OBSERVATIONS ON THE FLORA OF SIANG FRONTIER DIVISION, NORTH EAST FRONTIER AGENCY (NEFA)

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INTRODUCTION

The area under study is one of the botanically unknown areas of our country, as it had not been explored previously with a view to assessing the flora of the region. Inaccessibility for want of proper tracks in the highly mountaineous areas, coupled with inadequate facilities to procure provisions to pull on for an appreciable period, have been the main reasons for the scanty knowledge of the vegetable wealth of these areas. Burkitt's Abor expedition as early as 1911 (vide: "The Botany of the Abor expedition", Rec. bot. Surv. India 10, 1924) was confined mostly to the areas surrounding Pasighat and to the ranges of the outer Syom valley up to Kempang. It is, therefore, evident that the entire interior valleys of the Syom and the Sian rivers along the inner ranges of the Siang Frontier Division are terra-incognita so far as botanical knowledge is concerned. The present paper is a preliminary study of the predominant species composition of the region of the Siang Frontier Division lying between 26° 10' N-23° 10' N Lat. and 94° 35'E-94° 50'E Long. along the north-eastern part of India bordering Tibet. The exploration tour was carried out during November 1958. The party reached Tuting by air transport on the 5th November, 1958, and trekked from Tuting to Kapang La, the border between India and Tibet along the course of the river Dihang or Siang and then after returning to Tuting, continued the journey along the river up to Minguing and deviated from the Siang river route following the tribal route across the mountains along the Bori area till Along was reached. The altitudinal range of the area studied varies from 350 m (± 1200') to 2200 m (± 7250'). It is very interesting to note that the type of vegetation observed right up to the border of India and Tibet in the lower elevations along the course of the river is that of typical subtropical nature mixed with a few temperate species, even though the latitude hardly permits to foster such type. On the other hand the high mountain ranges on either side of the Siang valley develop distinct temperate vegetation with pure formation of Abies pindrow along the upper zone. The influence of altitude rather than latitude is clearly visible in this area.

ITINERARY

<table>
<thead>
<tr>
<th>Date</th>
<th>Locality</th>
</tr>
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<tbody>
<tr>
<td>5-11-1958</td>
<td>Dibrugarh (By air)</td>
</tr>
<tr>
<td>5-11-1958</td>
<td>Tuting</td>
</tr>
<tr>
<td>6-11-1958</td>
<td>Tuting surroundings</td>
</tr>
<tr>
<td>7-11-1958</td>
<td>Kopoh</td>
</tr>
<tr>
<td>8-11-1958</td>
<td>Gelling</td>
</tr>
<tr>
<td>9-11-1958</td>
<td>Kapang La</td>
</tr>
<tr>
<td>10-11-1958</td>
<td>Gelling surroundings</td>
</tr>
<tr>
<td>11-11-1958</td>
<td>Kopoh</td>
</tr>
<tr>
<td>12-11-1958</td>
<td>Tuting</td>
</tr>
<tr>
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<td>Jido</td>
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<tr>
<td>14-11-1958</td>
<td>Ninguing</td>
</tr>
<tr>
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<td>Paungo</td>
</tr>
<tr>
<td>16-11-1958</td>
<td>Minguing</td>
</tr>
<tr>
<td>17-11-1958</td>
<td>Minguing surroundings</td>
</tr>
<tr>
<td>18-11-1958</td>
<td>Takepokong</td>
</tr>
<tr>
<td>19-11-1958</td>
<td>Sirang</td>
</tr>
<tr>
<td>20-11-1958</td>
<td>Garsing</td>
</tr>
<tr>
<td>21-11-1958</td>
<td>Garsing surroundings</td>
</tr>
<tr>
<td>22-11-1958</td>
<td>Eyo</td>
</tr>
<tr>
<td>23-11-1958</td>
<td>Tumbing</td>
</tr>
<tr>
<td>24-11-1958</td>
<td>Kiak</td>
</tr>
<tr>
<td>25-11-1958</td>
<td>Kempang</td>
</tr>
<tr>
<td>26-11-1958</td>
<td>Along</td>
</tr>
<tr>
<td>27-11-1958</td>
<td>Kombong and Pakam</td>
</tr>
<tr>
<td>28-11-1958</td>
<td>Along surroundings</td>
</tr>
<tr>
<td>29-11-1958</td>
<td>Dibrugarh (By air)</td>
</tr>
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SOIL AND CLIMATE

The whole area consists of steep hills and deep gorges. Some of the surrounding ranges near India-
Tibet border reach as high as 3,600-3,900 m (12,000-13,000 ft) harbouring dense forests of Abies on the top. The hill slopes are often subjected to landslide and soil erosion due to heavy rainfall. There are many swiftly flowing streams and waterfalls, joining the main river Siang and its important tributaries the Sike and the Syom. The soil is mostly sandy loam mixed at certain places with alluvium. The region visited is more or less uniformly humid and seasonally very wet. Practically, there are no dry months. The whole area visited receives a heavy rainfall of about 400 cm (over 150") per annum both from South-west and North-east monsoon. The mornings during November are densely foggy indicating high percentage of humidity though there is very little rainfall. During November, the average maximum temperature is 22°C (33°F) with an average relative humidity of 94%.

FOREST TYPES

Three distinct types of forests have been observed during the course of the study. (1) tropical evergreen forest covers a considerable area from Pakam and Along to Garsing, along the Syom river valley (main tributary of the Siang river) with an altitudinal range of 300-900 m; (2) sub-tropical evergreen forest forms an intermediate stage along the entire region of the river valley covering an altitude of 900-1,500 m, combining both the tropical and temperate species. The general composition of the flora of the two types of forests noted above may be indicated as comprising tree species of *Dipterocarpus macrocarpus* Vent., *Hopea sinilheng* (Dunn) Bor, growing sparsely but appearing conspicuous along with other tree species like *Terminalia myriocarpa*, *Ficus* sp., *Saurauja panduana*, *Abroma fastuosa*, *Dysoxylum procerum*, *Combretum fagrocarpum*, *Wendlandia grandis*, *Musa indica*, *Callicarpa arborea*, *Castanopsis indica*, *Pasia
canteri*, mixed with shrubs of *Casearia varea*, *Polysc
tarillata*, *Eurya acuminata*, *Euonymous laudonii*, *Saba
taceolata*, *Anplectrum asamicum*, *Hedyotis scandens*, *Philogacanthus* sp., *Clerodendrum* sp., *Boehmeria* sp., *Musa* sp. and climbers like *Stephania glandulifera*, *Mereria umbellata* and various species of *Pueraria*, *Rubus*, *Piper*, *Dioscora*, *Smilax*, *Raphidophora* mixed with *Gnetum ula* at certain places. The ground layer is predominantly composed of dense herbaceous growth consisting of *Urena lobata*, *Hydrocotyle javanica*, *Ageratum conyzoides*, *Vernonia scandens*, several species of *Begonia*, *Chirata*, *Plectranthus*, *Polygonum*, *Elatostema* mixed with a few species of grasses, variety of ferns, and several species of *Selaginella*, liverworts and mosses.

Along cleared and burnt areas, *Neyraudia reynaudiana* grows predominantly and it is interesting to note that this species has been observed growing in small patches along the lower parts of the valley even in the area between Kapang La and Kopoh (3) sub-tropical mixed forest which gradually emerges from the sub-tropical type, covers the upper slopes of the ranges above the valley particularly from Garsing to Kapang La covering an altitude above 1,500 m. But along the track from Takepokong to Sirang where the altitude ranges from 1,600-2,200 m, a distinct temperate type of forest with *Quercus*—*Castanopsis—Michelia—Rhododendron—Cephalostachyum* association, grows luxuriantly. It is only in this region of the track followed by the party that the thin reed-like bamboo, *Cephalostachyum fuchsianum* grows abundantly. The region under study is mostly restricted to the mountain slopes on either side of the track and the higher slopes with altitude of 3,500-4,000 m with distinct temperate conifer forests particularly with *Abies* sp., have only been observed from the lower region. Along the inner ranges of the region under study, it is difficult to differentiate the types of forests noted above as several species** characteristic of tropical or sub-tropical areas continue to grow merging with the temperate species along the lower slopes of the Syom and Siang river valleys irrespective of the latitude, even up to 29°10' along the India-Tibet border area.

**ORCHID FLORA**

From a general running collection in this region, orchid species numbering to 40 and representing 16 genera have been collected. Of the various genera, *Coelogyne* and *Dendrobium* are well represented with 8 and 6 species respectively. Of these, 32 species have not been recorded earlier by Burkhill (I.e.). From these collections one species is new to the Himalayan region and one Malayan species of *Coelogyne carnea* Hook. f. is recorded from India for the first time. Like other parts of NEFA, this region also is a varietal home of orchids and more detailed study is very essential to

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* Species were in vegetative stage and hence not collected for the herbarium. Authors' field data were verified with Burkhill's account (I.e.).

** A list of a few of such species is given on page 141.
assess the real wealth of orchids in this and the adjoining regions.

**CRYPTOGAMIC FLORA**

Several species of algae, fungi (mostly members of Agaricales and Polyporales, representing genera like Fomes, Polyporus, Polystictus, Trametes, Auricularia, Clavaria, Sterium, Daedalea, Hydnum, Cantharellus), lichens, liverworts and mosses and pteridophytes have been collected from the area under study and deposited in the Cryptogamic herbarium of the Eastern Circle, Botanical Survey of India, Shillong. A few species of fungi have been identified by Dr. Bakshi of the Forest Research Institute, Dehra Dun and will be published in due course. Some details with regard to the foliose and fruticose types of the lichens collected, have been published by Awasthi (Proc. Indian Acad. Sci. 54 B: 24, 1961) who records a few interesting species of Lobaria, Pseudepiphylla, Peltigera, Cladonia, Stereocaulon, Parmelia, Cetraria and Usnea from the region under study. Similarly, a few details of the pteridophyte collections from this area besides other parts of Eastern India with a few new records have been published by Panigrahi (Indian For. 87: 242, 1961; Bull. bot. Surv. India 2: 300, 1960). In fact, most of the ferns out of the 74 species collected during this short study have been found to be of considerable interest for the Siang frontier division and with the proper understanding of the specific limits of the various ferns, there is ample scope for the study of this group in the NEFA region. It would not be surprising to note that many more ferns new to India may come to light after a detailed work in this little known region of NEFA. As such specific indications as to the new records are not given for the fern species in this study. It is interesting to note that as many as 12 species of Selaginella as given under the enumeration were collected during this short period of field study and there is every possibility of occurrence of some more species in this region. Even of this small number of species, 8 are newly recorded for this region, of which 3 species are new to the Himalayan region.

The species of the other groups like algae and bryophytes have yet to be identified.

**CROPS AND OTHER CULTIVATED PLANTS**

Along the lower cleared hill slopes, adjacent to the rivers, Oryza sativa, Eleusine coracana, Zea mays, Coix lacryma-jobi var. ma-yuen are the common main food crops cultivated by the tribal population. Associated with these are other subsidiary pulses and vegetable crops like Cajanus cajan, Dolichos lablab, Ipomoea batatas, Dioscorea species, Glycine max (Soya bean), Phascolus calcaratus, Cucurbita pepo and Colocasia antiquorum and Chenopodium album. Fruit trees like Artocarpus heterophyllus are also cultivated in the interior villages near Kopoh and Tuting. Dendrocalamus giganteus is a very useful bamboo, producing hollow stems of considerable dimensions with 15-25 cm in diameter which are used as pitchers for bringing water from the distant streams and as containers for intoxicating drinks, etc. It appears that this species was once introduced from the foot-hill areas and due to its economic utility, the cultivation of this species has spread to various villages. Livistona jenkinsiana, a graceful palm, indigenous to upper Assam and outer hilly areas of NEFA, has also been observed as growing in large grooves near many villages due to the careful introduction and propagation by the tribal population for its fan-like leaves used for thatching the huts (vide: Authors' paper in Principes 6 (3), 1962). It is very likely that some of these food crops might have been introduced into these areas by the tribal populations due to their contacts with the plains people of upper Assam. By such contacts Cosyrium arboresum, Nicotiana tabacum were also introduced into the villages along the outer ranges of the division. In most of the villages near Along, very sweet variety of 'Santara' (Citrus reticulata Blanco) is cultivated and the fruit orchards are well maintained.

