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FLORISTIC DIVERSITY, BIOLOGICAL SPECTRUM AND PHENOLOGY OF THE VASCULAR PLANTS OF DAUDZAI PESHAWAR, KHYBER PAKHTUNKHWA, PAKISTAN

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ABSTRACT

During the present research study a comprehenvie floristic list of previously unexplored area of Daudzai, District Peshawar, Pakistan was prepared. The biological spectrum and phonological studies were aslo carried out. For this purpose, continuous field visits were conducted from February 2019 to April 2020. A total of 564 vascular species of 118 families were recorded. Pteridophytes were represented by 6 species belonging to 6 families. Gymnosperms were represented by four families having 6 species. Monocotyledons were represented by 133 species distributed in 22 families. Dicotyledons were having 419 species belonging to 86 families. Poaceae was the dominant family with 59 species, followed by Asteraceae with 51 species. Among the toltal 564 species 199 species were cultivated, 355 species were wild, while 10 species were present in both wild and cultivated status. Herbs were dominant with 399 species followed by shrub with 78 species, trees with 72 species and climber with 15 species. Based on their presence in different seasons, 431 plant species were present in spring, 393 species in summer, 252 species were present in autumn and 218 species were present in winter. The life form spectra showed that therophytes were dominant with 260 species, followed by nanophanerophytes with 81 species. The leaf size spectra showed that microphyll were dominant in the area with 270 species, followed by nanophylls with 128 species. During the present study two species i.e., *Melochia corchorifolia* L. and *Soliva anthemifolia* (Juss.) Sweet were reported for the first time from Khyber Pakhtunkhwa Province. While a habitat specific species *Eulophia hormusjii* Duthie. of family Orchidaceae was also reported.

Key words: Floristic composition, biological spectrum, phenology, Daudzai, District Peshawar.

INTRODUCTION

Daudzai is situated to the north east of Peshawar city extended from 34° 02′ to 34°11′ north latitudes and 71° 27′ to 71° 42′ east longitudes (Fig. 1).

The land is fertile and several wetlands are present in Daudzai. River Kabul flow on the extreme north side and provide water, due to which the area is rich in species diversity. In the present study floristic and ecological studies were focused to explore the taxonomic and ecological composition of the vascular plants of the area. It is important to mention that floristic composition reflects the vegetation of an area. According to Longhi *et al.* (1992) flora means the total plants growing in a geographical territory including both cultivated and wild species. Floristic studies give complete knowledge about the plant wealth of an area. It is very important for the documentation of species and for reporting new species (Siddique *et al.*, 2016). Such kind of studies serves as the starting point for other comprehensive botanical studies (Saand *et al.*, 2019). Floristic study is the basic taxonomic study of the flora of an area (Panda *et al.*, 2014). Such studies are helpful in the identification and conservation of the plant wealth of a specific area in a scientific and systematic manner (Sultan-Ud-Din *et al.*, 2016).

Many workers have explored the floristic composition of different areas of the country (Asif *et al.*, 2019; Ibrahim *et al.*, 2019; Ali *et al.*, 2018; Khan *et al.*, 2017; Sultan-Ud-Din *et al.*, 2016). Biological vegetation spectrum studies are helpful in knowing the phytoclimatic conditions of a specific area. It is useful for the comparison of geographically distinct communities as well as it is used as an indicator for existing environmental condition (Khan *et al.*, 2017). Life form studies reflect the micro and macroclimatic conditions of the area (Shimwell, 1971). The leaf size knowledge clarifies the physiological process of the plant and plant communities (Oosting, 1956). Life form and leaf size spectra indicates climatic and human disturbance of a particular area (Cain and Castro, 1959). Biological spectrum studies thus ranked after the floristic composition and it is prerequisite for presenting the clear picture of the vegetation of an area. Many workers have enumerated the biological spectrum of different areas of the country (Ali *et al.*, 2018). Phenology can be described as the study of different life events of an organism. Phenological studies are useful in understanding the pattern of climate and reproductive cycle changes of the species. Flowering initiation is one of the important event for reproductive success of plant species (Vashistha *et al.*, 2009). The enlisting of local flora with phenology is important for effective species conservation and management plans (Khan *et al.*, 2018).

MATERIAL AND METHODS

Floristic survey was carried throughout the study period from February 2019 to April 2020 at reugular intervals for the documentation of floristic composition, local names, habit, biological spectrum and phenology of plants of the research area. Plants speciemns were collected from the entire reasrch area and were properly preserved. Ecological characteristics were recorded in the fields. Plants specimens were identified with help of flora of Pakistan (Nasir & Ali, 1970-1989, Ali & Nasir, 1989-1991, Ali & Qaisar, 1993-2019).

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The collected preserved specimens were mounted on herbarium sheets. The voucher specimens were deposited in the Herbarium, Department of Botany University of Peshawar (PUP). The biological spectrum of the plant species was determined and classified after Raunkiaer (1934).

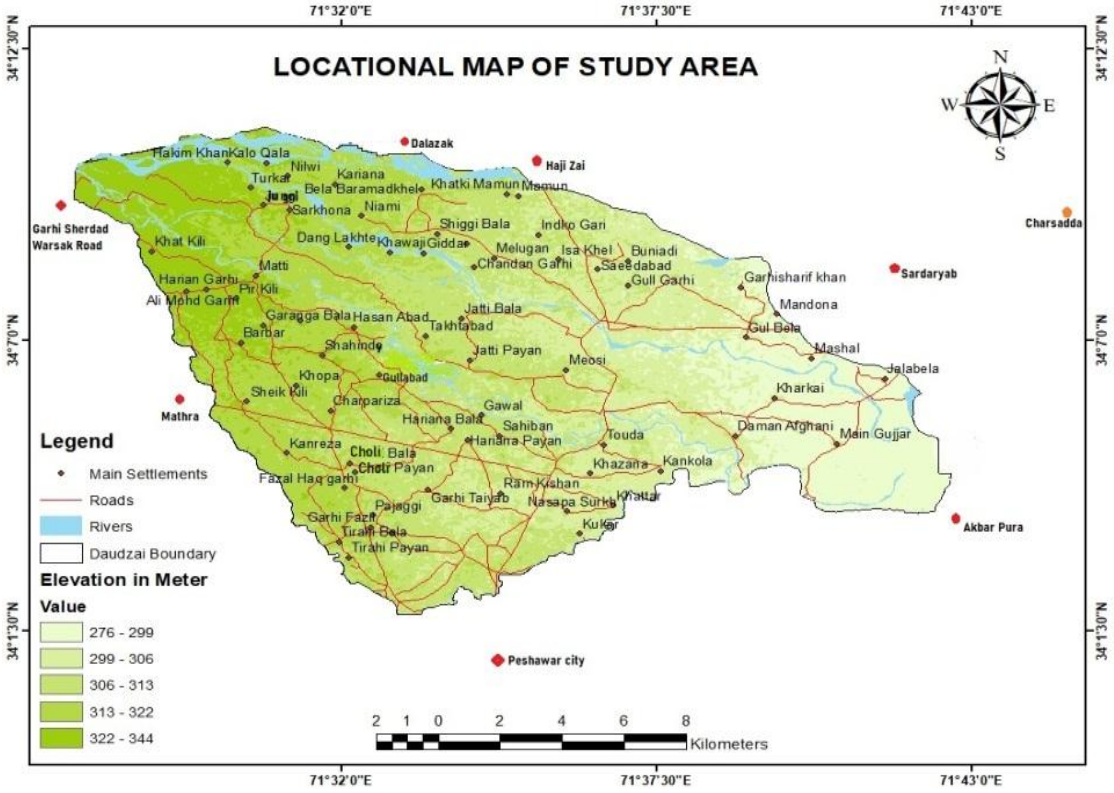

Fig: 1. Map of the study area, Daudzai Peshawar

PROBLEM STATEMENT AND GOAL OF STUDY

The research area selected for the present study is situated at the bank of Kabul River presenting rich plant diversity and during the flood season occasionally this area came under flood. Due to soil ersion caused by the flood, many species were lost in the near past and it is important to document the natural flora, newly arrived and habitat specific species of the area, which will help in identifying the important and key indicator species growing in the area. It is evident from the literature review that no documentation of the plant diversity and ecological charateristics of the plants have been carried out. Therefore, the main goal of the present reasrch was to document the floristic diversity, biological spectrum and phenology of the vascular plants growing in the area. Further, this study will provide baseline information in the form of a comprehensive checklist for future research endeavors in the fields of plant taxonomy, ecology, restoration and conservation.

RESULTS AND DISCUSSION

i. Floristic composition

In the present study 564 species of vascular plants were reported from the research area. The Pteridophytes were represented by 6 species belonging to 6 families. Gymnosperms were represented by four families and 6 species. Monocotyledons were represented by 133 species and 22 families. Dicotyledons were 419 species belonging to 86 families. Poaceae was the dominant family with 59 species followed by Asteraceae with 51 (spp.), Papilionaceae (28 spp.), Brassicaceae

(22 spp.), Euphorbiaceae (16 spp.), Cyperaceae (15 spp.), Solanaceae (14 spp.), Amaranthaceae, Moraceae, Rosaceae, Plantagenaceae (13 spp. each), Chenopodiaceae, Malvaceae (12 spp. each), Apiaceae (11 spp.), Convolvulaceae (10 spp.) (Fig-2). The remaining families were with less than 10 species (Table-1). Based on their status, 199 species were cultivated, 355 species were wild, while 10 species were present in both wild and cultivated status. Habit of the plants showed that herbs were dominant in the area with 399 species, followed by shrub with 78 species, trees with 72 species and climber with 15 species. During the present study one orchid *Eulophia hormusjii* Duthie. is reported as the habitat specific species from the area. While two species *viz.*, *Melochia corchorifolia* L. and *Soliva anthemifolia* (Juss.) Sweet are identified as new reports from Khyber Pakhtunkhwa Province for the first time.

