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## Observation on the Phyto-diversity of Sunderdunga Valley, Uttarakhand, Western Himalaya

*Despite numerous explorations and in-depth studies in the Western Himalaya on various themes, many areas remain under-explored. One such under explored area is Sundardhunga Valley, Bageshwar (Uttarakhand) in Western Himalaya. A detailed floristic survey was conducted during 2017-18. A total of 520 species of angiosperms (286 genera and 92 families), 45 species of Pteridophytes (24 genera and 15 families) and 7 species of Gymnosperms (5 genera and 4 families) were recorded within about 75 km<sup>2</sup> vegetated area above 2000 m elevations. The dominant families were Asteraceae (47), Rosaceae (37), Poaceae (34), Ranunculaceae (20) and Polygonaceae (19) among angiosperms and Polypodiaceae (12) and Aspleniaceae (5) among the ferns. Owing to difficult terrain and low accessibility to people and livestock during the growing season (June-September) the valley has luxuriant diversity.*

**Key words:** Phyto-Diversity, Inventory, Western Himalaya

### Introduction

Western Himalaya has been a major centre of attraction for a large number of explorers and naturalists since long time. It has a long history of explorations and documentation of the nature and natural resources. Despite numerous explorations and in-depth studies on various facets of this region, many valleys in Western Himalaya remain under-explored. One such place happens to be the Sundardhunga valley, nestled among the upper catchment of Pindari river and crowned by Maikotli and Mrighuni peaks. East of Sundardhunga, Pindari Glacier, even well traversed and familiar to a large section of people across the country.

The luxuriant characteristic forests of Western Himalaya dominated by one and another species of Oaks (*Quercus* spp.) prevails in the valley as well. These forests are not only intricately associated with the hydrological balance but also form the life support system for the resident communities. Forest based products e.g., fuelwood, fodder, timber, forest floor biomass, fiber, Medicinal and aromatic plants, edible fruits and fibre are the main sources of the people of Western Himalaya.

Kumaun part of Western Himalaya has been the reservoir of enormous natural resources which providing direct and indirect benefits to the mankind. The region has nearly forty smaller and larger glaciers and many high-altitude lakes. Pindari, Sunderdunga, Millam are some of the important glaciers. Pindari, Gori, Kali, Dhauri and Ramganga are few rivers of glacial origin of this region. The region harbours the most beautiful and fascinating flora, which are quite different from the flora of other hills of the Himalaya.

A number of studies on different aspects of vegetation have been conducted in the nearby area of Sundardhunga. Various studies have

*Sunderdhunga valley ranging from 2050m to 6775m has over 572 vascular plant species, of which 520 species are angiosperms, 45 species are pteridophytes and 7 species are of gymnosperms.*

**GAJENDRA SINGH, NAVEEN CHANDRA, VINEET PAL, LALIT MOHAN TEWARI<sup>1</sup> AND MEHENDRA PRATAP SINGH BISHT**  
Uttarakhand Space Application Centre  
92/2, Vasant Vihar, Dehradun  
\*E-mail: gajendrawat@yahoo.com

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<sup>1</sup>Department of Botany, DSB Campus Nainital, Kumaun University Nainital

described the Vegetation types of Pindari and Kumaun region (Tiwari and Singh, 1985; Upreti *et al.*, 1985; Singh and Singh, 1987; Rikhari *et al.*, 1989; Rawal *et al.*, 1994; Dhar *et al.*, 1997) at times. However, only couple of studies have been reported from the Sundardhunga valley because of low accessibility during the growing season. Rawat *et al.* (2013) have enumerated 76 high altitude ethnobotanical plants of the valley. Status and population density of 14 threatened plants around Devikund area was investigated with listing of 62 medicinal plants around the sacred lake (Sekhar and Rawat, 2011). Keeping the above gap in view, aim of the present study is to inventories the vascular plants (angiosperm, Pteridophytes and gymnosperm) of the valley.

### Material and Methods

#### Study area

Sunderdunga literally means beautiful stones valley lies ( $30^{\circ}06'50.56''$  to  $30^{\circ}17'10.24''$  N to  $79^{\circ}47'51.86''$  to  $79^{\circ}57'20.99''$  E) to the West of Pindari valley in Bageshwar district (Uttarakhand) in Western Himalaya (Fig.1). The altitude of the valley ranges from 2050m

to 6775m representing temperate, subalpine and alpine habitats. The study area having rippling streams, water falls, undisturbed wildlife and open meadows. The vegetated area and easily area is ranges from Ritang (Khati) village around 2050m elevation up to the Devikund (4465m). The local people inhabiting in the lower part of the valley in two revenue villages Ritang and Jatoli (2400m) are agro-pastoralists with livestock grazing and agriculture as their dominant land use activities. The valley receives heavy rainfall during rainy season and hardly access to the alpine region owing to heavy flow of river Sunderdunga. The area above the Ritang village to Kharkatiya (Sub-alpine camp) is dominated by dense and humid temperate forests rich in flora and fauna. Extensive patches of hill bamboo *Drepanostachyum falcatum* at lower elevation and *Taxus wallichiana* in the upper can be seen either side of the bridge trekking path. Above the Kharkatiya there are grassy slopes dominated by *Danthonia* and *Kobresia* forming the grazing pastures for about 3000-4000 sheep and goats. The valley offers a magnificent view of the Maiktoli and Mrigthuni peaks. Sunderdunga valley also provides access to Sukham and Maiktoli glaciers.

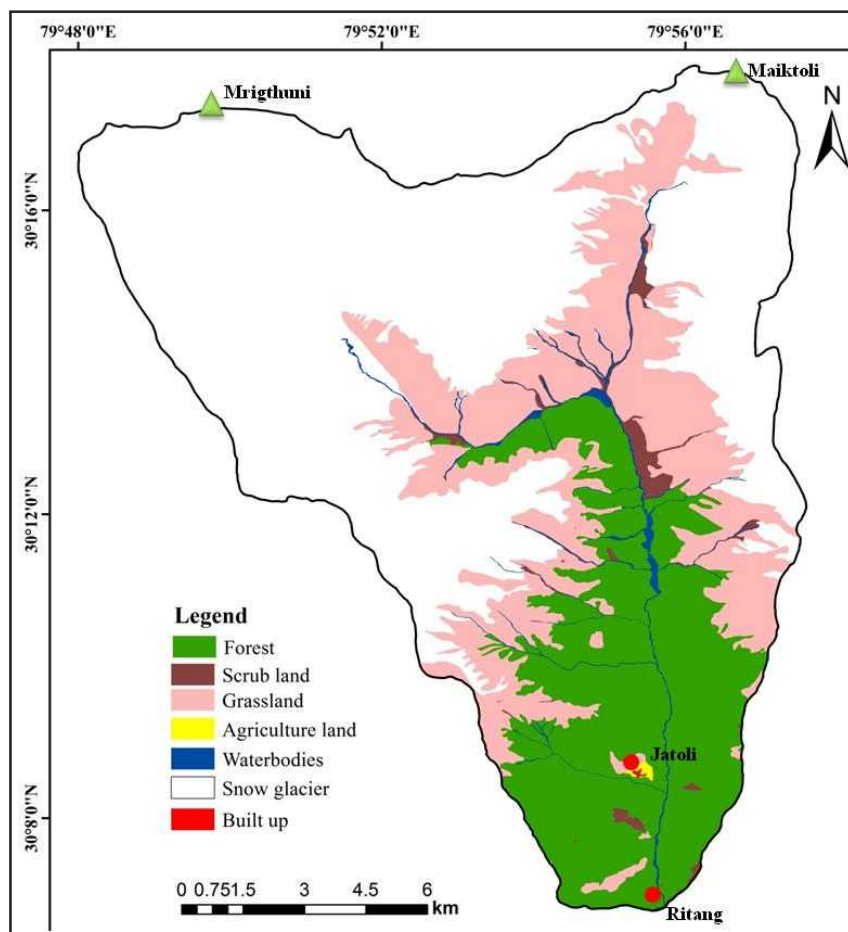


Fig. 1: Land use land cover map of Sunderdunga valley (Intensive study area).

