

Assessment of Herbaceous Flora of Lower Tanawal, Pakistan

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The present work has been carried out to collect information about herbaceous flora of Lower Tanawal District Abbottabad, KP, and Pakistan. Herbaceous species are vital constituents of ecosystems. Floristic studies have increasing importance in recent years to evaluate the plant wealth. During the present research study there are total 187 plant species (herbs) belonging to 60 families and 146 genera were recorded from the study area. Out of 60 families Asteraceae was the most dominant family with 22 species and 18 genera and other main contributing families were Lamiaceae (16 species and 12 genera), Poaceae, (14 species and 12 genera), Fabaceae (12 species and 7 genera), Brassicaceae (7 species and 7 genera) and Rubiaceae (6 species and 2 genera). The most dominant life form was wild.

Keywords: floristic; species; herbaceous; Lower Tanawal; Pakistan

Introduction

Floristic diversity refers to the variety and changeability of plants in a given area. It refers to the number of taxa in a given area. Floristic diversity can be measured from global diversity to ecosystem, community, populations, and species. Floristic studies also help us to understand the basic aspects of speciation, isolation, and evolution. Many ecological factors, generally biotic, modify the floristic constituents. Sometime the total number of species may be changed, or may be replaced with other species (Myers et al., 1990). Herbs are important segment of worldwide biodiversity. These are important source of medicine for human beings. The structure of herbaceous flora is diverse according to the climate. Herbs are usually small plants, which do not have woody stems (Hornby, 2001). The demand of Floristic studies increasing in recent years in response to evaluate the plant wealth (Vediya et al., 2011). The aim of the present research study was to explore the herbaceous plants of Lower Tanawal, Pakistan. This research work is helpful for future record to evaluate the plant species diversity in the study area (Figure 1).

