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AN INVENTORY OF THE FLORA OF BINOG WILDLIFE SANCTUARY, MUSSOORIE, GARHWAL HIMALAYA

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ABSTRACT

Systematic survey on the vascular plants was conducted in the Binog Wildlife Sanctuary, located in the outermost hill ranges of the Garhwal Himalaya. A total of 300 species of angiosperms (211 genera and 86 families), 31 species of Pteridophytes (23 genera and 14 families) and 4 species of Gymnosperms (3 genera and 2 families) were recorded from 1081.97 hectare area, between 1500-2330 m altitudes. The dominant families of Angiosperms were Asteraceae (19 genera, 32 species), Papilionaceae (14 genera, 22 species), Lamiaceae (12 genera, 22 species), Rosaceae (11 genera, 18 species), Poaceae (13 genera, 15 species), Ranunculaceae (5 genera, 9 species), Lauraceae (4 genera, 7 species), Polygonaceae (3 genera, 7 species), Urticaceae (5 genera, 6 species) and Rubiaceae (4 genera, 6 species). In Gymnosperms, only two families (Coniferae and Cupressaceae) were recorded of which Coniferae had 3 species while Cupressaceae had only one species. A total of 31 species of Pteridophytes were recorded from the region in which family Polypodiaceae (6 genera, 8 species) was dominant.

Key Words: Floristic Inventory, Mussoorie, Garhwal Himalaya.

INTRODUCTION

The Himalayan mountains, one of the most remarkable physical features in the Indian Himalayan region, represents structurally complex, tectonically active, biologically diverse, ecologically fragile and young eco-region. These mountains are a reservoir of many natural resources, of which the vegetational aspect is predominant. Although, several workers took interest in the collection and presentation of Himalayan flora even before the 19th century (Duthie 1906) up to recent (Gaur 1999), still a comprehensive account, especially on the exploration on intricate valleys is lacking. The Garhwal Himalaya, western part of the Uttarakhand state is trapped between three different floristic provinces-Tibetan province in the North, Upper Gangetic Plain Province in the South and Eastern Himalayan Provinces in the East and thus makes a transition zone of characteristics of these three floristic provinces. According to cumulative estimate Garhwal Himalaya has more than 3500 species of flowering plants most of which are in temperate forests and alpine meadows. As many as 427 species of flowering plants have been listed under various categories of 'Indian Red Data Book' (Nayar and Sastry 1987, 1988 and 1990) of which 30 species have been found distributed in Garhwal Himalaya.

The Garhwal Himalaya has been extensively surveyed in terms of flora by a large number of workers. Quite comprehensive information on the Garhwal flora has also been included in 'Flora Indica' by Hooker and Thomson (1855) and 'Flora of British India' in seven volumes (1872-1897) by Hooker. First collection of plants from Mussoorie was made by Royle, in 1824 and subsequent workers (Jameson 1842-1846, Royle 1833-1840, Marten 1909, Allen 1919) had also work on the floristics of the region. In 1942, Stewart published '*The Ferns of Mussoorie and Dehradun*'. Kanjilal (1963) wrote a flora of Chakrata, Dehradun and Saharanpur forest division. Gupta (1968) published flora of Nainital. Raizada (1976) supplemented the Duthie's flora of Upper Gangetic plains and of the adjacent Shiwalik and sub-Himalayan tracts. Babu (1977) and Raizada & Saxena (1978) studied herbaceous flora of Dehradun and flora of Mussoorie respectively. Last publication on the floristic diversity of the Mussoorie region was by Raizada (1977) and described about 1331 plants including Phanerogams, Ferns, and Fern Allies.

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However, several botanical explorations have been conducted in various parts of the Garhwal Himalaya, but very few studies have been followed in particular to the National parks and Wildlife Sanctuaries. As there was no study in Mussoorie after 1977, almost three decades gap, therefore, an attempt was made to study the floristic inventory of Binog Wildlife Sanctuary in Mussoorie, Garhwal Himalaya.

MATERIALS AND METHODS

Study area: The study was conducted in Binog Wildlife Sanctuary (28° 60' - 31°28' N, 70°49' - 80°60' E) also known as Mountain Quail Wildlife Sanctuary in Mussoorie Forest Division of Dehradun district, Garhwal Himalaya. It lies in the outer most ridges of Himalaya that runs approximately in west-east direction. The sanctuary spreads over an area of 1081.97 hectares (1500 to 2330 m asl). The rainfall approximates from 1800 to 3000 mm annually on the northern aspects. The principle rock in its various forms is Limestone. The soil in the region is generally medium loam but its composition, depth, moisture and humus content varies considerably from place to place depending upon aspect, slopes and soil cover. Physiographically the sanctuary is characterized by undulating topography. The Binog hill being isolated one lying to the north of the outer ridge is separated by the Ringali River. All the aspects are represented in the region, though northern is the most common (Management Plan 1999). According to Champion and Seth (1968) three major forest types are found in Binog Wildlife Sanctuary viz., Banj oak forests, Chir Pine forests and Grasslands/blanks.

Floristic & Ecological Survey: The present work is based on the detailed and careful survey and collection of vascular plants in Binog Wildlife Sanctuary during 2009-2010. The floristic surveys and specimen collections were carried out on foot following the existing trails at different altitudinal zones and landforms e.g., valleys, forested areas and rocky outcrops. Trails were sampled in all three existing forest types viz., a) Ban Oak Forests (BOF), b) Chir-Pine Forests (CPF) and c) Grassy slopes / forest blanks (GS). Identification of plants in the field was made with the help of available floras, research papers and reports (e.g., Raizada 1977, Polunin and Stainton 1984, Osmaston 1927) of the region. Unidentified plants were collected and preserved following Jain and Rao (1976) and brought to Wildlife Institute of India (WII) Dehra Dun for further examination and identification. Herbarium of WII and Forest Research Institute Dehra Dun (DD) were consulted to cross check the identity of various species. The threatened plant species found in the sanctuary was recorded with the help of published work (Nayar and Sastry 1990).

RESULTS AND DISCUSSION

Species richness and diversity:

During the study 335 species of vascular plants (Angiosperms, Gymnosperms and Pteridophytes) belonging to 237 genera and 102 families were recorded from the study area. Of these, 300 species were Angiosperms (86 families and 211 genera), 4 Gymnosperms and 31 Pteridophytes. Where there were 186 herbs, 71 shrubs, 19 climbers and 58 tree species (Table 1). Among Angiosperm monocots are represented by 32 species belonging to 27 genera and 10 families, while dicots contributed by 270 species belonging by 184 genera and 76 families. The ratio of monocotyledons (monocot) and dicotyledons (dicot) families, genera and species are 1: 7.6, 1: 7 and 1: 8.3 respectively.

The foremost families of Angiosperms in the Binog Wildlife Sanctuary are Asteraceae (19 genera, 32 species), followed by Papilionaceae (14 genera, 22 species), Lamiaceae (12 genera, 22 species), Rosaceae (11 genera, 18 species), Poaceae (13 genera, 15 species), Ranunculaceae (5 genera, 9 species), Lauraceae (4 genera, 7 species), Polygonaceae (3 genera, 7 species), Urticaceae (5 genera, 6 species and Rubiaceae (4 genera, 6 species). In Gymnosperms, only two families (Coniferae and Cupressaceae) were recorded of which Coniferae had 3 species while Cupressaceae had only one species. A total of 31 species of Pteridophytes were recorded from the region in which family Polypodiaceae (6 genera, 8 species) was dominant. **Threatened taxa:** Three plant species were found threatened (two vulnerable viz. *Acer caesium* and *Dioscorea deltoidea* and one endangered viz., *Acer oblongum*) from the sanctuary.

