

OBSERVATIONS ON THE VEGETATION OF EASTERN KUMAON BORDERING THE NEPAL FRONTIER

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A B S T R A C T

The paper describes some of the observations made during a botanical exploration tour of Eastern Kumaon bordering the Nepal Frontier and includes a list of plants collected with brief botanical notes. Among the plants collected are specimens of *Triosteum hirsutum* Wall., a rare member of *Caprifoliaceae*, *Stylophorum lactuoides* Benth. & Hook. f. of the *Papaveraceae* rarely collected in the past, *Osmunda regalis* L. and *Thesium himalense* Royle.

INTRODUCTION

During the month of June, 1960 the writer on behalf of the Northern Circle, Botanical Survey of India undertook a botanical exploration tour of the Eastern Kumaon bordering the Nepal Frontier. Collections were made from the following localities: Tanakpur, Champavat, Pithoragarh, Askot, upper reaches of Gori Valley near Jauljibee, Gori and Kali Sangum area, the Dhuliganga valley at Khela and Tavaghat, the upper portions of Thanidhar, Sirkha-Soosa mountain range, Rungling or Sumariyagad oak forest, Sinkholagad, Jipti, the Kali valley of Byans patti-Namjang falls, Bola pass, Malpa, Budigad, Budi pass and in the beautiful alpine meadow of Chhetothanga plateau of Garbyang and its environs up to the confluence of Kuti and Kali river on the way to Kalapani.

HISTORICAL ACCOUNT

The historical route to Mansorvar and Kailas via Garbyang has attracted the attention of plant collectors in the past and the first published account of its flora dates back to 1886 where in a brief description of the flora of north eastern portion of Kumaon including Darma and Byans patti has been given by Duthie. Strachey's Catalogue (1906) and Osmaston's (1927) account on the forest flora are other important contributions to our knowledge of the areas adjoining the Kali valley. There is no recent published account of this region and the results of the exploration tour are, therefore, described in the paper.

THE VEGETATION

Tanakpur and environs situated on the banks of the river Sharada (Kali) are rich in tree vegetation. *Trewia nudiflora* associated with *Dalbergia hircina* and *Milusa velutina* is commonly seen on the land towards riverside. The moist and water-logged areas support *Cyperus globosus*, *Fimbristylis complanata* and sandy areas *Phyla nodiflora* and shrubby *Phyllanthus reticulatus* along with a few grasses. However, the area in between Tanakpur and Champavat is densely covered with rich deci-

duous vegetation. The hilly areas are covered with *Rhus wallichii*, *Wendlandia heynei*, *Mallotus philippensis*, and *Callicarpa macrophylla* associated with shrubby *Coriaria*, *Erianthus*, *Bauhinia*, *Maesa*, *Buddleia*, *Woodfordia*, *Cassia*, *Colebrookia*, *Plectranthus* and *Urtica* species. The tree trunks are rich in epiphytic orchids especially *Aerides multiflorum*, *Vanda parviflora*, *Rhyncostylis retusa*, *Luisia terebinthifolia* and *Coelogyne cristata*. The common climbers are *Vitis lanata*, *Dioscorea bulbifera* and *Parthenocissus semicordata*. The herbaceous vegetation is mostly composed of *Nephrodium prolixum*, *Ophiorrhiza fasciculata*, *Pteris cretica*, *Solanum clavatum* and *Phlogacanthus thyrsiflorus*. Sometimes in the open and cleared areas one could see *Phoenix* sp. growing in abundance upto 2000 m.

Gradually the vegetation changes towards Champavat. The deciduous flora of lower height is replaced by temperate plants at higher elevations. *Rhododendron arboreum* with its chief associate *Lyonia ovalifolia* is the dominating association in certain areas of the forest. The other common shrubs are *Rubus ellipticus*, *Myrica nagi*, *Crataegus crenulata*, *Rosa moschata*, *Indigofera heterantha*, *Sarcococca saligna*, *Viburnum cotinifolium*, *Elaeagnus conferta* and *Benthamidia capitata*. The herbaceous vegetation especially on the moist slopy areas is covered with *Ranunculus laevis*, *Fragaria indica*, *Lepidium ruderae* and *Drymaria diandra*.

In region lying between Champavat and Pithoragarh one could demarcate the distinct altitudinal distribution of plants of temperate character. *Quercus incana* prevails from 1200 to 2000 m closely followed by *Ilex diphyrena* and *Litsaea umbrosa*. The other secondary associates of this region are species of *Berberis*, *Indigofera*, *Strobilanthes*, *Elsholtzia*, *Desmodium* and *Myrsine*. From 2000-3000 m *Quercus dilatata* forms extensive patches especially on moist soil having a subsoil which is invariably on limestone. Associated with *Quercus dilatata* is *Acer caesium* and *Carpinus viminea*. The other plants of tree habit in this area are

Euonymus, *Machilus* and *Symplocos*. Among the notable shrubs mention may be made of *Staphylea*, *Strobilanthes* and the ringal bamboo *Arundinaria falconeri*. *Quercus semecarpifolia* ranges from 2500 to 3500 m often mixed up with *Abies* and *Rhododendron*. The other associates are *Taxus*, *Acer*, *Viburnum*, *Cotoneaster*, *Ribes* and *Salix*. It is not an uncommon sight that sometimes *Quercus semecarpifolia* may completely disappear at higher elevations being substituted by meadows or grassy mounds.

Next, areas round about Pithoragarh were explored. This region is situated in the most beautiful valley of Sor and contains many impressive buildings and forts of imposing stature. From the bottom of the valley to the top of the mountain, ranges of varied heights are seen. Next to *Pinus roxburghii* which is more or less scattered all over the area and does not form a pure stand, the commonly seen association is that of *Rhododendron*—*Lyonia ovalifolia* widely prevalent throughout the range closely followed by *Quercus dilatata* growing on moist areas with subsoil of limestone. The shrubby plants are represented by *Coriaria*, *Spiraea*, *Pyracantha*, *Rubus*, *Plectranthus*, *Buddleia*, *Zanthoxylum*, *Gymnosporia* and *Cotoneaster*. The herbaceous cover is chiefly represented by *Roylea elegans*, *Cardamine hirsuta*, *Cirsium wallichii* and *Gnaphalium luteoalbum*.

On old forts and rocky aspects one could see *Cotoneaster micropyllus*, *Polygonatum cirrhifolium*, *Elatostema sessile*, *Woodfordia fruticosa*, *Rhus parviflora*, *R. wallichii*, *Lindenbergia macrostachya*, *Polygonum capitatum* and *Leucomeris spectabilis* growing in dense patches and sometimes almost to the exclusion of other plants.

