Xi'an Shiyou Daxue Xuebao (Ziran Kexue Ban)/
Journal of Xi'an Shiyou University, Natural Sciences Edition
ISSN: 1673-064X
E-Publication: Online Open Access
Vol: 66 Issue 03 | 2023
DOI 10.17605/OSF.IO/DCXQT

FLORISTIC STUDIES, BIOLOGICAL SPECTRUM AND PHENOLOGY OF LASPUR VALLEY, DISTRICT CHITRAL, HINDUKUSH RANGE PAKISTAN

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Abstract

The present study was carried to assess and explore the floristic diversity, phenology, and biological spectra of the plant diversity occuring in the Laspur Valley, District Chitral during 2017-2020. A total of 376 plant species were identified and belonged to 62 families and 210 genera. Among these, Angiosperms group was dominant with 367 species (97.60%), Gymnosperms with 6 species (1.59%) while pteridophytes' were represented by 3 species (0.79%). Asteraceae was the dominant family comprising 55 species (14.62%) followed by Fabaceae (39 spp.; 10.37%) and Lamiaceae (31 spp.; 8.24%). Habit-wise, the herbecious species were at the leading position with 321 species (85.37%) followed by the shrubs (30 spp.; 7.97%) and trees (25 spp.; 6.64 %). For lifeform spectrum, the Hemicryptophytes were dominant with 121 species (32.18) followed by Therophytes with 92 species (24.46%). Leaf size, Nanophyl were dominent with 121 species (32.18%) followed by Microphyll (118 spp.; 31.38%) and Mesophyll (77 spp.; 20.47). The phenological stage of each species was examined. The July was the peak of the flowering month (288 spp.; 65.42%) followed by June (115 spp.; 30.58%). The maximum fruiting was recorded in the month of September (213 spp. 56.64%) followed by October (84spp. 22.34%).The study reflects the inclusive ecological scenario and may be beneficial baseline information for conservation related studies.

Keywords: Floristic Studies, Biological spectrum, Phenology, Laspur Valley, Pakistan

INTRODUCTION

Chitral is a mountainous Valley and a district of Khyber Pakhtunkhwa (KP) province in Pakistan. The total covered area of the valley is 14850 sq km. It lies 35-15 06 to 36 55 32" N Latitude 71 51 34" E longitude with Elevation range Arandu 900m to Terichmir 7611m from sea level. Chitral contains distinct ranges of mountains surrounding the

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region on its west border is Hindukush and the Hindukush Raj, range is in the southeast while the Karakum range is located between them (Ali, 2009).

The Laspur Valley is in the upper part of District Chitral with papulation of 18000 individuals (Anon., 2017). This Valley covered about 640 sq km at the elevation range of 2525 m – 6000 m. Bordered the East by Ghazer (GB), in North with Mastuj, the West through Mushabart mountain (Booni zoom), and the Southern portion is bounded by Kalam (Swat) and Komrad (Dir Upper) (Fig. 1). Laspur represents a unique region because of located at the confluence of Hindukush, Himalaya, and Karakorum Mountain ranges.

The world flora represents an unequal distribution pattern in various regions and even each ecosystem exists a specific composition of plant species. In other words, the biological diversity randomly occurred in a wide-ranging pattern among localities, sites, and regions (Rosenzweig, 1995; Peters e*t al*., 2010). The first collector in Chitral was a British medical officer G.M.J Giles (1884 to 1885) who had collected several specimens from some locations in lower areas of the district. After Giles, Younghusband (1894) visited in the area and made collection, while Duthie (1898) was the first person who published a checklist of plants found in Chitral based on specimens collected during a Relief Expedition of Chitral in the supervision of a British officer in 1895. After that, several researchers made exploration activities in Chitral (Toppin, 1920; Schiebe, 1937; Wendelbo, 1952). Stewart (1972) listed the plant of Chitral in his catalogue. This list was mostly based on a collection from Chitral his own and various previous workers. He also provided a detailed exploration history of Chitral (Stewart, 1982). Approximately, 1500 vascular plant species were 15 reported for the Chitral with several rare and endemic species. It is interesting note here that Chitral recognized as third important region in Pakistan concerning the number of exclusively endemic species i.e., 34 (9.1%) species and is also considered as the center of radiation (Ali and Qaiser, 1986; Ali, 2009).

Flora is a valuable grant of nature on which humanity has remained always reliant. The authentic knowledge of plants is based on trial-as perfectly as-error method and delivered from one generation to another after advancement and some 19 additions (Khan *et al.,* 2013). The flora includes several documented species, while vegetation shows their distribution and the papulation and size of each (Durani *et al.,* 2005).

Pakistan is rich in plant diversity because of its varied climatic conditions, edaphology and pedology. Altitudinally, this region extends from 0m (Karachi) to 8611m (K2, the second highest peak in the world). In addition to this, three great and famous mountain ranges (the Himalayan, the Karakorum, and the Hindu Kush) and several massive glaciers outside the Polar Regions are located here (Ali & Qaiser, 1986). As result these conditions favor hosting several ecological zones and numerous micro-habitats (Champion *et al*., 1965; Nasir *et al.,* 1970).

Mountains are one of the major land ecosystems and possess a wide range of spectacular physiography encompassing great diversity of species (Jackson, 1987; Smith & Mark,

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2003; Khan *et al*., 2012). The biological spectrum of vegetation is the key to the Phyto climate and analysis of diverse life forms (Khan *et al.,* 2013; Ullah *et al.,* 2016). According to Raunkiaer (1934) plant species are classified into five groups based on their perennating bud (Hussain and Parveen, 2009). Biological spectra show complete detail about the flora of an area (Bailey and Sinott, 1915), it is helpful to understand physiological activities (Oosting, 1956). Anthropological disruption and climatic conditions can be observed by biological spectra (Cain & Castro, 1959). It is the indicator of the micro and macro climate of an area (Shimwell, 1971). Leaf traits play a vital role in carbon assimilation, oxygen balance, and energy balance (Ackerly et al., 2002). Life form and leaf size spectra are the indicator of floristic composition and climatic form of region (Cain and Castro, 1959). The evidence of phenology indicates the relationship of plant growth to seasonal changes and variations in photoperiod show their growth stages and biological actions assumed with the seasonal conditions (Manske, 2006). Phenology is the scheduling of biological activities and stages of plant species, which provide a background signal for collecting and synthesizing detailed quantitative information on the rhythm of the plant community (Sing and Sing, 1992; Zhang *et al.,* 2006).

MATERIALS AND METHODS

A comprehensive field survey was conducted in the Laspur Valley District Chitral Khyber Pakhtunkhwa to document data regarding floristic diversity, phenology, leaf and biological spectrum in each locality in every flowering session during 2017 t0 2020. Collected plant samples were pressed under field pressure. Relevant information was noted in the already prepared field notebook (sample of field notebooks) a mature individual i.e., in flowering and fruiting stages was selected for the collection. A separate collection was assigned for each collected specimen. Photographs regarding habitat, relevant species. To assess the phenological behavior with short vegetation season (June, July, August, and September) by walking and gathering method (Frenedozo, 2004) was used. Detailed literature was surveyed especially flora of Pakistan, flora of Afghanistan and India were thoroughly consulted. The lifeform classes and leaf spectrum of the plant species were recorded followed by proposed procedure of Raunkiaer (1934), Cain & Castro (1959) and Qadir Shetvy (1986).

The specimen was identified based on the flora of Pakistan (Nasir & Ali, 1970-1989: Ali & Nasir, 1989-1991: Ali & Qaiser, 1993-2021) and the flora of Afghanistan: Field Guide Afghanistan and Vegetation (Breckle & Rafiqpoor, 2010) and taxonomists from Hazara University were also consulted. Current botanical name, citation and respective family were confirmed through The Plant List (ww.theplantlist.org) and voucher specimens were deposited in the Herbarium (HUP), Department of Botany Hazara University Mansehra for further studies.

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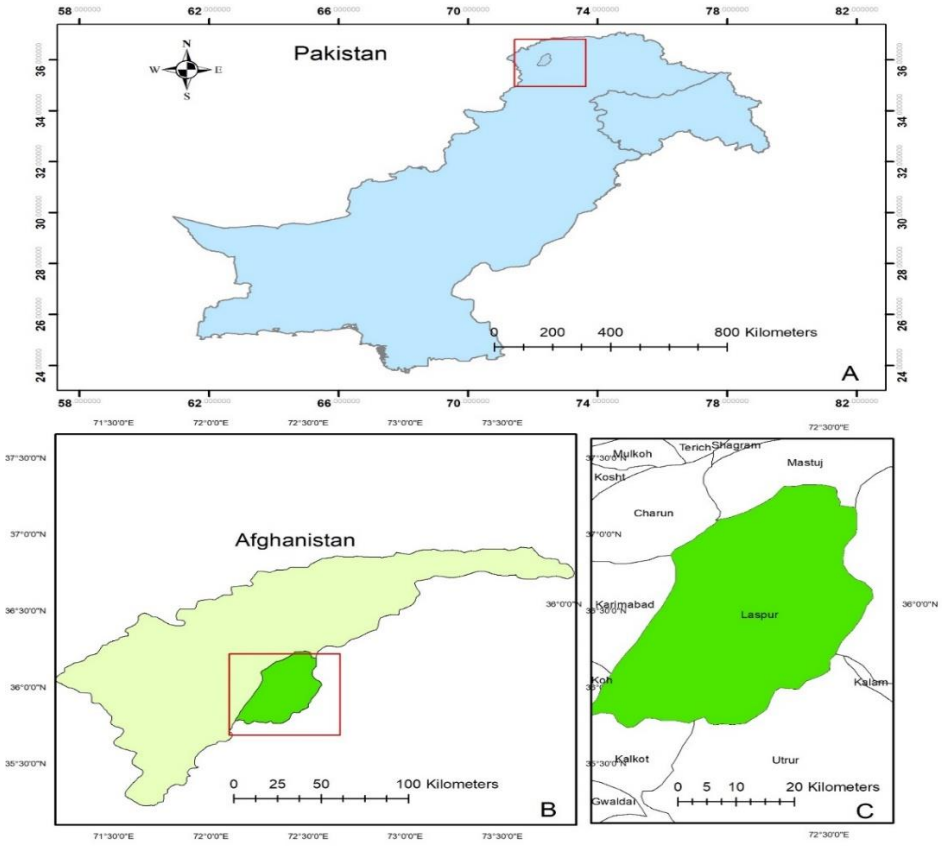

