separating species.

**A. intermedium** Bl. in Rumphia 1 : 102 . 1836 ; Hook f., l.c. 500.

var. **intermedium**

Herbs. Leaves 1 or 2 ; leaflets dimidiate-ovate or cordate, median elliptic. Limb of spathe lanceolate, incurved.

Sikkim, *s.l.* ; 2400 - 2700 m.

*Fl.* : July.

var. **biflagellatum** (Hara) Hara, Fl. E. Himal. 2 : 332. 1971. *Arisaema biflagellatum* Hara in J. Jap. Bot. 36 : 77. 1961.

Herbs. Spathe-blade yellowish green, with a longer tail, 8 - 16 cm long. Appendage greenish.

Sikkim, *s.l.* ; 2400 - 2700 m.

*Fl.* : June.

**A. Jacquemontii** Bl. in Rumphia 1 : 95. 1835 ; Hook. f., l.c. 505. *A. exile* Schott in Bonplandia 7 : 26. 1859 ; Hook. f., F.B.I. 6 : 506. 1893.

Herbs. Leaves 1 or 2 ; leaflets 5 - 7, elliptic or oblong-lanceolate. Spathe-limb oblong or ovate-lanceolate, striped with white, incurved and narrowed into a long drooping tail.

Changu, Bikbari, Thangsing, Dzungri, Legship, Lachung, Lachen; *ca* 4000 m.

*Fl.* : July - Aug.

**A. nepenthoides** (Wall.) Mart. in Flora 458. 1831 ; Hook. f., l.c. 504. *Arum nepenthoides* Wall., Tent. Fl. Nep. 26. t. 18. 1824. GURBU (Nep.).

Herbs ; Leaves 2 ; leaflets 5, elliptic or oblanceolate. Spathe-limb elliptic-ovate, base dilated into 2 broad rounded recurved auricles.

Chungthang to Lachen, Lachung, Dantam, below Bakhim, Damthang, Tendong ; up to 2700 m.

*Fl. & Fr.* : April - Oct.

*A. ochraceum* Schott in Bonplandia 7 : 27. 1959 ; Hook f., F.B.I. 6 : 507. 1813.

Herbs. Leaves radiatisect. Spathe-limb yellowish with brown stripes.

Sikkim, *s.l.* ; ca 3000 m.

*A. propinquum* Schott in Oester. Bot. Wochenbl. 7 : 333. 1857 ; Hook f., *l.c.* 501. *A. sikkimensis* Stapf ex Chatterjee in Bull. Bot. Soc. Bengal 3 : 18. 1949. *A. wallichianum* var. *sikkimense* (Stapf. ex Chatterjee) Hara in J. Bot. 48 : 21. 1965. *A. costatum* var. *sikkimense* (Stapf). Hara in J. Jap. Bot. 36 : 76. 1961. *A. ostiolatum* Hara in J. Jap Bot. 36 : 75. f. 1. 1961.

Herbs. Tubers subdepressed, ca 2 cm in diam. Leaf solitary, trisect ; segments ovate-elliptic. Spathe suberect.

Below Zalep la, Phedang, Changu, Jamling thang, Prek-chu-Thanshing, Dzungri ; 3500 - 4200 m.

*Fl.* : May - June.

*A. speciosum* (Wall.) Mart. in Flora 14 : 458. 1831 ; Hook. f., F.B.I. 6 : 500. 1893. *Arum speciosum* Wall., Tent. Fl. Nepal. 29, t. 20. 1824. MONGJING (Nep.).

var. **speciosum**

Herbs. Leaf solitary, trifoliate; leaflets elliptic or ovate, acuminate at apex, distinctly petiolulate, green with red margins. Spathe dark black-purple.

Lachen, Yoksum, Rate-chu, Gangtok ; 1750 - 3000 m.

*Fl. & Fr.* : March - July.

var. **mirabile** (Schott) Engl. in DC., Monogr. Phan. 2 : 540. 1879. *Arisaema mirabile* Schott in Oester. Bot. Wochenbl. 7 : 366. 1857.

Spadix appendage in the lower part conspicuously thickened, fusiform, curved, distinctly rugose-exasperate, sometimes forming small reticula.

Bakhim - Yoksum, Tendong Peak ; 2100 - 3100 m.

*Fl.* : June - July.

**A. tortuosum** (Wall.) Schott, Melet. 1 : 17. 1832. *Arum tortuosum* Wall., Pl. Asiat. Rar. 2 : 10, t. 114. 1830.

Herbs, up to 1.5 m tall. Leaves (1-) 2 (-3), pedately 5 -17-foliolate, leaflets rhombic-ovate, oblong to lanceolate, abruptly acuminate at apex, cuneate at base. Spathe green, sometimes dark purple.

Temi - Damthang, near Singhik, Nampok, Pemiangsti, Gangtok, Saramsa ; 1400 - 1800 m.

*Fl.* : April - June.

**A. utile** Hook. in Schott, Prodr. Aroid 30 : Bot. Mag. t. 6474.

Herbs. Leaves solitary ; leaflets sessile, rhombic-ovate or obovate, pale green with undulate, golden margins. Spathe-limb less than 10 cm broad, red-brown, coarsely reticulate.

Karponang - Changu, Lachen, Gamrothang ; 2700 - 3900 m.

*Fl. & Fr.* : May - June.

*Notes* : Plants are smaller than *A. griffithii* but similar in habit.

#### COLOCASIA Schott *nom. cons.*

**Colocasia affinis** Schott in Bonplandia 7 : 28. 1859 ; Hook. f., F.B.I. 6 : 523. 1893.

Herbs with globose tubers. Leaves 1 - 3, peltate, ovate-rounded, glaucous beneath. Spathe 6 - 10 cm long.

Legship - Tendong, Silak ; up to 2000 m.

*Fl. & Fr.* : June - Nov.

**C. esculenta** (L.) Schott in Schott & Endl., Melet. Bot. 18. 1832. *Arum esculentum* L., Sp. Pl. 965. 1753. *Arum colocasia* L., Sp. Pl. 965. 1753. *Colocasia antiquorum* Schott in Schott & Endl., Melet. Bot. 18. 1832 ; Hook. f., F.B.I. 6 : 523. 1893.

Herbs with hard, often tuberous rhizomes. Leaves peltate, ovate or subtriangular. Spathe more than 15 cm long.

Legship - Tendony, Jorethang, Yoksum ; 300 - 1200 m.

*Fl. & Fr.* : June - Nov.

**C. fallax** Schott in *Bonplandia* 7 : 28. 1859 ; *Hook.f.*, F.B.I. 6 : 524. 1893.

Herbs with tuberous rhizomes. Leaves orbicular-ovate, 10 - 24 x 7.5 cm. Spathe much shorter than the limb.

Sikkim, *s.l.* ; 400 - 2000 m.

*Fl. & Fr.* : May - Oct.

#### LASIA Lour.

**Lasia spinosa** (L.) Thwaites, *Enum. Pl. Zeyl.* 336. 1864. *Draconitum spinosum* L., *Sp. Pl.* 967. 1753. *Pothos lasia* Roxb., *Fl. Ind.* 1 : 458. 1820. *Pothos heterophyllus* Roxb., *Fl. Ind.* 1 : 457. 1820. *Lasia heterophylla* (Roxb.) Schott in Schott & Endl., *Melet. Bot.* 21. 1832. *Hook.f.*, F.B.I. 6 : 550. 1892.

Prickly plants with hastate-sagitate, deeply pedately pinnatifid leaves. Spathe very long, thick, twisted, dull purplish brown, up to 60 cm is diam.

Sikkim, *s.l.* ; up to 500 m.

*Fl. & Fr.* : Jan. - Nov.

#### POTHOS L.

**Pothos cathartii** Schott, *Aroid.* 1 : 22, t. 44 - 45. 1857 ; *Hook.f.*, F.B.I. 6 : 552. 1893.

Root-climbers with coriaceous bracts. Spathe *ca* 2.5 cm broad. Berries obovoid or oblong, 12 - 18 mm long, scarlet.

Dikchu Singhik, Toong, Rabongla Temi, Bhusuk ; 300 - 1500 m.

*Fl. & Fr.* : March - Dec.

*Notes* : On tree trunks.

**P. roxburghii** Schott, *Aroid.* 22. t. 37. 1858 ; *Prodr.* 565. 1860.

Root - climbers. Leaves obovate or lanceolate. Peduncles 4 - 6 mm long. Spathix large, erect, inclined or deflexed.

Sikkim Himalaya ; 300 - 1200 m (*cf.* *Hook.f.* 1893).

#### REMUSATIA Schott

**Remusatia hookeriana** Schott in *Oester. Bot. Wochenbl.* 7 : 133. 1857 ; *Hook.f.*, F.B.I. 6 : 522. 1893.

Herbs with much branched bulbiferous shoots. Leaves *ca* 10 - 15 cm long.

Dantam Pamianchi, Jorethang, Namchi, Yoksum Bakhim, Phantom, Lachen, Lachung, Gangtok, Penlong - Ia ; 1500 - 2400 m.

*Fl. & Fr.* : April - Nov.

**R. pumila** (D. Don) H. Li & A. Hary, Acta Bot. Yunn., Suppl. 5. 28. 1992. *Gonatanthus pumilus* (D. Don.) Engler & Krause in Engler, Pflanzenreich IV - 23E. Ht. 71 : 19, t. 5a - m. 1920 *Caladium pumilum* D. Don, Prodr. Fl. Nepal. 21. 1825. *G. sarmentosus* Klotzsch. & Otto in Link & Klotzsch., Icon. Pl. Rar. Hort. Roy. Bot. Berol. 1 : 33. t. 14. 1841. Hook. f., F.B.I. 6 : 522. 1893.

Terrestrial or epiphytic herbs. Leaves oblong-ovate, green below, yellow above, deep purple on sides. Spathe 12 - 20 cm long.

Toong -Chungthang, Namchi - Jorethang, Namthang, Yumthang, Sedonchen - Rongli, Kibek, Gangtok ; 1200 - 2400 m.

*Fl. & Fr.* : May - Nov.

Abundant on moist shady slopes.

### RHAPHIDOPHORA Hassk.

**Rhaphidophora callophyllum** Schott in Bonplandia 5 : 45. 1857. *R. lancifolia* Schott in Bonplandia 5 : 45. 1857 ; Hook.f., F.B.I. 6 : 545. 1893.

Climbers. Leaves falcately-lanceolate or ovate-lanceolate, 15 x 3.7 - 7.5 cm, acuminate or caudate, bases unequal sided; petioles 10 - 17.5 cm long, channelled to the knee. Spathe red inside.

Sikkim, *s.l.* ; 900 - 1500 m.

*Fl. & Fr.* : Jan.

**R. decursiva** (Roxb.) Schott in Bonplandia 5 : 45. 1857 ; Hook. f., F.B.I. 6 : 546. 1893. *Pothos decursivus* Roxb., Fl. Ind. 1 : 456. 1820. *R. eximia* Schott in Bonpland. 5 : 45. 1857 ; Hook.f., F.B.I. 6 : 587. 1893.

Huge climbers. Leaves oblong, with 5 - 15 unequal lobes. Spathe oblong-obovate, beaked, cream-yellow.

Deorali, Temi, Yoksum - Bakhim. 1300 - 2000 m.

*Fl. & Fr.* : July - Nov.

**R. glauca** (Wall.) Schott in Bonplandia 5 : 45. 1875 ; Hook. f., F.B.I. 6 : 547. 1893. *Pothos glaucus* Wall., Pl. Asiat. Rar 2 : 45 t. 156. 1832.

Climbers. Leaves oblique with 3 - 5 unequal lobes. Spathe oblong or oblong-lanceolate, pale yellow.

Yoksum, W. of Singtam, Deorali, Kabi ; 400 - 1800 m.

*Fl. & Fr.* : July - Nov.

**R. grandis** Schott in Oester. Bot. Wochenbl. 349. 1858.

Climbers. Leaves up to 1 x 0.5 m ; leaflet pairs greenish beneath; petioles grooved above. Spathe orange-yellow inside and outside.

Rathong - Chu valley, above Yoksum, W. of Singtam, Gangtok - Kabi ; 600 - 2100 m

*Fl. & Fr.* : May - Feb.

**R. hookeri** Schott in Bonplandia 5 : 45. 1857 ; Hook. *f.*, F.B.I. 6 : 540. 1893.

Climbers. Leaves oblong, cuspidately caudate-acuminate, base unequal sided. Spathe green, yellow inside.

Below Rumtek Monastery, Singtam - Gangtok ; up to 1250 m.

*Fl. & Fr.* : March - June.

#### SAUROMATUM Schott

**Sauromatum brevipes** (Hook. *f.*) N.E. Brown in Gard. Chorn. Ser. 34 : 93. 1903. *Typhonium brevipes* Hook. *f.*, F.B.I. 6 : 511. 1893.

Tuberous herbs with purple spotted stem, purplish green spathe and purple spadix appendage.

Sikkim Himalaya ; 2400 - 2800 m.

*Fl. & Fr.* : April - June.

#### SCINDAPSUS Schott

**Scindapsus officinalis** (Roxb.) Schott in Schott & Endl., Melet. Bot. 21. 1832 ; Hook. *f.*, F.B.I. 6 : 541. 1893. *Pothos officinalis* Roxb., Fl. Ind. 1 : 452. 1820.

Climbers. Leaves ovate, elliptic-ovate or nearly orbicular, 12.5 - 35 x 6 - 15 cm. Spathe up to 15 cm long, green, yellow within ; spadix equalling spathe, greenish yellow.

Sikkim, *s.l.* ; 300 m.

**TYPHONIUM** Schott

**Typhonium diversifolium** Wall. ex Schott, Aroid. 13 : t. 20 1855 ; Hook. f., F.B.I. 6 : 510. 1893.

var. **diversifolium**

Tuberous herbs. Spathe erect, green striped purple tinged-dark purple, spadix - appendage, Female flowers purple.

Lachen ; 2400 - 4300 m.

*Fl. & Fr.* : June - Sept.

var. **microspadix** Engl., Pflanzenr. 73 : 111. 1920.

Differs from var. *diversifolium* in its smaller inflorescence.

Lingtoo, Yumthang ; 3650 - 3950 m.

*Fl. & Fr.* : July Sept.

**T. trilobatum** (L.) Schott in Wien. Zeitschr. 3 : 72. 1829 ; Hook. f., F.B.I. 6 : 509. 1893. *Arum trilobatum* L., Sp. Pl. 965. 1753.

Herbs with subglobose tubers. Leaves 12.5 - 30 cm in diam., lobed ; lobes ovate. Spathe 7.5 - 30 cm long ; limb 3.7 - 10 cm broad, red-purple inside. Appendage bright red.

Sikkim, *s.l.*; ca 450 m.

*Fl. & Fr.* : July - Aug.

**JUNCAGINACEAE**

(R.C. Srivastava)

**TRIGLOCHIN** L.

**Triglochin maritima** L., Sp. Pl. 339. 1753 ; Hook. f., F.B.I. 6 : 563. 1893.

Scapigerous, marshy herbs. Leaves 1 - 3 mm wide, slightly flattened at the tip. Flowers small, brown-green. Fruits oblong - ovoid.

Lionakh, Gaigong to Kareng, Lachen, Thangu, Makula, Lungnak ; 2600 - 4600 m.

*Fl. & Fr.* : June - Aug.

**T. palustris** L., Sp. Pl. 38. 1753 ; Hook. f., F.B.I. 6 : 563. 1893.

Scapigerous, herbs. Leaves flaccid, up to 1 mm wide. Perianth green with purplish margins. Fruits narrowly clavate.

Lachen, above Lambi, Tangla, Thangshing ; 2900 - 4700 m.

*Fl.* : April - Aug.

### POTAMOGETONACEAE

(R.C. Srivastava)

### POTAMOGETON L.

**Potamogeton filiformis** Persoon, Syn. 1 : 152. 1805 ; Karthik. *et al.*, l.c. 284.

Herbs, up to 40 cm high. Stems slender, branched at base. Leaves submerged, consisting of 2 tubes, blunt apex. Flower-whorls distant.

Chamgong, Lhonak ; 3600 - 4600 m.

*Fl.* : Sept.

**P. nodosus** Poir. in Lam., Encycl. Suppl. 4 : 535. 1816. *P. indicus sensu* Hook. *f.*, F.B.I. 6 : 565. 1893.

Herbs. Stems terete. Leaves oblong-elliptic or elliptic-lanceolate, coriaceous ; petioles stout. Spikes densely flowered.

Lachung ; *ca* 2700 m.

*Fl.* : Aug.

**P. octandrus** Poir., Encycl., Suppl. 4 : 534. 1816. *P. javanicus* Hassk. in Act. Sci. Ind. Nersl. 1, 8 : 26. 1856 ; Hook. *f.*, F.B.I. 6 : 566. 1892.

Herbs, up to 60 cm high. Stem slender. Leaves ovate-oblong, entire. Flowers minute, in interrupted whorls.

Thangu ; *ca* 4200 m.

*Fl. & Fr.* : April - June.

**P. pectinatus** L., Sp. Pl. 127. 1753 ; Hook. *f.*, F.B.I. 6 : 567. 1893.

Herbs. Stem filiform, dichotomously branched. Leaves filiform. Flowers interruptedly whorled.

Lungmathang ; 3600 - 5100 m.

*Fl. & Fr.* : Oct.

In river bed.

## SPARGANIACEAE

## SPARGANIUM L.

**Sparganium fallax** Graebner in Allg. Bot. Zeitsch. 4 : 32. 1898.  
*S. simplex sensu* Hook f., F.B.I. 6 : 490. 1893, *non* Huds. 1778.

Aquatic perennial herbs. Leaves linear, spongy below. Inflorescence monoecious. Flowers dark brown.

Chaten ; *ca* 2670 m.

## ERIOCAULACEAE

(P. Basu)

## ERIOCAULON L.

**Eriocaulon alpestre** Hook. f. & Thoms. ex Koern. in Mus. Bot. Lugd. Bot. 3 : 163. 1867 ; Hook. f., F.B.I. 6 : 578. 1893.

Herbs. Leaves subulate. Seeds yellowish, glabrate.

Lachen valley, Lachung, Chola-range ; 1500 - 3000 m.

**E. luzulaefolium** Mart. in Wall., Pl. Asiat. Rar. 3 : 28. 1832 ; Hook. f., F.B.I. 6 : 582. 1893.

Herbs. Heads truncate. Seeds yellow.

Subtropical zone of E. Sikkim District ; up to 1700 m. Common.

**E. nepalense** Prescott ex Bong in Mem. Acad. Imp. Sci. St. Petersburg. ser. B., Sci. Match. 1 : 610. 1830 ; Hook. f., F.B.I. 6 : 581. 1893.

Herbs. Leaves broadly ligulate. Seeds ciliate.

Gangtok ; *ca* 1500 m.

**E. oryzetorum** Mart. in Wall., Pl. Asiat. Rar. 3 : 28. 1832 ; Hook. f., F.B.I. 6 : 579. 1893.

Herbs with distinct stem. Leaves ensiform. Seeds minute, yellow.

Sikkim, *s.l.* ; 600 - 800 m.

**E. seaboldianum** Steud., Syn. Pl. Cyp. 2 : 272. 1855 ; Hook. f., *l.c.* 6 : 577. 1893.

Herbs with distinct stem. Leaves linear, flat. Seeds red-brown.

Below Gangtok ; 1200 - 1750 m.

**E. truncatum** Ham. ex Mart. in Wall., Pl. Asiat. Rar. 3 : 20. 1832 ; Hook. f., Lc. 6 : 578. 1893.

Herbs with distinct stem. Leaves subulate. Seeds pale yellow.

Alpine Sikkim.

## CYPERACEAE

(R.C. Srivastava)

### BLYSMUS Panz. ex J.A. Schultes

**Blysmus compressus** (L.) Panz. ex Link var. **sikkimensis** (Clarke) Karthik. in Karthik. et al., Fl. Ind. Enum. Monocot. 32 - 33. 1989. *Scirpus caricis* Retz. var. *sikkimensis* Clarke in Hook. f., F.B.I. 6 : 661. 1893.

Herbs. Stems 10 - 40 cm tall. Spikelets distichous. Nuts sessile, ellipsoid.

Lachen, Chamnago, Yumthang, Lhonak, Kupup, Muguthang, Chola ; 2700 - 4500 m.

Fl. & Fr. : July.

### BULBOSTYLIS Kunth

**Bulbostylis barbata** (Rottb.) Clarke in Hook. f., F.B.I. 6 : 651. 1893. *Scirpus barabtus* Rottb., Progr. 27. 1772. & Descr. Ic. Pl. 52. t. 17. f. 4. 1773. *Stenophyllus barbata* (Rottb.) T. Cooke, Fl. Pres. Bombay 2 : 887. 1908 (3 : 401. 1967. Repr. ed). *Fimbristylis barbata* (Rottb.) Benth., Fl. Austr. 7 : 321. 1878.

Annual tufted herbs, up to 25 cm tall. Leaves in basal clusters, almost capillary, sheathed. Inflorescence terminal, capitate.

Jorethang - Ronbong bridge, Rangpo - Teesta ; 500 - 3000 m.

Fl. & Fr. : Sept.

**B. densa** (Ball.) Hand. - Mazz. in Karsten & Schenk, Vegetationsb. 20(7) : 16. 1930 ; Kern in Reinwardtia 6 : 51. 1961. *Scirpus densus* Wall. in Roxb., Fl. Ind. 1 : 231. 1820. *Isolepis trifida* Nees in Wight, Contr. Bot. Ind. 108. 1834. *Bulbostylis capillaris* Kunth var. *trifida* (Nees) Clarke in Hook. f., F.B.I. 6 : 652. 1893. *Bulbostylis trifida* (Nees) Nelmes in Kew Bull. 1950 : 209. 1950. *Fimbristylis capillaris* var. *trifida* (Nees) Mitra, Fl. Pl. E. India 1 : 108. 1958.

Annual, tufted herbs, up to 40 cm tall. Leaves in basal clusters, almost capillary, sheathed. Inflorescence anthelate.

Lachen, Lachung, Katao, Zemu, Gangtok, Pangthang, Dzungri, Hilay Murhay, Chungthang, Kabi, Phodong, Thangu, Penthang, Yumthang, Thanka La ; 300 - 4100 m.

*Fl. & Fr.* : July - Sept.

### CAREX L.

**Carex alopecuroides** D. Don *ex* Tilloch & Taylor in Phil. Mag. 62 : 455. 1823 ; Maberley in Taxon 29 : 603. 1980. *Carex japonica* Thunb. var. *alopecuroides* (D. Don *ex* Tilloch & Taylor) Clarke in Hook. f., F.B.I. 6: 737. 1894. MONGSHER (Nep.).

Perennials, up to 80 cm tall. Stems trigonous, narrowly winged. Leaves clustered at base, one sometimes higher up also. Inflorescence racemose, 7 - 10 cm long. Utricles yellowish green. Nuts ellipsoid, triquetrous, deep brown.

Lachung, Gangtok, Tumlong ; 1450 - 1800 m. in rock crevices.

*Fl. & Fr.* : Aug. Sept.

**C. alpina** Swartz in Liljeb. Svensk. Fl. ed. 2 : 26. 1796 ; Clarke in Hook. f., F.B.I. 6 : 730. 1894.

Herb, 10 - 65 cm tall. Leaves much shorter than the stems. Spikes 3 - 4, cuboid. Utricles obovoid-ellipsoid, yellow to pale brown.

Yumcho - la, Yumthang ; ca 4500 m.

*Fl. & Fr.* : April - June.

**C. atrata** L., Sp. Pl. 1387.1753 ; Clarke in Hook. f., F.B.I. 6 : 731. 1894.

var. **atrata**

Herbs, up to 60 cm tall. Leaves equalling the stem. Spikes 3 - 6, 18 - 25 mm long. Utricle large ovoid or ellipsoid, inflated, yellow brown, beakless. Nuts not filling the utricule.

North-East Sikkim, Lhonak, Samdong, Lachen ; 3300 - 5100 m.

*Fl. & Fr.* : July - Sept.

var. **glacialis** Boott, Illustr. 3 : 114. t. 365. 1862. *Carex duthiei* Clarke var. *glacialis* (Boott) Clarke in Hook. f., Lc. 732.

Herbs, up to 15 cm long. Leaves much shorter than stems. Spikes very small, ca 8 x 4 mm. Utricles small, slightly inflated.

Momay, Kankola, Yumthang Dzungri ; 3900 - 5100 m.

*Fl. & Fr.* : July - Aug.

var. **pullata** Boott, Illustr. 3 : 114 t. 364. 1862. *Carex duthiei* Clarke in Hook.f., l.c. 731. *Carex atrata* L. ssp. *pullata* (Boott) Kukenth. in Engl., Pflanzenr. 38 : 400. 1909.

Herbs. Lower spikes very shortly peduncled. Utricles narrow oblong. Nuts small stalked, nearly filling the utricles.

Changu, Bikbari, Lachen, Lhonak, Dzongri, Kupup ; 3300 - 4500 m.

*Fl. & Fr.* : July - Aug.

**C. atrofusca** Schkuhr., Riedgr. 1 : 106, f. 82. 1801. *C. atrofusca* Schkuhr. ssp. *minor* (Boott) T. Koyama in Ohashi, Fl. Pl. E. Himal. 3 : 122. 1975. *Carex ustulata* Wahlenb. var. *minor* Boott, Illustr. 1 : 71. t. 194. f. 1. 1858. *Carex ustulata sensu* Clarke in Hook.f., F.B.I. 6 : 734. 1894, non Wahlenb. 1803. *Carex atrofusca* var. *angustifructus* Kukenth. in Engl., Pflanzenr. 38 : 554. 1909.

Herbs, 10 - 40 cm tall. Spikes 2 - 5, terminal, male or bisexual. Utricles ellipsoid, shortly beaked.

Muguthang, Giagong plains, Chemathang to Thangshing, Momay, Zemu, Lhonak, Yumthang ; 3300 - 5300 m.

*Fl. & Fr.* : July.

**C. baccans** Nees in Wight, Contrib. Bot. Ind. 122. 1834 ; Clarke in Hook.f., F.B.I. 6 : 722. 1894. HARKATE (Nep.).

Perennials, up to 20 m tall. Leaves coriaceous, scattered all along and exceeding the stem. Panicles 30 - 85 cm long. Utricles globose, bright red on maturity.

Pakyong, Gangtok, Rimbi, Namchi, Deorali, Mamring, Chalisay ; 1200 - 2400 m.

*Fl. & Fr.* : Sept. - March.

**C. bigelowii** Torr. ex Schweinitz. in Ann. Lyc. New York 1 : 67. 1824. *Carex rigida* Gooden in Trans. Linn. Soc. 2 : 193. t. 22, f. 10. 1794, non Schrenk 1789.

Herbs, up to 20 cm tall. Leaves curved, flat. Spikes 3 - 4 together. Utricles ellipsoid.

Lachen ; ca 3600 m.

*Fl. & Fr.* : July - Aug.

**C. capillacea** Boott, Illustr. 1 : 44. t. 110. 1858 ; Clarke in Hook. f., F.B.I. 6 : 713. 1894.

Herbs, 10 - 30 cm tall, tufted. Stems and leaves capillary. Spikes 6 - 8 x 2.5 - 3 mm, dense, Utricles ovoid, pyramidal.

Lachen, Yakla ; 2700 - 3600 m.

*Fl. & Fr.* : July - Aug.

**C. continua** Clarke in Hook. f., F.B.I. 6 : 717. 1894.

Perennials, 20 - 40 cm tall. Leaves many, much longer than stem. Inflorescence 10 - 20 x 3.5 cm long, interrupted at base. Utricles oblong-ellipsoid, trigonous, beak short, deeply bifid.

Rangyet river side, Teesta river side ; up to 500 m.

*Fl. & Fr.* : Sept. - Oct.

**C. cruciata** Wahlenb. in Kongl. Vetensk. Acad. Handl. Stockh. 24 : 149. 1803 ; Clarke in Hook. f., F.B.I. 6 : 715. 1894 ; Nelmes in Reinwardtia 1 : 277. 1951. *Carex condensata* Nees in Wight, Contrib. Bot. Ind. 123. 1834 ; Clarke in Hook. f., l.c. 716.

Perennials, up to 15 cm tall. Stems trigonous. Leaves coriaceous, all along and exceeding the stem. Panicles up to 50 cm long. Male glumes more than 3 mm. Utricles sessile, inflated, ellipsoid, ovoid-oblong, subtrigonous, blackish brown.

Gangtok, Alichu near Busuk, Pakyong, Lachen, Namchi, on way to Katau ; up to 3300 m.

*Fl. & Fr.* : April - June (-Oct.).

On hill side walls.

var. **argocarpus** Clarke in Hook. f., F.B.I. 6 : 717. 1894.

Herbs. Secondary panicles pyramidal, dense. Utricles white, inflated, conspicuous.

Rangyet valley, Bakhim to Yoksum, Gangtok ; 600 - 2200 m.

*Fl. & Fr.* : Aug. - Oct.

**C. cruenta** Nees in Wight, Contrib. Bot. Ind. 128. 1834 ; Clarke in Hook. f., F.B.I. 6 : 734. 1894. *Carex ferruginea sensu* Clarke in Hook. f., l.c. 738 non Scop. 1772.

Herbs, up to 60 cm tall. Inflorescence ca 30 cm long. Spikes 5 - 12, remote ; terminal spike male. Utricles ellipsoid.

Zemu, Lachen ; 3900 - 4500 m.

**C. daltonii** Boott, Illustr. 1 : 5, t. 16. 1858 ; Clarke in Hook. *f.*, F.B.I. 6 : 727. 1894.

Herbs, up to 70 cm tall. Leaves many, longer than stem. Inflorescence up to 45 cm long. Spikes *ca* 5 x 0.4 cm, pale yellow, terminal one often male. Utricles ellipsoid, trigonous ; beak oblong-linear, *ca* 2/3 of the utricles.

Chunghang; up to 3000 m.

*Fl. & Fr.* : April - June.

**C. decora** Boott, Illustr. 1 : 5, t. 15. 1858 ; Clarke in Hook. *f.*, F.B.I. 6 : 725. 1894.

Herbs, 60 - 90 cm tall. Leaves much longer than stem. Inflorescence up to 45 cm long. Spikes 5, linear, purple-red, terminal one often wholly male. Utricles narrow-ellipsoid, trigonous, beaked.

Bakhim, Laghep, Tsomgo, Chola ; 2700 - 3600 m.

*Fl. & Fr.* : May - Nov.

**C. filicina** Nees in Wight, Contrib. Bot. Ind. 23. 1834, incl. var. *meiogyna* (Nees) Strachey. *Carex nilagirica* Steud., Syn. Cyp. 207. 1855. *Carex filicina* var. *minor* Boott, Illustr. 3 : 106, t. 317. & 318. 1862 ; Clarke in Hook. *f.*, *l.c.*

Herbs, 20 - 40 cm tall. Leaves subbasal, much longer than stems, narrow. Inflorescence elongate, cylindric spikes many, up to 20 cm long. Spikelets 6 - 8 mm long. Utricles *ca* 3 mm long, brown.

Karponang, Phodonchen, Bakhim, Lachen, Tsoka, Tendong R. F., Lungthang, Mainam R.F., Gangtok, Pentong, Lachung Yumthang, Panthong, Kyangosla, Chunghang, Aritar ; 1500 - 3700 m.

*Fl. & Fr.* : July - Aug.

**C. finitima** Boott, Illustr. 1 : 44, t. 112. 1858 ; Clarke in Hook. *f.*, F.B.I. 6 : 736. 1894. *Carex finitima* var. *attenuata* Clarke in Hook. *f.* *l.c.* 736.

Perennials, up to 40 cm tall. Stems trigonous. Leaves clustered at base, shorter than stem. Inflorescence up to 22 cm long. Utricles ellipsoid, trigonous. Nuts ellipsoid, trigonous, brown.

Zemu, Karponang, Lachen ; 3000 - 3600 m.

*Fl. & Fr.* : May.

**C. foliosa** D. Don *ex* Tilloch & Taylor

Herbs. Leaves 5 - 6.5 mm wide, culms stout, up to 55 cm high, ridged, acutely trigonous. Inflorescence 8-10 cm long. Utricles *ca* 3.5 mm x 1.2 mm, hispid upwards.

Lachen ; 2150 - 2900 m.

*Fr.* : Aug. - Sept.

**C. fragilis** Boott, *Illustr.* 1 : 7, t. 21. 1858 ; Clarke in *Hook. f.*, F.B.I. 6 : 728. 1894.

Herbs, 20 - 35 cm tall. Leaves narrow, equalling the stem. Spikes *ca* 2.5 cm long. Utricles oblong obovoid ; beak linear.

Lachen, Lachung ; 2700 - 3300 m.

**C. fucata** Boott *ex* Clarke in *Hook. f.*, F.B.I. 6 : 710. 1894.

Herbs. Spikes dense, blackish. Utricles ellipsoid, nerves not distinct.

Dzongri, Toong, Phedang, Mamaichu, Lachen ; 2700 - 3600 m.

*Fl. & Fr.* : Aug. - Oct.

**C. fusiformis** Nees in Wight., *Contrib. Bot. Ind.* 128. 1834 ; Clarke in *Hook. f.*, F.B.I. 6 : 736. 1894.

Herbs, up to 45 cm tall. Leaves flat, up to 30 cm long. Spikes 6 - 12, lax. Utricles ellipsoid, beak oblong-linear.

Dzongri, Toong, Phedong, Mamichu Lake, Lachen ; 3000 - 3600 m.

*Fr. & Fr.* : Aug. - Oct.

**C. gracilentata** Boott *apud* Strachey, *Cat. Pl. Kumaon* 73. 1854. *Carex alpina* var. *gracilentata* (Boott) Clarke in *Hook. f.*, F.B.I. 6 : 730. 1894.

Very slender herbs. Leaves *ca* 1.5 mm wide. Spikes small.

Lachen, Kupup, Eumtso la, Dzongri, Thangshing, Phedang, Thangu, Yumthang ; 3300 - 4200 m.

*Fl. & Fr.* : June - Sept.

**C. haematostoma** Nees in Wight, *Contrib. Bot. Ind.* 125. 1834 ; Clarke in *Hook. f.*, F.B.I. 6 : 744. 1894. *C. nakaoana* T.Koyama in *Acta Phytotax. Geobot.* 15 : 112. 1954.

Herbs. Stem up to 65 cm tall. Leaves flat, up to 50 cm long. Spikes purple, 1.2 - 6.2 x 3 - 0.6 cm. Utricles compressed, ovoid.

Dzalep, Ningbil, along Choktsering-chu, Lachen, Yumthang, Dzongri, Thangu, Thangshing ; 3300 - 5100 m.

*Fl. & Fr.* : May - Aug.

**C. inaequalis** Boott *ex* Clarke in Hook. *f.*, F.B.I. 6 : 726. 1894 *emend.* Kukenth. in Engl., Pflanzenr. 38 : 545. 1909.

Herbs, 30 - 40 cm tall. Leaves narrow, equalling the stem. Inflorescence *ca* 15 cm long. Spikes linear. Utricles small, narrow, ellipsoid, trigonous ; beak oblong-linear, 2/3 of utricles.

Lachen ; 2100 - 3300 m.

*Fl. & Fr.* : April - July.

**C. inanis** Kunth, Enum. Pl. 2 : 522. 1837 ; Clarke in Hook. *f.*, F.B.I. 6 : 743. 1894. *Carex schlagintweitiana* Boeck., Cyp. Nov. 1 : 48. 1888 ; Clarke in Hook. *f.*, *l.c.* *Carex setigera* D. Don var. *schlagintweitiana* (Boeck.) Kukenth. in Engl., Pflanzenr. 38 : 419. 1909.

Herbs, up to 37 cm tall. Leaves narrow, exceeding the stem. Spikes *ca* 16 mm long, terminal male. Utricles small, ovoid, trigonous, hispid beaked.

Zemu, Lachen, Lachung, Yumthang, Yangmaquala, Karponag, Tumbok, Yoksum to Mintok-khola ; 2400 - 3000 m.

*Fl. & Fr.* : June - Nov.

**C. inclinis** Boott *ex* Clarke in Hook. *f.*, F.B.I. 6 : 728. 1894.

Herbs, 10 - 25 cm tall. Leaves many, up to 30 cm long. Spikes solitary, males on top, females at base. Utricles narrow, ellipsoid, trigonous.

Lachen ; 2100 - 3900 m.

*Fl. & Fr.* : June - Aug.