The path between Pithoragarh and Askot possesses more or less the same type of vegetation as described above. Beyond Askot the botany becomes more interesting. *Rhododendron* and *Quercus* stems are covered with many epiphytes like *Dendrobium amoenum*, *Aeschynanthus ramosissima*, *Coelogyne cristata*, *Oberonia falconeri*, *Vanda parviflora*, *Rhynchostylis retusa* and *Aerides multiflorum*. The path gradually descends down to Jauljibee situated at an altitude of 900 m. Between Askot and Jauljibee there is a good stand of *Shorea robusta*. The Sal is often found mixed up with *Mallotus*, *Callicarpa*, *Cedrela*, *Lannea* and *Eugenia*. Dry rocky patches are often found to contain *Macaranga pustulata* and *Caesaria* sp. in association with *Mallotus philippensis*. Elevated flat regions are covered with *Rhododendron arboreum* closely followed by *Lyonia ovalifolia*. Under the Sal shade the herbaceous vegetation is represented by *Leea aspera*, *Lysimachia japonica*, *Kalanchoe spathulata*, *Polypodium ebnipes*, *Tragopogon gracile* and *Hypericum perforatum*. Under semi moist or wet conditions one

could see *Mazus surculosus*, *Calamintha clinopodium* and *Elatostema sessile*.

Jauljibee situated at an altitude of 900 m is in a valley at the confluence of the river Goriganga and the Kali (Sharada). The valley is surrounded on all sides by mountains clothed with dense miscellaneous forests at lower level and sub-deciduous forests of Sal, followed at still higher elevations by *Rhododendron*-*Lyonia* association. The frequently seen plants at the valley level are *Boehmeria rugosa*, *Cedrela toona*, *Bauhinia vahlii*, *Lannea coromandelica* and *Sapium insigne*. Still higher up the gregarious Sal makes its appearance followed by temperate plants.

The path from Jauljibee to Dharchula closely borders the Kali river. The valley is rich in deciduous vegetation and the surrounding mountains support temperate plants. The interesting finds of this path are *Rhaphidophora glauca*, a climbing aroid with strobiloid cylindrical spike, *Goodyera procera*, a ground orchid near moist slopy soil often found in association with *Remusatia vivipara* and *Scleria pergracilis*.

Dharchula situated on the banks of the river Kali is more or less a flat plateau inhabited by Bhotias. The vegetation in the valley consists of *Sapium insigne*, *Rhus wallichii*, *Caesaria* sp., *Lannea coromandelica* and *Cedrela toona*. The shrubby undergrowth is mainly represented by species of *Adhatoda*, *Colebrookia* and *Zizyphus*. The elevated parts leave a pure stand of Chir Pine or mixed forests of *Quercus* and *Rhododendron*.

From Dharchula to Tavaghat, a distance of 18 km there is a gradual ascent upto Khela at 2000 m and a slow descent to 1200 m near Tavaghat. The path upto Khela follows closely the river Kali and further upto Tavaghat the path passes through the river valley of Dharmaganga or Dhuliganga. The valley flora is being represented by *Macaranga pustulata*, *Rhus wallichii*, *Caesaria tomentosa*, *Cedrela toona*, *Sapium insigne* and the rocky aspects being covered with *Euphorbia royleana*. *Mallotus philippensis* is often found mixed up with the above plants. Closely the tree belt is interspersed with the shrubby *Leptodermis*, *Adhatoda*, *Pogostemon*, *Colebrookia* and *Callicarpa*. The tree trunks are covered with many epiphytic orchids viz: *Aerides*, *Luisia*, *Oberonia*, *Rhynchostylis* and *Vanda*. The huge rocky boulders all along the Dhuliganga valley support ferns in the shady crevices and orchids like *Pholidota articulata* with its drawn out white flowered racemes. It is not uncommon to see that sometimes big boulders are being clothed with the fern *Dryopteris* and the climbing aroid *Rhaphidophora glauca*.

Tavaghat, a camping space on the banks of Dhuliganga or Dharmaganga, is more or less a rocky place. The commonly seen plants are *Sapium*

insigne, *Rhus wallichii*, *Ficus foveolata*, *Boehmeria platyphylla*, *Pistacia integerrima* and *Euphorbia royleana*.

From Tavaghat situated at an altitude of 1100 m the path is one of steep ascent to the top of Thanidhar (2800 m). At lower levels the vegetation is more or less the same as described above. As the elevation increases the shrubby and herbaceous elements increase in number. The common shrubs are *Artemisia*, *Ficus*, *Urtica*, *Elsholtzia*, *Colebrookia*, *Plectranthus*, *Leptadenia* and *Girardinia* often found mixed up but for pure stands of *Girardinia heterophylla* and *Urtica dioica*. The vegetation around the rocky habitat is chiefly represented by *Peperomia*, *Sedum*, *Pleopeltis*, *Saxifraga*, *Polygonum*, *Lysimachia* and *Stellaria*.

Further ascent upto 2800 m leads into a temperate belt. *Rhododendron arboreum* with *Lyonia ovalifolia* and *Quercus incana* in moist sheltered places are the most important trees with varying dominance. Under their shade one could see *Onychium multisectum*, *Gonatanthus sarmentosus*, *Polygonatum cirrhifolium*, *Heracleum candicans*, *Campanula ramulosa*, *Viola serpens*, *Mazus surculosus*, *Cyperus niveus* and *Polypodium ebenipes*. The noteworthy climbers at this elevation are *Parthenocissus semicordata*, *Trichosanthes bracteata* and *Pentapanax leschenaultii* var. *umbellatum*.

In and around Thanidhar windswept *Quercus incana* forms a pure stand. On the moist slopes under Oak one can come across the beautiful carpet forming *Androsace lanuginosa* along with *Prunella vulgaris* and *Gentiana pedicellata*.

Next the area between Thanidhar and Pangu was botanised. The path is a steep descent into Pangu valley situated at an elevation of 1800 m. The vegetation bears a distinct number of temperate plants. The common plants are *Litsaea*, *Sarcococca*, *Berberis*, *Prinsepia*, *Lonicera*, *Viscum*, *Spiraea*, *Anemone*, *Hypericum* and *Rosa*. The upper reaches of the Pangu valley abounds in *Rhododendron-Lyonia* association and pure stand of *Quercus floribunda* and *Q. semecarpifolia*. The herbaceous plants at higher elevation are *Geranium nepalense*, *Gaultheria procumbens*, *Prunella vulgaris*, *Anemone rivularis*, *Spiraea canescens*, *Arsaema tortuosum* and *Rubus nutans*. The interesting find in the vale of Pangu near water sources is that of *Osmunda regalis* stand. The Royal Fern is reported to occur in Kumaon at Tola (Strachey, 1906) but its distribution in the Pangu valley has not been previously recorded.