Due to altitudinal variation, the climatic variation is more diverse in the region. Winter are very grievous at higher altitude. Severe frost is prevalent from December to February and occur even in the lower valleys. The temperature is also varies with altitude in the region. Pleasant nights and very hot days are the principal characteristics of lower altitudes in the summer season. The region experiences moderate rainfall. Monsoon arrives in the second or third week of June. Most of the rainfall (approximately 60%) is recorded between June and September. August is the month of maximum relative humidity.

### Floristic survey

Extensive field surveys were conducted during July-August, 2018 across the study area. Various habitats were surveyed based on altitude, topography, presence of perennial water channels and physiognomy of vegetation. The plants were identified using published literature (Osmaston, 1927; Naithani, 1984; Khullar, 2000; Rai *et al.*, 2017) and doubtful specimens were later verified at the herbaria of Wildlife institute of India (WII) and Forest Research Institute (FRI).

### General vegetation and Forest types

The Sundardhunga valley and surrounding landscape supports luxuriant vegetation, typical to mid-high elevation range in the Western Himalaya. Broad vegetation types include Mountain Broadleaved Evergreen Forests, Mountain Broad leaved Deciduous Forests, Mountain Needle leaved Forests, Mountain Grasslands, Subalpine Forests, Subalpine Bamboo Brakes, Subalpine Scrub (krummholz), Alpine Moist Scrub and Alpine Moist Meadows. Among the common tree species in the valley from the low to higher elevation zone are Oaks (*Quercus leucotrichophora*, *Q. floribunda*, *Q. semecarpifolia*), Burans (*Rhododendron arboreum*), *Pyrus pashia*, *Carpinus viminia*, *Lyonia ovalifolia*, *Aesculus indica*, *Daphniphyllum himalayense*, *Hippophae salicifolia*, *Acer* spp., *Meliosma dilleniifolia*, *Taxus wallichiana*, *Abies pindrow*, *A. spectabilis*, *Sorbus foliolosa*, and *Betula utilis*. Among the shrubs *Sarcocococca hookeriana*, *Daphne papyracea*, *Berberis* spp. and *Drepanostachyum falcatum* area the major component of the forests. In the subalpine and alpine region of the valley *Rhododendron campanulatum*, *R. anthopogon*, *R. lapidotum*, *Cassiope fastigiata* are among the dominant shrub species.

### Results

#### Floristic diversity

A total 572 species of vascular plants (angiosperm, pteridophyte and gymnosperm) belonging to 312 genera and 111 families were recorded from Sunderdunga valley. Out of these, 350 are herbs, 72 shrubs, 17 climbers, 31 grasses, 10 sedge, 47 trees and 45 are ferns. All the species recorded from the

valley have been enumerated according to Bentham and Hooker's system of classification. The valley harbors various medicinal and aromatic plants e.g., *Dactylorhiza hatagirea*, *Malaxis mucifera*, *Malaxis acuminata* as well. According to Conservation Assessment and Management plan workshop (Ved, 2003), 34 species are recorded under different threat category of IUCN. Out of 34 taxa 6 are Critically Endangered (CR), 10 Endangered (EN), 9 Vulnerable (VU) and 9 species are Near Threatened (NT).

**Enumeration of species:** The detailed enumeration of plants recorded from the Sundardhunga valley is given below.

#### Ranunculaceae

*Aconitum heterophyllum* Wall. ex Royle, 3400m  
*Aconitum violaceum* Jacq., 3200m (H)  
*Aconitum ferox* Wall. ex Ser., 3250m (H)  
*Aconitum leave* Royle, 2700 m (H)  
*Anemone obtusiloba* D. Don, 2600m (H)  
*Anemone rivularis* Buch. Ham. ex DC., 2600m (H)  
*Anemone raui* Goel & U.C. Battach., 2650m (H)  
*Anemone vitifolia* Buch.-Ham., 2680m (H)  
*Aquilegia pubiflora* Wall. ex Royle, 3000m (H)  
*Clematis barbellata* Edgew., 2500m (H)  
*Clematis buchananiana* DC., 2600m (H)  
*Clematis montana* Buch.-Ham. ex DC., 2800m (H)  
*Delphinium cashmerianum* Royle, 3300m (H)  
*Delphinium vestitum* Wall. ex Royle, 2950m (H)  
*Oxygraphis polypetala* (Royle) Hook. f. & Thoms., 3400m (H)  
*Ranunculus diffusus* DC., 2000m (H)  
*Ranunculus hirtellus* Royle, 1900m (H)  
*Thalictrum alpinum* L., 2000m (H)  
*Thalictrum foliolosum* DC., 2100m (H)  
*Trollius acaulis* Lindl., 3000m (H)

#### Paeoniaceae

*Paeonia emodi* Wall. ex Royle, 2000m (H)

#### Schisandraceae

*Schisandra grandiflora* (Wall.) Hook. f. & Thoms., 2200m (C)

#### Menispermaceae

*Cissampelos pariera* L., 2000m (C)  
*Coculus laurifolius* DC., 2000m (S)

#### Berberidaceae

*Berberis aristata* Schneid., 2600m (S)  
*Berberis asiatica* Roxb. ex DC., 2200m (S)  
*Berberis chirita* Buch. - Ham. ex Lindl., 2700m (S)  
*Berberis jaeschkeana* C.K.Schneid., 2650m (S)  
*Berberis kumaounensis* C.K.Schneid., 2650m (S)

#### Papaveraceae

*Meconopsis aculeata* Royle., 3200m (H)

#### Fumariceae

*Corydalis cashmeriana* Royle, 2900m (H)  
*Corydalis cornuta* Royle, 2850m (H)  
*Corydalis govaniiana* Wall., 2800m (H)  
*Corydalis thrysiflora* Prain. 3250 (H)  
*Corydalis meifolia* Wall., 3150 (H)  
*Fumaria indica* (Haussk.) Pugsley. 2150 (H)

**Brassicaceae**

- Arabis pterosperma* Edgew., 2700m (H)  
*Acryosperma primulifolium* Schulz, 3050m (H)  
*Capsella bursa-pastoris* (L.) Medik., 1600m (H)  
*Cardamine impatiens* L. 2200m (H)  
*Cardamine flexuosa* With. 2850 (H)  
*Thalpsi arvense* L. 2000m (H)