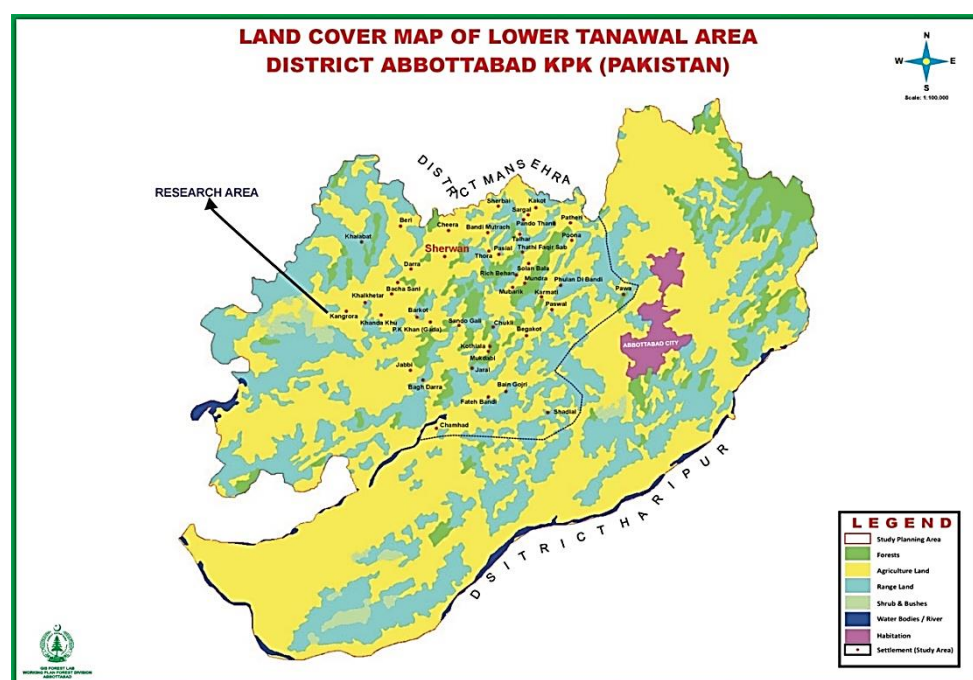


Fig. 1. Map of Lower Tanawal

Material and Methods

Description of the study area

Lower Tanawal is selected for present study. It is situated just about 10 km from Abbottabad city. The Lower Tanawal is part of the Lesser Himalayas. The Lesser Himalayas comprise on whole area of Hazara division including Abbottabad, Batagram, Haripur and Mansehra (Hussain & Ilahi, 1991). The Lower Tanawal is basically subtropical zone. In olden days this areas had a thick vegetation and other cultivation. Now days the vegetation are destroyed by human activities for building houses, schools. These people destroyed huge amount of trees used for firewood purposes. In recent days, they are affected by different climatic factors (i.e.) low rainfall, high temperature and other seasonal variations etc. Therefore, naturally the vegetation is slowly destroyed. This study shows the latest survey of herbs in this area.

Floristic survey

The survey of the study area was carried out during 2016-2018. Several field tours were made to cover the entire Lower Tanawal during different seasons. Present survey was conducted in the plant species growing in their natural habitats. Plant specimens were collected from the area under investigation. In this study collections of species were made from wide range of agricultural fields, forest areas. These specimens were identified and photographed. Maximum plants have been photographed in their natural habitat. Plant species were also distinguished according to their habit. Herbarium sheets were prepared properly. (Jain & Rao, 1960). Identification was done with the help of different floras, particular flora of Pakistan (Gamble et al., 1915-1935; Nasir et al., 1983). Plant systematics presented according to the Plant List (<http://www.theplantlist.org/>).

Results and discussion

Total 187 plant species belonging to 60 families and 146 genera were recorded from the study area (Table 1). Out of 187 plants, 183 species were angiosperms and four were belonging to Pteridophytes. The 143 genera were angiosperm, three were Pteridophytes, 57 families were angiosperm, and three were belonging to Pteridophytes (Fig. 2). Out of 60 families, the Asteraceae was the most dominant with 22 species and 18 genera, and other codominant were Lamiaceae (16 species and 12 genera), Poaceae (14 species and 12 genera), Fabaceae (12 species and seven