Ali *et al*. (2017) studied the floristic composition of Charsadda and they reported Poaceae, Asteraceae and Papilionaceae as the dominant families. They also stated that herbs were dominating in the area. Ibrahim *et al.* (2019) studied a similar climatic area, Takht Bhai they reported Asteraceae and Poaceae as the dominant families and they also stated that the number of the wild and herb species is greater than the rest of the status and habit respectively. Ullah *et al.* (2016) conducted a study on the floristic composition of Bannu and they also reported the same pattern of family dominancy. The result of Amjad *et al.* (2016) also supports our work. This is because of the member of these families have wide range of ecological amplitude. Khan *et al.* (2013) also reported Asteraceae and Poaceae as the dominant families from Sheikh Maltoon, Mardan. Both the areas are plain and almost the climatic conditions are same. Saeed *et al.* (2018), Khan *et al.* (2014) and Anjum *et al*. (2020) also reports Poaceae and Asteraceae as dominant families and they also placed herbs as the dominant habit from the area which favoured our result. There are many researchers who supports our work like Saand *et al.* (2019); Ali *et al.* (2018); Mehmood *et al*. (2015), according to them Poaceae and Asteraceae are the dominant families this is because of the dominancy of these two families in the flora of Pakistan. Similar reeasrch studies on the floristic composition and ecological aspects are recently carried out on other areas of the country (Muhammad *et al.*, 2020; Haq *et al.*, 2020; Khan and Asad, 2019).

ii. Life form spectrum

Life form spectrum studies were conducted in any area for knowing the prevailing phytoclimatic condition over there. The life form spectra of Daudzai showed that the dominant life form class was therophyte having 260 species followed by nanophanerophytes with 81 species, chamaephytes with 73 species, geophytes with 46 species, megaphanerophytes and mesophanerophytes with 28 species each and hemicryptophytes with 27 species. Rest of the life form classes have less than 27 species. Life form includes one parasite plant also (Table-2). Ali *et al.* (2017) studied the nearby area Charsadda, they also reported therophytes, chamaephytes and nanophanerophytes as the dominant life form. Khan *et al.* (2014) reported therophytes and chamaephytes as the dominant life form from Shahbaz

Garhi, Mardan which strongly supports the present study. Khan *et al.* (2012) studied the life form spectra of Takht-e-Nasrati and they also observed that therophytes were dominating in the area. Khan *et al.* (2011) study the flora of Darra Adam Khel and they almost presented the same type of life form dominancy. Ullah *et al.* (2016) also placed therophytes as the dominant life form class in the area which is in line with our result. Ibrahim *et al.* (2019) stated that therophytes were dominating in the area which is in favour of the present study. The domination of therophytes in the area was also reported by Anjum *et al.* (2020) which further strengthen our result. There are many other studies like Ali *et al.* (2016); Samad *et al.* (2018); Ullah and Badshah (2017) which supports the present work.

iii. Leaf size spectrum

According to leaf size spectra microphyll were dominating in the area having 270 species followed by nanophylls with 128 species. Other important leaf size classes were mesophylls 114 and leptophylls 30 species. The remaining classes have less than 30 species (Table-2). Ali *et al.* (2017) study the leaf size spectrum of Charsadda their results are exactly similar to the present study which strongly supports the present work. Samad *et a.* (2018) studied the life form spectrum of Lala Kalay, Peshawar which is located near to the present study area and almost the climatic condition of both the areas are same they also pointed out the same trend of the dominancy of microphylls, mesophylls and nanophylls in the area which is in line with the present study. Khan *et al.* (2014) studied the floristic composition and they reported microphylls, mesophylls and nanophylls as the dominant leaf size class over there. Khan *et al.* (2013) reported microphylls as the first dominant leaf size class and nanophylls as the second dominant leaf size class from Takht-e-Nasrati. Our reports agreed with those of Ullah and Badshah (2017) they also reported the domination of microphylls and nanophylls. Ahmed *et al.* (2019) also reported microphylls and nanophylls as the first and second leaf size classes. Asif *et al.* (2019) also reported the domination of microphylls and nanophylls from Balakot which supports the present work. The domination of microphylls were reported by many researchers such as (Bibi *et al.*, 2016; Hayat *et al.*, 2019; Bibi *et al.*, 2019).

iv. Phenology

Based on their presence in different seasons 431 plant species were present in spring, 393 species in summer, 252 species were present in autumn and 218 species were present in winter. On the basis of their life cycle, 188 plant species were present throughout the year i.e they were perennial, 142 plant species complete their whole life cycle in spring season only, 41 species complete their life span in spring and summer season, 29 species complete their life cycle from spring to autumn, 103 species emerged in summer and complete their life span in summer season only, 28 species complete their life cycle in summer and autumn., 4 species complete their whole life in autumn, 28 species have the duration from winter to spring and 1 species emerged in winter and complete the life cycle in summer. The results of the flowering season of angiosperms revealed that out 552 plants, majority of the plants flowered in spring season (278 spp., 50.36%) followed by summer season (190 spp., 34.42%) (Table-2). Ali *et al*. (2017) also placed the spring flora as dominant from the summer flora which supports the present work. Ullah *et al.* (2016) also reported that vernal are greater in number than aestival which support the present study. Samreen *et al.* (2016) conducted their research work in Darazinda, D.I. Khan and they also reported that spring flora is more dominant than the the other seasons flora which agrees to the present study. Ullah and Badshah (2017) reported that summer flora was dominant in Jelar area of Dir, this was because of the altitudional variation, as the area is located at higher altitude. The reason for dominance of summer flora is the more favourable condition in summer for the growth of the species. The reason for dominance of spring flora at plain areas with lower altitude is the favourable condition for growth during the spring season and spring flora is dominant at such areas.

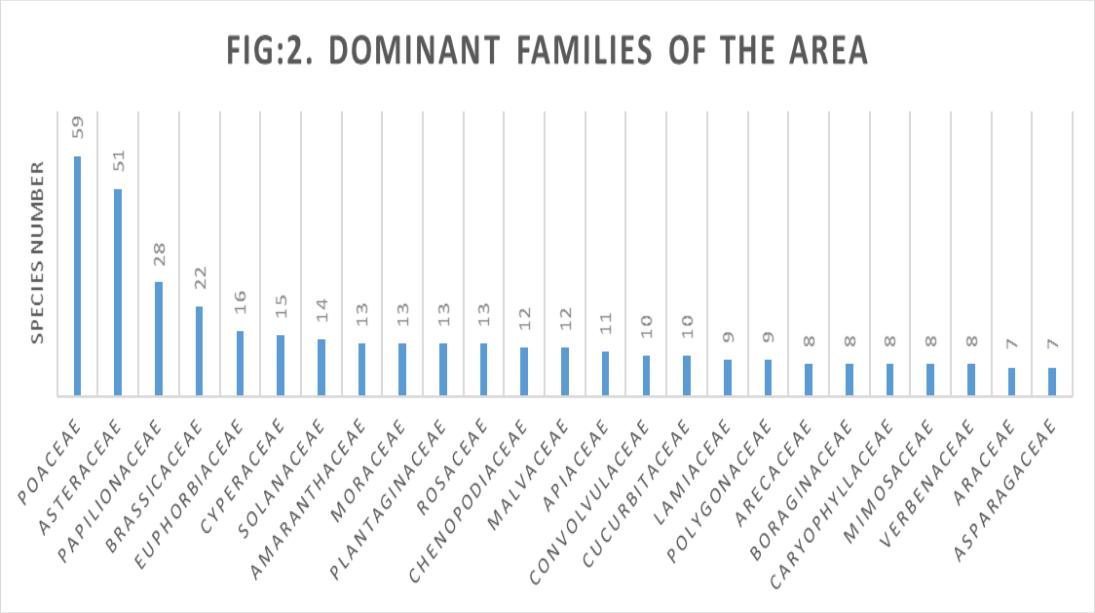

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Table No. 1. Floristic composition, Biological spectrum and phenology of flora of Daudzai, District Peshawar