**Violaceae**

- Viola biflora* L. 2800m (H)  
*Viola betonicifolia* var. *nepalensis* (Ging.) Back., 2100m (H)  
*Viola distans* Wall., 2500m (H)  
*Viola pilosa* Blume, 2000m (H)

**Caryophyllaceae**

- Arenaria festucoides* Benth. 2050m (H)  
*Arenaria neelgherrensis* Wight & Arn., 2050m (H)  
*Gypsophila cerastioides* D. Don, 2850m (H)  
*Sagina saginoides* (L.) Karsten, 2700m (H)  
*Silene vulgaris* (Moench) Garcke, 2500m (H)  
*Silene setisperma* Majumdar, 2550m (H)  
*Stellaria decumbens* Edgew. 2700m (H)  
*Stellaria media* (L.) Vill., 2100m (H)  
*Stellaria monosperma* var. *paniculata* (Edgew.) Majumdar, 2200m (H)

**Hypericaceae**

- Hypericum elodeoides* Choisy, 2400m (H)  
*Hypericum choisianum* Wall. ex N. Robson, 2050m (S)  
*Hypericum hookerianum* Wt. & Arn., 2500m (S)  
*Hypericum oblongifolium* Choisy, 2100m (S)  
*Hypericum uralum* Buch.-Ham. ex D. Don, 2200m (H)

**Theaceae**

- Eurya acuminata* DC., 2150m (T)

**Geraniaceae**

- Geranium collinum* Steph. ex Willd. 2940m (H)  
*Geranium nepalense* Sweet., 2850m (H)  
*Geranium ocellatum* Cambess. 2200m (H)  
*Geranium robertianum* L. 2740m (H)  
*Geranium wallichianum* D. Don ex Sweet., 2950m (H)

**Oxalidaceae**

- Oxalis corniculata* L., 2000m (H)

**Balsaminaceae**

- Impatiens devendrae* Pusalkar, 2700m (H)  
*Impatiens edgeworthii* Hook. f., 2250m (H)  
*Impatiens recemoca* DC., 2150m (H)  
*Impatiens scabrida* DC., 2000m (H)  
*Impatiens sulcata* Wall., 2750m (H)  
*Impatiens thomsonii* Hook. f., 2100m (H)

**Rutaceae**

- Boenninghausenia albiflora* (Hook.) Reich. ex Meissn., 2100m (H)  
*Skimmia anquitifolia* N.P Taylor & Airy Shaw 2730m (S)

**Aquifoliaceae**

- Ilex dipyrina* Wall., 2200 (T)

**Celastraceae**

- Euonymus echinatus* Wall., 2700m (S)  
*Euonymus tingens* Wall., 2230m (T)

**Rhamnaceae**

- Rhamnus procumbens* Edgew., 2000m (S)  
*Rhamnus variegatus* Roxb., 1950 (m)

**Vitaceae**

- Ampelocissus latifolia* (Roxb.) Planch., 2050m (C)  
*Parthenocissus semicordata* (Wall.) Planch., 2100m (C)  
*Tetrastigma obtectum* (Wall. ex M.A. Lawson) Planch., 2100m (C)

**Hippocastanaceae**

- Aesculus indica* (Wall. ex Camb.) Hook. f., 2035m (T)

**Aceraceae**

- Acer acuminatum* Wall. ex D. Don 2450m (T)  
*Acer caesium* Wall. & Brandis, 2400m (T)  
*Acer cappadocicum* Gleditsch, 2350m (T)  
*Acer oblongum* Wall. ex DC., 2300m (T)  
*Acer villosum* Wall. 2800m (T)

**Staphyleaceae**

- Staphylea emodi* Wall. ex Brandis, 2100m (S)

**Sabiaceae**

- Meliosma dilleniifolia* (Wall. ex Wight & Arn.) Walp., 2200m (T)

**Anacardiaceae**

- Pistacia integerrima* Stew., 2100m (T)  
*Rhus javanica* L. 2100m (T)  
*Rhus wallichii* Hook. f., 2100m (T)

**Papilionaceae**

- Astragalus chlorostachys* Lindl. 2950m (S)  
*Astragalus himalayanus* Klotz. 2750m (H)  
*Desmodium concinum* DC., 2100m (S)  
*Desmodium multiflorum* DC. 2050m (S)  
*Indigofera cylindrica* Grah. & Baker., 2500m (S)  
*Indigofera heterantha* Wall. ex Brandis, 2100m (S)  
*Lotus corniculatus* L. 2050m (H)  
*Parochetus communis* Buch.-Ham. ex D. Don, 3000m (H)  
*Piptanthus nepalensis* (Hook.) D. Don, 2150m (S)  
*Shuteria involucreta* Wight & Arn., 2200m (C)  
*Trifolium repens* L., 2700m (H)

**Caesalpinaceae**

- Caesalpinia decapetala* (Roth) Alston, 2050m (C)

**Rosaceae**

- Acomastylis elata* (Wall. ex Royle) Bolle, 3000m (H)  
*Agrimonia pilosa* Ledeb. 2000m (H)  
*Aruncus dioicus* (Maxim.) Hara, 3050m (H)  
*Cotoneaster acuminata* Lindl. 3000m (S)  
*Cotoneaster bacillaris* Wall. ex Lindl., 3000m (S)  
*Cotoneaster duthieana* (Schneid.) Klotz. 2550m (S)  
*Cotoneaster microphyllus* Wall. ex Lindl., 2650m (S)  
*Duchesnea indica* (Andr.) Fock., 2400m (H)  
*Filipendula vestita* (Wall. ex G. Don) Maxim. 3030m (H)  
*Fragaria daltoiniana* Gay, 3000m (H)  
*Fragaria nubicola* (Hook. f.) Lindl. ex Lacaita. 2750m (H)  
*Geum roylei* Bolle, 2340m (H)  
*Potentilla argyrophylla* Wall. ex. Lehm., 2650m (H)  
*Potentilla atosanguinea* Lodd. 3060m (H)  
*Potentilla cuneifolia* Bertol. 3000m (H)  
*Potentilla eriocarpa* Wall. ex Lehm. 3300m (H)  
*Potentilla lineata* Trevir. ex Reich. 2800m (H)  
*Potentilla microphylla* D. Don. 3500 (H)