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Table 1: Floristic details of Binog Wildlife Sanctuary

Groups		F	G	S	T	Sh	H	C
Angiosperms	Dicots	76	184	270	53	71	130	14
	Monocots	10	27	32	1	--	25	5
Gymnosperms		2	3	4	4	--	--	--
Pteridophytes		14	23	31	--	--	31	--
Total		102	237	337	58	71	186	19

F=Family; G=Genera; S=Species; T=Tree; Sh=Shrub; H=Herb; C=Climber.

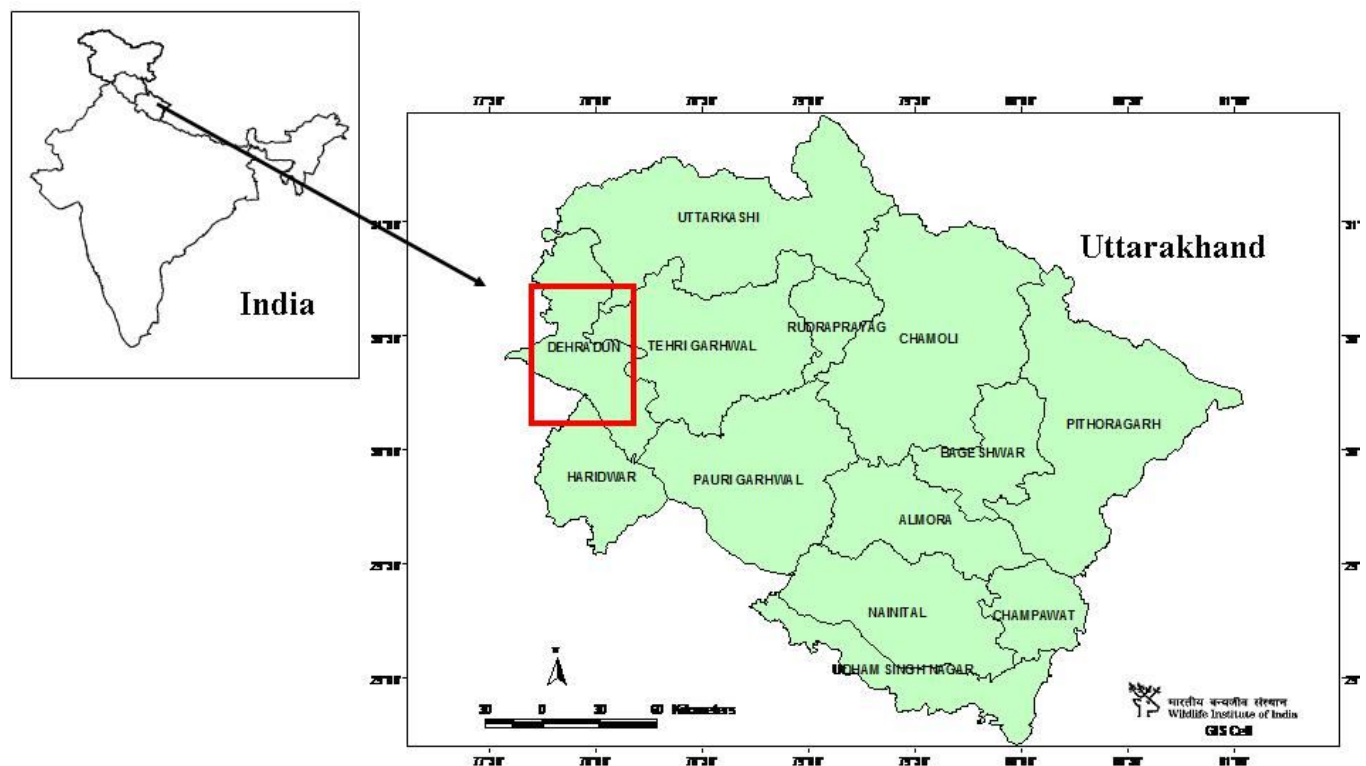


Figure 1: Map showing the intensive study site

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Table 2: List of Vascular Plants of Binog Wildlife Sanctuary

S. No.	Botanical name	Family	Local name	Habit	Habitat	Altitude (m)	IUCN status
1	<i>Aquilegia pubiflora</i> Wall.	Ranunculaceae	-	Herb	BOF	1500-3000	-
2	<i>Clematis buchananiana</i> DC.	Ranunculaceae	-	Climber	BOF, CPF	1500-3000	-
3	<i>Clematis gouriana</i> Roxb.	Ranunculaceae	Bel Kum, Bel Kungu	Climber	BOF, CPF	300-1000	-
4	<i>Clematis montana</i> Buch.	Ranunculaceae	Kujju, Kunju	Climber	BOF	1200-3600	-
5	<i>Clematis nepaulensis</i> DC.	Ranunculaceae	-	Climber	BOF	1350-2100	-
6	<i>Delphinium denudatum</i> Wall.	Ranunculaceae	Lili	herb	BOF	1450-3000	-
7	<i>Ranunculus laetus</i> Wall ex D. Don.	Ranunculaceae	-	Herb	BOF	1500-2200	-
8	<i>Ranunculus hirtellus</i> Royle.	Ranunculaceae	-	Herb	BOF	Up to 2000	-
9	<i>Thalictrum foliolosum</i> DC.	Ranunculaceae	Mamiri,	Herb	BOF, CPF	1500-2200	-
10	<i>Schizandra grandiflora</i> Hook. f. & Th.	Schisandraceae	Bani, Agati	Climber	BOF	Up to 3200	-
11	<i>Cissampelos pariera</i> Linn.	Menispermaceae	Parhe, Hajori	Climber	CPF	Up to 1800	-
12	<i>Berberis asiatica</i> Roxb.	Berberidaceae	Kingor, Rasaut	Shrub	BOF	900-3300	-
13	<i>Berberis chitria</i> Lindl.	Berberidaceae	Kingor, Chhota Totar	Shrub	BOF	1800-2700	-
14	<i>Berberis lycium</i> Royle.	Berberidaceae	Kingor	Shrub	BOF	1800-2700	-
15	<i>Mahonia borealis</i> Takeda.	Berberidaceae	Totar	Shrub	BOF	1700-2100	-
16	<i>Mahonia nepaulensis</i> DC.	Berberidaceae	Bara Totar	Shrub	BOF	1500-2100	-
17	<i>Argemone maxicana</i> Linn.	Papaveraceae	-	herb	GS	Up to 1500	-
18	<i>Capsella bursa-pastoris</i> Medic.	Cruciferae	-	Herb	CPF, GS	Up to 1500	-
19	<i>Viola canescans</i> Wall.	Violaceae	-	Herb	BOF	above 1500	-
20	<i>Viola serpens</i> Wall.	Violaceae	Banapsa	Herb	BOF	above 1500	-
21	<i>Arenaria serpyllifolia</i> Linn.	Caryophyllaceae	-	Herb	BOF	Up to 3600	-
22	<i>Stellaria media</i> Linn.	Caryophyllaceae	-	Herb	BOF	Up to 3600	-
23	<i>Hypericum dyeri</i> Rehder.	Hypericaceae	Ghia	Shrub	CPF, GS	1500-2400	-
24	<i>Hypericum oblongifolium</i>	Hypericaceae	Phiunli	Shrub	CPF, GS	1500-2100	-