Family	S#	Botanical Name	Phenology				1	2	3	4
			Sp	Su	A	W				
Pteridophytes										
Adiantaceae	1	*Adiantum capillus-veneris* L.	+	+	+	+	W	H	Ch	N
Dryopteridaceae	2	*Dryopteris filx-mas* (L.) Schott.	+	+	+	+	W	H	Ch	Mic
Equisetaceae	3	*Equisetum arvense* L.	+	+	+	+	W	H	Ch	Aph
Marsileaceae	4	*Marsilea quadrifolia* L.	+	+	+	-	W	H	G	Mic
Pteridaceae	5	*Pteris vittata* L.	+	+	+	+	W	H	Ch	Mic
Thelypteridaceae	6	*Ampelopteris prolifera* (Retz.) Copel.	+	+	+	+	W	H	Ch	Mic
Gymnosperms										
Araucariaceae	7	*Araucaria columnaris* (G.Forst.) Hook.	+	+	+	+	C	T	MegP	N
Cycadaceae	8	*Cycas revoluta* Thumb.	+	+	+	+	C	S	NP	Mic
Cupressaceae	9	*Cupressus sempervirens* L.	+	+	+	+	C	T	MegP	L
	10	*Juniperus communis* L.	+	+	+	+	C	S	NP	L
	11	*Thuja orientalis* L.	+	+	+	+	C	S	NP	L
Pinaceae	12	*Pinus roxburghii* Sarg.	+	+	+	+	C	T	MegP	Mic
Monocotyledons										
Agavaceae	13	*Agave americana* L.	*	*	+	+	C	S	NP	Meg
	14	*Agave sisalana* Perrine ex Engelm.	*	*	+	+	B	S	NP	Meg
	15	*Yucca aloifolia* L.	*	+	+	+	C	S	NP	Mes
Alismataceae	16	*Caldesia reniformis* (D. Don) Makino	-	*	-	-	W	H	G	Mes
	17	*Sagittaria trifolia* L.	-	*	-	-	W	H	G	Mes
Alliaceae	18	*Allium sativum* L.	*	-	+	+	C	H	G	Mic
	19	*Allium cepa* L.	*	-	+	+	C	H	G	Mes
	20	*Allium griffithianum* Boiss, Diagn.	*	-	-	+	W	H	G	Mic
Amaryllidaceae	21	*Hippeastrum vittatum* (L'Hér.) Herb.	+	*	+	+	C	H	G	Mes
	22	*Narcissus tazetta* L.	*	-	-	+	C	H	G	Mic
	23	*Zephyranthes rosea* Lindl.	*	*	+	+	C	H	G	Mic
Araceae	24	*Alocasia macrorrhiza* (L.) G.Don	+	*	+	+	C	S	NP	Meg
	25	*Colocasia esculenta* (L.) Schott.	-	*	+	-	C	H	G	Meg
	26	*Monstera deliciosa* Liebm.	+	*	+	+	C	C	NP	Meg
	27	*Epipremnum aureum* (Linden & Andre) G.S. Bunting	+	+	+	+	C	H	NP	Mes
	28	*Pistia stratiotes* L.	-	*	+	-	W	H	Th	Mes
	29	*Spirodela polyrhiza* (L.) Schleid.	+	*	-	-	W	H	Th	L
	30	*Syngonium podophyllum* Schott	+	+	+	+	C	S	NP	Meg
Arecaceae	31	*Bismarckia nobilis* Hildebr & H. Wendl.	+	+	+	+	C	S	NP	Meg
	32	*Chamaedorea elegans* Mart.	*	+	+	+	C	S	NP	Mic
	33	*Livistona chinensis* (Jacq.) R.Br. ex Mart.	*	+	+	+	C	S	NP	Meg
	34	*Phoenix dactylifera* L.	*	+	+	+	C	T	MegP	Mes
	35	*Phoenix roebelenii* O'Brien	*	+	+	+	C	S	NP	Mic
	36	*Phoenix sylvestris* (L.) Roxb.	*	+	+	+	W	T	MegP	Mes

	37	*Rhapis excels* (Thunb.) A. Henry	*	+	+	+	C	S	NP	Mic
	38	*Roystonea regia* (Kunth) O.F. Cook	+	+	+	+	C	T	MesP	Mes
Asparagaceae	39	*Asparagus densiflorus* (Kunth) Jessop	*	+	+	+	C	H	Ch	L
	40	*Asparagus racemosus* Willd	*	+	+	+	C	C	NP	L
	41	*Aspidistra elatior* Blume	+	+	+	+	C	H	Ch	Mes
	42	*Beaucarnea recurvata* Lem	+	+	+	+	C	S	NP	Mic
	43	*Chlorophytum comosum* (Thunb.) Jacques	*	*	+	+	C	H	Ch	Mic
	44	*Cordyline fruticosa* (L.) A Chey	*	+	+	+	C	S	NP	Mes
	45	*Ruscus hypophyllum* L.	*	+	+	+	C	S	Ch	Mic
Asphodelaceae	46	*Aloe maculata* All.	+	*	+	+	C	H	Ch	Mic
	47	*Aloe vera* (L.) Burnm f.	+	*	+	+	C	H	Ch	Mic
	48	*Asphodelus tenuifolius* Cav.	*	-	-	-	W	H	G	N
	49	*Haworthiopsis attenuata* (Haw.) G. D. Rowley	+	+	+	+	C	H	Ch	Mic
Cactaceae	50	*Opuntia dillenii* (Ker-Gawl) Haw.	+	*	+	+	W	S	Np	L
Cannaceae	51	*Canna indica* L.	*	*	+	-	B	H	Ch	Meg
Commelinaceae	52	*Commelina benghalensis* L.	-	*	-	-	W	H	Th	Mic
	53	*Commelina paludosa* Blume.	-	*	+	-	W	H	H	Mic
	54	*Tradescantia pallida* (Rose) D.R Hunt	+	*	+	+	C	H	Ch	Mic
Cyperaceae	55	*Bolboschoenus affinis* (Roth) Droboy.	*	-	-	-	W	H	G	Mic
	56	*Carex acutiformis* Ehrh.	*	+	-	-	W	H	Ch	Mic
	57	*Cyperus alopecuroides* Rottb	-	*	+	-	W	H	G	Mic
	58	*Cyperus difformis* L.	-	*	-	-	W	H	G	Mic
	59	*Cyperus exaltatus* Retz	-	*	-	-	W	H	G	Mic
	60	*Cyperus laevigatus* L.	-	*	-	-	W	H	G	N
	61	*Cyperus rotundus* L.	-	*	-	-	W	H	G	Mic
	62	*Eleocharis palustris* (L.) Roem & Schult.	+	*	-	-	W	H	G	L
	63	*Fimbristylis dichotoma* (L.) Vahl	-	*	-	-	W	H	G	Mic
	64	*Fimbristylis littoralis* Gaudich	-	*	+	-	W	H	G	Mic
	65	*Fuirena pubescens* (Poir.) Kunth	+	*	-	-	W	H	G	Mic
	66	*Kyllinga brevifolia* Rottb	-	*	-	-	W	H	G	N
	67	*Pycreus flavidus* T. Koyama	-	*	-	-	W	H	G	Mic
	68	*Schoenoplectus litoralis* (Schard.) Palla.	+	*	+	-	W	H	G	Mes
	69	*Schoenoplectus mucronatus* (L.) Palla.	+	*	+	-	W	H	G	Mic
Hydrocharitaceae	70	*Elodea canadensis* Michx.	+	-	*	+	W	H	G	N
	71	*Vallisneria spiralis* L.	+	-	*	+	W	H	G	N
Iridaceae	72	*Iris germanica* L.	*	-	-	-	C	H	G	Mic
	73	*Moraea sisyrinchium* (L.) Ker Gawl.	*	-	-	+	W	H	G	Mic
Juncaceae	74	*Juncus articulatus* L.	+	*	-	-	W	H	G	Mic
	75	*Juncus bufonius* L.	*	-	-	-	W	H	Th	Mic
	76	*Juncus inflexus* L.	+	*	-	-	W	H	Ch	Mic
Lemnaceae	77	*Lemna minor* L.	+	+	-	-	W	H	Th	L
Musaceae	78	*Musa paradisiaca* L.	*	*	*	+	C	S	NP	Meg
Orchidaceae	79	*Epipactus veratrifolia* Boss & Hohen	*	-	-	-	W	H	G	Mic
	80	*Eulophia hormusjii* Duthie.	*	-	-	-	W	H	G	N
	81	*Zeuxine strateumatica* (L.) Schlechter.	*	-	-	-	W	H	G	N

	82	*Acrachne racemosa* (Heyne ex Roem. & Schult.) Ohwi	-	*	-	-	W	H	Th	Mic
	83	*Aegelops*	*	-	-	-	W	H	Th	Mic
	84	*Agrostis viridis* Gouan.	*	-	-	-	W	H	Th	Mic
	85	*Alopecurus myosuroides* Huds.	*	-	-	-	W	H	Th	Mic
	86	*Apluda mutica* L.	-	*	+	-	W	H	H	Mic
	87	*Aristida adscensionis* L.	-	*	+	-	W	H	Th	Mic
	88	*Arundo donax* L.	+	*	+	-	W	S	NP	Mes
	89	*Avena fatua* Retz.	*	-	-	-	W	H	Th	Mic
	90	*Bambusa glaucescens* (Willd) Sieb ex Zunro	+	+	+	+	C	S	NP	Mic
	91	*Brachiaria ramosa* (L.) Stapf	-	*	-	-	W	H	Th	Mic
	92	*Brachiaria reptans* (L.) Gardner & Hubbard	-	*	-	-	W	H	Th	Mic
	93	*Brachypodium distachyon* (L.) P. Beauv	*	-	-	-	W	H	Th	N
	94	*Bromus catharticus* Vahl.	*	-	-	-	W	H	Th	Mic
	95	*Bromus pectinatus* Thunb.	*	-	-	-	W	H	Th	Mic
	96	*Cenchrus ciliaris* L.	*	+	-	-	W	H	Ch	Mic
	97	*Cenchrus pennisetiformis* Hochst & Steud ex Steud	+	*	*	+	C	S	NP	Mes
	98	*Cymbopogon citratus* (DC.) Stapf	+	+	+	+	C	H	Ch	Mic
	99	*Cymbopogon jwarancusa* (Jones)	*	+	-	-	W	H	Ch	Mic
	100	*Cynodon dactylon* (L.) Pers.	*	*	+	-	W	H	H	N
	101	*Dactyloctenium aegyptium* (L.) Willd.	-	*	-	-	W	H	Th	Mic
	102	*Dendrocalamus strictus* (Roxb.) Nees	+	+	+	+	C	S	MesP	Mes
	103	*Desmostachya bippinata* (L.) Stapf.	+	*	+	-	W	H	Ch	Mic
	104	*Dichanthelium* spp.	-	*	+	-	W	H	H	Mic
	105	*Dichanthium annulatum* (Forssk.) Stapf.	+	*	-	-	W	H	Th	Mic
	106	*Digitaria sanguinalis* (L.) Scop.	-	*	-	-	W	H	Th	Mic
	107	*Echionchloa colona* (L.) Link	-	*	-	-	W	H	Th	Mic
	108	*Echinochloa crus-galli* (L.) P. Beauv	-	*	-	-	W	H	Th	Mic
	109	*Eleusine indica* (L.) Gaertn.	-	*	-	-	W	H	Th	Mic
	110	*Eragrostis minor* Host, Gram.	-	*	+	-	W	H	Th	N
	111	*Eragrostis papposa* (Roem&Schult) Steud.	-	*	+	-	W	H	Ch	Mic
	112	*Hemarthria compressa* (L.f) R. Br.	+	*	-	-	W	H	H	Mic
	113	*Hordium murinum* L.	*	-	-	-	W	H	Th	Mic
	114	*Hordeum vulgare* L.	*	-	-	-	C	H	Th	Mic
	115	*Impereta cylindrica* (L.) Raeush	*	*	+	-	W	H	Ch	Mic
	116	*Lamarckia aurea* (L.) Moench	*	-	-	-	W	H	Th	N
	117	*Leptochloa panicea* (Retz.) Ohwi	-	*	-	-	W	H	Th	Mic
	118	*Lolium temulentum* L.	*	-	-	-	W	H	Th	Mic
	119	*Oryza sativa* L.	-	*	-	-	C	H	Th	Mes
	120	*Paspalum paspalodes* (Michx) Scribner	-	*	+	-	W	H	H	Mic
	121	*Paspalum scrobiculatum* L.	-	*	+	-	W	H	H	Mic
	122	*Pennisetum glaucum* (L.) R. Br.	-	*	-	-	C	H	Th	Mes