**NEW RECORDS AND INTERESTING ASPECTS OF DISTRIBUTION**

All the species under the present study have been carefully examined with reference to their distribution in India and with particular reference to the Himalayan region as a whole. Ten species are now newly recorded for the Himalayan region and this brings out a better understanding in the distribution of those species. To Burkhill's (1962) report of 1,078 species of Angiosperms from the Ahor land, 119 species have now been newly added from the present study of a short period of 24 days in which 319 species of Angiosperms are reported. There are, however, three interesting records of Beccarinda cordifolia (Anthony) B. L. Burtt, Coelogynae carnea Hook. f. and Dioscorea socrates (Prain & Burkhill, new to India, the distribution of which is briefly discussed under the enumeration.

These species together with several others as noted under the enumeration and a few more which are yet to be identified, particularly under Gesneriaceae,
Ericaceae, Vacciniaceae, etc. are worth further detailed scrutiny in the subsequent field studies in this region, giving special importance to Minguing—Takepokong—Sirang area and other higher slopes. Only by such study it will be possible to make out in the NEFA region, the occurrence of several other interesting species of the adjoining regions of India.

It would be also of considerable interest to note that there are several examples of species growing in tropical and sub-tropical belts of the Himalayas, extending right into the interior of the Siang valley, very near to India and Tibet border along the route from Gelling to Kapang La, irrespective of the latitude. They serve as striking examples to indicate how the climatic conditions mostly controlled by the altitude in the Himalayan region in comparison to the latitude, influence the distribution of such species along the warm or less cold valley of the Siang river even at points near India-Tibet border. The following species may be cited as few of the several examples:


Burkill (i.c.) in his detailed analysis of the flora of Abor land on the basis of the then available data of the surrounding regions, indicates that the Abor land is a variate node in phyto-geography (p. 15, i.c.). He, while citing several species as endemic to Abor hills and also the adjoining Daphia hills of the Subansiri frontier division and the Mishmi hills of the Lohit frontier division, points out that the Abor land flora has a distinct relationship to that of the Sikkim Himalayas on the east, the Mishmi hills on the west and the Assam hills and surroundings on the south and the south-east (p. 159, 165, i.c.). These observations are being supported to a considerable extent by the further studies carried out by the author and others of the Botanical Survey of India, on the flora of different parts of Sikkim—NEFA, Assam hills and Manipur. A few points regarding endemism and the distinct type of flora of the Abor land as put forward by Burkill (i.c.), are in fact applicable to the entire NEFA region, east of Bhutan which presents a distinct type of floristic composition in comparison to the Sikkim and Bhutan Himalayas. At present attempts are being made to present a series of floristic accounts of the five divisions of NEFA explored by the Botanical Survey of India so as to understand the genesis of the flora of NEFA more clearly. The present paper is one of such series.

ACKNOWLEDGEMENTS

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ENUMERATION

** New Record for India.
† New Record for the Himalayas.
* Plants not recorded by Burkill for Sian Frontier Division. All such records extend the distribution of respective taxa further east of Bhutan along the Himalayan ranges.

Note: All the field numbers cited below are to be attributed to the collector, Rao (the senior author).

MAGNOLIACEAE

*Michelia doldspora Ham. ex DC. M. excelsa Bl. Tree, 25 m high. Fruiting. Fairly common. Takepokong-Sirang, 1700-2300 m 17864, 17878.

ANNONACEAE


The leaves of this specimen are somewhat more leathery and do not match well with the other collections available in Central National Herbarium, Calcutta.

This record for the first time extends the distribution of the species to the Himalayas from the lower ranges of Burma, East Pakistan and Assam Hills.


MENISPERMACEAE

Cyclea bicristata (Griff.) Diels. Lophophyllum bicristata Griff.
Twiner. Flowering. Fairly abundant in limited spots. Kiak-Kempang, 300-400 m 18029.

*Stephania glandulifera* Miers. *S. rotunda* Lour. 
Climber. Flowering and fruiting. Fairly common. Tuting, 500 m 13113; Sirang-Garsing, 600-1400 m 17930; Tuting-Minguing, 900 m 17608.

**BRASSICACEAE ( = CRUCIFERAEE)**

Cardamine hirsuta Linn. 
Weed in cultivated fields. Flowering. Leaves used as vegetable. Fairly common. Kopoh-Gelling, 500-800 m 13081; west of Tuting Political colony, 700 m 17318.

**CAPPARACEAE ( = CAPPARIDACEAE)**

Crataeva religiosa Forst. var. nurvala Ham. *C. nurvala* Ham. 
Tree, 6 m high. Fruiting. Possibly cultivated. Fairly common. Kempang-Along, 300-400 m 18051.

**VIOLACEAE**

Viola distans Wall. 
Slender herb on moist rocks. Flowering. Abundant at several spots. Jido-Tuting, 500 m 13123.

V. patrinii DC. 
Weed along moist paddy fields. Fairly common. West of Tuting Political colony, 700 m 17319.

**POLYGALACEAE**

* Polygala arillata* Ham. 
Shrub, 3 m high. Fruiting. Fairly common. Gel-ling-Kapang La, 800-1500 m 17527.

* Salomonia cantonensis* Lour. 
Weed in fields. Leaves rosy-red. Flowering. Fairly common. Hill slope west of Tuting Political colony, 700 m 17333, 17334.

**CARYOPHYLLACEAE**

Small herb. Flowering. Abundant at several spots. Tuting-Kopoh along the river, 600-700 m 17404.

Mizushima (loc. cit.) considers that *D. cordata* Willd. is an American species.

**HYPERICACEAE**

Hypericum japonicum Thunb. 
Weed in moist open areas. Fairly common. Tuting Political colony, 700 m 17319 A.

**CLUSIACEAE ( = GUTTIFERAE)**

†Garcinia lanceaeform Roxb. 
This record indicates the distribution of this species in the Himalayan region also besides the East Bengal and Assam area.

**TERNSTROEMIACEAE**

†Camellia caduca C.B. Cl. ex Brandis, Ind. trees, 61, 1907. 
Tree, 5 m high. Flowering. Fairly common. Minguing-Takepokong, 1100-1800 m 17781. 
This is an interesting record for the Himalayas as this is known so far from the Assam hills only. This record confirms the indication of its occurrence in the Himalayan region (Sikkim and Bhutan) by Brandis (loc. cit.).

Eurya acuminata DC. 
Shrub, 3-5 m high. Flowering and fruiting. Fairly common. West of Tuting Political colony, 700 m 17305; Gelling-Kapang La, 800-1500 m 17492; Tumbing-Kiak, 400-700 m 17995.

* E. japonica Thunb. var. thunbergia Thw. 
Shrub, 2 m high. Fruiting. Fairly common. Sirang-Garsing, 600-1400 m 17904.

Saurauja napaulensis DC. 
Tree, 8 m high. Flowering. Abundant at several spots. Kopoh-Tuting, 600-700 m 17584.

S. punduana Wall. 
Tree with spreading branches, 8 m high. Flowering. Fairly common. Minguing-Pango, 500-800 m 17664; Kiak-Kempang, 300-400 m 18034; Tuting-Kopoh, 600-700 m 17423.

**MALVACEAE**

Hibiscus pungens Roxb. 
Shrub, 2 m high, on sandy loamy soil. Flowering. Fairly common. West of Tuting Political colony, 700 m 17301.

Sida rhombifolia Linn. 
Herb. Flowering. Fairly common. West of Tuting Political colony, 700 m 17326.

Urena lobata Linn. 
Herb, 1-2 m high. Flowering and fruiting. Very abundant at several spots. West of Tuting Political colony, 700 m 17363; Kiak-Kempang, 300-400 m 18028.
STERCULIACEAE

Tree, 3-5 m high. Capsule tomentose with an expanded pericarp. Fairly common. West of Tuting Political colony, 700 m 17312; Tuting-Ninguing, 900-1100 m 17633.

Byttneria aspera Colebr. *Byttneria aspera* Colebr.
Tree, 10 m high. Fruiting. Fairly common. Kopoh-Tuting, 600-800 m 17596.

TILIACEAE

Triumfetta tomentosa Bojer
Herb. Fruiting. Fairly common. Kopoh-Gelling, 700 m 17458; Kiak-Kempang, 300-400 m 18021.

MALTIGIHAECAE

Aspidopterys indica (Roxb.) Hochreut. *A. roxburghiana* A. Juss.
Climbing shrub, 3-5 m high. Fruiting. Abundant at several spots. Kempang-Along, 300-400 m 18049; Minguing 1200 m 17/93.

GERANIACEAE

Impatiens angustiflora Hook. f.
Herb, 1 m high. Flowering. Fairly common. West of Tuting Political colony, 700 m 17367.
* I. jurpia Ham.
Herb. Flowering. Abundant at several spots. Tuming-Kiak. 600 m 17988.

RUTACEAE

Citrus limetta Risso
Tree, 10 m high. Petiole winged. Fruiting. Fairly abundant at limited spots. Kopoh-Gelling, 300-700 m 17467.
This species grows wild even in Lohit frontier division. There is considerable difference of opinion in the specific identity of this wild form. Tanaka names it as *C. limettoides*. It is very likely that this is of natural hybrid origin.

Evodia meliaefolia Renth.
Tree. 5 m high. Young flowers greenish. Fairly common. Ninguing-Pango, 500-800 m 17687.

Fagara hamiltoniana (Wall.) Engl. *Zanthoxylum hamiltonianum* Wall.
* Glycosmis cyanocarpa* Spreng.
Shrub, 1 m high. Fruiting. Fairly common. Kempang-Along, 300-400 m 10845.

MELIACEAE

Amoora chittagonga Hiern *Aglaia chittagonga* Miq.
Shrub, 2-3 m high. Fruiting. Very scarce. Minguing, 1200 m 17732.

Aphananthe polysacchara (Wall.) Parker *Amoora rohituka* W. & A.
Tree, 8 m high. Fruiting. Fairly common. Minguing, 1200 m 17752.

Dysoxylum procerum Hiern
Tree, 5-7 m high. Flowering. Fairly common. Tuting-Ninguing, 900-1200 m 17640.

CELASTRACEAE

* Euonymous lowsonii C.B. Cl. & Prain
Shrub, 2 m high. Flowering and fruiting. Abundant at several spots. Takepokong-Sirang, 1700-2200 m 17852.

VITACEAE

Vitis brassteolata Wall.

V. planicaulis Hook. f.
Climber. Fairly common. Minguing, 1200 m 17750.

SABIACEAE

Meliosma simplicifolia Walp.
Tree, 5 m high. Fruiting. Fairly common. Kiak-Kempang, 300-400 m 18011.

Sabia lanceolata Colebr.
Climbing shrub. Flowering and fruiting. Fairly common. Kopoh-Tuting, 500-600 m 13096; Kopoh-Gelling, 700-800 m 17472; Kempang-Along, 300-400 m 18040.

ANACARDIACEAE

Shrub, 3 m high. Flowering. Abundant at several spots. Kopoh-Tuting, 500-600 m 13093.