*Potentilla nepalensis* Hook. f., 2100m (H)  
*Potentilla polyphylla* Wall. ex. Lehm. 3200m (H)  
*Potentilla rigida* Wall. ex Lehm. 3040m (H)  
*Prunus cornuta* (Wall. ex Royle) Steud., 2700m (T)  
*Rosa macrophylla* Lindl. 2200m (S)  
*Rosa sericea* Lindl., 2630m (S)  
*Rubus ellipticus* Sm., 2050m (S)  
*Rubus foliolosus* var. *recemosus* (Hook.f.) B.D Naithani. 2100m (S)  
*Rubus nepalensis* (Hook. f.) Kuntze. 2500m (S)  
*Rubus niveus* Thunb., 2200m (S)  
*Rubus panicuculatus* Sm., 1750m (C)  
*Rubus rosifolius* Sm., 2200 (S)  
*Sanguisorba diandra* (Hook. f.) Nordbong, 3000 (H)  
*Sibbaldia cuneata* Schouw ex Kunze., 3035m (H)  
*Sibbaldia microphylla* (D.Don) Hand. Mazz. 3100 (H)  
*Sibbaldia purpurea* Royle, 3040m (H)  
*Sorbus cuspidata* (Spach.) Hedl. 1960m (T)  
*Sorbus foliolosa* (Wall.) Spach, 3000m (S)  
*Spiraea bella* Sims. 3050m (S)  
*Spiraea canescens* D.Don. 1700m (S)

#### Saxifragaceae

*Astilbe rivularis* Buch.-Ham. ex D.Don, 2300m (S)  
*Bergenia ciliata* (Haw.) Sternb. 2100m (H)  
*Bergenia stracheyi* (Hook. f & Thoms.) Engl. 3500m (H)  
*Chrysosplenium tenellum* Hook.f. & Thoms. 2450m (H)  
*Chrysosplenium trichospermum* Edgew.ex Hook.f. & Thoms. 2840m (H)  
*Sexifraga brachypoda* D.Don 2960m (H)  
*Sexifraga brunonis* Wall. ex Ser. 3250 (H)  
*Sexifraga filicaulis* Wall.ex Sering. 2050m (H)  
*Sexifraga flagellaris* Willd.ex Sternb. 3000m (H)  
*Sexifraga jacquemontiana* Decne. 4000m (H)  
*Sexifraga parnassifolia* D.Don 3000m (H)  
*Sexifraga pseudo-pallida* Engl. & Irmsch. 2795m (H)  
*Sexifraga sibirica* L. 3500m (H)  
*Sexifraga stenophylla* Royle 2500m (H)

#### Parnassiaceae

*Parnassia nubicola* Wall. ex Royle, 3300m (H)

#### Hydrangeaceae

*Deutzia compacta* Craib, 2500m (S)  
*Deutzia staminea* R.Br. ex Wall. 2250m (S)  
*Hydranzea anomala* D.Don 2100m (S)

#### Grossulariaceae

*Ribes glaciale* Wall. 3000m (S)  
*Ribes griffithii* Hook.f. & Thoms. 2500m (S)

#### Crassulaceae

*Crassula campestris* (Eckl. & Zeyh.) Endl. 3000m (H)  
*Rhodiola heterodonta* (Hook. f. & Thoms.) Boriss. 3500m (H)  
*Rhodiola quadrifida* (Pall.) Fisch. & C.A.Mey, 2860m (H)  
*Rhodiola sinuata* (Royle ex Edgew.) S.H.Fu, 2640m (H)  
*Rhodiola trifida* (Hook. f. & Thoms.) Jacobsen, 3000m (H)  
*Sedum bupleuroides* (Wall. ex Hook. f. & Thoms.) S.H.Fu, 3500m (H)  
*Sedum ewersii* Ledeb. 3250m (H)  
*Sedum multicaule* Wall. ex Lindl. 3032m (H)  
*Sedum oreades* Hamet, 3600m (H)  
*Sedum trifidum* Hook.f. & Thoms. 2880m (H)  
*Sedum wallichianum* Hook. 3050m

#### Onagraceae

*Circaea alpina* (L.). Kurz, 2100m (H)  
*Epilobium angustifolium* L. 2450m (H)  
*Epilobium royleanum* Hausskn. 3000m (H)  
*Epilobium laetum* Wall. ex Hausskn. 3200m (H)  
*Epilobium latifolium* L. 2780m (H)  
*Epilobium royleanum* Hausskn. 3000m (H)

#### Apiaceae

*Acronema tenerum* (DC.) Edgew. 2800m (H)  
*Angelica glauca* Edgew. 3350m (H)  
*Bupleurum hamiltonii* Balak., 3000m (H)  
*Bupleurum longicaule* DC. 3000m (H)  
*Chaerophyllum acuminatum* Lindl. 3200m (H)  
*Chaerophyllum villosum* Wall.ex DC. 3000m (H)  
*Heracleum canescens* Lindl. 3000m (H)  
*Hydrocotyle nepalensis* Hook. 2800m (H)  
*Pimpinella diversifolia* DC., 2300m (H)  
*Pleurospermum brunonis* (DC.) C.B. Clarke, 4000m (H)  
*Pleurospermum candolii* (DC) C.B. Clarke, 3800m (H)  
*Sanicula elata* Buch.-Ham. ex D. Don, 2100m (H)  
*Selinum elatum* (Edgew.) Hiroe 2900m (H)  
*Selinum vaginatum* C.B. Clarke 3000m (H)  
*Selinum wallichianum* (DC.) Raizada & H.O.Saxena 3100m (H)  
*Trachydium roylii* Lindl. 2990m (H)  
*Vicatia conifolia* DC. 2800m (H)

#### Araliaceae

*Hedera nepalensis* Koch., 2000m (C)

#### Cornaceae

*Cornus macrophyllum* Wall., 2400m (T)

#### Caprifoliaceae

*Leycesteria formosa* Wall., 2550m (S)  
*Lonicera hispida* Pall. ex Schult. (S)  
*Lonicera myrtillus* Hook.f. & Thoms., 2700m (S)  
*Lonicera quinquelocularis* Hardw., 2100m (S)  
*Viburnum cotinifolium* D.Don 2850m (S)  
*Viburnum grandiflorum* Wall. ex DC. 2550m (S)  
*Viburnum mullaha* Buch.-Ham.ex D.Don, 2200m (S)  
*Viburnum nervosum* D.Don, 2700m (S)

#### Rubiaceae

*Galium acutum* Edgew. 3000m (H)  
*Galium aparine* L., 2100m  
*Galium asperifolium* Wall., 2800m (H)  
*Galium asperuloides* Edgew. 2800m (H)  
*Himalrandia tetrasperma* (Wall. ex Roxb.) T. Yamaz. 2050m (S)  
*Leptodermis lanceolata* Wall. 2000m (H)  
*Spermadictyon suaveolens* Roxb., 2050m (S)  
*Rubia cordifolia* L. 1750m (H)

#### Valerianaceae

*Nardostachys jatamansi* (D.Don) DC. 3200m (H)  
*Valeriana hardwickii* Wall., 2860m (H)  
*Valeriana himalayana* Grub. 3250m (H)  
*Valeriana jatamansi* W. Jones 2400m (H)

#### Dipsacaceae

*Dipsacus inermis* Wall. 2600m (H)  
*Triplostegia glandulefera* Wall. ex DC., 3000m (H)

**Morinaceae**

*Morina longifolia* Wall. ex DC., 3000m (H)