Fig 1: Map of Laspur Valley District Chitral Pakisatn

RESULT

Throug the current study a total of 376 vascular plant species were identified, belonging to 62 families with 210 genera. These comprise of 3 species of Pteridophytes represented by 3 families and 3 genera Gymnosperm were represented by 6 species, 2 genera and 2 families. Among Angiosperm, monocotyledons were comprised of 39 species 25 genera 7 families, while dicotyledons were dominant with 328 species, 180 genera and 50 families. Asteraceae was the leading family having 55 species (25 genera), followed by Fabaceae with 39 species (16 genera), Lamiaceae with 31 species (15 genera), Rosaceae and Poaceae 19 species (15 genera; 9 genera) each respectively, Ranunculaceae 12 species (7 genera), while the remaining families were less 10 species each. Among 210 identified genera *Astragalus* was the dominant genus with 13 species (6.19%), followed by *Artemisia* 11 species (5.23%), *Nepeta* 8 species (3.80%), *Potentilla* 7 species (3.33%), Allium 6 species (2.85%), *Amaranthus* and 5 species (2.38%) each, *Euphorbia*, *Epilobium, Geranium, Mentha, Morus, Papaver* 4 (1.90%) each were recorded

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as leading genera of the study area. According to their growth habit three main group were recognized i.e., herb, shrubs, and trees. There were 321 herb species (85.37), 30 shrub species (7.97) and tree was 25 (6.64). The life span analysis of herbaceous plants further classified into 3 sub-categories based on the life span of the species shown the perennial plants as leading class with 228 species (60.63%) followed by 85 species (22.60%) of the annual plants where 08 species (2.12%) were biennials. Among the lifeform spectrum the Hemicryptophytes were the dominant class with 121 species (32.18) plant species followed by Therophytes 92 (24.46), Chamaephytes 88 (23.40), Nanophanerophytes 28 (7.44) Megaphanerophytes 23 (6.11) Geophyte 21(5.58) and parasite species were 3 (0.79). Leaf spectra result showed that

Nanophyl were leading class with 121 species (32.18%) followed by Microphyll 118 species (31.38%), Mesophyll 77 (20.47), Leptophyll 39 (10.37%), Megaphyll 13 (3.45) and Aphyllous species 8 (2.12). The phenological stage of each species was examined by walking and gathering method regarding their flowering and fruiting/seeding stage during field visits. July was the peak of the flowering month with (288 spp. 65.42%), followed by June (115 spp.30.58%), May (14spp.3.72%), and April (1 spp. 0.26%), while the maximum fruiting shown in the month of September (213 spp. 56.64%), October (84 spp. 22.34%), August (71 spp. 18.88%) and July (8 spp. 2.12%).

DISCUSSION

The main reflection of vegetation of any area is its floristic structure. The flora of a particular region is the sum total of the species within either related to wild or cultivated species (Longhi *et al*., 1992). Floristic list is also representative of the view that species has its own ecological amplitude and interaction to the environment and to other species (Giusti *et al*., 1995). The plant biota presented three plant groups viz., Pteridophytes, Gymnosperms and Angiosperms in 376 vascular plant species, 210 genera and 62 families. Pteridophytes were presented by 3 family Cystopteridaceae Equisetaceae, Pteridaceae comprising only 1 species each. Gymnosperm with 2 genera with both three species individually. Our findings are congruent with many researchers of allied, neighboring and national regions The less fern species may be recognized due to dry, arid ecological condition as they are richly observed in tropical zone (Choy-Sin and Suan, 1974; Mandl *et al*., 2010). Angiosperms are the most successful and flourishing vascular plants which are found in rich due to their broad niche (Burger, 1981) which are advanced and cosmopolitan group in the world and cover any types of habitats in any type of ecosystem. Flowering plants were recorded with maximum sum (367 species, 205 genera, 57 families) presenting both mono and dicot species. The results showed harmony with the findings of the Shaheen *et al*. (2011) and Zakir (2014). The calculated generic index and specific index for the total recorded species were 3.44 and 5.7 respectively. The low floristic diversity may be due to the due to the arid climate with the dominant dry mountainous habitat as clarified in the studies of (Webster & Nasir., 1965). The collected A total of 62 families. The distribution of the species in families revealed that mono typic families were existed in Valley i.e., with one species (12) close with the

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findings of (Eberhardt, 2004a; Khan, 2007; Abbas, 2012). Asteraceae 25 genera (55 species), The richness of family Asteraceae can be related with the largest family in the national flora and its capable adaptation to diverse habitat types (Ali and Nasir, 1970; Hussain *et al.,* 2015 *Astragalus* was 13 species (6.19%), followed by *Artemisia* 11, (5.23%), *Nepeta* 209 8 (3.80%), *Potentilla* 7 (3.33%), *Allium* 6(2.85%), *Amaranthus* and *Anaphalis* 5 (2.38%), was leading genus of the area. These results show harmony with findings of study of Abbas (2012) in Tomik valley and (Khan, 2007) in the valleys of Haramosh and Bugrote, where mentioned genera showed their dominance. According to Dickore (2001) *Saussurea* displays great adaptations to harsh environmental conditions.

The growth habit classification is one of the common diversity indices in botanical studies. In the present study the plants were investigated for their growth habit and where three main groups were recognized i.e., herbs, shrubs, and trees. For better understanding the plant habits, the herbaceous plant species further categorized into three subcategories of annual herb, biennial herb and perennial herb based on period of life cycle. Habit wise Perennial herbs were prevailed with 228 (spp. 60.63%) followed annual herbs (85 spp.22.60 %), shrubs (30 spp. 7.97%), trees (25 spp. 6.64%). The flora with dominant habit of herbaceous plants strongly indicates the harsh and cold environment, short growing season, and thick snow layer (Tasser and Tappeiner, 2002). The environment of sub montane and montane belt encourages the growth of annuals and ephemerals but significantly low in elevated areas (Zazanashvili *et al*., 2000). Shrubs are extensive in the area and show decrease in number with increase in elevation. This also directs the low drought and hostile climate of the area. The regional climatic is not favorable for tree plant species may be due to the harsh and cold condition with high altitude. There short vegetation season and low precipitation could also be co-related with to a lesser extent tree number in the study area this finding is agreed with Mahdavi *et al.* (2013) and Qiong *et al.* (2010). Altitude is the most powerful environmental gradient in the ecological studies to know the evolutionary responses and the interaction of the organisms with their geophysical environment (Körner, 2007). The species richness declined with elevation supporting monotonic distribution model (MacArthur, 1972; Rohde, 1992).

For instance, life form affords rudimentary climatic information (Campbell and Werger, 1988; Danin and Orshan, 1990), provides comparison of regional floras and precise climate properties for continent, biogeographic region and altitude which is indicators of climate and microclimate (Curtis and McIntosh, 1950; Shimwell, 1971; Sarmiento and Monasterio, 1983) indicates habitat condition (Bakker *et al*., 1966). The Raunkierian classification based on perennating buds of the species six life form classes with leading hemicryptophyte with 121 (32.18%) followed by therophyte (92 species 24.46%), chamaephyte (88 species 23.40%), nanophanerophyte (28 species 7.44%), mega phanerophyte (23 species 6.11%), geophyte (21species 5.58%) and parasite (3 species 0.79%) was recorded as lowest life form classes. The hemicryptophyte life form showed increase with altitude and their occurrence indicates the cold and dry climate. Particularly Chamaephytes were found in lower rocky terrain which indicating the desert environment supported by the study of Hussain *et al.* (2015), Hoffmann (1982) and Montserrat-Martí

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et al. (2011). But some contradiction due to high altitude and climatic condition. Phanerophytes show huge population at lower elevations associated with cultivated species and waste lands and diminish with rise in altitude. Leaf spectra may be useful to understand the physiological process of plants and their communities (Oosting and Hess, 1956). Leaf spectra are commonly used to examine the flora of the specific region (Qadir and Shetvy, 1986; Hussain *et al*., 2015). The study of leaf spectra revealed that nanophylls were leading class (121 spp., 32.18%) followed by microphyll (118 spp., 31.38%), mesophyll (77 spp. 20.47%), leptophyll (39 spp. 10.37%), megaphyll (13 spp. 3.45%) and aphylls was (8 spp. 2.12%). There is no previous study on the leaf spectrum of the region, however other previous work on adjacent parts is compared. The findings are almost close with the findings of (Hussain *et al.,* 2015) from Chitral and little controversy may be the different altitudinal range and agreed with the results of (Qadir and Shetvy, 1986; Tareen and Qadir, 1993) conducted in the dry lands of Baluchistan. The agreement could be liked with the aridity of both areas favoring the growth of xerophytes. The phenological stage of each species was examined and categorized in 2 groups regarding their phenological stage (flowering and fruiting) at the time of observation and collection in the field. Flowering data identified that the July (2246 spp.65.42%) was peak of flowering plant species, followed by June (115spp. 30.58%), May (14spp. 3.72%) and in April (1spp. 0.26%) were recorded. while most fruiting shown in the month of September (213 spp. 56.64%) followed by October (84spp. 2234%), August (71spp. 18.88%), and in the July (8 spp. 2.12%) recorded. Our results match with those of Shreshtha, (1998), where the author noticed the blooming period from May to August in his study in, Nepal. As studied by Marqueus *et al*., (2004), phenological period and atmosphere are associated with each other in terms of temperature, day length and precipitation or rainfall. In the current investigation, 217 seeds were mostly set in chilly/cold season of December and that germinated in the next spring season. A significant number of plant species, the abscission period of leaves was cool season i.e., end October to mid of November, leaf flushing period may be due rapid fluctuation in temperature and unexpected rain fall mostly snow fall. In short, in our investigation area, the plant species grew up and matured to blossoming and fruiting stage in the warm and wet season. Moreover, fruiting phase ended at the start of the cool season and seeds shed off which entered the natural laboratory for cold treatment in the winter season and then once again germinates and experiences in favorable season. Similar phenological scenario was reported by Morellato (1995) who reported that the blooming period begins toward the end of the dry season and at the starting of the wet season, thus fruiting takes place in dry season and that the next rainy period will offer appropriate conditions for seed germination (Morellato et al., 1989). The phenological stage of the plant was co-related with the collecting month started from June to September each year (2017-2020). The phenology of the plant species strongly connected with seasonal fluctuation and especially the early spring and late summer rainfall. Most of the blooms were observed in the month of July. And the flowering stages reduce with the passage of summer and abrupt vegetation fall occurs after 15 of August at high altitudes. The area receives rain

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in early spring and late summer season. The phonological study is effective to know the forest health, seasonal diversity, and management (Ide and Oguma, 2010).