genera), Brassicaceae (7 species and seven genera) and Rubiaceae (six species and 2 genera). Remaining 54 families have less than six species (Fig.3). The result shows that dominant genera is Galium and Solanum having four species followed by Rumex, Cyperus, Chenopodium and Geranium with three species each (Fig 4). It was observed that out of 187 plants, 183 species were the wild four ornamental and three – cultivated (Fig. 5, Appendix 1).

The indigenous knowledge about the plants is an imperative mechanism for the study of natural resources. Because all productive resource sectors are revolves around traditional resource use. The local populations have their own knowledge about the utilization and conservation of plants for benefit of humankind. Preservation of natural resources is a matter of vital interest from ancient time. The biodiversity has become an important challenge for the world. There is a need to conserve exploited plants species of Lower Tanawal for future generation. It is indicated that recording indigenous knowledge through ethno botanical studies is significant for the preservation of biological diversities.

The herb community of sub-tropical forests of Lower Tanawal is very little known, with insufficient studies addressing its structure. Even with this rare information, it is clear that the herbs are a rich group in the study area. The dominance of families of Asteraceae, Poaceae, Fabaceae, and Lamiacea in all study areas reflects that these families are the most frequent in Lower Tanawal.

It has been observed in the hilly area of Lower Tanawal where extensive Patches of grasses grow there hardly any or no trees in that area. Many of these Guzara grasslands are open for animal grazing to the whole village, while most are closed in the season of rain to protect grass for food making in the winter season.

The change in herbaceous flora composition is related to effect of climate and land use conditions. Climate situations in the Lower Tanawal explain about the difference in species structure between different climate zones. Certainly, human disturbances effect composition of plant species. It was noted that species richness and cover are determined by multiple environmental factors of the study area. These results indicated that the distribution of herbaceous species is affected by climate, and land use, which affects the heterogeneity of vegetation.