**Asteraceae**

- Adenoclonium himalaicum* Edgew., 2750m (H)  
*Ainsliaea aptera* DC., 2150m (H)  
*Ainsliaea latifolia* (D.Don) Sch. Bip., 2450m (H)  
*Anaphalis contorta* (D.Don) Hook.f., 2300m (H)  
*Anaphalis margaritacea* (L.) Benth., 3000m (H)  
*Anaphalis royleana* DC., 2750m (H)  
*Anaphalis triplinervis* (Sims.) C.B. Clarke, 2630m (H)  
*Anaphalis virgata* Thoms. ex Clarke, 2600m (H)  
*Artemisia roxburghiana* Besser, 2600m (H)  
*Artemisia nilgirica* Clarke 2000m (H)  
*Aster albescens* (DC.) Wall. ex Hand.-Mazz. 2700m (H)  
*Aster diplostaphoides* (DC.) C.B. Clarke, 2800m (H)  
*Aster menthoides* (Benth.) Govaerts, 2900m (H)  
*Aster peduncularis* Wall. ex Nees, 2750m (H)  
*Bidens pilosa* L., 2100m (H)  
*Cirsium wallichii* DC., 2300m (H)  
*Cicerbita macrorhiza* (Royle) P. Beauv., 3300m (H)  
*Cicerbita violaefolia* (Decne.) Beauv., 3000m (H)  
*Conyza japonica* (Thunb.) Less. ex DC., 2100m (H)  
*Cremanthodium dacaisnei* C.B. Clarke, 3000m (H)  
*Doronicum kamaonense* (DC.) Aliv. Fern, 2400m (H)  
*Dubyaea hispida* DC., 2440m (H)  
*Erigeron multiradiatus* (Lindl. ex DC.) C.B. Clarke, 3300m (H)  
*Galinsoga parviflora* Cav., 2200m (H)  
*Gnaphalium affine* D. Don 2100m (H)  
*Gnaphalium hypoleucum* DC. 2100m (H)  
*Gerbera gossypina* (Royle) Beauv., 2300m (H)  
*Inula orientalis* Lam. 2730m (H)  
*Jurinea dolomiaea* Boiss. 3200m (H)  
*Leontopodium himalayanicum* DC., 3700m (H)  
*Ligularia amplexicaulis* DC., 3400m (H)  
*Ligularia sibirica* (L.) Cass. 2750m (H)  
*Mulgedium lacertianum* Wall. ex DC., 3160m (H)  
*Myriactis wallichii* Less. 2730m (H)  
*Parasanecio chenopodiifolius* (DC.) Grierson, 2660m (H)  
*Prenanthes brunoniana* Wall. ex DC. 2330m (H)  
*Saussurea auriculata* (DC.) Sch.-Bip. 3000m (H)  
*Saussurea leontodontoides* (DC.) Sch.-Bip., 3500m (H)  
*Saussurea obvallata* (DC.) Edgew. 4100m (H)  
*Saussurea roylei* C.B. Clarke, 3500m (H)  
*Senecio graciliflorus* DC., 2500m (H)  
*Sigesbeckia orientalis* L., 2400m (H)  
*Synotis alata* (Wall. ex DC.) Jeffery & Chen., 2400m (H)  
*Synotis kunthiana* (Wall. ex DC.) Jeffery & Chen., 3050m (H)  
*Synotis rufinervis* (DC.) Jeffrey & Chen., 2400m (H)  
*Tagetes minuta* L., 2100m (H)  
*Tanacetum dolichophyllum* (Kitam.) Kitam. 3600m (H)  
*Taraxacum officinale* Weber., 2650m (H)  
*Tragopogon gracilis* D. Don, 2300m (H)  
*Waldhemia glabra* (Decne.) Regel. 3700m (H)

**Campanulaceae**

- Campanula argyrotricha* Wall. ex DC., 3020m (H)  
*Campanula pallida* Wall., 2300m (H)  
*Codonopsis rotundifolia* Benth., 3000m (C)  
*Cyananthus lobatus* Wall. ex Benth. 3000m (H)  
*Cyananthus microphyllus* Edgew. 3300m (H)

**Ericaceae**

- Cassiope fastigiata* (Wall.) D. Don, 3100m (H)  
*Gaultheria nummularioides* D. Don, 2800m (H)  
*Gaultheria trichophylla* Royle, 3100m (H)  
*Lyonia ovalifolia* (Wall.) Drude, 1750m (T)  
*Rhododendron anthopogon* D. Don, 3000m (S)  
*Rhododendron arboreum* Sm., 2400m (T)  
*Rhododendron campanulatum* D. Don, 2850m (S)  
*Rhododendron lepidotum* Wall. ex D. Don, 2800m (S)

**Primulaceae**

- Androsace globifera* Druce, 2200m (H)  
*Androsace sermentosa* Wall. 2300m (H)  
*Lysimachia prolifera* Klatt, 2800m (H)  
*Primula denticulata* Sm., 3200m (H)  
*Primula elliptica* Royle, 3200m (H)  
*Primula macrophylla* D. Don, 3100m (H)  
*Primula stewartii* Wall. 3500m (H)

**Symplocaceae**

- Symplocos chinensis* (Lour.) Druce., 2400m (T)  
*Symplocos ramossissima* Wall. ex D. Don, 2200m (T)

**Oleaceae**

- Fraxinus micrantha* Linghesh 2200m (T)  
*Jasminum dispernum* Wall., 2050m (C)  
*Syringa emodi* Wall. ex G. Don, 2400m (T)

**Asclepiadaceae**

- Cynanchum auriculatum* Royle ex Wight, 2100m (H)  
*Marsdenia roylei* Wight, 2100m (C)

**Gentianaceae**

- Gentiana albicalyx* Burkill. 2350m (H)  
*Gentiana argentea* (Royle ex D. Don) Griseb., 2400m (H)  
*Gentiana capitata* Buch.-Ham. ex D. Don, 3000m (H)  
*Gentiana carinata* (D. Don) Griseb., 3200m (H)  
*Gentiana stipitata* Edgew. 2600m (H)  
*Gentiana tubiflora* Wall. ex Griseb., 3500m (H)  
*Gentianella pedunculata* (D. Don) H. Sm. 2750m (H)  
*Halenia elliptica* D. Don, 2000m (H)  
*Lomatogonium carinthiacum* Reichb., 3250m (H)  
*Swertia angustifolia* Buch.-Ham. ex D. Don, 2300m (H)  
*Swertia chirayita* (Roxb. ex Fleming) Karsten, 1900m (H)  
*Swertia ciliata* (D. Don ex G. Don) B.L. Burt., 2500m (H)  
*Swertia cordata* (Wall. ex G. Don) C.B. Clarke, 2900m (H)  
*Swertia cuneata* D. Don, 3200m (H)  
*Swertia speciosa* D. Don, 2700m (H)

**Boraginaceae**

- Arnebia benthami* (Wall. ex G. Don) J.M. Johnston, 3300m (H)  
*Arnebia euchroma* (Royle) Johnston., 3650m (H)  
*Cynoglossum glochidiatum* Wall. ex Benth., 2800 (H)  
*Cynoglossum lanceolatum* Forssk., 2300m (H)  
*Cynoglossum nervosum* Benth. 2300m (H)  
*Cynoglossum zeylanicum* (Vahl) Thunb. ex Lehm. 2850m (H)  
*Cynoglossum wallichii* G. Don, 2400m (H)  
*Eritrichium canum* (Benth.) Kitam., 2900m (H)  
*Hackelia uncinata* (Benth.) Fisch., 3010m (H)