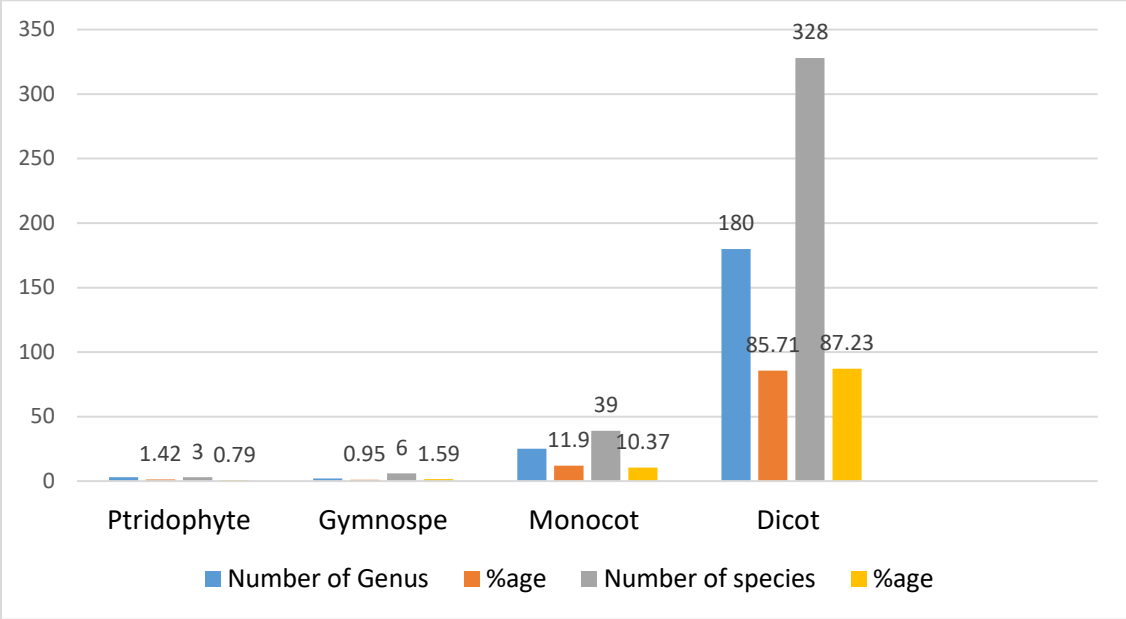

Fig 2: Proportion of major plant group in the study area

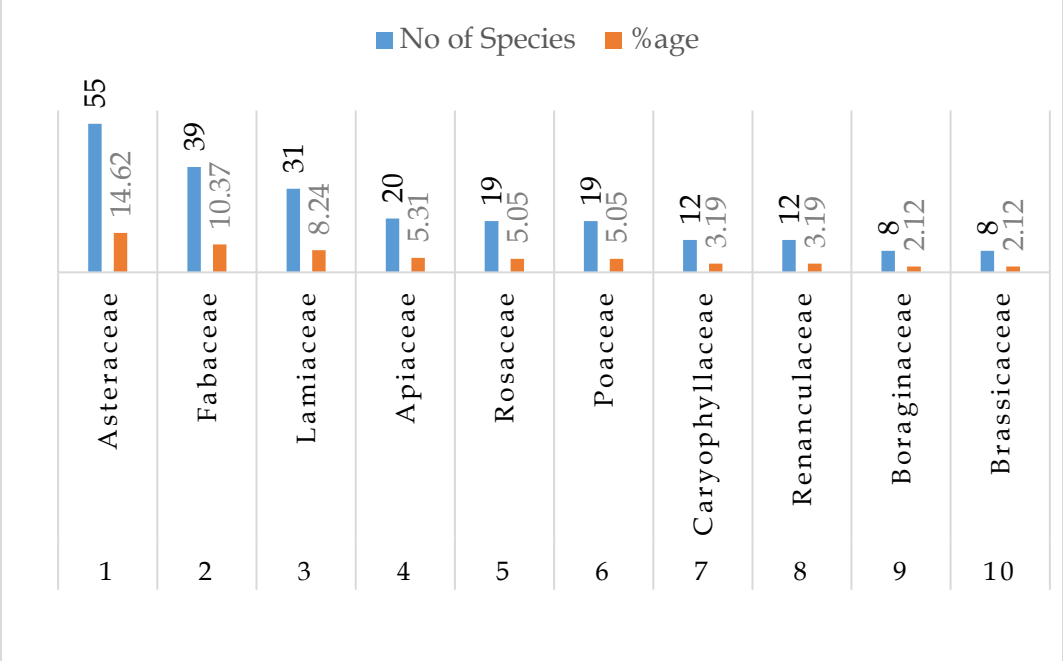

Fig 3: Ten Dominant families in the study area

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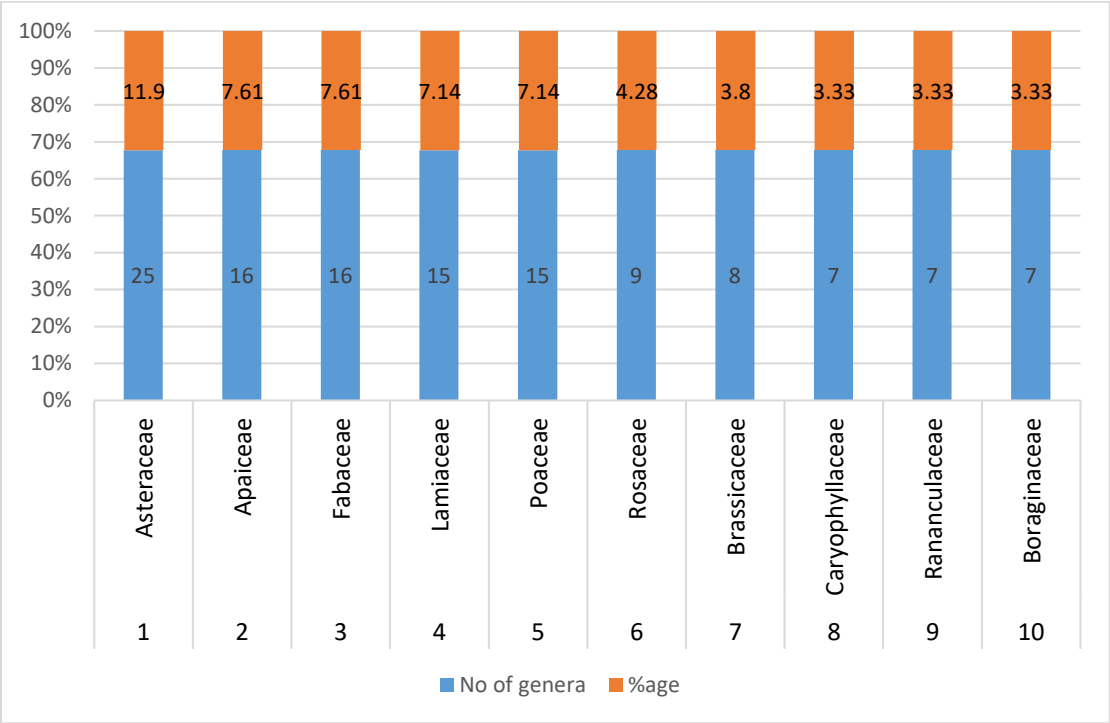

Fig 4: Ten dominant genera within family in the study area

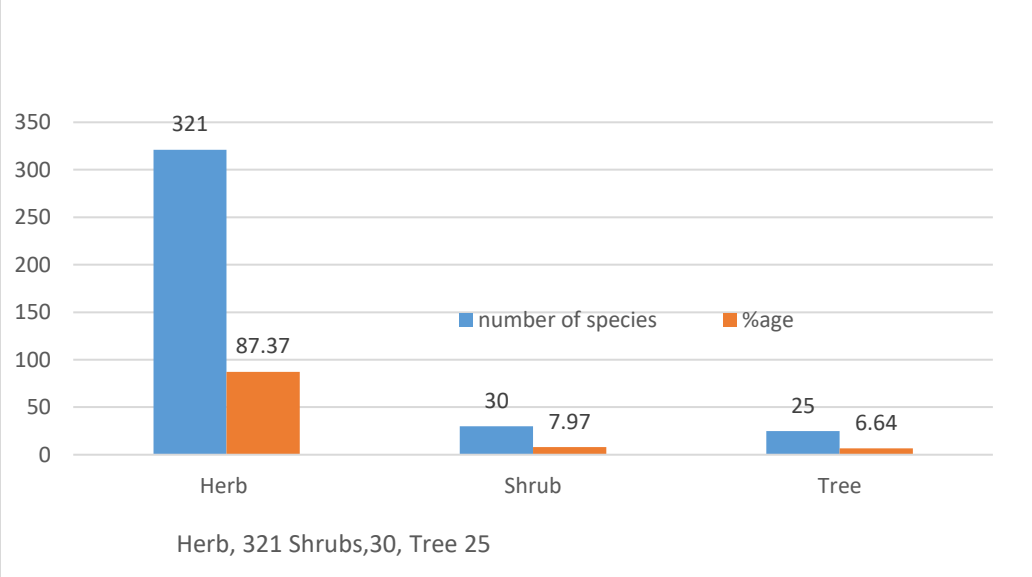

Fig 5: Growth habit wise diversity of plant species in the area

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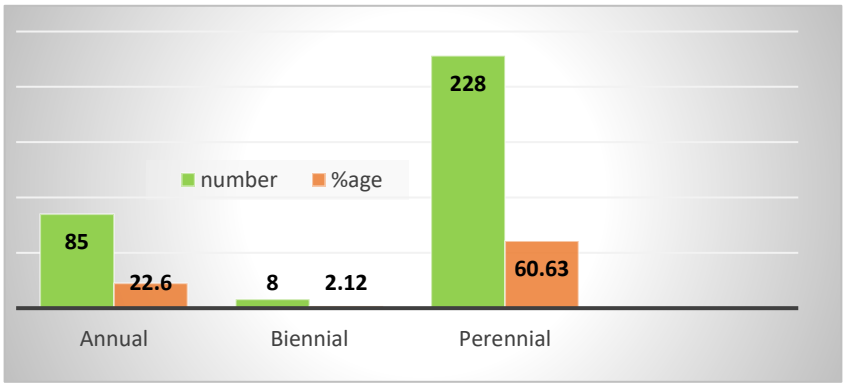