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	Choisy.						
25	<i>Hypericum perforatum</i> Linn.	Hypericaceae	-	Shrub	CPF, GS	900-2400	-
26	<i>Eurya acuminata</i> DC.	Theaceae	-	Tree	BOF	900-2100	-
27	<i>Malva neglecta</i> Wallr.	Malvaceae	-	Herb	BOF, GS	Up to 3000	-
28	<i>Grewia elastica</i> Royle.	Tiliaceae	-	Tree	GS	Up to 1800	-
29	<i>Grewia oppositifolia</i> Buch.	Tiliaceae	Bhimal	Tree	GS	Up to 1800	-
30	<i>Reinwardtia indica</i> Planch.	Linaceae	Basant, Phinli	Herb	BOF, CPF	Up to 1800	-
31	<i>Geranium nepalense</i> Sweet.	Geraniaceae	-	Herb	BOF, GS	1500-2700	-
32	<i>Geranium wallichianum</i> D.Don	Geraniaceae	Kaphul, Kaphla	Herb	BOF, GS	1900-3300	-
33	<i>Oxalis corniculata</i> Linn.	Oxalidaceae	-	Herb	GS	Up to 2100	-
34	<i>Oxalis debilis</i> DC.	Oxalidaceae	-	Herb	GS	900-2200	-
35	<i>Boenninghausenia albiflora</i> Reichb.	Rutaceae	Upania, Pissumar	Herb	BOF	1650-2400	-
36	<i>Zanthoxylum alatum</i> Roxb.	Rutaceae	Timru, Tejbai	Shrub	BOF	1200-2000	-
37	<i>Ailanthus altissima</i> (Mill.) Swingle	Meliaceae	-	Tree	BOF	Up to 2000	-
38	<i>Toona ciliata</i> Roem.	Meliaceae	Tun, toona	Tree	BOF, CPF	Up to 1200	-
39	<i>Toona serrata</i> Roem.	Meliaceae	Darli, Hill Tun, Dalra, Daul	Tree	BOF	900-2400	-
40	<i>Ilex dipyrrena</i> Wallch.	Aquifoliaceae	Kandara, kandra	Tree	BOF	1500-2400	-
41	<i>Euonymus pendulus</i> Wall.	Celastraceae	bhambel, Bhambela	Tree	BOF	900-2400	-
42	<i>Euonymus tingens</i> Wall.	Celastraceae	Bhameli, Roini	Tree	BOF	1800-3000	-
43	<i>Rhamnus virgatus</i> Roxb.	Rhamnaceae	Chandola, Thanthar	Shrub	CPF, GS	Up to 2700	-
44	<i>Sageretia oppositifolia</i> Brongn.	Rhamnaceae	Gonta, Bhaghmari	Shrub	BOF	Up to 2800	-
45	<i>Vitis himalayana</i> Brand.	Vitaceae	Banderbel, Binuni	Climber	BOF	1500-3300	-
46	<i>Vitis lanata</i> Roxb.	Vitaceae	Bhinana, Puliyana	Climber	BOF	Up to 1800	-
47	<i>Aesculus indica</i> Hook.f.	Hippocastanaceae	Baukhor, Chestnut, Pangar	Tree	BOF	1200-3000	-
48	<i>Acer caesium</i> Wall.	Aceraceae	Kanchli, Kainjal	Tree	BOF	1900-3000	Vulnerable

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49	<i>Acer oblongum</i> Wall.	Aceraceae	Kirmol	Tree	BOF	Up to 2000	Endangered
50	<i>Rhus parviflora</i> Roxb.	Anacardiaceae	Ninas, Ninawa, Tungla	Shrub	BOF	800-1800	-
51	<i>Rhus semialata</i> Murray.	Anacardiaceae	-	Shrub	CPF		-
52	<i>Rhus wallichii</i> Hook.f.	Anacardiaceae	Archoi	Shrub	BOF,GS	1200-2200	-
53	<i>Coriaria nepalensis</i> Wall.	Coriariaceae	Mansuri, Masuri	Shrub	BOF	Up to 2400	-
54	<i>Astragalus leucocephalus</i> Grah.	Papilionaceae	-	Herb	BOF,GS	300-2100	-
55	<i>Astragalus trichocarpus</i> Grah.	Papilionaceae	-	Herb	BOF,GS	1800-3000	-
56	<i>Crotolaria sessiliflora</i> Linn.	Papilionaceae	-	Herb	CPF,GS	Up to 2000	-
57	<i>Desmodium multiflorus</i> DC.	Papilionaceae	-	Shrub	BOF	1800-2200	-
58	<i>Desmodium tilifolium</i> Wall.	Papilionaceae	Chamlai	Shrub	BOF	1800-2200	-
59	<i>Flemingia bracteata</i> Wight.	Papilionaceae	-	Shrub	BOF	Up to 1500	--
60	<i>Flemingia strobilifera</i> R.Br.	Papilionaceae	-	Shrub	BOF	1800-2200	-
61	<i>Flemingia vestita</i> Benth.	Papilionaceae	-	Herb	BOF	Up to 2100	-
62	<i>Hedysarum astragaloides</i> Benth.	Papilionaceae	-	Herb	BOF,GS	Up to 2500	-
63	<i>Indigofera hererantha</i> Wall.	Papilionaceae	Kathi	Shrub	BOF,GS	1500-2400	-
64	<i>Indigofera gerardiana</i> Wall.	Papilionaceae	-	Shrub	BOF,GS	Up to 2500	-
65	<i>Lathyrus aphaca</i> Linn.	Papilionaceae	-	Trailing Herb	GS	Up to 2100	-
66	<i>Lathyrus sphaericus</i> Retz.	Papilionaceae	-	Herb	GS	Up to 1650	-
67	<i>Lespedza gerardiana</i> Grah.	Papilionaceae	-	Shrub	BOF	1500-3000	-
68	<i>Lespedza sericea</i> Thunb.	Papilionaceae	Kurinja	Shrub	BOF	Up to 2400	-
69	<i>Lespedza stenocarpa</i> Maxim.	Papilionaceae	-	Shrub	BOF	1000-1600	-
70	<i>Ougeinia oojeinensis</i> Benth.	Papilionaceae	Sandan	Tree	CPF,GS	Up to 1250	-
71	<i>Robinia pseudocasia</i> Linn.	Papilionaceae	Robinia	Tree	GS	Up to 1800	-
72	<i>Shutteria vestita</i> Wight & Arn.	Papilionaceae	-	Trailing Herb	BOF	2000	-

