

**ECOLOGICAL CHARACTERISTICS OF WEED FLORA IN THE
WHEAT CROP OF MASTUJ VALLEY, DISTRICT CHITRAL,
KHYBER PAKHTUNKHWA, PAKISTAN**

Syed Mukaram Shah^{1*}, Asad Ullah and Fazal Hadi

ABSTRACT

*Weed survey in the wheat (*Triticum aestivum* L.) crop of Mastuj valley was conducted during July and August, 2013. A total of 52 plant species belonging to 46 genera and 23 families were reported first time from the investigated area. The dominant families were Asteraceae, Papilionaceae and Poaceae each with 10, 7 and 5 species, respectively. Life-form spectra showed that therophytes were the leading life-form class with 42 species followed by geophytes and hemicryptophytes each with 5 species. Leaf-size classes indicated that there were 19 mesophyllous, 12 microphyllous, 10 macrophyllous, six nanophyllous, three megaphyllous, one leptophyllous and one aphyllous species. Phenological classification indicated that 46 plant species were in reproductive stage, five in post-reproductive stage, and one species was in pre-reproductive stage. These findings might be helpful to weed ecologists, agronomists and other agricultural scientists involved in weed management.*

Key words: Ecology, Mastuj valley, Pakistan, weeds, wheat.

Citation: Shah, S.M., A. Ullah and F. Hadi. 2014. Ecological characteristics of weed flora in the wheat crop of Mastuj valley, District Chitral, Khyber Pakhtunkhwa, Pakistan. Pak. J. Weed Sci. Res. 20(4): 479-487.

INTRODUCTION

Wheat (*Triticum aestivum* L.) is grown as one of the major cereal crops both in the irrigated and non-irrigated lands of District Chitral including Mastuj valley. Wheat is cultivated in all the possible available lands and is a source of staple food for humans and fodder for their cattle. Mastuj River, Laspur River, glaciers and precipitation in the form of rainfall and snowfall are the permanent source of irrigation in the area. The soil is mostly sandy along riverbeds, clayey in wetlands and stony along foothills. Weather conditions exhibit

¹Centre of Plant Biodiversity and Botanical Garden, University of Peshawar, Pakistan

*Corresponding author's email: shahecolgy95@yahoo.com

blossom spring, rainy summer, windy autumn and snowy winters. Hussain *et al.* (2004) recognized three weed communities in the wheat fields of Tehsil Mastuj. Sher *et al.* (2011) reported 40 weed species belonging to 21 families from wheat crop of District Swabi. Poaceae was the dominant family while therophytes and microphylls were the leading life-form and leaf-size classes. Memon *et al.* (2013) reported 23 weed species belonging to 10 families from wheat crop of District Khairpur, Sindh. Scursoni *et al.* (2014) surveyed 373 wheat fields in 2 different cropped areas and found rich species differences in both the southwest and southeast regions of the eastern sites of Buenos Aires, Argentina. The weed flora of wheat crop has also been reported from District Chitral (Hussain *et al.*, 2007), Dir (Shah *et al.*, 2004), Swat (Akhtar and Hussain, 2007), Mardan (Marwat *et al.*, 2006), Peshawar (Hussain *et al.*, 2012), Bannu (Ullah *et al.*, 2011), Rahim Yar Khan (Waheed *et al.*, 2009), Toba Tek Singh (Qureshi *et al.*, 2009) and Dera Ismail Khan (Marwat *et al.*, 2013).

MATERIALS AND METHODS

Three different cropped localities viz; Tooque, Chinar and Mastuj were analyzed for weed flora and their ecological characteristics during July and August, 2013. Plant species were collected, dried and identified with the help of Flora of Pakistan (Ali and Qaisar, 1995-2013). Biological and leaf-size spectra were known after Raunkiaer (1934) and Hussain (1989). Phenologically plants were classified by field observation into pre-reproductive, reproductive and post-reproductive stages.