Fig 6: Classification of herbaceous plants in study area

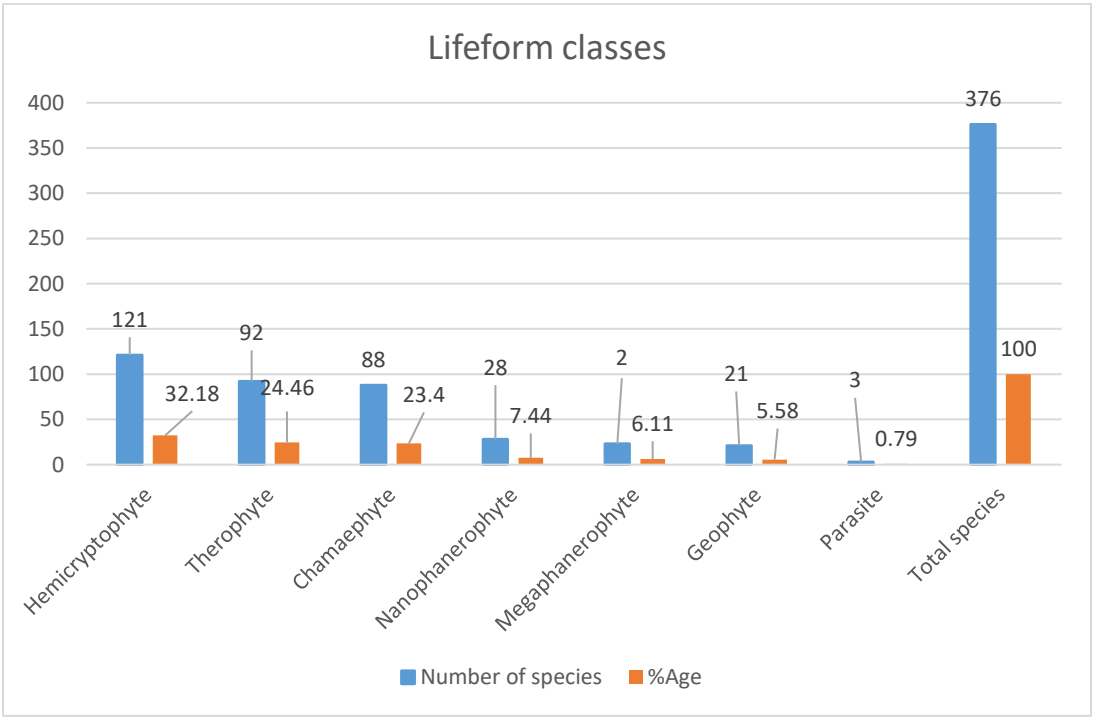

Fig 7: Lifeform Classes in the study area

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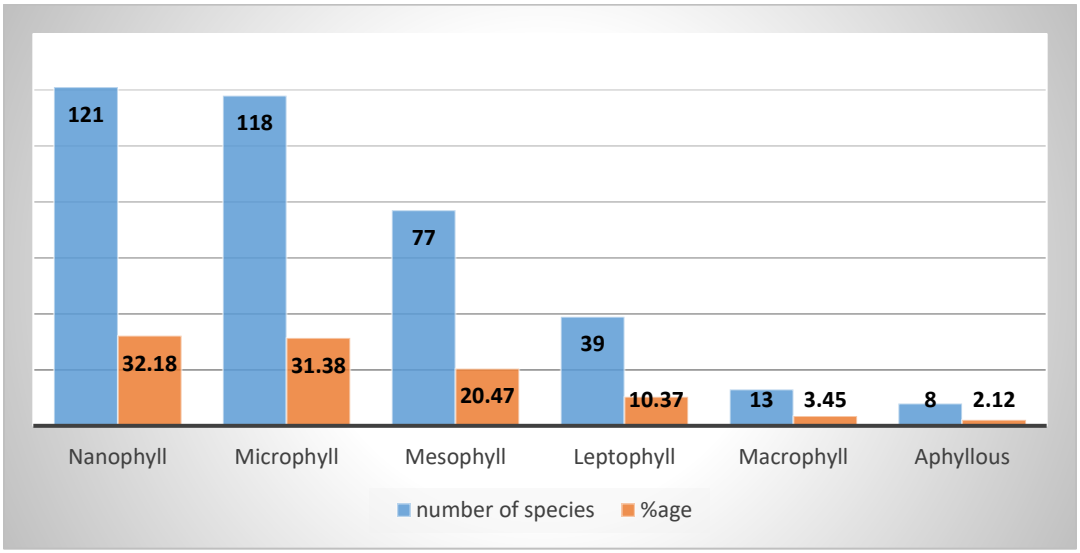

Fig 8: Leaf size spectra of the species in the study area

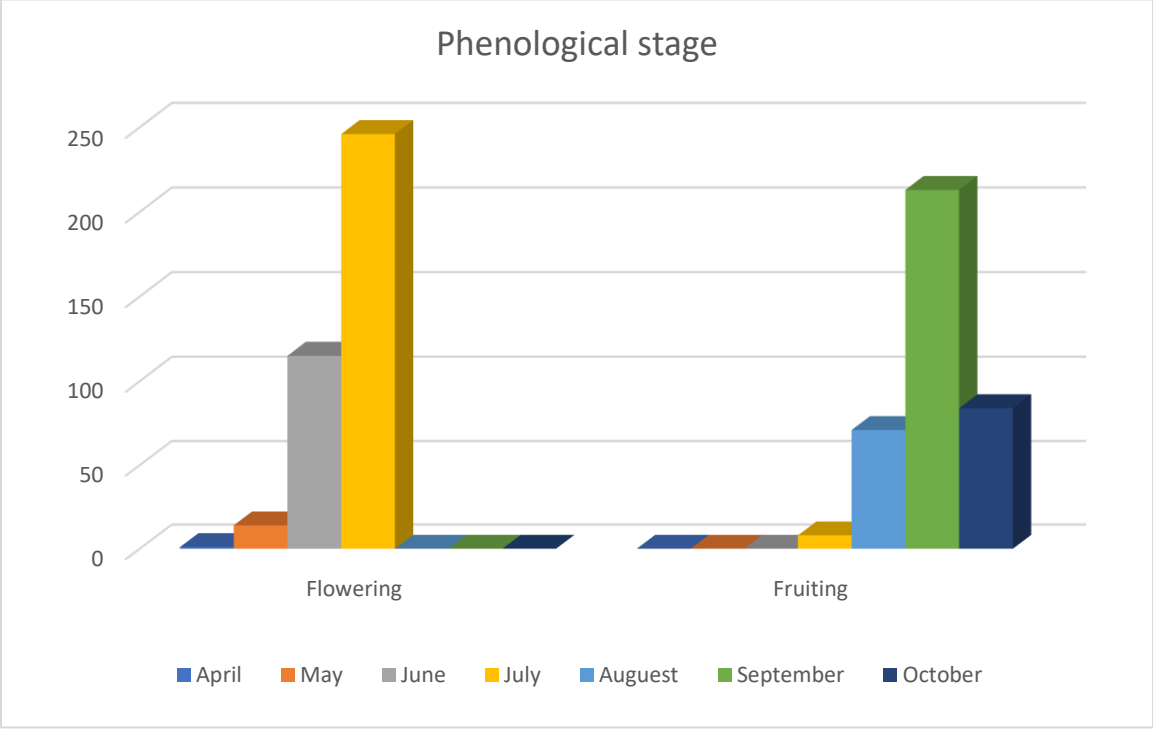

Fig 9: Phenological period of vascular plant in the study are

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Fig 9: Plant species distribution Within the Families

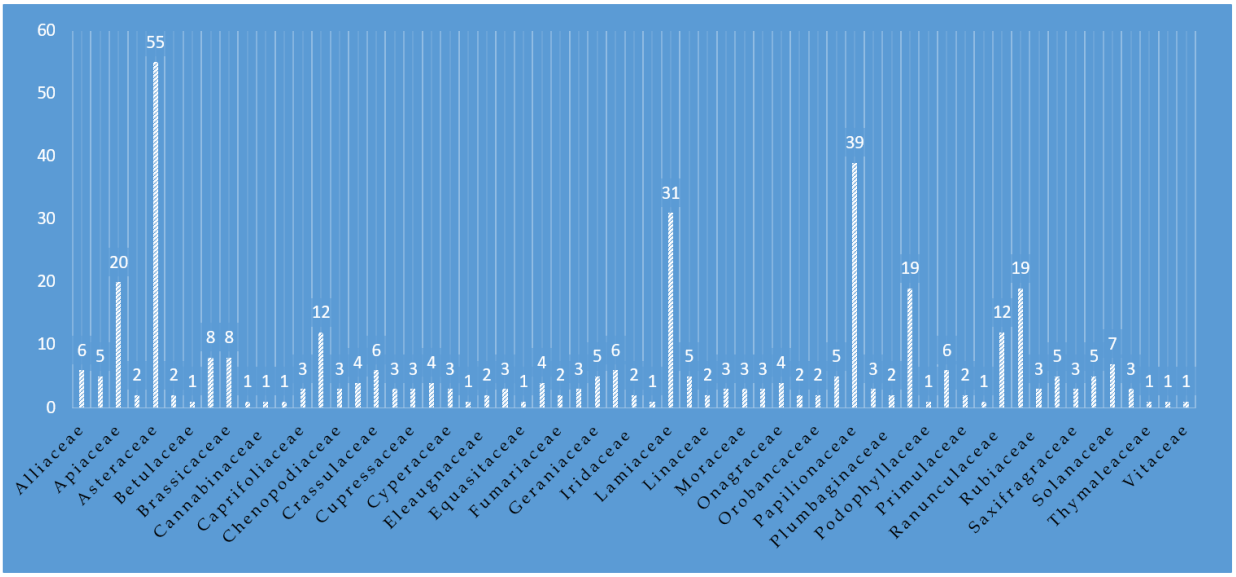

Table 1: Species found in Laspur Valley District Chitral Hindukush Range Pakistan

S. No	*Species Name*	Family	V/No	Leaf Size	Habit	Leaf form	Phenology	
							Flowering	Fruiting
1	*Allium cepa* L.	Alliaceae	8738	Me	Ph	Ge	June	September
2	*Allium carolinianum* DC.	Alliaceae	8737	Me	Ph	Ge	July	September
3	*Allium sativa* L.	Alliaceae	8739	Me	Ph	Ge	July	September
4	*Allium mirum* Wendelbu	Alliaceae	8740	Me	Ph	Ge	July	September
5	*Allium victorialis* L.	Alliaceae	8741	Me	Ph	Ge	July	September
6	*Allium oreoprasum* Schrenk	Alliaceae	8742	Na	Ph	Ge	July	September
7	*Amaranthus hybridus* L.	Amaranthaceae	8745	N	Ah	Th	July	September
8	*Amaranthus lanatus* Dum.Cours.	Amaranthaceae	8746	Mi	Ph	He	July	September
9	*Amaranthus tortuosus* Horne m.	Amaranthaceae	13470	Mi	Ah	Th	June	October
10	*Amaranthus retroflexus* L.	Amaranthaceae	8747	Mi	Ah	Th	July	September
11	*Amaranthus viridus* L.	Amaranthaceae	8741	Mi	Ah	Th	July	October
12	*Apium graveolens* L.	Apiaceae	8760	N	Ph	Ch	June	September