**C. indica** L., Mant. Pl. 2 : 574. 1771 ; Clarke in Hook. *f.*, F.B.I. 6 : 744. 1894.

Perennials up to 10 cm tall. Leaves coriaceous, all along and exceeding the stem, with dark brown sheath. Panicles up to 30 cm long. Utricles subsessile, ellipsoid. Nuts obovoid, subglobose.

Sikkim, *s.l.* ; *ca* 1500 m.

*Fl. & Fr.* : Aug.

***C. insignis*** Boott, *Illustr.* 1 : 5, t. 10. 1858 ; Clarke in *Hook.f.*, F.B.I. 6 : 725. 1894.

Perennials, up to 50 cm tall. Stems triquetrous, covered by red sheaths. Leaves evenly scattered throughout the stem. Spikes long, linear, lax, darkpurple. Utricles ellipsoid, trigonous.

Gangtok, Sakyong, on way to Bakhim, Pentong, Kewzing, Bitu ; 1500 - 2100 m.

*Fl. & Fr.* : July-Aug.

***C. laeta*** Boott, *Illustr.* 1 : 69, t. 188. 1858 ; Clarke in *Hook.f.*, F.B.I. 6 : 745. 1894.

Herbs, up to 15 cm tall, caespitose. Spikes slender 2 - 3 distant, terminal male. Utricles obovoid-ellipsoid, trigonous.

Tsomgo, Tungu ; 3600 - 3900 m.

*Fl. & Fr.* : June - Sept. Endemic.

***C. lehmannii*** Drejer, *Symb. Caricol.* 13. t. 2. 1844 ; Clarke in *Hook.f.*, F.B.I. 6 : 730. 1894.

Stout herbs. Lowest spike 2.5 - 7.5 cm distant ; lowest bract much overtopping the inflorescence. Utricles up to 2 mm.

Zemu, Changu, Chola, Yumthang, Dzongri ; 3600 - 3900 m.

*Fl. & Fr.* : July - Aug.

***C. longipes*** D. Don ex Tilloch & Taylor in *Phil. Mag.* 62 : 455. 1823 ; Clarke in *Hook.f.*, F.B.I. 6 : 704. 1894. *C. nepalensis* Spr., *Syst.* 3 : 811. 1826. *C. longipes* var. *nepalensis* (Spr.) Boott, *Ill.* 4. : 190. 1867 ; Clarke in *Hook.f.*, *l.c.* 704.

Herbs, 15-60 cm long. Leaves shorter than stem. Inflorescence very long, lax. Spikes greenish yellow. Utricles flattened, ovoid or ellipsoid, beaked.

Lachung to Yumthang, Lachen ; 2100 - 2700 m.

*Fl. & Fr.* : May - Aug.

***C. microglochin*** Wahlenb. in *Handl. Kong. A cad. Stockh.* 24 : 140. 1803 ; Clarke in *Hook.f.*, F.B.I. 6 : 711. 1894.

Herbs, up to 10 cm high. Leaves almost equalling the culms, subbasal, inrolled. Inflorescence consisting of a single androgynous spike. Utricles narrowly lanceolate, finally deflexed.

Lhonak, Gamothang ; 3600 - 4100 m.

*Fl. & Fr.* : May - Sept.

**C. monopleura** Kretz. in Not. Syst. Herb. Inst. Bot. Acad. Sci. URSS 7: 35. 1937 ; Nelmes in Kew Bull. 1950 ; 208. 1950. *C. rochebrunii* Franch. & Sav., Enum. Fl. Japon. 2: 555. 1878. *C. remota* var. *rochebrunii* (Franch & Sav.) Clarke in Hook.f., F.B.I. 6: 706. 1894.

Herbs, 20 - 30 cm long. Leaves up to 20 x 0.3 cm. Spikes 6 - 9, oblong. Utricles ca 4 mm long ; beak triangular.

Bakhim Yoksum, Lachen, above Tsoka, before Yumthang ; 2700 - 3600 m.

*Fl. & Fr.* : June - Aug.

**C. moorcroftii** Falc. ex Boott in Proc. Linn. Soc. 20: 140. 1851 ; Clarke in Hook. f., F.B.I. 6: 733. 1894.

Herbs, up to 20 cm high. Leaves basal, shorter than culms. Spikes large, reddish black, terminal pale. Utricles large, ellipsoid, trigonous, abruptly contracted into beak, pale upwards.

Giagong to Kareng, Chholamo Gurudongmar, Yumechu, Llonakh, 4800 - 5100 m.

*Fl. & Fr.* : Aug.

**C. munda** Boott, Illustr. 1: 7, t. 20. 1858 ; Clarke in Hook.f., F.B.I. 6: 727 1894.

Herbs, 25 - 45 cm tall. Leaves equalling the inflorescence. Spikes oblong-linear. Utricle ellipsoid, trigonous, greenish yellow, beaked.

Yakchey - Yumthang, Lachen, Lunguthang, on way to Katau from Lachung, Karponang, Dzongri, Leghep, Changu, Chola, Zemu ; 3000 - 3900 m.

*Fl. & Fr.* : July - Aug.

**C. myosurus** Nees in Wight, Contrib. Bot. Ind. 122. 1834 (excl. rep. Pl. Nepal) ; Clarke in Hook.f., F.B.I. 6: 723. 1894. *C. myosurus* var. *eminens* (Nees) Clarke in Hook.f., F.B.I. 6: 723. 1894. *Carex eminens* Nees

in Wight, Contrib. Bot. Ind. 122. 1834. *C. myosurus* var. *rotongensis* Clarke in Hook. f., F.B.I. 6 : 723. 1894.

Herbs, up to 90 cm tall. Leaves often equalling the stem. Panicles ca 30 cm long, dark reddish brown. Utricles narrowly ellipsoid trigonous.

Deorali, Gangtok, Rishi Khola ; 1800 - 2400 m.

*Fl.* : July - Sept.

*C. nivalis* Boott in Proc. Linn. Soc. 1 : 256. 1846 ; Clarke in Hook. f., F.B.I. 6 : 732. 1894.

Herbs. Terminal spikes wholly male, or female at top. Utricles broad, much compressed.

Lachen, Samdung ; 3300 - 5100 m.

*C. notha* Kunth, Enum. Pl. 2 : 421. 1837 ; Clarke in Hook. f., F.B.I. 6 : 709. 1894.

Herbs. Spikes linear-cylindric, brown. Utricles ellipsoid ; beak linear, short.

Upper Sikkim, Chola ; 3300 - 3600 m.

*Fl. & Fr.* : July - Aug.

*C. nubigena* D. Don ex Tilloch & Taylor in Phil. Mag. 62 : 455. 1823 ; Clarke in Hook. f., F.B.I. 6 : 702. 1894.

Herbs. Leaves long, narrow. Inflorescence ovoid to linear, 1.2 - 12 cm long, interrupted. Spikes ovoid, androgynous. Utricles ellipsoid.

Gangtok, Mintok-Khola to Prek -chu, Kupup, Karponang, Lachen, Lachung, Changu, Tosa, Yumthang ; 1800 - 4200 m.

*Fl. & Fr.* : May - June.

*C. obscura* Nees in Wight, Contrib. Bot. Ind. 126. 1834 ; Clarke in Hook. f., F.B.I. 6 : 731. 1894.

Herbs, 30 - 60 cm tall. Leaves overtopping the stem. Spikes blackish, terminal one occasionally male. Utricles oblong, beaked, shining yellow.

Chola, Manmaichu, Tosa, Zemu; 3600 - 3900 m.

*Fl. & Fr.* : July - Aug.

var. **brachycarpa** Clarke in Hook. *f.*, F.B.I. 6 : 731. 1894.

Utricle obovoid-ellipsoid, narrowed abruptly into a short oblong beak, scabrous.

Yumthang, Dzongri, Jamlingthang, Thangsing, Kupup, Pentangla, Zemu valley, Lachen, N.E. Sikkim ; 3300 - 3600 m.

*Fl.* : July - Aug.

**O. obscuriceps** Kukenth. in Engl., *Pflanzenr.* 38 : 723. 1909. *C. lurida* Clarke in Hook. *f.*, F.B.I. 6 : 742. 1894, *non* Wahlenberg

Herbs. Leaves inserted near base of culm, almost equalling culms. Spikes 4 - 5, distant, purple-red. Utricle-beak 2 - fid.

Lachen ; 2400 - 3600 m.

*Fl. & Fr.* : May - Aug.

**C. oedorrhampha** Nelves in Kew Bull. 1939 ; 659. 1939. *Carex tumida* Boott, *Illustr.* 1 : 66. t. 181. 1858, *non* Beilschm. 1850 ; Hook. *f.*, F.B.I. 6 : 741. 1894.

Herbs, 30 - 45 cm tall. Leaves longer than stem. Spikes 4 - 5, suberect, terminal one male. Utricles ellipsoid.

Sikkim, *s.l.* ; 2400 - 3000 m.

**C. olivacea** Boott in Proc. Linn. Soc. 1 : 286. 1845 ; Clarke in Hook. *f.*, F.B.I. 6 : 741. 1894.

Herbs, up to 90 cm high. Leaves basal, one on culm, exceeding culms. Inflorescence of one terminal male and 3 - 9 female spikes. Utricles armed, turgid and trigonous, abruptly contract into beak.

Sikkim, *s.l.* ; 2000 - 3050 m.

*Fl. & Fr.* : April - Sept.

**C. orbicularis** Boott in Proc. Linn. Soc. 1 : 254. 1854. *C. rigida sensu* Clarke in Hook. *f.*, F.B.I. 6 : 711. 1894, *non* Gooden 1894. *C. vulgaris sensu* Clarke in Hook. *f.*, F.B.I. 6 : 711. 1894, *non* Fries 1842.

Herbs, 10 - 25 cm tall. Leaves flat, recurved. Spikes 3 - 4, cylindric, dense. Utricle ellipsoid ; beak minute, entire.

Lachen ; 2700 - 3600 m.

*Fl. & Fr.* : July - Aug.

**C. pamirensis** Clarke *ex* Fedtsch in J. Bot. St. Petersburg. 1 : 19. 1908.  
*C. rostrata sensu* Clarke in Hook. *f.*, F.B.I. 6 : 740. 1894, *non* Stokes 1787.

Herbs, up to 90 cm tall. Spikes 3 - 6, distant, erect, upper most 1 - 3 male, lower female. Utricle ovoid to ellipsoid, inflated, suddenly narrowed into a beak.

Lachen ; 2700 - 3600 m.

**C. parva** Nees in Wight, Contrib. Bot. Ind. 120. 1834 ; Clarke in Hook. *f.*, F.B.I. 6 : 712. 1894.

Herbs. Spikes brown, 6 - 18 mm long. Utricles lanceolate, acuminate, long beaked, glabrous.

Kupup, Lachen; 3600 - 4800 m.

*Fl. & Fr.* : July - Aug.

**C. phacota** Spr. in L., Syst., Veg. ed. 16, 3 : 826. 1826 ; Clarke in Hook. *f.*, F.B.I. 6 : 708. 1894.

Herbs, up to 75 cm tall, triquetrous, Leaves equalling the stem. Inflorescence 10 - 15 cm long. Spikes 3 - 14, linear-cylindrical. Utricles ovoid. Beak short triangular.

Lachung ; 1800 - 2100 m.

**C. polycephala** Boott, Illustr. 1 : 4, t. 12. 1858 ; Clarke in Hook. *f.*, F.B.I. 6 : 725. 1894.

Robust herbs, 30 - 45 cm tall. Leaves long, exceeding the inflorescence. Inflorescence elongate-oblong, dense. Spikes large, oblong-cylindric, straw coloured. Utricles ellipsoid, trigonous.

Dikeeling, Labdong (Lepdang) ; 1500 - 3700 m.

*Fl. & Fr.* : April - July.

**C. praeclara** Nelmes in Hook., Ic. Pl. 35. t. 3403. 1940.

Herbs, up to 20 cm high. Inflorescence forming a 2.5 - 3.5 cm, dense head. Spikes 4 - 5, broadly ovoid, androgynous. Utricles with up to 0.5 mm long beak.

Lhonakh, Jonsony-la valley ; 4880 - 5030 m.

*Fl.* : Aug.

**C. praelonga** Clarke in Hook. *f.*, F.B.I. 6 : 707. 1894.

Herbs, 60 - 90 cm tall. Spikes 4 - 9, linear. Utricle obovate, yellow-brown.

Dikeeling, West of Dzungri ; 2250 - 2700 m.

*Fl. & Fr.* : April - May.

**Carex pseudofetida** Kukenth. in Bot. Tidsskr. 28 : 225, f. 1. 1907.

Herbs, up to 20 cm high. Leaves subbasal, deeply channelled, inrolled, shorter than culms. Inflorescence a densely congested head, ovoid to oblong. Spikes 3, androgynous. Utricles narrowly elliptic, pale golden.

Kareng Chholamo ; 3050 - 4780 m.

*Fl. & Fr.* : June - Aug.

**C. psychophila** Nees in Wight, Contrib. Bot. Ind. 127. 1834 ; Clarke in Hook. *f.*, F.B.I. 6 : 732. 1894.

Herbs, up to 60 cm tall. Leaves up to 45 x 0.4 cm. Spikes cylindric, terminal one female. Utricles small, obscurely nerved.

Yumthang ; ca 3600 m.

**C. pulchra** Boott, Illustr. 1 : 4. t.13. 1858 ; Clarke in Hook. *f.*, F.B.I. 6 : 727. 1894.

Herbs, 20-40 cm tall. Leaves shorter than inflorescence. Inflorescence oblong. Spikes linear, brown. Utricles narrow, ellipsoid-trigonous.

Lachen, before Yumthang, Lachung, Zemu, Lachung, Karponang ; 2100 - 3300 m.

*Fl. & Fr.* : July.

**C. radicalis** Boott, Illustr. 1 : 56. t. 147. 1858 ; Clarke in Hook. *f.*, F.B.I. 6 : 729. 1894.

Herbs. Culms almost capillary, 20 - 30 cm tall. Spikes 1 - 3, androgynous. Utricles ovoid, hairy, dull green.

Lachen ; 3000 - 3300 m.

*Fl. & Fr.* : July - Aug.

**C. rara** Boott in Proc. Linn. Soc. 1 : 284. 1854 & Illustr. 1 : 44. t. 109. 1858.

Herbs, up to 40 cm tall. Stem filiform, trigonous. Leaves few, filiform, clustered at base. Spikelets solitary, terminal androgynous. Utricle ovoid-oblong, beaked.

Laghep, Phedung Yumthang valley, Changu, Chola, Yakla, Legshisp ; 3000 - 3900 m.

*Fl. & Fr.* : July - Aug.

*C. royleana* Nees in Wt., Contrib. Bot. Ind. 127. 1834. *C. breviculmis sensu* Clarke in Hook. f., F.B.I. 6 : 746. 1894, *non* R. Br. 1810.

Herbs. Stem caespitose, 10 - 40 cm tall. Leaves 6 - 25 x 0.3 cm, flat. Spikes 2 - 5, oblong, terminal one male, female with 8 - 14 utricles. Utricles small ellipsoid, trigonous, sparsely pubescent.

Lachung ; 2700 - 3000 m.

*C. sahnii* Ghildyal & Bhattacharyya in J. Econ Tax. Bot. 7 : 447. 1985. *Carex kingiana* Clarke in Kew Bull. Addl. Ser. 8 : 75. 1908, *non* Lev. & Van. 1902 ; Ghildyal in Nayar & Sastry, Red Data Book Ind. Pl. 2 : 102. 1988.

Herbs. Spikelets linear-cylindric, androgynous, interrupted at base. Utricles oblong-ellipsoid, trigonous.

Phodong ; ca 1800 m. Endemic.

*C. setigera* D. Don in Trans. Linn. Soc. 14 : 330. 1824 ; Clarke in Hook. f., F.B.I. 6 : 743. 1894. *C. aristata* D. Don *ex* Tilloch & Taylor in Phil. Mag. 62 : 455. 1823.

Herbs. Leaves equalling the stem. Spikes 4 - 8, cylindric, distant, terminal 1 (-2 -3) male, lowest female. Utricles ovoid, hispid, suddenly narrowed into small oblong notched beak.

Chungthang, Lachen ; 2100 - 2400 m.

*C. setosa* Boott, Illustr. 3 : 108, t. 327 - 329. 1862 ; Clarke in Hook. f., F.B.I. 6 : 745. 1894.

Herbs with setose stem, 15 - 30 cm long. Leaves flat. Spikes 2 - 5, terminal one male. Utricles oblong-obovoid, trigonous, setose.

Chamnago, Lachen, Namdee ; 2700 - 3600 m.

*C. sikkimensis* Clarke in Hook. f., F.B.I. 6 : 708. 1894. *C. fucata* var. *sikkimensis* (Clarke) Kukenth. in Engl., Pflanzenr. Heft. 38 : 344. 1908.

Herbs. Leaves narrow, long. Spikes 4 - 7, linear, clavate, female at top. Utricles ellipsoid, *ca* 2 mm long.

Dzongri ; 3600 - 3900 m.

**C. spiculata** Boott var. *nobilis* Clarke in Hook. *f.*, F.B.I. 6 : 724. 1894. *C. nobilis* Boott, Illustr. 1 : 4, tt. 9 - 11. 1858. *C. myosurus* ssp. *spiculata* (Boott) Kukenth. var. *nobilis* Kukenth. in Engl., Pflanzenr. 38 : 259. 1909.

Perennials, up to 90 cm tall. Leaves coriaceous, much exceeding the stems. Panicles up to 40 cm long. Utricles sessile, subcoriaceous, not inflated, ellipsoid, trigonous, gradually beaked. Nuts stipitate, ellipsoid, triquetrous, dark brown.

Ryang ; up to 1200 m.

*Fl. & Fr.* : July - Sept.

**C. stramentitia** Boott ex Boeck. in Linnaea 40 : 351. 1876 ; Clarke in Hook. *f.*, F.B.I. 6 : 717. 1894.

Perennials, up to 12 cm tall. Leaves coriaceous, all along and exceeding the stem, up to 15 mm wide. Panicles up to 35 cm long. Utricles sessile, slightly obovoid, trigonous, abruptly beaked. Nuts ovoid-ellipsoid, triquetrous, yellowish brown.

Pakyong, Burmiak, Rangpo ; up to 1400 m.

*Fl. & Fr.* : Dec. - May.

**C. thomsonii** Boott, Illustr. 1 : 1, t. 1. 1858 ; Clarke in Hook. *f.*, F.B.I. 6 : 703. 1894.

Perennials, up to 30 cm tall. Stems trigonous. Leaves scattered all along the stem, sheaths black. Inflorescence spicate. Glumes and utricles purplish red, streaked and dotted. Nuts obovoid, deep brown.

Great Rangeet, Little Rangeet ; 300 - 600 m.

*Fl. & Fr.* : April.

**C. vesiculosa** Boott, Illustr. 3 : 107. t. 323. 1862 ; Clarke in Hook. *f.*, F.B.I. 6 : 717. 1894.

var. **vesiculosa**

Perennials, up to 1 m tall. Stem trigonous. Leaves coriaceous ; sheaths yellowish brown. Inflorescence irregularly paniced, panicles narrow, up to 40 cm long. Glumes ovate-lanceolate, yellowish brown, red

streaked. Utricles ellipsoid. Nuts stipitate, ellipsoid, triquetrous, irregularly ribbed, not inflated, yellowish brown, beak ca half the size of utricule.

Rumtek-Martam ; 1000-1800 m.

*Fl. & Fr.* : June - Dec.

In dry to moist, open places, among boulders.

var. **pallida** (Kukenth.) R.C. Srivastava

var. **congesta** f. **pallida** Kukenth. in Engl., Pflanzenr. Heft. 38. IV, 20 : 238. 1958.

Plants forming clumps on hillside walls, smaller than var. *vesiculosa*. Spikes, glumes and nuts paler.

Bitu locality on way to Kabi and Chitrey-Phamtam.

*Fl. & Fr.* : July - Aug.

On hill side walls at moist locations.

**C. wallichiana** Spr., Syst. 3 : 812. 1826. *Carex foliosa* D. Don ex Tilloch & Taylor in Phil. Mag. 62 : 455. 1823. *Carex muricata* L. var. *foliosa* (D. Don ex Tilloch & Taylor) Clarke in Hook. f., F.B.I. 6 : 703. 1894.

Perennials, up to 90 cm tall. Stems triquetrous. Leaves usually shorter than stem. Inflorescence spicate, up to 10 cm long. Glumes ovate, pale brown. Utricles ovate-lanceolate, pale greenish. Nuts ovoid.

Lachen ; 2150 - 2900 m.

*Fl. & Fr.* : July - Sept.

### CYPERUSL.

**Cyperus alulatus** Kern in Reinwardtia 1 : 463. f. 1. 1952. *Cyperus iria* var. *rectangularis* Kukenth. in Engl., Pflanzenr. 101. 152. 1935. *Cyperus rectangularis* (Kukenth.) Bennet in Indian Forester 95 : 692. 1969.

Annual herbs, up to 40 cm tall. Leaves equalling to or longer than the stem. Spikelets greenish yellow. Nuts obovoid, reddish brown.

Ranipool, Tingbong.

*Fl. & Fr.* : Aug. - Oct.

**C. castaneus** Willd., Sp. Pl. 1 : 278. 1797 ; Clarke in Hook. f., F.B.I. 6 : 598. 1893.

Annual herbs, up to 15 cm tall. Anthela usually simple, often reduced to a single head ; spikelets linear-oblong ; glumes oblong-spathulate. Nuts ca 1 mm long.

Geyzing, Jorethang - Ronghong Bridge Rd ; ca 500 m.

*Fl. & Fr.* : Sept. - Oct.

**C. compressus** L., Sp. Pl. 46. 1753 *emend.* Dandy in Exell. Cat. s. Tome 357. 1844 ; Clarke in Hook. f., F.B.I. 6 : 605. 1893. *Cyperus pectiniformis* R. & S., Mant. 2 : 128. 1824. *Cyperus compressus* var. *pectiniformis* (R. & S.) Clarke in J. Linn. Bot. 21 : 97. 1814.

Herbs. up to 10 cm high. Anthela simple, lax. Spikelets linear or oblong, compressed, greenish white to green, glumes ovate, 3 - 4 mm long. Nuts broadly obovoid, shortly apiculate.

Jorethang, Deorali (Gangtok), near Rabong la, near Singtam, Melli ; 550 - 2100 m.

*Fl.* : June - Oct.

**C. cuspidatus** Kunth in H.B.K., Nov. Gen. Sp. 1 : 204. 1815 ; Clarke in Hook. f., F.B.I. 6 : 598. 1893. *Cyperus uncinatus sensu* Clarke in Phillip. J. Sci. Bot. 2 : 82. 1907, *non* Poir. 1806.

Annual herbs, up to 20 cm tall. Anthela rays 1 - 3 ; spikelets linear, compressed ; glumes ovate, aristate. Nuts ca 1 mm long, punctulate.

Jorethang ; up to 2700 m.

*Fl. & Fr.* : May - June (-Oct.)

**C. difformis** L., Sp. Pl. 67. 1753 ; Clarke in Hook. f., F.B.I. 6 : 599. 1893.

Annuals, up to 70 cm tall. Anthela simple. Spikelets stellately spreading ; glumes 3-nerved. Nuts obovoid, trigonous, almost equalling the glumes.

Sikkim, *s.l.* ; up to 2400 m.

**C. distans** L. f., Suppl. 1.3. 1781 ; Clarke in Hook. f., F.B.I. 6 : 607. 1893.

Herbs: Anthela large, compound ; spikelets 10 - 20-flowered. Nuts oblong or narrowly ellipsoid.

Singtam - Ranipool, Jorethang ; up to 900 m.

*Fl. & Fr.* : Aug. - Sept.

**C. exaltatus** Retz., Obs. Bot. 5 : 117. 1789 ; Clarke in Hook. *f.*, F.B.I. 6 : 617. 1893.

Herbs, up to 1 m tall. Spikes long cylindric, lax ; spikelets linear, 8-20 flowered, brightly coloured.

Dikeeling ; *ca* 1000 m.

*Fl. & Fr.* : Sept. - Oct.

**C. halpan** L., Sp. Pl. 45. 1753 ('*haspan*'); Clarke in Hook. *f.*, F.B.I. 6 : 600. 1893.

Annual herbs, up to 30 cm tall. Anthela compound of decomposed ; spikelets linear-lanceolate ; glumes ovate - oblong. Nuts *ca* 0.5 mm long.

Tangpo - Teesta, Rishi - Khola, Dzongu, Tendong ; up to 1700 m.

*Fl. & Fr.* : April - Oct.

**C. involucratus** Rottboell.

Perennial herbs. Stems leafless, tufted, Basal sheaths papery. Inflorescence umbellete ; bracts leaflike. Spikelets in umbels of 5 - 9. Nuts oblong-elliptic, acute.

Gangok ; *ca* 1750 m. Cult.

**C. iria** L., Sp. Pl. 45. 1753 ; Clarke in Hook. *f.*, F.B.I. 6 : 606. 1893. *Cyperus parviflorus* Nees in Wight, Contrib. Bot. Ind. 87. 1834 *excl. syn.*, *non* Vahl 1806. *Cyperus iria* var. *parviflorus* (Nees) Miq., Fl. Ind. Bat. 3 : 270. 1859. *Cyperus paniciformis* Franch. & Sav., Pl. Jap. 2 : 103. 537. 1879. *Cyperus kamphoeveneri* Boeck., Cyp. Nov. 1 : 5. 1888 ; Clarke in Hook. *f.*, F.B.I. 6 : 594. 1893.

Annual herbs, up to 60 cm tall. Stem compressed, trigonous. Anthela simple or compound ; spikelets oblong, glumes keeled. Nuts broadly stripitate, obovoid-ellipsoid, triquetrous, *ca* 1.5 mm long.

Ranipool, Gangtok, Rangpo Teesta, Jorethang, Temi, below Runetek, Singtam ; up to 1150 m.

*Fl. & Fr.* : June - Oct.

**C. laxus** Lamk, Ill. 1 : 146. 1791 *emend.* Poir. in Lamk., Encycl. 7 : 260. 1806 ; J. Raynal in Adansonia 2, 17 : 277. 1978. *Cyperus*

*diffusus* Vahl, Enum. Pl. 2 : 321. 1805 ; Clarke in Hook. f., F.B.I. 6 : 603. 1893.

Herbs 20 - 75 cm tall. Leaves equalling the stem, flat. Spikelets 3 - 9 together, digitate. Nuts broadly ellipsoid, triquetrous.

Ratepani - Suntaley, Rishi, near Singtam, Rangpo ; 350 - 750 m.

*Fl. & Fr.* : Aug. - Sept.

*C. niveus* Retz., Obs. Bot. 5 : 12. 1788 ; Clarke, *l.c.* 601.

Slender herbs, up to 40 cm tall. Spikelets 3 - 12 mm strongly compressed, linear-oblong, 20 - 40-flowered. Nuts oblong - obovoid.

Sikkim, *s.l.* ; up to 1800 m.

*Fl. & Fr.* : Feb. - Aug.

*C. nutans* Vahl, Enum Pl. 2 : 363. 1806 ; Clarke, *l.c.* 607.

Herbs, up to 1 m tall. Anthela compound. Spikelets loosely spicate.

Legship, N.W. of Singtam, Namli.

*Fl.* : Aug. - Oct.

*C. pangorei* Rottb., Descr. Ic. Rar. Nov. Pl. 31. t. 7. f. 3. 1773.

*Cyperus corymbosus* Rottb. var. *pangorei* (Rottb.) Clarke in J. Linn. Soc. 21 : 292. 1884 & in Hook. f., F.B.I. 6 : 612. 1893. *Cyperus tegetum* Roxb., Fl. Ind. 1 : 208. 1832 ; Clarke in Hook. f., *l.c.* 613.

Perennials, up to 80 cm tall. Spikelets clustered. Glumes linear, obtuse, *ca* 3 mm long. Nuts narrowly obovoid-oblong, trigonous, *ca* 1.5 mm long.

Melli ; up to 300 m.

*Fl. & Fr.* : June - Oct.

*C. pilosus* Vahl, Enum. Pl. 2 : 534. 1806 ; Clarke in Hook. f., F.B.I. 6 : 609. 1893. *Cyperus obliquus* Nees in Wight, Contrib. Bot. Ind. 86. 1834. *Cyperus pilosus* var. *obliqua* (Nees) Clarke in J. Linn. Soc. 21 : 151. 1884 & in Hook. f., *l.c.* 610. *Cyperus pilosus* var. *polyantha* Clarke, *l.c.* 148. & in Hook. f., *l.c.*

Perennial herbs, up to 50 cm tall. Leaves canaliculate or plicate. Anthela compound, lax ; spikes ovoid ; spikelets linear ; glumes ovate, muticus or mucronulate. Nuts obovoid, *ca* 1.2 mm long.

Temi, near Singtam, Phodong, Rinchingpong, Ranipool, Rangeet, valley, Jorethang ; 500 - 600 m.

*Fl. & Fr.* : June - Oct.

*C. rotundus* L., Sp. Pl. 45. 1753 ; Clarke in Hook. f., F.B.I. 6 : 614. 1893.

Perennial herbs, up to 30 cm tall. Stems triquetrous. Anthela lax ; bracts foliaceous ; spikelets linear-lanceolate, glumes ovate, keeled. Nuts oblong-obovoid, ca 1.5 mm long, black.

Gangtok, Teesta, Saramsa, near Ranipool, Jorethang, Legship, Namthang ; up to 2150 m.

*Fl. & Fr.* : March - June.

*C. silletensis* Nees in Wight, Contrib. Bot. Ind. 79. 1834 ; Clarke in Hook. f., F.B.I. 6 : 600. 1893.

Annual herbs, up to 30 mm tall, tufted. Stems trigonous. Leaves 4 - 6, shorter than to subequalling the stem. Anthela compound ; spikelets in clusters, lanceolate ; glumes ovate-lanceolate, greenish stramineous to reddish, keeled. Nuts ellipsoid, apiculate ca 0.8 mm long, brownish.

Rangpo, Teesta ; ca 350 m.

*Fl. & Fr.* : June - July.

*C. tenuiculmis* Boeck. in Linnaea 36 : 286. 1870. *Cyperus zollingeri sensu* Clarke in Hook. f., F.B.I. 6 : 613. 1893, non Steud. 1855 ; Kern in Reinwardtia 2 : 108. f. 6. 1952. *Cyperus zollingeri* var. *condensatus* Kukenth. in Engl., Pflanzenr. 101 : 134. 1935.

Annuals or perennials, up to 30 cm tall, tufted. Stems triquetrous, grooved. Leaves 5 - 8, half to 2/3 of stem, margins revolute. Anthela simple or compound, lax ; spikelets shortly spicate, in clusters of 2 - 15 ; glumes elliptic-lanceolate, muticus, fulvous. Nuts obovoid, triquetrous, blackish.

Gangtok (near Elephat Mansion, Deorali), Rishi, Yoksum, near Runtek.

*Fl. & Fr.* : July - Oct.

*C. tenuispica* Steud., Syn. Cyp. 11. 1855. *Cyperus flavidus sensu* Clarke in Hook. f., F.B.I. 6 : 600 - 601. 1893, non Retz. 1789.

Annual herbs, up to 4 cm tall. Anthera lax ; glumes laxly arranged, ovate-oblong, slightly keeled towards the top. Nuts *ca* 0.5 mm long, tubercled, white.

Sikkim, *s.l.* ; in rice fields.

### ELEOCHARIS R. Br.

**Eleocharis congesta** D. Don, Prodr. Fl. Nepal. 41. 1825 ; Clarke in Hook. *f.*, F.B.I. 6 : 630. 1893. *Eleocharis afflata* Steud., Syn. Cyp. 2 : 76. 1855 ; C.B. Clarke in Hook. *f.*, *l.c.* 629. *Eleocharis subvivipara* Boeck. in Linnaea 36 : 424. 1870 ; Clarke in Hook. *f.*, *l.c.* *Eleocharis chaetaria* var. *subvivipara* (Boeck.) C.E. C. Fischer in Gamble, Fl. Pres. Madras 1648. 1931. (3 : 1145. 1967, Repr. ed.) *Eleocharis congesta* var. *subvivipara* (Boeck.) T. Koyama in J. Fac. Sci. Univ. Tokyo 3, 8 : 90. 1962.

Annuals or perennial herbs, up to 40 cm tall. Glumes ovate to lanceolate ; bristles retrorsely scabrous. Nuts *ca* 1 mm long ; style base shortly pyramidally triangular.

Ranipool, Penlong - la, Yoksum, Phedong to Kabi, Gangtok ; up to 2300 m.

*Fl. & Fr.* : May - Oct.

**E. dulcis** (Burm. *f.*) Trin. *ex* Henschel, Vita Rumph. 186. 1833. *Andropogon dulce* Burm. *f.*, Fl. Ind. 219. 1768. *Scirpus platagineus* Retz., Obs. Bot. 5 : 14. 1789. *Eleocharis plantaginea* (Retz.) R. & S., Syst. Veg. 2 : 150. 1817 ; Clarke in Hook. *f.*, F.B.I. 6 : 625. 1893.

Perennial herbs, up to 20 cm tall. Spikelets 1.5 - 6 x 3 - 6 mm; bristles retrorsely scabrous, light brown; styles 2 - 3 fid. Nuts obovate; style base triangular.

Sikkim *s.l.* ; *ca* 350 m.

*Fl. & Fr.* : Nov. - Dec.

**E. palustris** (L.) R. Br., Prodr. 224. 1810 ; Clarke in Hook. *f.*, F.B.I. 6 : 628. 1893. *Scirpus palustris* L., Sp. Pl. 70. 1753.

Perennial herbs, up to 30 cm tall. Spikes ovoid or subcylindric, densely many-flowered ; glumes membranous, ovate-lanceolate, muticus.

Lachen, Lhionak ; 3000 - 4310 m.

*Fl. & Fr.* : June - Aug.

*E. tetraquetra* Nees in Wight, Contrib. Bot. Ind. 113. 1834 ; Clarke in Hook. f., F.B.I. 6: 630. 1893.

Herbs, 20 - 90 cm tall. Spikelets oblong-ellipsoid. Nuts obovoid, trigonous.

Lachen, Lachung, Chungthang, North Rangeet ; 450 - 3300 m.

*Fl. & Fr.* : May - Oct.

### ERIPHORUM L.

*Eriophorum comosum* Wall. ex Nees in Wight, Contrib. Bot. Ind. 110. 1834 ; Clarke in Hook. f., F.B.I. 6: 664. 1893. *Scirpus comosus* Wall. in Roxb., Fl. Ind. 1 : 234. 1820.

Perennial herbs, up to 45 cm long. Leaves almost equalling the stem. Anthella decomposed or supra decomposed, with many ellipsoid spikelets ; glumes keeled. Nuts sessile, ellipsoid, ca 3 mm long.

Chalisay, Geyzing, Rongli Khola, Padamchen, Rorathang, Rangpo, on way to Pakyong, Jorethang, Ratepani, Singtam, Marchak before Dikchu ; up to 1200 m.

*Fl. & Fr.* : Sept. - Oct.

*Notes* : On hillside walls along Teesta ad Rangeet valleys.

*E. microstachyum* Boeck. in Linnaea 38 : 399. 1874 ; Clarke in Hook. f., F.B.I. 6 : 664. 1893.

Herbs, 5 - 15 cm long, slender. Spikelets 1 - 3, subcapitate, brown.

Sikkim, *s.l.* ; 2400 - 4800 m.

*Fl. & Fr.* : Sept. - Oct.

### FIMBRISTYLIS Vahl

*Fimbristylis aestivalis* (Retz.) Vahl. Enum. Pl. 2 : 288. 1806 ; Clarke in Hook. f., F.B.I. 6 : 637. 1893. *Scirpus aestivalis* Retz., Obs. Bot. 4 : 12. 1786. *Fimbristylis bis-umbellata sensu* C.E.C. Fischer in Gamble, Fl. Pres. Madras 1898. 1936 (3 : 1151. 1967 Repr. ed.), *non* Bub. 1850.

Annuals, up to 20 cm tall. Leaves setaceous. Spikelets solitary ; glumes ovate, keels green. Nuts elliptic or obovate.

Lachen, Yoksum, Dentam - Pamianchi, Gangtok, Ranipool ; up to 1700 m.

*Fl. & Fr.* : April - Aug.

**F. bisumbellata** (Forssk.) Bub., Dodec. 30. 1850. *Scirpus bisumbellatus* Forssk., Fl. Age.-Arab. 15. 1775. *Fimbristylis dichotoma sensu* Clarke in Hook. f., F.B.I. 6 : 635. 1893, *non* (L.) Vahl, 1806.