	123	*Phalaris minor* Retz.	*	-	-	-	W	H	Th	Mic
	124	*Phragmites karka* (Retz.) Trin. Ex Steud	+	*	+	-	W	H	Ch	Mes
	125	*Poa annua* L.	*	-	-	-	W	H	Th	N
	126	*Polypogon monspeliensis* (L.) Desf.	*	-	-	-	W	H	Th	Mic
	127	*Rostraria cristata* (L.) Tzvelev.	*	-	-	-	W	H	Th	Mic
	128	*Saccharum bengalense* Ritz.	+	+	*	-	W	S	Ch	Mes
	129	*Saccharum filifolium* Steud.	-	*	-	-	W	H	Ch	Mic
	130	*Saccharum griffithii* Munro ex Boiss.	-	*	-	-	W	S	NP	Mes
	131	*Saccharum officinarum* L.	+	+	+	-	C	S	Ch	Mes
	132	*Saccharum ravennae* (L.) Murr.	+	*	+	-	W	S	NP	Mes
	133	*Saccharum spontaneum* L.	-	*	+	-	W	H	Ch	Mic
	134	*Setaria pumila* (Poir.) Roem. & Schult	-	*	-	-	W	H	Th	Mic
	135	*Setaria viridis* (L.) P.Beauv.	-	*	-	-	W	H	Th	Mic
	136	*Sorghum bicolor* (L.) Moench.	-	*	-	-	C	H	Th	Mes
	137	*Sorghum halepense* (L.) Persoon	-	*	+	-	W	H	H	Mic
	138	*Stipa capensis* Thunb.	*	-	-	-	W	H	Th	N
	139	*Triticum aestivum* L.	*	-	-	-	C	H	Th	Mic
	140	*Zea mays* L.	-	*	-	-	C	H	Th	Mes
Pontederiaceae	141	*Eichhornia crassipes* (Mart.) Solms	-	*	+	-	W	H	Th	Mes
Potamogetonaceae	142	*Potamogeton crispus* L.	+	-	-	*	W	H	Th	Mic
	143	*Potamogeton nodosus* Poiret.	-	*	-	-	W	H	G	Mes
Typhaceae	144	*Typha domingensis* Pers.	-	*	+	-	W	H	G	Meg
Zingiberaceae	145	*Curcuma longa* L.	+	+	*	-	C	H	G	Meg
Dicotyledons										
Acanthaceae	146	*Justicia peploides* T.Anders.	-	*	-	-	W	H	Th	N
	147	*Ruellia simplex* C.Wright	-	*	+	-	C	H	Ch	Mic
Adoxaceae	148	*Sambacus nigra* L.	+	*	+	+	C	S	NP	Mic
Aizoaceae	149	*Mesembryanthemum coridfolium* L.f.	*	*	+	+	C	H	Ch	Mic
	150	*Trianthema portulacastrum* L.	-	*	-	-	W	H	Th	Mic
	151	*Zaleya pentandra* (L.) Jeffrey	-	*	-	-	W	H	Th	Mic
Amaranthaceae	152	*Achyranthus aspera* L.	-	*	+	-	W	H	Th	Mic
	153	*Aerva javanica* (Burm.f.) Shult.	-	*	+	-	W	H	Ch	N
	154	*Aerva sanguinolenta* (L.) Blume	+	*	+	+	C	H	Ch	Mic
	155	*Amaranthus spinosus* L.	-	*	+	-	W	H	Th	Mic
	156	*Amaranthus graecizans* L.	-	*	-	-	W	H	Th	N
	157	*Amaranthus viridis* L.	-	*	+	-	W	H	Th	Mic
	158	*Alternanthera bettzickiana* (Regel) Voss	*	*	+	+	C	H	Ch	N
	159	*Alternanthera paronychioides* St, Hil.	-	*	-	-	W	H	Ch	N
	160	*Alternanthera philoxeroides* (Mart.) Griseb	*	+	-	-	W	H	G	Mic
	161	*Alternanthera pungens* Kunth.	-	*	-	-	W	H	Th	N
	162	*Alternanthera sessilis* (L.) R.Br. ex DC.	-	*	-	-	W	H	Th	N
	163	*Celosia argentea* L.	-	*	-	-	B	H	Th	Mic
	164	*Digera muricate* (L.) Mart.	-	*	-	-	W	H	Th	Mic
Anacardiaceae	165	*Mangifera indica* L.	*	+	+	+	C	T	MegP	Mes
	166	*Pistacia chinensis* ssp. *integerrima* (J.L. Stewart) Rech.	*	+	+	+	C	T	MegP	Mic

	167	*Schinus terebinthifolia* Raddi	*	+	+	+	C	T	MicP	Mic
Annonaceae	168	*Polyalthia longifolia* (Sonnerat) Thwait	+	+	+	+	C	T	MicP	Mes
Apiaceae	169	*Ammi visnaga* (L.) Lam.	*	-	-	-	W	H	Th	N
	170	*Apium graveolens* L.	*	-	-	-	W	H	G	Mic
	171	*Coriandrum sativum* L.	*	-	-	-	C	H	Th	N
	172	*Conium maculatum* L.	*	-	-	-	W	H	Th	N
	173	*Daucus carota* L.	*	-	-	-	C	H	Th	N
	174	*Foeniculum vulgare* Mill.	*	-	-	-	C	H	Th	N
	175	*Oenanthe javanica* (Blume) DC.	*	-	-	-	W	H	Th	N
	176	*Pimpinella diversifolia* DC.	*	+	-	+	W	H	G	Mic
	177	*Scandax pectin veneris* L.	*	-	-	-	W	H	Th	N
	178	*Torilis leptophylla* (L.) Reichb.	*	-	-	-	W	H	Th	N
	179	*Trachyspermum ammi* (L.) Sprague ex Turrill	+	*	-	-	W	H	Th	N
Apocynaceae	180	*Alstonia scholaris* (L.) R.Br.	*	+	+	+	C	T	MegP	Mes
	181	*Catharanthus roseus* (L.) G.Don.	+	*	+	+	C	H	Ch	Mic
	182	*Nerium oleander* L.	+	*	+	+	B	S	NP	Mic
	183	*Thevetia peruviana* (Pers.) Schum.	+	*	+	+	C	T	MicP	Mic
Asclepiadaceae	184	*Calotropis procera* (Wight) Ali	+	*	+	+	W	S	NP	Mes
	185	*Cynanchum acutum* L.	+	*	-	-	W	H	Ch	Mic
Asteraceae	186	*Ageratum houstonianum* Mill.	-	*	-	-	W	H	G	Mic
	187	*Anthemis arvensis* L.	*	-	-	-	C	H	Th	Mic
	188	*Artemisia scoparia* Waldst. & Kit	+	*	+	-	W	H	Ch	N
	189	*Artemisia vulgaris* L.	-	*	+	-	W	H	Ch	Mic
	190	*Aster subulatus* Michaux.	-	*	+	-	W	H	Th	Mic
	191	*Bidens tripartita* L.	*	-	-	-	W	H	Th	N
	192	*Calendula arvensis* L.	*	-	-	+	W	H	Th	Mic
	193	*Calendula officinalis* L.	*	-	-	+	C	H	Th	Mes
	194	*Cotula australis* (Sieber ex Spreng.) Hook.	*	-	-	+	W	H	Th	N
	195	*Centaurea cyanus* L.	*	-	-	-	C	H	Th	Mic
	196	*Centaurea iberica* Trevir. & Spreng.	*	-	-	-	W	H	Th	Mic
	197	*Chrysanthemum indicum* L.	*	*	+	-	C	H	Ch	Mic
	198	*Cichorium intybus* L.	*	-	-	+	C	H	Th	Mic
	199	*Cirsium arvense* (L.) Scop.	*	-	-	-	W	H	Th	Mic
	200	*Conyza bonariensis* (L.) Cronquist	-	*	*	-	W	H	Th	N
	201	*Conyza canadensis* (L.) Cronquist.	-	*	-	-	W	H	Ch	Mic
	202	*Cosmos sulphureus* Cav.	-	*	+	-	C	H	Th	Mic
	203	*Eclipta prostrata* L.	*	*	+	+	W	H	Ch	N
	204	*Filago hurawarica* (Wall. Ex DC.) Wagentiz	*	-	-	-	W	H	Th	L
	205	*Gaillardia pulchella* Foug.	+	*	-	-	C	H	Th	Mic
	206	*Gazania rigens* (L.) Gaertn.	*	+	+	+	C	H	Ch	Mic
	207	*Gamochaeta pensylvanica* (Willd) Cabrera	*	-	-	-	W	H	Th	N
	208	*Helianthus annuus* L.	-	*	-	-	C	H	Th	Mes