From the vale of Pangu the path ascends to Soosa at an elevation of 2600 m. The area is situated on a ridge and presents the same vegetational pattern as on the hill tops of Pangu. *Quercus semecarpifolia* along with *Q. floribunda*, *Prunus cornuta* and *Salix elegans* dominate the forest area. The ground cover is represented by *Geranium wallichia-*

num, *Gaultheria procumbens*, *Rubus biflorus* and *Fragaria indica*. A further descent of 300 m leads to Sirkha, a thinly populated village. The path leads into a thick groove of *Rhododendron-Lyonia* association. At higher elevations grassy mounds are present. The mounds are chiefly composed of many species of *Ranunculus*, *Potentilla*, *Stellaria*, *Cardamine*, *Androsace* and *Veronica*. The shrubby stunted *Cotoneaster acuminata* and *Salix elegans*, are also found growing all along the edges of the grassy mounds. In this area it is not uncommon to find degraded *Picea* forest either due to disease or neglect. In such areas *Acer* and *Euonymus* species are coming into prominence.

At Sirkha, situated at an elevation of 2100 m *Berberis* and *Indigofera* dominate the vegetal cover. In open spaces *Acer*, *Salix*, *Euonymus*, *Cotoneaster*, *Deutzia* and *Rubus* are the commonly seen plants.

Next the path from Sirkha to Jipti a distance of 20 km is very interesting from botanical point of view. For some distance the path descends followed by a steep ascent to 2900 m. From that summit there is a descent to Sinkholagad valley and further ascent to Jipti ridge closely situated to the Kali river which flows near by. Rungling forest as it is called is the Oak dominant forest especially at higher elevations. At lower reaches the principal trees are *Acer* and *Aesculus* closely followed by *Rhododendron arboreum* and *Lyonia ovalifolia*. Interspersed along with the plants of tree habit are the thickets of the hill bamboo, *Arundinaria falconeri*, *Viburnum foetens*, *Rhamnus dahuricus* and *Leptodermis lanceolata*. Further up to the summit there is zone of *Quercus semecarpifolia* forest forming a pure stand, typifying the Oak forest of inner Himalayan regions. Thickly set, as it is, this part of Rungling forest is very moist. The tall oak trees with few branches are draped with moss, lichens and epiphytic ferns. Seldom one could see an oak tree without its epiphytic associates, clustering every aspect of the tree or having festoons of hanging lichens from the branches. The forest area is very damp and the undergrowth covers chiefly herbaceous plants like beautiful orange coloured ground orchid *Calanthe tricarinata*, the handsome flowered *Roscoea alpina*, *Polygonum sphaerocephalum*, *Hemiphragma heterophyllum*, *Viola biflora*, *Lamium album*, *Geum urbanum* and *Phlomis bracteosa*. The descent from the top to Sinkhola valley is steep and partly exposed. The Oak stand, as a contrast to the other side presents a disturbed pattern of distribution due to lack of moisture and exposure. The shrubby associations of *Viburnum stellulatum*, *Litsaea umbrosa*, *Daphne papyracea*, *Ribes acuminatum*, *Euonymus fimbriatus*, *Spiraea bella*, *Pyrus vestita* and *Elaeagnus conferta* are often found intermixed all along the forest. Sometimes the ringal bamboo forms a pure stand and dominates the dry

slopy areas. The exposed habitat under shady bushes harbours temperate herbs like *Thalictrum foliolosum*, *Scutellaria angulosa*, *Polystichum acanthophyllum*, *Aspidium aculeatum*, *Gonatanthus pumilus*, *Parochetus communis*, *Sagina procumbens*, *Actaea spicata*, *Bupleurum* spp. and *Arisaema* spp. The rocky aspects are covered with ferns, *Sedum* and lichens. From the valley the descent up to 2500 m leads to Jipti, a halting place situated on a ridge. This area abounds with pure stand of *Elaeagnus conferta*.

The next exploration was conducted all along the path from Jipti to Malpa. The Kali river which was missing from Soosa appears once again at Jipti in a deep gorge. The path passes closely the winding gorge and it is a steep descent of 4 km all along the rocky aspects. The commonly seen plants of rocky habitat are *Begonia picta*, *Sedum trifidum*, *S. rosulatum*, *Coelogyne* sp., *Eria* sp., *Dendrobium* sp., *Corallodiscus lanuginosus*, *Syngramme vestita*, *Osbeckia stellata*, *Asplenium alternans*, *Lycopodium annotinum* and *Crassula* sp.

There are very few plants of tree habit. The wind swept gorge supports many plants of shrubby habit. But for the scanty scattered occurrence of *Rhododendron arboreum* closely followed by *Lyonia ovalifolia* and *Rhus wallichii*, the plants of shrubby habit are *Debregeasia hypoleuca*, *Colquhounia coccinea* and *Elaeagnus conferta*. They extend and sometimes form a pure stand by themselves. Another plant which is often found mixed up with other plants is *Urtica dioica*. Moist areas are covered with *Boennighausenia albiflora*, *Ophiopogon intermedius* and *Parochetus communis*. The herbaceous plants are *Tylophora govanii*, *Polygala crotalariaoides*, *Arisaema flavum*, *Trichosanthes bracteata* and *Pilea umbrosa*.

After a deep descent in the gorge from Bindakot onwards, the path almost closely follows the Kali river upto Namjang waterfall. From the Namjang waterfall there is a gradual ascent to Bola pass situated at 2500 m. From the pass once again the path descends down and closely follows the Kali river upto Budi. It is not uncommon to observe *Hippophae rhamnoides* subsp. *salicifolia*, *Coriaria nepalensis*, *Buxus wallichiana*, *Echinops cornigerus*, *Spiraea lindleyana*, *Litsaea umbrosa*, extending all along the valley areas. The rocky moist crevices form a suitable habitat for *Incarvillea arguta*, *Hypericum patulum* and *Pennisetum flaccidum*.

From Malpa to Budi and the next halting place, the path is one of series of ascents and descents. This part of Kali valley is surrounded on all sides by snow clad mountains of considerable heights. The summits are being forested with Junipers or *Rhododendron* and sheets of waterfall all along the path. The rocky crevices support abundant ferns and orchids. In moist regions, especially in areas around the waterfalls, ferns, *Selaginella* and

mosses dominate almost to the exclusion of other plants.

Malpa, a halting place in the Kali valley is situated on the bank of the Kali river. The shrubby vegetation forms the dominating association. *Colquhounia vestita* association spreads considerably and sometimes it is found mixed up with *Urtica dioica*. The secondary shrubby associates are chiefly composed of species of *Leptodermis*, *Indigofera*, *Ulmus*, *Buddleia* and *Princepia*.

Among the shrubby vegetation *Abelia triflora*, forms a pure stand all along the slopy ridges. Near Budi several clumps of *Ephedra gerardiana* were found growing in the rocky slopy areas. Budi village commands an inspiring view of Namjang mountains of Nepal state. The temperate vegetation, chiefly composed of *Rhododendron*, *Acer*, *Elsholtzia*, *Spiraea*, *Salix*, *Taxus*, *Lonicera*, *Viburnum* and *Cotoneaster* is commonly seen all along the ascent from Budi village to Budi Pass situated at an elevation of 3200 m. The interesting herbaceous plants are *Thesium himalense*, *Sanicula europaea*, *Androsace geranifolia*, *Nomocharis oxypetala*, *Erysimum hieracifolium* and *Lamium amplexicaule*, found growing in abundance.