Annual herbs, up to 20 cm tall. Anthela compound to decomposed ; spikelets solitary ; glumes keeled. Nuts biconvex, shortly stipitate.

Royang, Rumtek ; 600 - 2500 m.

*Fl. & Fr.* : July - Sept.

**F. complanata** (Retz.) Link, Hort. Bot. Berol. 1 : 292. 1827 ; Clarke in Hook. f., F.B.I. 6 : 646. 1893. *Scirpus complanatus* Retz., Obs. Bot. 5 : 14. 1789.

Annual herbs. Anthela compound or decomposed ; spikelets lanceolate to oblong-ovoid ; glumes keeled. Nuts broadly obovoid, trigonous, ca 1 mm long, verruculose.

Lindok, above Yoksum, on way to Yumthang, ; 1800 - 2100 m.

*Fl. & Fr.* : July - Aug.

**F. dichotoma** (L.) Vahl, Enum. Pl. 2 : 287. 1806. *Scirpus dichotomus* L., Sp. Pl. 50. 1753. *Fimbristylis diphylla* Vahl, l.c. 289 ; Clarke in Hook. f., F.B.I. 6 : 636. 1893 (excl. var. *pluristriata*). *Fimbristylis diphylla* var. *annua* (R. & S.) Clarke in Hook. f., l.c. 637. *Fimbristylis annua* R. & S. var. *paucispiculata* Blatt. & Mcc. in J. Bombay Nat. Hist. Soc. 37 : 544. 1934.

Annual herbs, up to 80 cm tall. Leaves usually shorter than stem. Anthela simple to decomposed ; spikelets ovoid-globose. Nuts obovoid, ca 1 mm, shortly stipitate.

Near Phensong, on way to Lachung, Tingbong, Gezing, Rangpo - Teesta, Gangtok, Chungthang - Lachung, Temi, Dikchu, near Pheonsong ; up to 2700 m.

*Fl. & Fr.* : June - Oct.

**F. littoralis** Gaud. in Freyc., Voy. Bot. 413. 1826. *F. miliacea sensu* Benth., Fl. Austral. 316. 1878 ; Clarke in Hook. f., F.B.I. 6 : 644. 1893, *p.p. omne non* Vahl 1806, *non Scirpus miliaceus* L.

Annual or perennial herbs, up to 80 cm tall. Flowering shoots many, usually leafless ; anthela lax, supradecomposed ; spikelets ovoid ; glumes ovate. Nuts obovoid or suborbicular, trigonous, densely verrucose, pale brown.

Pachekhani, Ranipool, on way to Rishi ; up to 900 m.

*Fl. & Fr.* : June - Oct.

**F. miliacea** (L.) Vahl, Enum Pl. 2 : 287. 1806, *emend.* Blake in J. Arnold Arb. 35 : 216. 1954 ; Clarke in Hook. *f.*, F.B.I. 6 : 644. 1893. *Scirpus miliaceus* L., Syst. Veg. ed. 10, 2 : 868. 1759.

Herbs. Leaves shorter to equalling culm. Anthela lax, compound or decomposed. Spikelets oblong-ovoid. Nuts broadly ellipsoid to subglobose.

Phodong to Kabi, Pachekhani, up to 1800 m.

*Fl. & Fr.* : July - Oct.

**F. schoenoides** (Retz.) Vahl, Enum. Pl. 2 : 286. 1806 ; Clarke in Hook. *f.*, F.B.I. 6 : 634. 1893. *Scirpus schoenoides* Retz., Obs. Bot. 5 : 14. 1789.

Herbs, up to 20 cm tall. Leaves 0.5 - 1 mm wide. Anthela simple or reduced to a solitary spikelet. Spikelets broadly ovoid, terete. Nuts stipitate, obovoid.

Ranipool ; *ca* 750 m.

*Fl. & Fr.* : July - Aug.

**F. stolonifera** Clarke in Hook. *f.*, F.B.I. 6 : 637. 1893.

Herbs with slender creeping stolons covered with dull fibrous scales. Inflorescence simple. Spikelets up to 7.5 x 4 cm. Glumes reddish brown.

Phodong ; 1680 - 2900 m.

*Fl. & Fr.* : June - Sept.

**F. thomsonii** Boeck. in Linnaea 37 : 37. 1871 ; Clarke in Hook. *f.*, F.B.I. 6 : 646. 1893.

Annual or perennial herbs, up to 80 cm tall. Leaves equalling to or longer than the stem. Anthela compound to supradecomposed ; spikelets ellipsoid ; glumes spiral, ovate-oblong. Nuts obovoid, trigonous, brownish.

Rinchimpong ; up to 1500 m.

*Fl. & Fr.* : June - July.

#### INDOCOURTOISIA Bennet & Raiz.

**Indocourtoisia cyperoides** (Roxb.) Bennet & Raiz. in Ind. Forester 107 : 432. 1981. *Kyllinga cyperoides* Roxb., Fl. Ind. 1 : 187. 1820.

*Courtoisia cyperoides* (Roxb.) Nees in *Linnaea* 9 : 286. 1834 ; Clarke in *Hook. f., F.B.I.* 6 : 625. 1893. *Mariscus cyperoides* (Roxb.) A. Dietrich. in *L., Sp. Pl. ed. 6, 2* : 438. 1833.

Herbs. Stems tufted, trigonous. Leaves shorter than to exceeding stems ; sheaths very long, pale. Inflorescence up to 11.5 x 8.5 cm. Spikelets flat, elliptic. Nuts linear-elliptic, sharply trigonous, apiculate, pale brown.

Sikkim, *s.l.* (cf. Kukenth. 1936) ; *ca* 300 m.

*Fl.* : Dec.

### ISOLEPIS R. Br.

*Isolepis setacea* (L.) R. Br. 222. 1810 ; T. Koyama in Hara *et al.*, *Enum. Fl. Pl. Nepal* 1 : 112. 1978. *Scirpus setaceus* L., *Sp. Pl.* 73. 1753 ; Clarke in *Hook. f., F.B.I.* 6 : 654. 1893.

Herbs, 2.5 - 20 cm tall. Leaves *ca* 2.5 cm long, setaceous. Spikelets 1 - 3, in a quasilateral head. Nuts obovoid, trigonous.

Lachung Yumthang, Lachen Lodge bridge, Thangu, Zemu ; 3600 - 3900 m.

*Fl. & Fr.* : June - Oct.

### KOBRESIA Willd.

*Kobresia capillifolia* (Decne.) Clarke in *J. Linn. Soc. Bot.* 20 : 378. 1884 & *Hook. f., F.B.I.* 6 : 697. 1894. *Elyna capillifolia* Decne. in *Jacquem., Voy. 4 (Bot.)* : 173. t. 174. 1840.

Herbs, up to 30 cm tall. Leaves linear-setaceous. Spikes linear. Nuts ellipsoid.

Chholamo, Giagong, Gurudongmar, above Dikchu ; 3900 m.

*Fl. & Fr.* : July.

*K. clarkeana* (Kukenth.) Kukenth. in *Engl. Pflanzenr.* 38 : 48. 1909. *Schoenoxiphium clarkeanum* Kukenth. in *Bull. Herb. Boiss.* 4, 2. : 49. 1904.

Herbs, tufted, up to 35 cm high. Leaves almost equalling culms. Inflorescence a linear panicle ; lateral spikes *ca* 7, appressed, upper overlapping. Prophylls oblong, blunt.

Cholela ; *ca* 3800 m.

*Fl. & Fr.* : June.

**K. curticeps** (Clarke) Kukenth. in Engl., Pflanzenr. 38 : 47. 1909. *Carex curticeps* Clarke in Hook. f., F.B.I. 6 : 729. 1894.

Herb with 30 - 60 cm long slender culms. Leaves linear, up to 30 cm long, flat. Inflorescence linear, 2.5 - 12 cm long ; spikes loosely arranged. Achenes narrowly elliptic or oblong, slightly beaked.

Dzongri, Chamnago, Changu, Chola, Chakung - Chu, Gnathang, Tsomgo, Lungthang, Kyangoshla ; 3300 - 3700 m.

*Fl. & Fr.* : June - July.

**K. curvata** (Boott) Clarke in Kew Bull. Addl. Ser. 8. 68. & 137. 1908. *Carex curvata* Boott, Illustr. Carex 1 : 2, t. 5. 1858 ; Clarke in Hook. f., F.B.I. 6 : 728. 1894.

Herbs, up to 36 cm tall. Leaves filiform, 2 - 16 cm long. Inflorescence linear or linear-oblong, 1.5 - 8 cm long. Nuts elliptic ovoid, ca 2 mm long.

Kupup, Karponang, Nathula, Kyangosla, Lachung, Tsomgo, Thangu, Changu ; 3700 - 4900 m.

*Fl. & Fr.* : July - Aug.

**K. duthiei** Clarke in Hook. f., F.B.I. 6 : 697. 1894.

Herbs up to 40 cm tall. Leaves linear, flat, 1 - 16 cm long. Inflorescence erect, consisting of a single linear or linear-oblong spike. Nuts obovoid-oblong, shortly beaked.

Nathula, Bikbari, Dzongri, to Prek-chu, Jelep - La ; 3900 - 4200 m.

*Fl. & Fr.* : July - Aug.

**K. esenbeckii** (Kunth) Noltie in Edinb. J. Bot. 50 : 43. 1993. *Carex esenbeckii* Kunth, Enum Pl. 2 : 522. 1837, *non* Boott 1845. *K. seticulmis* Boeck. in Linnaea 39 : 3. 1875 ; Clarke in Hook. f., F.B.I. 6 : 695. 1894. *Carex trinervis* Nees in R. Wight, Contrib. Bot. Ind. 120. 1834, *nom. illegit.* *Kobresia trinervis* Boeck. in Linnaea 39 : 4. 1875, *nom. illegit.* *K. hookeri* var. *dioica* Clarke in Hook. f., F.B.I. 6 : 695. 1894. *K. angusta* Clarke, *l.c.* 965.

var. **esenbeckii**

Herbs, 4 - 30 cm tall. Leaves shorter than equalling the stem, linear, flat. Inflorescence erect, consisting of a single linear androgynous spike. Nuts linear, beaked.

Chakung - Chu, Tosa, Sherabthang, Lachen, Changu, Namdee, Llonakh, Tsomgo Telepla, Momay ; 3300 - 3900 m.

*Fl. & Fr.* : May - July.

*Notes* : A polymorphic species.

var. *fissiglumis* (Clarke) Noltie in Edinb. J. Bot. Soc. 50 (1) : 43. 1993. *K. fissiglumis* Clarke in Hook. f., F.B.I. 6 : 696. 1894.

Differs from var. *esenbeckii* in its unisexual spikes in having prophylls open to the base, smooth keel and female glumes being oblong, truncate, with distinct hyaline apex.

Bikbari to Chaunrikiang, west of Chemathang, Thegu ; 4250  
4300 m.

*K. gammiei* Clarke in Kew Bull. Addl. ser. 8 : 68. 1908.

Herbs, up to 20 cm long. Leaves almost equalling the stem. Inflorescence 4 - 5 cm long. Spikes 10 - 12 mm long. Styles 3-fid.

Tongsup near Dzongri ; to Gamothang, Jamlingthang Bikbari, Monlepcha, Thangshing to Lam Pokhri ; 3400 - 3800 m.

*Fl. & Fr.* : July - Aug.

*K. laxa* Nees in Wt., Contrib. Bot. Ind. 119. 1834 ; Clarke in Hook. f., F.B.I. 6 : 698. 1894.

var. *laxa*

Herbs, 3 - 35 cm tall. Leaves linear, flat, up to 30 cm long. Inflorescence bright red, lax, paniculate ; glumes of lowest spike leafy. Prophylls linear. Nuts narrowly oblong or elliptic-oblong, ca 3 mm long.

Lachen ; 3400 - 3800 m.

*Fl. & Fr.* : July - Aug.

var. *curvirostris* (Clarke) R.C. Srivastava. *Kobresia curvirostris* Clarke in Hook. f., F.B.I. 6 : 699. 1894.

Herbs, up to 15 cm tall, slender. Leaves as stem, ca 2 mm wide. Spikes densely panicled. Panicles ca 2.5 x 0.8 cm. Nuts narrowly oblong ; beak cylindrical, exert, curved.

Thangu ; ca 4200 m.

*K. nepalensis* (Nees) Kukenth. in Engl., Pflanzenr. 38 : 40. 1909. *Uncinia nepalensis* Nees in Wt., Contrib. Bot. Ind. 129. 1834. *Carex linearis* Boott, Illustr. 1 : 51, t. 136. 1858 ; Clarke in Hook. f., F.B.I. 6 : 712. 1894. *K. nepalensis* var. *elachista* (Clarke) Kukenth. in Engl., Pflanzenr. 38 : 40. 1909. *Carex linearis* var. *elachista* Clarke in Hook. f., F.B.I. 6 : 713. 1894.

**var. nepalensis**

Herbs, up to 40 cm tall. Leaves filiform, equalling or longer than stem. Inflorescence linear, up to 7 cm long. Spikes androgynous, male spike terminal. Nuts oblong or lanceolate, beaked.

Chakung chu, Shaerbthang, Jalep la, Nathu la, Lachen ; 3900 - 5700 m.

*Fl. & Fr.* : July - Aug.

**var. vaginosa** (Clarke) R.C. Srivastava *K. vaginosa* Clarke in Hook. f., F.B.I. 6 : 695. 1894.

Herbs, up to 20 m tall. Stems sheathed up to almost three - fourth. Leaves filiform. Spikes dioecious. Nuts linear - oblong.

Momay, near Bikbari ; 4300 - 4900 m.

*Fl. & Fr.* : July - Sept.

**K. prainii** Kükenth. in Bull. Herb. Boiss. 4, 2 : 50. 1904 & in Engl., Pflanzenr. 38 : 40. 1909. *K. utriculata* Clarke in Kew Bull. Add. Ser. 8 : 67. 1908.

Herbs, up to 20 cm tall. Leaves linear, almost equalling culms. Nuts oblong-elliptic, minutely apiculate, not beaked.

Makula, Muguthang ; 3350 - 5270 m.

*Fl. & Fr.* : May - Sept.

**K. pygmaea** (Clarke) Clarke in Hook. f., F.B.I. 6 : 696. 1894. *Hemicarex pygmaea* Clarke in J. Linn. Soc. Bot. 20 : 383. 1883.

Herbs, 5 - 60 mm tall, base covered with brown lamina bearing outer sheaths. Leaves up to 6 cm long. Inflorescence erect, consisting of a single unbranched spike, unisexual or androgynous spikes. Nuts oblong or obovate, slightly beaked.

Kareng-Cholamo, Llonakh, Momay, Kongra-la, near Tebhla Pass, Muguthang ; 3900 - 4500 m.

*Fl. & Fr.* : May - Sept.

**K. royleana** (Nees) Boeck. in Linnaea 39 : 8. 1875 ; Clarke in Hook. f., F.B.I. 6 : 698. 1894. *Trilepis royleana* Nees in Edinb. New Phil. J. 17 : 267. 1834 & in Wight, Contrib. Bot. Ind. 119. 1834.

**var. royleana**

Herbs, up to 40 cm tall. Leaves linear, flat, 3-40 cm long. Inflorescence erect, linear-oblong, consisting of many congested, elliptic or oblong spikes. Nuts oblong, ca 2.2 mm long.

Dzongri, Samdung ; 3500 - 4800 m.

*Fl. & Fr.* : July - Sept.

var. **humilis** (C. A. Mey) Kukenth. in Engl., Pflanzenr. 38 : 46. 1909. *Elyna humilis* C.A. Mey *apud* Trautv. in Acta Horti Petrop. 1 : 21. 1871. *Kobresia persica* Kukenth. & Bomm. in Oest. Bot. Z. 47 : 133. t. 2. 1897.

Samding, Kareng - Chholamo ; ca 4900 m.

*Fl. & Fr.* : July - Sept.

**K. schoenoides** (C. A. Mey) Steud., Sy. Cyp. 246. 1855 ; Clarke in Hook. f., F.B.I. 6 : 697. 1894. *Elyna schoenoides* C.A. Mey in Ledeb. Fl. Alt. 4 : 235. 1853.

Stout herbs, up to 16 cm tall, base covered with coriaceous laminaless outer sheaths. Leaves linear-filiform, 6-16 cm long. Inflorescence erect of a single oblong, 1-3 x 0.3 x 0.5 cm spike. Nuts obovoid, ca 2 x 1 mm, slightly beaked, trigonous.

Jalep-La, Nathu-La, Kupup, Kareng-Cholamo, Pa to Yongdi, Ynorth-Donkiala, Llonakh ; 3900 - 5700 m.

*Fl. & Fr.* : May - June.

**K. sikkimensis** Kukenth. in Engl., Pflanzenr. 38 : 47. 1909 ; Clarke in Kew Bull. Addl. Ser. 8 : 145. 1908.

Herbs, up to 60 cm tall. Leaves linear, flat, upto 32 x 0.3 cm. Inflorescence oblong, 4-6 cm long, lax. Spikes loosely arranged, unisexual ; sterile rachillas included in the prophyll.

Dzongri, Gamothang ; 3800 - 4600 m.

*Fl. & Fr.* : July - Aug.

**K. uncinoides** (Boott) Clarke in Hook. f., F.B.I. 6 : 698. 1894. *Carex uncinoides* Boott, Illustr. 1 : 8. t. 23. 1858.

Herbs, up to 35 cm tall. Leaves linear, flat, up to 21 cm long. Inflorescence erect, oblong, 1-7 x 1 cm ; spikes closely arranged. Nuts oblong or oblanceolate, slightly beaked, trigonous.

Sherabthang, Lachung, Lachen, Changu, Dzongri, Chakung-Chu, Chola, Megu, Yakla, Jalepla, Kupup, Nathula, Tsomgo ; 3300 - 4300 m.

*Fl. & Fr.* : May - July (-Oct.)

**K. vidua** (Boott *ex* Clarke) Kukenth. in Engl., Pflanzenr. 38 : 40. 1909. *Carex vidua* Boott *ex* Clarke in Hook. *f.*, F.B.I. 6 : 713. 1894.

Herbs, 14 - 20 cm tall. Leaves equal to or shorter than stem, linear. Inflorescence dioecious consisting of a single spike. Nuts oblong, beaked.

Lachen, Thangshing to Lam Pokhri ; 3900 - 4400 m.

*Fl. & Fr.* : July.

### KYLLINGA Rottb.

**Kyllinga brevifolia** Rottb., Descr. & Ic. 13. t. 4. f. 3. 1773 ; Clarke in Hook. *f.*, F.B.I. 6 : 588. 1893. *Cyperus brevifolius* (Rottb.) Hassk., Cat. Hort. Bogor 24. 1844.

Perennial herbs with long, creeping, slender rhizomes. Culms arranged in a single row along rhizome. Leaves radical and subradical, shorter than culms. Inflorescence a single globose head (rarely 2 or 3), greenish or brownish. Nuts ellipsoid, obtuse.

Singtam, Namli, Lachung, Lachen, Ranipool, Busuk, Gangtok, Saramsa, Yoksum ; up to 2400 m.

*Fl. & Fr.* : June - Sept.

**K. nemoralis** (J. R. & G. Forst.) Dandy *ex* Hutch. & Dalziel., Fl. W. Trop. Afr. 2, 2 : 487. 1836. *Thryocephalon nomorale* J. R. & G. Forst., Charact. Gen. Pl. 129. t. 65. 1776. *Kyllinga monocephala* Rottb., Descr. Ic. Nov. Pl. 13. f. 4. 1773, *nom. illeg.* ; Clarke in Hook. *f.*, F.B.I. 6 : 588. 1893.

Perennial herbs, laxly tufted with long creeping rhizomes. Culms 10 - 45 cm tall, 1 - 1.5 mm thick. Leaves many, equal to or shorter than culms. Inflorescence a single head, bearing a globose, central spike and 2 - 3 small lateral spikes. Nuts yellowish brown.

Saramsha, near Jorethang, Tashiding, Melli R.F., Singtam ; up to 1400 m.

*Fl. & Fr.* : July - Sept.

**K. odorata** Vahl *ssp. cylindrica* (Nees) T. Koyama in Gard. Bull. Singapore 30 : 161. 1977. *K. cylindrica* Nees in Wight, Contrib. Bot. India 91. 1834 ; Clarke in Hook. *f.*, F.B.I. 6 : 588. 1893.

Herbs. Stems not thickened at base, 10 - 30 cm tall. Leaves much shorter than stem. Heads of 3 spikes, medium cylindric, lateral much shorter, subovoid, straw coloured. Nuts yellow-brown, black on maturity.

Saramsha ; Rango - Teesta, 1100 - 1700 m.

*Fl. & Fr.* : June - July.

### LIPOCARPHA R. Br.

**Lipocarpa chinensis** (Obs.) Kern in Blumea Suppl. 4 : 167. 1958. *Scirpus chinensis* Obs., Daqb. Ostind. Resa 220. 1757. *Hypaelyptum argenteum* Vahl, Enum. Pl. 2 : 283. 1806. *Lipocarpa argentea* (Vahl) R. Br. ex Nees in Linnaea 9 : 287. 1835 ; Clarke in Hook. f., F.B.I. 6 : 667. 1893.

Herbs. Rhizomes lacking. Stem 5 - 40 cm tall, obtusely trigonous. Leaves equalling to or shorter than stems. Inflorescence of a single head. Spikelets 1 - 8, pale or fuscous. Nuts sessile, obovoid or ellipsoid, obtuse.

Lachen, Phodong to Kabi, near Rani pool, Phensong ; up to 1800 m.

*Fl. & Fr.* : July - Aug.

### MARISCUS Vahl

**Mariscus compactus** (Retz.) Boldingh., Zakf. Landb. Java 77. 1916. *Cyperus compactus* Retz., Obs. Bot. 5 : 10. 1789. *Cyperus dilutus* Vahl, Enum Pl. 2 : 357. 1806. *Mariscus microcephalus* Presl., Rel. Haenk. 1 : 182. 1830 ; Clarke in Hook. f., F.B.I. 6 : 624. 1893. *Mariscus dilutus* (Vahl) in Wight, Contrib. Bot. Ind. 90. 1834.

Perennial herbs, up to 50 cm tall. Stems spongy, trigonous or subterete, 2 - 5 mm thick. Leaves 5 - 7. Anthela compound or decumbent, greenish when young, bright reddish brown with age.

Namthang, Saramsa ; up to 1400 m.

*Fl. & Fr.* : May - June.

**M. cyperinus** (Retz.) Vahl, Enum. Pl. 2 : 377. 1806 ; Clarke in Hook. f., F.B.I. 6 : 621. 1893. *Kyllinga cyperina* Retz., Obs. Bot. 6 : 21. 1791. *Cyperus cyperinus* (Retz.) Valck.-Sur., Gesl. Cyp. Mal. Arch. 154. t. 6, f. 10. 1898.

#### var. **cyperinus**

Perennial herbs. Culms 10 - 60 cm tall, 1 - 3 mm thick, triquetrous. Leaves several at base. Anthela simple open but with short rays, sometimes nearly head-like.

Lower Siche Basti, Gangtok, on way to Rumtek, Saramsa, Ronglikhola, Melli, Chuchachen, Dentam, Namli ; up to 1700 m.

*Fl. & Fr.* : May - Sept.

var. **bengalensis** Clarke in Hook. *f.*, F.B.I. 6 : 621. 1893. *Cyperus cyperinus* var. *bengalensis* (Clarke) Kukenth. in Engl., Pflanzenr. 101 : 520. 1936.

Umbels contracted into 1 head ; spikes shortly cylindric or ovoid ; spikelets linear, bearing 2 - 4 nuts in fruits, spreading at right angles.

Sikkim, *s.l.* ; up to 1200 m.

*Fl. & Fr.* : May - July.

var. **laxatus** (Clarke) Kukenth. in Engl., Pflanzenr. 101 : 519. 1936. *Cyperus umbellatus* Clarke var. *laxatus* Clarke in J. Linn. Soc. 21 : 201. 1888. *Mariscus tenuifolius* Schrad. ex Nees, Fl. Bras. 2 : 46. 1842 ; Clarke in Hook. *f.*, F.B.I. 6 : 622. 1893. *Mariscus cyperinus* ssp. *laxatus* (Clarke) T. Koyama in Gdns. Bull. Singapore 30 : 157. 1977.

Herbs with very narrow leaves. Umbels simple, contracted. Spikes solitary, cylindric or ovoid, lax ; spikelets bearing usually 2 nuts.

Gangtok, Dzongu, Chungthang ; up to 1800 m.

*Fl. & Fr.* : May - June.

**M. dubius** (Rottb.) C.E.C. Fischer in Gamble, Fl. Pres. Madras 1644. 1931 (3 : 1142. 1967. Repr. ed.). *Cyperus dubius* Rottb., Descr. & Ic. Pl. 21. t. 4. f. 5. 1773. *Mariscus dregeanus* Kunth, Enum. Pl. 2 : 120. 1837 ; Clarke in Hook. *f.*, F.B.I. 6 : 620. 1893.

Herbs up to 30 cm tall, without stolons. Leaves often equalling stem. Umbels contracted in 1 very dense ovoid head ; spikelets ovoid, bearing 2 - 6 nuts.

Gangtok ; ca 1800 m.

*Fl. & Fr.* : June - Aug.

**M. hookerianus** Clarke in Hook. *f.*, F.B.I. 6 : 623. 1893. *Cyperus sikkimensis* Kukenth. in Engl., Pflanzenr. 101 : 467. 1936, non *Cyperus hookerianus* Arn. nec *C. hookeri* Boeck.

Herbs with horizontal, woody rhizomes. Culms up to 50 cm tall. Inflorescence of 7 cylindric spikes. Spikelets oblong, bearing 4, trigonous, dull white, nuts.

Sikkim (*cf.* Hook. *f.* 1893).

*Fl.* : July.

**M. paniceus** (Rottb.) Vahl, Enum. Pl. 2 : 378. 1806 ; Clarke in Hook. f., F.B.I. 6 : 620. 1893. *Kyllinga panicea* Rottb., Descr. Ic. 15, t. 4. f. 1. 1773. *Cyperus paniceus* (Rottb.) Boeck. in Linnæa 36 : 381. 1870.

Perennial, tufted herbs. Culms up to 45 cm tall, 1 - 2 mm thick, trigonous. Leaves 3 - 7, shorter than the culm. Anthela simple, contracted, greenish.

Dzongu, Namchi, Melli ; up to 1200 m.

*Fl. & Fr.* : May - Dec.

**M. squarrosus** (L.) Clarke in Hook. f., F.B.I. 6 : 623. 1893 ; Hooper in Saldanha & Nicolson, Fl. Hassan Dt. 690. 1976. *Cyperus squarrosus* L. in Torner, Cent. Pl. 2 : 6. 1756. *Cyperus aristatus* Rottb., Descr. Pl. Rar. Progr. 22. 1772. Clarke in Hook. f., l.c. 606. *Mariscus aristatus* (Rottb.) Tang & Wang in Fl. Rep. Pop. Sin. 11 : 178. t. 59, f. 12 - 13. 1963 ; T. Koyama in Hara *et al.*, Enum. Fl. Pl. Nepal 1 : 116. 1978.

Small, annual herbs. Culms 3 - 10 cm tall, 0.5 - 1.5 mm thick, triquetrous. Anthela simple, open or often reduced to a single hemispherical spike.

Lachung, Lachen, Keodom, Chungthang ; 2400 - 2700 m.

*Fl. & Fr.* : May - Oct.

**M. sumatrensis** (Retz.) Raynal in Adansonia 15 : 110. 1975. *Kyllinga sumatrensis* Retz., Obs. Bot. 4 : 13. 1786. *Scirpus cyperoides* L., Mant. Pl. 2 : 181. 1771. *Mariscus sieberianus* Nees ex Clarke in Hook. f., F.B.I. 6 : 622. 1893. *Cyperus cyperoides* (L.) O. Ktze., Rev. Gen. Pl. 3 : 333. 1898.

**var. sumatrensis**

Perennial herbs, not stoloniferous. Culms 1 - many together, erect, triquetrous, up to 80 cm tall, 1 - 3 mm wide. Leaves many, equal to or shorter than culm. Anthela open, simple.

Tashiding, Chunchachen, Rumtek, Burtuk, Basti, Phodong, Aho, Ronglikhola, Nam Nam road (Deorali), Sada, Yoksum, Temi, Singtam ; 400 - 1800 m.

*Fl. & Fr.* : March - Dec.

**var. evolutior** (Clarke) Karthik. in Karthik. *et al.*, l.c. 64. 1989. *Mariscus sieberianus* var. *evolutior* (Clarke) Hook. f., F.B.I. 6 : 622. 1893.

*Cyperus cyperoides* var. *evolutior* (Clarke) Kukenth. in *Sinensia* 3 : 80. 1932 & Engl., *Pflanzenr.* 101 : 516. 1926.

Herbs with linear spikelets bearing 2 - 4 nuts.

Sikkim, *s.l.*

*Fl. & Fr.* : March - Dec.

### PYCREUS P. Beauv.

***Pycreus diaphanus*** (Schrad. ex R. & S.) Hooper & T. Koyama in *J. Jap. Bot.* 51 : 316. 1976. *Cyperus diaphanus* Schrad. ex R. & S., *Mant.* 2 : 477. 1824. *Cyperus latespicatus* Boeck. in *Flora* 42 : 433. 1859. *Pycreus latespicatus* (Boeck.) Clarke in *Hook. f., F.B.I.* 6 : 590. 1893. *Cyperus diaphanus* var. *latespicatus* (Boeck.) Kern in *Steenis, Fl. Males.* 1, 7 : 653. 1974.

Herbs. Stems 10 - 30 cm tall. Leaves half in length to stem. Inflorescence simple. Spikelets spicate, ca 4 mm wide, straw coloured or reddish brown. Nuts obovoid, compressed, black.

Gangtok (New Cantt.) ; 1100 - 2100 m.

*Fl. & Fr.* : Sept. - Oct.

***P. flavidus*** (Retz.) T. Koyama in *J. Jap. Bot.* 51 : 316. 1976. *Cyperus flavidus* Retz., *Obs. Bot.* 5 : 13. 1789. *Cyperus globosus* All., *Fl. Pedem.* 49. 1789, *non* Forssk. 1775. *Cyperus capillaris* Koen. ex Roxb., *Fl. Ind.* 1 : 198. 1820. *Pycreus globosus* (All.) Reichb., *Fl. Germ. Excurs.* 2 : 140. 1830. *Pycreus capillaris* (Koen. ex Roxb.) Nees ex Clarke in *Hook. f., F.B.I.* 6 : 591. 1893.

#### var. **flavidus**

Herbs, up to 80 cm tall. Leaves 1 - 4, shorter than or equalling the stems. Anthela simple. Spikelets many, linear, 15 - 50-flowered. Nuts obovoid, lenticular, apiculate, blackish brown

Rinkinpong, up to 2000 m.

*Fl. & Fr.* : June - Sept.

var. **erectus** (Clarke) Karthik. in *Karthik. et. al., Fl Ind. Enum. Monocot.* 65. 1989. *Pycreus globosus* var. *erectus* Clarke in *J. Linn. Soc.* 35 : 15. 1898 & 36 : 205. 1903. *Cyperus globosus* var. *erectus* (Clarke) Kukenth. in Engl., *Pflanzenr.* 101 : 356. 1936. *Cyperus flavidus* var. *erectus* (Clarke) Korla in *Bull. Bot. Surv. Ind.* 9 : 236. (1967) 1968.

Anthela simple or compound. Spikelets cinnamomeous to purplish with age, 20 - 40-flowered.

Sikkim, *s.l.* ; up to 1200 m.

*Fl. & Fr.* : April - May.

**P. polystachyos** (Rottb.) B. Beauv., *Fl. Oware* 2 : 48, t. 86, f. 2. 1807 ; Clarke in *Hook. f.*, *F.B.I.* 6 : 592. 1893.

Herbs, up to 60 cm high, tufted. Stems leafy below. Leaves flat, much shorter than the stem. Inflorescence a dense compound head. Spikes with 4 - 11 linear spikelets.

Sikkim, *s.l.* (BM).

**P. pumilus** (L.) Nees *ex* Clarke in *Hook. f.*, *F.B.I.* 6 : 591. 1893. *Cyperus pumilus* L., *Cent. Pl.* 2 : 6. 1756.

Herbs, up to 25 cm tall. Leaves shorter than stem. Anthela simple or subcompound. Spikelets 10 - 40 in subglobose heads ; 8 - 20-flowered. Nuts obovoid, apiculate, blackish brown.

Phensong, N. W. of Singtam, Tashiding, up to 1400 m.

*Fl. & Fr.* : June - Nov.

**P. sanguinolentus** (Vahl) Nees *ex* Clarke in *Hook. f.*, *F.B.I.* 6 : 590. 1893. *Cyperus sanguinolentus* Vahl, *Enum Pl.* 2 : 351. 1806.

**ssp. sanguinolentus**

Herbs. Stems 10 - 50 cm long. Leaves equalling or much shorter than stems. Inflorescence simple. Spikelets shortly spicate or clustered, linear or oblong. Nuts obovoid, greyish brown.

Lindok, Pangthang, Rishi, Lindok, Kupup, Lachen, Phadonchen ; up to 3200 m.

*Fl. & Fr.* : July - Aug.

ssp. **melanocephalus** (Miq.) Karthik. *et al.*, *Fl. Ind. Enum. Monocot.* 66. 1989. *Cyperus melanocephalus* Miq., *Fl. Ind. Bat.* 3 : 259. 1859. *Cyperus sanguinolentus f. melanocephalus* (Miq.) Kuekenth. in *Engl. Pflanzenr.* 101 : 386. 1936. *Cyperus sanguinolentus ssp. melanocephalus* (Miq.) Kern in *Reinwardtia* 3 : 55. 1954.

Herbs, up to 25 cm high. Leaves 1 - 2 mm broad. Anthela capitately contracted ; bracts erect or suberect. Nuts *ca* 1.5 mm long.

Rishi ; 1000 - 1700 m.

*Fl. & Fr.* : May - Sept. (-Dec.).

**P. stramineus** Clarke in Hook. *f.*, F.B.I. 6 : 589. 1893. *Cyperus stramineus* Nees in Wight, Contrib. Bot. Ind. 74. 1834., *non* Desf. 1820. *Cyperus substramineus* Kukenth. in Engl., Pflanzenr. 101 : 398. 1936.

Herbs, 5 - 30 cm tall. Inflorescence reduced to 1 compound head, of 5 - 12 straw coloured. Spikelets 15 - 40 (-70) - flowered. Nuts obovoid, blackish brown.

Sikkim, *s.l.* : up to 1700 m.

*Fl. & Fr.* : Aug. - Oct.

**P. sulcinus** (Clarke) Clarke in Hook. *f.*, F.B.I. 6 : 593. 1893. *Cyperus sulcinus* Clarke in J. Linn. Soc. 21 : 56. 1884.

Herbs up to 40 cm tall. Anthela simple, lax, spikelets 40 - 50-flowered. Nuts sessile, linear-oblong, blackish brown.

Legship, Phensang ; up to 1500 m.

*Fl. & Fr.* : July - Nov.

**P. uniloides** (R. Br.) Urban, Symb. Antill. 2 : 164. 1900. *Cyperus uniloides* R. Br., Prodr. 216. 1810.

Herbs, up to 90 cm high. Leaves shorter than culms. Inflorescence simple umbel. Spikes of 3 - 20 spikelets. Spikelets up to 22 - flowered, yellow or brownish yellow.

Melli - Teesta ; up to 2600 m.

*Fr.* : Aug.

#### **RHYNCHOSPORA** Vahl *nom. cons.*

**Rynchospora corymbosa** (L.) Britt. in Trans. New York Acad. Sci. 11 : 84. 1892. *Scirpus corymbosus* L., Gent. Pl. 2 : 7. 1756. *Rynchospora aurea* Vahl, Enum. Pl. 2: 229. 1806 ; Clarke in Hook. *f.*, F.B.I. 6 : 671. 1893.

Robust herbs, 60 - 90 cm tall, without stolons. Leaves 30 - 60 x 1.2 - 2.5 cm. Panicles *ca* 30 cm, composed of 3 - 5 corymbs. Spikelets usually solitary, reddish brown, *ca* 8 mm long. Perianth-bristles 6, equalling nuts in length. Nuts *ca* 2.5 mm, smooth, reticulated or transversely wavy ; beak conical, 4 - 5 mm long, grooved, pale greenish.

Sikkim, *s.l.* (*vide* Hook. *f.* 1893).

*Fl. & Fr.* : June - Nov.

