

UTILITARIAN ASPECTS OF WEEDS OF WHEAT FIELDS IN CHARBAGH VALLEY DISTRICT SWAT PAKISTAN

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ABSTRACT

Weed survey was conducted from February to May 2016, in fields of wheat crop of Charbagh Valley, district Swat. Information on 18 families and 34 species was collected with regard to their ecological characteristics, medicinal and other economic uses by local inhabitants. The dominant families were Fabaceae and Poaceae represented by 5 species each, followed by Asteraceae with 4 species. Biological spectra expressed that therophytes were the major life form class with 31 species (91.176%) and geophytes had 3 species (8.8235%). Leaf size classification showed nanophyll with 11 species (32.35%) were the major size class followed by microphyll 10 species (29.41%), mesophylls with 6 species (17.64%), leptophyll with 5 species (14.70%) while macrophyll and megaphyll with single species each (2.941%). Weeds were used as vegetables, medicinal and for grazing animals as fodder. The present study was aimed to screen out the ecological aspects of weed flora in wheat crops of Charbagh. The recent work is the first report on the weed ecology of Charbagh Valley. This may help for future intensive and extensive researches on weed diversity in the area.

Keywords: Ecological evaluation, medicinal plants, *Triticum aestivum*, weed diversity, weed competition, Pakistan.

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INTRODUCTION

The research area Charbagh is located in the district Swat, Khyber Pakhtunkhwa Province, Pakistan. The valley lies from 34° 34' to 35° 55' North latitude and 72° 50' East longitude. District Swat is bounded on the North by districts of Chitral and Ghizer, on the west by Upper Dir and Lower Dir Districts, Kohistan and Shangla districts fall on its East and on the South it is bounded by Buner and Malakand districts. The climate of the research area is moderately cold with short and cool summers. The hottest month is June with mean maximum and minimum temperature of 33°C and 16°C, respectively. The coldest month is January and the mean maximum and minimum temperatures remained at 11°C and -2°C, respectively. The Winter season is long and extends from November to March. Rain and snowfall occur during this season and temperatures fall below freezing point. The amount of rainfall received during winter season is more than that of summer season. The highest rainfall recorded during the month of March was about 242 mm. The major crops of the area are vegetables, wheat, maize and rice. Sources of water supply include river water and monsoon rains. Weeds ecological attributes vary from place to place due to edaphic and agro-ecological factors. Like crops, weeds are also sensitive, delicate and easily affected by the environment. Weed scientists in developing countries work only on a single or limited number of weed species which are associated with specific crop for example wheat, maize, sugar cane and rice. These kind of studies are often related to the production of crops, herbicide impacts upon the weeds and soil related factors and impacts on weeds and crops (Iqbal *et al.*, 2015). It is evident from the weed studies that the weeds are not only resulting in low quality crop but it is considerably decreasing the biomass and productivity of the crops (Inayat *et al.*, 2014). It was found that the weeds were locally used as astringent, anti-constipation agents, diuretic, laxative and anthelmintic. They are also used in jaundice, ulcer, cosmetics, dried skin, skin freckles,

piles, abdominal pain and diabetes (Hadi *et al.*, 2014). Weeds are undesirable on account of their competitive and allelopathic behavior and providing habitats to harmful organisms (Sher *et al.*, 2011). The highly competitive nature of grassy weeds could be attributed to its rapid and luxurious growth of weeds in wheat fields (Siddiqui *et al.*, 2010). Hussain *et al.* (2009) reported sixty two species of weeds including 15 monocots and one pteridophyte of 24 families as weed of wheat in the University of Peshawar Botanical Garden Azakhel, District Nowshera, Pakistan. Waheed *et al.* (2009) studied and documented 37 weed species belonging to 33 genera and 17 families. Whereas, Ali *et al.* (2015) reported 46 weed species belonging to 21 families and 43 genera. Invasiveness does not involve sowing and establishment of suspected species on bare land as well as in the established communities (Khan *et al.*, 2011). In another study, 40 weed species belonging to 21 families including two monocots (five species) and 19 dicot families (35 species) were reported from Maidan Valley, district Lower Dir Pakistan (Ullah *et al.*, 2016). Our current report is the first ever record of weeds growing in wheat crop fields of Charbagh valley, District Swat Pakistan.