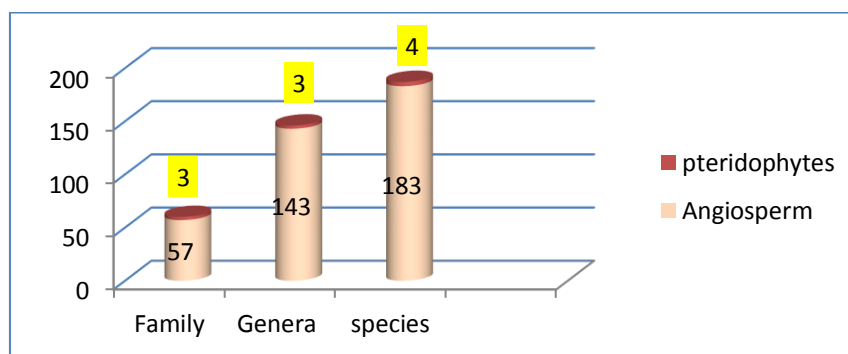


Fig. 2. Floristic richness of Lower Tanawal flora. The OY axis represents the species number

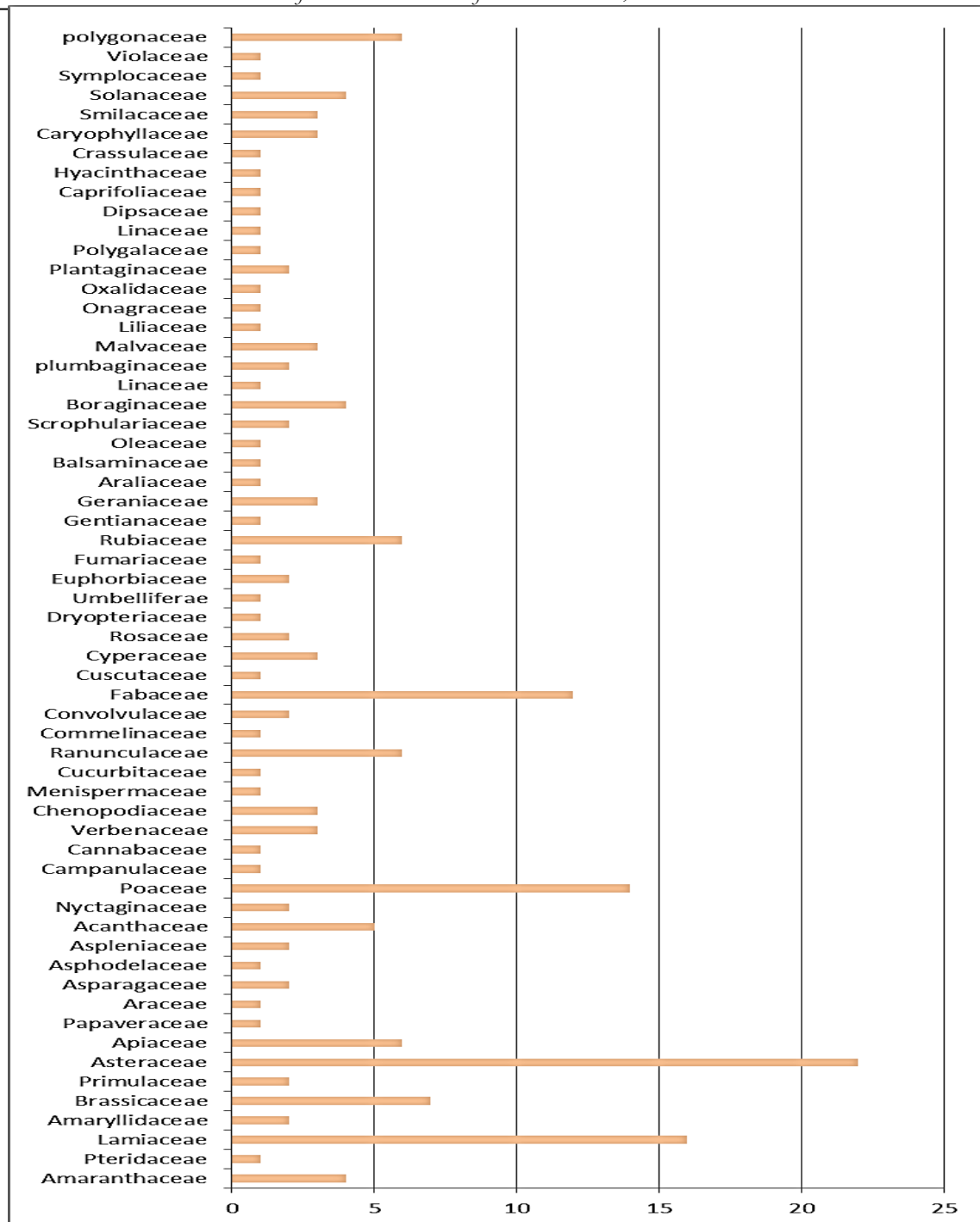


Fig. 3. Graphical representation of family wise species. The OX axis represents the species number