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13	*Bupleurum exaltatum* M.Bieb	Apiaceae	8752	Mi	Ph	He	June	September
14	*Carum carvi* L.	Apiaceae	8753	Le	Ph	He	July	September
15	*Cerum copticum*	Apiaceae	13471	Le	Ph	He	July	September
16	*Conium maculatum* L.	Apiaceae	8751	Mi	Bh	He	July	September
17	*Cuminum cyminum* L.	Apiaceae	8754	Mi	Ph	He	July	September
18	*Daucus carota* L.	Apiaceae	8765	Mic	Bh	Ge	July	September
19	*Ferula narthex* Boiss.	Apiaceae	8757	Mes	Ph	He	June	September
20	*Foeniculum vulgare* Mill	Apiaceae	13472	Mi	Ph	Ch	June	September
21	*Heracleum alpinum* L.	Apiaceae	8763	Me	Ph	He	July	September
22	*Heracleum canariense* Choisy ex DC.	Apiaceae	8759	Me	Ph	He	June	October
23	*Heracleum polyadenum* Rech.f.	Apiaceae	8758	Me	Ph	He	July	October
24	*Ligusticum elatum* C.B.Clarke	Apiaceae	8749	Me	Ph	He	June	October
25	*Pimpanella stewartii* (Dunn)E.Nasir	Apiaceae	8761	Na	Ph	He	July	September
26	*Platytaenia radiata* (Rech.f.& Riedi) Alva	Apiaceae	8750	Na	Ph	He	July	October
27	*Pleruspermum candollei* (DC.)C.B clarke in Hook	Apiaceae	13473	Mi	Ph	He	July	October
28	*Pleruspermum hookeri* var*thomsonii* C.B.Clarke	Apiaceae	8762	Na	Ah	Th	July	September
29	*Psammogeton cabulicus* (Wag.)E.Nasir	Apiaceae	8756	Na	Ah	Th	June	September
30	*Scaligera chitralica* Hiroe	Apiaceae	4502	Na	Ph	Ch	July	September
31	*Scandix pecten-veneris* L.	Apiaceae	8764	Na	Ah	Th	July	September
32	*Eremurus stenophyllus* (Bois. &Bushe) Baker subsp. *stenophyllus*	Asphodelaceae	8768	Mi	Ph	He	July	October

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33	*Eremurus himalaicus* Baker	Asphodelaceae	13364	Mi	Ph	Ch	June	August
34	*Allardia tomentosa* Decne.	Asteraceae	8768	Na	Ph	He	July	October
35	*Allarida glabra* Decne.	Asteraceae	9065	Na	Ph	He	July	October
36	*Anaphalis chitralensis* Qaiser & Rubina Abid	Asteraceae	8769	Na	Ph	Ch	July	October
37	*Anaphalis scopulosa Borriss*	Asteraceae	8770	Na	Ph	He	July	October
38	*Anaphalis virgata* Thomson ex C.B.Clarke	Asteraceae	8771	Na	Ph	Ch	July	September
39	*Anaphalis boissieri* Georgiadou	Asteraceae	9074	Na	Ph	Ch	July	September
40	*Anaphalus mergorinthies*	Asteraceae	9067	Mi	Ph	Ch	May	August
41	*Anthemis cotula L.*	Asteraceae	8772	Mi	Ph	He	June	August
42	*Artemisia absinthium* L.	Asteraceae	9066	Mi	Ph	Ch	July	October
43	*Artemisia biennis* Willd.	Asteraceae	8763	Mi	Ph	He	July	October
44	*Artemisia brevifolia* L.	Asteraceae	8774	Mi	Ph	Ch	June	September
45	*Artemisia dranculus* L.	Asteraceae	8775	Mi	Ph	Ch	July	September
46	*Artemisia maritima* L.	Asteraceae	9053	Mi	Ph	Ch	June	September
47	*Artemisia perviflora* Rox.	Asteraceae	8777	Me	Ph	T h	June	September
48	*Artemisia rutifolia* Spreng.	Asteraceae	8778	Na	Ph	Ch	July	October
49	*Artemisia scoparia* Waldst. & Kitam.	Asteraceae	8779	Na	Ph	He	July	September
50	*Artimisia chitralensis* Ali	Asteraceae	9077	Mi	Sh	Np	July	September
51	*Artimisia ludeviciana* Nutt.	Asteraceae	9076	Mi	Ah	Th	July	September
52	*Artimisia microcepala* jacquen. ex Bess.	Asteraceae	9075	Mi	Ah	Th	July	September
53	*Aster altachis* Wild.	Asteraceae	9073	Me	Ph	He	July	October
54	*Aster amilus* L.	Asteraceae	9072	Me	Ph	He	June	October
55	*Biden bipinnata* L.	Asteraceae	9054	Na	Ph	He	June	October

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56	*Carthamus tinctorius* L.	Asteraceae	9061	Mi	Ph	Ch	July	October
57	*Carthamus getulus* Pomel.	Asteraceae	8781	Me	Ph	Ch	July	September
58	*Cichorium Intybus* L	Asteraceae	9071	Me	Ah	Th	July	October
59	*Circium arvens L.*	Asteraceae	9068	Me	Ph	Ch	July	September
60	*Circium vulgare* (Savi.) Ten,	Asteraceae	9055	Mi	Ph	Ch	July	September
61	*Circium willichi* Dc	Asteraceae	9070	Me	Ph	Ch	July	September
62	*Erigeron canadensis* L.	Asteraceae	9056	Mi	Ph	Ch	July	September
63	*Cotula nepalensis* L.	Asteraceae	8786	Me	Ph	Ch	July	October
64	*Echinops echinatus* Roxb.	Asteraceae	9069	Me	Ah	Th	July	September
65	*Erigeron bonariensis* L.	Asteraceae	9078	Mi	Ph	Ch	July	September
66	*Erigeron glaucus* Ker Gawl.	Asteraceae	9079	Mi	Ph	Ch	July	September
67	*Helianthus annuus* L.	Asteraceae	9056	Me	Ah	Th	July	September
68	*Inula obtusifolia* Kern.	Asteraceae	8782	Me	Ph	Ch	July	September
69	*Inula rhizocephala* var. *intermedia* Kitam.	Asteraceae	8783	Na	Ph	He	July	September
70	*Lactuca arientalis (Boiss)*	Asteraceae	8784	Mi	Ph	T h	July	September
71	*Lactuca sativa* L.	Asteraceae	9062	Ma	Ah	Th	June	Auguest
72	*Leontopodium leontopodium* H.Karst.	Asteraceae	8786	Le	Ph	He	July	October
73	*Leontopodium nanum (*Hook.f.&Thomsonnex C.B.Clerki Hand Mazz	Asteraceae	8785	Na	Ph	He	July	September
74	*Phagnalon acuminatum* Boiss.	Asteraceae	8787	Na	Ah	Th	July	September
75	*Saussurea afghana* Lipsch.	Asteraceae	8788	Me	Ph	Ch	July	September
76	*Saussuria jacea (*Klotzsech) C. B. Clarke	Asteraceae	9054	Me	Ph	Ch	July	September
77	*Senecio analogus*	Asteraceae	13474	Na	Ph	Th	July	September

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78	*Solidago virgurea* L.	Asteraceae	8789	N	Ph	Ch	June	September
79	*Sonchus arvensis* L.	Asteraceae	13475	Me	Ph	Th	July	September
80	*Tanacetum chitralense* (Pollech)K.Bremer & Hmphries	Asteraceae	8790	Mi	Ph	He	July	September
81	*Tanacetum eriobasis* (Rech.f.)Kouale usk.	Asteraceae	8791	Mi	Ph	Ch	July	September
82	*Tanacetum falconeri* Hook.f	Asteraceae	8792	Mi	Ph	He	July	October
83	*Taraxicum calocephalum* H.M	Asteraceae	8793	Mi	Ph	He	July	September
84	*Taraxicum officinale* Weber	Asteraceae	13476	Mi	Ph	Th	July	September
85	*Tragopogon pratensis* L.	Asteraceae	8794	Na	Ph	He	July	September
86	*Tricholepsis chaetelopsis* (Boiss.) Rech.f.	Asteraceae	8795	Na	Ph	Ch	July	September
87	*Tricholepsis trichocephala* Linez.	Asteraceae	8796	Na	Ph	Ch	June	Auguest
88	*Tripleurospermum disciforme* (C.A.Mey). Schultz.Bip	Asteraceae	8797	Na	Ph	He	June	Auguest
89	*Berberis Kashmirana* Ahrendt.	Berberidaceae	13477	Na	Sh	Np	July	October
90	*Berberis lycium* L.	Berberidaceae	8798	Na	Sh	Np	July	october
91	*Betula utilis* D.Don	Betulaceae	13478	Me	T	Mp	July	October
92	*Anchusa italica* Retz.dar	Boraginaceae	8800	Na	Ah	Th	June	September
93	*Arnebia euchroma* (Royle) I.M. Johnst.	Boraginaceae	8806	Na	Ph	He	July	September
94	*Arnebia lindbergiana* (Rech.f.) I.M.Johnst.	Boraginaceae	8802	Na	Ph	He	June	September
95	*Heliotropium europaeum* var. *tanuiflorum* (Guss.)Bass	Boraginaceae	8804	Na	Ph	He	June	Auguest
96	*Cynoglossum anchusoides* Lind	Boraginaceae	8799	Mi	Ah	Ch	July	September