Rhus semialata Murray *R. chinensis* Mill.
Tree, 3-9 m high. Flowering and Fruiting. Fairly common. Hill slope west of Tuting Political colony, 700 m 17304.

CONNARACEAE

Rourea caudata Planch.
Tree, 7 m high. Fruiting. Fairly common. Minguing-Takepokong, 1100-1800 m 17772.
Cajanuss cajan (Linn.) Millsp.

Cultivated. Hill slope west of Tuting Political colony, 700 m 17355.

* Desmodium laburnifolium DC.

Herb, 1 m tall. Fruiting. Fairly common. Pango-Minguing, 500-1200 m 17718.

* D. laxum DC. D. gardneri Benth.

Shrub, 2 m high. Fruiting. Fairly common. Tuting-Kopoh, 600-800 m 17392.

Dolichos lablab Linn.


Herb. Fruiting. Cultivated. Ninguing-Pango, 500-800 m 17698.

Phaseolus calcaratus Roxb. P. torosus Roxb.


Pueraria peduncularis Grah.

Climber. Fruiting. Abundant at several spots. Minguing, 1100 m 17724.

* P. thunbergiana Benth.


MIMOSACEAE

* Entada phaseoloides (Linn.) Merr. E. scandens Benth.


ROSACEAE

Fragaria indica Andr.

Herb, nearly 70 cm high. Flowering. Abundant at several spots on moist soil slopes: Kopoh-Gelling, 500-800 m 13085.

* Pygeum glaberrimum Hook. f.

Tree, 8 m high. Flowering. Fairly common. Pango-Minguing, 500-1200 m 17712.

Rubus ciliatus Sm.

Straggling shrub, 2-3 m high with stout prickles and hairs. Fruiting. Fairly common. Tuting, 700 m 13013.

R. lucens Focke

Stout, prickly climber. Leaves trifoliolate. Flowering and fruiting. Fairly abundant at several spots. Tuting-Kiak, 300-600 m 17996; Kopoh-Gelling, 700 m 17474; Tuting-Ninguing, 900-1100 m 17620.

* R. moluccanus Linn.

Straggling, prickly shrub. Flowering and fruiting. Fairly common. Hill slope west of Tuting Political colony, 700 m 17342.

SAXIFRAGACEAE

* Hydrangea robusta Hook. f. & T.

Shrub, 3 m high. Flowering and fruiting. Fairly common, Minguing-Takepokong, 1200-1700 m 17804.

COMBREACEAE

* Combretum flagarcarpum C.B. Cl.

Tree, 3 m high. Fruiting. Fairly common. Minguing, 1200 m 17745.

MELASTOMACEAE

* Anpectrum assamicum C.B. Cl.

Shrub, 2-3 m high. Flowering and fruiting. Stem chewed for juice by the Abors. Fairly common. Kiak-Kempang, 300-400 m 18013; Tuting-Kopoh, 600-800 m 17396; Gelling-Kapang La, 800-1500 m 17495.

Medinilla rubicunda Bl.

Large shrub or small tree, 6 m high. Fruiting. Fairly abundant at limited spots. Tuting-Ninguing, 900-1200 m 17627; west of Tuting Political colony, 700 m 17321.

Melastoma normale D. Don

Shrub, 2-3 m high. Flowering. Fairly abundant at several spots. Kombong, 350 m 13025.

Osbeckia stellata Wall.


* Oxyspora paniculata DC.

Small tree, 6 m high. Fruiting. Fairly common on moist shady places. Jido-Tuting, 500-900 m 13122.

O. vagans Wall.

Shrub, 2 m high, hirsute. Flowering. Fairly common. Kiak-Kempang, 300-400 m 18012; Tuting-Kopoh along the river course, 600-800 m 17397.

Sacapyramis nepalensis Wall.

Glairrous, succulent herb. Flowering and fruiting. Fairly common. Gelling-Kapang La, 800-1500 m 17517.

† Sonerila khasiana C.B. Cl.

Herb, 1-2 m high. Flowering. Fairly common on road sides. Pango-Minguing, 500-1200 m 17723.

This record extends the distribution of the species from the Khasi and Jaintia hills of Assam to the Himalayas proper.
ONAGRACEAE

Jussiaea suffruticosa Linn.
Weed on waste lands. Flowering. Abundant at several spots. Kiak-Kempang, 300-400 m 18032.

SAMYDACEAE

Casearia vareca Roxb.
Shrub, 5 m high. Flowering and fruiting. Fairly common. Sirangi-Garsing, 600-1400 m 17908; Kiak-Kempang, 300-400 m 18023; west of Tuting Political colony, 700 m 17361; Gelling-Kapang La, 800-1500 m 17513; Tuming-Kiak, 300-600 m 17992.

CUCURBITACEAE

Cucurbita pepo DC.
Commonly cultivated for its edible fruits. Kopoh-Gelling, 700 m 17487; Eyo-Tuming, 400-700 m 17974.

* Melothria heterophylla (Lour.) Cogn. Zehneria umbellata Thw.
Climber with angular stem. Flowering and fruiting. Fairly common. Ninguing-Pango, 500-800 m 17674.

* Trichosanthes bracteata (Lamk.) Voigt. T. palmata Roxb.

BEGONIACEAE

* Begonia episcupalis C.B. Cl.
Slender herb. Flowering. Abundant at several spots along moist shady places. Pango-Minguing, 500-1200 m 17711.

* B. roxburghii A. DC.
Sucrellent herb. Flowering and fruiting. Very abundant at several spots. Ninguing-Pango, 500-800 m 17667; Tuting-Kopoh, 600-800 m 17416.

MOLLUGINACEAE

Mollugo pentaphylla Linn. M. stricta Linn.
Herb. Flowering. Abundant at several spots along cultivated fields. Tuting Political colony, 700 m 17315.

APIACEAE (—UMBELLIFERAE)

Hydrocotyle javanica Thunb.

Sanicula europaea Linn.

ARALIACEAE

Aralia foliolosa Seem.
Small tree, 6 m high, armed with prickles. Leaves bipinnately compound. Flowering. Very scarce. Garsing-Eyo, 600 m 17394.

* Brassaiopsis hispida Seem.
Small tree, 5 m high, armed with prickles. Leaves large, digitately lobed. Flowering. Fairly common. Kempang-Along, 300-400 m 18037.

Schefflera venulosa (W. & A.) Harms. Heptapleurum venulosum Seem. var. macrophylla Wall.
Woody climber. Flowering and fruiting. Fairly common. Gelling-Kapang La, 800-1500 m 17524.

CAPRIFOLIACEAE

Viburnum colebrookianum Wall.
Shrub, 6 m high. Flowering. Fairly common. Tuting-Kopoh, 600-750 m 17417.

RUBIACEAE

Carlemannia griffithii Benth.
Annual, 1 m high. Flowering and fruiting. Fairly common. Pango-Minguing, 500-1100 m 17699.

Damnocanthus indicus Gaertn.
Thorny shrub. Stem pubescent. Flowering. Fairly abundant at limited spots. Takepokong-Sirang, 1700-2200 m 17851.

Hedyotis scandens Roxb.
Woody climbing shrub, 3 m high. Flowering. Fairly common on moist soil slopes and shady corners. West of Tuting Political colony, 700 m 17390; Kopoh-Tuting, 500-600 m 13087; Kiak-Kempang, 300-400 m 18014; Sirang-Garsing, 600-1400 m 17906.

Ixora subsessilia Wall.

Lasianthus hiermannii King ex Hook. f.
Shrub, 1 m high. Flowering. Fairly common. West of Tuting Political colony, 700 m 17314.

* Luculia pinceana Hook.
Erect shrub, 2 m high with spreading branches. Flowering. Fairly common. Minguing-Takepokong, 1100-1800 m 17768.

Mussaenda galbra Vahl

Naucea sessilifolia Roxb.
Tall shrub or small tree, 3 m high. Flowering and fruiting. Fairly abundant at limited spots. West of Tuting Political colony, 700 m 17346.
Ophiorrhiza mungos Linn. *O. calcarata* Hook. f.

Tall herb, 1 m high. Flowering. Fairly common. West of Tuting Political colony, 900 m 17327; Kopoh-Gelling, 1600-2500 m 13086.

*Psychotria denticulata* Wall.

Tree, 6 m high. Fruiting. Abundant at several spots. Tuting-Kopoh, 600-750 m 17415.

*Spiradiclis bifida* Kurz

Perennial herb, 1-2 m high. Flowering and fruiting. Fairly common. West of Tuting Political colony, 700 m 17354; Kopoh-Tuting, 600-750 m 17646; Garsing-Eyo, 600 m 17932.


Small tree, 8 m high. Flowering. Fairly abundant at limited spots. Pango-Minguing, 500-1200 m 17697; Tuting-Kopoh, 600-750 m 17409; Kopoh, 650 m 13078.

**ASTERACEAE (= COMPOSITAE)**

*Adenostemma lavenia* (Linn.) O. Kuntze *A. viscosum* Forst.

Herb with succulent stem, 1 m high. Flowering and fruiting. Abundant at several spots. Gelling-Kapang La, 800-1500 m 17497; Tuting, 700 m 17340.

*Ageratum conyzoides* Linn.

Common weed. Flowering. Very abundant all over the area. Kopoh-Gelling, 750 m 17448; Tuting, 750 m 17345; Kiak-Kempang, 400 m 18015.

*Anaphalis arancosa* DC.

Herb, 1 m high. Tomentose hairs on stem and ventral surface of leaves. Flowering. Fairly abundant at several spots. Gelling-Kapang La, 1500 m 17528.

*Erechtites valerianaefolia* DC.

Slender herb. Flowering. Very abundant at several spots. Kempang, 400 m 18054.

As Burkill did not record this species, it appears to be of recent entering into this area from the Assam plains.

*Gnaphalium luteo-album* Linn.

Small herb. Flowering. Commonly used as vegetable by the Abores. Fairly common. Tuting, 600 m 13060.

*G. purpureum* Linn.

Slender herb. Flowering. Abundant at several spots. Kombong, 450 m 13021.

*Gynura nepalensis* DC.


*Inula cappa* DC.

Stout shrub, 2-3 m high. Branches and leaves hairy. Flowering. Fairly common on dry slopes. Kombong-Pakam, 300 m 13040; Tuting-Jido, 500-600 m 13101.

*Senecio triligulatus* Ham. ex D. Don

Woody climber, 2-3 m high. Flowering. Fairly common. Kopoh-Gelling, 500-800 m 17446.

*Spilanthes acmella* Linn.

Slender herb. Flowering. Abundant at several spots. Tuting, 600 m 13062.

*Vernonia scandens* DC.

Woody climber. Flowering. Abundant at several spots. Gelling-Kopoh, 500-800 m 13088, 13089; Tuting, 700 m 17341; Minguing-Takepokong, 1100-1500 m 17815.
CAMPAULACEAE
Campanumoea javanica Bl.
Climber. Flowering. Fairly common. Minguing-Pango, 500-800 m 17742; Gelling-Kapang La, 800-1500 m 17516.

VACCINIACEAE
Agapetes nutans Dunn
Epiphytic, pendulous shrub. Flowering. Fairly common. Minguing-Takepokong, 1100-1700 m 17807; Takepokong-Sirang, 1700-2200 m 17845.
This species was first described by Dunn from Burkill’s collection from Siang division only. Burkill considers this to be endemic for this area. However, it has not been recorded so far from other parts of the Himalayas.
* Vaccinium serratum Wt.
Shrub, 2-3 m high. Flowering. Fairly common. Minguing-Pango, 400-800 m 17685.
V. venosum Wt.