	209	*Helianthus tuberosus* L.	-	+	-	-	C	H	G	Mic
	210	*Iflago spicata* Forssk.	*	-	-	-	W	H	Th	L
	211	*Lactuca dissecta* D. Don	*	-	-	-	W	H	Th	Mic
	212	*Lactuca sativa* L.	*	-	-	-	C	H	Th	Mic
	213	*Lactuca serriola* L.	*	+	-	-	W	H	Th	Mic
	214	*Launea procumbens* Roxb.	*	+	-	-	W	H	H	Mic
	215	*Parthenium hysterophorus* L.	*	*	-	-	W	H	Th	Mic
	216	*Pentanema vestitum* L.	+	*	+	-	W	H	Ch	Mic
	217	*Pluchea lanceolata* (DC.) C. B.	+	*	+	-	W	S	Ch	N
	218	*Pseudognaphalium affine* (D.Don) anderb.	*	-	-	-	W	H	Th	L
	219	*Reichardia tingitana* (L.) Roth	*	-	-	-	W	H	H	Mic
	220	*Senecio vulgaris* L.	*	-	-	-	W	H	Th	N
	221	*Silybum marianum* (L.) Gaertn.	*	-	-	-	W	H	Th	Mes
	222	*Solidago canadensis* L.	+	*	-	-	C	H	Ch	Mic
	223	*Soliva anthemifolia* (Juss.) R.Br. ex Less	*	-	-	-	W	H	Th	N
	224	*Sonchus asper* (L.) Hill.	*	-	-	-	W	H	Th	Mic
	225	*Sonchus maritimus* L.	*	-	-	-	W	H	H	Mic
	226	*Sonchus oleraceus* L.	*	-	-	-	W	H	Th	Mic
	227	*Sonchus wightianus* DC.	*	*	+	+	W	H	Ch	Mic
	228	*Tagetes erecta* L.	*	-	-	-	C	H	Th	Mic
	229	*Tagetes patula* L.	*	*	-	-	C	H	Th	Mic
	230	*Taraxacum officinale* Weber.	*	-	-	-	W	H	Th	Mic
	231	*Urospermum picroides* (L.) Scop. ex F.W. Schmidt	*	-	-	-	W	H	Th	Mic
	232	*Verbesina encelioides* (Cav.) Benth & Hook. F.ex A. Gray	-	*	-	-	W	H	Th	Mic
	233	*Xanthium strumarium* L.	-	*	-	-	W	H	Th	Mes
	234	*Youngia japonica* (L.) DC.	*	-	-	-	W	H	Ch	Mic
	235	*Zinnia elegans* Jacq.	-	*	-	-	C	H	Th	Mic
	236	*Zoegia purpurea* Fresen	*	-	-	-	W	H	Th	N
Basellaceae	237	*Basella alba* L.	*	*	+	+	C	C	Np	Mes
Bignoniaceae	238	*Campsis radicans* (L.) Seem.	*	*	+	+	C	C	NP	Mic
	239	*Dolichandra unguis-cati* (L.) Miers.	*	*	+	+	C	C	NP	Mic
	240	*Jacaranda mimosifolia* D.Don	*	+	+	+	C	T	MegP	N
	241	*Tecoma stans* (L.) Juss. ex H,B & K.	*	*	+	+	C	S	Np	Mic
Bombacaceae	242	*Bombax ceiba* L.	*	+	+	+	W	T	MegP	Mes
Boraginaceae	243	*Anchusa arvensis* (L.) Bieb.	*	-	-	-	W	H	Th	N
	244	*Buglossoides arvensis* (L.) Johnston.	*	-	-	-	W	H	Th	N
	245	*Cordia myxa* L.	*	+	+	+	C	T	MesP	Mes
	246	*Cynoglossum lanceolatum* Forssk.	+	*	-	-	W	H	Ch	Mic
	247	*Ehretia serrata* Roxb.	*	+	+	+	C	T	MesP	Mes
	248	*Heliotropium curassavicum* L.	-	*	-	-	W	H	Ch	Mic
	249	*Heliotropium europaeum* L.	-	*	-	-	W	H	Th	Mic
	250	*Heliotropium striogosum* Willd.	-	*	-	-	W	H	Ch	N

Brassicaceae	251	*Brassica compestris* L.	*	-	-	*	C	H	Th	Mes
	252	*Brassica juncea* (L.) Czern.	*	-	-	*	C	H	Th	Mes
	253	*Brassica napus* L.	*	-	-	*	C	H	Th	Mes
	254	*Brassica nigra* (L.) K.Koch.	*	-	-	+	W	H	Th	Mic
	255	*Brassica oleracea* L.	+	-	-	+	C	H	Th	Mes
	256	*Capsella bursa-perstoris* Medic.	*	-	-	-	W	H	Th	N
	257	*Cardaria chalepensis* (L.) Hand-Mazz.	*	-	-	-	W	H	Th	Mic
	258	*Coronopus didymus* (L.) Sm.	*	-	-	*	W	H	Th	N
	259	*Eruca sativa* Mill.	*	-	-	-	W	H	Th	Mes
	260	*Goldbachia laevigata* (M. Bieb.) DC.	*	-	-	+	W	H	Th	Mic
	261	*Lobularia maritima* (L.) Desv.	*	-	-	*	C	H	Th	N
	262	*Lepidium pinnatifidum* Ledeb.	*	-	-	-	W	H	Th	N
	263	*Lepidium sativum* L.	*	-	-	+	C	H	Th	Mic
	264	*Malcolmia cabulica* (Boiss.) Hook. f. & Thoms.	*	-	-	-	W	H	Th	N
	265	*Malcolmia africana* (L.) R. Brown.	*	-	-	-	W	H	Th	Mic
	266	*Nasurtium officinale* R. Br.	*	-	-	+	W	H	Th	N
	267	*Neslia apiculata* Fisch.	*	-	-	-	W	H	Th	N
	268	*Notoceras bicorne* (Ait.) Amo	*	-	-	-	W	H	Th	N
	269	*Raphanus raphanistrum* L.	*	-	-	*	W	H	Th	Mes
	270	*Raphanus sativus* L.	*	-	-	-	C	H	Th	Mes
	271	*Rorippa islandica* (Oeder) Borbas.	*	-	-	+	W	H	Th	Mic
	272	*Sisymbrium irio* L.	*	-	-	-	W	H	Th	Mic
Caesalpiniaceae	273	*Bauhinia variegata* L.	*	+	+	+	C	T	MesP	Mes
	274	*Cassia fistula* L.	+	*	+	+	C	T	MesP	Mes
	275	*Senna occidentalis* (L.) Link	-	*	-	-	W	H	Th	Mic
Campanulaceae	276	*Campanula benthamii* Wall. ex Kitamura	*	-	-	-	W	H	Th	N
	277	*Campanula pallida var. pallida* E. Nasir	*	-	-	-	W	H	Th	N
Cannabinaceae	278	*Cannabis sativa* L.	*	*	-	-	W	H	Th	Mic
Capparidaceae	279	*Capparis decidua* (Forssk.) Edgew.	+	*	+	+	W	S	NP	Aph
	280	*Cleome viscosa* L.	-	*	-	-	W	H	Th	N
Caprifoliaceae	281	*Lonicera japonica* Thunb.	*	+	+	+	C	C	Np	Mic
Caryophyllaceae	282	*Arenaria serpyllifolia* L.	*	-	-	-	W	H	Th	L
	283	*Cerastium glomeratum* Thuill.	*	-	-	-	W	H	Th	N
	284	*Dianthus caryophyllus* L.	*	*	+	+	C	H	Ch	Mic
	285	*Herniaria hirsuta* L.	*	-	-	-	W	H	Th	L
	286	*Silene conoidea* L.	*	-	-	-	W	H	Th	Mic
	287	*Spergula arvensis* L.	*	-	-	-	W	H	Th	N
	288	*Stelleria media* (L.) Ctr.	*	-	-	+	W	H	Th	N
	289	*Vaccaria hispanica* (Miller) Rauschert	*	-	-	-	W	H	Th	Mic
Celastraceae	290	*Euonymus japonicus* Thunb.	+	+	+	+	C	S	Np	Mic
Ceratophyllaceae	291	*Ceratophyllum demersum* L.	*	-	-	+	W	H	Th	N
Chenopodiaceae	292	*Atriplex stocksii* Boiss.	-	*	+	-	W	H	Th	Mic
	293	*Chenopodium album* L.	*	+	-	-	W	H	Th	Mic
	294	*Chenopodium ambrosoides* L.	+	*	+	-	W	H	Ch	Mic
	295	*Chenopodium foliosum* (Moench) Aschers	*	-	-	-	W	H	Th	Mic
	296	*Chenopodium glaucum* L.	*	+	-	-	W	H	Th	Mic