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97	*Lithospermum arvense* (Boiss.) Ried	Boraginaceae	8803	Mi	Ah	Th	June	Auguest
98	*Mattiastrum dielsii* Bornm.	Boraginaceae	8801	Mi	Ah	Th	June	Auguest
99	*Onosma dichroantha* Boiss.	Boraginaceae	8805	Na	Ah	Ch	June	Auguest
100	*Alyssum dasertorum* Stap.f	Brassicaceae	8807	Mi	Ah	Th	July	October
101	*Brassica rapa* L.	Brassicaceae	8808	Me	Ah	Th	July	September
102	*Capsella bursa-pastoris* (L.)Medik.	Brassicaceae	8809	Me	Ah	Th	June	Auguest
103	*Cardaria draba* (L.) Desu	Brassicaceae	8810	Mi	Ah	Ch	June	Auguest
104	*Descurainia sophia* (L.) webb & Benth	Brassicaceae	8811	Me	Ph	He	June	Auguest
105	*Diplotax harra* (Forssk.)Bioss	Brassicaceae	8812	Me	Ah	He	June	Auguest
106	*Draba affghanica* Boiss	Brassicaceae	8813	Mi	Ah	Th	July	October
107	*Sisymbrium irio* L.	Brassicaceae	8814	Mi	Ah	Th	June	Auguest
108	*Campanula leucantha* Gilli	Campanulaceae	8815	Na	Ph	Ch	June	September
109	*Canabas sativa* L.	Cannabinaceae	8816	Mic	Ah	Th	July	October
110	*Capparis spinosa* L.	Capparaceae	8817	Me	Sh	Ch	July	October
111	*Lonicera asperifolia* (Deenc).F.&Thomas	Caprifoliaceae	8819	Na	Ph	He	July	September
112	*Lonicera heterophylla* Dince	Caprifoliaceae	8818	Na	Sh	Np	July	September
113	*Lonicera microphylla* Wild.Ex	Caprifoliaceae	13479	Na	Sh	Np	July	September
114	*Cerastium dichotomum* L.	Caryophyllaceae	8820	Na	Ph	He	July	September
115	*Cerastium cerastoides* (L.) Britton	Caryophyllaceae	8822	Le	Ph	He	July	September
116	*Dianthus angulatus* Royle ex. Benth	Caryophyllaceae	8824	Na	Ph	He	July	October
117	*Gypsophila cephalotes* (Schrenk)Williams	Caryophyllaceae	8825	Mi	Ph	He	July	September

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118	*Minuartia hybrida* (Vill.) Schischk.	Caryophyllaceae	8823	Mi	Ph	He	July	September
119	*Minuartia kashmirlea* (Edgew) Mattf.	Caryophyllaceae	8829	Mi	Ph	Ch	July	September
120	*Saponaria griffithiana* Boiss.	Caryophyllaceae	8830	Mi	Ph	Th	June	Auguest
121	*Silene arenosa* C.Koch	Caryophyllaceae	8831	Na	Ah	Ch	June	Auguest
122	*Silene conoidea* L.	Caryophyllaceae	8832	Na	Ah	He	June	Auguest
123	*Silene vulguris* (Moench)Garek e	Caryophyllaceae	8828	Mi	Ph	Ch	June	Auguest
124	*Stellaria media* (L.)Vill.	Caryophyllaceae	8827	Na	Ah	Th	July	September
125	*Stellaria monospermum* Buch-Ham ex. Don	Caryophyllaceae	8826	Na	Ph	He	June	Auguest
126	*Chenopodium botrys* L.	Chenopodiaceae	13186	Mi	Ah	Th	July	September
127	*Chenopodium foliosum* Asch	Chenopodiaceae	13481	Na	Ph	Ch	July	September
128	*Chenopodiun album* L.	Chenopodiaceae	13482	Na	Ah	Th	June	September
129	*Convulvulus arvensis* L.	Convolvulaceae	8834	Mi	Ah	Th	May	Auguest
130	*Ipomea purpureus* L.	Convolvulaceae	8833	Me	Ah	Th	July	October
131	*Ipomea turbinata* Lags., Gen.	Convolvulaceae	13483	Me	Ah	Th	July	September
132	*Ipomoea hederacea* Jacq Icon	Convolvulaceae	8835	Mi	Ah	Th	July	September
133	*Orostachys spinosa* (L.) Sweet	Crassulaceae	8839	Me	P h	He	July	September
134	*Rhasularia alpestris* (Kar. &kir) Boriss	Crassulaceae	8840	Me	Ph	Ch	Junly	October
135	*Rhodiola coccinea* (Royle) Boriss.	Crassulaceae	8837	Me	Ph	He	July	September
136	*Rhodiola heterodonta* (Hook.f.&Thomson) Boriss	Crassulaceae	8838	Na	Ph	Ch	July	October
137	*Sedum ewersii* Ledeb.	Crassulaceae	8836	Na	Ph	Ch	July	October
138	*Sedum hispanicum* L.	Crassulaceae	8842	Na	Ph	Ch	June	Auguest

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139	*Cucurbita maxima* Duch ex Lam	Cucurbitaceae	8843	Na	Ah	Th	June	Auguest
140	*Cucurbita sativas* L.	Cucurbitaceae	8844	Me	Ah	Th	June	Auguest
141	*Cucurbita pepo* L.	Cucurbitaceae	8845	Me	Ah	Th	June	Auguest
142	*Juniperus polycarpos* var. *turcomanica* (B.Fedtsch.) R.P.Adams	Cupressaceae	8846	Le	T	Mp	June	September
143	*Juniperus communis* L. var. *saxatilis Pallas*	Cupressaceae	8847	Le	Sh	Np	July	October
144	*Juniperus exelsa* M. Bieb.	Cupressaceae	8848	Le	T	MP	June	October
145	*Cuscuta hyalina* Roth	Cuscutaceae	8851	Ap	A h	Th	July	September
146	*Cuscuta gigantea* Griff.	Cuscutaceae	8849	Aph	Ph	Pa	July	September
147	*Cuscuta pedicellata* Ledeb	Cuscutaceae	8850	Aph	Ph	Pa	July	September
148	*Cuscuta reflexa* Roxb.	Cuscutaceae	8852	Aph	Ph	Pa	July	September
149	*Carex melanantha* C.A.Mey	Cyperaceae	8853	N	Ph	He	June	Auguest
150	*Carex orbicularis* Boott	Cyperaceae	13465		Ph	He	June	October
151	*Cyperus rotundus* L.	Cyperaceae	8854	N	Ph	He	July	September
152	*Cystopteris fragilis* (L.) Bernh.	Cystopteridaceae	13463	Na	Ph	He	June	September
153	*Elaeagnus angustifolia* L	Elaeaugnaceae	8855	Me	T	Mp	June	October
154	*Hippophae rhamnoides* L. sub spp *turkistanica*	Elaeaugnaceae	8856	Na	Sh	Np	June	October
155	*Ephedra gerardiana* Wall.ex.Stapf	Ephedraceae	8859	Aph	Sh	Ch	June	Auguest
156	*Ephedra intermedia* Schrenk&C.A Meyer	Ephedraceae	8858	Aph	Sh	Ch	June	Auguest
157	*Ephedra majour* subsp. *procera* Fish.&Mey	Ephedraceae	8857	Aph	Sh	Ch	June	Auguest
158	*Equisetum arvense* L.	Equisetaceae	8865	Ap	Ah	He	July	September

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159	*Euphorbia cyrtophylla* Prokh	Euphorbiaceae	8863	Mi	Ph	He	July	September
160	*Euphorbia helioscopia* L	Euphorbiaceae	8860	Na	Ph	He	July	September
161	*Euphorbia osyridea* Boiss.	Euphorbiaceae	8862	Na	Ph	Ch	July	October
162	*Euphorbia thomsoniana* Boiss	Euphorbiaceae	8861	Na	Ph	He	July	October
163	*Astagalus psilocentros* Fisch.	Fabaceae	13497	Mi	Ph	He	July	October
164	*Astragalus baghlanesis* I.Domel	Fabaceae	13519	Mi	Ph	Ch	June	September
165	*Astragalus bamianicus* Podlech	Fabaceae	13498	Mi	Ph	Ch	June	September
166	*Astragalus bancistrocarpus* B. Fedtsch	Fabaceae	8940	Mi	Ph	Ch	July	September
167	*Astragalus candolleanus* Royle ex Benth.	Fabaceae	13499	Mi	Ph	He	July	September
168	*Astragalus chitralensis* Ali	Fabaceae	8962	Me	Ph	Ch	July	September
169	*Astragalus diopogan* Bunge	Fabaceae	13500	Mi	Ph	He	July	September
170	*Astragalus eriocephalus* Wild	Fabaceae	13501	Le	Ph	Ch	July	September
171	*Astragalus falconeri* Bunge	Fabaceae	13502	Mi	Ph	He	July	September
172	*Astragalus gahiratensis* Ali	Fabaceae	8937	Le	Ph	He	July	October
173	*Astragalus laspurensis* Ali	Fabaceae	13503	Le	Ph	He	July	September
174	*Astragalus minuto-foliolatus* Wendelbo	Fabaceae	13519	Le	Ph	He	July	October
175	*Astragalus oplites* Benth.Ex Parker	Fabaceae	13504	Na	Sh	Np	July	October
176	*Cicer microphyllum* Benth.	Fabaceae	8936	Le	Ph	He	July	September
177	*Cicer nuristanicum* Kitamura	Fabaceae	8965	Na	Ah	He	June	September
178	*Colutea paulsenii* frenyn subsp *paulsenii*	Fabaceae	8942	Na	Sh	Np	July	September

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179	*Faba vulgaris* Moench	Fabaceae	8968	Na	Ah	He	June	Auguest
180	*Hedysarum falconeri* Baker	Fabaceae	8963	Me	Ph	He	June	Auguest
181	*Hedysarum minjanense* Reh.F	Fabaceae	8947	Na	Ph	Ch	July	October
182	*Lathyrus aphaca* L.	Fabaceae	8945	Mi	Ah	He	June	Auguest
183	*Lens culinaris* Medik.	Fabaceae	8667	Na	Ah	Ch	July	September
184	*Medicago lupulina* L.	Fabaceae	8950	Na	Ah	Th	June	Augest
185	*Medicago sativa* L.	Fabaceae	8949	Na	Ph	He	June	Auguest
186	*Melilotus officinalis* (Linn.) Pall.	Fabaceae	8948	Na	Ah	Th	June	Auguest
187	*Oxytropis glorisosa* Ali	Fabaceae	8941	Na	Ph	He	June	Auguest
188	*Oxytropis humifusa* Kar. & Kir.	Fabaceae	8964	Le	Ph	He	June	Auguest
189	*Oxytropis tatarica* Camb.ex Bunge	Fabaceae	8961	Le	Ph	He	June	Auguest
190	*Pisum sativum* L.	Fabaceae	13505	Mi	Ah	Th	July	September
191	*Rubina pseudo-acecia* L.	Fabaceae	8944	Na	T	Ph	July	September
192	*Sophora mallis* (Royle) Baker subsp.*mullis*	Fabaceae	8943	Na	Sh	Np	July	September
193	*Trifolium dubium* sibth	Fabaceae	13506	Na	Ph	Ch	June	Auguest
194	*Trifolium fragiferum* L.	Fabaceae	8935	Na	Ah	Th	June	Auguest
195	*Trifolium resupinatum* L.	Fabaceae	8939	Na	Ah	Th	June	Auguest
196	*Trifolium repens* L.	Fabaceae	8969	Na	Ph	He	June	Auguest
197	*Trigonella emodi* Benth	Fabaceae	8966	Mi	Ah	Th	July	September
198	*Trigonella corniculata* L.	Fabaceae	13507	Mi	Ah	Th	July	October
199	*Vicia faba* L.	Fabaceae	8946	Mi	Ah	Th	June	Auguest
200	*Vicia sativa* L.	Fabaceae	13508	Na	Ah	Th	June	Auguest
201	*Vicia subvillosa* (Ledeb) Traut.	Fabaceae	8970	Mi	Ph	Ch	July	September
202	*Carydalis crassifólia* Royle	Fumariaceae	8866	Le	Ph	Ch	July	September
203	*Corydalis gortschakovii* Schrenk	Fumariaceae	8864	Le	Ph	He	July	October