ERICACEAE
* Gaultheria fragrantissima Wall.
Shrub, 4 m high. Flowering and fruiting. Fairly common. Minguing-Takepokong, 1200-1800 m 17765.
Rhododendron sp.
Shrub, 2 m high. Flowering and fruiting. Fairly common. Takepokong, 1700-2200 m 17863.
It is interesting that this species is still in flower even during November. There are a few more species of *Rhododendron* in this region which are, however, in vegetative stage only.

MYRSINACEAE
* Ardisia humilis Vahl
Glabrous shrub, 2 m high. Fruiting. Scarce. Tuting-Ninguing, 900-1100 m 17647.

* Embelia floribunda Wall.
Large climber. Flowering and fruiting. Fairly common. Minguing, 1100 m 17740.
* E. tsjariam-cottam (R. & S.) A. DC.
Shrub, 3 m high. Fruiting. Fairly common. Kopoh-Gelling, 700 m 17473.
This species is distinct from *E. robusta* Roxb.

Maesa indica Wall.
Shrub or small tree, 10 m high. Flowering and fruiting. Fairly common. Tuting Political colony, 780 m 17349; Pakam-Kombong, 300 m 13016; Kopoh-Gelling, 500-800 m 13084.

SAPOTACEAE
Sarcosperma arboenum Benth.
Tree, 8 m high. Flowering. Scarce in limited spots. Ninguing-Pango (near hanging bridge), 500-800 m 17709.
† S. griffithii Benth.
Small tree, 5 m high. Flowering. Fairly common. Minguing-Takepokong, 1100-1700 m 17773.
This record extends the distribution of the species to the Himalayan ranges from the Assam hills. The fruits of the species which are essential to understand its affinity with *S. arboenum* Benth., are still unknown.

STYRACEAE
Styrax serratum Roxb.
Shrub or small tree, 5 m high. Fruiting. Fairly common. Kiak-Kempang, 300-400 m 18026.
Symlocos ferruginea Roxb.
Tree, 5 m high. Flowering. Fairly common. Kopoh-Tuting, 600-800 m 17388.

OLACEAE
Jasminum coarctatum Roxb.

APOCYNACEAE
Parabarium micranthus (A. DC.) Pierre ex Spire.
Ecdysanthera micrantha A. DC.
Large woody climber. Fruiting. Fairly common. Kopoh-Gelling, 800 m 17457; Garsing-Eyo, 600 m 17942; Kempang-Along, 400 m 18053.

ASCLEPIADACEAE
Dischidia sp.
Slender epiphytic shrub with spreading branches. Abundant at several spots. Takepokong-Sirang, 1700-2200 m 17845.

LOGANIACEAE
Buddicia asiatica Loure.
Shrub, 2-3 m high. Fairly common. Minguing, 1700 m 17741.

Fagraea obovata Wall.
Tree, 12 m high. Fruiting. Fairly abundant at limited spots. Kopoh-Gelling, 800 m 17464.

GENTIANACEAE
* Crawfurdia speciosa Wall.
Climber. Flowering. Fairly common. Takepokong-Sirang, 1700-2200 m 17868; Minguing, 1200 m 17735.
**BORAGINACEAE**

*Cynoglossum furcatum* Wall.
Herb, 1 m. high, hispid. Flowering and fruiting. Fairly common. Kopoh-Gelling, 700 m 17452.

**CONVOLVULACEAE**

*Ipomoea batatas* Lamk.
Prostrate herb. Cultivated for its edible tubers. Pango-Minguing, 500-1200 m 17702, 17703.

*Merremia umbellata* (Linn.) Hall. f. *Ipomoea cymosa* R. & S.
Climber. Flowering and fruiting. Fairly common. Pango-Minguing, 500-1200 m 17701; Kopoh-Tuting, 600-750 m 17385.

† *Rivea ornata* Chois.

**SOLANACEAE**

*Solanum kunii* Brace ex Prain

*S. nigrum* Linn.
Herb. Flowering and fruiting. Fairly common. Gelling-Kapang La, 800-1500 m 17514.

*S. subtruncatum* Wall.
Shrub, 1 m high. Leaves entire. Fruiting. Fairly common. Sirang-Garsing, 600-1400 m 17909.

**SCROPHULARIACEAE**

*Lindernia crustacea* (Linn.) F. V. Mueller.
*Vandelia crustacea* Benth.
Diffusely branching herb. Flowering. Fairly common. Tuting Political colony, 700 m 17356; Kempang-Along, 400 m 18041.

**GESNERIACEAE**

*Aeschynanthus acuminate* Wall.
Shrub, 3-5 m high, succulent. Flowering. Fairly common. Tuting-Kopoh, 600-800 m 17406.

Petrodoxa cordifolia Anthony.
Annual prostrate herb. Fruiting. Fairly abundant at several spots. Takepokong-Sirang, 1700-2200 m 17882.

This species has been so far recorded from a few places of Upper Burma. This is the first record of this genus in India.

† *Chirita oblongifolia* (Roxb.) B. L. Burtt *C. acuminate* R. Br.
Succulent herb, 1 m high, on rocky surfaces. Leaves hairy. Fruiting. Fairly common. Pango-Minguing, 500-1200 m 17719.

*C. pumila* D. Don
Succulent annual herb, tomentose. Flowering. Fairly abundant in limited spots. Kopoh-Gelling, 800 m 17461.

*C. urticaefolia* Ham.
Herb, 1 m high. Flowering. Fairly abundant in limited spots. Garsing-Eyo, 600 m 17938.

**ACANTHACEAE**

*Eranthemum palatiferum* Nees
Shrub, 2 m high on shady moist soil. Flowering. Fairly common. Jido-Tuting, 600 m 13130.
• Peristrophe speciosa Nees
Herb, 1 m high. Flowering. Fairly common. Tuting-Ninguing, 900-1200 m 17613; west of Tuting Political colony, 700 m 17358; Kopoh-Gelling, 800 m 17447.

Phlogacanthus curviflorus Nees
Shrub, 2 m high. Flowering. Abundant at several spots. Gelling-Kapang La, 800-1500 m 17499.

P. gracilis T. Anders. ex Burkill
Herb, 1 m high. Flowering. Fairly common. Kopoh-Tuting, 600-800 m 17631; Kombong-Pakam, 300 m 13033; Tuting Political colony, 700 m 17351.

It is interesting to record that this species was reported by Burkill (L.c.) from the outer hilly areas around Along and the present collection extends its distribution further interior in the slopes surrounding Tuting. It is difficult to say whether this is endemic to the area but so far this has not been reported outside Siang division.

P. guttatus Nees
Shrub, 3-5 m high, glabrous. Flowering. Fairly common. Tuting Political colony, 700 m 17336.

† P. tubiflorus Nees
Shrub, 1 m high. Flowering. Fairly common. Kempang-Along, 400 m 18043.
This produces very attractive flowers, worth introducing in the gardens. (Fig. 1).

* Strobilanthes helictus T. Anders.
Shrub, 3 m high. Flowering. Abundant in several spots. Takepokong-Sirang, 1700-2200 m 17873; Minguing-Takepokong, 1200-1700 m 17774.

Thunbergia coccinea Wall.
Climber. Flowering. Fairly common. Kopoh-Tuting, 600-800 m 17594; Tuting Political colony, 700 m 17412.

VERBENACEAE

Callicarpa arbores Roxb.
Evergreen tree, 5-6 m high. Fruiting. Abundant at several spots. Kiak-Kempang, 400 m 18017; Tuting Political colony, 700 m 17347; Tuting-Kopoh, 600-800 m 17405, 17429.

* Clerodendrum bracteatum Wall.
Shrub, 2 m high. Flowering. Abundant at several spots. Minguing-Takepokong, 1200-1700 m 17801.
This record establishes the continuity of the distribution of the species from Sikkim to Mishmi hills of the Lohit frontier division.

C. colebrookioides Walp.
Shrub, 1 m high. Flowering. Fairly common. Ninguing-Pango, 500-800 m 17686.

C. griffithianum C.B.Cl.
Shrub, 2 m high. Flowering. Fairly common. Kopam-Kombong, 300 m 13017.

C. nutans Wall.

C. viscosum Vent.
Large pubescent shrub, 3-5 m high. Flowering. Very abundant. Along, 350 m 18047 A.

LAMIACEAE (= LABIATAE)

Achyropermum wallichianum Benth. ex Hook. f.
Small herb, 60 cm high, on moist shady places. Flowering. Abundant at several spots. Gelling-Kopoh, 500-800 m 13091, 17401.

* Ajuga bracteosa Wall.
Herb. Flowering. Very abundant. Tuting, 600 m 13065.

Anisomeles indica (Linn.) O. Kuntze A. ovata Br.
Herb, 1 m high. Flowering. Fairly common. Kiak-Kempang, 1500 m 18016; Kempang-Along, 400 m 18038; Tuting Political colony, 700 m 17303.

Calamintha gracilis Benth.
Small herb on moist soil slopes. Flowering. Abundant at several spots. Tuting, 600 m 13064.

* Dysophylla auricularia Bl.
Annual tomentose herb. Flowering. Fairly common. West of Tuting Political colony, 700 m 17343.

* Elsholtzia blanda Benth.
Perennial shrub, 1-2 m high. Flowering. Fairly common. Kopoh-Gelling, 800 m 17453.

Leucoceptrum canum Smith

Perilla ocimoides Linn.
Aromatic tomentose herb. Flowering. Normally cultivated for oil extracted from nutlets. Very abundant at several spots in wild condition. Kopoh-Gelling, 800 m 17451; west of Tuting Political colony, 700 m 17337.

Plectranthus coeora Ham.
Aromatic pubescent herb, 1 m high. Flowering. Fairly common. Kempang-Along, 400 m 18044.

* P. melissoides Benth.
Slender herb. Flowering. Fairly common. West of Tuting Political colony, 700 m 17339.

P. striatus Benth.
Perennial herb, pubescent. Flowering. Abundant at several spots. Kopoh-Gelling, 800 m 17449.
Pogostemon parviflorus Benth.
Herb, 1 m high. Flowering. Fairly common. Tuting-Ninguing, 1200 m 17630.

PLANTAGINACEAE
Plantago major Linn. P. erosa Wall.
Perennial herb. Leaves radical. Flowering. Abundant at several spots. Kopoh-Gelling, 600-800 m 13076; Tuting-Ninguing, 900-1200 m 17609.

AMARANTHACEAE
* Achyranthes bidentata Bl.
Annual herb. Flowering. Abundant at several spots. Tuting Political colony, 800 m 17324.

CHENOPODIACEAE
Chenopodium album Linn.
Herb. Flowering. Cultivated for its edible leaves. Pango-Minguing, 500-1200 m 17696.

POLYGONACEAE
Fagopyrum cymosum Meissn.
Polygonum capitatum Ham.
Creeping herb on moist soil slopes and shady areas. Flowering. Abundant at several spots. Tuting-Ninguing, 900-1200 m 17644; Tuting, 600 m 13132.
P. chinense Linn.
Herb, 1 m high. Fruiting. Fairly common. Takepokong-Sirang, 1500-2200 m 17857.
P. chinense Linn. var. brachiata (Poir.) Kanjilal et al.
Shrub. Flowering. Abundant at several spots. Garsing-Eyo, 600 m 17933.
P. chinense Linn. var. ovalifolia Meissn.
Annual herb, 2 m high. Flowering. Abundant at several spots. Tuting Political colony, 700 m 17364; Tuting-Ninguing, 900-1200 m 17628.
P. posumbu Ham.
Slender herb with purple stem. Flowering. Fairly common. Kopoh-Gelling, 500-800 m 13087; Tuting Political colony, 800 m 17365.
P. runcinatum Ham.
Herb on moist soil slopes. Flowering. Abundant at several spots. Jido-Tuting, 600 m 13121.
P. virginianum Linn.
Large herb, 1 m high, densely tomentose. Flowering. Fairly common. Tuting Political colony, 700 m 17357.