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73	<i>Trifolium pratense</i> Linn.	Papilionaceae	-	Herb	CPF,GS	1200-2400	-
74	<i>Trifolium repens</i> Linn.	Papilionaceae	-	Herb	CPF,GS	Up to 1800	-
75	<i>Uraria neglecta</i> Prain.	Papilionaceae	-	Herb	BOF	2200	-
76	<i>Vicia augustifolia</i> Linn.	Papilionaceae	-	Climber	CPF,GS	Up to 1800	-
77	<i>Vicia sativa</i> Linn.	Papilionaceae	-	Herb	CPF,GS	Up to 2250	-
78	<i>Caesalpinia decapetala</i> Roth.	Caesalpiniaceae	Kingraee	Shrub	BOF	Up to 1300	-
79	<i>Bauhinia vahlii</i> Wight & Arn.	Caesalpiniaceae	Malu, Maljhan	Woody climber	BOF,CPF,GS	Up to 2500	-
80	<i>Albizia chinensis</i> (Osbeck) Merr.	Mimosaceae	Kala siris	Tree	CPF,GS	Up to 2200	-
81	<i>Mimosa himalayana</i> Gamble.	Mimosaceae	Khaniyari	Shrub	GS	900-2200	-
82	<i>Agrimonia pilosa</i> Ledeb.	Rosaceae	-	Herb	BOF	1800-2100	-
83	<i>Cotoneaster acuminata</i> Lindl.	Rosaceae	Ruins	Shrub	BOF	Up to 2000	-
84	<i>Cotoneaster bacillaris</i> Wall.	Rosaceae	Ruins	Shrub	BOF	1200-2400	--
85	<i>Cotoneaster microphylla</i> Wall.	Rosaceae	Bheddra	Shrub	BOF	1200-3000	-
86	<i>Fragaria indica</i> Andr.	Rosaceae	-	Herb	BOF,CPF,GS	Up to 2400	-
87	<i>Potentilla fulgens</i> Wallich ex Lehm.	Rosaceae	Ban ajwain	Herb	BOF	Up to 2500	-
88	<i>Potentilla nepalensis</i> Hook.f.	Rosaceae	-	Herb	BOF,GS	Up to 2500	--
89	<i>Prinsepia utilis</i> Royle.	Rosaceae	Behkal	Shrub	BOF,CPF,GS	1200-2400	-
90	<i>Prunus armeniaca</i> Linn.	Rosaceae	Khurmani, Chullu	Tree	GS	Up to 2500	-
91	<i>Prunus cerasoides</i> D. Don.	Rosaceae	Padam, Panyyan	Tree	BOF	Up to 2400	-
92	<i>Prunus persica</i> (L.) Batsch.	Rosaceae	Aaru, Peech	Tree	GS	Up to 2000	-
93	<i>Pyracantha crenulata</i> Roem.	Rosaceae	Gingaru	Shrub	BOF,GS	Up to 2800	-
94	<i>Pyrus pashia</i> Buch.	Rosaceae	Mehal, Molu, Kainthal	Tree	BOF,CPF	900-2400	-

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95	<i>Rosa moschata</i> Mill.	Rosaceae	Kunia	Shrub	BOF,CPF,GS	1200-2400	-
96	<i>Rosa sericea</i> Lindl.	Rosaceae	-	Shrub	BOF,CPF,GS	Up to2200	-
97	<i>Rubus ellipticus</i> Sm.	Rosaceae	Hinsar, Hissar	Shrub	BOF,CPF,GS	600-2100	-
98	<i>Rubus niveus</i> Thunb.	Rosaceae	Anchu	Shrub	BOF	1200-3000	-
99	<i>Rubus paniculatus</i> Smith.	Rosaceae	Kathriyola, Gohania	Shrub	BOF,CPF	900-2000	-
100	<i>Spiraea canescans</i> D.Don.	Rosaceae	Kathruinshi	Herb	BOF	1800-3600	-
101	<i>Bergenia ciliata</i> Royle.	Saxifragaceae	Pashanbed	Herb	BOF,GS	1500-3000	-
102	<i>Deutzia corymbosa</i> R. Br.	Hydrangeaceae	-	Shrub	BOF	1800-3000	-
103	<i>Deutzia staminea</i> R. Br.	Hydrangeaceae	Gughti	Shrub	BOF	above 1500	-
104	<i>Itea nutans</i> Royle.	Grossulariaceae	-	Shrub	BOF	Up to 1800	-
105	<i>Sedum adenotrichum</i> Wall. ex Edgew.	Crassulaceae	-	Herb	BOF		-
106	<i>Woodfordia fruticosa</i> Kurz.	Lythraceae	Dhaura, Daula	Shrub	BOF,CPF,GS	Up to 1500	-
107	<i>Punica granatum</i> Linn.	Punicaceae	Anar	Tree	BOF,GS	Up to 2000	-
108	<i>Oenothera rosea</i> Soland.	Onagraceae	-	Herb	BOF,GS	Up to 2400	-
109	<i>Centalla asiatica</i> Linn.	Apiaceae	Mandukparni, Brahmi	Herb	BOF	Up to 2000	-
110	<i>Heracleum candicans</i> Wall.	Apiaceae	Kakhriya	Herb	BOF,GS	1800-3600	-
111	<i>Pimpinella diversifolia</i> DC.	Apiaceae	-	Herb	BOF	2200	-
112	<i>Hedera nepalensis</i> K. Koch.	Araliaceae	Laduli (Ivy),Mithiari	Climber	BOF	1700-3000	--
113	<i>Cornus capitata</i> Wall.	Cornaceae	Bhanvora, Tharmol	Tree	BOF	1000-2100	-
114	<i>Cornus macrophylla</i> Wall.	Cornaceae	Khagsi	Tree	BOF	1200-2400	-
115	<i>Cornus oblonga</i> Wall.	Cornaceae	Gohntale, Karu,Karhu	Tree	BOF	1200-2200	-
116	<i>Alangium chinense</i> (Lour.) Rehder.	Alangiaceae	Bhutkainju, Kimu	Tree	CPF,GS	Up to 2000	-
117	<i>Abelia triflora</i> R. Br.	Caprifoliaceae	Gughati	Shrub	BOF	1500-3000	--
118	<i>Lonicera quinquelocularis</i> Hardw.	Caprifoliaceae	Gughti,Bhatkukra	Shrub	BOF	1500-3600	-
119	<i>Lonicera myrtillus</i> Hook.f. & Thompson	Caprifoliaceae		Shrub	BOF	Up to2800	-
120	<i>Viburnum coriaceum</i> Blume.	Caprifoliaceae	Rashnia, Titmela	Tree	BOF	1200-2400	-