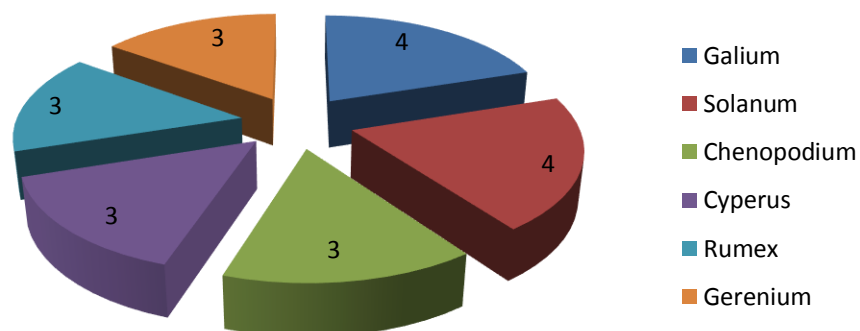


Fig. 4. Dominant taxa with in genera.

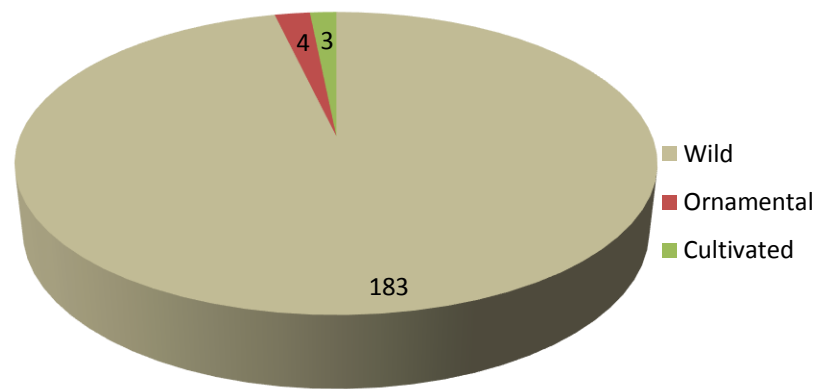


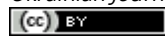
Fig. 5. Status of herbaceous plants

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Appendix

Table 1. List of herbaceous flora of Lower Tanawal.