PIERACEAE
* Piper gamblei C. DC.
Climber, growing on moist soil slopes and shady areas. Fairly common. Jido-Tuting, 600 m 13124.
* P. griffithii C. DC.
Climber, 3-5 m high. Fruiting. Fairly common. Tuting-Kopoh, 600-800 m 17407.

LAURINACEAE
Cryptocarya andersoni King

Balanophoraceae
* Balanophora sp. (possibly new)
Reddish-brown or yellowish-red root parasite in dark, shady humid corners. Flowering. Grows at limited spots. Tuting-Ninguing (down the Tuting village towards Ninguing), 1200 m 17615 A; Sirang, 1100 m 17917.
Balanophora sp.
Dark or tan-brown root parasite, smaller in size than the foregoing species. Grows at limited spots on the wayside in large clusters on the root of a tree. Siching-Porang (after 3 miles from Eyo on way to Tuming), 500 m 17966.

EUPHORBIACEAE
* Bridelia montana Willd.
Shrub, 3-5 m high. Fruiting. Fairly common. Ninguing-Pango, 500-800 m 17662.

MORACEAE
Artocarpus heterophyllus Lamk. A. integrifolia auct. non Linn. f.
Conocephalus suaveolens Bl.
Evergreen tree, 10-12 m high. Fruiting. Fairly common. Jido-Tuting, 600 m 13129.
* Ficus clavata Wall.
Shrub, 5 m high. Fruiting. Fairly abundant at limited spots. Takepokong-Sirang, 1500-2200 m 17893.
F. fistulosa Reinw.
Tree, 7 m high. Hypanthodia in bunches from base of stem, long peduncled, green and edible. Fairly common. Gelling-Kapang La, 800-1500 m 17573; Eyo-Tuming, 400-600 m 17969.
* F. hirta Vahl var. roxburghii (Miq.) King
Small tree, 6 m high. Young parts rusty pubescent.
Fruiting. Fairly common. Tutng-Kopoh, 600-800 m 17411; Ninguing-Pango, 500-800 m 13103; Kiak-Kempang, 400 m 18025.

Ficus hispida Linn. f.
Small tree without aerial roots. Hypanthodia from mature stem, hispid, green. Fruiting. Fairly common. Kopoh-Tutng, 600-800 m 17581; Garsing-Eyo, 600 m 17958. (Fig. 2).

F. oligodon Miq. F. pomifera Wall.
Small tree, 6 m high. Hypanthodia red and hairy. Fairly common. Kopoh-Gelling, 800 m 17458; Tutng, 700 m 17368.

F. sarmentosa Ham. ex J. E. Sm. F. forceolata Wall. ex Miq.
Scendent climber, 5 m high. Hypanthodia pinkish-red at maturity. Fairly common. Ninguing-Pango, 500-800 m 17678.

URTICACEAE

Boehmeria macrophylla D. Don
Large shrub, 3-5 m high. Flowering and fruiting. Abundant at several spots. Kopoh-Gelling, 700 m 17549.

B. platyphylla D. Don
Perennial spreading shrub. Fruiting. Fairly common. Tutng Political colony, 700 m 17359.

Elatostema acuminatum Brong.
Succulent herb. Flowering. Very abundant throughout the area. Tutng-Ninguing, 900-1200 m 17616.

E. dissectum Wedd.
Herb, 1 m high. Flowering. Leaves and flowers edible either as raw or cooked, and in times of scarcity, consumed by hill tribes in large quantities. Abundant at several spots. Tutng Political colony, 700 m 17311; Ninguing-Pango, 500-800 m 17665.

E. imbricans Dunn
Small, annual, succulent herb. Flowering. Abundant at several spots. Takepokong-Sirang, 1900-2400 m 17866.

This species was first described by Dunn from Burkill's collections from Siang Frontier Division only and considered to be endemic. The species however has not been reported from any other part so far. This appears to be a good species.

E. rupestrse Wedd.
Small shrub, 1-3 m high on dry slopes. Flowering. Fairly common. Kombong-Pakam, 300 m 13041; Jido-Tutng, 600 m 13125.

E. sessile Forst.
Herb with succulent stem. Flowering. Abundant at several spots. Takepokong-Sirang, 1700-2200 m 17848.

Laportea crenulata Gaud.
Shrub, 3 m high with stinging hairs. Utricle white, with a pinkish tinge. Fairly common. Gelling-Kapang La, 800-1500 m 17512.

Oreocnide integrifolia Miq. Villebrunnea integrifolia Gaud.
Evergreen tree, 7-8 m high. Flowering. Fairly common. Gelling-Kopoh, 600-800 m 13090.

Pilea insolens Wedd.
Annual herb. Stem succulent. Fairly common. Gelling-Kapang La, 800-1500 m 17490.

P. smilacifolia Wedd.
Shrub, 2 m high. Flowering. Fairly common. Tutng-Jido, 600 m 13105.

Pouzolzia hirta Hassk.
Small shrub, 1-2 m high. Flowering. Very abundant throughout the area on moist slopes. Kopoh-Tutng, 600 m 13100; Tutng Political colony, 700 m 17320.

* P. zeylanica Benn. P. indica Gaud.
Weed in the paddy field. Flowering. Fairly common. Tutng Political colony, 700 m 17322.

* Procris laevigata Bl.
Herb, 1 m high. Flowering. Fairly common. Eyo-Tuming, 400-600 m 17975.

FAGACEAE

Castanopsis indica A. DC.
Evergreen tree, 25 m high. Fairly common. Ninguing-Pango, 500-800 m 17682.

Pasania listeri (King) Schottky. Quercus listeri King
Tree, 16 m high. Very scarce. Kiak-Kempang, 400 m 19010.

ORCHIDACEAE

* Arachnacte cathcartii Benth.

* Arundina graminifolia (D. Don) Hochr. Arundina bumbuifolia Lindl.
Terrestrial herb among the grasses. Flowering. Fairly common in limited spots. Tutng Political colony (near river side), 700 m 17384.

* Bulbophyllum caulisiformum Hook. f.
Pseudo-bulbs 7 cm long, green, distant, single-leaved. Fairly common. Gelling-Kapang La, 800-1500 m 17550.
* Bulbophyllum hirtum Lindl.
  Pseudo-bulbs short, two-leaved. Flowering. Very scarce. Tuting Political colony, 800 m 17369.

B. reptans Lindl.
  Pseudo-bulbs small, distant, one-leaved. Flowering. Fairly abundant at several spots. Minguing-Takepokong, 1200-1800 m 17830; Takepokong-Sirang, 1800-2200 m 17850.
  * B. thomsonii Hook. f.
  Pseudo-bulbs small, conical, one-leaved. Fairly common. Gelling-Kapang La, 800-1500 m 17549.

Calanthe biloba Lindl.
  Terrestrial herb, 2 m high. Flowering. Very abundant at several spots. Minguing-Takepokong, 1200-1800 m 17814.
  * C. densiflora Lindl.
  Terrestrial herb, 50 cm high. Flowering and fruiting. Very scarce. Minguing-Takepokong, 1200-1800 m 17833; Tuting Political colony, 700 m 17371.
  * Coelogyne barbata Griff.
  Pseudo-bulbs large, 7-10 cm long, ridged. Fruiting. Fairly common. Minguing, 1200 m 17754.
  ** C. carnea Hook. f.
  This species so far known only from the Malayan peninsula is now recorded for India from the Himalayan zone, thus extending its distribution further north. On the basis of another collection of this species from the Khasi and Jaintia hills of Assam, it is quite possible that this species might have spread to the east Himalayan region through the hills of Burma and Assam.
  * C. flavida Wall.
  * C. fuscescens Lindl.
  Pseudo-bulbs long, narrowly grooved, two-leaved. Flowering and fruiting. Fairly common. Sirang-Garsing, 600-1400 m 17913; Gelling-Kapang La, 800-1500 m 17546.
  * C. nitida Lindl.
  Pseudo-bulbs 5 cm, crowded. Fairly common. Gelling-Kapang La, 1200-1800 m 17552.
  C. ovalis Lindl.
  Pseudo-bulbs 8 cm long. Fruiting. Abundant at several spots. Minguing-Takepokong, 1200-1800 m 17838; Gelling-Kapang La, 800-1500 m 17552; Sirang-Garsing, 600-1400 m 17914.
  * C. praecox Lindl.
  * C. prolifera Lindl.
  Pseudo-bulbs ovoid or conical. Flowering. Fairly common. Minguing, 1200 m 17758.
  * Cymbidium cyperifolium Wall.
  Epiphyte with long narrow leaves. Flowering. Fairly common. Takepokong-Sirang, 1800-2200 m 17855.

† Dendrobium cretaceum Lindl.
  This record extends the distribution of the species to the Himalayan region also.
  * D. denuans Don
  * D. eriaciflorum Griff.
  Epiphyte. Flowering. Fairly common. Kopoh-Tuting, 600-800 m 17601.
  * D. hookerianum Lindl.
  N. nobile Lindl.
  Epiphyte. Stem erect, compressed. Fairly common. Gelling-Kapang La, 800-1500 m 17551.

Dendrobium sp.
  Epiphyte. Fruiting. Fairly common. Gelling-Kapang La, 800-1500 m 17553 A.
  * Éria acervata Lindl.
  * E. carinata Gibbs.
  * E. confusa Hook. f.
  Epiphyte on Quercus sp. Fairly common. Gelling-Kapang La, 800-1500 m 17553.
  * E. graminifolia Lindl.

Gooduya procura Hook.
  Terrestrial herb, 1 m high. Fairly common. Kopoh-Gelling, 500-800 m 13075; Kopoh-Tuting, 600-800 m 17602.
  * Habenaria goodyeroides Don Peristylus goodyeroides Lindl.
Terrestrial orchid, 1 m high. Very scarce on loamy soils. West of Tuting Political colony, 700 m 17395.

* Herpysma longifolia Lindl.

Terrestrial herb, 1 m high. Flowering. Fairly abundant at limited spots on rocky soils. Takepokong-Sirang, 1200-1800 m 17829.

Liparis bituberculata Lindl.

Terrestrial herb. Fairly common. Jido-Tuting, 600 m 13114.

* L. bootanensis Griff.


L. longipes Lindl.

Epiphyte. Pseudo-bulbs very variable, either narrow and long or compressed and small. Flowering. Fairly common. Tuting Political colony, 700 m 17370; Kopoh-Gelling, 900 m 17477; Sirang-Garsing, 600-1400 m 17924; Minguing-Pango, 500-800 m 17663.

* L. plantaginea Lindl. L. griffithii Ridley.

Epiphyte. Fruiting. Fairly common. Sirang-Garsing, 600-1400 m 17651.

This record establishes the continuity of distribution along the Eastern Himalayas from Sikkim to the foot hills of Lohit Frontier division.

* L. resupinata Ridley.


* Oberonia pyrulifera Lindl.


Otochilus fusca Lindl.


* O. porrecta Lindl.


* Phaius mishmensis Reichb. f. P. tankervilliae (All.) Bl. P. wallischii Lindl.

Terrestrial herb, 1.5 m high. Flowering. Very scarce. Eyo-Tuming, 600 m 17965; Tuting-Ninguing, 900-1200 m 17614.

This species is fairly common in the lower altitudes of the Lohit valley as recorded by the senior author and also recorded from Sikkim. The present record establishes the continuity of its distribution in the Eastern Himalayas.