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121	<i>Viburnum cotinifolium</i> Don.	Caprifoliaceae	Bhatnai, Gumera	Shrub	BOF	1800-3300	-
122	<i>Viburnum mullaha</i> Buch.-Ham	Caprifoliaceae	Richhoi, Rincholi	Shrub	BOF	1800-3300	-
123	<i>Galium aparine</i> Linn.	Rubiaceae	-	Herb	BOF	900-3000	-
124	<i>Galium rotundifolium</i> Linn.	Rubiaceae	-	Herb	BOF,CPF,GS	1200-3000	-
125	<i>Galium vestitum</i> D.Don.	Rubiaceae	-	Herb	BOF,CPF	1500-2200	-
126	<i>Leptodermis lanceolata</i> Wall.	Rubiaceae	Padarh, Padera	Herb	CPF,GS	1200-3000	-
127	<i>Randia tertrasperma</i> Roxb.	Rubiaceae	Maindal	Shrub	BOF	1200-2000	-
128	<i>Rubia cordifolia</i> Linn.	Rubiaceae	Manjeet	Climber	BOF,CPF,GS	Up to 2400	-
129	<i>Wendlendia excerta</i> DC.	Rubiaceae	Thirchunia	Tree	GS,CPF	1200-2400	-
130	<i>Valeriana wallichii</i> DC.	Valerianaceae	Somiya	Herb	BOF,GS	1200-3000	-
131	<i>Ainsliaea aptera</i> DC.	Asteraceae	-	Herb	BOF	1800-2400	-
132	<i>Ainsliaea latifolia</i> Don.	Asteraceae	-	Herb	BOF	1500-2200	-
133	<i>Anaphalis adnata</i> DC.	Asteraceae	-	Herb	BOF	1900-2200	-
134	<i>Anaphalis busua</i> Buch.	Asteraceae	-	Herb	BOF	1450-2200	-
135	<i>Anaphalis cinnamomea</i> DC.	Asteraceae	-	Herb	BOF	1900-2200	-
136	<i>Anaphalis triplinervis</i> (Sims.) C.B. Clarke.	Asteraceae	-	Herb	BOF,GS	Up to 2000	-
137	<i>Artemisia parviflora</i> Buch.	Asteraceae	-	Herb	BOF	900-3000	-
138	<i>Artemisia nilagirica</i> (C.B. Clarke) Pamp.	Asteraceae	Korinja	Shrub	BOF	Up to 2500	-
139	<i>Artemisia roxburghiana</i> Besser.	Asteraceae	-	Herb	BOF	1500-3000	-
140	<i>Artemisia vulgaris</i> Linn.	Asteraceae	Chhamara	Herb	BOF,GS	1500-3600	-
141	<i>Bidens pilosa</i> Auct.	Asteraceae	-	Herb	GS	Up to 1800	-
142	<i>Carpesium abrotanoides</i> Linn.	Asteraceae	-	Herb	BOF	1500-3000	-
143	<i>Carpesium cernuum</i> Linn.	Asteraceae	-	Herb	BOF	1800-2400	-
144	<i>Carpesium trachelifolium</i> Less.	Asteraceae	-	Herb	BOF	1800-2100	-
145	<i>Chrysanthemum</i>	Asteraceae	-	Herb	BOF,GS	Up to 2000	-

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	<i>leucanthemum</i> Linn.						
146	<i>Cirsium verutum</i> (D.Don.) Spreng.	Asteraceae	-	Herb	GS	Up to 1500	-
147	<i>Erigeron canadensis</i> Linn.	Asteraceae	Kuranja	Herb	BOF,GS	Up to 2100	-
148	<i>Erigeron karvinskianus</i> DC.	Asteraceae	-	Herb	BOF,GS	1500-2200	-
149	<i>Eupatorium adenophorum</i> Spreng.	Asteraceae	-	Herb	BOF,CPF,GS	500-2500	--
150	<i>Eupatorium riparium</i> Regal.	Asteraceae	-	Herb	GS	Up to 1500	--
151	<i>Gerbera gossypina</i> Royle.	Asteraceae	-	Herb	BOF	1200-2400	-
152	<i>Inula cappa</i> Buch.-Ham.	Asteraceae	-	Herb	BOF,GS	Up to 3000	-
153	<i>Inula cuspidata</i> DC.	Asteraceae	Atthu	Herb	BOF,GS	1200-2100	-
154	<i>Launaea secunda</i> Hook.f.	Asteraceae	-	Herb	BOF,GS	1950	-
155	<i>Myriactis wallichii</i> Lees.	Asteraceae	-	Herb	BOF	1200-3000	-
156	<i>Senecio chrysanthemoides</i> DC.	Asteraceae	-	Herb	BOF,GS	2000-3900	-
157	<i>Senecio nudicaulis</i> Buch.-Ham.	Asteraceae	-	Herb	BOF,GS	Up to 3500	-
158	<i>Serratula pallida</i> DC.	Asteraceae	-	Herb	BOF	2200	--
159	<i>Sonchus arvensis</i> Linn.	Asteraceae	-	Herb	BOF,CPF	Up to 2400	-
160	<i>Tagetes minuta</i> Linn.	Asteraceae	-	Herb	BOF,CPF,GS	Up to 1800	-
161	<i>Taraxacum officinale</i> Wigg.	Asteraceae	-	Herb	BOF,CPF,GS	300-3600	-
162	<i>Youngia japonica</i> Linn.	Asteraceae	-	Herb	BOF	Up to 3000	-
163	<i>Campanula argyrotricha</i> Wall.	Campanulaceae	-	Herb	BOF,CPF	Up to 2000	-
164	<i>Campanula benthamii</i> Wall.	Campanulaceae	-	Herb	BOF	Up to 1500	-
165	<i>Lyonia ovalifolia</i> Wall.	Ericaceae	Anyar, Aiyar	Tree	BOF	900-2400	-
166	<i>Rhododendron arboreum</i> Smith.	Ericaceae	Barans, Brans	Tree	BOF	1200-3300	-
167	<i>Anagallis arvensis</i> Linn.	Primulaceae	-	Herb	BOF	Up to 2100	-
168	<i>Androsace lanuginosa</i> Wall.	Primulaceae	-	Herb	BOF	1650-3000	-

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169	<i>Androsace rotundifolia</i> Hardw.	Primulaceae	-	Herb	BOF	1500-3300	--
170	<i>Primula denticulata</i> Smith.	Primulaceae	-	Herb	BOF	Up to 2500	-
171	<i>Primula umbellata</i> (Lour.) Benth.	Primulaceae	-	Herb	BOF	Up to 2500	-
172	<i>Myrsine africana</i> Linn.	Myrsinaceae	Ridki, Barmi, Bedari	Shrub	BOF, CPF	600-2400	-
173	<i>Myrsine semiserrata</i> Wall.	Myrsinaceae	Bains, Gaunta	Shrub	BOF	1400-2000	-
174	<i>Symplocos cochinchinensis</i> Lour.	Symplocaceae	-	Shrub	BOF	900-2400	-
175	<i>Jasminum grandiflorum</i> Linn.	Oleaceae	Chambeli	Climber	BOF	Up to 2800	-
176	<i>Jasminum humile</i> Linn.	Oleaceae	Marchula, Surmarhi	shrub	BOF	Up to 2400	-
177	<i>Carissa spinarum</i> A. DC.	Apocynaceae	-	Shrub	CPF, GS	900-2000	-
178	<i>Trachelospermum axillare</i> Hook.f.	Apocynaceae	-	Herb	BOF	2500	-
179	<i>Buddleja paniculata</i> Auct.	Buddlejaceae	Gughtai, Sendroi	Shrub	BOF, CPF	750-2400	-
180	<i>Gentiana argentea</i> DC.	Gentianaceae	-	Herb	GS	1950-2400	-
181	<i>Gentiana capitata</i> Buch.-Ham.	Gentianaceae	-	Herb	GS	1200-3600	-
182	<i>Gentiana contorta</i> Royle.	Gentianaceae	-	Herb	GS	1500	-
183	<i>Cynoglossum zeylanicum</i> (Lehm.) Brand	Boraginaceae	-	Herb	CPF, GS	1200-2000	-
184	<i>Cestrum aurantiacum</i> Lindl.	Solanaceae	-	Shrub	CPF, GS	1500-1800	-
185	<i>Cestrum parqui</i> Lindl.	Solanaceae	-	Shrub	CPF, GS	1500-2000	-
186	<i>Solanum xanthocarpum</i> Sch. & Wendl.	Solanaceae	-	Herb	CPF, GS	600-2200	-
187	<i>Solanum verbascifolium</i> Linn.	Solanaceae	Ban tamakhu	Shrub	CPF, GS	600-2000	-
188	<i>Nicandra physalodes</i> (L.) Gaertn.	Solanaceae	-	Herb	CPF, GS	900-2400	-
189	<i>Physalis minima</i> Linn.	Solanaceae	-	Herb	CPF, GS	900-2200	-