Budi pass opens out into a green plateau locally called Chhetothanga, a flat green meadow occupying considerable area at an elevation of 3200 m. The elevated plateau harbours many interesting alpine and sub alpine plants. This camping ground is 3 km away from Garbyang village. It is a beautiful green meadow overlooking the Kali river. Above the meadow there are series of bleak mountains with innumerable ravines. Bordering the extensive meadow there are Pine forests around. Under dense Pine shade there is very little undergrowth but away from *Pinus* grooves one could see many shrubby plants chiefly represented by *Salix lindleyana*, *S. elegans*, *Euonymus fimbriatus*, *Lonicera alpigena*, *L. parvifolia*, *Syringa emodi*, *Rosa anserinaefolia* and *Berberis jaeschkeana*. Often these shrubby plants are found in dense thickets and one could see the pure stands are being indiscriminately cut, thereby exposing the surface to soil erosion.

The sub alpine meadow is chiefly composed of *Plantago* sp., *Trifolium* sp., *Poa* sp., *Guldenstaedtia himalaica*, *Androsace villosa* and a number of small plants belonging into *Ranunculaceae*, *Cruciferae*, *Umbelliferae*, *Cyperaceae* and *Gramineae*. *Cotoneaster microphylla* extends and forms pure stands; occasionally *Berberis* bushes are found growing along with *Cotoneaster microphylla*. Under shade one could see *Cynanchum vincetoxicum*, *Thymus serpyllum*, *Geranium nepalense*, *Anemone polyanthes* and *Gentiana argentea*. Wherever there is dry habitat Juniper bushes are found growing. Often such areas are reencircled by *Iris kumaonensis*, *Astragalus rhizanthus* and *Anaphalis aristata*. The most interesting collection of the meadow is that of *Stylophorum lactucoides* of the *Papavera-*

ceae, a curious hairy herb with large yellow flowers. The plant prefers exposed shaly banks and exhibits scattered occurrence. Another rare plant is that of *Triosteum hirsutum*, a member of *Caprifoliaceae* found in association with *Berberis* shrub. They do not exhibit gregarious growth, and prefer open sunny habitat. The plant can be easily distinguished by its opposite connate leaves and green flowers with dirty brown patch inside. It flowers during spring and the set fruits ripen during September and October, at which time the local people collect the edible fruits.

From the meadow all the way down to Kali river via Garbyang is extremely interesting. After leaving the meadow the path passes through a portion of the association of *Pinus wallichiana* and *Abies spectabilis*. In open spaces *Viburnum* sp., *Cimicifuga foetida*, *Juniper* sp., *Berberis* sp., *Hippophae* sp., *Prunus cornuta* and *Salix lindleyana* are frequently found growing. As one descends down this path to the river, one can see that the ravage caused as a result of frequent earthquakes that this part of land is experiencing since 10 years. It is a sinking piece of land, muddy and moist with innumerable ravines sloping towards the river. This part of the land is almost bare and only the craggy peaks and shaly banks support rare and curious plants.

The areas which are not muddy but firm, support *Osmunda claytoniana* and *Cimicifuga foetida*. Green wet areas support *Parochetus communis*, *Anemone obtusiloba*, *Iris kumaonensis*, *Agrimonia eupatorium*, *Roscoeia alpina* and *Trillium govanianum*. Another interesting medicinal plant is that of *Hyoscyamus niger* whose seeds are used by the villagers as a sedative.

The mountains especially the open summits support *Saxifraga*, *Potentilla*, *Corydalis*, *Pedicularis*, *Polygonum*, *Ranunculus*, *Anemone* and *Carex* in abundance. The valley area is quite inhospitable for the growth of any plant but the path along the river up to the confluence of Kali and Kuti river possesses portions of the land with *Panicum miliaceum*, *Fagopyrum* and *Amaranthus*.

SYSTEMATIC CENSUS

RANUNCULACEAE

Clematis barbellata Edgew.

Chhetothanga to Garbyang; Rao 11889; alt. 3200 m.

Anemone obtusiloba D. Don

Chhetothanga to Garbyang; Rao 11889; alt. 3200 m.

A. narcissifolia L. var. *polyanthes* Finet et Gagn.
(= *A. polyanthes* D. Don)

Garbyang; Rao 11902; alt. 3000 m.

A. rivularis Buch.-Ham. ex DC.

Pangu; Rao 11713; alt. 1800 m.

A. rupicola Camb.

Garbyang; Rao 11902; alt. 3000 m.

Thalictrum foliolosum DC.

Rungling forest; Rao 11773; alt. 2000-2900 m.

T. minus L.

Budi; Rao 11853; alt. 2500 m.

T. pauciflorum Royle

Malpa; Rao 11835; alt. 2200 m.

Aquilegia vulgaris L.

Sirkha; Rao 11727; alt. 2100 m.

Actaea spicata L.

Garbyang, Rungling forest; Rao 11888, 11890 and 11925; alt. 3000 m.

ANNONACEAE

Milium velutina (Dunal) Hook. f. & Thoms.

Tanakpur; Rao 11527, 11502; alt. 450 m.

MENISPERMACEAE

Cocculus laurifolius DC.

Ramnagar to Tanakpur; Rao 11516; alt. 800-450 m.

BERBERIDACEAE

Berberis aristata DC.

Sirkha; Rao 11939; alt. 2100 m.

B. jaeschkeana C. K. Schn.

Garbyang; Rao 11911; alt. 3000 m.

PAPAVERACEAE

Stylophorum lactucoides Benth. & Hook. f.

Chhetothanga to Garbyang; Rao 11864; alt. 3200 m.

FUMARIACEAE

Corydalis cornuta Royle

Sirkha; Rao 11933; alt. 2100 m.

CRUCIFERAE

Cardamine hirsuta L.

Champavat; Rao 11545; alt. 2500 m.

Erysimum hieracifolium L.

Budi; Rao 11844; alt. 2500 m.

Lepidium ruderales L.

Champavat; Rao 11545; alt. 2500 m.

VIOLACEAE

Viola biflora L.

Tavaghat to Thanidhar; Rao 11758; alt. 1300-1500 m.

V. serpens Wall.

Tavaghat to Thanidhar; Rao 11674; alt. 1500 m.

V. serpens Wall. var. *canescens* Wall.

Rungling forest; Rao 11674; alt. 2000-2900 m.

POLYGALACEAE

Polygala crotalarioides Buch.-Ham.

Thanidhar to Malpa; Rao 11698, 11784; alt. 2000 m.

CARYOPHYLLACEAE

Cerastium vulgatum L.

Malpa; Rao 11916; alt. 2200 m.

Stellaria longissima Wall.

Tavaghat to Thanidhar; Rao 11685; alt. 1300-1500 m.