* Ritaia himalaica King & Pantl.

Epiphyte. Leaves linear. Fairly common. Takepokong-Sirang, 1700-2200 m 17923; Gelling-Kapang-La, 600-1500 m 17548.

ZINGIBERACEAE

* Amomum subulatum Roxb.

Herb, 2 m high. Flowering and fruiting. Very abundant at several spots. Garsing-Eyo, 600 m 17952.

Costus speciosus Smith

Succulent herb, 1.5 high. Flowering. Fairly common. Gelling-Kapang La, 800-1500 m 17534.

* Hedychium coccineum Ham. ex Sm.

Herb, 2 m high. Flowering. Fairly common. Takepokong-Sirang, 1700-2200 m 17877.

H. gardnerianum Rosc.

Herb, 1 m high. Flowering. Very scarce. Minguing-Takepokong, 1200-1800 m 17777.

MUSACEAE

Musa velutina Wendel.

Giant herb, 5 m high. Flowering. Fairly common. Kopoh-Tuting, 600-800 m 17599.

Burkill (l.c.) considers this species as endemic to Abor hills only. But the senior author collected this species from adjoining range of Lohit frontier division where it grows abundantly.

HAEMODORACEAE

Ophiopogon intermedius Don

Annual herb. Leaves long, narrow-linear. Flowering. Fairly abundant at limited spots. Takepokong-Sirang, 1700-2200 m 17853; Minguing-Takepokong, 1200-1700 m 17799.

TACCACEAE

Tacca laevis Roxb.

Herb. Fruiting. Fairly common along roadside. Garsing-Eyo, 600 m 17950; Sirang-Garsing, 600-1400 m 17988.

DIOSCOREACEAE

Dioscorea gibra Roxb.

Twiner to the right. Flowering. Fairly common. Tuting Political colony, 700 m 17352; Gelling-Kapang La, 1200 m 17513; Kopol-Tuting, 600-800 m 17589.

* D. hamiltonii Hook. f.

Twiner to the right. Fruiting. Fairly abundant at limited spots. Tuting-Ninguing, 700-1000 m 17617.

* D. oppositifolia Linn.

Twiner to the right. Fairly common. Kiak-Kapang, 400 m 18036.

D. pentaphylla Linn.

Thorny twiner to the left. Leaves palmately compound. Fairly common. Minguing, 1200 m 17736; Pango-Minguing, 500-1200 m 17717.
**Dioscorea sectechii** Prain and Burkill

Climber with empty fruits hanging on stem after the dispersal of seeds. Fruiting. Fairly common. Minguing, 1200 m 17744.

This species is so far known from Malayan Peninsula and Sumatra. The present record is new to India and extends its distribution to the Himalayas possibly through Burma. Unfortunately the seeds were not available during November and their study which has not been made so far is of considerable interest.

LILIACEAE

Disporum pullum Salisb.

Shrub, 1 m high. Fruiting. Fairly abundant at limited spots. Minguing-Takepokong, 1200-1800 m 17809.

Paris sp.

Herb, 1 m high. Leaves in rosette form. Fruiting. Very scarce. Takepokong-Sirang, 1800-2200 m 17858.

* Peliosanthes macrophylla* Wall.

Herb. Flowering. Fairly abundant in limited spots along rocky crevices. Minguing-Takepokong, 1200-1800 m 17800.

Polygonatum oppositifolium Royle.

Herb, 1 m high. Fruiting. Fairly common on rocky surfaces. Sirang-Garsing, 600-1400 m 17905.

Smilax lanceaefolia Roxb.


* S. minutiflora* A. DC.

Climbing shrub, unarmed. Fairly abundant at limited spots. Minguing-Takepokong, 1200-1800 m 17805.

* S. oxyphylla* Wall.


* S. roxburghiana* Wall.


Tupistra aurantiaca* Wall.

Herb, 1 m high. Fruiting. Scarce. Takepokong-Sirang, 1200-1800 m 17880.

COMMELINACEAE

* Ancilema seacerrimum* Kunth

Annual herb. Flowering and fruiting. Abundant at several spots. Kopoh-Gelling, 700-800 m 17454.

This species grows extensively along the lower hills of Lohit Frontier division also.

* Commelina paludosa* Bl. *C. obliqua* Ham.

Robust herm, 1 m high. Abundant at several spots. growing along with grasses. Tuting Political colony, 700 m 17329.

Flacsoa scandens* Lour.

Slender herb. Flowering. Abundant at several spots. Tuting Political colony, 700 m 17313; Kik-Kempang, 400 m 18031.

Ferrestia hookeri Hassk.

Stout herb. Fairly common. Kopoh-Gelling, 600-800 m 17469.

Murdannia nudiflora* (Linn.) Brenan

Small herb. Flowering. Fairly common in cultivated fields. Tuting Political colony, 700 m 17316.

Steptolirion volubilis* Edgew.

Tender climber. Stem chocolate-brown. Flowering. Fairly common. Ninguing-Pango, 500-800 m 17656; Gelling-Kapang La, 800-1500 m 17494.

JUNCACEAE

* Juncus ochraceus* Ham.

Perennial herb. Fairly abundant at limited spots. Takepokong-Sirang, 1200-1800 m 17056.

ARFACAEAE (= PALMAE)

Calamus floribundus* Griff.


* Didymosperma nana* H. Wendl. & Drude


Livistonia jenkinsiana* Griff.

Palm, 3 m high or more. Leaves fan-shaped, used in thatching huts. Fairly abundant at limited spots. Sirang-Garsing, 600-1400 m 17912.

This species has been observed by the author under cultivation particularly near villages along the Siang and Tirap Frontier divisions. This is cultivated due to its economic utility. This is a very graceful palm for cultivation and several seedlings have been raised at the Fairchild palm garden, Miami (Florida, U.S.A.) from the seeds collected from this division (vide *Principes* 6(3), 1962).

Pinanga gracilis* Bl.

Slender palm, 5-7 m high. Fruiting. Fairly common. Tuting-Kopoh, 600-800 m 17421; Ninguing-Pango, 500-800 m 17671.

The stem is carved into walking sticks by the Abors.

Wallisia densiflora* Mart.

Low palm. Leaves white on lower surface. Parts of stem are used by the Abors in the preparation of intoxicating drinks. Fairly common: Gelling-Kapang La, 900-1700 m 17529.
PANDANACEAE

Pandanus furcatus Roxb.
Tree, 6 m high. Fruiting. Fairly common. Ningguing-Tango, 500-800 m 17669.

ARACEAE

* Alocasia indica Schott.
Robust herb. Fruiting. Fairly common and also under cultivation. Tutung-Ningguing, 900-1200 m 17636.
Corms are highly starchy and eaten by the Abors.
† Arisaema decipiens Schott.
Herb, 1 m high. Flowering. Fairly abundant. Sirang-Garsing, 600-1400 m 17907; Takepokong-Sirang, 1800-2200 m 17886. (Fig. 3).
This record extends the distribution of the species to the Himalayan region from the Assam Hills.
Colocasia esculentum (Linn.) Schott. Colocasia antiquorum Schott.
Perennial herb. Fairly common and also under cultivation. Eyo-Tutung, 400-600 m 17979.
Corms are eaten by the Abors.
Pothos cathcarti Schott.
Rhaphidophora glauca Schott.
R. grandis Schott.
Robust climber. Fruiting. Abundant at several spots. Takepokong-Sirang, 1800-2200 m 17887; Ningguing-Pango, 600-1000 m 17688.

CYPERACEAE

Carex filicina Nees
Sedge, 50 cm high. Fairly common on wayside.
Takepokong-Sirang, 1200-1800 m 17861.
C. insignis Boott
Herb, 25 cm high. Fairly common along river bank.
Takepokong-Sirang, 1700-2200 m 17849.
Scirpus sp.
Herb, 1 m high. Flowering. Fairly common.
Tuting Political colony, 700-800 m 17332.

POACEAE (= GRAMINEAE)

Cephalostachyum fuchsiannum Gamble
Bushy shrub, 5 m high. Stem 2.5 cm or more in diameter. Very abundant at several spots. Takepokong-Sirang, 1700-2200 m 17888.

This species is restricted to higher ranges only above 2000 m. The stem is hard and fairly smooth as though it is polished and is much used by the Abors as the tube for the tobacco bamboo pipe. With the cigarettes introduced along with N.E.F.A. administration, the young stems of hardly 1 cm in diameter are also used for making cigarette holders.
Coix lacryma-jobi. Linn. var. ma-yuen (Romanet) Stapf.
Annual herb. Fairly common in wild state. Cultivated near Tutung (600 m) for starchy seeds. Tutung-Ningguing, 900-1200 m 17632.
* C. lacryma-jobi Linn. var. stenocarpa Stapf
Herb, 3 m high. Fairly common near the streams. Kopoh-Gelling, 700-800 m 17445; west of Tutung Political colony, 700 m 17309.
Occasionally cultivated by the Abors for the seeds, used as beads.
* Dendrocalamus giganteus Munro
Gigantic shrub, 25 m high or more. Stem 20 cm in diameter or more. Sheath about 4.5 cm long. Scarce. Tutung-Ningguing, 1000-1200 m 17654.
Most of the large groves of this species are seen near the villages as they are carefully cultivated by the Abors. Though this is a Burmese-Malayan species and has been under cultivation in Assam hilly areas, it is interesting to record that this useful species has also been introduced into such interior parts of the division by the Abors. Each node of the stem is made into a pitcher by the Abors which can contain more than half a bucket of water. These are the water pitchers mainly used by the Abors and Mishmis for carrying water from the nearby streams to the author’s camps in his Siang and Lohit division tours.
Digitaria sp.
Herb, 1 m high. Flowering. Abundant at several spots. Kopoh-Tutung, 600-800 m 17577.
Eleusine coracana (Linn.) Gaertn.
Tender herb. Very commonly cultivated. Pangominguing, 500-1200 m 17707.
E. indica (Linn.) Gaertn.
Herb. Fairly common along wayside. Kopoh-Tutung, 600-800 m 17578.
Erianthus sp.
Perennial grass, 3 m high. Flowering. Fairly abundant at limited spots along the river banks. Takepokong-Sirang, 1600-2200 m 17697.
* Neyraudia reynaudiana (Kunth) King ex Hitch.
Perennial grass, 3-5 m high. Very abundant at different spots along river banks and forest cleared.
156 BULLETIN OF THE BOTANICAL SURVEY OF INDIA [Vol. 7

low lands. Takepokong-Sirang, 1800-2200 m 17842.

Oryza sativa Linn.

Herb. Commonly cultivated along the lower slopes of the valleys of the Siang Division as the main food crop. Gelling area, 900 m 17530.

* Panicum brevifolium Linn.

Slender decumbent herb. Flowering. Abundant at several spots. Tuting-Kopoh, 600-800 m 17418.

Paspalum conjugatum Berg.

Annual herb. Very abundant all along wayside. Kopoh-Tuting, 600-800 m 17576; Tuting Political colony, 700 m 17360.

Phragmites karka (Retz.) Trin. ex Steud.


*Sacciolepis indica (Linn.) A. Chase

Herb, 60 cm high. Flowering. Abundant at several spots on wayside. West of Tuting Political colony. 760 m 17362.

† Themeda villosa (Poir.) A. Camus

Tall perennial herb, 5-6 m high. Fairly abundant at limited spots. Tuting Political colony, 700 m 17331; Takepokong-Sirang, 1800-2200 m 17856.

The present record extends the distribution of the species to the Himalayas from the low hilly regions of Eastern India from where it has been so far reported.

FERNS

OPHIOGLOSSACEAE

Botrychium dancifolium Wall. B. suberum Wall.