RESULTS AND DISCUSSION

Fifty two species of 23 families including 20 dicot families, 2 monocot families and 1 pteridophyte family were recorded as weeds from wheat crop of Mastuj valley (Table-1). Asteraceae was leading family with 10 species (19.23%), followed by Papilionaceae with 7 species (13.46%) and Poaceae with 5 species (9.61%). Polygonaceae had 4 species (7.69%) while Caryophyllaceae had 3 species (5.76%). Ghenopodiaceae, Lamiaceae, Malvaceae, Plantaginaceae and Solanaceae had 2 species (3.84%) each. The remaining 13 families had 1 species representation. Life-form spectra (Table 2) indicated that there were 42 (80.76%) therophytes, 5 (9.61%) geophytes and 5 (9.61%) hemicryptophytes. Leaf-size spectra (Table-2) showed that mesophylls were the leading leaf-size class (19 spp., 36.53%), which was followed by microphylls (12 spp., 23.07%), macrophylls (10 spp., 19.23%), nanophylls (6 spp., 11.53%), megaphylls (three species, 5.76%) and leptophylls (one species, 1.92%). Phenological studies exhibited that 46(88.46%) weeds were in reproductive stage, five

(9.61%) in post-reproductive stage, and one (1.92%) was in pre-reproductive stage (Table-2). *Artemisia scoparia*, *Cannabis sativa*, *Datura stramonium*, *Lactuca serriola*, *Nepeta cataria* and *Verbascum thapsus* were found in Mastuj, while *Alcea rosea*, *Lotus corniculatus*, *Trachomitum venetum* and *Vaccaria pyramidata* were present in Tooque and *Epilobium hirsutum* and *Vicia sativa* were recorded in Chinar (Table-1).

Weeds are undesirable on account of their competitive and allelopathic behavior and providing habitats for harmful organisms. The yield per acre of wheat can be increased by agronomic practices including weed control. However, the authentic identification and distribution has always been a pre-requisite for weed management (Sher *et al.*, 2011). Beside addition of organic matter to the soil and conservation of soil gene bank weeds often offer competition with the existing standing crops and thus reduce the productivity. Majority of the weeds release allelochemicals and create problems during harvesting and threshing. The present study concluded that Asteraceae, Papilionaceae and Poaceae were dominant families with maximum number of plant species. The weeds need proper pre-reproductive management for the better yield of wheat in the research area.

Table-2. Summary of Life-form, Leaf-size and Phenology of Weeds of Wheat crops of Mastuj valley, District Chitral, Pakistan

S.No.	Parameters	No. of Species	Percentage %
A.	Life-form classes		
1.	Therophytes	42	80.76
2.	Geophytes	5	9.61
3.	Hemicryptophytes	5	9.61
B.	Leaf-size classes		
1.	Mesophylls	19	36.53
2.	Microphylls	12	23.07
3.	Macrophylls	10	19.23
4.	Nanophylls	6	11.53
5.	Megaphylls	3	5.76
6.	Leptophylls	1	1.92
7.	Aphyllous	1	1.92
C.	Phenological classes		
1.	Reproductive stage	46	88.46
2.	Post-reproductive stage	5	9.61
3.	Pre-reproductive stage	1	1.92