Arenaria orbiculata Royle

Tavaghat to Thanidhar, Jipti to Malpa, Garbyang; *Rao* 11688, 11815, 11900; alt. 1300-3000 m.

Sagina procumbens L.

Jipti; *Rao* 11781; alt. 2510 m.

Drymaria cordata Willd. subsp. *diandra* (Blume) J. Duke

Tanakpur; *Rao* 11540; alt. 450 m.

PORTULACACEAE

Portulaca oleraceae L.

Dharchula; *Rao* 11633; alt. 1300 m.

HYPERICACEAE

Hypericum cernuum Roxb.

Champavat; *Rao* 11577; alt. 1700 m.

H. patulum Thunb.

Malpa, Namjang waterfall; *Rao* 11828, 11917; alt. 2200 m.

H. perforatum L.

Askot; *Rao* 11608; alt. 1800 m.

STERCULIACEAE

Helicteres isora L.

Kaulgarh to Tanakpur; *Rao* 11490; alt. 700-450 m.

TILIACEAE

Grewia elastica Royle

Kaulgarh to Tanakpur; *Rao*, 11493; alt. 700-450 m.

Triumfetta rhomboidea Jacq.

Dharchula to Tavaghat; *Rao* 11647; alt. 1300-1500 m.

GERANIACEAE

Geranium nepalense Sweet.

Garbyang; *Rao* 11881; alt. 3000 m.

Impatiens cristata Wall. (= *I. scabrida* DC.)

Namjang waterfall; *Rao* 11921; alt. 2300 m.

RUTACEAE

Boenninghausenia albiflora Reich.

Jipti to Malpa; *Rao* 11810; alt. 2500-2200 m.

Zanthoxylum alatum Roxb.

Pithoragarh; *Rao* 11579; alt. 1900 m.

Murraya koenigii (L.) Spreng.

Kotdwar to Tanakpur; *Rao* 11487; alt. 700-450 m.

Hesperethusa crenulata (Roxb.) Roem.

Kotdwar to Tanakpur; *Rao* 11488; alt. 700-450 m.

Aegle marmelos Corr.

Kotdwar to Tanakpur; *Rao* 11486; alt. 700-450 m.

CELASTRACEAE

Euonymus fimbriatus Wall.

Rungling forest, Chhetothanga to Garbyang; *Rao* 11761, 11873; alt. 2000-3000 m.

E. hamiltonianus Wall.

Sirkha; *Rao* 11728; alt. 2100 m.

Gymnosporia rufa Wall.

Champavat; *Rao* 11575; alt. 1700 m.

RHAMNACEAE

Zizyphus nummularia (Burm. f.) W. & A.

Dharchula; *Rao* 18635; alt. 1300 m.

Berchemia edgeworthii Laws.

Budi; *Rao* 11851; alt. 2500 m.

Rhamnus virgatus Roxb. (= *R. dahuricus* Pall.)

Rungling forest; *Rao* 11734; alt. 2000-2900 m.

AMPELIDACEAE

Parthenocissus semicordata (Wall.) Planch.

Tavaghat to Thanidhar; *Rao* 11681; alt. 1300-1500 m.

Vitis lanata Roxb. var. *rugosa* Laws.

Pithoragarh; *Rao* 11590; alt. 1900 m.

Leea edgeworthii Sant. (= *Leea aspera* Edgew. non Wall.)

Askot, Dharchula; *Rao* 11600, 11631; alt. 1800-1300 m.

SAPINDACEAE

Acer villosum Wall.

Pithoragarh; *Rao* 11750; alt. 1900 m.

ANACARDIACEAE

Rhus wallichii Hook. f.

Pithoragarh; *Rao* 11574; alt. 1900 m.

Pistacia integerrima Stewart

Tavaghat; *Rao* 11665; alt. 1800 m.

CORIARIACEAE

Coriaria nepalensis Wall.

Sirkha; *Rao* 11940; alt. 2100 m.

LEGUMINOSAE

Crotalaria albida Heyne ex Roth.

Jauljibee; *Rao* 11628; alt. 1400 m.

Parachetis communis Buch.-Ham.

Jipti, Garbyang; *Rao* 11780, 11893; alt. 2400 m.

Trigonella emodi Benth.

Malpa, Chhetothanga to Garbyang; *Rao* 11819, 11868, 11884; alt. 2500 to 3200 m.

Indigofera heterantha Wall. ex Brandis

Champavat; *Rao* 11547; alt. 1700 m.

I. hebeptala Benth. ex Baker

Budi; *Rao* 11852; alt. 2500 m.

Tephrosia purpurea Pers.

Kaulgarh-Tanakpur; *Rao* 11501; alt. 450 m.

Gueldestaedia himalaica Baker

Chhetothanga to Garbyang; *Rao* 11879; alt. 3200 m.

Astragalus rhizanthus Royle

Chhetothanga to Garbyang; *Rao* 11861; alt. 3200 m.

Desmodium gangeticum (L.) DC.

Ramnagar to Tanakpur; *Rao* 11511; alt. 800-450 m.

Dalbergia hircina Benth.

Tanakpur; *Rao* 11542; alt. 450 m.

ROSACEAE

Prunus cornuta (Royle) Steudel

Soosa; *Rao* 11720; alt. 2400 m.

Spiraea bella Sims

Rungling forest; *Rao* 11757; alt. 2000-2900 m.

Spiraea lindleyana Wall.Malpa; *Rao* 11831; alt. 2500 m.**Rubus ellipticus** Sm.Champavat; *Rao* 11554; alt. 1700 m.**R. lasiocarpus** Sm.Tavaghat; *Rao* 11942; alt. 1500 m.**R. pendunculatus** D. DonSirkha; *Rao* 11729; alt. 2100 m.**R. nutans** Wall.Soosa; *Rao* 11717; alt. 2400 m.**R. paniculatus** Sm.Champavat; *Rao* 11550; alt. 1700 m.**Geum urbanum** L.Rungling forest; *Rao* 11748; alt. 2000-2900 m.**Fragaria vesca** L.Rungling forest; *Rao* 11760; alt. 2500 m.**Rosa anserinaefolia** Boiss.Garbyang; *Rao* 11909; alt. 3000 m.**R. moschata** Mill.Champavat; *Rao* 11551; alt. 1700 m.**Pyrus vestita** Wall.*Local name*: MALUIRungling forest; *Rao* 11766; alt. 2000-2900 m.**Pyracantha crenulata** (Roxb.) Roem. (= *Cratageus crenulata* Roxb.)*Local name*: GHINGARUChampavat, Dharchula, Tavaghat; *Rao* 11546, 11640; alt. 1700 m.**Cotoneaster acuminata** Lindl.Sirkha; *Rao* 11725; alt. 2100 m.**C. rosea** Edgew.Garbyang; *Rao* 11769; alt. 3000 m.**C. microphylla** Wall. ex Lindley*Local name*: GHERISoosa; *Rao* 11616; alt. 2400 m.