Terrestrial fern, 45 cm high. Fronds compound, terminal branches fertile. Very scarce in cultivated fields. Pango-Minguing, 500-1200 m 17705.

GLEICHENIACEAE

Dicranopteris linearis (Burm.) Underwood. Gleichenia linearis (Burm.) Clarke var. altissima Holtt.

Terrestrial fern. Fertile sori in two rows on either side of the midrib of the pinnule. Fairly common. Tumbing-Kiak, 400-600 m 17990.

D. linearis (Burm.) Underwood var. montana (Holtt.) Panigrahi. G. linearis (Burm.) Clarke var. montana Holtt.

Terrestrial fern, 3 m high. Sori whitish. Abundant at several spots. Pango-Minguing, 800-1200 m 17706.

Hicriopteris longissima (Bl.) Panigrahi. Gleichenia longissima Bl. G. glauca Hook.

Climbing fern, growing up to 5 m high. Primary branches 2 m in length. Sori brownish. Abundant at several spots. Eyo-Tumbing, 500-600 m 17963.

PTERIDACEAE

Histeopteris incisa (Thbg.) J. Sm.

Terrestrial fern. Fronds 3 m long. Sori at the notch of lobes of pinnules. Very scarce. Takepokong-Sirang. 1800-2200 m 17843.

Lindsaya cultrata (Willd.) Sw. Adiantum cultratum Willd.

Epiphytic fern. Fronds 50 cm long. Abundant at several spots growing on mossy rocky slopes. Kopoh-Gelling. 800 m 17471.

Microlepia speluncae (Linn.) More Polypodium speluncae Linn. Microlepia polypodioides Presl.

Terrestrial fern. Fronds 2-3 m long, tripinately compound. Fairly common on loamy or clayey soils, particularly along the banks of streams. West of Tuting Political colony, 700 m 17379; Pango-Minguing, 600-1200 m 17704.

Onychium siliculosum (Desv.) C. Chr. Pteris siliculosus Desv.

Terrestrial fern. Sori yellow, all over the undersurface. Fairly common, sometimes growing on rocky surfaces. Minguing-Pango, near the hanging bridge. 700 m 17658.

Pityrogramma calomelanos (Linn.) Link Acrostichum calomelanos Linn.

Terrestrial fern. Fronds 30 cm long. Fertile fronds white on undersurface. Very scarce. Tuting-Kopoh, 400-800 m 17767.

Panigrahi (Bull. B.S.I. Lc., 312) cites wrongly 45 cm high' Fronds compound, terminal branches fertile. Very scarce in cultivated fields. Pango-Minguing, 500-1200 m 17705.

† Themeda villosa (Poir.) A. Camus

Tall perennial herb, 5-6 m high. Fairly abundant at limited spots. Tuting Political colony, 700 m 17331; Takepokong-Sirang, 1800-2200 m 17856.

The present record extends the distribution of the species to the Himalayas from the low hilly regions of Eastern India from where it has been so far reported.

FERNS

OPHIOGLOSSACEAE

Botrychium dancifolium Wall. B. suberum Wall.

Terrestrial fern, 45 cm high. Fronds compound, terminal branches fertile. Very scarce in cultivated fields. Pango-Minguing, 500-1200 m 17705.

GLEICHENIACEAE

Dicranopteris linearis (Burm.) Underwood. Gleichenia linearis (Burm.) Clarke var. altissima Holtt.

Terrestrial fern. Fertile sori in two rows on either side of the midrib of the pinnule. Fairly common. Tumbing-Kiak, 400-600 m 17990.

D. linearis (Burm.) Underwood var. montana (Holtt.) Panigrahi. G. linearis (Burm.) Clarke var. montana Holtt.

Terrestrial fern, 3 m high. Sori whitish. Abundant at several spots. Pango-Minguing, 800-1200 m 17706.

Hicriopteris longissima (Bl.) Panigrahi. Gleichenia longissima Bl. G. glauca Hook.

Climbing fern, growing up to 5 m high. Primary branches 2 m in length. Sori brownish. Abundant at several spots. Eyo-Tumbing, 500-600 m 17963.

PTERIDACEAE

Histeopteris incisa (Thbg.) J. Sm.

Terrestrial fern. Fronds 3 m long. Sori at the notch of lobes of pinnules. Very scarce. Takepokong-Sirang. 1800-2200 m 17843.

Lindsaya cultrata (Willd.) Sw. Adiantum cultratum Willd.

Epiphytic fern. Fronds 50 cm long. Abundant at several spots growing on mossy rocky slopes. Kopoh-Gelling. 800 m 17471.

Microlepia speluncae (Linn.) More Polypodium speluncae Linn. Microlepia polypodioides Presl.

Terrestrial fern. Fronds 2-3 m long, tripinately compound. Fairly common on loamy or clayey soils, particularly along the banks of streams. West of Tuting Political colony, 700 m 17379; Pango-Minguing, 600-1200 m 17704.

Onychium siliculosum (Desv.) C. Chr. Pteris siliculosus Desv.

Terrestrial fern. Sori yellow, all over the undersurface. Fairly common, sometimes growing on rocky surfaces. Minguing-Pango, near the hanging bridge. 700 m 17658.

Pityrogramma calomelanos (Linn.) Link Acrostichum calomelanos Linn.

Terrestrial fern. Fronds 30 cm long. Fertile fronds white on undersurface. Very scarce. Tuting-Kopoh, 400-800 m 17767.

Panigrahi (Bull. B.S.I. Lc., 312) cites wrongly 45 cm high' Fronds compound, terminal branches fertile. Very scarce in cultivated fields. Pango-Minguing, 500-1200 m 17705.

† Themeda villosa (Poir.) A. Camus

Tall perennial herb, 5-6 m high. Fairly abundant at limited spots. Tuting Political colony, 700 m 17331; Takepokong-Sirang, 1800-2200 m 17856.

The present record extends the distribution of the species to the Himalayas from the low hilly regions of Eastern India from where it has been so far reported.
1500 m 17574 ; Tuting Political colony, 700 m 17376. *Pteris cascada* Linn.

Epiphytic fern. Cauldex long, chocolate-brown. Fronds 1 m long. Sori along the margin. Fairly common. Tuming-Kiak, 400-600 m 17993.

**P. quadriflora** Retz. *P. grivilliana* Wall.

Terrestrial fern. Sori along the margin. Fairly common mostly amidst rocky crevices. Kopoh-Gelling, 800 m 17462.

**P. vittata** Linn.

Terrestrial fern, 1 m high. Fronds narrow. Very scarce, sometimes amidst rocky crevices. Tuting-Kopoh, 600-800 m 17391.

**Sphenomeris chusana** (Linn.) Copel. *Adiantum chusania* Linn. *Stenoloma chinensis* Sw.

Terrestrial fern. Fronds 30 cm long. Fairly common along the wayside. Tuting Political colony, 700 m 17380.

**PARKERIACEAE**

**Ceratopteris thalictroides** (Linn.) Brogn. *Acrostichum thalictroides* Linn.

Terrestrial fern. Pinnacles very much lobed and linear. Fairly abundant at limited spots. Tuting-Ninguing, 900-1200 m 17621.

**PLAGIOGYRIACEAE**

**Piagiogynia pycnothylla** (Kuze) Mett. *Lomaria pycnothylla* Ktze.

Terrestrial fern. Fronds 1 m long. Sori in a continuous line along the margin. Very scarce. Minguing-Takepokong, 1200-1800 m 17786.

**DAVALLIACEAE**

**Nepholopsis cordifolia** (Linn.) Presl *Polypodium cordifolium* Linn. *Nepholopsis tuberosa* Presl.

Terrestrial fern. Sori along the margin at regular intervals. Fairly common and mostly amidst rocky crevices. Tuting-Kopoh, 600-800 m 17414.

**CYATHEACEAE**

**Cytacea contaminans** (Hook.) Copel. *Alsopila contaminans* Hook.

Tree fern, 1 m high. Fairly common. Kopoh-Tuming, 600-800 m 17395.

**C. decipiens** (Scott) Baker *Alsopila andersoni* Scott

Tree fern. Sori on either side of mid-vein of pinnules. Abundant at several spots, particularly on loamy soils. Tuting Political colony, 700 m 17372.

C. *ornata* (Schott.) Copel. *Alsopila scottiana* Barw.

Tree fern, 3 m high. Fronds bipinnately compound. Sori on either side of mid-vein of pinnules. Abundant at several spots. Sirang-Garsing, 600-1400 m 17901.

**ASPIDIACEAE**

**Abaecopterus lakhipurensis** Ching var. *hirsuta* Ching

Terrestrial fern, 1 m high. Sori in between the veins. Fairly common. Gelling-Kapang La, 800-1500 m 17558.

**A. multilinata** (Wall.) Ching

Terrestrial fern. Fronds 5 m long. Fairly common, sometimes grows on mossy rocky surfaces. Tuting Political colony, 700 m 17378.

**Athyrium bantamense** (Bl.) Milde

Terrestrial fern. On moist and loamy soils amidst rocks. Fronds 1 m long. Sori in a line along the veinlets. Abundant in several spots, particularly on moist and loamy soils and amidst rocks. Gelling-Kapang La, 800-1500 m 17680; Tuting-Kopoh, 600-800 m 17390.

**A. esculentum** (Retz.) Copel.

Terrestrial fern, 2-3 m high. Fronds bipinnately compound. Sori on either side of the veins of pinnules. Fairly common. Tuting Camp, 700 m 17375; Tuting-Kopoh, 600-800 m 17413, 17419; Minguing-Takepokong, 1200-1800 m 17787.

**Cyclosorus unitus** (Linn.) Ching

Terrestrial fern. Fronds 40-90 cm long. Brittle. Sori on either side of the veins of pinnules. Fairly common. Tuting Political colony, 700 m 17374.

**Egenolfia appendiculata** (Willd.) J. Sm. *Polybotrya appendiculata* J. Sm.

Epiphytic or terrestrial creeping fern. Fairly abundant at limited spots on rocky surfaces. Eyo-Tuming, 400-600 m 17970.

**Phanerolepia hookeriana** (Presl) Copel. *Cyttonium caducum* (Wall.) Moore

Epiphytic fern. Fronds 70 cm long. Very scarce. Tuming-Kiak, 300-400 m 17989.

**Tectaria multicaudata** (Wall.) Ching *Aspidium multicaudatum* Wall.

Terrestrial fern. Fronds 1 m long. Sori scattered all over. Abundant at several spots. Sirang-Garsing, 600-1400 m 17899.

**BLECHNACEAE**

**Blechnum orientale** Linn.

Terrestrial fern. Sori on either side of the rib, brownish-grey. Fairly common, particularly in rocky
crevices. Tuting-Ninguing, 900-1200 m 17638; Kopoh-Gelling, 800 m 17444.

**ASPLENIACEAE**

Asplenium griffithianum Hook.

Epiphytic fern. Frond simple. Sori elongated on either side of the rib along the veins. Very scarce. Takepokong-Sirang, 1800-2200 m 17862.

A. nidus Linn. Thamnopteris nidus Presl.

Epiphytic fern. Frond 70 cm long. Sori linear, restricted towards apical portion of lamina. Very abundant at several spots. Garsing-Eyo, 600 m 17337; Gelling-Kapang La, 800-1500 m 17505.

A. rutaefolium (Berg.) Ktze.

Epiphytic, creeping fern. Fairly common. Minguing, 1200 m 17726; Tuting-Ninguing, 900-1200 m 17634; Gelling-Kapang La, 800-1500 m 17491.

A. tenerum Forst.

Epiphytic fern. Fronds 30 cm long. Sori brownish radiating from the rib. Abundant at several spots. Minguing, 1200 m 17725.