**R. rugosa** (Vahl) Gale in *Rhodora* 46 : 275, t. 835. f. 1 a & b. 1944. *Schoenus rugosus* Vahl, *Ecolog. Amer.* 5. 1798. *Rhynchospora glauca sensu* Clarke in *Hook. f.*, *F.B.I.* 6 : 671. 1893, *non* Vahl 1806. *Rhynchospora brownii* R. & S., *Syst. Veg.* 2 : 86. 1817. *Rhynchospora rugosa* ssp. *brownii* (R. & S) T. Koyama in *Hara et al.*, *Enum. Fl. Pl. Nepal* 1 : 118. 1978.

**var. rugosa**

Perennial herbs, up to 80 cm tall. Leaves canaliculate, rigid. Panicles narrow, consisting of 3-4 corymbiform anthelas. Spikelets ovate-lanceolate, ferruginous. Nuts sessile, obovoid.

Sikkim, *s.l.* ; 1000 - 1500 m.

*Fl. & Fr.* : June - Aug.

var. **griffithii** (Boeck.) Verma & Venna Chandra in *Bull. Bot. Surv. India* 22 : 128. (1980) 1982. *Rhynchospora griffithii* Boeck. in *Linnaea* 38 : 404. 1874 ; Clarke in *Hook. f.*, *F.B.I.* 6 : 672. 1893. *Rhynchospora griffithii* var. *levisetis* Clarke in *Hook. f.*, *l.c.* 6 : 672. 1893.

Perianth-bristles twice longer than the nut-beak. Nuts narrowly oblong, pale brown.

Lachen, Lachung ; *ca* 3000 m.

*Fl. & Fr.* : July - Nov.

var. **sikkimensis** (Clarke) Verma & Veena Chandra in *Bull. Bot. Surv. India* 22 : 130. 1980. *Rhynchospora sikkimensis* Clarke in *Hook. f.*, *F.B.I.* 6 : 672. 1893.

Herbs. Panicles narrow, spikelets many, bearing 3-6 nuts. Perianth bristles 6, scarious, twice longer than nuts. Nuts narrowly obovoid, truncate ; beak longer than the nuts.

Khetchipheri Lake ; 2400 m.

*Fl. & Fr.* : July - Oct.

**SCHOENOPLECTUS** (Reichb.) Palla

**Schoenoplectus grossus** (L.f.) Palla in *Allg. Bot. Z.* 17 : Biebl. 3. 1911. *Scirpus grossus* L.f., *Suppl.* 104. 1781 ; Clarke in *Hook. f.*, *F.B.I.* 6 : 659. 1893. *Scirpus kysoor* Roxb., *Fl. Ind.* 1 : 230. 1832. *Scirpus grossus* var. *kysoor* (Roxb.) Clarke in *Hook. f.*, *l.c.* 660.

Perennials, up to 2 m tall. Stems triquetrous below, 3-winged upwards. Leaves clustered at base. Anthela terminal. Spikelets ovoid-oblong. Nuts oblong-obvoid, triquetrous, *ca* 1.2 mm long.

Sikkim, *s.l.* ; up to 600 m.

**S. juncoidea** (Roxb.) Palla in Bot. Jahrb. Syst. 10 : 299. 1888. *Scirpus juncoides* Roxb., Fl. Ind. 1 : 218. 1820. *Scirpus erectus sensu* Clarke in Hook. f., F.B.I. 6 : 656. 1893, *non* Poir. 1804.

Herbs. Culms up to 80 cm tall, *ca* 3 mm thick, sheathed at base. Leaves lacking. Inflorescence pseudolateral, head with 1 - 9 spikelets.

Lachen, Phodong, between Phodong - Kabi ; 2400 m.

*Fl. & Fr.* : March - June.

**S. mucronatus** (L.) Palla in Verh. K.K. Zool. Bot. Ges. Wien 38 : 657. 1893. *Scirpus mucronatus* L., Sp. Pl. 50. 1753. *Scirpus triangulatus* Roxb., Fl. Ind. 1 : 219. 1820. *Schoenoplectus triangulatus* (Roxb.) Sojak in Cas. Nar. Muz. (Prague) 141 : 62. 1972.

Perennial herbs with creeping rhizomes. Culms up to 100 cm tall. Leaves lacking. Inflorescences pseudolateral, usually capitate.

Near Kabi, Gangtok, Kabi - Phodong, Lachen, Yoksum ; 2400 - 2700 m.

*Fl. & Fr.* : March - June.

**S. supinus** (L.) Palla in Bot. Jahrb. 10 : 299. 1889 ; J. Raynal in *Adansonia* 2, 16 : 145. 1976. *Scirpus supinus* L., Sp. Pl. 49. 1753 ; Clarke in Hook. f., F.B.I. 6 : 655. 1893.

Herbs. Stems sessile. Spikelets in a single lateral head. Nuts obovoid, triquetrous.

Sikkim, *s.l.* ; up to 900 m.

### SCIRPUS L.

**Scirpus ternatanus** Reinw. *ex* Miq., Fl. Ind. Bat. 3 : 307. 1856 ('*ternatensis*'). *Scirpus chinensis* Munro in Seem., Bot. Voy. Herald 423. 1857 ; Clarke in Hook. f., F.B.I. 6 : 662. 1893.

Perennial herbs. Stems terete below, trigonous above. Leaves scattered all along the stem. Anthela decomposed, spikelets in clusters of 4 - 15, ovoid - oblong ; glumes ovate to suborbicular, brown. Nuts broadly obovoid.

Nampok, Lachen, Lachung, Lachen ; 1800 m.

*Fl. & Fr.* : April - June.

**SCLERIA P. Berg.**

**Scleria levis** Retz., Obs. Bot. 4 : 13. 1786. *Scleria hebecarpa* Nees in Wight, Contrib. Bot. Ind. 117. 1834 ; Clarke in Hook. f., F.B.I. 6 : 689. 1894. *Scleria pubescens* Steud., Syn. Pl. Glum. 2 : 168. 1855. *Scleria hebecarpa* var. *pubescens* (Steud.) Clarke in Hook. f., l.c.

Perennials, up to 1 m tall. Stem triquetrous. Leaves 80 x 0.8 cm. Inflorescence paniculate, of a terminal and 1-2 lateral partial panicles, spikelets unisexual, pale brown. Nuts subglobose, apiculate, glossy white (rarely bluish black).

Teesta & Rangeet valleys ; 300 - 900 m.

Fl. & Fr. : April - Oct.

**S. lithosperma** (L.) Swartz, Prodr. 18. 1788 ; Clarke in Hook. f., F.B.I. 6 : 685. 1894. *Scirpus lithospermus* L., Sp. Pl. 51. 1753.

Perennials, up to 70 cm tall. Leaves scattered on stem, aggregated in middle, 1 - 5 mm wide. Panicles up to 30 cm long, narrow, of 1 lateral and 2-3 lateral partial panicles. Spikelets bisexual, solitary or 2-3 together. Nuts oblong-ovoid, trigonous, glossy-ferruginous.

Sikkim, s.l. ; up to 900 m.

Fl. & Fr. : July - Aug.

**S. parvula** Steud., Syn. Pl. Glum. 2 : 174. 1855 ; Kern in Blumea 11 : 202. 1961. *Scleria tessellata sensu* Clarke in Hook. f., F.B.I. 6 : 686. 1894, p.p. non Willd. 1805.

Annual, tufted herbs, up to 1 m tall. Leaves up to 50 x 0.5 cm. Panicles up to 4 cm long, of 1 terminal and 1-3 lateral panicles. Spikelets unisexual. Nuts obovoid, apiculate, glossy-white.

Lachung ; ca 2700 m.

Fl. & Fr. : May - Oct.

**S. terrestris** (L.) Fassett in Rhodora 26 : 159. 1924. *Zizania terrestris* L., Sp. Pl. 991. 1753. *Scleria elata* Thw., Enum. Pl. Zeyl. 353. 1864 ; Clarke in Hook. f., l.c. 690. *S. elata* var. *decolorans* Clarke in Hook. f., l.c. 690. *S. elata* var. *latior* Clarke in Hook. f., l.c. 690.

Perennial herbs, up to 1 m tall. Leaves up to 75 x 0.3 cms. Panicles up to 15 cm long, of 1 terminal and 2-5 lateral partial panicles. Spikelets unisexual, stramineous to purplish. Nuts ovoid, apiculate, glossy-white, blackish on ripening

Rangpo, Dzongu ; up to 1800 m.

*Fl. & Fr.* : July - Dec.

## POACEAE

Subfamily : **BAMBUSOIDEAE**

(S. Kumar)

**BAMBUSA** Schreb. *nom. cons.*

**Bambusa arundinacea** (Retz.) Willd., Sp. Pl. 2 : 245. 1799 ; Gamble in Hook. *f.*, F.B.I. 7 : 395. 1896. *Bambos arundinacea* Retz., Obs. Bot. 5 : 24. 1789.

Tall, thorny, perennials. Branches bright green, shiny, curved, with 2-3 recurved spines on nodes ; culms large, broad ; sheaths thickly clothed with golden hairs. Leaves linear-lanceolate, with swollen petioles.

Cultivated in the lower hills (*cf.* Varmah & Bahadur 1980).

**B. pallida** Munro in Trans. Linn. Soc. 26 : 97. 1868 ; Gamble in Hook. *f.*, F.B.I. 7 : 389. 1896. PUSHEE (Lep.) ; BONGSHING (Bhut.).

Culms olive green. Nodes not so conspicuous ; nodes and internodes thin-walled. Culm-sheaths truncate at top. Leaves glabrous above, white-hirsute beneath, subulate tipped.

Teesta valley, Great Rangeet valley, Pedong ; 1500 - 1800 m.

**B. tulda** Roxb., Fl. Ind. 2 : 193. 1832 ; Gamble in Hook. *f.*, F.B.I. 7 : 387. 1896. *B. teres* Buch.-Ham. *ex* Munro in Trans. Linn. Soc. 26 : 95. 1868. *B. nutans* Wall. *ex* Munro, *l.c.* 92 ; Hook. *f.*, *l.c.* 387. *B. longispicula* Gamble in Brandis, Indian Trees 668. 1906. PAOSHIDING YING (Lep.) ; MALLOO, MAHLA (Nep.).

Culms straight, nodes not swollen ; internodes thick-walled with a white ring below nodes ; culm-sheaths dorsally clothed with black hairs, auricled at base, auricles with dense bristles.

*Notes* : Cultivated up to 1500 m for ornamental purposes. It fetches good prices to growers.

## CHIMONOBAMBUSA Makino

**Chimonobambusa hookeriana** (Munro) Nakai in J. Arn. Arb. 6 : 151. 1925. *Arundinaria hookeriana* Munro in Trans. Linn. Soc. London 26 : 29. 1868 ; Gamble in Hook. *f.*, F.B.I. 7 : 382. 1896. PRONG, PRAONG (Lep.) ; SINGHANI (Nep.).

Culms slender, caespitose, glaucous green ; nodes ringed by the base of sheath ; internodes thick-walled with a dark-bluish ring at top. Leaves linear.

Yoksum, Chungthang ; 1800 - 2200 m.

*Notes* : The parent plant dies after maturity of seeds and formation of suckers from the root.

### DENDROCALAMUS Nees

**Dendrocalamus hamiltonii** Nees & Arn. *ex* Munro in Trans. Linn. Soc. 26 : 151. 1868 ; Gamble in Ann. Roy. Bot. Gard. Calc. 7 : 84. t. 74. 1896 *et* in Hook. *f.*, F.B.I. 7 : 405. 1896. PAO (Lep.) ; TAMA (Nep.).

Culms with many branches at angles, curved downwards, young culms appressedly pubescent ; nodes with scars ; internodes thick-walled ; culm - sheaths glabrous, truncate at apex. Panicles furrowed on one side, bearing half verticillate semiglobular purple heads.

Yoksum, Rate - chu, Gangtok ; 1000 - 2000 m.

*Notes* : Widely used for matwork, building and baskets.

**D. hookeri** Munro in Trans. Linn. Soc. 26 : 151. 1868 ; Gamble in Ann. Roy. Bot. Gard. Calc. 7 : 83. t. 73. 1896 *et* in Hook. *f.*, F.B.I. 7 : 405. 1896. PATU (Lep.) ; TILI BANS (Nep.).

Culms caespitose with long curved branches, internodes dark green, thick-walled ; culm sheaths densely covered with black brown hairs outside. Leaves oblong lanceolate, cuspidate, with prominent yellow midrib. Panicles large, bearing globular heads.

*Notes* : Cultivated at 600 - 1500 m for making baskets and water-buckets.

**D. patallaris** Gamble in Ann. Roy. Bot. Gard. Calc. 7 : 86. t. 75. 1896 *et* in Hook. *f.*, F.B.I. 7 : 406. 1896. PAGJIOK, PAGJIOK - PAO (Lep.).

Culms striate, dull green ; nodes ringed ; internodes thin-walled ; culm-sheaths long cylindric, sparsely strigose, with wings and fringed margins. Panicles compound, bearing distant distichous heads.

Sikkim, *s.l.* ; *ca* 1200 m.

*Notes* : Ornamental.

**D. sikkimensis** Gamble in Hook., Ic. Pl. t. 1770. 1888 *et* in Ann. Roy. Bot. Gard. Calc. 7 : 82. t. 72. 1896 *et* in Hook. f., F.B.I. 7 : 405. 1896. PUGRIANG (Lep.).

Culms caespitose, naked below, dark green ; nodes ringed, internodes rough ; culm-sheaths densely covered with a dark golden brown felt. Panicles large, bearing red-brown, globose heads.

Sikkim, *s.l.* ; 1200 - 1800 m.

*Notes* : It is the largest, beautiful bamboo of Sikkim, used for making 'Chunga' for carrying water or milk by local inhabitants.

### DREPANOSTACHYUM Keng f.

**Drepanostachyum intermedium** (Munro) Keng. f. in J. Bomb. Res. 2 : 28. 1883. *Arundinaria intermedia* Munro in Trans. Linn. Soc. 16 : 28. 1868 ; Gamble, Ann. Roy. Bot. Gard. Calc. 7 : 15. 1896 *et* in Hook. f., F.B.I. 7 : 381. 1896. *Chimonobambusa intermedia* (Munro) Nakai in J. Arn. Arb. 6 : 151. 1925. PARMIOK (Lep.) ; NIGALO, TITI NIGALA (Nep.).

Small shrubs. Culms slender, greyish green ; nodes swollen with a prominent ring and white line below ; culm-sheaths glabrous, striate, ciliate below. Leaves linear-oblong-lanceolate. Panicles whorled ; racemose, borne on leafless culms.

Sikkim *s. l.* ; 1200 - 2100 m.

**D. gracilis** (Blanchard) S. Kumar *comb. nov.* *Arundinaria gracilis* Blanchard in Revue Horticole 490. 1886 ; Camus, Les. Bambusees 38. 1912 ; Varmah & Bahadur in Ind. For. Rec. 6 : 1. 1980.

Small caespitose shrubs. Culms green. Branches turning yellow at maturity. Culm-sheath with an imperfect blade and divaricate panicle.

Sikkim *s.l.* (*cf.* Varmah & Bahadur 1980).

**D. jainianum** (Das & Pal) R. Majumdar in Bull. Bot. Surv. India 25 : 235. t. 1. (1983) 1895. *Chimonobambusa jainiana* Das & Pal in J. Econ. Tax. Bot. 4 : 1023 - 24. t. 1. 1983.

Culms caespitose, light brown, striate with tubercle based hairs. Nodes with a peltate hairy disc. Leaves oblong-lanceolate, acuminate, hairy along prominent midrib on lower surface. Panicles loose, drooping.

Sikkim, *s.l.*

*Fl. & Fr.* : March - April.

**D. polystachyum** (Kurz ex Gamble) R. Majumdar in Fl. Ind. Enum. Monocot. 277. 1989. *Arundinaria polystachya* Kurz ex Gamble in Ann. Roy. Bot. Gard. Calc. 7 : t. 5. 1896 et in Hook. f., F.B.I. 7 : 378. 1896. *Chimonobambusa polystachya* (Kurz ex Gamble) Nakai in J. Arn. Arb. 6 : 151. 1925.

Small hairy shrubs. Culms soft ; culm sheaths lacking. Leaves lanceolate, acuminate, tip twisted. Panicles large, terminal or axillary.

Sikkim, *s.l.* ; 900 1500 m.

**D. suberectum** (Munro) R. Majumdar in Bull. Bot. Surv. India 25 : 236. 1985. *Arundinaria suberecta* Munro in Trans. Linn. Soc. London 26 : 32. 1868 ; Gamble in Ann. Roy. Bot. Gard. Calc. 7 : 25. t. 24. 1896 et in Hook. f., F.B.I. 7 : 385. 1896.

Culms caespitose, olive green. Nodes smooth, slightly swollen. Internodes thick walled. Branchlets whorled. Culm-sheaths recurved, subulate. Leaves linear, subsessile.

Sikkim, *s.l.*

### HIMALAYACALAMUS Keng f.

**Himalayacalamus falconeri** (Hook. f. ex Munro) Keng f. in J. Bomb. Res. 2 : 24. 1983. *Thamnocalamus falconeri* Hook. f. ex Munro in Trans. Linn. Soc. 26 : 34. 1868. *Arundinaria falconeri* (Hook. f. ex Munro) Benth. in Benth. & Hook., Gen. Pl. 3 : 1208. 1883 ; Gamble in Ann. Roy. Bot. Gard. Calc. 1896 et in Hook. f., F.B.I. 7 : 383. 1896. *Drepanostachyum falconeri* (Hook. f. ex Munro) J. Campbell, Gen. Himal. Bamb. 23. 1983.

Tall shrubs. Young culms smooth, old ones scurvy white with yellow green stripes ; nodes swollen. Culm-sheaths oblong, truncate tipped, with persistent base. Leaves soft, oblong-lanceolate, glabrous. Panicles leafy.

Sikkim, *s.l.* ; 1900 2700 m.

### MELOCALAMUS Benth.

**Melocalamus indicus** R. Majumdar in Bull. Bot. Surv. India 25 : 236. t. 1. (1983) 1985.

Evergreen, scandent bamboo. Culms almost solid spreading and arching over tall trees, hanging downwards with tufts of green leaves and branched tips ; nodes with a woody ring ; internodes white scurfy. Culm-sheaths crustaceous, falling at maturity. Panicles with globular culsters of spikelets.

Sikkim, *s.l.*

### PHYLLOSTACHYS Sieb. & Zucc.

**Phyllostachys assamica** Gamble ex Brandis, Indian Trees 667. 1906. *P. bambusoides* Gamble in Ann. Roy. Bot. Gard. Calc. 7 : 27, t. 27. 1896 *et in* Hook. *f.*, F.B.I. 7 : 386. 1896, *non* Sieb. & Zucc.

Culms caespitose, yellow, flattened on one side. Branches semi verticillate. Culm-sheaths thin, papery, striate, rounded above into a short neck. Leaves having black hairy petiole, glaucous beneath with white stiff hairs below.

Gangtok.

### SCHIZOSTACHYUM Nees

**Schizostachyum munroi** S. Kumar & P. Singh in J. Ind. Bot. Soc. 1992. *Cephalostachyum capitatum* Munro in Trans. Linn. Soc. 26 : 139. 1868. *Schizostachyum capitatum* (Munro) R. Majumdar in Karthik. *et al.*, Fl. Ind. Enum. Monocot. 281. 1989, *non* Rupr. 1840. PAYONG (Lep.) ; GOBIA, GOPE (Nep.).

Semiscandent shrubs. Culm-sheaths pale brown, appressed pubescent. Leaves ovate-lanceolate. Inflorescence dense terminal or axillary, globular heads. Caryopsis beaked, brownish, shiny.

Sikkim, *s.l.* ; 600 2400 m.

**S. polymorphum** (Munro) R. Majumdar in Karthik. *et al.*, Fl. Ind. Enum. Monocot. 242. 1989. *Pseudostachyum polymorphum* Munro in Trans. Linn. Soc. 26 : 142. t. 1. 1868 ; Gamble in Ann. Roy. Bot. Gard. Calc. 7 : *et in* Hook. *f.*, F.B.I. 7 : 409. 1896. PARPHIOK, PAPHOK (Lep.) ; FILING (Nep.).

Shrubs with creeping rhizomes. Culms subscandent ; nodes simple ; internodes thin-walled ; culm-sheaths truncate with strigose brownish hairs and very small auricles with a tuft of bristles. Panicles large with wiry angled rachis. Caryopsis globose, crustaceous.

Sikkim, *s.l.*

**S. sharmae** S. Kumar & P. Singh in J. Ind. Bot. Soc. 1992. *Schizostachyum latifolium* (Munro) R. Majumdar in Karthik. *et al.*, Fl. Ind. Enum. Monocot. 281. 1989, *non* Gamble. *Cephalostachyum latifolium* Munro in Trans. Linn. Soc. 26 : 140. 1868 ; Gamble in Ann. Roy. Bot. Gard. Calc. 7 : 106. 1898 *et in* Hook. *f.*, F.B.I. 7 : 412. 1896.

Semiscandent shrubs with thin darkgreen, rough, culms having a whitish ring below nodes. Culm-sheaths thin, papery, straw-coloured with

rounded tip, auricled. Leaves unequal at base. Inflorescence a terminal globose head composed of clusters of spikelets. Caryopsis broadly ovoid, stalked, curved above.

Sikkim, *s.l.* (*cf.* Varmah & Bahadur 1980).

### THAMNOCALAMUS Munro

**Thamnocalamus aristatus** (Gamble) E.G. Camus, Les. Bambus 54. 1913. *Arundinaria aristata* Gamble in Ann. Roy. Bot. Gard. Calc. 7 : 18. t. 17. 1896 *et in* Hook. *f.*, Fl. Brit. Ind. 7 : 382. 1896. BHESHA (Bhut.) ; BABAIN (Lep.) ; RATONIGALA (Nep.).

Shrubs with glabrous yellow culms. Branchlets reddish. Nodes prominent. Culm-sheaths loose, glabrous with ciliate margin and few stiff bristles at mouth, fascicled. Leaves on joints of branchlets. Inflorescence drooping.

Sikkim, *s.l.* ; 2200 3300 m.

### YUSHANIA P.C. Keng

**Yushania maling** (Gamble) R. Majumdar in Fl. Ind. Enum. Monocot. 283. 1989. *Arundinaria maling* Gamble in Kew Bull. 1912 ; 139. 1912. *Fargesia maling* (Gamble) J. Campbell, Gen. Himal. Bamb. 40. 18 1985. PHIUNG, MHEEM (Bhut.) ; PHYEUM MIKNU (Lep.) ; MALING, MALINGO, KAORE-MALING, PARENT (Nep.).

Gregarious shrubs. Culms thick walled, hollow, indistinctly ribbed, green, with a ring of long bristles at nodes. Culm-sheaths straw-coloured, prominently striate, with ciliate margins, covered with brown hairs on the outer surface and auricled on both sides. Caryopsis oblong, dorsally furrowed.

Sikkim, *s.l.* ; 1800 3600 m.

**Y. microphylla** (Griff.) R. Majumdar in Fl. Ind. Enum. Monocot. 283. 1989. *Bambusa microphylla* Griff., Journ. 1 : 242. 259. 1847. *Arundinaria microphylla* (Griff.) Munro in Trans. Linn. Soc. 26 : 32. 1868 ; Gamble in Ann. Roy. Bot. Gard. Calc. 7 : 22. t. 118. 1896 *et in* Hook. *f.*, F.B.I. 7 : 383. 1896.

Gregarious caespitose shrubs with densely tufted culms. Internodes very long, glabrous. Nodes prominent. Leaves linear-lanceolate.

Sikkim, *s.l.* ; 2400 3100 m.

**Y. pantlingii** (Gamble) R. Majumdar in Fl. Ind. Enum. Monocot. 283. 1989. *Arundinaria pantlingii* Gamble in Ann. Roy. Bot. Gard. Calc.

7 : 129, t. 118. 1896 *et in* Hook. *f.*, F.B.I. 7 : 380. 1896. *Semiarundinaria pantlingii* (Gamble) Nakai in J. Arn. Arb. 6 : 151. 1925. *Fargesia pantlingii* (Gamble) J. Campbell, Gen. Himal. Bamb. 41. 1985.

Culms smooth. Nodes with a hairy ring. Culm-sheaths smooth, striate, auricled. Panicles on leafless branches. Caryopsis oblong, grooved, dark brown.

Chungthang, Lachung ; 1800 2300 m.

**Y. racemosa** (Munro) R. Majumdar in Karthik. *et al.*, Fl. Ind. Enum. Monoc. 283. 1989. *Arundinaria racemosa* Munro in Trans. Linn. Soc. 26 : 17. 1868 *emend.* Gamble in Kew Bull. 1912. 138. 1912 ; Gamble in Ann. Roy. Bot. Gard. Calc. 7 : 9, t. 8. 1896 *et in* Hook. *f.*, F.B.I. 7 : 379. 1896. *Fargesia racemosa* (Munro) Yi in J. Bomb. Res. 2 : 39. 1983.

Gregarious shrubs. Culms thin-walled, erect, with a ring on nodes ; internodes bluish green, scabrous. Culm-sheaths striate, covered with scattered black hairs. Leaves linear-lanceolate with setaceous tip.

Dzongri, Chola valley ; 3000 3600 m.

#### Subfam. : PANICOIDEAE

(S. Kumar)

#### ALLOTEROPSIS C.B. Presl.

**Alloteropsis semialata** (R. Br.) Hitch. in Contrib. U.S. Nat. Herb. 12 : 210. 1909 ; Bor, Grass. Ind. 276. 1960. *Panicum semialum* R. Rr., Prodr. 192. 1810. *Axonopus semialatus* (R. Br.) Hook. *f.*, F.B.I. 7 : 64. 1896.

Small grass. Culms densely tufted. Leaf blades linear, finely acuminate. Spikes subdigitate. Spikelets pale brown, awned.

Sikkim, *s.l.* ; up to 1950 m.

*Fl. & Fr.* : May Sept.

#### APLUDA L.

**Apluda mutica** L., Sp. Pl. 82. 1753 ; Bor, *l. c.* 93. *Apluda varia* Hara in DC., Monogr. Phan. 196. 1889 ; Hook. *f.*, F.B.I. 7 : 150. 1896.

Perennial grass. Leaf-blades linear. Panicles false, with single node ; racemes comprising of 1 sessile and 2 awnless pedicelled spikelets enclosed in a spathe.

Jorethang, Teesta valley, Rangpo ; 800 2500 m.

*Fl. & Fr.* : Aug. Nov.

### APOCOPSIS Nees

**Apocopsis palaeacea** (Trin.) Hochr. in Bull. N. Y. Bot. Gard. 6 : 262. 1910 ; Bor, *l. c.* 96. *Ischaemum palaeaceum* Trin. in Mem. Acad. Sci. Peters. ser. 6, 2 : 293. 1832. *Apocopsis royleanus* Nees in Ann. Mag. Nat. Hist. 7 : 142. 1841 ; Hook. *f.*, F.B.I. 7 : 142. 1896.

Perennial, erect grass. Leaf blades narrowly lanceolate, acuminate. Peduncles long, slender. Spikelets 1-2, with rusty villous rachis. Pedicelled spikelets represented by pedicels only.

Sikkim, *s. l.* ; 1700 m.

*Fl. & Fr.* : July Dec.

### ARTHAXON P. Beauv.

**Arthraxon castratus** (Griff.) Narayanswami *ex* Bor, Fl. Assam 5 : 376. 1940 *et* Grass. Ind. 99. 1960. *Andropogon castratus* Griff., Notul. 3 : 89. 1851. *Arthraxon rudis* (Steud.) Hochst. in Flora 39 : 188. 1856 ; Hook. *f.*, F.B.I. 7 : 144. 1896.

Perennial erect grass. Leaf-blades oblong or ovate-lanceolate, with cordate amplexicaul base. Peduncle of inflorescence densely whitish pubescent. Racemes with shortly ciliate joints. Sessile spikelets compressed.

Reshi ; 500 m.

*Fl. & Fr.* : Dec.

**A. hispidus** (Thunb.) Makino in Bot. Mag. Tokyo 26 : 214. 1912 ; Bor, Grass. Ind. 99. 1960. *Phalaris hispida* Thunb., Fl. Jap. 44. 1784. *A. ciliaris* P. Beauv., Ess. Agrost. 111. 152. t. 11, f. 6. 1812 ; Hook. *f.*, F.B.I. 7 : 146. 1896. *A. nudus* (Steud.) Hochst. in Flora 39 : 188. 1856 ; Bor, *l. c.* ; Hook. *f.*, *l. c.* 101. *A. submuticus* (Steud.) Bor, *l. c.* 144 ; Bor, *l. c.* 102. *A. breviaristatus* Hack. in DC., Mongr. Phan. 6 : 350. 1889 ; Hook. *f.*, *l. c.* ; Bor., *l. c.* 99. *A. inermis* Hook. *f.*, *l. c.* ; Bor, *l. c.* 100. *A. quartinianus* (A. Rich.) Nash. in N. Amer. Flora 17 : 99. 1912 ; Bor, *l. c.* 102. *A. hookeri* (Hack.) Henr. in Blumea 4 : 526. 1941 ; Bor, *l. c.* 99.

Annual grass with densely tufted trailing culms. Leaf-blades sparsely hairy. Spikelets, solitary, lanceolate, without a lemma in lower floret. Pedicelled spikelet represented by a vestigial lower glume.

Gangtok, Richingpong to Gaysing, Little Rangeet, up to 1900 m.

*Fl. & Fr.* : June Sept.

**A. lancifolius** (Trin.) Hochst. in Flora 39 : 188. 1856 ; Bor, *l. c.* 100. 1960. *Andropogon lancifolius* Trin. in Mem. Acad. Sci. Petersb. 62 : 171. 1832. *Anthraxon microphyllus sensu* Hook. *f.*, F.B.I. 7 : 146. 1896 *p. p.*, non (Trin.) Hochst. 1856.

Annual grass with decumbent slender culms. Leaf-blades with a cordate, amplexicaul base. Paired spikelets only in upper part of inflorescence ; lower glume of sessile spikelets with indistinct nerves.

Gangtok, Penengla, Yak la, Richingpong to Gyalsing ; 900 1800 m.

**A. microphyllus** (Trin.) Hochst. in Flora 39 : 188. 1856 ; Hook. *f.*, F.B.I. 7 : 147. 1896. *p. p.* ; Bor, *l. c.* ed. 2. 1. 1973. *Andropogon microphyllus* Trin. in Mem. Acad. Sci. St. Petersburg. 6, 2 : 275. 1833. *Anthraxon sikkimensis* Bor in Kew Bull. 1951 : 447. 1952 *et* Grass. Ind. 102. 1960.

Annual grass. Culms slender, glabrous ; nodes pubescent. Leaf-blades with hairy margins. Peduncles glabrous. Spikelets paired throughout.

Lachung ; 2000 3000 m.

*Fl. & Fr.* : July Oct.

### **BOTHRIOCHLOA** O. Kuntze

**Bothriochloa bladhii** (Retz.) S. T. Blake in Proc. R. Soc. Queensland 80 : 62. 1969. *Andropogon bladhii* Retz., Obs. Bot. 2 : 27. 1781. *Bothriochloa intermedia* (R. Br.) A. Camus in Ann. Soc. Linn. Lyon. 1930. n. s. 76 : 164. 1931 ; Bor, Grass. Ind. 108. 1960. *B. glabra* (Roxb.) A. Camus, *l. c.* ; Bor, *l. c.* ; 107. *B. odorata* (Donna Lisboa) A. Camus, *l. c.* ; Bor, *l. c.* 109. *Andropogon intermedium* R. Br., Prodr. 202. 1810 ; Hook. *f.*, F.B.I. 7 : 175. 1896. *A. odoratus* Donna Lisboa in J. Bombay Nat. Hist. Soc. 4 : 123. 1889. *Dichanthium bladhii* (Retz.) W. D. Clayton in Kew Bull. 32 : 3. 1977. *D. odoratum* (Donna Lisboa) Jain & Deshpande in Bull. Bot. Surv. Ind. 20 : 134. 1979.

Tufted perennials with tall robust culms. Leaf-blades linear. Racemes in irregular whorls. Peduncle simple or branched. Rachis pubescent. Pedicelled spikelets usually pitted. Sessile spikelets narrowly elliptic.

Gangtok ; 500 1800 m.

*Fl. & Fr.* : Aug. Jan.

**B. ischaemum** (L.) Keng in Cotrib. Biol. Lab. Sci. Soc. China Bot. 10 : 201. 1936 ; Bor, *l.c.* 108. 1960. *Andropogon ischaemum* L., Sp. Pl. 1047. 1753 ; Hook. *f.*, F.B.I. 7 : 171. 1896.

Tufted perennials with mostly basal leaves. Inflorescence in subdigitate racemes. Spikelets oblong-lanceolate, sessile.

Sikkim *s.l.*

### BRACHIARIA Griseb.

**Brachiaria ramosa** (L.) Stapf in Prain, Fl. Trop. Afr. 9 : 542. 1919 ; Bor, *l.c.* 284. 1960. *Panicum ramosum* L., Mant. 1 : 29. 1767 ; Hook. *f.*, F.B.I. 7 : 36. 1896.

Annuals. Leaf-blades broadly linear. Rachis triquetrous. Spikelets adaxial. Lower glumes 5-7 nerved.

Singtam ; up to 1800 m.

*Fl. & Fr.* : July - Oct.

**B. reptans** (L.) Gard. et Hubb. in Hook., *l.c.* Pl. sub. t. 3363. 1938 ; Bor, *l.c.* 285. 1960. *Panicum reptans* L., Syst. Nat. ed. 10. 870. 1759. *Panicum prostratum* Lam., Ill. 1 : 171. 1791 ; Hook. *f.*, F.B.I. 7 : 33. 1896.

Annuals. Culms decumbent, rooting at nodes. Leaf-blades glabrous, ovate-lanceolate, with cordate amplexicaul base and thickened margins. Spikelets glabrous, paired. Lower glume truncate. Caryopsis flattened, oval.

South Sikkim District ; 200-1800 m.

*Fl. & Fr.* : June - Oct.

*Notes* : A good fodder grass with edible grains.

**B. villosa** (Lam.) A. Camus in Lecomte, Fl. Gen. de l' Indo - Chine 7 : 433. 1922 ; Bor, *l.c.* 286. 1960. *Panicum villosum* Lam., Ill. 1 : 173. 1791, *p.p.* ; Hook. *f.*, F.B.I. 7 : 34. 1896, *p.p.*

Annuals. Culms rooting at base, shortly hairy below. Leaves pubescent or villous at both the surfaces. Spikelets solitary, pubescent, with lower glumes acute or obtuse but not truncate.

Sikkim, *s.l.* ; up to 2400 m.

*Fl. & Fr.* : July - Sept.

**CAPILLIPEDIUM** Stapf

**Capillipedium assimile** (Steud.) A. Camus in Lecomte, Fl. Gen. de l' Indo - Chine 7 : 314. 1922 ; Bor, Grass. Ind. 110. 1960. *Andropogon assimilis* Steud. in Zoll. Syst. Verz. 58. 1854 ; Hook. f., F. B. I. 7 : 179. 1896. *Dichanthium assimile* (Steud.) Deshpande in Fasc. Fl. India 15 : 6. 1894.

Perennials. Culms decumbent, nodes glabrous. Leaflets hispidulous, linear-lanceolate. Panicles branched, bearded in the axis. Racemes jointed, filiform. Sessile spikelets shorter than pedicelled spikelets.

Lower Burtuk Basti, Baluakhani, on way to Rongli, Jorethang, Deorali ; 600 - 2100 m.

*Fl. & Fr.* : Sept. - Dec.

**C. parviflorum** (R. Br.) Stapf in Prain, Fl. Trop. Afr. 9 : 169. 1917 ; Bor, l.c. 112. 1960. *Holcus parviflorus* R. Br., Prodr. 199. 1810. *Andropogon micranthus* Kunth, Rev. Gram. 1 : 165. 1829 ; Hook. f., F. B. I. 7 : 178. 1896. *Dichanthium parviflorum* (R. Br.) DC. in Amer. J. Bot. 54 : 386. 1967.

Rumtek, Baluakhani ; up to 2000 m.

*Fl. & Fr.* : Jan. - March.

**CHRYSOPOGON** Trin.

**Chrysopogon aciculatus** (Retz.) Trin., Fund. Agrost. 188. 1822 ; Bor, l. c. 115. 1960. *Andropogon aciculatus* Retz., Obs. Bot. 5 : 22. 1789 ; Hook. f., F.B.I. 7 : 188. 1896.

Grass with decumbent culms. Leaves linear. Panicles erect with slender filiform branches. Spikelets compressed, sessile. Pedicels of pedicelled spikelets glabrous.