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204	*Centaurium pulchellum* (Sw.) Hayek ex Hand.-Mazz., Stadlm. Janch. & Faltis	Gentianaceae	8858	Mi	Ah	Th	July	September
205	*Gentiana tianchanica* Rupr.ex kusn	Gentianaceae	8869	Mi	Ph	He	June	September
206	*Gentionopsis vvedenskyi* (Grossh.) VV.Pis'yukova	Gentianaceae	8867	Mi	Ph	He	July	September
207	*Erodium cicutarium* (L.) L.Herit ex Aiton	Geraniaceae	8872	Na	Ah	Th	June	September
208	*Geranium pusillum* L.	Geraniaceae	8873	Mi	Ah	Th	July	September
209	*Geranium willichianum* D.Don ex Sweet	Geraniaceae	8874	Me	Ph	He	July	September
210	*Geranium chalesii* (Aitch. &Hemsl.)Vved.ex Nevski	Geraniaceae	8870	Me	Ph	Ch	July	October
211	*Geranium pratense* var. *strewartanum* Schimidii Y.Nasir	Geraniaceae	8871	Mi	Ph	Ch	July	September
212	*Grassularia alpestre* Dens	Grossulariaceae	13484	Na	Sh	Np	July	October
213	*Rabies villosum* Wall	Grossulariaceae	8878	Mi	Sh	Np	July	October
214	*Ribes himalense* Royl.ex. Decne.	Grossulariaceae	13485	Me	Sh	Np	July	September
215	*Ribes aurem* Wall	Grossulariaceae	8876	Me	Sh	Np	July	October
216	*Ribes orientale* Desf	Grossulariaceae	8877	Me	Sh	Np	July	October
217	*Ribes oxyacanthoides* L.	Grossulariaceae	13486	Na	Sh	Np	July	October
218	*Iris germanica* L.	Iridaceae	8879	Me	Ph	He	May	July
219	*Iris songarica* Schrenk	Iridaceae	8880	Me	Ph	He	May	July
220	*Juglans regia* L.	Juglandaceae	8881	Ma	T	Mp	June	September
221	*Alajja rhomboidea* (Benth.) Ikonn.	Lamiaceae	13487	Na	Ph	Ch	July	September
222	*Clinopodium valgare* L.	Lamiaceae	8885	Mi	Ah	Th	July	September

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223	*Dracocephalum bipinnatum* Rupr.	Lamiaceae	13488	Na	Ph	Ch	June	Auguest
224	*Dracocephalum paulseni* Briquet	Lamiaceae	8907	Na	Ph	He	July	October
225	*Elsholtzia densa* Lab	Lamiaceae	8882	Na	Ah	Th	July	September
226	*Lagochilus carbulicus* Benth.	Lamiaceae	8893	Mi	Ph	Ch	July	September
227	*Lamium album* L.	Lamiaceae	8892	Mi	Ah	Th	June	Auguest
228	*Mentha arvensis* L.	Lamiaceae	13489	Mi	Ph	He	July	September
229	*Mentha longifolia* (L.) L.	Lamiaceae	8804	Me	Ph	He	July	September
230	*Mentha roleana* Benth.	Lamiaceae	8903	Na	Ph	He	July	September
231	*Mentha spacata* L.	Lamiaceae	13490	Me	Ah	Th	May	October
232	*Micromeria biflora* (Buch. - Ham.ex D.Don) Benth.	Lamiaceae	13491	Me	Ph	Ch	July	September
233	*Nepeta cataria* L.	Lamiaceae	8901	Me	Ph	Ch	July	September
234	*Nepeta floccosa* Benth.	Lamiaceae	8898	Mi	Ph	Ch	July	September
235	*Nepeta leucolaena* Bent ex Hook.f.	Lamiaceae	8911	Le	Ph	He	July	October
236	*Nepeta longibracteata* Benth.	Lamiaceae	8900	Na	Ph	Ch	July	September
237	*Nepeta pamirensis* Franch	Lamiaceae	8896	Na	Ph	Ch	July	October
238	*Nepeta paucifolia* Mukerjee	Lamiaceae	8899	Na	Ph	Ch	June	Auguest
239	*Nepeta praetervisa* Reach.f.	Lamiaceae	8897	Na	Ph	Ch	July	September
240	*Nepeta saturejoides* Boiss.	Lamiaceae	8895	Na	Ah	Th	July	September
241	*Prunella vulgaris* L.	Lamiaceae	8905	Mi	Ph	He	July	September
242	*Salvia moorcroftiana* Wall.ex Benth.	Lamiaceae	8886	Me	Ph	Th	June	September
243	*Salvia nobicola* Wall. ex Sweet	Lamiaceae	8888	Me	Ph	Ch	July	September

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244	*Scutellaria edelbagii* Rech.f.	Lamiaceae	8890	Le	Ph	He	July	September
245	*Scutellaria leptosiphon* Nevski	Lamiaceae	8885	Le	Ph	He	July	September
246	*Scutalaria multicaulis* Boiss.	Lamiaceae	8883	Le	Ph	Ch	July	September
247	*Teucrium stocksianum* Boiss	Lamiaceae	8902	Mi	Ph	Ch	June	September
248	*Thymus lineris* Benth.	Lamiaceae	8891	Na	Ph	He	July	October
249	*Thymus serphylum* L.	Lamiaceae	13492	Na	Ph	He	July	October
250	*Ziziphora clinopodioides* Lam.	Lamiaceae	8909	Le	Ph	Ch	June	September
251	*Ziziphora tenuior* L.	Lamiaceae	8910	Le	Ah	Th	June	September
252	*Luzula spicata* (L.)Dc.	Liliaceae	8913	N	Bh	Ge	June	Auguest
253	*Gagea setifolia* Baker	Liliaceae	8914	N	Bh	Ge	May	July
254	*Ixiolirion tatarica* Pall.Herb	Liliaceae	8912	Me	Ph	Ge	July	October
255	*Tulipa clusiana* Dc.	Liliaceae	13517	L	Bh	Ge	July	September
256	*Tulipa stellata* Hook.	Liliaceae	8915	L	Bh	Ge	July	September
257	*Linum parenne* L.	Linaceae	13523	Na	Ah	Th	June	Auguest
258	*Linum usitatissimum* L.	Linaceae	8916	Na	Ph	Ch	June	Auguest
259	*Abutilon theophrasti* Medik.	Malvaceae	8917	Me	Sh	Np	June	Auguest
260	*Alcera rosea* L.	Malvaceae	8918	Ma	Ph	He	June	Auguest
261	*Malva neglegta* Wallr.	Malvaceae	8919	Me	Ph	Th	June	Auguest
262	*Morus rubra* L	Moraceae	8922	Ma	T	Mp	May	July
263	*Morus alba* L.	Moraceae	8920	Ma	T	Mp	May	July
264	*Morus nigra* L.	Moraceae	8921	Ma	T	Mp	May	July
265	*Fraxinus excelsior* L.	Oleaceae	13493	Mi	T	Np	June	Auguest
266	*Jasminum officinalis* L.	Oleaceae	13494	Mi	Sh	Np	July	September
267	*Olea ferruginea* wall.ex Aitch	Oleaceae	13495	Mi	T	Np	June	September
268	*Epilobium chitralens* Raven	Onagraceae	8927	Mi	Ph	He	July	October
269	*Epilobium hirsutum* L.	Onagraceae	8926	Na	Ph	Th	July	September

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270	*Epilobium latifolium* L.	Onagraceae	8924	Mi	Ph	He	July	October
271	*Epilobium angustifolium* L	Onagraceae	8925	Me	Ph	Th	June	September
272	*Epipactis hellebarine* (L.) Crantz	Orchidaceae	8929	Mi	Ph	Hc	July	September
273	*Epipactis ovata* (L.)R.Br	Orchidaceae	1202	Mi	Ph	Hc	July	October
274	*Orobanchae amoena C*.A. Men	Orobancaceae	8928	Le	Ah	Th	July	September
275	*Orobanchae cernua* Leofl.	Orobancaceae	13496	Le	Ph	Ch	July	September
276	*Glaucium elegans* Fish. & Mey.	Papavaraceae	8933	Me	Ah	Th	July	September
277	*Papaver dubium* L	Papavaraceae	8932	Me	Ah	Th	July	September
278	*Papaver nudicuale* L.	Papavaraceae	8934	Le	Ph	He	July	September
279	*Papaver pavoninum* Sherenk.	Papavaraceae	8931	Mi	Ph	He	July	September
280	*Papaver somniferum* L.	Papavaraceae	8930	Ma	Ah	Th	July	September
281	*Plantago lanciolata* L.	Plantaginaceae	8973	Mi	Ph	Th	July	September
282	*Plantago gentinoides* Sub spp *griffithii (*Decne.) Rech.f.	Plantaginaceae	8974	Mi	Ph	Th	July	October
283	*Plantago major* L.	Plantaginaceae	8975	Ma	Ph	G	July	September
284	*Acantholimon acanthobryum* Rech.f. & Schiman-Czeika	Plumbaginaceae	8972	Na	Ph	Ch	July	October
285	*Acathalimon ulicinum* (Willd.ex schult*)*	Plumbaginaceae	13509	Na	Ph	Ch	July	October
286	*Aristida cayanantha* Steud.	Poaceae	13466	Na	Ph	He	July	October
287	*Calamagrostis pseudophragmitiies* (Haller f.) Keler	Poaceae	8987	Na	Ph	Ch	July	September
288	*Echinochloa crus-galli* (L.) P. Beauv.	Poaceae	8987	Na	Ah	Th	July	September
289	*Elymus dahuricus* Turez-ex.Griseb	Poaceae	8976	Na	Ph	Ch	July	September