	297	*Chenopodium murale* L.	*	-	-	*	W	H	Th	Mic
	298	*Kochia indica* Wight.	-	*	-	-	W	H	Th	N
	299	*Kochia scoparia* (L.) Schrad.	-	*	-	-	C	H	Th	N
	300	*Salsola imbricata* Forssk.	-	*	-	-	W	H	Th	L
	301	*Salsola tragus* L.	*	+	-	-	W	H	Th	N
	302	*Spinacea oleracea* L.	*	-	-	+	C	H	Th	Mes
	303	*Suaeda fruticosa* Forssk.	+	*	+	-	W	S	Ch	N
Combretaceae	304	*Conocarpus erectus* L.	*	+	+	+	C	T	MicP	Mic
	305	*Quisqualis indica* L.	+	*	*	+	C	C	MesP	Mic
	306	*Terminalia arjuna* (Roxb. ex DC.) Wight & Arm	+	*	+	+	C	T	MegP	Mes
Convolvulaceae	307	*Convolvulus arvensis* L.	*	-	-	-	W	H	Th	Mic
	308	*Ipomoea cairica* (L.) Sweet	+	*	+	+	B	C	NP	Mic
	309	*Ipomoea cornea* ssp. *fistulosa* (Mart. ex Choisy) D. Austin	+	*	+	+	W	S	NP	Mes
	310	*Ipomoea eriocarpa* R. Br.	-	*	-	-	W	H	Th	Mic
	311	*Ipomoea hederacea* Jacq.	-	*	-	-	W	H	Th	Mes
	312	*Ipomoea indica* (Burm. f.) Merrill	-	*	-	-	W	H	Th	Mes
	313	*Ipomoea nil* (L.) Roth	-	*	-	-	W	H	Th	Mes
	314	*Ipomoea pes-tigridis* L.	-	*	-	-	W	H	Th	Mic
	315	*Ipomoea purpurea* (L.) Roth	+	*	+	+	C	C	Np	Mes
	316	*Merremia hederacea* (Burm. f.) Hall	-	*	-	-	W	H	Th	Mic
Crassulaceae	317	*Bryophyllum daigremontianum* (Raym.-Hamet & H. Perrier) A. Berger	*	+	+	+	C	H	Ch	Mes
	318	*Bryophyllum pinnatum* (Lam.) Oken	*	+	+	+	C	H	Ch	Mic
	319	*Kalanchoe delagoensis* Eckl. & Zeyh	*	+	+	+	C	H	Ch	Mic
	320	*Kalanchoe integra* (Medik.) Kuntze	*	+	+	+	C	H	Ch	Mic
Cucurbitaceae	321	*Citrullus colocynthis* (L.) Schard.	-	*	-	-	W	H	Th	Mic
	322	*Citrullus lanatus* (Thunb.) Mats. & Nakai.	-	*	-	-	W	H	Th	Mic
	323	*Cucumis melo* L. subsp. *Agrestis* (Naudin) Pangalo.	-	*	-	-	W	H	Th	Mic
	324	*Cucurbita maxima* Duch. Ex Lam.	-	*	-	-	C	H	Th	Meg
	325	*Lagenaria siceraria* (Molina) Standley.	-	*	-	-	C	H	Th	Meg
	326	*Luffa acutangula* (L.) Roxb.	-	*	-	-	C	H	Th	Meg
	327	*Luffa cylindrica* (L.) Roem.	-	*	-	-	C	H	Th	Meg
	328	*Momordica charantia* L.	-	*	-	-	C	H	Th	Mes
	329	*Mukia maderaspatana* (L.) M. J. Roem	-	*	-	-	W	H	Th	Mic
Cuscutaceae	330	*Cuscuta reflexa* Roxb.	+	*	-	-	W	H	P	Aph
Ebenaceae	331	*Diospyros kaki* L.f.	*	+	+	+	C	T	MicP	Mes
	332	*Diospyros lotus* L.	*	+	+	+	C	T	MicP	Mes
Euphorbiaceae	333	*Chrozophora tinctoria* (L.) Raffin.	-	*	-	-	W	H	Th	Mic
	334	*Euphorbia cotinifolia* L.	+	*	+	+	C	S	NP	Mic
	335	*Euphorbia falcata* L.	*	-	-	-	W	H	Th	N
	336	*Euphorbia helioscopia* L.	*	-	-	-	W	H	Th	N
	337	*Euphorbia hirta* L.	-	*	-	-	W	H	Th	N

	338	*Euphorbia indica* Lam.	-	*	-	-	W	H	Th	N
	339	*Euphorbia milii* Des Moul.	*	*	*	+	C	S	NP	Mic
	340	*Euphorbia peplus* L.	*	-	-	-	W	H	Th	N
	341	*Euphorbia pulcherrima* Willd. Ex Klotzsch	*	*	+	+	C	S	NP	Mes
	342	*Euphorbia prostrata* L.	-	*	-	-	W	H	Th	L
	343	*Euphorbia royleana* Boiss.	*	+	+	+	C	S	Np	Mic
	344	*Euphorbia thymifolia* L.	-	*	-	-	W	H	Th	L
	345	*Jatropha integerrima* Jacq.	*	*	+	+	C	S	NP	Mes
	346	*Phyllanthus amarus* Schum & Thonn.	-	*	-	-	W	H	Th	L
	347	*Ricinus communis* L.	*	+	+	+	W	S	NP	Meg
	348	*Sapium sebiferum* (L.) Roxb.	*	+	+	+	W	T	MesP	Mic
Frankeniaceae	349	*Frankenia perverulenata* L.	*	-	-	-	W	H	Th	L
Fumariaceae	350	*Fumaria indica* (Hausskn) H.N. Pugsley.	*	-	-	-	W	H	Th	N
Gentianaceae	351	*Centaurium pulchellum* (Sw.) Druce.	*	+	-	-	W	H	Th	N
Geraniaceae	352	*Erodium malacoides* (L.) L'Herit ex Aiton.	*	+	+	+	W	H	Th	N
	353	*Pelargonium zonale* L'Herit ex Soland.	*	*	+	+	C	H	Ch	Mic
Lamiaceae	354	*Lamium ampexicaule* L.	*	-	-	-	W	H	Th	N
	355	*Leucas cephalotes* (Roth.) Spreng.	-	*	-	-	W	H	Th	Mic
	356	*Lycopus europaeus* L.	+	*	-	-	W	H	Th	Mic
	357	*Mentha arvensis* L.	+	+	+	+	C	H	H	Mic
	358	*Mentha longifolia* (L.) Huds.	*	+	-	-	W	H	Ch	Mic
	359	*Micromeria biflora* (Buch-Ham ex D.Don) Benth	*	-	-	-	W	H	Th	L
	360	*Ocimum basilicum* L.	*	*	+	+	C	H	Ch	Mic
	361	*Perilla frutescens* (L) Britton	-	*	-	-	W	H	Th	Mes
	362	*Salvia plebeia* R. Br.	*	-	-	-	W	H	Th	Mic
Lentibulariaceae	363	*Utricularia australis* R.Br.	*	+	+	-	W	H	G	N
Linaceae	364	*Linum perenne* L.	+	+	-	-	W	H	Th	L
	365	*Linum usitatissimum.* L.	+	-	-	-	B	H	Th	N
Lythraceae	366	*Ammannia baccifera* L.	-	*	-	-	W	H	Th	N
	367	*Ammannia verticillate* (Ard.) Lam.	-	*	-	-	W	H	Th	N
	368	*Cuphea hyssopifolia* Kunth.	*	+	+	+	C	S	NP	N
	369	*Lagerstroemia speciose* (L.) Pers.	+	*	+	+	C	S	NP	Mes
	370	*Gonostegia pentandra* (Roxb.) Miq.	-	*	+	-	W	H	Ch	N
Malvaceae	371	*Abutilon indicum* (Link) Sweet	-	*	+	-	W	H	Th	Mes
	372	*Abelmoschus esculentus* L.	-	*	-	-	C	H	Th	Mes
	373	*Alcea rosea* L.	*	-	-	-	C	H	Th	Mes
	374	*Brachychiton populneus* (Schott & Endl.) R.Br.	*	+	+	+	C	T	MesP	Mic
	375	*Hibiscus rosa-sinensis* L.	*	+	+	+	C	S	NP	Mes
	376	*Hibiscus sabdariffa* L.	-	*	-	-	C	H	Th	Mes
	377	*Hibiscus trionum* L.	-	*	-	-	W	H	Th	Mic
	378	*Malva parviflora* L.	*	-	-	-	W	H	Th	Mic