Ranipul, Rangpo, Molli, Chhuzachen ; up to 1700 m.

**C. gryllus** (L.) Trin., Fund. Agrost. 188. 1822 ; Bor, Grass. Ind. 117. 1960. *Andropogon gryllus* L., Cent. Pl. 2 : 33 : 1756 ; Hook. f., F.B.I. 7 : 187. 1896.

Grass with erect culms. Panicles lax, branches whorled, densely bearded. Lower glume of sessile spikelet cartilaginous. Pedicelled spikelet linear-lanceolate.

Luing Basti ; 800 - 2900 m.

**C. lancearius** (Hook. f.) Haines, Bot. Bihar & Orissa 1036. 1924 (3 : 103. 1961 rep. ed.) ; Bor, l. c. 118. 1960. *Andropogon lancearius* Hook. f., F.B.I. 7 : 190. 1896.

Perennials with glabrous nodes. Leaflets lanceolate, acuminate, minutely spinulose at margins. Panicles bearig solitary, erect racemes. Pedicels of pedicelled spikelets hairy.

Sikkim, *s.l.* ; 500 - 800 m.

### COIX L.

**Coix lacryma-jobi** L., Sp. Pl. 972. 1753 ; Hook. f., F.B.I. 7 : 100. 1896 ; Bor, l. c. 264. 1960.

var. *lacryma - jobi* SAONKRU (Hindi) ; GARGAR (Beng.).

Annuals. Culms shiny. Leaflets cordate at base, acuminate at apex, sheath broad. Female spikelets surrounded by a hardened bract forming head like structure. Male spikelets loosely imbricate on a slender rachis.

Burtuk, Rieng, Tumlong ; 800 - 1500 m.

*Fl. & Fr.* : May - Oct.

var. **ma - yuen** (Romanet) Stapf ex Hook. f., F.B.I. 7 : 100. 1896 ; Bor, l. c. 265. 1960. *Coix ma - yuen* Romanet in Bull. Soc. Accl. Paris, 3, 8 : 442. 1881.

Annuals with soft striate involucre. Fruits crustaceous or chartaceous.

Sikkim *s.l.* ; up to 1500 m.

*Fl. & Fr.* : July - Sept.

*Notes* : It is commonly cultivated for preparation of a beer from the soft shelled fruits. The stem and leaves are used as fodder.

### CYMBOPOGON Spr.

**Cymbopogon flexuosus** (Nees ex Steud.) Wats. in Atkins., Gaz. N. W. Prov. Ind. 392. 1881 ; Bor, Grass. Ind. 127. 1960. *Andropogon flexuosus* Nees ex Steud., Syn. Pl. Glum. 1 : 388. 1854. *A. nardus* L. var. *flexuosus* Hack. in DC., Monogr. Phan. 6 : 603. 1889 ; Hook. f., F.B.I. 7 : 207. 1896. *C. flexuosus* (Nees ex Steud.) Wats. var. *sikkimensis* Bor in J. Bombay Nat. Hist. Soc. 52 : 162. 1954 *et l.c.*

Aromatic perennials. Culms stout, glabrous. Leaves linear, glaucous, green with purple tinge, coarsely hairy on upper surface. Inflorescence nodding. Sessile spikelets oblong, pedicelled spikelets acuminate.

Ratepani, Ranipul, Rangpo ; 900 1100 m.

*C. khasianus* (Hack.) Stapf ex Bor, Ind. For. Rec. (Bot. ) 1 : 3. 92. 1983 et Grass. Ind. 128. 1960 ; Soenarko in Reinwardtia 9 : 346. 1977. *Andropogon naruds* var. *khasianus* Hack. in DC., Monogr. Phan. 608. 1889 ; Hook. f., F.B.I. 7 : 206. 1896.

Perennials ; nodes tomentose ; internodes, shiny, glabrous. Leaves linear, acuminate at apex. Panicles decompose, with noded axis, elliptic acute spatheole. Sessile spikelets purplish with lower glume ungrooved. Pedicelled spikelets elliptic, acute.

Sikkim *s. l.* ; 100 1500 m.

*C. martinii* (Roxb.) Wats. in Atkins., Gaz. Ind. 10 : 392. 1882 ; Bor, *l. c.* 129. 1960. *Andropogon martinii* Roxb., Fl. Ind. 1 : 280. 1820. *A. schoenanthus* L. var. *martinii* (Roxb.) Hook. f., F.B.I. 7 : 204. 1896. *C. motia* Gupta in Proc. Ind. Acad. Sci. B. 71 : 92. 1970.

Tufted perennials with woody stout rootstock. Culms with swollen nodes. Leaves tapering to form a filiform tip, cordate at base. Pseudopanicles with long narrowly elliptic spatheole, green, turning reddish on maturity. Lower glume of sessile spikelets with V-shaped groove in lower half. Pedicelled spikelets obtuse.

Singtam ; 900 1200 m.

*Fl. & Fr.* : Sept. Nov.

*Notes* : An important essential oil yielding grass.

*C. microtheca* (Hook.) A. Camus in Rev. Bot. Appl. 1 : 284. 1921 ; Bor, *l. c.* 129. 1960. *Andropogon microtheca* Hook. f., F.B.I. 7 : 208. 1896.

Perennials, with erect smooth culms. Leaves glabrous, sheaths auricled. Inflorescence glabrous, branched with spatheoles, dilated at tip, joints of racemes densely ciliate on edges. Spikelets smaller than other species.

Luing Basti, Nan Dunga, between Tarkhola and Rangpo, Teesta valley ; 400 1200 m.

*C. pendulus* (Nees ex Steud.) Wats. in Atkins., Gaz., N. W. Prov. Ind. 392. 1882 ; Bor, *l. c.* 131. 1960. *Andropogon pendulus* Nees ex Steud., Syn. Pl. Glum. 1 : 388. 1854. *A. nardus* var. *grandis* Hack. in DC., Monogr. Phan. 6 : 605. 1889, *p. p.* ; Hook. f., F.B.I. 7 : 206. 1896, *p. p.*

Robust perennials. Culms tall stout. Leaves linear, acuminate with a pleasant lemon odour. Panicles pendulous, decomposed, subtended by spathes. Lower glume of sessile spikelets with a concave groove from base to apex.

Teesta valley.

### CYRTOCOCCUM Stapf

*Cyrtococcum accrescens* (Trin.) Stapf in Hook., Ic. Pl. sub. t. 3096. 1922; Bor, l. c. 291. 1960. *Panicum accrescens* Trin., Sp. Gram. Ic. 1 : t. 88. 1828.

Perennials, with tall culms arising from a branching, decumbent base. Leaves linear-lanceolate, tapering to a sharp point. Panicle lax, glabrous, branches capillary. Spikelets distinctly gibbous; tip of flower glume acute, upper glume boat shaped, pedicelled-spikelets with cupulate tip.

Ratong to Yuksom.

*Fl. & Fr.* : July Oct.

*C. longipes* (Wt. & Arn. ex Hook. f.) A. Camus in Bull. Mus. Hist. Nat. Paris 27 : 1921; Bor, l. c. 291. 1960. *Panicum longipes* Wt. & Arn. ex Hook. f., F.B.I. 7 : 58. 1896.

Perennials. Culms glabrous. Leaves linear-lanceolate, finely pubescent beneath. Panicle fastigiate branched; branches capillary. Spikelets acuminate, 3-nerved.

Rishap. *Fl. & Fr.* : June Nov.

*C. oxyphyllum* (Steud.) Stapf in Hook., Ic. Pl. sub. t. 3096. 1922; Bor, l. c. 291. 1960. *Panicum oxyphyllum* Steud., Syn. Pl. Glum. 1 : 65. 1854. *P. pilipes* Nees & Arn. ex Buese in Miq., Pl. Jungh. 3 : 376. 1854; Hook. f. F.B.I. 7 : 57. 1896.

Small perennials with decumbent creeping culms. Leaves oblong-lanceolate. Panicles lax, with pilose branches. Pedicels shorter than spikelets.

Sikkim, s. l.

*Fl. & Fr.* : June Dec.

*C. patens* (L.) A. Camus in Bull. Mus. Hist. Nat. Paris 27 : 18. 1928; Bor, l. c. 292. 1960. *Panicum patens* L., Sp. Pl. 58. 1753; Hook. f., F.B.I. 7 : 57. 1896.

Perennials. Culms branched, glabrous. Leaves acuminate, with hispid margins. Panicle lax, flexuous, spreading. Spikelets orbicular ; lower glume obtuse or subacute.

Sikkim, *s. l.*

### DICHANTHIUM Willemet.

**Dichanthium annulatum** (Forssk. ) Stapf in Prain, Fl. Trop. Africa 9 : 178. 1979 ; Bor, *l. c.* 133. 1960. *Andropogon annulatum* Forssk., Fl. Aegypt.-Arab. 173. 1775 ; Hook. *f.*, F.B.I. 7 : 196. 1896.

Densely tufted perennials. Culms hairy, noded. Leaves linear, acuminate, hairy. Racemes subdigitate. Caryopsis elliptic, light brown

Sikkim, *s. l.* ; up to 1100 m.

*Fl. & Fr.*: Sept. Dec.

**D. caricosum** (L. ) A. Camus in Bull. Mus. Hist. Nat. Paris 27 : 549. 1921 ; Bor, Grass. Ind. 134. 1960. *Andropogon caricosus* L., Sp. Pl. ed. 2. 1480. 1763 ; Hook. *f.*, F. B. I. 7 : 196. 1896.

Perennials. Culms glabrous, noded. Leaves linear-lanceolate. Racemes with solid joints and pedicels. Spikelets obovate, awned. Caryopsis linear or fusiform.

Sikkim, *s. l.*

*Fl. & Fr.* : July Dec.

### DIGITARIA Haller *nom. cons.*

**Digitaria ciliaris** (Retz.) Koel., Descr. Gram. 27. 1802. *Panicum ciliare* Retz., Obs. Bot. 4 : 16. 1786. *Digitaria biformis* Willd., Enum. Pl. Hort. Berol. 92. 1809 ; Bor, *l. c.* 299. 1960. *D. adscendens* (Kunth) Henr. in Blumea 1 : 92. 1934 ; Bor, *l. c.* 298. *Paspalum sanguinale* (L.) Lam. var. *ciliare* (Retz. ) Hook. *f.*, F.B.I. 7 : 15. 1896. *D. sanguinale* (L.) Lam. var. *rottleri* Hook. *f.*, *l. c.*

Annual grass. Culms decumbent, rooting at nodes. Leaf-blades linear. Racemes digitate or whorled. Spikelets appressed lanceolate ; lower glumes obscure, margins of nerves of lower smooth. Caryopsis ellipsoid, grey or light brown.

Melli, Rumtek ; up to 1500 m.

*Fl. & Fr.* : June Nov.

**D. compacta** (Roth ex R. & S.) Wedk. in Blumea 21 : 71. 1973. *Paspalum compactum* Roth ex R. & S., Syst. Veg. 2 : 316. 1817 ; Hook. *f.*, F.B.I. 7 : 12. 1896 ; Bor, Grass. Ind. 336. 1960.

Grass with decumbent leafy culms. Leaf-blades elliptic, lanceolate, sparsely hairy on both sides. Sheaths densely hairy; hairs bulbous at base. Spikelets hemispheric, without a lower glume.

Moplong.

*Fl. & Fr.* : June Dec.

**D. cruciata** (Nees ex Steud.) A. Camus in Lecomte, *Fl. Gen. de l' Indo-Chine* 7 : 399. 1922 ; Bor, *Grass. Ind.* 300. 1960. *Panicum cruciatum* Nees ex Steud., *Syn. Pl. Glum.* 1 : 30. 1854. *Paspalum sanguinale* Lam. var. *cruciatum* (Nees ex Steud.) Hook. f., *F.B.I.* 7 : 14. 1896.

Annual grass with decumbent culms creeping at base. Leaves linear-lanceolate, membranous. Ligule truncate. Racemes subdigitate. Caryopsis apiculate, protruding above lower lemmas.

Deorali ; 100 1500 m.

*Fl. & Fr.* : June Dec.

**D. radicata** (C. B. Presl.) Miq., *F l. Ind. Bat.* 3 : 437. 1857. *Panicum radicosum* C. B. Presl., *Rel. Hanek.* 1 : 297. 1830. *D. tinorense* (Kunth) Bal. in Morot., *J. de. Bot.* 4 : 138. 1890 ; Bor, *l. c.* 306. 1960. *Paspalum sanguinale* var. *debile* Hook. f., *F.B.I.* 7 : 16. 1896.

Annuals. Culms decumbent, rooting at nodes. Leaves linear, scabrous. Ligule truncate. Rachis winged. Caryopsis narrow, lanceolate, acute, yellowish to pale brown.

Rangpo ; up to 1500 m.

*Fl. & Fr.* : Sept. Nov.

**D. sanguinalis** (L.) Socp., *Fl. Carn. ed.* 2, 1 : 52. 1772 ; Bor, *l. c.* 304. 1960. *Panicum sanguinale* L., *Spl. Pl.* 57. 1753. *Paspalum sanguinale* (L.) Lam., *Ill.* 1 : 176 1791 ; Hook. f., *F.B.I.* 7 : 13. 1896.

Annuals with ascending culms. Leaves linear ; sheath basally hirsute. Racemes subdigitate. Spikelets narrowly elliptic to ovate ; lower lemma with distinct minute spines. Caryopsis lanceolate, grey or light brown.

Phodonchen ; up to 1800 m.

*Fl. & Fr.* : July. Sept.

**D. setigera** Roth. *apud R. & S., Syst. Veg.* 2 : 474. 1817 ; Bor, *l. c.* 305. 1960. *Paspalum sanguinale* Lam. var. *extensum* Hook. f., *F.B.I.*

7 : 15. 1896. *P. sanguinale* var. *calliblepharata* (Henr. ) Veldk. in *Blumea* 21 : 40. 1973.

Annual grass with creeping culms. Leaf-blades linear-lanceolate. Racemes subdigitate large. Caryopsis lanceolate, not apiculate, grey or yellowish brown.

Sikkim, *s. l.* ; up to 600 m.

*Fl. & Fr.* : July Oct.

**D. stricta** Roth ex R. & S., *Syst. Veg.* 2 : 474. 1817 ; Bor, *Grass. Ind.* 305. 1960. *Paspalum coyleanum* Nees ex Hook. *f.*, *F.B.I.* 7 : 18. 1896. *D. stricta* var. *glabrescens* Bor in *Webbia* 11 : 336. 1955 *et l.c.* *D. stricta* var. *denudata* (Link. ) Hern., *Digitaria* 175. 1950 ; Bor, *l.c.* 306.

Perennial grass with erect, leafy, culms. Leaf-blades linear, acuminate. Racemes subdigitate on a slender peduncle ; rachis narrowly winged ; pedicels dilated at tip. Caryopsis elliptic, apiculate.

Sikkim, *s. l.* ; up to 2100 m.

*Fl. & Fr.* : Aug. Oct.

#### DIMERIA R. Br.

**Dimeria ornithopoda** Trin., *Fund. Agrost.* 167.t. 14. 1820 ; Hook. *f.*, *F.B.I.* 7 : 104. 1896 ; Bor, *Grass. Ind.* 142. 1960.

Annual grass with weak culms, bearded at nodes, Leaf-blades linear, setaceous. Ligule ciliate. Spikes with solitary, shortly pedicelled, spikelets. Caryopsis cylindrical.

Sikkim, *s. l.*

*Fl. & Fr.* : July Dec..

#### ECHINOCHLOA P. Beauv.

**Echinochloa colonum** (L.) Link., *Hort. Berol.* 2 : 209. 1833 ; Bor, *l.c.* 308. 1960. *Panicum colonum* L., *Syst. Nat.* ed. 10, 2 : 870. 1759. Hook. *f.*, *F.B.I.* 7 : 32. 1892.

Annuals with erect or ascending culms. Leaves marked with purple streaks, eligulate. Racemes 4 - rowed, with uncrowded spikelets. Caryopsis broadly elliptic, deciduous.

Sikkim, *s. l.* ; up to 1800 m.

*Fl. & Fr.* : May June.

*Notes* : It is one of the finest fodder grass.

**E. crus-galli** (L.) P. Beauv., Ess. Agrost. 53. 161. 1812 ; Bor, *l. c.* 310. 1960. *Panicum crus-galli* L., Sp. Pl. 1 : 56. 1753 ; Hook. f., F.B.I. 7 : 30. 1896. *E. glabrescens* Munro ex Eggel., Ann. List. Grass Uganda 16. 1974 ; Bor, *l. c.* 311.

Annuals with erect or ascending culms. Leaves linear, eligulate. Racemes in 2 to several irregular rows. Spikelets ovate-elliptic, hispid. Caryopsis broadly elliptic

Lower Sichey Basti, Gangtok.

*Fl. & Fr.* : June Oct.

*Notes* : Found in marshy places like rice fields etc. It is a good fodder grass.

**E. grumentacea** Link., Hort. Berol. 1 : 204. 1827 ; *Panicum crus - galli* var. *frumentaceum* Hook. f., F.B.I. 7 : 31. 1896.

Robust herbs with erect culms. Leaves broadly linear. Spikelets broadly elliptic to orbicular, pubescent to hispid ; lower lemma acute.

Sikkim, *s.l.*

*Fl. & Fr.* : Aug. Oct.

*Notes* : It is a source of potent beer.

#### EREMOPOGON (Hack.) Stapf

**Eremopogon foveolatus** (Del.) Stapf in Prain, Fl. Trop. Afr. 9: 183. 1917; Bor, *l. c.* 148. 1960. *Andropogon foveolatus* Del., Fl. d' Egypte 16. t. 8. f. 2. 1812 ; Hook. f., F.B.I. 7 : 168. 1896.

Perennials with densely tufted culms. Leaves linear, scaberulous beneath, basal sheath villous ; ligule hyaline, ciliate. Racemes solitary at the end of branches ; joints of raceme and pedicels silky hairy. Sessile spikelets glabrous, pitted, purplish. Caryopsis oblong.

Sikkim, *s.l.*

*Fl. & Fr.* : July Dec.

#### EULALIA Kunth

**Eulalia fastigiata** (Nees ex Steud.) Haines, Bot. Bihar & Orissa 1014. 1924 et 3 : 1061 (rep. ed.) Bor, *l. c.* 155. 1960. *Saccharum fastigiatum* Nees ex Steud., Syn. Pl. Glum. 1: 409. 1855. *Erianthus fastigiatus* Nees ex Steud., *l. c.* ; Hook. f., F.B.I. 7 : 125. 1896.

Robust grass with erect glabrous culms. Leaves linear, acuminate; sheath fimbriate, throated. Racemes verticillate at nodes of panicle, densely silky hairy, mauve. Spikelets linear-lanceolate ; upper lemma bidentate.

Sikkim, *s. l.* ; 500 - 1400 m.

*Fl. & Fr.* : Aug. - Jan.

**E. hirtifolia** (Hack.) A. Camus in Ann. Soc. Linn. Lyon n. s. 68 : 202. 1922 ; Bor, *l.c.* 155. 1960. *Pollinia hirtifolia* Hack. in DC., Mongr. Phan. 6 : 165. 1889 ; Hook. *f.*, F.B.I. 7 : 111. 1896.

Annuals with erect leafy culms. Leaves linear, pubescent. Rachis with golden violet stiff hairs. Sessile spikelets lanceolate ; lower glume shiny, ciliate, chartaceous.

Reshi ; *ca* 2400 m.

*Fl. & Fr.* : Oct. - Dec.

**E. leschenaultiana** (Decne.) Ohwi in Bull. Tokyo Muse. No. 18 : 2. 1974 ; Bor, Grass. Ind. 155. 1960. *Andropogon leschenaultianus* Decne., Herb. Timor Descr. 29. 1835. *Pollinia cumingii* Nees in Hook. Kew J. Bot. 2 : 98. 1850 ; Hook. *f.*, F. B.I. 7 : 114. 1896. *E. cumingii* (Nees) A. Camus in Lecomte, Fl. Gen. de l' Indo-Chine 7 : 250. 1922.

Perennials. Culms slender, ascending, pubescent. Leaves linear, acuminate, margins scabrid. Racemes with densely golden hairs on sides and back of joints and pedicels. Lower floret absent.

Sikkim ; *s.l.*

*Fl. & Fr.* : Oct. - Jan.

**E. mollia** (Griseb.) O. Ktze., Rev. Bot. Gen. Pl. 2 : 775. 1891 ; Bor, Grass. Ind. 156. 1960. *Erianthus mollis* Griseb. in Nachr. Ges. Wiss. Gottingen 92. 1868. *Pollinia mollis* (Griseb.) Hack. in DC., Mongr. Phan. 6 : 161. 1889 ; Hook. *f.*, F.B.I. 7 : 111. 1896.

Perennials. Culms erect, slender, glabrous. Leaves narrowly lanceolate, acute, glabrous ; ligule small, bearded. Spikes crowded. Spikelets concealed by long hairs.

Sikkim, *s.l.* ; up to 2400 m.

*Fl. & Fr.* : Sept. - Oct.

**E. quadrinervis** (Hack.) O. Ktze., Rev. Bot. Gen. Pl. 2 : 775. 1891 ; Bor, Grass. Ind. 157. 1960. *Pollinia quadrinervis* Hack. in DC., Mongr. Phan. 6 : 158. 1889 ; Hook. *f.*, F.B.I. 7 : 110. 1896.

Perennials. Culms slender, leafy. Leaves linear, acuminate, hairy ; margins scabrid. Racemes spreading, white-hairy. Spikelets pale brown, with lower glume distinctly 4-nerved.

Richingpong to Gyalzing ; up to 1500 m.

*Fl. & Fr.* : Sept. Dec.

### EULALIOPSIS Honda

*Eulaliopsis binata* (Retz.) C.E. Hubb. in Hook., Ic. Pl. Sub. t. 3262. 1935 ; Bor, *l. c.* 158. 1960. *Andropogon binatus* Retz., Obs. Bot. 5 : 21. 1789. *Ischaemum angustifolium* (Trin.) Hack. in DC., Mongr. Phan. 6 : 241. 1889; Hook. *f.*, F.B.I. 7 : 129. 1896.

Perennials. Culms erect, densely tufted with wooly base. Leaves narrow, hirsute below, hairs tubercled at base. Upper lemma bidentate, awned. Caryopsis black.

Sikkim, *s.l.* ; up to 2100 m.

*Fl. & Fr.* : June Sept.

### HEMARTHRIA R. Br.

*Hemarthria compressa* (L. *f.*) R. Br., Prodr. 207. 1810; Bor, *l. c.* 161. 1960. *Rottboellia compressa* L. *f.*, Suppl. Pl. 114. 1781 ; Hook. *f.*, F.B.I. 7 : 153. 1896.

Perennials. Culms erect, branched, compressed, leafy. Leaves linear, acuminate at apex, rounded at base. Racemes fasciated with almost articulate rachis. Spikelets all similar, lower glume bluntly acuminate.

Ronglikhola, Burtuk Basti, Gangtok ; up to 1800 m.

*Fl. & Fr.* : Sept. Dec.

### ICHNANTHUS P. Beauv.

*Ichnanthus cicinus* (F. M. Bail.) Merr. in Enum. Philipp. Fl. Pl. 1 : 70. 1924 ; Bor, *l. c.* 314. 1960. *Panicum vicinum* F. M. Bail., Syn. Queens. Fl. Suppl 3: 82. 1890. *Ichnanthus pallens sensu* Hook. *f.*, F.B.I. 7 : 60. 1896, *non* Munro 1861.

Perennials. Culms weak. Leaves oblong-lanceolate, attenuate, amplexicaul or obliquely cordate at base. Panicles emerging from the sheath of flag leaf, with erect angular rachis and hispid or wooly branches. Fertile florets with lateral basal appendages or scars.

Sikkim, *s.l.*

*Fl. & Fr.* : Sept. Dec.

**IMPERATA** Cyr.

**Imperata cylindrica** (L.) Reuschel., Nom. Bot. ed. 3 : 10. 1797 ; Bor, *l.c.* 169. 1960. *Lagureos cylindricus* L., Syst. Nat. ed. 10 : 878. 1759. *Imperata arundinacea* Cyr., Pl. Rar. Neap. 2 : 26. t. 11. 1792 ; Hook. *f.*, F.B.I. 7 : 106. 1896. *I. cylindrica* var. *major* (Nees) C. E. Hubb. ex E. E. Hubb. et Vaughan, Grass Manr. 96. 1940 ; Bor, *l.c.* 170.

Chungthang, Gyalshing, Dentam, Baluakhani.

*Fl. & Fr.* : May - Nov.

**ISCHAEMUM** L.

**Ischaemum barbatum** Retz., Obs. Bot. App. 6 : 35. 1791 ; Bor in Kew Bull. 15 : 411. 1961 et Grass. Ind. (rep. ed.) App. 1. 1973. *Ischaemum aristatum sensu* Hack. ssp. *imberbe* Hack. var. *imbricatum* Hack. in DC., Mongr. Phan. 6: 203. 1889 ; Hook. *f.*, F.B.I. 7 : 127. 1896. *I. goebelli* Hack. in Ost. Bot. Z. 51 : 149. 1901 ; Bor, Grass. Ind. 179. 1960.

Tall grass with smooth terete culms. Leaves lanceolate with cartilaginous margins and very long ligule. Inflorescence of 2 false noded racemes, without a sheath. Sessile spikelets with 1-nerved upper glume ; lower glume with 2 - 3 nodules in lower region only.

Sikkim, *s. l.* ; up to 1500 m.

*Fl. & Fr.* : Aug. - Dec.

**I. indicum** (Houtt.) Merr. in J. Arnold Arbor. 19 : 320. 1938 ; Bor, *l.c.* 180. 1960. *Paleum indicum* Houtt., Nat. Hist. 2. 13 : 198. t. 90. f. 2. 1782. *I. ciliare* Retz., Obs. Bot. 6 : 36. 1791 ; Hook. *f.*, F.B.I. 7 : 133. 1896. *I. aristatum auct. non* L. : Hook. *f.*, *l.c.* 126.

Grass with prostrate decumbent culms, rooting at nodes. Leaves linear lanceolate, hirsute ; ligule small, membranous. Racemes with glabrous peduncle, joints hairy along margins. Sessile spikelets greenish, upper glume many nerved, shortly aristate; lower glume with nodules.

Sikkim, *s. l.*

*Fl. & Fr.* : Aug. - Dec.

**I. rugosum** Salisb., *l.c.* Stri. Rar. 1. t. 1. 1791 ; Hook. *f.*, F.B.I. 7 : 127. 1896 ; Bor, *l.c.* 182. 1960.

Tall grass with erect or ascending culms. Leaves linear-lanceolate, almost glabrous. Racemes slightly appressed to each other. Sessile spikelets yellow with distinct nodules on lower glume.

Sikkim, *s.l.*

### MICROSTEGIUM Nees

**Microstegium ciliatum** (Trin.) A. Camus in Ann. Soc. Linn. Lyon. s.n. 68 : 201. 1921 ; Bor, Grass. Ind. 193. 1960. *Pollinia ciliata* Trin. in Mem. Acad. Sci. Petersb. 6 : 306. 1832 ; Hook. *f.*, F.B.I. 7 : 117. 1896. *Pollinia monantha* Nees ex Steud., Hook. *f.*, *l.c.*

Perennials. Culms highly branched in lower region. Racemes subdigitate, joints linear, compressed, ciliate in two rows. Sessile spikelets with V-shaped median groove on lower glume, bearded with stiffly ciliate white or purplish hairs. Stamens 3.

Mangan ; up to 1800 m.

*Fl. & Fr.* : Oct. Dec.

**M. nudum** (Trin.) A. Camus in Ann. Soc. Linn. Lyon. n.s. 1832. 68 : 201. 1921 ; Bor, *l.c.* 194. 1960. *Pollinia nuda* Trin. in Mem. Acad. Sci. Petersb. 6, 2 : 307. 1832 ; Hook. *f.*, F.B.I. 7 : 117. 1896.

Annuals, culms decumbent, multinoded, glabrous. Leaves lanceolate, acuminate. Spikelets with shortly bearded callus ; lower glume with a broad shallow median groove ; upper lemma with a long awn. Caryopsis subovoid, abruptly narrowed at tip. Stamens 2.

Sikkim, *s.l.* ; up to 1800 m.

*Fl. & Fr.* : Sept. Oct.

**M. petiolare** (Trin.) Bor in Ind. For. Rec. (Bot.) 1 : 87. 1938 *et* Grass. Ind. 1194. 1960. *Spodiopogon petiolaris* Trin. in Mem. Acad. Sci. Petersb. 6, 2 : 301. 1832. *Ischaemum petiolaris* (Trin.) Hack. in DC., Mongr. Phan. 6 : 238. 1889 ; Hook. *f.*, F.B.I. 7 : 138. 1896.

Grass with tall, glabrous stout culms. Leaves lanceolate, acuminate, hairy ; margins scabrid. Racemes with joints and pedicels subtrigonal. Sessile spikelets with deeply bifid upper lemma. Stamens 2.

Dikchu.

*Fl. & Fr.* : Sept. Nov.

*Notes* : A new record for Sikkim.

**M. vagans** (Nees ex Steud.) A. Camus in Ann. Soc. Linn. Lyon n.s. 68 : 200. 1921 ; Bor, Grass. Ind. 195. 1960. *Pollinia vagans* Nees ex Steud., Pl. Glum. 1 : 410. 1855 ; Hook. *f.*, F.B.I. 7 : 115. 1896. *Pollinia grate* Hack. in DC., Mongr. Phan. 6 : 238. 1889 ; Hook. *f.*, *l.c.*

Tall grass with branched glabrous culms, pubescent at nodes. Leaves linear-lanceolate, acuminate. Racemes with hairy joints ; joints dilated at top. Sessile spikelets with obtuse lower and upper glume. Stamens 3.

Sikkim ; *s.l.*

*Fl. & Fr.* : Oct. Dec.

*Notes* : It is used as a fodder grass.

**M. vimineum** (Trin.) A. Camus in Ann. Soc. Linn. Lyon n.s. 68 : 201. 1921 ; Bor, *l.c.* 195. 1960. *Andropogon vimineous* Trin. in Mem. Acad. Sci. Petersb. 6, 2 : 268. 1832. *Pollinia imberbis* Nees ex Steud. Syn. Pl. Glum. 1 : 410. 1855 ; Hook. *f.*, F.B.I. 7 : 117. 1896. *M. vimineum* var. *willdenowianum* (Nees) Sur in J. Econ. Tax. Bot. 6 : 175. 1985.

Annuals with glabrous, furrowed culms. Leaves linear-lanceolate, leaf-blades hairy on upper surface. Inflorescence of false spikes ; joints of rachis channelled. Stamens 3, anthers less than 1 mm long. Caryopsis rounded.

1500 2000 m.

*Fl. & Fr.* : Oct. Dec.

#### MISCANTHUS Anders.

**Miscanthus nepalensis** (Trin.) Hack. in DC., Mongr. Phan. 6 : 104. 1889 ; Hook. *f.*, F.B.I. 7 : 107. 1896 ; Bor, Grass. Ind. 196. 1960. *Eulalia nepalensis* Trin. in Mem. Acad. Sci. Petersb. 6, 2 : 333. 1832.

Tufted perennials with small rhizomes. Leaves linear, glabrous. Racemes bearded, with golden brown hairs, 3 4 times longer than spikelets. Spikelets all pedicelled with awned lemmas. Caryopsis oblong-ellipsoid.

Baluwakhani, Gangtok, Rate - Chu, Phadomchan, Soreng ; up to 1500 2400 m.

*Fl. & Fr.* : April June.

**M. nudipes** (Griseb.) Hack. in DC., Mongr. Phan. 6 : 109. 1889 ; Hook. *f.*, F.B.I. 7 : 107. 1896 ; Bor, Grass. Ind. 196. 1960. *Erianthus nudipes* Griseb. in Nachr. Koen. Akad. Wiss. Goet. 92. 1868.

Perennials with subrobust culms. Leaves linear, pubescent on both surfaces. Inflorescence of fasciculate racemes. Spikelets brownish hairy.

Lachung to Donbyon, Lachen to Tallam, Samdong ; 2100  
2700 m.

### MNESITHEA Kunth

**Mnesithea khasiana** (Hack.) Koning & Sosef in Blumea 31 : 291. 1986. *Rottboellia striata* Nees ex Steud. ssp. *khasiana* Hack. in DC., Mongr. Phan. 6 : 302. 1889 ; Hook. f., F.B.I. 7 : 157. 1896. *Coelorachis khasiana* (Hack.) Stapf ex Bor in Ind. For. Rec. (Bot.) 1 (3) : 101. 1938 et Grass. Ind. 121. 1960.

Culms solid, erect, branched. Leaves - linear-lanceolate. Racemes of 2 - 4 - jointed fascicles arising from spathe like sheaths. Sessile spikelets in pairs, at each node of axis.

Sikkim, *s.l.*

**M. striata** (Nees ex Steud.) Koning & Sosef. in Blumea 31 : 292. 1986. *Rottboellia striata* Nees ex Steud., Syn. Pl. Glum 1 : 361. 1854 ; Hook. f., F.B.I. 7 : 157. 1896. *Coelorachis striata* (Nees ex Steud.) A. Camus in Ann. Soc. Linn. Lyon. n.s. 68 : 1197. 1921. Bor, Grass. Ind. 121. 1960.

Culms glabrous. Leaves linear-lanceolate. Racemes exerted from sheath, nodes without a spathe ; rachis striate. Sessile spikelets not spherical.

Sikkim, *s.l.*

**M. granularis** (L.) Koning & Sosef in Blumea 31 : 295. 1986. *Cenchrus granularis* L., Mant. Fl. 2. App. 575. 1771. *Manisuris granularis* (L.) L.f., Nov. Gram. Gen. 40. 1779 ; Hook. f., F.B.I. 7 : 159. 1896. *Hackelochloa granularis* (L.) Ktze., Rev. Gen. Pl. 2 : 776. 1891. Bor, Grass. Ind. 159. 1960. *Manisuris porifera* Hack. in Oest. Bot. Z. 41 : 48. 1891 ; Hook. f., *l.c.* 160. *Hackelochloa porifera* (Hack.) Rhind, Grass Burma 77. 1954 ; Bor, *l.c.*

Culms compressed, softly hairy. Leaflets linear-lanceolate, hairy on both surfaces with ciliate margins. Racemes solitary or from axillary branches. Sessile spikelets almost spherical in shape.

Rangyet valley ; 1000 1500 m.

### OPHIUROS Gaertn. f.

**Ophiuros exaltatus** (L.) O.Ktze., Rev. Gen. Pl. 2: 780. 1891 ; Bor, Grass. Ind. 199. 1960. *Aegilops exaltata* L., Mant. 2 : 575. 1771. *Ophiyrous corymbosus* Gaertn. f., Fruct. 3 : 4. t. 181. 1805. Hook. f., F.B.I. 7 : 160. 1896.

Perennials with erect, solid culms, leafy throughout. Leaves linear-lanceolate, with spinulose margins. Spikes corymbosely fasciculate in dense purple tinged fascicles with short peducles. Spikelet solitary, sessile.

Sikkim, *s.l.*

### OPLISMENUS P. Beauv.

**Oplismenus burmanii** (Retz.) P. Beauv., Ess. Agrost. 54. 168. 1812; Hook. *f.*, F.B.I. 7 : 68. 1896. Bor, *l.c.* 317. 1960. *Panicum burmanii* Retz., Obs. Bot. 3 : 10. 1783.

Annuals with prostrate or trailing culms. Leaves lanceolate-ovate, sparingly white hairy. Racemes 3-8, with hirsute rachis; spikelets with crossband of hairs and scaberulous awn.

Kabi, Mangan, Singtam, Sangtok; up to 1800 m.

*Fl. & Fr.* : July-Sept.

**O. compositus** (L.) P. Beauv., Ess. Agrost. 54. 168. 1812; Hook. *f.*, F.B.I. 7 : 66. 1896; Bor, *l.c.* 317. 1960. *Panicum compositum* L., Sp. Pl. 57. 1753.

Perennial grass with ascending decumbent culms. Leaves lanceolate to narrowly ovate, minutely hairy below. Spikelets distant, up to 12 mm in the lowest racemes. Awns viscid, smooth.

Gangtok, Mangan; up to 2400 m.

*Fl. & Fr.* : June-Dec.

**O. undulatifolius** (Ard.) R. & S., Syst. Veg. 2 : 482. 1817, *non* P. Beauv. *nom. nud.*; Hook. *f.*, F.B.I. 7 : 66. 1896; Bor, *l.c.* 318. 1960. *Panicum undulatifolium* Ard., Animd. Spec. Ait. 14 : t. 4. 1764.