**Cuscutaceae**

- Cuscuta reflexa* Roxb. 2050m (C)

**Solanaceae**

- Nicandra physalodes* (L.) Gearn., 2100m (H)

**Scrophulariaceae**

- Euphrasia himalaica* Wettst., 3000m (H)  
*Hemiphragma heterophyllum* Wall. 2500m (H)  
*Falconeria himalaica* Hook.f. 3000m (H)  
*Lindenbergia grandiflora* (Buch.-Ham. ex D.Don) Benth., 2050m (H)  
*Pedicularis bifida* (Buch.-Ham.) Pennell, 2800m (H)  
*Pedicularis gracilis* Wall. ex Benth. 3100m (H)  
*Pedicularis hoffmeisterii* Klotz. 2750m (H)  
*Pedicularis pectinata* var. *rosea* Agnihotri & Hussain, 3000m (H)  
*Pedicularis punctata* Decne. 3400-3700m (H)  
*Picrorhiza kurrooa* Royle ex Benth., 3100m (H)  
*Scrophularia calycina* Benth., 3100m (H)  
*Scrophularia himalaica* Royle ex Benth. 2400m (H)  
*Verbascum thapsus* L., 2400m (H)  
*Veronica cana* Wall. ex Benth. 3300m (H)

**Orobanchaceae**

- Orobanche alba* Stephan ex Willd., 2700m (H)

**Gesneriaceae**

- Chirita pumila* D.Don, 2200m (H)  
*Didymocarpus aromaticus* Wall. ex D.Don, 2000m (H)

**Acanthaceae**

- Dicliptera bupleuroides* Nees, 2050m (H)  
*Pteracanthus attenuatus* (C.B. Clarke) Bremek., 2400m (H)  
*Strobilanthus atropurpureus* Nees, 2600m (H)

**Verbenaceae**

- Calicarpa macrophylla* Vahl, 2100m (H)

**Lamiaceae**

- Ajuga brachystemon* Maxim., 2400m (H)  
*Clindopodim umbrosum* (M.Bieb.) Koch. 2700m (H)  
*Coleus barbetus* (Andrews) Benth. 1600m (H)  
*Elsholtzia fruticosa* (D.Don) Rehder. 2300m (H)  
*Elsholtzia pilosa* (Benth.) Benth., 2500m (H)  
*Elsholtzia strobilifera* Benth., 2350m (H)  
*Lamium album* L., 2400m (H)  
*Leucas lanata* Benth., 2200m (H)  
*Micromeria biflora* (Buch.-Ham ex D.Don) Benth., 2100m (H)  
*Nepeta eriostachya* Benth. 2300m (H)  
*Nepeta govaniana* (Wall. ex Benth.) Benth. 2500m (H)  
*Origanum vulgare* L. 2600m (H)  
*Phlomis bracteosa* Royle ex Benth 2800m (H)  
*Prunella vulgaris* L., 2400m (H)  
*Salvia hians* Royle ex Benth., 1800m (H)  
*Salvia nubicola* Wall. ex Sweet., 2400m (H)  
*Stachys melissaeifolia* Benth., 2400-3600m (H)  
*Thymus linearis* Benth., 2300-3700m (H)

**Plantaginaceae**

- Plantago himalaica* Pilger, 2700m (H)

**Amaranthaceae**

- Achyranthes bidentata* Bl., 2400m (H)  
*Cyathula capitata* Moq., 2500m (H)  
*Cyathula tomentosa* (Roth.) Moq., 2300m (H)

**Chenopodiaceae**

- Chenopodium album* L., 2500m (H)

**Phytolaccaceae**

- Phytolacca acinosa* Roxb. 2000-2700m (H)

**Polygonaceae**

- Aconogonum rumicifolium* (Royle ex Bab.) H.Hara, 3100-3700m (H)  
*Bistorta affinis* (D.Don) Greene, 2500-3800m (H)  
*Bistorta macrophylla* (D.Don) Sojak, 3000-3700m (H)  
*Bistorta vacciniifolia* (Wall. ex Meissn.) Greene, 3300m (H)  
*Fagopyrum dibotrys* (D.Don) Hara, 1800-2600m (H)  
*Koenigia delicatula* (Meissn.) Mesicek & Sojak 2600-3500m (H)  
*Oxyria digyna* (L.) Hill, 3200m (H)  
*Persicaria amplexicaulis* (D.Don) Ronse Decr. 2500m (H)  
*Persicaria nepalensis* (Meissn.) H. Gross 2700m (H)  
*Persicaria polystachya* Wall. ex Meissn., Gross 3300m (H)  
*Persicaria sinuata* (Royle ex Bab.) Rajbh. & R. Joshi, 3300m (H)  
*Polygonum capitatum* Buch.-Ham ex D.Don, 2050m (H)  
*Polygonum nummularifolium* Meissn., 4000m (H)  
*Polygonum paniculatum* L. 3000m (H)  
*Rheum emodi* Wall. ex Meissn 3400m (H)  
*Rheum moorcroftianum* Royle, 3250m (H)  
*Rheum webbianum* Royle, 2500m (H)  
*Rubrivena polystachya* (Wall. ex Meissn.) M.Král, 3300m (H)  
*Rumex acetosa* L., 2900m (H)  
*Rumex nepalensis* Spreng., 3000m (H)

**Piperaceae**

- Peperomia tetraphylla* (Forst.) Hook. & Arn., 2400m (H)

**Lauraceae**

- Cinnamomum tamala* (Buch.-Ham.) T. Nees & Eberm., 1900m (T)  
*Litsea elongata* (Nees) Hook.f., 2300m (T)  
*Neolitsea cuipala* (Buch.-Ham. ex D.Don) Kosterm., 2200m (T)  
*Persea odoratissima* (Nees) Kosterm., 1850m (T)

**Thymelaeaceae**

- Daphne papyracea* Wall.exsteud., 2400m (S)

**Elaeagnaceae**

- Elaeagnus parvifolia* Wall. ex Royle, 2400m (S)  
*Hippophae salicifolia* D.Don, 2700m (T)

**Buxaceae**

- Buxus wallichiana* Baill., 2200m (T)  
*Sarcococca hookeriana* D.Dun. 2000m (S)

**Euphorbiaceae**

- Euphorbia pilosa* L., 2200m (H)  
*Euphorbia stracheyi* Boiss., 2700m (H)

**Daphniphyllaceae**

- Daphniphyllum himalayense* (Benth.) Mull.-Arg., 2200m (T)

**Ulmaceae**

- Celtis australis* L., 2100m (T)

**Moraceae**

- Ficus auriculata* Lour. 1600m (T)  
*Ficus hederacea* Roxb., 2400m (C)  
*Ficus semicordata* Buch.-Ham. ex Sm. 2100 (T)  
*Ficus subincisa* Buch.-Ham. ex Sm. 2100m (T)

**Urticaceae**

- Boehmeria macrophylla* Hornem. 2050m (S)  
*Boehmeria macrophylla* var. *scabrella* (Roxb.) D.G.Long, 2100m (S)