	379	*Malvastrum coromandelianum* (L.) Garcke	*	*	+	-	W	H	Ch	Mic
	380	*Malvaviscus penduliflorus* DC.	+	*	+	+	C	S	NP	Mic
	381	*Pterospermum acerifolium* (L.) Willd.	*	+	+	+	C	T	MegP	Meg
	382	*Melochia corchorifolia* L.	-	*	-	-	W	H	Th	Mic
Meliaceae	383	*Melia azedarach* L.	*	+	+	+	W	T	MesP	Mic
Menispermaceae	384	*Tinospora malabarica* Miers	*	+	+	+	C	C	NP	Mes
Mimosaceae	385	*Acacia farnesiana* (L.) Wild.	*	+	+	+	W	S	MicP	L
	386	*Acacia modesta* Wall.	*	+	+	+	W	T	MesP	L
	387	*Acacia nilotica* L.	*	+	+	+	W	T	MesP	L
	388	*Albizia lebbeck* (L.) Bth.	*	+	+	+	W	T	MegP	N
	389	*Leucaena leucocephala* (Lam.) de Wit.	*	+	+	+	W	T	MesP	N
	390	*Mimosa himalayana* Gamble.	-	+	+	-	W	S	Ch	L
	391	*Prosopis cineraria* (L.) Druce	*	+	+	+	W	T	MicP	L
	392	*Prosopis juliflora* (Sw.) Dc.	*	*	+	+	W	S	NP	N
Moraceae	393	*Brousonetia papyrifera* (L.) Vent.	*	+	+	+	W	T	MesP	Mes
	394	*Ficus benghalensis* L.	*	*	+	+	W	T	MegP	Mes
	395	*Ficus benjamina* L.	*	+	+	+	W	T	MegP	Mic
	396	*Ficus carica* Hausskn. Ex. Boiss.	*	*	+	+	C	T	MicP	Mes
	397	*Ficus elastica* Roxb. Ex Hornem.	*	+	+	+	C	T	MegP	Mes
	398	*Ficus maclellandii* King	+	*	+	+	C	T	MicP	Mes
	399	*Ficus palmata* Forssk.	+	*	+	+	W	T	MicP	Mes
	400	*Ficus pumila* L.	+	*	+	+	C	C	NP	Mic
	401	*Ficus religiosa* L.	*	*	+	+	W	T	MegP	Mes
	402	*Ficus virens* Aiton	+	+	*	+	W	T	MegP	Mes
	403	*Morus alba* L.	*	+	+	+	W	T	MegP	Mes
	404	*Morus macroura* Miq.	*	+	+	+	C	T	MesP	Mes
	405	*Morus nigra* L.	*	+	+	+	W	T	MegP	Mes
Myrtaceae	406	*Callistemon lanceolatus* (Sm.) Sweet.	*	+	+	+	C	T	MesP	Mic
	407	*Eucalyptus camaldulensis* Dehn.	*	+	+	+	W	T	MegP	Mes
	408	*Eucalyptus torelliana* F.Muell.	*	+	+	+	C	T	MegP	Mes
	409	*Melaleuca bracteata* F. Muell.	+	+	+	+	C	T	MicP	N
	410	*Psidium gauajava* L.	*	*	+	+	C	T	MesP	Mes
	411	*Syzygium cumini* (L.) Skeels.	+	+	+	+	C	T	MegP	Mes
Nelumbonaceae	412	*Nelumbo nucifera* Gaertn.	-	*	-	-	W	H	G	Meg
Nyctaginaceae	413	*Boerhavia procumbens* Banks ex Roxb.	-	*	-	-	W	H	Th	N
	414	*Bougainvillea glabra* Choisy.	*	*	+	+	C	S	Np	Mic
	415	*Mirabilis jalapa* L.	-	*	-	-	B	H	G	Mes
Oleaceae	416	*Jasminum humile* L.	*	+	+	+	C	S	NP	Mic
	417	*Jasminum mesny* Hance	*	+	+	+	C	S	NP	Mic
	418	*Jasminum officinale* L.	*	+	+	+	C	S	NP	Mic
	419	*Jasminum sambac* (L.) Aiton.	*	+	+	+	C	S	NP	Mes
	420	*Ligustrum ovalifolium* Hassk.	*	+	+	+	C	S	NP	Mic
	421	*Olea europaea* L.	+	+	+	+	C	T	MicP	Mic
Onagraceae	422	*Epilobium hirsutum* L.	-	*	-	-	W	H	Th	Mic
	423	*Ludwigia perennis* L.	-	*	-	-	W	H	Th	Mic

Oxalidaceae	424	*Oxalis corniculata* L.	*	+	+	+	W	H	H	N
	425	*Oxalis pes-caprae* L.	*	-	-	-	W	H	G	N
Papaveraceae	426	*Argemone mexicana* L.	*	-	-	-	W	H	Th	Mic
	427	*Papaver dubium* L.	*	-	-	-	W	H	Th	N
	428	*Papaver hybridum* L.	*	-	-	-	W	H	Th	N
	429	*Papaver somniferum* L.	*	-	-	-	C	H	Th	Mes
Passifloraceae	430	*Passiflora coerulea* L.	*	+	+	+	C	C	NP	Mic
Plantaginaceae	431	*Antirrhinum majus* L.	*	-	-	-	C	H	Th	Mic
	432	*Bacopa monnieri* (L.) Pennell	-	*	-	-	W	H	Th	N
	433	*Gratiola brevifolia* Raf.	-	*	-	-	W	H	Th	L
	434	*Kickxia ramosissima* (Wall.) Janchen	*	-	-	-	W	H	Th	N
	435	*Kickxia spp.*	-	*	-	-	W	H	Th	N
	436	*Misopates orontium* (L.) Raf.	*	-	-	-	W	H	Th	N
	437	*Plantago amplexicaulis* Cav.	*	-	-	-	W	H	Th	Mic
	438	*Plantago lanceolata* L.	*	-	-	-	W	H	H	Mic
	439	*Plantago major* L.	*	+	+	-	W	H	H	Mes
	440	*Veronica anagallis-aquatica* L.	*	-	-	-	W	H	Th	Mic
	441	*Veronica beccabunga* L.	*	-	-	-	W	H	Th	Mic
	442	*Veronica biloba* L.	*	-	-	-	W	H	Th	N
	443	*Veronica persica* Poir.	*	-	-	-	W	H	Th	N
Papilionaceae	444	*Alhagi mourorum* Medic.	+	*	-	-	W	S	Ch	N
	445	*Cajanus cajan* (L.) Millsp.	-	*	-	-	C	H	Th	Mic
	446	*Crotalaria sessiliflora* L. subsp. *Sessiliflora*	-	*	-	-	W	H	Th	Mic
	447	*Astragalus orbiculatus* Ledebour	*	-	-	-	W	H	H	N
	448	*Astragalus scorpiurus* Bunge	*	-	-	-	W	H	Th	N
	449	*Astragalus subumbellatus* Klotzssch	*	-	-	-	W	H	H	N
	450	*Dalbergia sisso* Roxb ex DC.	*	+	+	+	W	T	MegP	Mic
	451	*Glycyrrhiza glabra* L.	*	+	-	-	W	H	H	Mic
	452	*Indigofera linifolia* (Linn.f.) Retz.	-	*	-	-	W	H	Th	N
	453	*Lathyrus aphaca* L.	*	-	-	-	W	H	Th	N
	454	*Lathyrus odoratus* L.	*	-	-	-	C	H	Th	Mic
	455	*Lotus corniculatus* L.	*	+	-	-	W	H	H	N
	456	*Medicago lupulina* L.	*	-	-	-	W	H	Th	N
	457	*Medicago minima* L.	*	-	-	-	W	H	Th	N
	458	*Medicago polymorpha* L.	*	-	-	-	W	H	Th	N
	459	*Medicago sativa* L.	*	-	-	-	W	H	Th	N
	460	*Melilotus indica* (L.) All.	*	-	-	-	W	H	Th	N
	461	*Parkinsonia aculeata* L.	*	+	+	+	W	S	NP	L
	462	*Pisum sativum* L.	*	-	-	-	C	H	Th	Mic
	463	*Sesbania sesban* (L.) Merrill	-	*	-	-	B	H	Th	N
	464	*Sophora alospecuroides* L.	+	+	-	-	W	S	Ch	N
	465	*Trifolium alexandrinum* L.	*	-	-	+	C	H	Th	Mic
	466	*Trifolium resupinatum* L.	*	-	-	+	C	H	Th	Mic
	467	*Trigonella foenum-graecum* L.	*	-	-	-	C	H	Th	Mic
	468	*Trigonella monantha* ssp. *incisa* (Benth) Ali comb &Stat.	*	-	-	-	W	H	Th	N
	469	*Vicia sativa* L.	*	-	-	-	W	H	Th	N
	470	*Vigna aconitifolia* (Jacq.) Marechal	-	*	-	-	B	H	Th	Mic
	471	*Vigna radiata* (L.) R. Wilczek	-	*	-	-	B	H	Th	Mic

Platanaceae	472	*Platanus orientalis* L.	*	+	+	+	W	H	MegP	Mes
Polemoniaceae	473	*Phlox drummondii* Hook.	*	-	-	-	C	H	Th	N
Polygonaceae	474	*Emex australis* Steinh.	*	-	-	-	W	H	Th	Mic
	475	*Persicaria glabra* (Willdenow)	+	*	+	-	W	H	H	Mic
	476	*Persicaria hydropiper* (L.) Delabre	+	*	+	-	W	H	H	Mic
	477	*Persicaria maculosa* Gray	+	*	+	-	W	H	H	MIc
	478	*Polygonum aviculare* L.	*	-	-	-	W	W	Th	N
	479	*Polygonum plebjum* R. Br.	*	+	-	-	W	L	H	L
	480	*Rumex crispus* L.	*	-	-	-	W	H	Th	Mes
	481	*Rumex dentatus* (Meissn) Rich.	*	-	-	-	W	H	Th	Mes
	482	*Rumex vesicarius* L.	*	-	-	-	W	H	Th	N
Portulacaceae	483	*Portulaca grandiflora* Hook.	+	*	+	-	C	H	Ch	N
	484	*Portulaca olearaceae* L.	-	*	-	-	W	H	Th	N
Primulaceae	485	*Anagallis arvensis* L.	*	-	-	-	W	H	Th	N
	486	*Samolus valerandi* L.	*	+	-	-	W	H	H	N
Proteaceae	487	*Grevillea robusta* A. Cunn. Ex R.Br.	+	+	+	+	C	T	MesP	Mic
Punicaceae	488	*Punica granatum* L.	*	+	+	+	C	S	NP	Mic
Ranunculaceae	489	*Ranunculus arvensis* L.	*	-	-	-	W	H	Th	N
	490	*Ranunculus bulbosus* L.	*	-	-	-	W	H	Th	N
	491	*Ranunculus muricatus* L.	*	-	-	-	W	H	Th	N
	492	*Ranunculus sceleratus* L.	*	-	-	-	W	H	Th	Mic
Resedaceae	493	*Oligomeris linifolia* (Vahl.) Macbride	*	-	-	-	W	H	H	N
Rhamnaceae	494	*Ziziphus jujuba* Mill.	+	*	+	+	C	T	MicP	Mic
	495	*Ziziphus mauritiana* Lam.	+	*	+	+	W	T	MegP	Mic
	496	*Ziziphus nummularia* (Burm.f.) Wight & Arn.	+	*	+	+	W	S	NP	Mic
Rosaceae	497	*Eriobotrya japonica* (Thunb.) Lindl.	*	+	+	+	C	T	MesP	Mes
	498	*Malus domestica* Borkh.	*	+	+	+	C	T	MicP	Mic
	499	*Potentilla supina* L.	*	-	-	-	W	H	Th	N
	500	*Prunus armeniaca* L.	*	+	+	+	C	T	MegP	Mes
	501	*Prunus domestica* L.	*	+	+	+	C	T	MesP	Mic
	502	*Prunus dulcis* (Mill.) D.A. Webb	*	+	+	+	C	T	MicP	Mes
	503	*Prunus persica* (L.) Batsch.	*	+	+	+	C	T	MicP	Mes
	504	*Pyrus communis* L.	*	+	+	+	C	T	MesP	Mes
	505	*Pyrus pyrifolia* (Burm. f.) Nakai.	*	+	+	+	C	T	MesP	Mes
	506	*Rosa alba* L.	*	+	+	+	W	S	NP	Mic
	507	*Rosa brunonii* Lindl.	*	+	+	+	W	S	NP	Mic
	508	*Rosa indica* L.	*	+	+	+	C	S	NP	Mic
	509	*Rubus fruticosus* L.	*	+	+	+	W	S	NP	Mic
Rubiaceae	510	*Gallium aparine* L.	*	-	-	-	W	H	Th	N
	511	*Gardenia jasminoides* J.Ellis	*	+	+	+	C	S	NP	Mes
Rutaceae	512	*Citrus aurantifolia* (Christm.) Swingle	*	+	+	+	C	S	NP	Mic
	513	*Citrus aurantium* L.	*	+	+	+	C	T	MicP	Mic
	514	*Citrus limon* (L.) Osbeck	*	+	+	+	C	S	NP	Mic
	515	*Citrus sinensis* (L.) Osbeck	*	+	+	+	C	T	MicP	Mes
	516	*Murraya paniculata* (L.) Jack	*	+	+	+	C	T	MicP	Mic