Perennials with trailing culms, rooting at nodes. Leaves undulating. Spikelets contiguous, less than 4 mm apart in lowest racemes.

Sikkim *s.l.*; up to 2700 m.

### PANICUM L.

**Panicum auritum** Presl. *ex* Nees, Agrost. Bras. 176. 1829; Hook. *f.*, F.B.I. 7 : 40. 1896; Bor, Grass. Ind. 324. 1960.

Perennials with erect leafy culms; internodes long. Leaves narrowly linear-lanceolate, hairy. Panicles contracted with subsecund fascicles of racemes; rachis channelled. Spikelets oblong-lanceolate with strongly 3-5-nerved lower glumes.

Sikkim, *s.l.*

**P. brevifloium** L., Sp. Pl. 59. 1753 ; Bor, Grass. Ind. 324. 1960.  
*Panicum ovalifolium* Poir. in Lam., Encycl. 4 : 279. 1816. Hook. *f.*, F.B.I. 7 : 44. 1896.

Annual grass with ascending, striate culms, rooting at basal nodes. Leaves ovate-lanceolate, acuminate at apex, cordate amplexicaul at base. Branches of panicles with numerous alternate or verticillate branchlets. Spikelets purplish pubescent, with faintly nerved lower glume.

Lower Sichey Busty, Gangtok ; up to 1800 m.

*Fl. & Fr.* : May Oct.

**P. humidorum** Buch.-Ham. *ex* Hook. *f.*, F.B.I. 7 : 53. 1896 ; Bor, *l.c.* 326. 1960.

Perennial grass with creeping, procumbent culms, rooting at nodes. Leaves linear with obtuse base. Spikelets smaller, purple, with epaleate lower florets.

Sikkim, *s.l.*

*Fl. & Fr.* : July Dec.

**P. khasianum** Munro *ex* Hook. *f.*, F.B.I. 7 : 54. 1896 ; Bor, *l.c.* 327. 1960.

Perennials. Culms prostrate and creeping, with glabrous nodes. Leaves lanceolate. Ligule narrow, ciliate. Spikelets ellipsoid ; lower glume deltoid and obscurely nerved.

Sikkim, *s.l.*

**P. miliaceum** L., Sp. Pl. 58. 1753 ; Hook. *f.*, F.B.I. 7 : 45. 1896 ; Bor, *l.c.* 327. 1960.

Annuals. Culms stout, clothed with long spreading hairs ; nodes bearded. Leaves linear. Spikelets largest of all species occurring in state. Caryopsis orbicular, plano-convex, white.

Sikkim, *s.l.*

**P. notatum** Retz., Obs. Bot. 4 : 18. 1756 ; Bor, Grass. Ind. 701. 1960. *Panicum montanum* Roxb., Fl. Ind. 1 : 315. 1820 ; Hook. *f.*, F.B.I. 7 : 53. 1896.

Perennials with woody base. Culms erect, branched. Leaves lanceolate, cordate at base. Ligule obscure. Spikelets ellipsoid-oblong.

Sikkim, *s.l.*

**P. paludosum** Roxb., Fl. Ind. 1 : 310. 1820 ; Bor, Grass, Ind. 329. 1960. *P. proliferum sensu* Hook. *f.*, F.B.I. 7 : 50. 1896, *non* Lam.

Perennials. Culms erect or ascending, spongy, rooting at nodes. Leaves linear - ensiform. Spikelets ovate, acuminate, green ; lower glume orbicular or reniform, obscurely nerved.

Sikkim, *s.l.*

*Fl. & Fr.* : Aug. Feb.

**P. psilopodium** Trin., Gram. Panic. 217. 1826 ; Hook. *f.*, F.B.I. 7 : 46. 1896 ; Bor, Grass, Ind. 329. 1960 ; Hsu in Hara, Fl. East Him. 370. 1966 ; Ohwi in Ohashi, Fl. East. Him. 3 : 121. 1975. *P. psilopodium* var. *coloratum* Hook. *f.*, *l.c.* 47.

Annuals. Culms tufted, with black nodes. Leaves linear - lanceolate ; ligule a ciliate ring. Panicles lax ; spikelets deciduous. Upper glume 11-nerved. Caryopsis elliptic.

Sikkim, *s.l.*

*Fl. & Fr.* : July Nov.

**P. repens** L., Sp. Pl. ed. 2, 87. 1762 ; Hook. *f.*, F.B.I. 7 : 49. 1896 ; Bor, *l.c.* 330. 1960.

Perennials with stoloniferous rhizomes. Culms solid. Leaves distichous, linear-lanceolate with involute margins. Panicles lax, with angular rachis. Caryopsis oblong.

Sikkim, *s.l.*

*Fl. & Fr.* : Aug. Sept.

**P. sumatrense** Roth ex R. & S., Syst. Veg. 2 : 434. 1817 ; Bor, Grass, Ind. 701. 1960. *Panicum millare* Lam., Ill. 1 : 173. 1791 ; Hook. *f.*, FBI. 7 : 46. 1896.

Annuals. Culms erect or ascending. Leaves linear ; ligule ciliate, truncate. Panicles with triquetrous rachis, contracted. Spikelets persistent, green or purple tinged. Caryopsis subglobose, dull white.

Sikkim, *s.l.* ; 600 m.

*Fl. & Fr.* : July Oct.

**P. walens** Mes. in Bot. Jahrb. 34 : 146. 1904, (*watens*). *Panicum humile* Nees ex Steud. Syn. Pl. Glum. 1 : 84. 1854 *non* Thunb. ex Trin.

1826 ; Hook. *f.*, F.B.I. 7 : 48. 1896. *P. austroasiaticum* Ohwi in Act. Phytotax. Geobot. 2 : 45. 1924 ; Bor, *l.c.* 324. 1960.

Dwarf annuals with erect, slender, glabrous culms. Leaves linear ; ligule a ciliate rim. Panicles open, ovate-oblong. Spikelets ellipsoid, shortly acuminate with paleate lower floret.

Sikkim, *s.l.*

### PASPALIDIUM Stapf

***Paspalidium flavidum*** (Retz.) A. Camus in Lecomte, Fl. Gen. de l' Indo - Chine 7 : 419. 1922 ; Bor, *l.c.* 333. 1960. *Panicum flavidum* Retz., Obs. Bot. 4 : 15. 1786 ; Hook. *f.*, F.B.I. 7 : 28. 1896.

Tufted perennials. Culms slender, glabrous, somewhat compressed. Leaves linear-lanceolate. Inflorescence of pseudo spikes. Spikelets abaxial with developed lower glume and paleate male lower floret ; upper lemma granulose.

Sikkim, *s.l.*

*Fl. & Fr.* : Aug. Sept.

***P. punctatum*** (Burm. *f.*) A. Camus in Lecomte, Fl. Gen. de l' Indo - Chine 7 : 419. 1922 ; Bor, *l.c.* 333. 1960. *Panicum punctatum* Burm. *f.*, Fl. Ind. 26. 1768 ; Hook. *f.*, F.B.I. 7 : 29. 1896.

Perennials with spongy rhizomes. Culms decumbent or prostrate, rooting at nodes. Leaves linear. Inflorescence consisting of distantly placed pseudo spikes. Spikelets with neuter, lower floret without palea ; upper lemma rugulose.

Sikkim, *s.l.*

*Fl. & Fr.* : Sept. Oct.

### PASPALUM L.

***Paspalum conjugatum*** Bewrg. in Act. Helvet. Phys. Manth. 7 : 129. t.8. 1773 ; Hook. *f.*, F.B.I. 7 : 11. 1896.

Creeping, stoloniferous herbs. Leaves lanceolate, sparsely hairy above. Spikelets 2-seriate, plano-convex, with a ciliate fringe from margins.

Sikkim, *s.l.*

***P. dilatatum*** Poir. in Lam., Encyclop. 5 : 35. 1804 ; Bor, Grass. Ind. 338. 1960.

Tufted perennials. Culms robust, leafy at base. Leaves linear-lanceolate, acuminate. Inflorescence of 3 - 5 (-10) racemes with 2 - 4 rows of paired spikelets. Spikelets ovate, pubescent, yellowish green ; upper glume concave, ciliate at margins, sparsely pilose above.

Gangtok - Penangla (on way to Tashi View Point, TNA Campus).

**P. paspalodes** ( Mich. ) Scribn. in Mem. Tor. Bot. Club. 5 : 129. 1894. (*paspaloides*). *Digitaria paspalodes* Michx., Fl. Bor. Amer. 1 : 46. 1803. *Paspalum distichum auct. non L.* 1759. *nom. confus* : Hook. f., F.B.I. 338. 1960.

Creeping stoloniferous perennials. Culms dark, hairy, noded. Leaves with rounded ciliate base. Spikelets solitary in two rows, plano-convex pale green ; lower glumes minute scaly. Upper glumes appressely puberulent, herbaceous.

Lindok, East Distt.

*Fl. & Fr.* : April May ; Aug. Sept.

**P. scobiculatum** L., Mant. 1: 29. 1767 ; Hook. f., F.B.I. 7 : 10. 1896, *p.p.* ; Bor, *l.c.* 340. 1960. *P. orbiculare* Forst. f., Fl. Insul. Austr. Prodr. 7. 1786 ; Bor, *l.c.* *P. commersonii* Lam., Ill. 1 : 175. t. 43. f. 1. 1791 ; Bor, *l.c.* 335. *Paspalum cartilagineum* J.S. ex C.B. Presl., Rel. Haenk. 1 : 216. 1830 ; Bor, *l.c.* 335.

Perennials with tufted spongy culms, rooting at nodes. Leaves lanceolate. Racemes digitate, borne on a long axis. Spikelets in two rows ; lower glume lacking ; upper glume papyraceous, lower floret sterile.

Lingdok, East Distt.

*Fl. & Fr.* : April Dec.

#### **PENNISETUM** Rich. ex Pers.

**Pennisetum americanum** (L.) K. Schum. in Engl, Pflanz. Oest. Afr. B. 51. c. t. 4. f. A. & B. 1895. *Panicum americanum*. L., Sp. Pl. 56. 1753. *Pennisetum typhodeum* L.C. Rich. in Pers., Syn. Pl. 1: 72. 1805 ; Hook.f., F.B.I. 7 : 86. 1896. *P. typhodes* (Burm. f.) Stapf & C.E. Hubb. in Kew Bull. 1933 ; 271. 1933 ; Bor, Grass. Ind. 350. 1960.

Tall annuals. Culms erect with bearded nodes. Leaves linear-lanceolate. Panicles compact, cylindrical, pubescent. Spikelets ovate-elliptic, subtended by cream coloured or brownish involucrel bristles. Caryopsis ellipsoid-orbicular.

Cultivated in tropical zone.

*Fl. & Fr.* : Sept. Oct.

**P. clandestinum** Hochst. ex Chiov. in Ann. Ist Bot. Roma 8 : 41. t. 5. f. 2. 1903, Bor, Grass. Ind. 344. 1960.

Perennials with many creeping rhizomes. Culms short, copiously branched, appressed. Leaves linear, obtuse. Inflorescence consisting of cluster of 2-4 spikelets. Caryopsis oblong-ellipsoid, brown.

Introduced, naturalized.

*Notes* : A fodder grass locally known as "*Kikuya Grass*".

**P. flaccidum** Griseb. in Nachr. Ges. Wiss. Goett. 86. 1868 ; Hook.f., F.B.I. 7 : 84. 1896 ; Bor, Grass. Ind. 344. 1960.

Tufted perennials with thick rhizomes. Culms erect, branched. Leaves flat or folded. Panicles linear, with scabrid rachis having shallow ribs below cupular scars.

Sikkim, *s.l.*

**P. glaucum** (L.) R. Br., Prodr. 1 : 195. 1810. *Panicum glaucum* L., Sp. Pl. 56. 1753. *Setaria glauca* (L.) P. Beauv., Ess. Agrost. 51 : 169. 178. 1812 ; Hook.f., F.B.I. 7 : 78. 1896 ; Bor, *l.c.* 344. 1960.

Annuals. Culms loosely tufted, geniculate. Leaves linear-lanceolate. Inflorescence consisting of pseudospikes, erect, dense, with minutely pubescent rachis. Involucre persistent.

Sikkim, *s. l.*

*Fl. & Fr.* : Sept. Oct.

**P. orientale** L.C. Rich. in Pers, Syn. Pl. 1 : 72. 1805 ; Hook.f., F.B.I. 7 : 86. 1896 ; Bor, Grass. Ind., 34. 1960.

Perennials with creeping stout rhizome. Culms tall, erect, with glabrous nodes. Leaves linear. Spikes erect or nodding, pinkish, with flexuous villous or woolly rachis. Outer spikelets imperfect, anther-cells not bearded at apex. Caryopsis ellipsoid.

Sikkim, *s.l.*

*Fl. & Fr.* : Aug. Dec.

**P. pedicellatum** Trin. in Mem. Acad. Petersb. ser. 6,3 : 184. 1834 ; Hook.f., F.B.I. 7 : 86. 1896 ; Bor, *l.c.* 346. 1960.

Annuals with tall, glabrous, noded culms. Leaves linear-lanceolate. Spikes reddish purple, dense, erect or nodding, with angular, winged or ribbed rachis. Spikelets with silky hairs on back. Caryopsis oblong-lanceolate.

Jorethang.

*Fl. & Fr.* : Aug. Jan.

**A. purpureum** K. Schum., Beskr. Guin. Pl. 44. 1827; Bor, *l.c.* 348. 1960. ELEPHANT or NAPIER GRASS (Eng.).

Perennials with creeping rhizomes. Culms erect, branched; nodes with a ring of stiff, long appressed hairs. Leaves linear, acuminate, purple tinged, glabrous beneath. Inflorescence consisting of dense cylindric yellow or purple tinged pseudospikes; lateral pedicelled spikelets surrounded by involucre of bristles of unequal length.

Sikkim, *s.l.*

### PHACELURUS Griseb.

**Phacelurus zea** (C.B. Clarke) W.D. Clayton in Kew Bull. 33 : 177. 1978. *Rothoella zea* C.B. Clarke, in J. Linn. Soc. 25 : 86. f. 35. 1889; Hook. *f.* F.B.I. 7 : 152. 1896. *Thysis zea* (C.B. Clarke) Stapf in Hook., *l.c.* Pl. sub. t. 3078. 1892; Bor, *l.c.* 255. 1960.

Culms tall, glabrous. Leaves with serrulate-ciliate margins. Particles of subverticillate spikes; joints of rachis swollen, dorsally compressed; margins of lower glume narrowly inflexed.

Sikkim, *s.l.*

*Fl. & Fr.* : Aug. Dec.

### POGONATHERUM P. Beauv.

**Pogonatherum crinitum** (Thumb.) Kunth, Enum. Pl. 1 : 478. 1833; Hook. *f.* F.B.I. 7 : 141. 1896; Bor, Grass. Ind. 200. 1960. *Andropogon crinitus* Thunb., Fl. Japan 40 : t. 1748.

Perennials. Culms slender, highly branched. Leaves linear-lanceolate. Racemes dense with long delicate yellowish brown awns. Spikelets up to 2 mm; upper lemma deeply cleft; lower floret empty.

Rhenock, on way to Jorethan.

*Fl. & Fr.* : May June.

**P. paniceum** (Lam.) Hack. in Allg. Bot. Z. 178. 1906; Bor, Grass. Ind. 202. 1906. *Saccharum paniceum* Lam., Encycl. 1 : 595. 1785. *P. saccharoideum* P. Beauv., Ess. Agrost. 176. 1812; Hook. *f.* F.B.I. 7 : 141. 1896.

Tufted perennials. Culms erect, stiff. Leaves linear-lanceolate. Racemes with many delicate yellow-brown awns. Spikelets more than 2 mm long, lower floret male.

Singtam, Ranipool, Gangtok, Burtuk Busti.

**POLYTOCA** R. Br.

***Polytoca digitata*** (L.f.) Druce in Rep. Bot. Exch. Cl. Brit. Is. 4 : 641. 1916 ; Bor, *l.c.* 267. 1960. *Apluda digitata* L. f., Suppl. Pl. 434. 1781. *Polytoca bracteata* R.Br., Pl. Jav. Rar. 20. t. 5. 1838 ; Hook. f., F.B.I. 7 : 101. 1896.

Perennials. Culms with one sided grooved sheath at base, tomentose at nodes. Leaves linear. Racemes male, terminal, in lateral ones female or male at top, or female always at base. Lower glume obtuse, mucronate without an arista.

Sikkim, *s.l.*

*Fl. & Fr.* : July Dec.

***P. wallichiana*** (Nees ex Steud.) Benth. in J. Linn. Bot. 19 : 52. 1881 ; Hook.f., F.B.I. 7 : 101. 1896 ; Bor, *l.c.* 267. 1960. *Cyathorhachis wallichiana* Nees ex Steud., Syn. Pl. Glum. 1 : 403. 1855.

Perennials with well developed stolons. Culms leafy glabrous. Leaves linear. Panicles compound, with terminal node and lateral female spikelets. Lower glume toothed on one side, produced into a caudate arista.

Sikkim, *s.l.*

**PSEUDECHINOLAENA** (Hook.f.) Stapf

***Pseudechinolaena polystachya*** (H.B.K.) Stapf in Prain, Fl. Trop. Afr. 9 : 495. 1919 ; Bor, Grass. Ind. 352. 1960. *Echinolaena polystachya* H.B.K., Nov. Gen. Sp. Pl. 1 : 119. 1816. *Panicum uncinatum* Raddi, Agrost. Bras. 41. 1823 ; Hook. f., F.B.I. 7 : 58. 1896.

Perennials. Culms pubescent, noded, branched, rooting at base. Leaves ovate-lanceolate. Panicles with slender rachis, filiform branches. Spikelets laterally compressed, obliquely ovate, upper glume hispid.

Sikkim, *s.l.*

*Notes* : It forms thick masses in secondary forest. Its fruits stick to the legs of grazing animals by means of hooked spines of upper glume.

**PSEUDOPOGONATHERUM** A. Camus

***Pseudopogonatherum contortum*** (Brongn.) A. Camus in Lecomte, Fl.Gen. de l' Indo - Chine 7 : 255. 1922 ; Bor, *l.c.* 204. 1960. *Pollinia articulata* Trin. in Hook. f., F.B.I. 7 : 109. 1896. *P. articulata* Trin. var. *pedicellata* Hack. ex Hook. f., *l.c.* 110.

Annuals. Culms slender, densely tufted. Leaves filiform to linear. Panicles silky white. Spikelets all pedicelled ; upper glume with a long slender awn.

Sikkim, *s.l.*

*Notes* : A gregarious grass of open hill side ; morphologically very variable.

**P. brunoiana** Griff., Not. 3, 29. 1851 ; Bor, *l.c.* 353. 1960. *Holcus natans* Roxb. ex Hook. *f.*, F.B. I. 7 : 62. 1896. *Chamaeraphis spinescens* Poir. var. *brunoniana* Hook. *f.*, *l. c.*

On way to Tinbon, Lachung ; up to 2700 m.

*Notes* : Found in swampy places.

#### PSEUDOSORGHUM A. Camus

**Pseudosorghum fasciculare** (Roxb.) A. Camus in Bull. Mus. Hist. Nat. Paris 26 : 662. 1920 ; Bor, *l.c.* 205. 1960. *Andropogon fascicularis* Roxb., Fl. Ind. 1 : 269. 1820 ; Hook. *f.*, F.B.I. 7 : 177. 1896. *A nitidulus* Hook. *f.*, *l.c.* 199.

Annuals. Culms glabrous, decumbent, slender. Leaves lanceolate. Racemes spiciform with joints of rachis and pedicels without a median furrow. All pairs of spikelets heterogamous ; upper lemma of sessile spikelets bifid.

Sikkim, *s.l.*

*Fl. & Fr.* : Sept. Dec.

#### ROTTBOELLIA L.f. *nom. cons.*

**Rottboellia cochinchinensis** (Lour.) Clayton in Kew Bull. 35 : 1817. 1981. *Stegosia cochinchinensis* Lour., Fl. Cochinch. 1 : 51. 1790. *R. exaltata* L. *f.*, Suppl. Pl. 114. 1781, *non* (L.) L. *f.* 1779 ; Hook. *f.* in F.B.I. 7 : 156. 1896 ; Bor, Grass. Ind. 206. 1960. *R. exaltata* L. *f.* var. *robusta* Hook. *f.*, *l.c.*

Perennials. Culms erect, leafy, solid, branched at base. Leaves linear-lanceolate. Racemes solitary, terete, with dorsally glabrous internodes. Sessile spikelets solitary at each node of axis. Pedicelled spikelets imperfect with narrowly winged lower glume.

Sikkim, *s.l.*

*Fl. & Fr.* : Oct. Feb.

## SACCHARUM L. Pl.

**Saccharum longisetosum** (Anders. ex Benth.) Narayanasw. ex Bor, Fl. Assam 5 : 461. 1940 et Grass. Ind. 211. 1960. *Erianthus longisetosus* Anders. ex Benth. in J. Linn. Soc. Bot. 19 : 67. 1881 ; Hook. f., F.B.I. 7 : 124. 1896.

Perennials. Culms solid, arising from stout rhizomes. Leaves lanceolate with scabrid margins. Panicles densely packed with drooping racemes, clothed with reddish brown hairs. Lower glume chartaceous, glabrous, upper glume 1-nerved.

Gangtok.

var. **hookeri** (Hack.) Bor, Grass. Ind. 212. 1960. *Erianthus hookeri* Hack. in DC., Mongr. Phan. 6 : 143. 1889 ; Hook. f., F.B.I. 7 : 125. 1896.

Perennials with closely fitted sheath. Panicles of silky racemes; rachis ciliate at angles. Lower glume dorsally villous, upper glume 3-nerved.

Lachen, Rangpo, Rorathang.

**S. narenga** (Nees ex Steud.) Hack. in DC., Mongr. Phan. 6 : 119. 1889. *Erinathus narenga* Nees ex Steud., Syn. Pl. Glum. 1 : 411. 1855. *Narenga porphyrocoma* (Hance ex Trim.) Bor in Ind. For. 66 : 267. 1940 et Grass. Ind. 198. 1960.

Stout perennials with tall erect culms. Densely bearded at nodes, appressed silky below panicle. Panicles narrow, erect, woolly, purplish or whitish. Glumes coriaceous, obtuse.

Sikkim, *s.l.*

**S. officinarum** L., Sp. Pl. 54. 1753. Hook. f., F.B.I. 7 : 118. 1896 ; Bor, Grass. Ind. 212. 1960.

Grass with juicy, glabrous culms, waxy below nodes. Leaves linear-lanceolate. Panicles dense, ovate pyramidal. Spikelets surrounded by dense white silky hairs.

Cultivated in valleys.

**S. procerum** Roxb., Fl. Ind. 1 : 248. 1820 ; Bor, *l.c.* 213. 1960.

Tall grass with solid, terete culms. Leaves linear lanceolate. Panicles large, with silvery - grey hairy. Sessile spikelets with setaceous upper glume, curved at apex. Pedicelled spikelets with dorsally villous glumes.

Sikkim, *s.l.*

**S. rufipilum** Steud., Syn. Pl. Glum. 1 : 409. 1855 ; Bor, *l.c.* 213. 1960. *Erianthus versicolor* Nees ex Steud., *l.c.* ; Hook. *f.*, F.B.I. 7 : 124. 1896. *E. rufipilus* (Steud.) Griesb. in Nachr. Ges. Wiss. 'Gottingen' 93. 1868 ; Bor, *l.c.* 152. *E. versicolor* var. *patens* (Hack.) Hook. *f.*, *l.c.* *E. fulvus* Nees ex Steud. Syn. Pl. Glum. 1 : 409. 1855, *E. fulvus* Nees ex Hack. in DC., Mongr. Phan. 6 : 147. 1889 ; Hook. *f.*, *l.c.* 123.

Perennials. Culms erect, robust. Leaves linear, flat or convolute. Panicles with appressed silky peduncles. Spikelets brownish, with reddish silky hairs and membranous lower glumes.

Gangtok, Bop near Chungthang, on way to Rongli.

*Fl. & Fr.* : July Sept.

**S. sikkimensis** (Hook. *f.*) Narayana. ex Bor, Fl. Assam 5 : 462. 1940 et Grass. Ind. 214. 1960. *Erianthus sikkimense* Hook. *f.*, F.B.I. 7 : 123. 1896.

Perennials. Culms tall, slender. Leaves narrow, flat. Panicles silky villous below ; rachis villous or appressed hairy. Spikelets with coriaceous lower glume and entire upper lemma with a short awn.

Lachen.

**S. spontaneum** L., Mant. Pl. 2 : 183. 1771 ; Hook. *f.*, F.B.I. 7 : 118. 1896 ; Bor, Grass. Ind. 214. 1960.

Perennials, with thick rhizomes. Culms erect, solid, glabrous, with hairy nodes. Leaves petiolate towards base. Panicles lax, silvery white, pedicels ciliate. Spikelets with long silky hairs and acuminate lower glume.

On way to Rumtek, Rangeet, Rishop, Teesta, below Chhangu.

#### SACCIOLEPIS Nash.

**Sacciolepis indica** (L.) A. Chase in Proc. Biol. Soc. Wash. 218. 1908 ; Bor, *l.c.* 357. 1960. *Aira indica* L., Sp. Pl. 1753 in 'Errata'. *Panicum indicum* L., Mant. Pl. 2 : 184. 1771, non Mill. 1786. *P. indicum* L. var. *angustum* (Trin.) Hook. *f.*, *l.c.* 428. *P. indicum* L. var. *gracile* Hook. *f.*, *l.c.*

Tufted annuals. Culms glabrous, striate. Leaves linear-lanceolate. Panicles cylindrical, spiciform, continuous. Spikelets obliquely lanceolate, acute, relatively smaller, greenish purple. Caryopsis oblong.

Rongli khola, Ranipool, Deorali, Lindok.

*S. interrupta* (Willd.) Stapf in Priant, Fl. Trop. Afr. 9 : 757. 1920 ; Bor, l.c. 358. 1960. *Panicum interruptum* Willd., Sp. Pl. 1 : 341. 1798 ; Hook. f., F.B.I. 7 : 40. 1896.

Perennials. Culms ascending from a stout creeping rootstock. Rootstock spongy. Leaves linear, flat, rounded or subcordate at base. Panicles cylindrical, interrupted, spiciform. Spikelets densely crowded, acute, green. Caryopsis obovoid, apiculate.

Sikkim, s.l.

Notes : A very good fodder grass relished by cattle.

*S. myosuroides* (R. Br.) A. Camus in Lecomte, Fl. Gen. de l' Indo - Chine 7 : 460. 1922 ; Bor, l.c. 358. 1960. *Panicum myosuroides* R. Br., Prodr. 189. 1810 ; Hook. f., F.B.I. 7 : 42. 1896.

Annuals. Culms glabrous. Leaves narrow linear, flat, wooly. Panicles narrow, spiciform, cylindric, dense. Spikelets obtuse, pale green, purple tinged at tip.

Chungthang, Soreng, Rumtek.

### SCHIZACHYRIUM Nees

*Schizachyrium brevifolium* (Swartz) Nees ex Buse in Miq, Pl. Jungh. 359. 1854 ; Bor, l.c. 215. *Andropogon brevifolium* Swartz, Prodr. Veg. Ind. Occ. 26. 1788 ; Hook. f., F.B.I. 7 : 165. 1896.

Annuals. Culms weak, slender. Leaves linear, sharply pointed at apex. Racemes slender, solitary, concealed in a narrow spathe, joints glabrous. Caryopsis compressed, glabrous.

Sikkim, s.l.

Fl. & Fr. : Aug. Jan.

*S. delaveyi* (Hack.) Bor in Ind. For. Rec.(Bot.) 1 : 95. 1938 et Grass. Ind. 215. 1960. *Andropogon delaveyi* Hack. in DC., Mongr. Phan. 6 : 40. 1889. *A. bootanensis* Hook. f., F.B.I. 7 : 166. 1896.

Perennials. Culms many noded, erect. Leaves linear. Spathe reddish. Racemes compressed.

Sikkim, s.l. ; 2400 2600 m.

### SETARIA P. Beauv. nom. cons.

*Setaria barbata* (Lam.) Kunth, Rev. Gram. 1 : 47. 1829 ; Bor, Grass. Ind. 360. 1960. *Panicum barbatum* Lam., Ill. 1 : 171. 1791. *P. flavescens sensu* Hook. f., F.B.I. 7 : 56. 1896, non Swartz 1788. *P. rhachitrichum* Hochst. in Flora 27 : 254. 1844 ; Hook. f., l.c. 56.

Annuals. Culms slender. Leaves linear-lanceolate, plicate, broad, softly hairy on both surfaces. Panicles narrow, loose. Spikelets sessile, green, subtended by persistent bristles. Upper lemma transversely rugose. Caryopsis apiculate.

Jorethang ; 1500 1800 m.

*Fl. & Fr.* : July Oct.

*S. forbesiana* (Nees ex Steud.) Hook. f., F.B.I. 7 : 81. 1896 ; Bor, *l.c.* 360. 1960. *Panicum forbesianum* Nees ex Steud., Syn. Pl. Glum. 1 : 98. 1854.

Perennials. Culms tufted. Leaves linear-lanceolate, acuminate. Panicles narrowly pyramidal, erect. Spikelets apiculate. Caryopsis ca 2.5 mm long, elliptic.

Sikkim, *s.l.* ; 1000 1800 m.

*Fl. & Fr.* : Aug. Dec.

*S. intermedia* R. & S., Syst. Veg. 2 : 489. 1817 ; Hook. f., F.B.I. 7 : 79. 1896. *Panicum tomentosum* Roxb., Fl. Ind. 1 : 303. 1820. *Setaria tomentosa* (Roxb.) Kunth, Rev. Gram. 1 : 47. 1829 ; Bor, Grass. Ind. 365. 1960.

Annuals. Culms weak, ascending. Leaves broadly linear, acuminate, with bristles along midrib. Panicles contracted. Caryopsis ca 1.5 mm long, obtuse.

Sikkim, *s.l.*

*Fl. & Fr.* : Sept. Oct.

*S. italica* (L.) P. Beauv., Ess. Agrost. 51. 170. 178. 1812 ; Hook. f., F.B.I. 7 : 78. 1896 ; Bor, *l.c.* 362. 1960. *Panicum italicum* L., Sp. Pl. 56. 1753.

Annuals. Culm erect or ascending. Leaves linear. Panicles spiciform, cylindric. Spikelets deciduous, oblong-elliptic. Caryopsis broadly elliptic, ca 2 mm long.

Cultivated in tropical zone.

*S. palmifolia* (Koen.) Stapf in J. Linn. Soc. Bot. 42 : 186. 1914. *Panicum palmifolium* Koen. in Naturf. 23. 208. 1788. *P. plicatum* Willd., Enum. Pl. 1023. 1809, *non* Lam. 1791.

Perennials. Rootstocks branched, woody. Culms erect or ascending. Leaves linear-lanceolate, acuminate, plicate between nerves. Spikelets ovoid, lower lemma apiculate.

Sikkim, *s.l.*

*Fl. & Fr.* : July Nov.

**S. plicata** (Lam.) T. Cooke, *Fl. Pres. Bombay* 2 : 919. 1908 ; Bor, *l.c.* 364. 1960. *Panicum plicatum* Lam., *Encycl.* 4 : 736. 1797 ; Hook. *f.*, *F.B.I.* 7 : 55. 1896.

Perennials. Culms tufted, leafy. Leaves elliptic-oblong to linear-lanceolate, plicate. Panicles erect or drooping with purplish green branches. Bristles stiff at the end of branchlets. Spikelets ovoid ; lower lemma dorsally flattened. Caryopsis globose.

On way to Pakyong, Baluwakhani, Gangtok.

*Fl. & Fr.* : Aug. Jan.

**S. pumila** (Poir.) R. & S., *Syst. Veg.* 2 : 891. 1817. *Panicum pumillum* Poir. in Lam., *Encycl.* 4 : 273. 1816. *Setaria pallida -fusca* (K. Schum.) Stapf & C. E. Hubb. in *Kew. Bull.* 1930 : 250. 1930 ; Bor, *Grass. Ind.* 363. 1960. *S. glauca auct. non* (L.) P. Beauv.

Annuals. Culms loosely tufted. Leaves linear. Panicles spiciform, continuous. Bristles antrorsely banded, 7 - 8 in each involucre. Spikelets ovate. Caryopsis elliptic, plano-convex.

Burtuk, Gangtok, Lindok, Reshi, Rumtek, Gyalshing, Rate - Pani, Melli.

*Fl. & Fr.* : June Oct.

**S. verticellata** (L.) P. Beauv., *Ess. Agrost.* 51. 178. 1812 ; Hook. *f.*, *F.B.I.* 7 : 80. 1896 ; Bor, *l.c.* 365. 1960. *Panicum verticillatum* L., *Sp. Pl.* ed. 2 : 82. 1762.

Annuals. Culms tall erect or ascending. Leaves linear-lanceolate, sparsely pilose or hispid. Panicles interrupted spiciform. Bristles retrorsely barbed. Spikelets pale green. Caryopsis *ca* 2 mm long, elliptic.

Sikkim, *s.l.* ; 1500 1800 m.

*Fl. & Fr.* : July Oct.

#### **SORGHUM** Moench *nom. cons.*

**Sorghum miliiforme** (Hack.) Snowden in *Kew Bull.* 1935 : 237. 1935 ; Bor, *l.c.* 239. 1960. *Andropogon sorghum* ssp. *sativus* var. *miliiformis* Hack. in *DC., Mongr. Phan.* 6 : 518. 1889 ; Hook. *f.*, *F.B.I.* 7 : 184. 1896.

var. **miliiforme**

Annuals. Culms up to 2 m high. Leaves linear, very large. Panicles 5-10 cm broad. Spikelets paired, straw coloured; lower glume reddish. Caryopsis ca 3 mm, orbicular, dark brown to violet brown.

Sikkim, *s.l.*; 1500 m. Cultivated.

var. **sikkimensis** Snowden in Kew Bull. 1935; 237. 1935; Bor, *l.c.* 239. 1960.

Annuals. Panicle erect, contracted, 15-20 cm broad. Caryopsis orbicular, ca 4 mm.

Sikkim, *s.l.*; ca 1500 m. Cultivated.

### THEMEDA Forsk.

**Themeda arundinacea** (Roxb.) Ridley in Trans. Linn. Soc. ser. 2, 3 : 401. 1893; Bor, *l.c.* 250. 1960. *Anthistria arundinacea* Roxb., Fl. Ind. 1 : 256. 1820. *A. gigantea* (Roxb.) Hack. in DC., Monogr. Phan. 6 : 774. 1889; Hook. *f.*, F.B.I. 7 : 216. 1896.

Tufted perennials with solid, erect, smooth, polished culms up to 5 m high. Leaves linear with subulate tip. Panicles nodding at apex; involucre spikelets with golden hairs, sessile spikelets bearded. Awns up to 5 cm long.

Rhenock; ca 1200 m.

*Fl. & Fr.* : Aug. Jan.

**T. hookeri** (Griseb.) A. Camus in Bull. Mus. Hist. Nat. Paris 26 : 425. 1920; Bor, *l.c.* 251. 1960. *Anthistria hookeri* Griseb. in Goett. Nachr. 91. 1868; Hook. *f.*, F.B.I. 7 : 216. 1896.

Perennials. Culm up to 60 cm tall, slender. Leaves narrow, linear, glabrous. Awns up to 2.5 cm long.

Chungthang, Lachung; up to 2500 m.

**T. quadrivalvis** (L.) O. Ktze., Gen. Pl. 2 : 994. 1891; Bor, *l.c.* 252. 1960. *Andropogon quadrivalvis* L. in Mur. Syst. Veg. ed. 13 : 758. 1774. *Anthistria ciliata* L. *f.*, Suppl. 113. 1781; Hook. *f.*, F.B.I. 7 : 213. 1896.

Annuals. Culms tall, erect or ascending, up to 2 m tall; nodes glabrous. Involucre spikelets in pairs, inserted at different leaves, less than 6 mm long. Awns up to 3.5 mm long.

Mangan; up to 2000 m.

*Fl. & Fr.* : Aug. Jan.

**T. triandra** Forssk., Fl. Aeg. - Arab. 1238. 178. 1775 ; Bor, *l.c.* 254. 1960. *Anthistiria imberbis* Retz., Obs. Bot. 3 : 11. 1783 ; Hook. *f.*, F.B.I. 7 : 211. 1896. *Themeda imberbis* (Retz.) T. Cooke, Fl. Pres. Bombay 2 : 993. 1908.