*Debregesia salicifolia* (D. Don) Rendle, 1800m (S)  
*Elatostema monandrum* (Buch.-Ham. ex D. Don) Hara, 2800m (H)  
*Girardinia diversifolia* (Link.) Friis, 2200m (S)  
*Pilea racemosa* (Royle) Tuyama, 2300m (H)  
*Pilea scripta* (Buch.-Ham. ex D. Don) Wedd., 2200m (H)  
*Pilea umbrosa* Wedd., 2500m (H)  
*Pouzolzia zeylanica* (L.) Benn. 2200m (H)  
*Urtica dioica* L., 2500m (S)

#### Juglandaceae

*Juglans regia* L., 2100m (T)

#### Myricaceae

*Myrica esculenta* Buch.-Ham. ex D. Don, 2300m (T)

#### Betulaceae

*Alnus nepalensis* D. Don, 2100m (T)  
*Betula utilis* D. Don, 2800-3700m (T)  
*Betula alnoides* Buch.-Ham. ex D. Don, 2200-2600m (T)  
*Carpinus viminea* Lindl., 2100m (T)

#### Fagaceae

*Quercus floribanda* Rehder, 2000-2800m (T)  
*Quercus leucotrichophora* A. Camus, 2300m (T)  
*Quercus semecarpifolia* Sm. 2400-3300m (T)

#### Salicaceae

*Populus ciliata* Wall. ex Royle, 2500m (T)  
*Salix calyculata* Hook. f. ex Anderss., 3300m (S)  
*Salix denticulata* Anderss., 2500m (S)  
*Salix flabellaris* Ander. 3300m (S)  
*Salix lindleyana* Wall. ex Anderss., 3200m (S)

#### Orchidaceae

*Calanthe plantaginea* Lindl., 2200 (H)  
*Cypripedium elegans* Reichb. f. 2800 (H)  
*Dactylorhiza hatagiea* (D. Don) Soo, 3000m (H)  
*Dienia cylindrostachya* Lindl. 2500m (H)  
*Epipectis helleborine* (L.) Crantz., 2450m (H)  
*Gooderya fusca* (Lindl.) Hook. f., 2700 (H)  
*Gooderya repens* (L.) R. Br., 2900m (H)  
*Gymnedenia orchidis* Lindl. 2900m (H)  
*Malaxis acuminata* D. Don, 2300m (H)  
*Malaxis mucifera* (Lindl.) Kuntze. 3000m (H)  
*Peristylus elisabethae* (Duthie) Gupta, 2700m (H)  
*Satyrium nepalense* D. Don, 2500m (H)

#### Zingiberaceae

*Cautleya spicata* (Sm.) Baker, 2300m (H)  
*Hedychium spicatum* Buch.-Ham. ex Sm. 2200m (H)  
*Roscoea alpina* Royle, 2550m (H)  
*Roscoea purpurea* Sm. 2600 (H)

#### Haemodoraceae

*Aletris passiflora* (Klotzsch) Hand.-Mazz. 3200m (H)  
*Ophiopogon intermedius* D. Don, 2500 (H)

#### Iridaceae

*Iris kemaonensis* Wall. ex D. Don, 3200m (H)

#### Dioscoreaceae

*Dioscorea bulbifera* L., 2050m (C)  
*Dioscorea deltoidea* Wall. ex Griseb. 2400 (H)

#### Amaryllidaceae

*Allium strecheyi* Baker, 3100m (H)  
*Allium wallichii* Kunth, 3300m (H)

#### Liliaceae

*Asparagus curillus* Buch.-Ham. ex Roxb., 2050m (S)  
*Clintonia udensis* Trautv. (Kunth ex Baker) Hara, 3000m (H)  
*Fritillaria roylei* Hook. 3200m (H)  
*Lloydia longiscapa* Hook. f. 3300m (H)  
*Nomocharis oxypetala* (Royle) Wilson, 3500m (H)  
*Polygonatum geminiflorum* Decne. 3200m (H)  
*Polygonatum multiflorum* (L.) All., 2700m (H)  
*Polygonatum verticillatum* (L.) All., 2300m (H)  
*Smilacina purpurea* Wall. 2800m (H)  
*Steptopus simplex* D. Don, 2600m (H)  
*Theropogon pallidus* (Kunth.) Maxim. 2350m (H)  
*Trillidium govonianum* Wall. ex D. Don, 3550m (H)

#### Smilacaceae

*Smilax aspera* L., 2100m (C)  
*Smilax elegans* Wall. ex Kunth, 2200m (C)

#### Commelinaceae

*Commelina paludosa* Bl., 2200m (H)  
*Murdannia spirata* (L.) Bruckn., 2000m (H)

#### Juncaceae

*Juncus clarkei* Buchenau, 2800m (H)  
*Juncus concinnus* D. Don, 2600m (H)  
*Juncus himalensis* Klotzsch & Garcke. (H)

#### Araceae

*Acorus calamus* L., 2200m (H)  
*Arisaema jacquemontii* Blume., 2900m (H)  
*Arisaema propinquum* Schott, 2600m (H)

#### Cyperaceae

*Bulbostylis capillaris* (L.) Kunth ex C. B. Clarke 2400m (Sd)  
*Carex cruciata* Wahlenb. 2300m (Sd)  
*Carex nivalis* Boott, 3400m (Sd)  
*Carex nubigena* D. Don ex Tillich & Taylor, 3000m (Sd)  
*Carex setosa* Boott, 3000m (Sd)  
*Carex obscura* Nees, 3200m (Sd)  
*Cyperus cyperoides* (L.) Kuntz. 2200m (Sd)  
*Eriphorum comosum* (Wall.) Wall. ex C. B. Clarke, 2200m (Sd)  
*Fimbristylis dichotoma* (L.) Vahl, 2050m (Sd)  
*Kobresia nepalensis* (Nees) Kukenthal, 3600m (Sd)

#### Poaceae

*Andropogon munroi* Cl., 2450m (G)  
*Agrostis pilosula* Trin., 2600m (G)  
*Apluda mutica* L., 2100m (G)  
*Arthraxon lancifolius* (Trin.) Hochst., 2100m (G)  
*Arundinella bengalensis* (Spreng.) Druce, 2050m (G)  
*Bothriochloa bladhii* (Retz.) Blake, 2100m (G)  
*Calamagrostis pseudophragmites* (Hall.) Koeler, 2600m (G)  
*Chrysopogon gryllus* (L.) Trin., 2050m (G)  
*Cymbopogon distans* (Nees ex Steud.) W. Watson, 2300m (G)  
*Danthonia cashmeriana* Jaub. & Spach. 3100m (G)  
*Digitaria ciliaris* (Retz.) Koel., 2100m (G)  
*Digitaria setigera* Roth, 2500m (G)  
*Drepanostachyum falcatum* (Nees), 2100m (S)  
*Eleusine indica* (L.) Gaerth., 2100m (G)  
*Eragrostis nigra* Nees ex Steud., 2350m (G)  
*Eulalia mollis* (Griseb.) Kuntz., 2200m (G)