S.N	Plant name	Family	Status
1.	<i>Achyranthes aspera</i> L.	Amaranthaceae	wild
2.	<i>Adiantum capillus -veneris</i> L.	Pteridaceae	Wild
3.	<i>Ajuga bracteosa</i> Wall. ex Benth	Lamiaceae	Wild
4.	<i>Allium griffithianum</i> Boiss	Amaryllidaceae	Wild
5.	<i>Alliaria petiolata</i> (M.Bieb.) Cavara & Grande	Brassicaceae	wild
6.	<i>Allium stipitatum</i> Regel	Amaryllidaceae	wild
7.	<i>Alternanthera pungens</i> Kunth.	Amaranthaceae	wild
8.	<i>Amaranthus viridis</i> L.	Amaranthaceae	wild
9.	<i>Anagallis arvensis</i> L.	Primulaceae	wild
10.	<i>Anaphalis margaritacea</i> (L.) Benth. & Hook.f.	Asteraceae	wild
11.	<i>Anaphalis triplinervis</i> (Sims) Sims ex C.B.Clarke	Asteraceae	wild
12.	<i>Angelica arguta</i> Nutt.	Apiaceae	wild
13.	<i>Androsace rotundifolia</i> Hardw.	Primulaceae	wild
14.	<i>Anthriscus caucalis</i> M.Bieb.	Apiaceae	wild
15.	<i>Argemone Mexicana</i> L.	Papaveraceae	wild
16.	<i>Ariesema flavum</i> (Forssk.) Schott	Araceae	wild
17.	<i>Aristida cyanantha</i> Steud.	Poaceae	wild
18.	<i>Artemisia absinthium</i> L.	Asteraceae	wild
19.	<i>Artemisia scoparia</i> Waldst. & Kitam.	Asteraceae	wild
20.	<i>Asparagus adscendens</i> Roxb	Asparagaceae	wild
21.	<i>Asparagus officinalis</i> L.	Asparagaceae	wild
22.	<i>Asphodelus tenuifolius</i> Cav.	Asphodelaceae	wild
23.	<i>Asplenium ceterach</i> L.	Aspleniaceae	wild
24.	<i>Asplenium trichomanes</i> L.	Aspleniaceae	wild
25.	<i>Astragalus leucocephalus</i> Bunge	Fabaceae	wild
26.	<i>Barleria cristata</i> L.	Acanthaceae	wild
27.	<i>Biden pilosa</i> L.	Asteraceae	wild
28.	<i>Boerhavia diffusa</i> L.	Nyctaginaceae	wild
29.	<i>Bothriochloa ischaemum</i> (L.) Keng.	Poaceae	wild
30.	<i>Bromus tectorum</i> L.	Poaceae	wild
31.	<i>Calamintha hysaspidis</i> (Falc.ex Benth.) Hedge	Lamiaceae	wild
32.	<i>Calamintha nepeta</i> L.	Lamiaceae	wild
33.	<i>Calamagrostis acutiflora</i> (Schr.) DC.	Poaceae	wild
34.	<i>Campanula leucoclada</i> Boiss.	Campanulaceae	wild
35.	<i>Cannabis sativa</i> L.	Cannabaceae	wild
36.	<i>Capsella bursa</i> Raf.	Brassicaceae	wild
37.	<i>Cardamine hirsuta</i> L.	Brassicaceae	wild
38.	<i>Carduus nutans</i> L.	Asteraceae	wild
39.	<i>Caryopteris odorata</i> (D.Don) B.L.Rob	Verbenaceae	wild
40.	<i>Carthamus oxyacantha</i> M.Bieb.	Asteraceae	wild
41.	<i>Chenopodium album</i> L.	Chenopodiaceae	wild
42.	<i>Chenopodium ambrosioides</i> L.	Chenopodiaceae	wild
43.	<i>Chenopodium vulgare</i> L.	Chenopodiaceae	wild
44.	<i>Chrysopogon serrulatus</i> Trin.	Poaceae	wild
45.	<i>Cichorium intybus</i> L.	Asteraceae	wild
46.	<i>Cirsium falconeri</i> (Hook.f.) Petr.	Asteraceae	wild
47.	<i>Cissampelos pareira</i> L.	Menispermaceae	wild
48.	<i>Citrullus colocynthis</i> (L.) Schrad.	Cucurbitaceae	wild
49.	<i>Clematis grata</i> Wall.	Ranunculaceae	wild
50.	<i>Clematis graveolens</i> Lindl.	Ranunculaceae	wild
51.	<i>Commelina virginica</i> L.	Commelinaceae	wild
52.	<i>Convolvulus arvensis</i> L.	Convolvulaceae	Ornamental
53.	<i>Conyza Canadensis</i> L.	Asteraceae	wild
54.	<i>Coronopus didymus</i> (L.) Sm.	Brassicaceae	wild
55.	<i>Crotalaria rotundifolia</i> J.F.Gimel	Fabaceae	wild
56.	<i>Cuscuta reflexa</i> Roxb.	Cuscutaceae	wild
57.	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	wild
58.	<i>Cyclospermum leptophyllum</i> (Pers.) Sprague	Apiaceae	wild
59.	<i>Cyperus iria</i> L.	Cyperaceae	wild
60.	<i>Cyperus niveus</i> Retz	Cyperaceae	wild
61.	<i>Cyperus esculentus</i> L.	Cyperaceae	wild
62.	<i>Delphinium grandiflorum</i> L.	Ranunculaceae	wild