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190	<i>Lindenbergia indica</i> Linn.	Scrophulariaceae	-	Herb	BOF	950-2200	-
191	<i>Verbascum thapsus</i> Linn.	Scrophulariaceae	Gidar tamaku	Herb	BOF,GS	Up to 3300	-
192	<i>Veronica persica</i> Poir.	Scrophulariaceae	-	Herb	BOF,GS	1200-2300	-
193	<i>Adhatoda vasica</i> Nees.	Acanthaceae	Bansa, Vansu, Panvarh	Shrub	CPF,GS	Up to 1500	-
194	<i>Barleria cristata</i> Linn.	Acanthaceae	Kalabansa	Herb	CPF,GS	Up to 1850	-
195	<i>Dicliptera bupleuroides</i> Nees.	Acanthaceae	-	Herb	CPF,GS	900-2000	-
196	<i>Strobilanthes alatus</i> Nees.	Acanthaceae	Pathora, Lolar	Herb	BOF	1800-3000	-
197	<i>Strobilanthus purpureance</i>	Acanthaceae	-	Herb	BOF	1800-3000	-
198	<i>Achymanthera gossypinna</i>	Acanthaceae	-	Shrub	BOF	1800-3000	-
199	<i>Caryopteris grata</i> Wall.	Verbenaceae	-	Shrub	BOF,GS	1200-1950	-
200	<i>Caryopteris odorata</i> Don.	Verbenaceae	Chingari, Karui, Lindria	Shrub	CPF,GS	Up to 1800	-
201	<i>Lantana camara</i> Linn.	Verbenaceae	kuri	Shrub	CPF,GS	Up to 2400	-
202	<i>Vitex negundo</i> L.	Verbenaceae	-	Shrub	CPF,GS	700-2000	-
203	<i>Ajuga bracteosa</i> Wall.	Lamiaceae	-	Herb	BOF,GS	Up to 2100	-
204	<i>Ajuga macrosperma</i> Wall.	Lamiaceae	-	Herb	BOF,GS	Up to 2400	-
205	<i>Ajuga parviflora</i> Benth.	Lamiaceae	-	Herb	BOF,GS	900-2100	-
206	<i>Anisomeles ovata</i> R. Br.	Lamiaceae	-	Herb	CPF,GS	Up to 1800	-
207	<i>Colebrookea oppositifolia</i> Sm.	Lamiaceae	Bindu	Shrub	CPF,GS	Up to 1500	-
208	<i>Craniotome versicolor</i> Rchb.	Lamiaceae	-	Herb	BOF	1200-2500	-
209	<i>Elsholtzia flava</i> Benth.	Lamiaceae	-	Shrub	BOF,GS	1500-2850	-
210	<i>Elsholtzia fruticosa</i> Rehder.	Lamiaceae	Pathoi, Potha	Shrub	BOF,GS	2100-2700	-
211	<i>Leucas lanata</i> Benth.	Lamiaceae	-	Herb	BOF,GS	Up to 1800	-
212	<i>Micromeria biflora</i> Benth.	Lamiaceae	-	Herb	BOF,GS	300-2100	-
213	<i>Origanum vulgare</i> Linn.	Lamiaceae	Ban tulsi	Herb	BOF	1700-3600	-
214	<i>Plectranthus rugosus</i> Wall.	Lamiaceae	Karbai	Herb	BOF	900-2400	-
215	<i>Pogostemon parviflorus</i> Benth.	Lamiaceae	-	Herb	BOF,CPF,GS	Up to 1800	-
216	<i>Salvia lanata</i> Roxb.	Lamiaceae	-	Herb	BOF	1500-2400	-

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217	<i>Scutellaria grossa</i> Wall.	Lamiaceae	-	Herb	BOF	Up to 2000	-
218	<i>Scutellaria scandens</i> D.Don.	Lamiaceae	Kapu	Herb	BOF	Up to 1800	-
219	<i>Plantago major</i> Linn.	Plantaginaceae	-	Herb	GS	600-1800	-
220	<i>Boerhavia diffusa</i> Linn.	Nyctaginaceae	-	Herb	CPF,GS	500-1800	-
221	<i>Cythula tomentosa</i> Moq.	Amranthaceae	-	Herb	CPF,GS	Up to 1800	-
222	<i>Achyranthes aspera</i> Linn.	Amranthaceae	Apamarg	Herb	CPF,GS	Up to 2000	-
223	<i>Celosia argentea</i> Linn.	Amranthaceae	-	Herb	CPF,GS	900-1800	-
224	<i>Fagopyron esculentum</i> Moench.	Polygonaceae	-	Herb	GS	Up to 1800	-
225	<i>Polygonum amplexicaule</i> D.Don	Polygonaceae	-	Herb	GS	Up to 1800	-
226	<i>Polygonum capitatum</i> Ham.	Polygonaceae	-	Herb	GS	Up to 1800	-
227	<i>Polygonum chinense</i> Linn.	Polygonaceae	-	Herb	GS	Up to 2000	-
228	<i>Polygonum hydropiper</i> Linn.	Polygonaceae	-	Herb	GS	Up to 2000	-
229	<i>Rumex hastatus</i> Don.	Polygonaceae	Amilda, Bhilmora	Herb	BOF,CPF,GS	Up to 2500	-
230	<i>Rumex nepalensis</i> Spreng.	Polygonaceae	-	Herb	CPF,GS	600-2000	-
231	<i>Piper brachystachyum</i> Wall.	Piperaceae	Pahari pipar	Herb	BOF	1500-2000	-
232	<i>Cinnamomum tamala</i> Nees.	Lauraceae	Tejpatta	Tree	CPF,BOF	Up to 2000	-
233	<i>Cocculus laurifolius</i> DC.	Lauraceae	Thilphara	Tree	BOF	Up to 1800	-
234	<i>Litsaea lanuginosa</i> Nees.	Lauraceae	-	Tree	BOF	Up to 2500	-
235	<i>Litsaea umbrosa</i> Nees.	Lauraceae	Shurur	Tree	BOF	Up to 2500	-
236	<i>Persea duthiei</i> King.	Lauraceae	Kawala Bhojo	Tree	BOF	1500-2500	-
237	<i>Persea gamblei</i> King.	Lauraceae	-	Tree	BOF	1500-2500	-
238	<i>Persea odorratissima</i> Nees.	Lauraceae	Kaula, kawala	Tree	BOF	1000-2200	-
239	<i>Daphne oleoides</i> Schreb.	Thymelaeaceae	-	Tree	BOF	2500	-
240	<i>Daphne papyracea</i> Wallich ex Steud.	Thymelaeaceae	Satpura, Dhakchamboi	Shrub	BOF	1500-2800	-
241	<i>Wickstroemia canescans</i> Meissn.	Thymelaeaceae	Chambai	Shrub	BOF	1200-2500	-
242	<i>Osyris arborea</i> Wall.	Santalaceae	Dalmi, Dalmia	Shrub	BOF	1200-1800	-