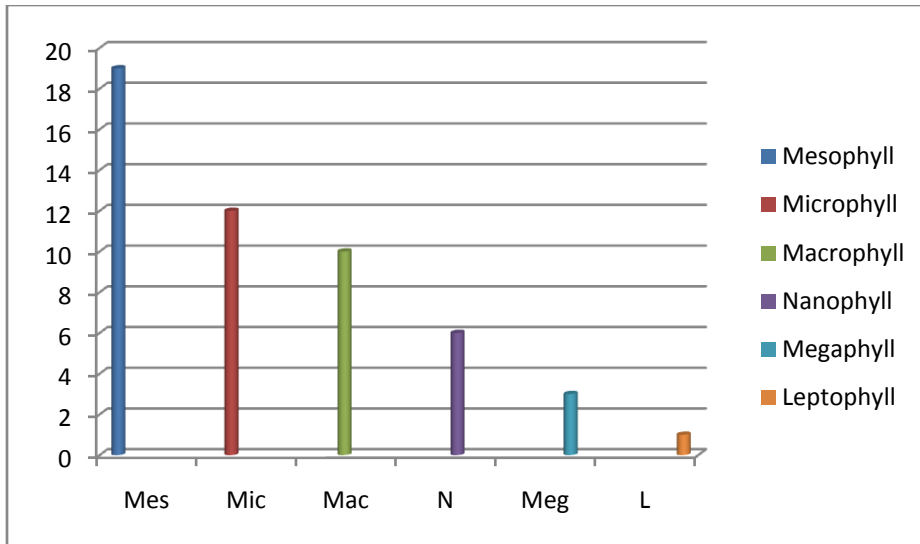


Figure 1. Leaf-size, phenology and life-forms of weeds of wheat crops in Mastuj, Chitral



Figure 2. *Cnicus benedictus* L., a noxious weed of wheat crop in Mastuj valley, Chitral, Pakistan.

Table-1. Floristic composition and biological spectra of weeds of wheat crops in Mastuj valley, District Chitral, Pakistan.

S.No	Plant species	Localities			Life-form	Leaf-size	Phenology
		Tooque	Chinar	Mastuj			
A.	Pteridophyta						
1.	1. Family Equisetaceae <i>Equisetum ramossimum</i> Desf.	+	-	+	G	L	Rep
B.	Angiosperms						
I.	Monocotyledons						
2.	2. Family Iridaceae <i>Iris ensata</i> Thunb.	+	-	+	G	Meg	Rep
3.	3. Family Poaceae <i>Bromus gracillimus</i> Bunge.	-	+	+	Th	Mac	Post-rep
4.	<i>Cynodon dactylon</i> (L.) Pers.	+	+	+	H	Mic	Rep
5.	<i>Dichanthium annulatum</i> Forssk. Stapf.	-	+	-	H	Mic	Rep
6.	<i>Phragmites karka</i> (Retz.) Trin ex Steud.	+	+	-	G	Meg	Pre-rep
7.	<i>Setaria glauca</i> (Retz.) Trin ex Steud.	+	+	+	Th	Mes	Rep
II.	Dicotyledons						
8.	4. Family Amaranthaceae <i>Amaranthus reteoflexus</i> L.	+	+	+	Th	Mes	Rep
9.	5. Family Apocynaceae <i>Trachomitum venetum</i> (L.) Woodson.	+	-	-	H	Mes	Rep
10.	6. Family Asteraceae <i>Artemisia parviflora</i> Roxb.	+	+	+	Th	Mes	Rep
11.	<i>Artemisia scoparia</i> Waldst & Kit.	-	-	+	H	Mic	Rep
12.	<i>Cichorium intybus</i> L.	+	+	+	Th	Mac	Rep
13.	<i>Cnicus benedictus</i>	+	+	+	Th	Mac	Rep
14.	<i>Helianthus annuus</i> L.	+	-	+	Th	Meg	Rep
15.	<i>Lactuca serriola</i> L.	-	-	+	Th	Mac	Rep