Perennials. Culms erect, up to 1 m tall. Panicles enclosed in spatheoles. Awns up to 6 mm long. Caryopsis up to 3.5 mm long, truncate at apex.

Chalisay on way to Rongli.

*Fl. & Fr.* : Oct. Nov.

### VETIVERIA Bory. de St. Vincent.

**Vetiveria zizanoides** (L.) Nash in Small, Fl. South-east U.S. 67. 1903; Bor, *l.c.* 258. 1960. *Phalaris zizantoides* L., Mant. Pl. 2 : 183. 1771. *Andropogon squarrosus* L. *f.*, Suppl. 433. 1781. Hook. *f.*, F.B.I. 7 : 186. 1896.

Perennials. Roots stout, spongy, aromatic. Culms up to 2 m tall, tufted. Panicles contracted, with many pairs of spikelets arranged in whorled racemes.

Sikkim, *s.l.* ; 1200 m.

*Fl. & Fr.* : Sept.

### ZEA L.

**Zea mays** L., Sp. Pl. 971. 1753 ; Hook. *f.*, F.B.I. 7 : 102. 1896.

Annual robust grass with tall erect culms. Leaves broadly lanceolate, hairy on upper surface. Male inflorescence a panicle. Female inflorescence axillary, sessile, enclosed in a leafy sheath surrounded by bracts. Spikelets conical, arranged in longitudinal rows. Caryopsis subglobose, shiny, hard, pale yellow or white-orange to dark purple.

Cultivated in tropical and subtropical regions.

*Fl. & Fr.* : July Sept.

*Notes* : It is one of the main crops of Sikkim.

### Sub fam. POOIDEAE

(Paramjit Singh)

**Agrostis filipes** Hook. *f.*, F.B.I. 7 : 256. 1896 ; Bor, Grass. Ind. 387. 1960.

Small tufted perennials. Panicles narrow, interrupted ; glumes *ca* 2.5 mm long, equal.

Changu, Chamnago.

*Fl. & Fr.* : July Sept.

**A. gigantea** Roth, Tent. Fl. Germ. 1 : 31. 1788 ; Bor, Grass. Ind. 387. 1960. *A. stolonifera* L. subsp. *gigantea* (Roth) Naie and Weiller, Fl. Afr. Nord. 2 : 120. 1893. *A. alba auct. non* Hook. f., F.B.I. 7 : 254. 1896.

Rhizomatous perennials. Panicles very effuse, glumes equal.

Sikkim, *s.l.* ; 2900 - 4000 m (*vide* Hook.f., *op.cit.*).

**A. himalayana** Bor in Kew Bull. 1953 ; 269. 1953 ; Bor, Grass. Ind. 387. 1960.

Culms up to 30 cm high. Spikelets 1 - 1.2 mm long ; glumes equal ; palea minute.

Mainam, Dentam R.F.

*Fl. & Fr.* : July Aug.

**A. hookeriana** Clarke *ex* Hook. f., F.B.I. 7 : 256. 1896 ; Bor, Grass. Ind. 387. 1960. *A. poluninii* Bor in Kew Bull. 1953 : 269. 1953.

Culms 30 - 60 cm high, slender. Spikelets 3 - 4 mm long ; glumes unequal ; lemma awned.

Changu, Dzongri ; 3000 - 3400 m.

*Fl. & Fr.* : July Oct.

**A. inaequiglumis** Griseb. in Goett. Nachr. 80. 1868 ; Hook. f., F.B.I. 7 : 257. 1896 ; Bor, Grass. Ind. 387. 1960.

Culms 5 - 15 cm high. Panicles spiciform. Spikelets *ca* 2.5 mm long ; glumes unequal ; palea absent.

Chakung Chu, Karponang, Momay - Samdong ; 3000 - 4500 m.

*Fl. & Fr.* : July Oct.

**A. micrantha** Steud., Syn. Pl. Glum. 1 : 170. 1854 ; Hook. f., F.B.I. 7 : 256. 1896 ; Bor, Grass. Ind. 388. 1960.

Culms up to 1 m high. Spikelets *ca* 2 mm long ; pedicels clavate ; glumes subequal ; lemma ovate-truncate ; palea rectangular.

Lachen.

*Fl. & Fr.* : July Nov.

**A. myriantha** Hook. *f.*, F.B.I. 7 : 257. 1896 ; Bor, Grass Ind. 388. 1960. *A. myriantha* Hook. *f.* var. *sikkimensis* Hook. *f.*, F.B.I. 7 : 257. 1896.

Culms up to 70 cm high. Panicles 15 - 30 cm long; glumes equal ; lemma 1.25 mm long ; palea minute.

Dikchu, Phadomchen.

*Fl. & Fr.* : July Sept.

**A. nervosa** Nees ex Trin. in Mem. Acad. Sci. Petersb. Ser. 6, 6 : 328. 1814 ; Bor, Grass Ind. 388. 1960. *A. clarkei* Hook. *f.*, F.B.I. 7 : 257. 1896.

Culms 15 - 30 cm long. Panicles pyramidal, 14 - 15 cm high. Spikelets 2 - 2.5 mm long ; glumes unequal, lemma 1.5 mm long ; palea absent or minute.

Changu, Dzongri ; 3300 - 4000 m.

*Fl. & Fr.* : Aug. Sept.

**A. pilosula** Trin. in Mem. Acad. Sci. Petersb. Ser. 6, 6 : 372. 1814 ; Bor, Grass Ind. 388. 1960. *Calamagrostis pilosula* (Trin.) Hook. *f.*, F.B.I. 7 : 263. 1896.

Culms 30 - 90 cm high. Panicles 10 - 20 cm long. Spikelets 2.5 - 3.5 mm long ; glumes acute ; lemma 2 - 3 mm long, hairy, awned ; palea up to one - third of the lemma.

Changu ; 1400 - 3700 m.

*Fl. & Fr.* : Aug. Sept.

**A. sikkimensis** Bor in Kew Bull. 1954 : 502. 1954 ; Bor, Grass Ind. 390. 1960. *A. divaricata* Griseb. in Goett. Nachr. 81. 1868, non Hofman 1800 ; Hook. *f.*, F.B.I. 7 : 258. 1896.

Culms 10 - 15 cm high. Panicles 3 - 5 cm long and broad. Spikelets 1.5 - 1.75 mm long ; glumes unequal ; lemma three-fourth of upper glumes ; palea minute, orbicular.

Ningbil, Karponang ; 2800 - 4000 m.

*Fl. & Fr.* : July Aug.

**A. stolonifera** L., Sp. Pl. 1 : 62. 1753 ; Bor, Grass. Ind. 390. 1960.  
*A. alba auct. non* L. : Hook.f., F.B.I. 7 : 254. 1896.

Culms 15 - 70 cm high. Panicles 3 - 10 cm long. Spikelets 2 - 3 mm long ; glumes acute ; lemma 1.5 - 2.5 mm long ; awnless or with a short awn ; anther 1 - 1.5 mm long.

Sikkim, *s.l.* ; 1500 - 4000 m (*vide* Hook. *f.*, *op.cit.* )

**A. triaristata** (Hook.f.) Bor, Grass. Ind. 391. 1960. *Deyeuxia triaristata* Hook.f., F.B.I. 7 : 266. 1896. *Calamagrostis triplifera* Hook. *f.*, F.B.I. 7 : 262. 1896.

Culms 20 - 45 cm high. Panicles of few very long, wide spreading branches. Spikelets *ca* 4 mm long ; glumes glabrous ; lemma with mucros in between two lateral and median awn.

Changu, Sherabthang.

*Fl. & Fr.* : Aug. - Sep.

#### ALOPECURUS L.

**Alopecurus aequalis** Sobol, Fl. Petrop. 16. 1799 ; Bor, Grass. Ind. 392. 1960. *A. aristulatus* Michx., Fl. Bor. Am. 1 : 43. 1803 ; Hook. *f.*, F.B.I. 7 : 238. 1896.

Annulas or perennials. Spike 2.5 - 7.5 cm long. Spikelets *ca* 2.5 mm long ; awn *ca* 2 mm long, median - dorsal.

Gangtok.

*Fl. & Fr.* : Apr. - Aug.

**A. geniculatus** L., Sp. Pl. 60. 1753 ; Hook.f., F.B.I. 7 : 239. 1896 ; Bor, Grass. Ind. 393. 1960.

Erect or geniculately ascending perennials. Spikelets strongly compressed, *ca* 2.75 mm long, awn up to 4.5 mm long from the base of lemma.

Sikkim (*vide* Hook. *f.*, *op. cit.*).

#### ANISELYTRON Merr.

**Aniselytron treutleri** (O. Ktze.) Sojak in Cas. Nat. Muz. 148. 202. 1980 ; Bennet & Raizada in Ind. Forester 107 : 434. 1981. *Milium treutleri* O. Ktze., Rev. Gen. Pl. 2 : 780. 1891, *p.p.* *Deyeuxia treutleri* (O.Ktze.) Stapf in Hook., Ic. Pl. t. 2396. 1895 ; Hook. *f.*, F.B.I. 7 : 269.

1896. *Aulacolepis treutleri* (O. Ktze.) Hack. in Fedde Rep. Sp. Nov. 3 : 242. 1907 ; Bor, Grass. Ind. 394. 1960.

Culms up to 50 cm high, glabrous. Leaf-blades up to 25 cm long, 1 cm wide. Spikelets 1-flowered, lemma slightly curved.

Lachen ; 2100 - 3500 m.

*Fl. & Fr.* : Aug. - Sept.

### ANTHOXANTHUM L.

***Anthoxanthum flexuosa*** (Hook. f.) Veldk. in Blumea 30 : 347. 1895. *Hierochloe flexuosa* Hook. f., F.B.I. 7 : 222. 1896 ; Bor, Grass. Ind. 441. 1960.

Rhizomatous perennials. Culms 30 - 75 cm high. Leaves up to 10 cm long, 4 mm broad. Panicles 5 - 8 cm long and 4 mm broad. Spikelets long, pedicelled.

Changu, Bakhim.

*Fl. & Fr.* : July - Sept.

***A. hookeri*** (Griseb.) Rendle in J. Linn. Soc. 36 : 380. 1904 ; Bor, Grass. Ind. 431. 1960. *Ataxia hookeri* Griseb. in Goett. Nachr. 77. 1868. *Hierochloe hookeri* (Griseb.) Clarke ex Hook. f., F.B.I. 7 : 223. 1896.

Culms 15 - 16 cm high. Spikelets 6 - 8.5 mm long ; short pedicelled.

Thangu, Zemu ; 2600 - 3400 m.

*Fl. & Fr.* : June - July.

***A. sikkimense*** (Maxim.) Ohwi in Bull. Tokyo Sci. Mus. 18 : 8. 1947 ; Bor, Grass. Ind. 431. 1960. *Hierochloe sikkimensis* Maxim. in Bull. Acad. Sci. St. Petersburg. 32 : 262. 1888. *H. gracillima* Hook. f., F.B.I. 7 : 223. 1896.

Slender grass. Spikelets up to 5 mm long, short pedicelled.

Sikkim (*vide* Hook. f., *op. cit.*).

### ARUNDINELLA Reddl.

***Arundinella bengalensis*** (Spreng.) Druce in Rep. Bot. Exch. Cl. Brit. Isles 605. 1917 ; Bor, Grass. Ind. 421. 1960. *Panicum bengalense* Spreng., Syst. Veg. 1 : 311. 1852. *Arundinella wallichii* Nees ex Steud., Syn. Gram. 114. 1854 ; Hook. f., F.B.I. 7 : 75. 1896.

Stout perennial. Panicle up to 30 cm long ; branches 2.5 - 4 cm long. Spikelets ca 3 mm long, lower floret male, upper bisexual, lemma awned.

Rangect, Laltung.

*Fl. & Fr.* : Aug. - Nov.

**A. decempedalis** (O. Ktze.) Jano. in Fedde Rep. 17 : 84. 1921 ; Bor, Grass. Ind. 422. 1960. *Panicum decempedalis* O. Ktze, Rev. Gen. Pl. 2 : 783. 1891. *Arundinella clarkii* Hook. f., F.B.I. 7 : 75. 1896.

Perennial up to 2 m tall. Panicle up to 45 cm, branches long, filiform, lemma awnless.

Saramsa ; 700 - 1000 m.

*Fl. & Fr.* : Aug. - Oct.

**A. hookeri** Munro ex King in Nat. Contr. Univ. Sci. Rep. Ser. B. 2 (3) : 50. 1936 ; Bor, Grass. Ind. 422. 1960. *A. villosa* Steud. var. *himalaica* Hook. f., F.B.I. 7 : 73. 1896.

Densely tufted perennials, up to 45 cm high. Panicles spiciform. Spikelets with bristly hairs on glumes.

Bakhim, Lachung ; 2500 - 3000 m.

*Fl. & Fr.* : July - Oct.

**A. nepalensis** Trin., Gram. Panic. 62. 1826 ; Bor, Grass. Ind. 423. 1960. *A. brasiliensis auct. non* Raddl. 1832 ; Hook. f., F.B.I. 7 : 73. 1896.

Perennials with scaly rhizomes. Panicles up to 30 cm long. Spikelets glabrous. Fertile lemma awned.

Singtam.

*Fl. & Fr.* : Oct. - Nov.

#### ARUNDOL.

**Arundo donax** L., Sp. Pl. 81. 1753 ; Hook. f., F.B.I. 7 : 302. 1896 ; Bor, Grass. Ind. 413. 1960.

Perennial with creeping rhizomes and 2 - 4 m high culms. Panicles 30 - 60 cm long.

Gangtok ; ca 1700 m.

*Fl. & Fr.* : Aug. - Dec.

**AVENAL.**

*Avena fatua* L. ssp. *fatua* var. *glabrata* Peterm., Fl. Bieuitz. 13 : 1841 ; Bor, Grass. Ind. 434. 1960. *Avena sativa* L. var. *sericea* Hook. f., F.B.I. 7 : 275. 1896.

Annual. Culms few or solitary, 30–80 cm high, stout. Panicle open or contracted. Spikelets 2.2–2.8 cm long, with 2-florets. Lemma bearded at base only.

Yamthang ; 3200 m (*vide* Hook. f., *op. cit.*)

*A. sativa* L., Sp. Pl. 79. 1753 ; Hook. f., F.B.I. 7 : 275. 1896 ; Bor, Grass. Ind. 434. 1960.

Culms simple. Panicle open. Spikelets 2.2–3 cm long. Lemmas glabrous.

Chungthang. Weed in the cultivated fields.

*Fl. & Fr.* : Mar. May.

**BRACHYPODIUM P. Beauv.**

*Brachypodium sylvaticum* (Huds.) P. Beauv., Ess. Agrost. 101. 155. 1812 ; Hook. f., F.B.I. 7 : 362. 1896 ; Bor, Grass. Ind. 450. 1960. *Festuca sylvatica* Huds., Fl. Angl. 1 : 38. 1762. *Brachypodium wattii* Clarke in J. Linn. Soc. 25 : 90. t. 40. 1887.

Perennials, culms up to 1.5 m high. Raceme up to 15 cm long, nodding. Spikelets sessile, cylindrical at first, becoming compressed later.

Gangtok.

*Fl. & Fr.* : Apr–Sept.

**BRIZA L.**

*Briza media* L., Sp. Pl. 70. 1753 ; Hook. f., F.B.I. 7 : 336. 1896 ; Bor, Grass. Ind. 528. 1960.

Perennial. Culms 30–100 cm high, very slender. Inflorescence an erect spreading pyramidal panicle.

Gnaton (*vide* Hook. f., *op. cit.*)

**BROMUS L.**

*Bromus himalaicus* Stapf in Hook. f., F.B.I. 7 : 358. 1896 ; Bor, Grass. Ind. 453. 1960. *Zerna himalaica* (Stapf) Henr. in Blume 4(3) : 499. 1941.

Culms up to 70 cm high. Leaves linear, acuminate, pubescent. Spikelets linear-oblong, up to 2.5 cm long ; lemma glabrous or hairy along the margins, awn slender.

Sikkim (*vide* Hook. *f.*, *op. cit.* ; Bor, *op. cit.*).

3000 -3700 m.

*Fl. & Fr.* : June Oct.

**B. porphyranthus** T.A. Cope in Nasir & Ali, Fl. Pak. 143 : 574. 1892. *B. himalaicus* Stapf var. *grandis* Stapf in Hook. *f.*, F.B.I. 359. 1896. Bor, Grass. Ind. 454. 1960. *B. grandis* (Stapf) Meld. in Hara *et al.*, Enum. Fl. Pl. Nepal 1 : 125. 1978, *non* Hitchc. 1912.

Loosely tufted perennial. Panicles branched, simple, ending in a solitary spikelet. Spikelets 20 - 25 mm long, lemmas densely hairy, lowest usually 13 - 15 mm long, awns usually robust.

Tsangu (Thangu) ; 3300 - 3600 m.

**B. ramosus** Huds., Fl. Angl. 40.1762. Bor, Grass. Ind. 456. 1960 ; Hook. *f.*, F.B.I. 7 : 358. 1896.

Culms up to 1 m high. Panicle wide and loose, the lowest branch with a ciliate scale at base. Spikelets up to 4 cm long ; lemmas with straight awn.

Lachen.

*Fl. & Fr.* : July Aug.

**B. staintonii** Melderis in Hara *et al.* Enum. Fl. Pl. Nepal 1 : 125. 1978. *Bromus ramosus sensu* Bor, Grass. Ind. 456. 1960, *non* Huds. 1853.

Sikkim, *s.l.*

#### CALAMAGROSTIS Adans.

**Calamagrostis emodensis** Griseb. in Goett. Nachr. 80. 1868 ; Hook. *f.*, F.B.I. 7 : 261. 1896 ; Bor, Grass. Ind. 395. 1960.

Tufted perennial, 80 - 130 cm high. Panicles nodding, 13 - 35 cm long. Spikelets ca 6 mm long, lemma with excluded awn ; palea almost as long as lemma.

Gangtok, Zemu Valley ; 2200 - 4000 m.

*Fl. & Fr.* : July Oct.

**C. pseudophragmites** (Hall. f.) Koeler, Descr. Gram. 106. 1802 ; Bor, Grass. Ind. 396. 1960. *Arundo pseudophragmites* Hall. f. in Roem., Arch. für. Bot. 1 : 11. 1797. *Calamagrostis littorea* (Schrad.) P. Beauv., Ess. Agrost. 15. 157. 1812 ; Hook. f., F.B.I. 7 : 261. 1896.

Perennials, with creeping rhizomes ; culms 40 - 150 cm high. Panicles lax, 10 - 14 cm long. Spikelets 5 - 9 mm long, lemma with included or shortly excluded awn, palea half as long as lemma.

Lachen, Chungthang ; 1500 - 2700 m.

*Fl. & Fr.* : July - Sept.

#### CATABROSA P. Beauv.

**Catabrosa sikkimensis** Stapf in Hook. f., F.B.I. 7 : 311. 1896.

Stoloniferous perennial, culms up to 15 cm long, slender. Panicles ovate to oblong, 4 - 7 cm long. Spikelets 2 - 2.5 mm long, purple.

Lhok valley.

*Fl. & Fr.* : June - Aug.

#### CENTOTHECA Desr.

**Centotheca lappacea** (L.) Desv. in Nouv. Bull. Sci. Soc. Philom. Paris. 2 : 189. 1818 ; Hook. f., F.B.I. 7 : 32. 1896 ; Bor, Grass. Ind. 457. 1960. *Cenchrus lappaceus* L., Sp. Pl. ed. 2. 1488. 1763.

var. **lappacea**

Culms 15 - 90 cm high. Leaves ovate-lanceolate. Panicles loose. Spikelets ovate-oblong, glumes keeled, lemmas with bristles near the margins.

Teesta (West Bengal).

#### COELACHNE R. Br.

**Coelachne simpliciuscula** (Steud.) Benth. in J. Linn. Soc. 19 : 93. 1881 ; Bor, Grass. Ind. 576. 1860. *Panicum simpliciusculum* Steud., Syn. Pl. Glum. 1 : 96. 1854. *C. pulchella sensu* Hook. f., F.B.I. 7 : 270. 1896, non R. Br. 1810.

Annuals. Culms 15 - 40 cm high, slender. Panicles, simple, spike like. Spikelets globose.

In marshy places near Gangtok.

*Fl. & Fr.* : Throughout the year.

**COLPODIUM** Trin.

**Colpodium wallichii** (Hook. f.) Bor in Kew Bull. 1953 : 270. 1953 ; Bor, Grass. Ind. 530. 1960. *Catabrosa wallichii* Hook. f., F.B.I. 7 : 312. 1896.

Culms 15 - 40 cm high. Leaf-blades 3 - 7 mm long. Panicle narrow. Spikelets pendulous, glumes oblong ; lemma with shortly hairy outer nerves.

Kankola pass (*vide* Hook. f., *op. cit.*)

**CYATHOPUS** Stapf

**Cyathopus sikkimensis** Stapf in Hook., Ic. Pl. t. 2395. 1895 ; Hook. f., F.B.I. 7 : 240. 1896 ; Bor, Grass. Ind. 565. 1960.

Culms about 1 m high. Panicles effuse ; spikelets scaberulous ; glumes beaked.

Lachung valley ; ca 3300 m.

*Fl. & Fr.* : Oct. - Dec.

**CYNODON** L.

**Cynodon dactylon** (L.) Pers., Syn. Pl. 1 : 85, 1805 ; Hook. f., F.B.I. 7 : 288. 1896 ; Bor, Grass. Ind. 469. 1960. *Panicum dactylon* L., Sp. Pl. 58. 1753.

Creeping perennial. Inflorescence of 3 - 6 ascending to spreading digitate slender spikes.

Gangtok ; up to 2000 m.

*Fl. & Fr.* : Throughout the year.

**DACTYLOCTENIUM** Willd.

**Dactyloctenium aegyptium** (L.) Beauv., Ess. Agrost. Expl. Pl. 15. 1812 ; Bor, Grass. Ind. 489. t. 54. 1960. *Cynosurus aegyptius* L., Sp. Pl. 72. 1753. *Eleusine aegyptia* (L.) Desf., Fl. Atlant. 1 : 85. 1789 ; Hook. f., F.B.I. 7 : 295. 1896.

Annuals. Culms up to 70 cm high. Inflorescence of 2 - 6 mm linear to oblong spikes, naked at the tip for 2 - 3 mm. Spikelets with upper glume, mucronate or awned.

Sikkim. Only one sheet without locality (LBG) represents its distribution in Sikkim.

**DANTHONIA DC.**

**Danthonia cumminsii** Hook. f., F.B.I. 7 : 282. 1896.  
*D. cachemeryana sensu* Hook. f., F.B.I. 7 : 281. 1896, *non* Jaub. & Spach. 1851. *P. jacquemotii* Bor in Kew Bull. 7 : 80. 1952 ; Bor, Grass. Ind. 479. 1960.

Perennials with woody rootstock ; culms up to 60 cm high.  
 Panicles 10-30 cm long. Spikelets 15-25 mm long.

Jongu, Tangu, Gnatong, Legyep.

*Fl. & Fr.* : July-Sept.

**DESCHAMPSIA L.**

**Deschampsia caespitosa** (L.) P. Beauv., Ess. Agrost. 91, t. 18. f. 2. 1812 ; Hook. f., F.B.I. 7 : 273. 1896 ; Bor, Grass. Ind. 435. 1960.  
*Aira caespitosa* L., Sp. Pl. 64. 1753.

Densely tufted perennial. Panicles oblong. Spikelets narrowly oblong, 2-flowered, lemma awned from near the base.

Zemu valley, Lhonak, Yumthang, Yakla ; 3600-4800 m.

*Fl. & Fr.* : June-Nov.

**DEYEUSIA P. Beauv.**

**Deyeusia abnormis** Hook. f., F.B.I. 7 : 268. 1896 ; Korthof & Veld. in Gard. Bull. Sing. 37 : 218. 1985.

Densely tufted perennial. Panicles contracted or effuse ; branches and branchlets capillary. Callus hairs half the length of lemma, awn absent.

Lanchung valley (*vide* Hook. f., *op. cit.*).

**D. debilis** (Hook. f.) Veldk. in Gard. Bull. Sing. 37 : 220. 1985.  
*Calamagrostis debilis* Hook. f., F.B.I. 7 : 262. 1896. *Agrostis debilis* (Hook. f.) Bor, Grass. Ind. 387. 1960, *non* Poir. 1810. *A. neodebilis* Bennet & Raizada in Ind. For. 107 : 433. 1981.

Tufted perennial. Panicles narrow. Spikelets purplish brown, glumes unequal, lemma shorter than glumes, anthers very small.

Chola, 3700 m (*vide* Hook. f., *op. cit.*).

**D. nivicola** Hook. f., F.B.I. 7 : 267. 1896 ; Bor, Grass. Ind. 399. 1960.

Densely tufted perennial. Panicles 2.5–4 cm long, contracted, spiciform. Spikelets 6 mm long, glumes unequal, lanceolate-acuminate, lemma shorter than glumes, awn basal, included.

Momay Samdong (*vide* Hook. *f.*, *op. cit.*).

**D. pulchella** (Griseb.) Hook. *f.*, F.B.I. 7 : 268. 1896 ; Bor, Grass. Ind. 399. 1960. *Calamagrostis pulchella* Griseb. in Goett. Nachr. 78. 1868. *Calamagrostis lahulensis* G. Singh in Taxon 33 : 94. 1984.

Tufted perennial. Panicles oblong up to 5 cm long, branches scaberulous. Spikelets 4–5 mm long, callus shortly bearded, glumes unequal, lemma with submedian awn.

Changu, Momay Samdong ; 3500–4800 m.

*Fl. & Fr.* : July–Oct.

**D. scabrescens** (Griseb.) Duthie in Atkins., Gaz. N.W. India 628. 1882. Hook. *f.*, F.B.I. 7 : 267. 1896 ; Bor, Grass. Ind. 399. 1960. *Calamagrostis scabrescens* Griseb. in Goett. Nachr. 79. 1868. *Calamagrostis filiformis* Griseb. *l.c.* 79. 1868. *Deyeusia filiformis* (Griseb.) Hook. *f.*, F.B.I. 7 : 268. 1896. *D. scabrescens* var. *humilis* Hook. *f.*, *l.c.* 1896.

Perennials up to 1.5 m high. Panicle up to 20 cm long, contracted. Spikelets 6–6.5 mm long ; glumes unequal, lemma minutely scabrid, awn inserted about one third below tip, scabrid.

Changu, Zemu valley ; 2700–3900 m.

*Fl. & Fr.* : Aug.–Oct.

**D. tibetic** Bor in Kew Bull. 1949 ; 66. 1949 ; Bor, Grass. Ind. 400. 1960. *Calamagrostis tibetica* (Bor) G. Singh in Taxon 32 : 95. 1984.

Perennial up to 20 cm high, pilose and angular below panicle. Panicle compact, spiciform. Spikelets purple, glumes equal, pilose.

Chakalunga ; ca 5000 m.

*Fl. & Fr.* : June.

#### ELEUSINE Gaertn.

**Eleusine coracana** (L.) Gaertn., Fruct. 1 : 8. t.l.f. 11. 1789 ; Hook. *f.*, F.B.I. 7 : 294. 1896 ; Bor, Grass. Ind. 492. 1960. *Cynosurus coracanus* L., Syst. Nat. ed. 10, 2 : 875. 1759. KODO (Nep.).

Tufted annual ; culms 15 - 85 cm high. Leaf-blades usually folded. Inflorescence digitate, of 1 - 10 slender ascending spikes. Spikelets 3 - 9 flowered, elliptic.

Cultivated.

**E. indica** (L.) Gaertn., Fruct. 1 : 8. 1789 ; Hook. f., F.B.I. 7 : 293. 1896 ; Bor, Grass. Ind. 493. 1960. *Cynosurus indicus* L., Sp. Pl. 72. 1753.

Tufted annual ; culms 15 - 85 cm high. Leaf-blades usually folded. Inflorescence digitate, of 1 - 10 slender ascending spikes. Spikelets 3 - 9-flowered, elliptic.

Throughout subtropical and temperate Sikkim as a weed.

### ELYMUSL.

**Elymus nutans** Griseb. in Goett. Nach. 72. 1868 ; Bor, Grass. Ind. 670. 1960. *E. sibiricus auct. non L.* : Hook. f., F.B.I. 7 : 373. 1896, *p.p.*

Tufted perennial. Spike often flexuous, usually nodding, 5 - 15 cm long. Spikelets paired at the nodes of rachis.

Naku la ; 4200 - 4700 m.

*Fl. & Fr.* : Aug. - Nov.

**E. semicostatus** (Nees ex Steud.) Meld. in Hara *et al.*, Enum. Fl. Pl. Nepal 1 : 132. 1978. *Triticum semicostatum* Nees ex Steud., Syn. Glum. 1 : 346. 1854. *Agropyron semicostatus* (Nees ex Steud.) Boiss., Fl. Or. 5 : 662. 1884 ; Hook. f., F.B.I. 7 : 369. 1896 ; Bor, Grass. Ind. 665. 1960.

Tufted perennial, erect or geniculately ascending. Spike 8 - 30 cm long. Spikelets 6 - 8-flowered, glumes unequal, palea shorter than lemma.

Sikkim (*fide* Hook. f., *op. cit.* & Bor, *op. cit.*).

**E. sikkimensis** (Melderis) Melderis in Hara *et al.*, Enum. Fl. Pl. Nepal 1 : 132. 1978. *Agropyron sikkimense* Melderis in Bor, Grass. Ind. 666. 694. 1960.

Perennial, 70 - 80 cm high ; culms scabrous. Spike lax. Spikelets 3 - 6-flowered, palea as long or longer than lemma.

Lachen, Momay Samdong ; *ca* 4500 m.

*Fl. & Fr.* : May-Aug.

**ERAGROSTIS** Wolf.

**Eragrostis atrovirens** (Desf.) Trin. ex Steud., Nom. Bot. ed. 2. 1 : 562. 1840 ; Bor, Grass. Ind. 503. 1960. *Poa atrovirens* Desf., Fl. Atlant. 1 : 73, t. 14. 1798.

Tufted perennial. Panicles ovate or oblong ; spikelets 6 -59 flowered, narrowly oblong, 3 - 20 mm long, breaking up from the base.

Jora ; 500 - 1000 m.

*Fl. & Fr.* : Almost throughout the year.

**E. coarctata** Stapf in Hook. f., F.B.I. 7 : 313. 1896 ; Bor, Grass. Ind. 507. 1960.

Perennial ; culms tufted. Inflorescence an elongate, subspiciform panicle. Spikelets on short pedicels, glumes equal, lemmas ciliate on the margins, palea strongly ciliate on the keels.

Rongli, Rongpo ; 300 - 700 m.

*Fl. & Fr.* : May.

**E. curvula** (Schrad.) Nees, Fl. Afr. Austr. 397. 1841 ; Bor, Grass. Ind. 507. 1960. *Poa curvula* Schrad. in Goett. Anz. Ges. Wiss. 3 : 2073. 1821.

Densely tufted perennial ; leaves usually rolled or filiform. Panicle spreading. Spikelets breaking up from the base.

Gangtok. Introduced.

**E. ferruginea** (Thunb.) P. Beauv., Ess. Agrost. 71. 1812 ; Stapf in Hook. f., F.B.I. 7 : 324. 1896 ; Bor, Grass. Ind. 508. 1960. *Poa ferruginea* Thunb., Fl. Jap. 50. 1784.

Perennial up to 45 cm high. Panicles 10 - 50 cm long, oblong. Spikelets 6 mm long, pedicels with glandular band ; lemma rounded on the back, palea shorter than lemma.

Lindok.

*Fl. & Fr.* : May - June.

**E. gangetic** (Roxb.) Steud., Syn. Pl. Glum. 1 : 266. 1854 ; Bor, Grass. Ind. 508. 1960. *Poa gangetica* Roxb., Fl. Ind. 1 : 321. 1820. *Eragrostis stenophylla* Hochst. ex Miq. in Verh. Konink.-Ned. Inst. 3, 4 : 39. 1851. Stapf in Hook. f., F.B.I. 7 : 318. 1896.

Annual, tufted grass. Panicles oblong, nodding. Spikelets linear-oblong, 10-30-flowered, lemmas broadly ovate, subacute, palea deciduous.

Gyalshing, Rishi, Rhenock ; 400-1300 m.

*Fl. & Fr.* : Almost throughout the year.

**E. japonica** (Thunb.) Trin. in Mem. Acad. Sci. Petersb. 6, 1 : 405. 1831. Bor, Grass. Ind. 509. 1960. *Poa japonica* Thunb., Fl. Jap. 51. 1784. *Eragrostis diarrhena* (Schult.) Steud., Syn. Pl. Glum. 1 : 266. 1854 ; Bor, Grass. Ind. 507. 1960. *E. diplachnoides* Steud., l.c. 268 ; Bor, Grass. Ind. 508. 1960. *E. interrupta* var. *tenuissima* Stapf in Hook. f., F.B.I. 7 : 316. 1896.

Annual or short-lived perennial. Panicles linear-lanceolate to narrowly ovate ; 4-5 cm long. Spikelets 4-14-flowered, ovate-oblong, 1.3-3 mm long, breaking up from the apex.

Rangit valley.

*Fl. & Fr.* : Aug. - Oct.

**E. minor** Host, Gram. Austr. 4 : 15. 1809 ; Stapf in Hook. f., F.B.I. 7 : 321. 1896. *E. poaeoides* P. Beauv., Ess. Agrost. 162. 1812 ; Bor, Grass. Ind. 512. 1960. *E. pappiana* Chiov. in Ann. Ist. Bot. Roma 8 : 371. 1908 ; Bor, Grass. Ind. 511. 1960 ; Jain in Bull. Bot. Surv. Ind. 10 : 161. 1969.

Loosely tufted annual, culms 6-60 cm high, ascending. Panicles ovate. Spikelets narrowly oblong or almost linear, breaking up from base, glumes subequal, often glandular on the keel.

Gangtok.

*Fl. & Fr.* : June - Sept.

**E. nigra** Nees ex Steud., Syn. Pl. Glum. 1 : 267. 1854 ; Stapf in Hook. f., F.B.I. 7 : 324. 1896 ; Bor, Grass. Ind. 511. 1960.

Perennial, leafy at base. Panicles large spreading, lax. Spikelets linear to oblong, glumes subequal, palea persistent.

Chungthang, Lachen ; 900-3000 m.

*Fl. & Fr.* : June - Aug.

**E. nutans** (Retz.) Nees ex Steud., Nom. Bot. ed. 2, 1 : 563. 1840 ; Bor, Grass. Ind. 511. 1960. *Poa nutans* Retz., Obs. Bot. 4 : 19. 1786. *Eragrostis stenophylla* auct. non Miq : Hook. f., F.B.I. 7 : 318. 1896. *p.p.*

Perennial ; culms densely tufted, 30 - 40 cm high. Panicles ovate or oblong or sublinear, branches distant, pedicels of spikelets filiform. Spikelets 4 - 6 mm long, linear-oblong, palea caducous, keels scabrid.

Deorali, Gangtok.

*Fl. & Fr.* : Sept. - Nov.

**E. papposa** (Roem. & Schult.) Steud., Nom. Bot. ed. 2, 1 : 564. 1840 ; Hook. *f.*, F.B.I. 7 : 322. 1896 ; Bor, Grass. Ind. 511. 1960. *Megastachye papposa* Roem. & Schult., Syst. Veg. 2 : 585. 1817.

Tufted perennial ; culms 10 - 40 cm high. Panicles ovate. Spikelets grey-green to purplish green, glumes unequal, paleas minutely scaberulous on the keels, persistent.

Gyalshing, Soreng.

*Fl. & Fr.* : Apr. - Oct.

**E. pilosa** (L.) P. Beauv., Ess. Agrost. 71. 162. 175. 1812 ; Stapf in Hook. *f.*, F.B.I. 7 : 323. 1896 ; Bor, Grass. Ind. 512. 1960. *Poa pilosa* L., Sp. Pl. 68. 1753.

Loosely tufted annual. Panicles elliptic to ovate, 4 - 25 cm long, open, usually with a few long hairs in the axis of lower branches.

Sikkim, *s.l.*

*Fl. & Fr.* : July - Oct.

**E. tenella** (L.) P. Beauv. ex R. & S., Syst. Veg. 2 : 576. 1817 ; Stapf in Hook. *f.*, F.B.I. 7 : 315. 1896 ; Bor, Grass. Ind. 513. 1960 (incl. vars.). *Poa tenella* L., Sp. Pl. 69. 1753. *E. tenella* var. *plumosa* (Retz.) Stapf in Hook. *f.*, F.B.I. 7 : 315. 1896.