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243	<i>Daphniphyllum himalayense</i> (Benth.) Muell.-Arg.	Euphorbiaceae	Ratnali,Raktchandan	Tree	BOF	1800-2500	-
244	<i>Euphorbia pilosa</i> Linn.	Euphorbiaceae	-	Herb	CPF	2000	-
245	<i>Glochidion velutinum</i> Wight.	Euphorbiaceae	Kathmava	Tree	CPF,GS	900-1800	-
246	<i>Sapium insigne</i> (Royle) Kurz.	Euphorbiaceae	Khani	Tree	CPF,GS	900-1800	-
247	<i>Phyllanthus parvifolius</i> Buch.-Ham.	Euphorbiaceae	-	Herb	BOF	1500-2500	-
248	<i>Buxus wallichiana</i> Baill.	Buxaceae	Papri	Tree	BOF	1800-2700	-
249	<i>Sarcococca saligna</i> Muell. Arg.	Buxaceae	Tilliari	Shrub	BOF	Up to 3000	-
250	<i>Boehmeria macrophylla</i> Don.	Urticaceae	-	Herb	GS	1000-1800	-
251	<i>Debregeasia hypoleuca</i> Wedd.	Urticaceae	Sinar	Shrub	BOF,CPF,GS	1200-2200	-
252	<i>Debregeasia longifolia</i> Wedd.	Urticaceae	-	Shrub	BOF,CPF,GS	1200-2200	-
253	<i>Girardinia heterophylla</i> Decne.	Urticaceae	Bicchhu	Herb	GS	1500-2200	-
254	<i>Pilaea umbrosa</i> Wedd.	Urticaceae	-	Herb	BOF	1800	-
255	<i>Urtica parviflora</i> Roxb.	Urticaceae	kandli	Herb	BOF,CPF,GS	1000-2200	-
256	<i>Celtis australis</i> Linn.	Ulmaceae	Khiraak	Tree	CPF,GS	Up to 1500	-
257	<i>Ficus nimoralis</i> Wall.	Moraceae	Thilka, Dudhoi	Tree	GS	1200-2500	-
258	<i>Ficus palmata</i> Forsk.	Moraceae	Anjir, Pheru, Khemri	Tree	GS	800-1800	-
259	<i>Ficus roxburghii</i> Wall.	Moraceae	Timla, Tirmal	Tree	GS	1200-2200	-
260	<i>Ficus scandens</i> Roxb.	Moraceae	Makhota, Chhanchri	Climber	BOF,CPF,GS	Up to 2000	-
261	<i>Morus serrata</i> Roxb.	Moraceae	Kinu, Tunt	Tree	GS	1500-3000	-
262	<i>Juglans regia</i> Linn.	Juglandiaceae	Akhrot, Akhor	Tree	GS	1500-3000	-
263	<i>Myrica esculenta</i> Thund.	Myricaceae	Kaphal	Tree	BOF	1500-2500	-
264	<i>Betula alnoides</i> Buch.-	Betulaceae	Shhol, Kathbhuj	Tree	BOF	Up to 3500	-

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	Ham.						
265	<i>Carpinus viminea</i> Wall.	Betulaceae	Chankharik	Tree	BOF	Up to 3000	-
266	<i>Quercus floribunda</i> Rehder.	Fagaceae	Moru oak	Tree	BOF	Up to 3000	-
267	<i>Quercus leucotrichophora</i> A. Camus	Fagaceae	Banj, Ban oak	Tree	BOF	Up to 2500	-
268	<i>Castanea sativa</i> Mill.	Fagaceae	Chestnut	Tree	BOF	Up to 2000	-
269	<i>Populus ciliata</i> Wallich.	Salicaceae	Pahari Pipal	Tree	GS	1800-2500	-
270	<i>Salix lindleyana</i> Wallich.	Salicaceae	-	Shrub	BOF	Up to 2800	-
271	<i>Calanthe plantaginea</i> Lindl.	Orchidaceae	-	Herb	BOF	1500-2100	-
272	<i>Zeuxine flava</i> (Wall. ex Lindl.) Trimen	Orchidaceae	-	Herb	BOF	Up to 2800	-
273	<i>Hedychium coronarium</i> Koen.	Zingiberaceae	-	Herb	BOF,GS	Up to 2000	-
274	<i>Curculigo orchiodes</i> (Kurz.) Wallich.	Hypoxidaceae	Talmulika	Herb	BOF	Up to 500	-
275	<i>Dioscorea deltoidea</i> Wall.	Dioscoreaceae	Kathtarun	Climber	BOF	Up to 2000	Vulnerable
276	<i>Dioscorea bellophylla</i> (Prain) Voigt ex Haines	Dioscoreaceae	-	Climber	BOF	Up to 2000	-
277	<i>Asparagus racemosus</i> Don.	Liliaceae	Satawar, Satawari	Climber	BOF,CPF	900-2200	-
278	<i>Paris polyphylla</i> Smith.	Liliaceae	-	Herb	BOF	2500	-
279	<i>Smilax aspera</i> Linn.	Smilacaceae	Kukardana	Climber	BOF	Up to 2800	-
280	<i>Smilax elegans</i> Wallich.	Smilacaceae	-	Climber	BOF	Up to 2800	-
281	<i>Smilax spinosa</i> Mill.	Smilacaceae	-	Climber	BOF,CPF	Up to 2800	-
282	<i>Commelina benghalensis</i> Linn.	Commelinaceae	-	Herb	CPF,GS	Up to 1500	-
283	<i>Trachycarpus fortunei</i> Wendl.	Arecaceae	-	Tree	BOF	Up to 2800	-
284	<i>Carex setigera</i> D.Don.	Cyperaceae	-	Herb	GS	Up to 2000	-
285	<i>Carex spp</i>	Cyperaceae	-	Herb	GS	Up to 2500	-
286	<i>Cyperus rotundus</i> (Rottb.) Kuekenth.	Cyperaceae	-	Herb	CPF,GS	Up to 2000	-
287	<i>Eriophorum comosum</i>	Cyperaceae	-	Herb	GS	Up to 1800	-