SAXIFRAGACEAE

Deutzia staminea R. Br.Sirkha; *Rao* 11730; alt. 2100 m.**Ribes acuminatum** Wall.Rungling forest; *Rao* 11759; alt. 2000-2900 m.

CRASSULACEAE

Kalanchoe spathulata DC.Askot; *Rao* 11598; alt. 1800 m.

MYRTACEAE

Cleistocalyx operculatus (Roxb.) Merr. & Perry.
(= *Eugenia operculata* Roxb.)Askot; *Rao* 11603; alt. 1800 m.

MELASTOMACEAE

Osbeckia stellata Wall. ex D. DonThanidhar to Pangu, Jipti to Malpa; *Rao* 11672, 11788; alt. 2000-2500 m.

SAMYDACEAE

Casearia tomentosa Roxb.Kaulgar to Tanakpur; *Rao* 11491; alt. 700-400 m.

CUCURBITACEAE

Trichosanthes bracteata (Lamk.) Voigt. (= *T. palmata* Roxb.)'Tavaghat to Thanidhar, Jipti to Malpa; *Rao* 11696; 11787; alt. 1500-2500 m.**Zehneria umbellata** Thw.Pangu; *Rao* 11712; alt. 1800.

UMBELLIFERAE

Centella asiatica (L.) Urb. (= *Hydrocotyle asiatica* L.)Ramnagar to Tanakpur; *Rao* 11518; alt. 800-400 m.**Sanicula europaea** L. var. *elata* Ham.Budi; *Rao* 11847; alt. 2500 m.**Bupleurum lanceolatum** Wall.Rungling forest; *Rao* 11927; alt. 2800-2000 m.**Haracleum candicans** Wall. ex DC.Thanidhar, Jipti to Malpa; *Rao* 11694, 11814; alt. 1500-2000 m.

ARALIACEAE

Pentapanax leschanaultii Seem. var. *umbellatum* Seem.Thanidhar; *Rao* 11690; alt. 1500 m.

CORNACEAE

Dendrobenthamia capitata (Wall.) Hutchinson
(= *Cornus capitata* Wall.)Champavat; *Rao* 11557; alt. 1700 m.

CAPRIFOLIACEAE

Viburnum continifolium D. DonChampavat; *Rao* 11555; alt. 1700 m.**V. foetens** Decne.Rungling forest, Garbyang; *Rao* 11745, 11892; alt. 2000-3000 m.**V. mullaha** Buch.-Ham. ex D. Don (= *V. stellatum* Wall.)Rungling forest; *Rao* 11763, 11768; alt. 2000 m.**Triosteum hirsutum** Wall.Chhetothanga, Garbyang; *Rao* 11857; alt. 3200 m.**Abelia triflora** Br.Budi; *Rao* 11843; alt. 2500 m.**Lonicera alpigera** L.Garbyang; *Rao* 11899; alt. 3000 m.

RUBIACEAE

Ophiorrhiza fasciculata D. DonShady and moist habitat. Champavat; *Rao* 11539; alt. 1700 m.**Leptodermis kumaonensis** Park.Budi; *Rao* 11850; alt. 2500 m.**L. lanceolata** Wall.Pithoragarh, Rungling forest; *Rao*, 11582, alt. 1700-2000 m.**Galium asperuloides** Edgew.Rungling forest; *Rao* 11749; alt. 2000-2800 m.

VALERIANACEAE

Valeriana jatamansii JonesGarbyang; *Rao* 11896; alt. 3000 m.

DIPSACACEAE

Morina longifolia Wall. ex DC.Garbyang; *Rao* 11903; alt. 3000 m.

COMPOSITAE

Solidago virga-aurea L.Sirkha; *Rao* 11934; alt. 2100 m.

Erigeron alpinus L.

Pithoragarh, Rungling forest; *Rao* 11567, 11736; alt. 1900-2000 m.

Gnaphalium luteo-album Benth.

Pithoragarh; *Rao* 11580; alt. 1900 m.

Siegesbeckia orientalis L.

Sirkha; *Rao* 11934; alt. 2100 m.

Artemisia nilagirica (Clarke) Pamp.

Namjang waterfall; *Rao* 11920; alt. 2300 m.

Echinops cornigerus DC.

Malpa; *Rao* 11836; alt. 2200 m.

Cirsium wallichii DC. (= *Cnicus wallichii* DC.)

Pithoragarh; *Rao* 11920; alt. 1900 m.

Ainsliaea aptera DC.

Grabyang; *Rao* 11895; alt. 3200 m.

Tragopogon gracilis D. Don

Askot; *Rao* 11607; alt. 1800 m.

CAMPANULACEAE

Campanula ramulosa Wall.

Tavaghat-Thandidhar; *Rao* 11673; alt. 2000-2800 m.

ERICACEAE

Lyonia ovalifolia (Wall.) Drude [= *Pieris ovalifolia* (Wall.) D. Don]

Champavat, Askot, Malpa; *Rao* 11549, 11604, 11837; alt. 1700-2200 m.

Rhododendron arboreum Sm.

Thandidhar; *Rao* 11680; alt. 2800 m.

R. lepidotum Wall. ex D. Don

Chhetothanga to Garbyang, *Rao* 11872; alt. 3200 m.

PLUMBAGINACEAE

Plumbago zeylanica L.

Dharchula to Tavaghat; *Rao* 11637; alt. 1300-1500 m.

PRIMULACEAE

Abdrosace geranifolia Watt.

Budi; *Rao* 11848; alt. 2500 m.

A. lanuginosa Wall.

Thandidhar to Pangu; *Rao* 11699; alt. 2000 m.

Lysimachia japonica Thunb.

Askot; *Rao* 11606; alt. 1900 m.

MYRSINACEAE

Maesa indica (Roxb.) Wall.

Tanakpur; *Rao* s. n. alt. 400 m.

Ardisia solanacea Roxb.

Tanakpur; *Rao* 11515; alt. 400 m.

OLEACEAE

Syringa emodi Wall. ex G. Don

Garbyang; *Rao* 11904; alt. 3000 m.

APOCYNACEAE

Holarrhena antidysenterica (L.) Wall.

Kotdwar to Tanakpur; *Rao* 11485; alt. 700-400 m.

ASCLEPIADACEAE

Cryptolepis buchananii Roem. & Sch.

Jauljibee; *Rao* 11623; alt. 1400 m.

Cynanchum vincetoxicum Pers.

Chhetothanga to Garbyang; *Rao* 11862; alt. 3200 m.

Tylophora govanii Decne

Jipti; *Rao* 11782; alt. 2500 m.

Heterostemma alatum Wt.

Dharchula, Tavaghat; *Rao* 11657; alt. 1300 m.

LOGANIACEAE

Buddleia asiatica Lour.

Pithoragarh; *Rao* 11588; alt. 1900 m.

GENTIANACEAE

Gentiana argentea Royle

Jipti to Malpa; *Rao* 11842; alt. 2200 m.