Salicaceae	517	*Populus nigra* L.	*	+	+	+	C	T	MegP	Mes
	518	*Salix acmophylla* Boiss.	*	+	+	+	W	T	MesP	Mes
Salvadoraceae	519	*Salvadora oleoides* Decne.	+	+	+	+	C	T	MesP	Mic
Scrophulariaceae	520	*Leucophyllum frutescens* (Berland.) I.M.Johnst	*	+	+	+	C	S	NP	Mic
	521	*Mazus pumilus* (N. L. Burman) Steenis	*	-	-	*	W	H	Th	N
	522	*Verbascum thapsus* L.	*	*	+	+	W	H	Ch	Mes
Sapindaceae	523	*Dodonaea viscosa* (L.) Jacq.	*	+	+	+	C	S	NP	Mic
Simaroubaceae	524	*Alianthus altissima* (Mill.) Swingle.	*	+	+	+	W	T	MesP	Mes
Sapotaceae	525	*Manilkara zapota* (L.) P.Royen.	*	+	+	+	C	T	MesP	Mes
Solanaceae	526	*Capsicum annuum* L.	-	*	+	-	C	H	Th	Mic
	527	*Cestrum diurnum* L.	*	+	+	-	C	S	NP	Mic
	528	*Cestrum nocturnum* L.	*	+	+	+	C	S	NP	Mes
	529	*Datura innoxia* Miller.	-	*	-	-	W	H	Th	Mes
	530	*Lycopersicon esculentum* Miller.	-	*	-	-	C	H	Th	Mic
	531	*Nicotiana plumbaginifolia* Viv.	*	-	-	-	W	H	Th	Mes
	532	*Petunia hybrida* Hort. ex E. Vilm.	*	*	-	-	C	H	Th	Mic
	533	*Physalis divaricata* D. Don.	-	*	-	-	W	H	Th	Mic
	534	*Solanum melongena* L.	*	*	+	-	C	H	Ch	Mes
	535	*Solanum nigrum* L.	-	*	-	-	W	H	Ch	Mic
	536	*Solanum surattense* Burm. f. k	*	*	-	-	W	H	Th	Mic
	537	*Solanum tuberosum* L.	*	-	-	+	C	H	G	Mic
	538	*Withania coagulans* (Stocks) Dunal	*	+	+	-	W	S	Ch	Mic
	539	*Withania somnifera* (L.) Dunal	*	+	+	+	W	S	Ch	Mes
Sphenocleaceae	540	*Sphenoclea zeylanica* Gaertn.	-	*	-	-	W	H	Th	Mic
Tamaricaceae	541	*Tamarix aphylla* (L.) Lanza.	+	*	+	+	W	T	MesP	L
	542	*Tamarix dioca* Roxb ex Roch.	+	*	+	+	W	S	NP	L
Tiliaceae	543	*Corchorus olitorius* L.	-	*	-	-	W	H	Th	Mic
Thymelaeceae	544	*Thymelaea passerina* (L.) Cosson and Germain.	*	-	-	-	W	H	Th	N
Tropaeolaceae	545	*Tropaeolum majus* L.	*	-	-	-	C	H	Th	Mes
Ulmaceae	546	*Celtis caucasica* Willd.	*	+	+	+	W	T	MesP	Mes
Urticaceae	547	*Forsskaolea tenacissima* L.	*	+	+	+	W	H	Ch	Mic
	548	*Parietaria lusitanica* L.	*	-	-	-	W	H	Th	N
	549	*Urtica pilulifera* L.	*	-	-	-	W	H	Th	Mic
Verbenaceae	550	*Clerodendrum fragrans* Willd.	*	+	+	+	C	C	NP	Mes
	551	*Clerodendrum inerme* (L.) Gaertn.	*	+	+	+	C	S	NP	Mic
	552	*Clerodendrum splendens* G. Don.	*	+	+	+	C	S	NP	Mes
	553	*Duranta repens* L.	*	+	+	+	C	S	NP	Mic
	554	*Lantana camara* L.	*	*	*	+	W	S	NP	Mic
	555	*Phyla nodiflora* (L.) Greene.	-	*	-	-	W	H	H	N
	556	*Verbena officinalis* L.	+	*	-	-	W	H	Ch	Mic
	557	*Vitex negundo* L.	*	*	+	+	W	S	NP	Mic
Violaceae	558	*Viola betonicifolia* Sm.	*	+	-	-	W	H	H	Mic
	559	*Viola stocksii* Boiss	*	-	-	-	W	H	Th	N
	560	*Viola tricolor* L.	*	-	-	-	C	H	Th	Mic

	561	*Parthenocissus quinquefolia* (L.) Planch.	+	*	+	+	C	C	NP	Mic
	562	*Vitis vinifera* L.	*	+	+	+	C	C	NP	Mes
Zygophyllaceae	563	*Peganum harmala* L.	*	-	-	-	W	H	Ch	Mic
	564	*Tribulus terrestris* L.	-	*	-	-	W	H	Th	N

Key to abbreviations:

1-Status, W-Wild, C-Cultivated, B. Cultivated and wild. 2-Habit, C-Climber, H-Herb, S-Shrub, T-Tree. 3-Life form, G-geophyte, Th-Therophyte, H-Hemicryptophyte, Ch-Chamaephyte, NP-Nanophanerophyte, MicP- Microphanerophyte, MesP-Mesophanerophyte, MegP-Megaphanerophyte, P-Parasite. 4-Leaf size, L-Leptophyll, N-Nanophyll, Mic-Microphyll, Mes-Mesophyll, Meg-Megaphyll, Ap-Aphylles. Phenology: ∗ indicates the presence of plant in flowering stage, + shows the presence, - shows the absence.

Table no: 2. Summary of the ecological attributes of Daudzai, Peshawar

	Characteristics	Spp	%tage
1. Flora	i: Families	118	-
	ii. Species	564	-
2. Status	i. Cultivated	199	35.3%
	ii. Wild	355	62.9%
	iii. Cultivated/ Wild	10	1.8%
3. Habit	i. Climbers	15	2.7%
	ii. Herb	399	70.7%
	iii. Shrub	78	13.8%
	iv. Trees	72	12.8%
4. Life form spectra	i.Chemophytes	73	12.94%
	ii. Geophytes	46	8.16%
	iii. Hemicryptophytes	27	4.79%
	iv. Megaphanerphytes	28	4.96%
	v. Mesophanerophytes	28	4.96%
	vi. Microphanerophytes	20	3.55%
	vii. Nanophanerophytes	81	14.36%
	viii. Parasites	1	0.18%
	ix. Therophytes	260	46.10%
5. Leaf size spectra	i. Aphylous	3	0.53%
	ii. Leptophylls	30	5.32%
	iii. Megaphylls	19	3.37%
	iv. Mesophylls	114	20.21%
	v. Microphylls	270	47.87%
	vi. Nanophylls	128	22.70%

6. Phenology	➢ Seasonality		
	i. Spring	431	-
	ii. Summer	393	-
	iii. Autumn	252	-
	iv. Winter	218	-
	➢ Life cycle		
	i. Perennials	188	33.33%
	ii. Spring	142	25.18%
	iii. Spring and Summer	41	7.27%
	iv. Spring to Autumn	29	5.14%
	v. Summer	103	18.26%
	vi. Summer and Autumn	28	4.96%
	vii. Autumn	4	0.71%
	viii. Winter and Spring	28	4.96%
	ix. Winter to Summer	1	0.18%
	➢ Flowering season		
	i. All seasons		
	ii. Spring	3	0.54%
	iii. Spring to Summer	278	50.36%
	iv. Spring to Autumn	38	6.88%
	v. Summer	3	0.54%
	vi. Summer to Autumn	190	34.42%
	vii. Autumn	4	0.72%
	viii. Winter	4	0.72%
	ix. Winter to Spring	1	0.18%
	x. No Flower	8	1.45%
		23	4.17%

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