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290	*Hordeum murinum* L.	Poaceae	8978	Na	Ah	Th	June	Auguest
291	*Hordeum vulgare* L.	Poaceae	13447	Mi	Ah	Th	June	Auguest
292	*Hordeum distichon* L.	Poaceae	13520	Mi	Ah	Th	June	September
293	*Panicum miliaceum* L.	Poaceae	13521	Mi	Ah	Th	June	September
294	*Pennisetum typhideum* (Burm.f.)stapf	Poaceae	13448	Me	Ah	Th	July	October
295	*Phragmites karka* (Retz.) Trin ex. Stend.	Poaceae	8986	Mi	Ph	Ch	July	September
296	*Poa alpina* L.	Poaceae	8979	Mi	Ph	He	June	Auguest
297	*Poa annua* L.	Poaceae	8982	Le	Ah	Th	June	Auguest
298	*Puccinella distans* (L.) Pari	Poaceae	8981	Le	Ph	He	July	September
299	*Saccharum filifolium* Nees. Ex Stend	Poaceae	8984	Na	Ph	He	July	September
300	*Saccharum ravennae* (L.) Mur	Poaceae	8985	Na	Ph	Ch	June	September
301	*Setaria viridis* (L.)P. Beavu.	Poaceae	8980	Na	Ah	Th	July	September
302	*Stipa jacquemonti* Jaub.S.Spach	Poaceae	8983	Mi	Ph	He	July	October
303	*Triticum aestivum* L.	Poaceae	13469	Mi	Ah	Th	June	Auguest
304	*Zea mays* L.	Poaceae	13518	Me	Ah	Th	July	September
305	*Podophyllum emodi* Wall.ex Royle	Podophyllaceae	8971	Na	Ph	Ch	July	September
306	*Oxyria digyna* (L.) Hill	Polygonaceae	13510	Na	Ph	Th	June	Auguest
307	*Persicaria amphibia* (L.) S. F.Gray	Polygonaceae	8988	Mi	Ph	Ch	June	Auguest
308	*Polygonum aviculare* L.	Polygonaceae	8989	Na	Ph	Th	June	Auguest
309	*Polygonum cognatum* Meisn. *subsps chitralicum* (Reh.f.& Scheimn-Czeika0Qaiser	Polygonaceae	8990	Na	Ph	He	July	September
310	*Rheum tibeticum* Maxim.ex.Hook. F.	Polygonaceae	8992	Ma	Ph	G	July	October

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311	*Rumex longifolius* Dc.	Polygonaceae	8991	Me	Ph	He	July	October
312	*Primula macrophylla* D.Don	Primulaceae	13511	Me	Ph	He	July	October
313	*Primula rosea* Royl.	Primulaceae	13512	Mi	Ph	He	April	July
314	*Adiantum fimbriatum* Christ	Pteridaceae	13462	Le	Ph	He	July	September
315	*Aconitum laeve* Royl	Ranunculaceae	8995	Mi	Ph	Ch	July	September
316	*Aconitum violaeceum* jacquem.ex Stapf	Ranunculaceae	9002	Me	Bh	Ge	July	October
317	*Adonis estivalis* L.	Ranunculaceae	9001	Mi	Ph	He	July	September
318	*Anemone obtusiloba* D.Don	Ranunculaceae	9003	Me	Ph	He	July	September
319	*Aquilegia fragrans* Benth Var fragrns	Ranunculaceae	9000	Mi	Ph	Ge	July	September
320	*Clematis aspleniifolia* Schrenk	Ranunculaceae	13513	Le	Ph	He	July	September
321	*Clematis graveolens* Lindl.	Ranunculaceae	8996	Mi	Ph	Ch	July	September
322	*Clematis orientalis* L	Ranunculaceae	8998	Na	Ph	He	July	September
323	*Delphenium bruunonianum* Royl	Ranunculaceae	8999	Mi	Ph	Ch	July	October
324	*Delphenium nordagheni* Wendelbo	Ranunculaceae	13514	Na	Ph	He	July	October
325	*Delphenium pyremidale* Royl	Ranunculaceae	8997	Me	Ph	Ch	July	September
326	*Ranunculus arvensis* L.	Ranunculaceae	8994	Na	Ph	Th	June	Auguest
327	*Cotoneaster horizontalis* Decne	Rosaceae	9007	Me	Sh	Np	June	Auguest
328	*Cotoneater acuminatus* Wall.ex Lendl.	Rosaceae	9005	Me	T	Mp	June	Auguest
329	*Crataegus sonagarica* K.Koch.	Rosaceae	9019	Me	T	Mp	July	September
330	*Malus pumila* Mill.	Rosaceae	9004	Mi	T	Mp	May	September
331	*Potentilla anseriana* L.	Rosaceae	9021	Mi	Ph	He	July	September

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332	*Potentilla atrosanguinea* G.Lood.ex.D.Don	Rosaceae	9013	Mi	Ph	He	July	September
333	*Potentilla dryadanthoides* (Jaz)virosilov	Rosaceae	9020	Na	Ph	Ch	July	September
334	*Potentilla ghazniensis* Sojak	Rosaceae	9012	Mi	Ph	He	July	September
335	*Potentilla grisea* Juz.var.grisea	Rosaceae	9010	Mi	Ph	He	July	October
336	*Potentilla multifida* L.	Rosaceae	9018	Me	Ph	He	July	September
337	*Potentilla persica* Boiss. Hauss Kn	Rosaceae	9011	Mi	Ah	Th	July	September
338	*Prunus armeniaca* L.	Rosaceae	9017	Me	T	Mp	May	Auguest
339	*Prunus domestica* L	Rosaceae	9015	Mic	T	Mp	May	Auguest
340	*Prunus avium* (L.) L.	Rosaceae	9016	Me	T	Mp	May	July
341	*Pyrus communis* L.	Rosaceae	9008	Ma	T	Mp	May	Auguest
342	*Pyrus pashia* Buch.Hem.ex.D. Don.	Rosaceae	9022	Me	T	Mp	May	September
343	*Rubus fruticosus* L.sens.str.	Rosaceae	9014	Mi	Sh	Np	July	September
344	*Rosa alba* L.	Rosaceae	9006	Mi	Sh	Np	July	September
345	*Rosa webbiana* Wall.ex.Royle	Rosaceae	9009	Na	Sh	Np	June	Auguest
346	*Asperula oppositifolia* Regel & Schamalh.	Rubiaceae	9025	Le	Ph	Th	July	September
347	*Galium Boreale* L.	Rubiaceae	9023	Na	Ah	Th	July	September
348	*Gallonia chitrallensis* nazim	Rubiaceae	9024	Na	Ah	Th	July	September
349	*Populus tricocarpa* Torr & A.Gray.ex Hook	Salicaceae	9032	Me	T	Mp	June	October
350	*Populus nigra* L.	Salicaceae	9033	Ma	T	Mp	June	October
351	*Salix alba* L.	Salicaceae	9030	Na	T	Mp	June	October
352	*Salix nigra* Marshall	Salicaceae	9028	Me	T	Mp	June	October
353	*Salix songarica* Anderson	Salicaceae	9029	Mi	T	Mp	June	October
354	*Bergenia* stracheyi	Saxifragraceae	9027	Mi	Ph	G	July	September

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	(Hook.f. & Thorns.) Engl.							
355	*Bergenia ciliata* (Haw.)Sternb.	Saxifragraceae	13515	Mi	Ph	G	July	September
356	*Saxifraga flagllaris* willd.ex.stemb	Saxifragraceae	9026	Mi	Ph	G	July	September
357	*Linaria odora* Fisch.	Scopholariaceae	9035	Le	Ph	Th	July	September
358	*Pedicularis bicomuta* Klotz sch	Scopholariaceae	9034	Me	Ph	He	July	October
359	*Leptorhabdos perviflora* (Bith) Bth.	Scopholariaceae	9036	Na	Ph	He	July	September
360	*Scrophularia umbrosa* Dumart	Scopholariaceae	9037	Me	Ph	Ch	July	September
361	*Verbascum thapsus* L.	Scopholariaceae	9038	Ma	Bh	G	July	September
362	*Datura innoxia* Miller D.Metel Rech.f.) Rech	Solanaceae	9045	Mi	Ah	He	July	September
363	*Datura stramonium* L.	Solanaceae	9043	Ma	Ph	Th	July	September
364	*Hyocymus niger* L.	Solanaceae	9042	L	Ah	Th	July	September
365	*Lysopersicum esculantum* Miller	Solanaceae	9041	Mi	Ah	Th	June	September
366	*Solanum nigrum* L.	Solanaceae	8940	Mi	Ah	Th	June	Auguest
367	*Solanum surattense* Born.f	Solanaceae	9044	Le	Ph	Th	July	September
368	*Solanum tuberosum* L.	Solanaceae	9039	Le	Ph	G	June	September
369	*Tamarix arceuthoides* Beg	Tamaricaceae	9048	Le	T	Mp	July	September
370	*Tamarix ramossissima* Ledeb.	Tamaricaceae	9046	Le	Sh	Np	July	September
371	*Tamarix tetragyna* C.A Mey	Tamaricaceae	9047	Le	Sh	Np	July	September
372	*Daphne mucranata* Royle	Thymaleaceae	9049	Na	Sh	Np	June	Auguest
373	*Viola rupestres* Chm.	Violaceae	9050	Mi	Ph	He	June	Auguest
374	*Vitis vinifera* L.	Vitaceae	13516	Mi	Sh	Np	June	September
375	*Perganum harmala* L.	Zygophylaceae	9052	Na	Ph	He	July	September
376	*Fagonia glutinosa* Delile	Zygophylaceae	9051	Na	Ph	He	July	September

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Key to Table:

1) Abbreviation for plant habit. Ph =Perenial herb, Ah=Annual herb, Bi=binnial herb, Sh=Shrub, T=Tree.
2) Abbreviation for leaf spectra, A=Aphylls, Le=Liptophyll, Mi=Misophyll, N=Nanophyll.
3) Abbreviation for life form, Np= Nanophanerphyte, Mp= Megaphanerphytes, Ch= Chamaephyte, He= Hemicryptophyte, Ge= Geophyte, Pa=ParasiteREFERENCES Abbas, Z., 2012. "Floristic diversity, cultural uses and phytosociology of Tormic Valley Baltistan". M.phil Thesis, Quaid-i-Azam University Islamabad, Pkistan.

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ISSN: 1673-064X
E-Publication: Online Open Access
Vol: 66 Issue 03 | 2023
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