16.	<i>Matricaria chamomila</i> L.	+	+	+	Th	Mic	Rep
17.	<i>Sonchus asper</i> (L.) Hill.	+	+	+	Th	Mes	Rep
18.	<i>Taraxacum officinale</i> Weber.	+	+	+	Th	Mes	Post-rep
19.	<i>Xanthium strumarium</i> L.	+	-	+	Th	Mac	Rep
20.	7,Family Brassicaceae <i>Cepseella bursa-pastoris</i> (L.) Medic.	-	+	+	Th	Mic	Rep
21.	8.Family Cannabinaceae <i>Cannabis sativa</i> L.	-	-	+	Th	Mes	Rep
22.	9.Family Caryophyllaceae <i>Arenaria serpyllifolia</i> L.	+	+	+	Th	Mic	Rep
23.	<i>Silene conoidea</i> L.	+	+	+	Th	Mes	Post-rep
24.	<i>Vaccaria pyramidata</i> Medik.	+	-	-	Th	Mes	Post-rep
25.	10.Family Chenopodiaceae <i>Chenopodium album</i> L.	+	+	+	Th	Mes	Rep
26.	<i>Chenopodium botrys</i> L.	+	+	+	Th	Mes	Rep
27.	11.Family Convolvulaceae <i>Convolvulus arvensis</i> L.	+	+	+	Th	Mes	Rep
28.	12.Family Cuscutaceae <i>Cuscuta reflexa</i> Roxb.	+	-	+	Th	Ap	Rep
29.	13.Family Euphorbiaceae <i>Euphorbia peplus</i> L.	+	+	+	Th	N	Rep
30.	14.Family Lamiaceae <i>Mentha longifolia</i> (L.) Huds.	+	+	+	Th	Mes	Rep
31.	<i>Nepeta cataria</i> L.	-	-	+	Th	Mes	Rep
32.	15.Family Malvaceae <i>Alcea rosea</i> L.	+	-	-	Th	Mac	Rep
33.	<i>Malva neglecta</i> Wallr.	+	-	+	Th	Mes	Rep
34.	16.Family Onagraceae <i>Epilobium hirsutum</i> L.	-	+	-	Th	Mic	Rep

35.	17.Family Papilionaceae <i>Glycyrrhiza glabra</i> L.	+	+	+	G	Mes	Rep
36.	<i>Lotus corniculatus</i> L.	+	-	-	Th	N	Rep
37.	<i>Medicago sativa</i> L.	+	+	+	H	N	Rep
38.	<i>Melilotus officinale</i> (L.) Desr.	+	+	+	Th	Mic	Rep
39.	<i>Trifolium repens</i> L.	+	+	+	Th	Mic	Rep
40.	<i>Trifolium resupinatum</i> L.	+	+	+	Th	Mic	Rep
41.	<i>Vicia sativa</i> L.	-	+	-	Th	Mic	Rep
42.	18.Family Plantaginaceae <i>Plantago lanceolata</i> L.	+	+	+	Th	Mac	Rep
43.	<i>Plantago major</i> Aitch.	+	+	+	G	Mes	Rep
44.	19.Family Polygonaceae <i>Polygonum aviculare</i> L.	+	-	+	Th	N	Rep
45.	<i>Polygonum dumetorum</i> L.	+	+	+	Th	Mes	Rep
46.	<i>Polygonum persicaria</i> L.	+	+	+	Th	Mes	Rep
47.	<i>Rumex longifolius</i> DC.	+	+	+	Th	Mac	Post-rep
48.	20.Family Portulacaceae <i>Portulaca oleracea</i> L.	+	+	+	Th	N	Rep
49.	21.Family Rubiaceae <i>Galium aparine</i> L.	+	+	+	Th	N	Rep
50.	22.Family Scrophulariaceae <i>Verbascum thapsus</i> L.	-	-	+	Th	Mac	Rep
51.	23.Family Solanaceae <i>Datura stramonium</i> L.	-	-	+	Th	Mac	Rep
52.	<i>Solanum nigrum</i> L.	-	+	+	Th	Mic	Rep

Keys: Life-form classes: Th. Therophytes. G. Geophytes. H. Hemicryptophytes Leaf-size classes: L. Leptophylls. N. Nanophylls. Mic. Microphylls. Mes. Mesophylls, Mac. Macrophylls. Meg. Megaphylls. Ap. Aphyllous
Phenological classes: Pre-rep. Pre-reproductive. Rep. Reproductive. Post-rep. Post-reproductive

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