*Festuca gigantea* (L.) Vill., 2600m (G)  
*Festuca rubra* L. 2900m (G)  
*Festuca valesiaca* Schleich. ex Gaudin, 3000m (G)  
*Helictotrichon aspersum* (Manno) Bor, 2500m (G)  
*Isachne albens* Trin., 2100m (G)  
*Microstegium nudum* (Trin.) A. Camus, 2050m (G)  
*Miscanthus nepalensis* (Trin.) Hack., 2400m (G)  
*Oplismenus compositus* (L.) P. Beauv. 2050m (G)  
*Oplismenus undulatifolius* (Ard.) Roem. & Schult. 2100m (G)  
*Pennisetum glaucum* (L.) R. Br., 2300m (G)  
*Pennisetum orientale* Rich., 2400m (G)  
*Phleum alpinum* L. 3000m (H)  
*Poa alpine* L. 3300m (G)  
*Poa annua* L. 3000m (G)  
*Saccharum rufipilum* Steud. 2300m (G)  
*Thamnocalamus falconeri* Hook. f. ex Munro, 2700m (S)  
*Thamnocalamus spathiflorus* (Trin.) Munro, 2500m (S)  
*Trisetum clarkei* (Hook. f.) Stewart, 3000m (G)

### Ephedraceae

*Ephedra gerardiana* Wall. ex Stapf, 4000m (S)

### Cupressaceae

*Juniperus communis* L. 3300m (S)  
*Juniperus indica* Bertol. 3400m (S)

### Taxaceae

*Taxus wallichiana* Zucc. 2700m (T)

### Pinaceae

*Abies pindrow* (Royle ex D. Don) Royle, 2700m (T)  
*Abies spectabilis* (D. Don) Mirb. 2800m (T)  
*Pinus roxburghii* Sarg. 2200m (T)

### Selaginellaceae

*Selaginella chrysocaulos* (Hook.) Spreng, 2100m

### Loxogrammeae

*Loxogramma involuta* (D. Don) Prest., 2300m  
*Loxogramma porcata* Price, 2200m

### Polypodiaceae

*Anthromeris wallichiana* (Spring) Ching, 2200m  
*Drynaria mollis* Bedd., 2400m  
*Drynaria propinqua* (Wall. ex Mett.) Bedd., 2200m  
*Lepisorus contortus* (Christ.) Ching., 2100m  
*Microsorium zippellii* (Blume) Ching. Bull., 2400m  
*Phymatopteris ebenipes* (Hook.) Pic. Ser., 2200m  
*Phymatopteris oxyloba* (Wall. ex Kunze) Pic. Ser., 2400m  
*Phymatopteris stracheyi* (Ching) Pic. Ser., 2300m  
*Polypodioides amoenum* (Wall. ex Mett.) Ching, 2300m  
*Polypodioides lacnopus* (Wall. ex Hook.) Ching, 2500m  
*Polypodioides microrhizoma* (Clarke ex Baker) Ching, 2400m  
*Pyrrosia stictica* (Kunze) Holttum, 2500m

### Sinopteridaceae

*Cheilanthes albo-marginata* Clarke, 2050m  
*Cheilanthes dalhousiae* Hook., 2050m

### Cryptogrammaceae

*Onychium contiguum* Wall. ex Hope, 2100m

### Pteridaceae

*Pteris cretica* L., 2100m  
*Pteris pseudoquadriaurita* Khullar ex Khullar, 2600m  
*Pteris wallichiana* Aghard., 2500m

### Adiantaceae

*Adiantum edgeworthi* Hook., 2050m  
*Adiantum capillus-veneris* L., 2050m

### Hemiontidaceae

*Coniogramma affinis* Wall. ex Hieron, 2200m  
*Coniogramma caudata* (Wall. ex Ett.) Ching, 2300m

### Vittariaceae

*Vittaria flexuosa* Fee, 2200m

### Aspleniaceae

*Asplenium dalhousiae* Hook., 2100m  
*Asplenium ensiforme* Wall. ex Hook. & Grev., 2200m  
*Asplenium indicum* Sledge, 2100m  
*Asplenium tenuicaule* Hayata, 2500m  
*Asplenium planicaule* Wall. ex Mett., 2400m

### Woodsiaceae

*Woodsia elongata* Hook., 2200m

### Athyraceae

*Athyrium aitkinsonii* Bedd., 2100m  
*Athyrium fimbriatum* (Wall. ex Kook.) Moore, 2050m  
*Athyrium schimperii* Moug ex Fee, 2100m  
*Diplazium esculentum* (Retz.) Sw., 2100m  
*Diplazium maximum* (D. Don) C. Chr., 2100m

### Dryopteridaceae

*Dryopteris cochleata* (Buch-Ham. ex D. Don) C. Chr., 2050m  
*Dryopteris redactopinnata* Basu & Panigrahi, 2400m  
*Dryopteris wallichiana* (Spreng in L.) Hayland, 2500m  
*Polystichum squarrosus* (D. Don) Fee, 2200m  
*Polystichum stimulans* (Kunze. ex Mett.) Bedd., 2100m

### Davalliaceae

*Araiostegia pulchra* (D. Don) Copel, 2100m  
*Leucostegia immersa* (Wall. ex Hook.) Presl., 2100m

### Blechnaceae

*Woodwardia unigameta* (Makino) Nakai, 2300m

H= Herb, S= Shrub, T=Tree, Sd= Sedge, G= Grass, C= Climber

### सुन्दरडूंगा घाटी, उत्तराखण्ड, पश्चिमी हिमालय की

#### पादप-विविधता पर प्रेक्षण

गजेन्द्र सिंह, नवीन चन्द्रा, विनीत पाल, ललित मोहन तिवारी एवं  
महेन्द्र प्रताप सिंह बिष्ट

#### सारांश

विभिन्न विषय वस्तुओं पर पश्चिमी हिमालय में असंख्य अन्वेषणों और गहन अध्ययनों के बावजूद कई क्षेत्र अभी भी नहीं खोजे जा सकते हैं। ऐसा ही एक क्षेत्र पश्चिमी हिमालय में सुन्दरडूंगा घाटी, बागेश्वर (उत्तराखण्ड) है। 2017-18 में एक विस्तृत पादपी सर्वेक्षण किया गया। 2000 मी. से ऊपर की ऊँचाई पर करीब 75 वर्ग कि.मी. वानस्पतिक क्षेत्र के भीतर आवृतबीजियों को कुल 520 प्रजातियों (286 वंश और 92 कुल), टेरीडोफाइटों की 45 प्रजातियां (24 वंश और 15 कुल) और अनावृतबीजियों की 7 प्रजातियां (5 वंश और 4 कुल) अभिलिखित की गई। आवृतबीजियों में प्रधान कुल एस्टीरेसीया (47), रोसेसीया (37), पोएसीया (34), रेनुकुलेसीया (20) और पॉलीगोनेसीया

(19) और फनों में पॉलीपोडिप्सीया (12) और एसप्लीनिप्सीया (5) थी। वर्धमान मौसम (जून-सितम्बर) के दौरान लोगो और पशुधन को निम्न पहुँच और कठिन भूभाग के कारण घाटी में प्रचुर विविधता होती है।

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