**POLYPODIACEAE**

Arthron meris himalayense (Hook.) Ching.

Epiphytic fern. Sori in two rows in between the veins. Scarce in limited spots. Minguing-Takepokong, 1200-1800 m 17779.

A. wardii (C.B. Cl.) Ching

Epiphytic fern. Fronds 1 m long. Sori in two rows, on either side of the midrib in between the veins, dark-brownish. Fairly common. Minguing-Takepokong, 1200-1800 m 17783.

Belvisia spicata (Linn. f.) Mirbel. Gymnopteris spicata (Linn. f.) Presl.


Coly sia hemionitidea (Wall.) Presl.

Epiphytic fern. Fronds dark-green. Sori irregular, between the veins on either side of the ribs. Fairly common. Gelling-Kapang La, 800-1500 m 17811.

Goniophlebium subauriculatum (Bl.) Presl. Polypodium subauriculatum Bl.

Epiphytic fern. Fronds 1 m long. Sori in depressions in between the veins. Scarce. Gelling-Kapang La, 500-1500 m 17515.

Lemmaphyllum carnosum (Wall.) Presl. Drymoglossum carnosum (Wall.) J. Sm.

Epiphytic fern. Fronds dimorphic. Fertile fronds narrow with sori arranged in two continuous lines on either side of the midrib. Fairly common. Gelling-Kapang La, 800-1500 m 17532.

L. subrostratum (Christ.) Ching

Epiphytic, creeping fern. Fronds simple, sori in between the veins on either side of the rib. Fairly common. Gelling-Kapang La, 800-1500 m 17518; Ninguing-Pango, 500-1000 m 17668.

Lepisorus longifolius (Bl.) Holtt. Polypodium linearis (Thunb.) Moore.

Epiphytic fern. Fronds linear. Sori irregular on either side of the rib. Abundant at several spots. Gelling-Kapang La, 800-1500 m 17501, 17509, 17544; Minguing-Takepokong, 1200-1800 m 17790.

Microsorium heterocarpum (Bl.) Ching

Epiphytic, creeping fern. Fronds simple. Abundant at several spots. Ninguing Pango, 500 800 m 17659.

This is a Malaysian species recorded from the East Himalayas and the Assam hills as new to India (Panigrahi in Ind. For. 87: 243. 1961).

M. lucidum (Roxb.) Copel.

Epiphytic fern. Caudex dark green. Fronds 1 m long. Sori in two rows on either side of the rib. Fairly abundant at limited spots. Minguing, 1200 m 17738; Tuting Political colony, 700 m 17537.

This species is now recorded from different parts of Eastern India as new to the region (Panigrahi l.c.)

M. punatatum (Linn.) Copel.

Epiphytic fern. Fronds simple. Sori between the veins, irregular, more towards the upper half, brownish. Very scarce. Minguing, 1100 m 17971.

M. superulicace (Bl.) Ching

Epiphytic fern. Sori irregularly distributed. Fairly common. Gelling-Kapang La, 800-1500 m 17503.

Polypodium amoenum Wall.

Epiphytic fern. Frond about 1 m long. Abundant at several spots. Gelling-Kapang La, 800-1500 m 17493.

P. niponicum Mett. Goniophlebium niponicum (Mett.) Christ.

Epiphytic fern. Fronds drooping. Fairly abundant at very limited spots. Minguing-Takepokong, 1200-1800 m 17810.

Pseudodrynaria coronans (Wall.) Ching Drynaria coronans (Wall.) J. Sm.

Epiphytic fern. Frond 2 m long. Sori in between the veins in a line. Very scarce. Minguing, 1100 m 17746.

Pyrosia adnascens (Sw.) Ching

Epiphytic fern. Frond fleshy, linear. Sori yellowish-
green, all over the lower surface. Abundant at several spots. Tuting-Ninguing, 900-1200 m 17653.

**Pyressia lanceolata** (Alston) Ching

Epiphytic, creeping fern. Fronds narrow, 15 cm long. Fairly common on rocky surfaces. Tumbing-Kiaik, 400-600 m 17997.

**P. longifolia** (Burm.) Morton

Epiphytic fern. Fronds thick, linear. Sori brownish-yellow, towards apical region of lamina. Abundant at several spots. Gelling-Kapang La, 800-1500 m 17533.

**P. penangiana** (Hook.) Holt.

Epiphytic fern. Caudex short. Fronds 70 cm long. Sori restricted to upper parts of lamina. Fairly abundant at limited spots. Gelling-Kapang La, 800-1500 m 17504.

**P. porosa** (Wall.) Ching

Epiphytic fern. Sori scattered. Fairly common. Gelling-Kapang La, 800-1500 m 17510; Ninguing-Mingoing, 1200 m 17748.

**P. stigmosea** (Sw.) Ching

Epiphytic fern. Frond simple. Sori brick red, completely covering the lamina, but restricted to the upper half only. Fairly common. Eyo-Tumbing, 400-500 m 17967.

**VITTARIAEAE**

**Anthrophyrum reticulatum** (Forst.) Kaulf. *Hemionites reticulatum* Forst.

Epiphytic fern. Fronds simple, pendulous. Very scarce. Eyo-Tumbing, 400-600 m 17973; Ninguing-Mingoing, 500-800 m 17693.

**Vittaria elongata** Sw. var. *angustifolia* Holt.

Epiphytic fern. Sori irregular, restricted to upper half of lamina only. Fairly common. Mingoing-Takokong, 1200-1800 m 17766.

**V. sikimensis** Kuhn.

Epiphytic fern. Fronds linear, thick. Sori along the margin. Very scarce. Gelling-Kapang La, 800-1500 m 17540.

**V. zosterifolia** Willd.

Epiphytic fern. Frond ribbon-like, 1 m long. Sori along the margin. Fairly common. Gelling-Kapang La, 800-1500 m 17502; Tuting-Kopah, 600-700 m 17408; Tuting-Ninguing, 900-1200 m 17652 (Fig. 4).

**EQUISETACEAE**

**Equisetum debile** Roxb.

Stem, 15 cm high. Fairly common on sandy, loamy soil along the edge of streams. Tuting Political colony, 700 m 17308.

**SELAGINACEAE**

[Comments on distribution are given after the scrutiny of Alston's enumeration of the Indian species of *Selaginella*, *Proc. nat. Inst. Sci. India*, b (3), 211, 1945].

† *Selaginella biforis* A. Br. ex Kuhn f.

Abundant at several spots, spreading on moist slopes. Tuting Political colony, 700 m 17768.

This is a Malaysian species recorded so far from the hills of Assam and Manipur only. The present record extends its distribution further north into the Himalayan region.

† *S. decipiens* Warb.

Fairly common on moist areas. Pango-Mingoing, 500-1200 m 17722.

This species has so far been collected from very limited areas of the hills of Assam. The present record extends its distribution to the Himalayan ranges also.

* *S. delicatula* (Desv.) Alston

Abundant all along the wayside, growing mixed with low grasses. Tuting-Kopah, 600-800 m 17424.

This species is widely distributed in different parts of India, Burma and the Andamans. (Alston) (L.c.) while citing Wallich's collection from Nepal, doubts the correctness of the locality. The present record not only confirms the possibility of its occurrence in the Himalayas but also extends its distribution towards the North Eastern interiors of the Himalayas.

* *S. helferi* Warb.

Succulent plant. Fairly abundant in very limited spots in shady areas. Kopah-Gelling, 800 m 17456.

This record extends the distribution of the species to the interior ranges of the Aber hills from the outer ranges of which Burkil collected in 1911 and mis-identified (L.c.) as *S. wilddenowii* Baker, *S. plumosa* Baker and *S. plana* Hieron.

† *S. hookeri* Baker *S. wallichii* Spring var. *typica* Warb.

Stem pinkish-grey. Abundant at several spots on rocky surfaces. Garsing-Eyo, 600 m 17944.

This species has so far been recorded mostly from the hills of Assam extending to Naga hills and Manipur and further to Kachin hills of Burma. Burkil's record of this species as *S. wallichii* Spring and the present record extends its distribution further north to the Himalayan ranges.

* *S. inequalifolia* (Hook. et Grev.) Spring

Stem chocolate-brown. Fairly common, scrambling on wayside slopes. Kempang-Along, 300-400 m 18042.

The record of this Indo-Burmese species from the
Himalayan region is so far based on Griffith's collection from the Mishmi hills (Lohit Frontier division) only. The present record confirms its occurrence in the East Himalayan region.

† Selaginella intermedia (Bl.) Spring S. atroviridis (Wall.) Spring.

Plant, 70 cm high, profusely branched. Fairly common in wet parts of the forests and moist slopes. Garsing-Eyo, 600 m 17949.

Alston did not record the Burkill's report of this species from the Abor hills. This Malaysian species has been recorded in India mostly from the hilly parts of South India only and also from a few parts in Burma. The present record together with Burkill's extends its distribution further north to the Himalayan region, possibly through Burma.

S. megaphylla Baker

Fairly common on moist slopes. Tuting Political colony, 700 m 17335.

The present record extends its distribution further interior in the Siang valley. This species was mis-identified by Burkill as S. atroviridis Spring.

*S. pennata (Don) Spring

Plant, 30 cm high. Abundant at several spots, particularly on lamp shady rocks. Minguing-Takepokong, 1200-1800 m 17796, 17770.

The present record establishes the continuity of its distribution along the East Himalayan ranges and Assam hills. This was wrongly identified by Burkill (l.c.) as S. semicordata Spring.

*S. pennata (Don) Spring

Plant, 30 cm high. Abundant at several spots, particularly in wet parts of the forest. Minguing-Takepokong, 1200-1800 m 17798.

This species was wrongly identified as S. caulescens Spring by Burkill (l.c.).

*S. subdiaphana (Wall.) Spring.

Plant, 30 cm high. Fairly common on moist shady slopes. Takepokong-Sirang, 1800-2200 m 17841; Minguing-Pango, 500-800 m 17673.

This record extends the distribution of the species further east along the Himalayan ranges.

LYCOPODIACEAE

Lycopodium cernuum Linn.
Terrestrial plant, 1 m high. Sporophylls whitish. Fairly abundant at limited spots. Tuting Political colony, 700 m 17346.

*L. phylegmaria Linn.
Epiphytic plant. Very scarce. Garsing-Eyo, 600 m 17933.

PSILOTACEAE

*Psilotum nudum (Linn.) Beauv. P. triquetrum Swartz.
Epiphytic plant. Stem green. Very scarce, growing on a moss covered, moist branch in small bunches. Gelling-Kapang La, 800-1500 m 17522.

The species has so far been reported from very interesting localities in different parts of India; but the present record, together with the senior author's another collection from Tirap Frontier Division (Rao 20146), is from the extreme corners of north-east Himalayas, almost near the border of India and Tibet on the lower slopes of the Siang valley. This locality represents possibly the northern most point from which the species is rarely recorded so far.

GNETACEAE

*Gnetum ula Brongn.

The present record extends its distribution further east along the Himalayan ranges.

EXPLANATION TO THE PLATE
Plate I (Figs. 1-4)

1. Phlogacanthus tubiflorus with attractive red or rosy-red flowers, growing wild on the way from Kempang to Along at 300 mm.

2. Ficus hispida, growing near Kopoh at 700 m, with a huge bunch of hypanthodia, hanging almost from the base of stem.

3. Arisaema decipiens with attractive spathe and numerous tendril lar outgrowths from the tip of inflorescence, growing near Garsing at 900 m.

4. Vittaria zosterifolia with long ribbon-like fronds, growing on rocks near Gelling at 1000 m.