Tufted annual. Panicles elliptic or pyramidal. Spikelets 4 - 8-flowered, 1.5 - 2.5 mm long, breaking from the apex, palea ciliate on keels.

Rishikhola, Chakung ; 200 - 1000 m.

*Fl. & Fr.* : Mar. - Sept.

**E. tremula** (Lam.) Steud., Syn. Pl. Glum. 1 : 269. 1854 ; Stapf in Hook. *f.*, F.B.I. 7 : 320. 1896 ; Bor, Grass. Ind. 514. 1960. *Poa tremula* Lam., Tab. Encycl. 1 : 185. 1791.

Loosely tufted annual ; culms 30 - 100 cm high. Panicle ovate, 7-30 cm long, loose and open. Spikelets linear, 5 - 25 mm long, 1.5 - 2 mm wide, glumes unequal, palea scabrid on keels, persistent.

Sikkim, *s.l.*

*Fl. & Fr.* : Mar. - Nov.

*E. unioloides* (Retz.) Steud., Syn. Pl. Glum. 1 : 264. 1854 ; Bor, Grass. Ind. 515. 1960. *Poa unioloides* Retz. Obs. Bot. 5 : 19. 1789. *Eragrostis amabilis* Stapf in Hook. f., F.B.I. 7 : 317. 1896.

Tufted annual or short lived perennial. Spikelets 11 - 80-flowered, ovoid to oblong, 3.5 - 16 mm long, 2.5 - 4 mm wide, florets slightly overlapping, breaking from base, glumes unequal, narrowly lanceolate, 1-nerved, palea deciduous.

Gangtok, Rangpo ; 400 - 1700 m.

*E. viscosa* (Retz.) Trin. in Mem. Acad. Sci. Petersb. Ser. 6, 1 : 397. 1830 ; Bor, Grass. Ind. 515. 1960. *Poa viscosa* Retz., Obs. Bot. 4 : 20. 1786. *Eragrostis tenella* var. *viscosa* (Retz.) Stapf in Hook. f., F.B.I. 7 : 315. 1896.

Tufted annual ; culms 10 - 30 cm high, glandular. Panicle dense, cylindrical or oblong, 7 - 18 cm long, up to 3.5 cm broad. Spikelets 5 - 20-flowered, often purplish, about 3 mm long, glumes almost equal, obtuse, lemmas broadly elliptic, obtuse or rounded.

Teesta ; *ca* 300 m.

*Fl. & Fr.* : April.

### FESTUCA L.

*Festuca coelestis* (St. Yves) Krecz. & Bobrov in Kum. Fl. USSR 2 : 514. 770. 1934 ; T.A. Cope in Nasir & Ali, Fl. Pak. 143. 359. 1982. *Festuca ovina* L. ssp. *coelestris* St. Yves in Candollea 3 : 376. 1928 ; Bor, Grass. Ind. 539. 1960. *F. valesiaca* var. *tibetica* Stapf in Hook. f., F.B.I. 7 : 349. 1896 ; Bor, Grass. Ind. 542. 1960.

A dwarf tufted perennial. Culms slender. Leaves folded, setaceous. Spikelets 3 - 4-flowered, glumes 1-nerved, lemmas scabrid towards tip with 1 - 2 mm long awn, ovary glabrous.

Donkia La ; 5100 m (*vide* Hook. f., *op. cit.* ; Bor, *op. cit.*).

*F. cumminisii* Stapf in Hook. f., F.B.I. 7 : 349. 1896 ; Bor, Grass. Ind. 538. 1960.

Tufted perennials. Culms slender. Panicles nodding or flexuous, 5 - 10 cm long. Spikelets pale green or purple, glumes unequal, lemma awned, palea scabrid.

Changu, Sherabthang, Chamnago.

*Fl. & Fr.* : July Aug.

**F. leptobogon** Stapf in Hook. *f.*, F.B.I. 7 : 354. 1896 ; Bor, Grass. Ind. 538. 1960.

Tufted perennial. Panicles 15 - 30 cm long ; open or contracted. Spikelets 2 - 3 flowered, glumes unequal, lemmas 7 - 8 mm long, 5-nerved, 2-lobed at apex, awn straight, scabrid, 7 mm long. Ovary minutely hispid on the top.

Lachen.

*Fl. & Fr.* : July.

**F. parvigluma** Steud., Syn. Pl. Glum. 1 : 305. 1854 ; Bor, Grass. Ind. 540. 1960.

Glumes short, broadly oblong, obtuse, lemmas entire at tip.

Yatung (Bor, *op. cit.*).

**F. polycolea** Stapf in Hook. *f.*, F.B.I. 7 : 349. 1896 ; Bor, Grass. Ind. 540. 1960. *F. ovina* ssp. *polycolea* (Stapf) St. Yves in Candollea 3 : 373. 1928 ; Bor, Grass. Ind. 540. 1960.

var. **polycolea**

Densely tufted perennial. Leaves rigid, setaceous. Panicles ovate or narrow, 5 - 8 cm long, erect, rigid. Spikelets 8 - 12 mm long, glumes scabrid, lemma involute, awned, ovary glabrous.

Dzongri, Yakla, Zemu ; 3000 - 5000 m.

*Fl. & Fr.* : July Oct.

var. **brevis** Stapf in Hook. *f.*, F.B.I. 7 : 350. 1896 ; Bor, Grass. Ind. 540. 1960.

Culms 10 - 15 cm long. Panicles 1.5 - 3.5 cm long, contracted.

Lachen (*vide* Hook. *f.*, *op.cit.*).

**F. rubra** L., Sp. Pl. 74. 1753 ; Stapf in Hook. *f.*, F.B.I. 7 : 352. 1896 ; Bor, Grass. Ind. 540. 1960.

Culms 15 - 90 cm high. Leaves folded, setaceous. Panicles loose. Spikelets 5 - 14 mm long, lemma 4 - 7.5 mm long, scaberulous towards tip, ovary glabrous or sparsely hairy.

Tosa ; 3500 - 4200 m.

*Fl. & Fr.* : July Aug.

**F. undata** Stapf in Hook. *f.*, F.B.I. 7 : 350. 1896 ; Bor, Grass. Ind. 542. 1960.

var. **undata**

Tufted perennial, 30 - 60 cm high. Leaves subsetaceous. Culms scabrid below the panicle, awn of lemma 1.5 mm long.

Gnathang ; 3500 m.

*Fl. & Fr.* : Sept.

var. **aristata** Stapf in Hook. *f.*, F.B.I. 7 : 387. 1896 ; Bor, Grass. Ind. 542. 1960.

Awn slender, longer than lemma ; anthers 1.3 - 1.5 mm long. Ovary glabrous.

Chamnago ; 3200 - 4000 m.

*Fl. & Fr.* : July Aug.

**F. valesiaca** Schleich ex Gaud., Agrost. Helvet. 1 : 242. 1811 ; Bor, Grass. Ind. 542. 1960 ; Hook. *f.*, F.B.I. 7 : 348. 1896. *F. ovina* L. ssp. *sulcata* Hack. var. *valesiaca* (Schleich ex Gaud.) Koch., Syn. ed. 1 : 812. 1837 ; Bor, Grass. Ind. 540. 1960.

Tufted perennial ; culms 10 - 40 cm high, erect, slender. Leaves folded, setaceous. Panicles narrowly oblong, contracted. Spikelets 5 - 7-flowered, lemma scabrid in the upper part, awn 1 - 3 mm long.

Sikkim (*vide* Hook. *f.*, *op.cit.*).

#### GARNOTIA Brongn.

**Garnotia acutigluma** (Steud.) Ohwi in Bot. Mag. Tokyo 55 : 393. 1941 ; Gould in Kew Bull. 27 : 540. 1972. V. Prakash & Jain in Fasc. Fl. Ind. 3 : 5. 1979. *Urachne acutigluma* Steud., Syn. Pl. Glum. 1 : 121. 1854. *Garnotia stricta* auct. non Brongn. 1832 ; Hook. *f.*, F.B.I. 7 : 243. 1896, *p.p.* ; Bor, Grass. Ind. 569. 1960, *p.p.*

Perennial ; culms 25 - 70 cm long. Spikelets with bearded base, glumes awned, lemma with straight awn.

Burtuk, Rongli, Yoksum.

*Fl. & Fr.* : Aug. Nov.

var. **logiseta** (Hack.) Ved Prakash & Jain in Fasc. Fl. Ind. 3 : 6. 1979.

**G. polygonooides** Munro ex Oliver in Hook. *f.*, Ic. Pl. 15 : 64. t. 1481. 1885 ; Hook. *f.*, F.B.I. 7 : 243. 1896 ; V. Prakash & Jain, Fasc. Fl. Ind. 3 : 10. 1978.

Perennial ; culms erect from decumbent base. Panicles 8 - 18 cm long. Spikelets conspicuously bearded at base, lemma with geniculate, 13 - 25 mm long awn.

Neebay ; 2000 - 3000 m.

*Fl. & Fr.* : Sept. - Dec.

**G. tenella** (Arn. ex Miq.) Jan. in Fedde Repert. 17 : 86. 1921 ; Gould in Kew Bull. 27 : 528. 1972. *Berghanisa tenella* Arn. ex. Miq. in Vash. Konink. Nederl. Inst. 3, 4 : 34. 1851. *Garnotia stricta sensu* Hook. *f.*, F.B.I. 7 : 243. 1896 ; Bor, Grass. Ind. 569. 1960, *non* Brongn. 1831.

Annuals. Leaf-sheaths glabrous. Panicles, 3 - 29 cm long, contracted. Spikelets scabrid ; lemma with geniculate, 5 - 12 mm long awn.

Richingpon to Gayzing.

*Fl. & Fr.* : Aug. - Dec.

#### GLYCERIA R. Br.

**Glyceria tonglensis** C.B. Clarke in J. Linn. Soc. 15 : 19. 1876 ; Hook. *f.*, F.B.I. 7 : 346. 1896 ; Bor, Grass. Ind. 571. 1960. *G. kasmiriensis* L. Kelso in Rhodora 37 : 262. 1935.

Tufted or creeping perennial ; culms 20 - 50 cm high. Panicles 10 - 156 cm long. Spikelets ovate, 4 - 6-flowered, glumes acute, lemma obtuse.

Chakung Chu.

*Fl. & Fr.* : July - Sept.

#### HELICTOTRICHON Roem. & Schult.

**Helictotrichon virescens** (Nees ex Steud.) Henr. in Blumea 3 : 452. 1940 ; Bor, Grass. Ind. 439. 1960 ; Sevenster & Veldkemp in Blumea 28 : 338. 1983. *Trisetum virescens* Nees ex Steud., Syn. Pl. Glum. 1 : 226. 1854. *Avena aspera* Munro ex Thw., Enum. Pl. Zeyl. 372. 1864 ; Hook. *f.*, F.B.I. 7 : 276. 1896 (incl. vars.). *Helictotrichon sperum* (Munro ex Thw.) Bor in Ind. For. Rec. n.s. Bot. 68. 1938 ; Bor, Grass. Ind. 438. 1960. *H. parviflorum* (Hook. *f.*) Bor in Kew Bull. 1951 ; 445. 1952 ; Bor, Grass. Ind. 439. 1960.

Tufted perennials ; culms 40 - 120 cm high. Leaves flat. Panicles loose. Spikelets 3-flowered.

Gnatong, Tallum Samdong, Zemu Valley ; 2100 4400 m.

*Fl. & Fr.* : July Aug.

### HOLCUS L.

**Holcus lanatus** L., Sp. Pl. 1048. 1753 ; Hook. *f.*, F.B.I. 7 : 274. 1896 ; Bor, Grass. Ind. 443. 1960.

Annual or perennial, up to 1 m high. Leaves flat. Panicles laterally compressed.

Sikkim, *s. l.* Naturalized in Darjeeling.

### HORDEUML.

**Hordeum aegiceras** Nees ex Rolye, Ill. Bot. Himal. 418. t. 17.f. 2. 1836 ; Bor, Grass. Ind. 675. 1960. *H. vulgare* ssp. *aegiceras* (Nees ex Royle) A. Love in Fedde Repert. 95 : 435. 1984. *H. vulgare* var. *aegiceras* Aitch. In Hook. *f.*, F.B.I. 7 : 371. 1896.

Erect annual. Leaves flat. Spikelets one flowered, lemma produced into a dilated 3-fid appendage.

Sikkim. Cultivated.

**H. vulgare** L., Sp. Pl. 84. 1753 ; Hook. *f.*, F.B.I. 7 : 371. 1896 ; Bor, Grass. Ind. 677. 1960.

ssp. *vulgare*

Erect annual grass. Leaves flat. Spikelets two ranked.

Sikkim. Cultivated.

ssp. **agriocrithon** (Aberg) A. Love in Fedde Repert. 95 : 435. 1984. *Hordeum agriocrithon* Aberg in Ann. Agri. Coll. Sweden 6 : 159. 1938. Bor, Grass. Ind. 676. 1960.

*Notes* : It is believed to be the ancestral form of the cultivated Barley. May be found in Sikkim (*cf.* Bor, *op. cit.*).

### ISACHNE R. Br.

**Isachne albens** Trin., Sp. Gram. 1. lc. t. 85. 1826 ; Hook. *f.*, F.B.I. 7 : 22. 1896 ; Bor, Grass. Ind. 579. 1960.

Tall perennials ; culms erect or spreading, 30 120 cm high. Spikelets 1.5 16 mm long, florets equal in size and texture, glumes glabrous.

Throughout subtropical Sikkim.

*Fl. & Fr.* : Almost throughout the year.

***L. clarkei*** Hook. *f.*, F.B.I. 7 : 24. 1896 ; Bor, Grass. Ind. 579. 1960.

Annuals ; culms slender, often rooting at nodes. Spikelets up to 1 mm long, pedicels longer than spikelets, lemmas involute, scabrid.

Lachung valley ; 1500 - 3300 m.

*Fl. & Fr.* : Aug. - Dec.

***L. himalaica*** Hook. *f.*, F.B.I. 7 : 23. 1896 ; Bor, Grass. Ind. 581. 1960.

Perennials ; culms 30 - 60 cm high, erect or spreading. Panicles pyramidal. Spikelets 1.8 - 2.1 mm long, ellipsoid to subglobose on long capillary, glandular pedicels, lemmas glabrous.

Sikkim, *s.l.*

*Fl. & Fr.* : Aug. - Dec.

***L. miliacea*** Roth *ex* R. & S., Syst. Veg. 2 : 476. 1817 ; Hook. *f.*, F.B.I. 7 : 25. 1896 ; Bor, Grass. Ind. 582. 1960.

Annuals ; culms up to 20 cm tall. Leaves small, smooth. Spikelets *ca* 2 mm long, florets unequal in size and of different textures.

Gangtok ; 700 - 1700 m.

*Fl. & Fr.* : Aug. - Nov.

***L. sikkimensis*** Bor in Kew Bull. 1949 ; 115. 1949 & Bor, Grass. Ind. 582. 1960.

Annual ; culms up to 40 cm tall. Panicles 5 - 10 cm long, effuse, branches flexuous, eglandular. Spikelets *ca* 2 cm long, ellipsoid, smooth, florets of similar texture.

Karponang, Lachung.

*Fl. & Fr.* : July - Sept.

#### LOLIUM L.

***Lolium perenne*** L., Sp. Pl. 83. 1753 ; Hook. *f.*, F.B.I. 7 : 365. 1896 ; Bor, Grass. Ind. 545. 1960.

Stoloniferous perennials. Leaves linear, complicate. Spikelets oblong, 3 - 11-fid.

Sikkim, *s.l.* (*vide* Hook. *f.*, *op. cit.* ; Bor, *op. cit.*).

### MUHLENBERGIA Schreb.

**Muhlenbergia huegelii** Trin. in Mem. Acad. Sci. Petersb. Ser. 6, 4 : 41. 198. 1841 ; Bor, Grass. Ind. 401. 1960. *M. viridissima* Nees *ex* Steud., Syn. Pl. Glum. 1 : 178. 1854 ; Hook. *f.*, F.B.I. 7 : 259. 1896 ; Hsu in Hara, Fl. E. Himal. 368. 1966.

Annual or short perennials. Panicles elongate, branches and pedicels slender. Spikelets awned, glumes 1-nerved, lemmas twice as long as the glumes.

Sikkim (*vide* Hook. *f.*, *op. cit.* ; Bor, *op. cit.*).

### NEYRAUDIA Hook.f.

**Neyraudia reynaudiana** (Kunth) Keng *ex* Hitchc., Amer. Jour. Bot. 21 : 131. 1934 ; Bor, Grass. Ind. 518. 1960. *Arundo reynaudiana* Kunth, Rev. Gram. 1 : 275. t. 49. 1830. *Neyraudia madagascariensis* (Kunth) Hook. *f.* var. *zollingeri* Hook. *f.*, F.B.I. 7 : 305. 1896. GUNGRING (Nep.).

A perennial grass up to 4 m tall ; culms terete, shining. Panicles large, nodding. Spikelets 4 8-flowered, lowest lemma empty.

Jorethang, Chatesay, Deorali ; 1000 1800 m.

*Fl. & Fr.* : July Sept.

### PHAENOSPERMUM Benth. & Hook.f.

**Phaenospermum globosum** Munro *ex* Oliver in Hook., Ic. Pl. Sub. t. 1991. 1891 ; Bor, Grass. Ind. 614. 1960.

A robust 2 3 m tall perennial. Leaves broad, acuminate, tessellately nerved.

Sikkim (*vide* Bor, *op. cit.*).

### PHALARIS L.

**Phalaris arundinacea** L., Sp. Pl. 55. 1753 ; Hook. *f.*, F.B.I. 7 : 221. 1896 ; Bor, Grass. Ind. 615. 1960.

Perennial, rhizomatous grass. Culms tall, up to 1.5 m high. Panicles 7 40 cm long, dense. Glumes acute, wingless or with inconspicuous wing on the keel, sterile florets 2, below the fertile floret.

Sikkim (*vide* Bor, *op. cit.*).

**P. minor** Retz., Obs. Bot. 3 : 8. 1783 ; Hook. f., F.B.I. 7 : 221. 1896 ; Bor, Grass. Ind. 616. 1960.

Annuals ; culms 20 - 100 cm high. Panicles 1 - 6 cm long, ovate - oblong. Glumes equal, broadly winged, sterile - floret one.

Betwo.

*Fl. & Fr.* : April - June.

#### PHLEUML.

**Phleum alpinum** L., Sp. Pl. 1 : 59. 1753 ; Hook. f., F.B.I. 7 : 236. 1896 ; Bor, Grass. Ind. 402. 1960.

Loosely tufted, shortly rhizomatous perennials ; culms erect or ascending. Panicles 1 - 5 cm long, broadly cylindrical to ovoid. Glumes truncate, stiffly ciliate on keel, awn equal in length to glumes, lemma shorter than glumes.

Zemu, Thangu ; 3300 - 3900 m.

*Fl. & Fr.* : July - Sept.

#### PHRAGMITES Adans.

**Phragmites australis** (Cav.) Trin. ex Steud., Nom. Bot. ed. 2. 324. 1854 ; Clayton in Taxon 17 : 168. 1968. *Arundo australis* Cav. in Anales Hist. Nat. Madrid. 1 : 100. 1799. *P. communis* Trin, Fund. Agrost. 134. 1820 ; Hook. f., F.B.I. 7 : 303. 1896 ; Bor, Grass. Ind. 416. 1960.

Perennial weed with creeping rhizomes. Panicles 20 - 30 cm long, 6 - 10 cm wide ; lowest branches with a silky beard at the base.

Chungthang ; ca 1600 m.

*Fl. & Fr.* : July - Oct.

#### PIPTATHERUM P. Beauv.

**Piptatherum aequiglume** (Duthie ex Hook. f.) Duthie ex Rozhev. in Bot. Mater. Gart. Bot. Inst. Komarova. Acad. Nauk. USSR. 14 : 113. 1951. *Oryzopsis aequiglumis* Duthie ex Hook. f., F.B.I. 7 : 234. 1896.

Loosely tufted perennial. Culms stout. Leaf-blades flat. Panicles lax. Spikelets lanceolate, lemma densely hairy, awn long, exserted, deciduous or subpersistent.

Giagong ; 2700 - 4500 m.

*Fl. & Fr.* : Oct. - Nov.

## POA L.

**Poa annua** L., Sp. Pl. 68. 1753 ; Stapf in Hook. *f.*, F.B.I. 7 : 345. 1896 ; Bor, Grass. Ind. 555. 1960.

Annual or subperennial ; culms erect, up to 30 cm tall, smooth. Panicle ovate, lax. Spikelets oblong ovate, 3 - 7-flowered, lemma silky ciliate along keel and outer-side nerves.

Sikkim, *s. l.* ; 1800 - 2500 m.

*Fl. & Fr.* : March - Sept.

**P. eleanorae** Bor in Kew Bull. 1948 ; 142. 1948 ; Bor, Grass. Ind. 556. 1960.

Perennial ; culms up to 40 cm tall, geniculate at base. Panicles up to 24 cm long. Spikelets cuneate, 2 - 3-flowered, glumes unequal, lemma 5 - 6 mm long, keels ciliate below, palea scabrous on keels.

N.E. Sikkim.

*Fl. & Fr.* : Aug.

**P. gammieana** Hook. *f.*, F.B.I. 7 : 345. 1896 ; Bor, Grass. Ind. 557. 1960.

Perennial ; culms 30 - 60 cm high, leafy throughout. Panicles up to 10 cm long. Spikelets pale green, 3 - 2-flowered, lemma hairy on nerves and keel, palea ciliate on keels.

Changu, Naku Chu, Tankra Mt.

*Fl. & Fr.* : June - July.

**P. himalayana** Nees *ex* Steud., Syn. Pl. Glum. 1 : 256. 1854 ; Stapf in Hook. *f.*, F.B.I. 7 : 344. 1896 ; Bor, Grass. Ind. 557. 1960.

Perennials. Culms ascending from geniculate base. Panicles lax, up to 15 cm long, branches capillary, flexuous. Spikelets 3 - 4-flowered, pale green, lemma subobtusely, 5-nerved, silky hairy on keel and side nerves, palea ciliate on keels.

Chola range, Lachung valley ; 3000 - 4000 m.

*Fl. & Fr.* : June - Aug.

**P. hirtiglumis** Stapf in Hook. *f.*, F.B.I. 7 : 343. 1896. Nelderis in Hara *et al.*, Enum. Fl. Pl. Nepal 140. 1978.

Rhizomatous perennials. Culms 20 - 30 cm high, smooth. Panicles up to 5 cm long, pyramidal. Spikelets obovate, green or violet-tinged,

Lachung valley ; 4000 - 4900 m.

*Fl. & Fr.* : June - Aug.

***P. khasiana*** Stapf in Hook. *f.*, F.B.I. 7 : 343. 1896 ; Bor, Grass. Ind. 557. 1960.

Annual ; culms 30 - 60 cm high. Panicles pyramidal. Spikelets ovate-oblong, pale green, glumes unequal, rough, lemmas oblong, keel and outer nerves sparsely silky or subglabrous, palea scabrid on keels.

Chamnango, Singalela range ; 3300 - 4200 m.

*Fl. & Fr.* : May - June.

***P. ludens*** R.R. Stewart in Brittonia 5 : 420. 1945 ; Bor, Grass. Ind. 558. 1960. *P. pseudo-pratensis* Hook. *f.*, F.B.I. 7 : 340. 1896, non Beyer 1891 *nec* Serbn. *et* Ruyd. 1896.

Perennials ; culms smooth. Panicles up to 20 cm long, branches up to 7 cm long. Spikelets ovate-oblong, 6 - 8 mm long, 3 - 2-flowered, bluish, glumes unequal, lemma, oblong, silky hairy on keel beyond the middle, palea ciliate below.

Changu, Jelep - La, Zemu valley ; 3500 - 4000 m.

*Fl. & Fr.* : June - July.

***P. nemoralis*** L., Sp. Pl. 69. 1753 ; Stapf in Hook. *f.*, F.B.I. 7 : 341. 1896 ; Bor, Grass. Ind. 558. 1960. *P. nemoralis* L. var. *ligulata* Stapf in Hook. *f.*, F.B.I. 7 : 341. 1896.

Perennial ; culms loosely tufted, 30 - 60 cm high. Panicles lax, branches erect or spreading. Spikelets 2 - 4-flowered, glumes unequal, rough, lemma oblong, subobtuse, with keel silky hairy at the base ; palea scaberulous on the keels.

Chamnango ; 3300 - 3600 m.

*Fl. & Fr.* : June - July.

***P. nitide-spiculata*** Bor in Kew Bull. 1948 ; 139. 1948 ; Bor, Grass. Ind. 558. 1960.

Perennial ; culms up to 30 cm tall, glabrous. Panicles lax, up to 16 cm long. Spikelets elliptic-oblong, 2 - 3-flowered, long pedicellate, glumes unequal, lemma oblong, obtuse, ciliate on the keels at base, scabrous above, palea pilose between the keels.

Thangu, Jelep - la.

*Fl. & Fr.* : June July.

**P. pagophila** Bor in Kew Bull. 1949 ; 239. 1949 ; Bor, Grass. Ind. 558. 1960. *P. flexuosa* Stapf in Hook. f., F.B.I. 7 : 342. 1896, non Sm. 1800.

Perennial, stoloniferous ; culms 20 - 40 cm high. Panicles pyramidal, lax. Spikelets green, usually suffused with purple, glumes equal, lemmas usually smooth, rarely scaberulous on the keels, palea scabrid on the keels.

Giagong, Yakla ; 3800 - 4600 m.

*Fl. & Fr.* : July - Sept.

**P. poophagorum** Bor in Kew Bull. 1948 : 143. 1948 ; Bor, Grass. Ind. 559. 1960.

Perennial ; culms 15 cm long, glabrous. Panicles up to 5 cm long. Spikelets on small scabrous branches, lemma glabrous, palea scabrous on keel.

Temu - la.

*Fl. & Fr.* : July.

**P. polyneuron** Bor in Kew Bull. 1952 ; 223. 1952 ; Bor, Grass. Ind. 559. 1960.

Perennials ; culms up to 30 cm tall. Panicles loose. Spikelets 3-4-flowered, compressed, elliptic ; glumes unequal ; lemma ciliate on nerves and keels, dorsally hairy in lower half, palea pilose in lower half.

Nathu - La.

*Fl. & Fr.* : June - July.

**P. sikkimensis** (Stapf) Bor in Kew Bull. 1952 ; 130. 1952 ; Bor, Grass. Ind. 560. 1960. *Poa annua* L. var. *sikkimensis* Stapf in F.B.I. 7 : 346. 1896.

Perennial, stoloniferous ; culms up to 30 cm high. Panicles up to 15 cm long, glumes firm, lemma obtuse, glabrous.

Patang La, Sebu valley ; 3500 - 4700 m.

*Fl. & Fr.* : July - Sept.

**P. tibeticola** Bor in Kew Bull. 1948 ; 139. 1948 ; Bor, Grass. Ind. 561. 1960.

Annual to perennial, culms up to 25 cm tall, glabrous. Panicles up to 10 cm long. Spikelets elliptic-oblong, 2-3-flowered, glumes unequal, lemma oblong-elliptic, obtuse, scabrous on keel and lateral nerves, palea scabrous on keel.

Chungyu ; ca 5000 m.

*Fl. & Fr.* : Sept.

### POLYPOGON Desf.

**Polyogon fugax** Nees ex Steud., Syn. Pl. Glum. 1 : 184. 1854 ; Bor, Grass. Ind. 403. 1960. *P. higagaweri* Steud., l.c. 1 : 422. 1854. *P. littoralis* var. *higagaweri* (Steud.) Hook. f., F.B.I. 7 : 246. 1896.

Annual. Panicles narrowly ovate, oblong or cylindrical, usually lobed. Spikelets pale green or yellowish, glumes slightly notched at the apex.

Sikkim, *s.l.* (*vide* Hook. f., *op. cit.*).

There is only one collection without precise locality at CAL.

### SPOROBOLUS R.Br.

**Sporobolus diander** (Retz.) P. Beauv., Ess. Agrost. 26. 147. 178. 1812 ; Hook. f., F.B.I. 7 : 247. 1896 ; Bor, Grass. Ind. 629. 1960. *Agrostis diandra* Retz., Obs. Bot. 5 : 19. 1789.

Tufted perennials ; culms erect or geniculately ascending. Panicles effuse, stamens 2.

Sikkim, *s.l.*

**S. fertilis** (Steud.) W.D. Clayton in Kew Bull. 19 : 294. 1965. *Agrostis fertilis* Steud., Syn. Pl. Glum. 1 : 170. 1854. *Sporobolus indicus auct. non* R. Br. : Hook. f., F.B.I. 7 : 247. 1896 ; Bor, Grass. Ind. 630. f. 76. 1960.

Perennials ; culms slender, erect. Panicles contracted. Spikelets pale green, upper glume shorter than lemma, stamens 3.

Phassing, Tassiding.

*Fl. & Fr.* : Apr. - Nov.

**S. piliferus** (Trin.) Kunth, Enum. Pl. 1 : 211. 1833 ; Hook. f., F.B.I. 7 : 251. 1896 ; Bor, Grass. Ind. 632. 1960. *Vilfa pilifera* Trin., Diss. Bot. 157. 1824.

Densely tufted annuals. Panicles interrupted, linear, strict. Spikelets brown, upper glume as long as or longer than lemmas.

Sikkim ; wayside weed in tropical and subtropical parts.

*Fl.* : May Sept.

### STIPA L.

***Stipa concinna*** Hook. *f.*, F.B.I. 7 : 230. 1896.

Tufted perennials, 8–22 cm high. Leaf-blades involute, setaceous. Panicles narrow, 2.5–4 cm long. Spikelets purplish ; lemma pilose at base only ; awn plumose throughout.

Sikkim (*vide* Hook. *f. op. cit.* ; Bor, *op. cit.*).

***S. consanguinea*** Trin. & Rupr., Sp. Gram. Stirp. 78. 1842 & in Mem. Acad. Sci. Petersb. 6, 7 : 78. 1843 ; Bor, Grass. Ind. 664. 1960. *Stipa koelzii* R.R. Steward in Brittonia 5 : 441. 1945.

Tufted perennial, 17–25 cm high. Panicles contracted ; absent 2.5 cm long, lemma thinly pubescent to glabrous.

Sikkim, *s.l.*, G.H. Cave 276 (CAL).

***S. mongholica*** Turcz. ex. Trin. in Bull. Sci. Acad. Petersb 1 : 67. 1836 ; Hook. *f.*, F.B.I. 7 : 229. 1896 ; Bor, Grass. Ind. 645. 1960.

Tufted perennials. Leaf-blades involute, setaceous. Panicles loose. Spikelets 3–5 mm long ; pedicels capillary ; glumes subequal, lemma pilose, awn flexuous, plumose throughout.

Chola, Lhonak ; 4000–4500 m.

*Fl. & Fr.* : July Aug.

***S. purpurea*** Griseb. in Nachr. Ges. Wiss., Gottingen 1868 : 82. 1868 ; Hook. *f.*, F.B.I. 7 : 229. 1896 ; Bor, Grass. Ind. 645. 1960.

Tufted perennials, 15–25 cm high. Panicles loose, 6–12 cm long ; glumes shortly acuminate, lemma pubescent, awn 6–8 cm long, bigeniculate, plumose throughout.

Naku la ; 4800–5800 m.

*Fl. & Fr.* : Oct. Nov.

***S. roylei*** (Nees) Mez. in Fedde Repert. 17 : 207. 1921 ; Bor, Grass. Ind. 646. 1960. *Orthoraphium roylei* Nees in Proc. Linn. Soc. 1 : 94. 1841. *S. orthoraphium* Steud., Syn. Pl. Glum. 131. 1854 ; Hook. *f.*, F.B.I. 7 : 233. 1896.

Densely tufted perennials. Culms slender. Panicles 15–25 cm long. Spikelets on short, erect pedicels; glumes unequal, lemma subulate, awn up to 2.5 cm long, not twisted, glabrous.

Chakung chu, Gnatong, Jelep la; 3000–3700 m.

*Fl. & Fr.* : July–Oct.

### THYSANOLAENA Nees

***Thysanolaena latifolia*** (Roxb. ex Hornem.) Honda in J. Fac. Sc. Tokyo Sect. III. Bot. 3 : 312. 1930; Mebberley in Taxon 33 (3) : 437. 1984. *Agrostis maxima* Roxb., Fl. Ind. 1 : 319. 1820. *Thysanolaena maxima* (Roxb.) O. Ktze., Rev. Gen. Pl. 2 : 794. 1891. *Thysanolaena agrostis* Nees in Edinb. New. Phil. J. 18 : 180. 1835; Hook. f., F.B.I. 7 : 61. 1896. *T. sikkimensis* Gdger. in Bull. Soc. Bot. Fr. 66 : 303. 1919.

Perennials. Culms 1.5–3.5 m high. Leaves lanceolate. Panicles 30–60 cm long. Spikelets ca 1.5 mm long, lower florets sterile, upper bisexual.

Rangeet, Rebong, Dikchu, Gangtok; 500–1700 m.

*Fl. & Fr.* : Feb.–May.

### TRIKERAIA Bor

***Trikeria hookeri*** (Stapf) Bor in Kew Bull. 1954; 555. 1955; Bor, Grass. Ind. 647. 1960. *Stipa hookeri* Stapf in J. Linn. Soc. Bot. 30 : 120. 1894; Hook. f., F.B.I. 7 : 232. 1896.

Culms up to 70 cm high. Panicles 10–15 cm long. Spikelets 1-flowered, glumes membranous, lemma oblong, elliptic, hyaline, hairy, deeply bifid at the apex, lateral nerves produced to two stout scabrid bristles, awn from back of the lemma.

Kankola Pass (*fide* Hook. f., *op. cit.*).

### TRIPOGON Roem. & Schult.

***Tripogon filiformis*** Nees ex Steud., Syn. Pl. Glum. 1 : 301. 1854; Hook. f., F.B.I. 7 : 288. 1896; Bor, Grass. Ind. 521. 1960.

Tufted perennials; culms simple. Spikelets 5–8-flowered; lemma with a median awn, shortly awned, outer lobes short or long, obtuse or acute or awned inner lobes.

Lachung; Reunig Chu.

*Fl. & Fr.* : Sept.–Oct.

**T. trifidus** Munro ex Stapf in Kew Bull. 1892 ; 85. 1892 ; Hook. f., F.B.I. 7 : 286. 1896 ; Bor, Grass. Ind. 524. 1960.

Tufted perennials, up to 45 cm high, lower glume lobed on one side, lemma bearded at the base.

Sikkim (*fide* Hook.f. *op cit.* ; Bor, *op. cit.*).

#### TRisetUM Pers.

**Trisetum flavescens** (L.) P. Beauv., Ess. Agrost. 88. 153. 180. 1812 ; Bor, Grass. Ind. 448. 1960. *Avena flavesceps* L., Sp. Pl. 80. 1753. *A sikkimensis* Hook. f., F.B.I. 7 : 280. 1896.

Perennials. Panicles very effuse. Spikelets yellowish green, glumes unequal, hyaline.

Lachen & Lachung valley (*fide* Hook. f., *op. cit.*).

**T. scitulum** Bor in Kew Bull. 1956 ; 212. 1956 ; Bor, Grass. Ind. 448. 1960. *Avena flavescens auct. non L.* : Hook. f., F.B.I. 7 : 279. 1896.

Perennials. Panicles effuse. Spikelets brownish or bronze, glumes unequal, lemma shining.

Yumthang, Zemu valley, Sherabthang.

*Fl. & Fr.* : Aug. Sept.

**T. spicatum** (L.) Richt., Pl. Eur. 1 : 59. 1890 ; Bor, Grass. Ind. 448. 1960. *Aira spicata* L., Sp. Pl. 64. 1753. *Avena subspicata* L., Syst. Nat. ed. 10 : 873. 1759. Hook. f., F.B.I. 7 : 278. 1896. *Trisetum subspicatum* (L.) P. Beauv., Ess. Agrost. 88. 149. 1812.

Perennials. Panicles spiciform or ovoid, erect, densely spiculate.

Llonak, Zemu valley, Dongri ; 3600 4800 m.

*Fl. & Fr.* : June Aug.

#### TRITICUM L.

**Triticum aestivum** L., Sp. Pl. 85. 1753 ; Bor, Grass. Ind. 679. 1960. *T. vulgare* Vill., Hist. Pl. Dauph. 2 : 153. 1787 ; Hook. f., F.B.I. 7 : 367. 1896.

Cultivated.

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