G. pedicellata Wall.

Pangu; *Rao* 11709; alt. 1800 m.

BORAGINACEAE

Cyanoglossum zeylanicum (Wall.) Thunb. ex Lehm. (= *C. furcatum* Wall.)

Pithoragarh; *Rao* 11571; alt. 1900 m.

SOLANACEAE

Hyoscyamus niger L.

Garbyang; *Rao* 11870; alt. 3000 m.

SCROPHULARIACEAE

Mazus surculosus D. Don

Askot, Tavaghat, Thandidhar; *Rao* 11610, 11677; alt. 1800 m.

Lindenbergia macrostachya Benth.

Pithoragarh; *Rao* 11584; alt. 1900 m.

Hemiphragma heterophyllum Wall.

Rungling forest; *Rao* 11753; alt. 2800 m.

Veronica agrestis L.

Rungling forest; *Rao* 11753; alt. 2000-2800 m.

GESNERIACEAE

Aeschynanthus ramosissima Blume

Askot; *Rao* 11595; alt. 1800 m.

Coraliodiscus lanuginosus (Wall. ex DC.) B. L. Burt (= *Didissandra lanuginosa* Clarke)

Jipti to Malpa; *Rao* 11790; alt. 2200 m.

BIGNONIACEAE

Incarvillea arguta (Royle) Royle (= *Amphicome arguta* Lindl.)

Malpa; *Rao* 11820; alt. 2200 m.

ACANTHACEAE

Barleria cristata L.

Askot; *Rao* 11605; alt. 1800 m.

Lepidagathis hyalina Nees

Dharchula to Tavaghat; *Rao* 11636; alt. 1300-1500 m.

VERBENACEAE

Phyla nodiflora (L.) Green (= *Lippia nodiflora* Rich.)

Tanakpur; *Rao* 11535; alt. 400 m.

Premna latifolia Roxb.

Tanakpur, Dharchula; *Rao* 11494, 11630; alt. 400-1300 m.

LABIATAE

Pogostemon plectranthoides Desf.

Dharchula to Tavaghat; Rao 11643; alt. 1300-1500 m.

Clinopodium vulgare L. (= *Calamintha clinopodium* Benth.)

Askot; Rao 11611; alt. 1800 m.

Anisomeles indica Kuntze (= *A. ovata* R. Br.)

Tavaghat; Rao 11654; alt. 1500 m.

Colquhounia coccinea Wall.

Jipti to Malpa; Rao 11607; alt. 2500-2200 m.

Lamium album L.

Rungling forest; Rao 11751; alt. 2000-2800 m.

Roylea calycina Briq.

Pithoragarh; Rao 11561; alt. 1900 m.

Prunella vulgaris L.

Pithoragarh, Pangu; Rao 11568, 11707; alt. 1800 m.

Phlomis bracteosa Royie

Rungling forest; Rao 11733; alt. 2000-2800 m.

Teucrium stoloniferum Roxb.

Tanakpur; Rao 11519; alt. 400 m.

PLANTAGINACEAE

Plantago asiatica L. (= *P. major* L.)

Garbyang; Rao 11898; alt. 3200 m.

P. brachyphylla Edgew.

Sirkha; Rao 11898; alt. 2100 m.

AMARANTHACEAE

Aerva sanguinolenta (L.) Bl. (= *A. scandens* Wall. ex Moq.)

Dharchula to Tavaghat; Rao 11646; alt. 1300-1500 m.

Cyathula tomentosa Moq.

Dharchula to Tavaghat; Rao 11659; alt. 1300-1500 m.

PHYTOLACCACEAE

Phytolacca acinosa Hook. f.

Sirkha; Rao 11731; alt. 2600 m.

POLYGONACEAE

Polygonum viviparum L.

Garbyang; Rao 11908; alt. 3200 m.

P. sphaerocephalum Wall. ex Meissn.

Rungling forest; Rao 11754; alt. 200-2800 m.

P. capitatum Buch.-Ham.

Pithoragarh; Rao 11586; alt. 1900 m.

Rumex hastatus D. Don

Pithoragarh; Rao 11576; alt. 1900 m.

LAURACEAE

Litsaea umbrosa Nees

Rungling forest, Malpa; Rao 11770, 11827; alt. 2200 m.

THYMELAEACEAE

Daphne papyracea Decne.

Rungling forest; Rao 11771; alt. 2400 m.

ELAEAGNACEAE

Elaeagnus conferta Roxb.

Champavat, Jipti, Malpa; Rao 11556, 11779, 11822; alt. 1700-2500 m.

Hippophae rhamnoides Serv. subsp. **salicifolia** (D. Don) Serv.

Local name: CHAUK: CHU.

Malpa; Rao 11829; alt. 2200 m.

LORANTHACEAE

Scurrula elata (Edgew.) Danser

Tavaghat to Thanidhar; Rao 11684; alt. 1500 m.

Viscum album L.

Pangu; Rao 11704; alt. 1800 m.

V. nepalense Spreng.

Champavat; Rao 11558; alt. 1700 m.

SANTALACEAE

Thesium himalense Royle

Budi; Rao, 11845; alt. 2500 m.

EUPHORBIACEAE

Euphorbia pilosa L.

Pangu; Rao 11702; alt. 1800 m.

Sarcococca saligna (D. Don) Muell.-Arg.

Champavat; Rao 11548; alt. 1700 m.

Buxus wallichiana Baill. (= *B. sempervirens* auct. Plur., non Linn.)

Malpa; Rao, 11824, alt. 2200 m.

Andrachne cordifolia Muell.-Arg.

Pangu; Rao 11703; alt. 1800 m.

Phyllanthus reticulatus Poir.

Tanakpur; Rao 11526; alt. 400 m.

Jatropha curcas L.

Jauljibee; Rao 11617; alt. 1400 m.

Sapium insigne Benth.

Tavaghat to Thanidhar; Rao 11693, 11664; alt. 1500 m.

URTICACEAE

Ulmus wallichiana Planch.

Sirkha; Rao 11936; alt. 2100 m.

Ficus foveolata Wall.

Tavaghat; Rao 11662; alt. 1500 m.

Pilea scripta Wedd.

Malpa; Rao 11818; alt. 2200 m.

P. umbrosa Wedd.

Rungling forest, Jipti to Malpa; Rao 11755, 11812; alt. 2200-2500 m.

Elatostema sessile Forst.

Jauljibee; Rao 11624; alt. 1400 m.

Boehmeria platyphylla D. Don

Dharchula to Tavaghat; Rao 11660; alt. 1300-1500 m.

Debregeasia hypoleuca Wedd.

Jipti to Malpa; Rao 11793; alt. 2500 m.

CUPULIFERAE

Alnus nepalensis D. Don

Jipti; Rao 11924; alt. 2500 m.

Quercus semecarpifolia Sm.

Soosa, Rungling forest; Rao 11715, 11931; alt. 2400 m.