63.	<i>Delphinium roylei</i> Munz	Ranunculaceae	wild
64.	<i>Deschampsia cespitosa</i> L.	Poaceae	wild
65.	<i>Dicliptera bupleuroides</i> Nees	Acanthaceae	wild
66.	<i>Digera muricata</i> (L.) Mart.	Amaranthaceae	wild
67.	<i>Duchesnea indica</i> (Jacks.) Focke	Rosaceae	wild
68.	<i>Dryopteris marginalis</i> (L.) A. Gray.	Dryopteridaceae	wild
69.	<i>Eleusine indica</i> (L.) Gaertn.	Poaceae	wild
70.	<i>Eremostachys superba</i> Royle ex Benth.	Lamiaceae	wild
71.	<i>Eryngium billardieri</i> L.	Umbelliferae	wild
72.	<i>Euphorbia hirta</i> L.	Euphorbiaceae	wild
73.	<i>Euphorbia peplus</i> L.	Euphorbiaceae	wild
74.	<i>Fumaria indica</i> (Haukskn.) H. N.	Fumariaceae	wild
75.	<i>Galium aparine</i> L.	Rubiaceae	wild
76.	<i>Galium circaezans</i> Michx	Rubiaceae	wild
77.	<i>Galium spurium</i> L.	Rubiaceae	wild
78.	<i>Galium triflorum</i> Michx	Rubiaceae	wild
79.	<i>Gentiana argentea</i> (Royle ex D. Don) Royle ex D. Don	Gentianaceae	wild
80.	<i>Geranium ocellatum</i> Jacquem. ex Cambes S.	Geraniaceae	wild
81.	<i>Geranium rotundifolium</i> L.	Geraniaceae	wild
82.	<i>Geranium robertianum</i> L.	Geraniaceae	wild
83.	<i>Hedera helix</i> L.	Araliaceae	
84.	<i>Heliotropium bacciferum</i> Forssk	Boraginaceae	wild
85.	<i>Heracleum sphondylium</i> L.	Apiaceae	wild
86.	<i>Imperata cylindrica</i> L.	Poaceae	wild
87.	<i>Impatiens glandulifera</i> Royle	Balsaminaceae	wild
88.	<i>Indigofera linifolia</i> (L. F.) Retz.	Fabaceae	wild
89.	<i>Ipomoea purpurea</i> (L.) Roth	Convolvulaceae	Ornamental
90.	<i>Jasminum humile</i> L.	Oleaceae	Ornamental
91.	<i>Justicia pectoralis</i> (Jacq)	Acanthaceae	wild
92.	<i>Kickxia ramosissima</i> (Wall)	Scrophulariaceae	wild
93.	<i>Lactuca indica</i> L.	Asteraceae	wild
94.	<i>Lactuca serriola</i> L.	Asteraceae	wild
95.	<i>Lamium album</i> L.	Lamiaceae	wild
96.	<i>Lappula barbata</i> (M. Bieb.) Gürke	Boraginaceae	wild
97.	<i>Lathyrus aphaca</i> L.	Fabaceae	wild
98.	<i>Launaea procumbens</i> (Roxb.) Ramayya & Rajagopal	Asteraceae	wild
99.	<i>Lepidium didymum</i> L.	Brassicaceae	wild
100.	<i>Lespedeza juncea</i> Linn. f	Fabaceae	wild
101.	<i>Linum corymbulosum</i> Rchb	Linaceae	wild
102.	<i>Limonium echioides</i> (L.) Mill.	Plumbaginaceae	wild
103.	<i>Malvastrum coromandelianum</i> (L.) Garcke	Malvaceae	wild
104.	<i>Malva neglecta</i> Wallr.	Malvaceae	wild
105.	<i>Marrubium vulgare</i> L.	Lamiaceae	wild
106.	<i>Medicago denticulata</i> Willd.	Fabaceae	wild
107.	<i>Medicago polymorpha</i> L.	Fabaceae	wild
108.	<i>Melilotus indicus</i> (L.) All.	Fabaceae	wild
109.	<i>Mentha arvensis</i> L.	Lamiaceae	wild/cultivated
110.	<i>Mentha longifolia</i> (L.) Huds	Lamiaceae	Wild/ cultivated
111.	<i>Micromeria biflora</i> (Buch.-Ham. ex D. Don) Benth.	Lamiaceae	wild
112.	<i>Mirabilis jalapa</i> L.	Nyctaginaceae	wild
113.	<i>Nasturtium officinale</i> R. Br.	Brassicaceae	wild
114.	<i>Nanorrhinum acerbium</i> (Boiss.) Betsche	Plantaginaceae	wild
115.	<i>Nepeta cataria</i> L.	Lamiaceae	wild
116.	<i>Nepeta ciliaris</i> Benth	Lamiaceae	wild
117.	<i>Notholirion thomsonianum</i> (Royle) Stapf	Liliaceae	wild
118.	<i>Oenothera rosea</i> L. Her. ex Aiton	Onagraceae	wild
119.	<i>Onosma hispida</i> Wall. ex G. Don	Boraginaceae	wild
120.	<i>Origanum vulgare</i> L.	Lamiaceae	wild
121.	<i>Oxalis corniculata</i> (L.)	Oxalidaceae	wild
122.	<i>Parthenium hysterophorus</i> L.	Asteraceae	wild
123.	<i>Pennisetum orientale</i> Rich	Poaceae	wild
124.	<i>Pentanema vestitum</i> Wall. ex DC	Asteraceae	wild
125.	<i>Perilla frutescens</i> (L.) Britton.	Lamiaceae	wild
126.	<i>Phleum alpinum</i> L.	Poaceae	wild
127.	<i>Phleum arenarium</i> L.	Poaceae	wild
128.	<i>Pimpinella stewartii</i> Nasir	Apiaceae	wild
129.	<i>Plantago lanceolata</i> L.	Plantaginaceae	wild