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	Wall.						
288	<i>Apluda mutica</i> Linn.	Poaceae	Chari, Tachila	Grass	GS	Up to 2000	-
289	<i>Arundinaria falcata</i> Nees.	Poaceae	Ringal, Tham Ringal	Grass	GS	Up to 2200	-
290	<i>Arundinella nepalensis</i> Trin.	Poaceae	Tutnalia, Suina	Grass	GS	1200-2000	-
291	<i>Arundinella pumila</i> (Hochst.) Steud.	Poaceae	-	Grass	GS	1200-2000	-
292	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Dub-grass	Grass	GS	Up to 2200	-
293	<i>Eragrostis nepalensis</i>	Poaceae	-	Grass	GS	Up to 2000	--
294	<i>Erianthus rufipilum</i> Steud.	Poaceae	-	Grass	GS	Up to 2200	-
295	<i>Heteropogon contortus</i> (L.) P. Beauv.	Poaceae	Kumra, Kumeria	Grass	GS	Up to 2000	-
296	<i>Koeleria cristata</i> Auct.	Poaceae	-	Grass	GS	1800-2200	-
297	<i>Muhlenbergia himalayanensis</i> Hack.	Poaceae	-	Grass	GS	1500-2200	-
298	<i>Oplismenus burmannii</i> (Retz.) Beauv.	Poaceae	-	Grass	GS	600-1800	-
299	<i>Phragmites communis</i> Trin.	Poaceae	Narkul	Grass	GS	1200-1800	-
300	<i>Pogonatherum paniceum</i> Hack.	Poaceae	-	Grass	GS	2000	-
301	<i>Themeda arundinacea</i> Ridley.	Poaceae	-	Grass	GS	Up to 2500	-
302	<i>Tripogon filiformis</i> Nees.	Poaceae	-	Grass	GS	1200-2500	-
303	<i>Pinus roxburghii</i> Sargent.	Pinaceae	Chir, Chir-Pine	Tree	CPF,GS	600-2200	-
304	<i>Pinus wallichiana</i> A.B. Jackson	Pinaceae	Kail, Blue-Pine	Tree	BOF	Up to 2800	-
305	<i>Cedrus deodara</i> (Roxb.) G. Don.	Pinaceae	Devdar	Tree	BOF	Up to 3200	-
306	<i>Cupressus torulosa</i> D. Don.	Cupressaceae	Leuri, Surai	Tree	CPF,GS	1200-2500	-
307	<i>Equisetum arvense</i> L.	Equisetaceae	-	Herb	BOF	1600	-
308	<i>Selaginella chrysocaulos</i> (Hook.) Spring	Selaginellaceae	-	Fern	BOF	1600	-
309	<i>Loxogramma involuta</i> (D.	Loxogrammaceae	-	Fern	BOF	1700	-

Research Article

	Don) Prest.						
310	<i>Loxogramma porcata</i> Price	Loxogrammaceae	-	Fern	BOF	1700	-
311	<i>Drynaria mollis</i> Bedd.	Polypodiaceae	-	Fern	BOF	2000	-
312	<i>Drynaria propinqua</i> (Wall. ex Mett.) Bedd.	Polypodiaceae	-	Fern	BOF	2000	-
313	<i>Lepisorus contortus</i> (Christ.) Ching.	Polypodiaceae	-	Fern	BOF	1700	-
314	<i>Microsorium zippelli</i> (Blume) Ching. Bull.	Polypodiaceae	-	Fern	BOF	1700	-
315	<i>Phymatopteris ebenipes</i> (Hook.) Pic. Ser.,	Polypodiaceae	-	Fern	BOF	1700	-
316	<i>Phymatopteris oxyloba</i> (Wall. ex Kunze) Pic. Ser.,	Polypodiaceae	-	Fern	BOF	1800	-
317	<i>Polypodiastrum argutum</i> (Wall. ex Hook.) Ching.	Polypodiaceae	-	Fern	BOF	1900	-
318	<i>Pyrrosia stictica</i> (Kunze) Holttum	Polypodiaceae	-	Fern	BOF	2200	-
319	<i>Cheilanthes albomarginata</i> Clarke	Sinopteridaceae	-	Fern	BOF	1700	-
320	<i>Onychium contiguum</i> Wall. ex Hope	Cryptogrammaceae	-	Fern	BOF	2100	-
321	<i>Pteris cretica</i> L.	Pteridaceae	-	Fern	BOF	1700	-
322	<i>Adiantum edgeworthi</i> Hook.	Adiantaceae	-	Fern	BOF	1700	-
323	<i>Adiantum capillus-veneris</i> L.	Adiantaceae	-	Fern	BOF	1600	-
324	<i>Coniogramma affinis</i> Wall. ex Hieron	Hemiontidaceae	-	Fern	BOF	1700	-
325	<i>Coniogramma caudata</i> (Wall. ex Ett.) Ching	Hemiontidaceae	-	Fern	BOF	1600	-
326	<i>Vittaria flexuosa</i> Fee	Hemiontidaceae	-	Fern	BOF	1800	-
327	<i>Asplenium dalhousiae</i> Hook.	Aspleniaceae	-	Fern	BOF	1600	-

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328	<i>Asplenium indicum</i> Sledge	Aspleniaceae	-	Fern	BOF	1600	-
329	<i>Athyrium fimbriatum</i> (Wall. ex Kook.) Moore	Athyraceae	-	Fern	BOF	2000	-
330	<i>Diplazium esculentum</i> (Retz.) Sw.	Athyraceae	-	Fern	BOF	1800	-
331	<i>Dryopteris wallichiana</i> (Spreng.)	Dryopteridaceae	-	Fern	BOF	1700	-
332	<i>Dryopteris nigropaleacea</i> (Jankins) Jankins,	Dryopteridaceae	-	Fern	BOF	1800	-
333	<i>Polystichum stimulans</i> (Kunze. ex Mett.) Bedd.	Dryopteridaceae	-	Fern	BOF	1600	-
334	<i>Polystachyum longipaleatum</i> Christ.	Dryopteridaceae	-	Fern	BOF	1600	-
335	<i>Cyrtomium falcatum</i> Presl	Dryopteridaceae	-	Fern	BOF	1600	-
336	<i>Lygodium japonicum</i> (Thunb.) Sw.	Lygodiaceae	-	Fern	BOF	1600	-
337	<i>Woodwardia unigameta</i> (Makino) Nakai	Blechnaceae	-	Fern	BOF	1600	-

BOF=Banj oak forest, CPF= Chir-pine forest, GS= Grassy slopes/ forest blanks.

Research Article

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REFERENCES

- Allen GO (1919).** A few additions to the list of Mussoorie plants by James Marten in Vol. XIX.p. 475, *Journal of Bombay Natural History Society* **26**(2): 695-696.
- Jain, S. K. and R. R. Rao (1976).** A Handbook of Field and Herbarium Method. New Delhi.
- Nayar MP and Sastry AK (1987, 1988, 1990).** Red Data Book of Indian Plants. **I, II & III.** Botanical Survey of India, Calcutta.
- Osmaston AE (1927).** A Forest Flora for Kumaon. Allahabad.
- Polanin O and Stainton A (2009).** Flowers of the Himalaya. Oxford University Press, New Delhi.
- Raizada MB (1959).** Mussoorie and its plants. *Indian Forester* **85**(11): 668-690.
- Raizada MB (1976).** Supplement to Duthie's Flora of the Upper Gangetic Plain and of the adjacent Siwalik and sub-Himalayan tracts. Bisen Singh Mahendra Pal Singh, Dehradun.
- Raizada MB and Saxena HO (1977).** Flora of Mussoorie Vol. 1. Bisen Singh Mahendra Pal Singh, Dehradun.
- Rodgers WA and Panwar HS (1988).** Planning a Wildlife Protected Area network in India. **I. & II.** Wildlife Institute of India, Dehradun.
- Royle JF (1833-40).** Illustrations of the Botany and other branches of the natural history of the Himalayan mountains and the Flora of Cashmir, London.
- Samant SS and Dhar U (1997).** Diversity, endemism and economic potential of wild edible plants of Indian Himalaya. *International Journal of Sustainable Development and World Ecology* **4**(3): 179-191.
- Samant SS, Dhar U and Palni LMS (1998b).** Medicinal plants of Indian Himalaya: Diversity Distribution Potential Values. Gyanogaya Prakashan, Nainital.
- Singh DK and Hajra PK (1996).** Floristic diversity. In: *Biodiversity status in the Himalaya*, edited by Gujral (British Council, New Delhi) 23-38.
- Stewart RR (1942).** The Ferns of Mussoorie and Dehradun. 150th Anniversary Volume Royal Botanical Garden Calcutta, 159-172.