Q. floribunda Wall. (= *Q. dilatata* Lindl.)

Soosa; Rao 11714; alt. 2400 m.

Quercus lanuginosa D. DonJipti; *Rao* 11922; alt. 2500 m.

SALICACEAE

Salix elegans Wall. ex Anderss.Sirkha; *Rao* 11724; alt. 2100 m.**S. lindleyana** Wall. ex Anderss.Garbyang; *Rao* 11883; alt. 3200 m.

GYMNOSPERMS

EPHEDRACEAE

Ephedra gerardiana Wall. ex StapfBudi; *Rao* 11854; alt. 2500 m.

MONOCOTYLEDONS

ORCHIDACEAE

Oberonia falconeri Hook. f.Askot; *Rao* 11602; alt. 1800 m.**Cirrhopetalum maculosum** Lindl.Askot; *Rao* 11599; alt. 1800 m.**Coelogyne cristata** Lindl.Askot; *Rao* 11596; alt. 1800 m.**Pholidota imbricata** (Roxb.) Lindl.Dharchula to Tavaghat; *Rao* 11650; alt. 1300-1500 m.**P. articulata** Lindl.Dharchula to Tavaghat; *Rao* 11661; alt. 1300-1500 m.**Calanthe tricarinata** Lindl.Rungling forest; *Rao* 11744; alt. 2200 m.**Aerides odoratum** Lour.Askot; *Rao* 11614; alt. 1800 m.**A. multiflorum** Roxb.Askot, Dharchula; *Rao* 11562; alt. 1800 m.**Luisia teretifolia** Gaud.Tanakpur, Dharchula, Tavaghat; *Rao* 11535; alt. 400-1400 m.**Vanda cristata** Lindl.Tavaghat, Thanidhar; *Rao* 11692; alt. 1400 m.**V. parviflora** Lindl.Askot; *Rao* 11615; alt. 1800 m.**Goodyera procera** Hook.Jauljibee to Dharchula; *Rao* 11627; alt. 1300 m.

SCITAMINEAE

Roscoea alpina RoyleRungling forest, Garbyang, Namjang waterfalls; *Rao* 11747, 11906, 11918; alt. 2000-3200 m.

HAEMODORACEAE

Mondo intermedium (D. Don) Bailey (= *Ophiopogon intermedius* D. Don)Jipti, Malpa; *Rao* 11811; alt. 2500 m.

IRIDACEAE

Iris kumaonensis Wall. ex D. DonGarbyang; *Rao* 11891; alt. 3200 m.

DIOSCORIACEAE

Dioscorea deltoidea Wall. ex Kunth.Rungling forest; *Rao* 11928; alt. 2400 m.

LILIACEAE

Smilax vaginata Dcne.Rungling forest; *Rao* 11756; alt. 2200 m.**Asparagus curillus** Buch.-Ham.Pithoragarh; *Rao* 11592; alt. 1900 m.**Polygonatum cirrhifolium** RoylePithoragarh, Tavaghat, Malpa; *Rao* 11566, 11686, 11833; alt. 1900-2500 m.**Nomocharis oxypetala** (Royle) Balf. f.Chhetothanga to Garbyang; *Rao* 11858; alt. 3200 m.**Trillium govanianum** Wall. ex RoyleGarbyang; *Rao* 11905; alt. 3200 m.

ARACEAE

Arisaema costatum (Wall.) Mart. ex Schott. (= *A. wallichianum* Hook. f.)Rungling forest; *Rao* 11932; alt. 2400 m.**A. flavum** SchottJipti, Malpa; *Rao* 11782; alt. 2500 m.**A. jacquemontii** Bl.Rungling forest; *Rao* 1929; alt. 2400 m.**Sauromatum guttatum** SchottDharchula to Tavaghat; *Rao* 11641; alt. 1300-1500 m.**Remusatia vivipara** SchottJauljibee; *Rao* 11619; alt. 1400 m.**Gonatanthus pumilus** (D. Don) Engl. (= *G. sarmenosus* Klotzsch)Jipti; *Rao* 11777; alt. 2500 m.**Rhaphidophora glauca** SchottJauljibee to Dharchula; *Rao* 11626; alt. 1300 m.

CYPERACEAE

Cyperus niveus Retz.Tavaghat to Thanidhar; *Rao* 11678; alt. 1500 m.**C. globosus** All. (= *Pycneus capillaris* Nees)Tanakpur; *Rao* 11524; alt. 450 m.**C. kyllingia** Endl. (= *Kyllinga monocephala* Rottb.)Jauljibee, *Rao* 11622; alt. 1200 m.**Fimbristylis complanata** (Retz.) Link.Tanakpur; *Rao* 11525; alt. 450 m.

GRAMINEAE

Desmostachya bipinnata (L.) StapfKotdwar; *Rao* 11482; alt. 700 m.**Thamnocalamus spathiflorus** (Trin.) Munro (= *Arundinaria spathiflora* Trin.)Ramnagar; *Rao* 11512; alt. 800 m.**T. falconeri** Hook. f. (= *Arundinaria falconeri* Benth.)Rungling forest; *Rao* 11739; alt. 2000-2900 m.

FILICALES

Adiantum capillus-veneris L.Dharchula; *Rao* 11634; alt. 1300 m.**Asplenium alternans** Wall.Jipti to Malpa; *Rao* 11802; alt. 2500-2000 m.**Crypsinus ebenipes** (Hk.) Copel. (= *Polypodium ebenipes* Hook.)Askot; *Rao* 11601; alt. 1800 m.

Onychium auratum Kaulf. [= *O. siliculosum* (Desv.) C. Chr.]

Tavaghat to Thanidhar; *Rao* 11682; alt. 1500 m.

O. multisectum F. Hend.

Dharchula to Tavaghat; *Rao* 11642; alt. 1300-1500 m.

Pteris cretica L.

Tanakpur; *Rao* 11541; alt. 400 m.

P. quadriaurita Retz.

Dharchula to Tavaghat; *Rao* 11658; alt. 1300-1500 m.

Pteridium aquilinum (L.) Kuhn.

Rungling forest; *Rao* 11743; alt. 2000-2900 m.

Polystichum aculeatum (L.) Schott. (= *Aspidium aculeatum* Sw.)

Tavaghat to Thanidhar; *Rao* 11689; alt. 1500 m.

P. acanthophyllum Fr.

Rungling forest; *Rao* 11775; alt. 2000-2900 m.

Gymnopteris vestita (Wall.) Underw. [= *Syngramme vestita* (Wall.) Bedd.]

Jipti to Malpa; *Rao* 11789; alt. 2500-2200 m.

Thelypteris oethodes (Kze.) Ching (= *Nephrodium prolixum* Bak.)

Tanakpur; *Rao* 11531; alt. 400 m.

Woodwardia radicans Sm.

Jipti to Malpa; *Rao* 11809; alt. 2500-2200 m.

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