130.	<i>Plumbago zeylanica</i> L.	Plumbaginaceae	wild
131.	<i>Poa balfourii</i> auct .	Poaceae	wild
132.	<i>Poa poiformis</i> Labill	Poaceae	wild
133.	<i>Polygala abyssinica</i> R.Br.ex.Fresen.	Polygalaceae	wild
134.	<i>Polygala vulgaris</i> L.	Polygonaceae	wild
135.	<i>Polygonum plebeium</i> R.Br.	Polygonaceae	wild
136.	<i>Polygonum viviparum</i> L.	Polygonaceae	wild
137.	<i>Potentilla rivalis</i> Nutt. ex Torr. & A.Gray	Rosaceae	wild
138.	<i>Ranunculus muricatus</i> L.	Ranunculaceae	wild
139.	<i>Ranunculus parviflorus</i> L.	Ranunculaceae	wild
140.	<i>Reinwardtia trigyna</i> Planch.	Linaceae	wild
141.	<i>Rhynchosia tomentosa</i> (L) Hook & Arn.	Fabaceae	wild
142.	<i>Rubia cordifolia</i> L.	Rubiaceae	wild
143.	<i>Rubia manjith</i> Roxb	Rubiaceae	wild
144.	<i>Rumex dentatus</i> L.	Polygonaceae	wild
145.	<i>Rumex hastatus</i> D.Don.	Polygonaceae	wild
146.	<i>Rumex nepalensis</i> Spreng	Polygonaceae	wild
147.	<i>Salvia coccinea</i> Buc'hoz ex EtL	Lamiaceae	Ornamental
148.	<i>Salvia moorcroftiana</i> Wall. ex Benth.	Lamiaceae	wild
149.	<i>Saussurea heteromalla</i> D.Don	Asteraceae	wild
150.	<i>Scabiosa candollei</i> Wall.	Dipsaceae	wild
151.	<i>Scabiosa ochroleuca</i> L.	Caprifoliaceae	wild
152.	<i>Scandix pecten-veneris</i> L.	Apiaceae	wild
153.	<i>Scilla griffithii</i> Hochr.	Hyacinthaceae	wild
154.	<i>Scrophularia dentata</i> Royle .ex.Bentham.	Scrophulariaceae	wild
155.	<i>Sedum sarmentosum</i> Bunge	Crassulaceae	wild
156.	<i>Senecio aquaticus</i> Hill.	Asteraceae	wild
157.	<i>Sida cordata</i> (Burm.f.) Borss.Waalk	Malvaceae	wild
158.	<i>Sisymbrium irio</i> L.	Brassicaceae	wild
159.	<i>Silene conoidea</i> L.	Caryophyllaceae	wild
160.	<i>Smilax -bona-nox</i> L.	Smilacaceae	wild
161.	<i>Smilax china</i> L.	Smilacaceae	wild
162.	<i>Smilax rotundifolia</i> L.	Smilacaceae	wild
163.	<i>Solanum erianthum</i> D.Don	Solanaceae	wild
164.	<i>Solanum incanum</i> L.	Solanaceae	wild
165.	<i>Solanum nigrum</i> L.	Solanaceae	wild
166.	<i>Solanum surattense</i> Burm. f.	Solanaceae	wild
167.	<i>Sonchus asper</i> (L.)Hill	Asteraceae	wild
168.	<i>Sonchus oleraceus</i> (L.) Hill	Asteraceae	wild
169.	<i>Stachys emodi</i> Hedge.	Lamiaceae	wild
170.	<i>Stellaria alsinoides</i> Boiss	Caryophyllaceae	wild
171.	<i>Stellaria media</i> (L.) Vill.	Caryophyllaceae	wild
172.	<i>Strobilanthes efloraofindia</i> C.B.Clarke	Acanthaceae	wild
173.	<i>Strobilanthes oliganthus</i> (Miq)	Acanthaceae	wild
174.	<i>Tagetes minuta</i> L.	Asteraceae	wild
175.	<i>Taraxacum officinale</i> L.	Asteraceae	wild
176.	<i>Tricholepis angustifolia</i> -DC	Asteraceae	wild
177.	<i>Trichodesma indicum</i> (L) R.Br	Boraginaceae	wild
178.	<i>Tridax procumbens</i> L.	Asteraceae	wild
179.	<i>Trifolium repen</i> L.	Fabaceae	wild
180.	<i>Verbena officinalis</i> L.	Verbenaceae	wild
181.	<i>Veronica stewartii</i> Pennel	Plantaginaceae	wild
182.	<i>Verbena tenuisecta</i> Briq.	Verbenaceae	wild
183.	<i>Verbascum Thapsus</i> L.	Scrophulariaceae	wild
184.	<i>Vicia hirsuta</i> (L.) Gray.	Fabaceae	wild
185.	<i>Vitis vinifera</i> L.	Vitaceae	Wild/cultivated
186.	<i>Vicia sativa</i> L.	Fabaceae	wild
187.	<i>Viola Odorata</i> L.	Violaceae	wild