MATERIALS AND METHODS

Regular field surveys were carried out in Charbagh Valley, District Swat during February and May 2016 for collection of weeds from wheat fields. The weeds were dried, pressed and identified with the help of Flora of Pakistan (Stewart, 1972; Nasir and Ali, 1971-1991; Ali and Nasir, 1991-1993; Ali and Qaiser, 1993-2016) and other available literature. Life forms, leaf sizes were determined after Raunkiaer (1934) and Hussain (1989). Photographs were taken by using Nikon Digital Camera. The economic and medicinal uses of each species were recorded by asking questions from local people including hakeems and farmers. Voucher numbers were assigned to the specimens and were deposited in the Herbarium of the Department of Botany, University of Peshawar for future reference.

RESULTS AND DISCUSSION

The recent study revealed that 34 species in 18 families were growing in the wheat crop of the research area (Table-1). The dominant families were Fabaceae and Poaceae represented by 5 species (14.70%) each, followed by Asteraceae with 4 species (11.76%) Caryophyllaceae and Ranunculaceae each had 3 species (8.82%) and Brassicaceae had 2 species (5.88%). The remaining 12 families were monophylitic and contributed only single species (2.94%) each (Table-2, Fig.1). The present findings agree with the reports of Hussain *et al.* (2009), Sher *et al.* (2011), Badshah *et al.* (2013) and Ullah and Rashid (2013) who also reported that Fabaceae and Poaceae were the leading families in their studies. Life form classes (Table-2, Fig.3) showed that therophyte with 31 species (91.76%) was the dominant life form class followed by geophyte having only 3 species (8.82%). The findings agree with those of Hussain *et al.* (2009), Sher *et al.* (2011), Badshah *et al.* (2013), Inayat *et al.* (2014), Hadi *et al.* (2014), Hussain *et al.* (2015), Ali *et al.* (2015), and Ullah *et al.* (2016) have also observed the dominance of therophytic weeds in the cultivated crops. Leaf size classification (Table-2; Fig. 2) represented that nanophyll (11 species, 32.35%) was the major leaf size class followed by microphyll (10 species, 29.41%), mesophyll with 6 species (17.64%), leptophylls with 5 species (14.70%) while macrophylls and megaphylls with single species each (2.94%). The present conclusions agree with that of Hussain *et al.* (2009) who concluded that mostly weed species have small leaf sizes. The major parts of

the plants used were leaves, shoots, flowering tops, seeds, seed oil, and whole plant. Some weeds species are cultivated in this area and majority of the weeds were wild. Locally these plants were used for different purposes such as 38 fodder (38 species), carminative (15), laxative (12), pothorb (8), constipation (5), diarrhea (4), diuretic (3), toxic and laxative (3), vomiting problems (3), constipation (2) and five species were used for curing eye diseases, laxative, dysentery, malaria, blood pressure and blood purifier. The inhabitants are dependent on weed for food and fodder. Weeds reduce the productivity of the crops and are also a major component of natural ecosystem (Ullah *et al.*, 2013; Hadi *et al.*, 2014; Ullah *et al.*, 2016). It also shows similarity in the above cited studies in which *Cirsium arvense* was reported as the dominant species in pre harvesting stage which might be due to similarity in the climatic factors and edaphic factors of weeds species in wheat fields. Weed species in the study area were photographed and few of them are presented in Fig. 2. We can increase the production of crops by removing weeds at their initial stages or by using environment friendly herbicides (Akhtar *et al.*, 2007; Iqbal *et al.*, 2015). Plant scientists usually study the economically important and wild plant species. Several studies conducted including Ullah *et al.* (2011) reported 93 species of 82 genera and 34 families as weeds of wheat fields of FR Bannu. Before using the control measures the weeds must be categorized into various economic use classes for conservation as far as possible.

Table=1. Diversity, Ecological characteristics, Medicinal and Economic uses of weed of wheat field of Charbagh Valley, District Swat, KP, Pakistan.

Family No.	Families/ Botanical Names	Local Names	English Names	Habit	Life form	Leaf size	Local Distribution status	Part used	Economic and Medicinal uses
1.	Apiaceae 1. <i>Scandix pecten-veneris</i> L.	Kali ziri	Shepherd's needle	Herb	Th	Lep	Wild	Shoots and leaves	Used as salad
2.	Asteraceae 2. <i>Cirsium arvense</i> (L.) Mill	Azghakay	Canada thistle	Herb	Th	Mic	Wild	Whole plant	Fodder and decoction is used for softness of skin
	3. <i>Sonchus asper</i> (L.) Hill.	Shodapay	Prickly Sowthistle	Herb	Th	Na	Wild	Whole plant	Fodder, increase milk production in cattles.
	4. <i>Sonchus oleraceus</i> L.	Shodapay	Common Sowthistle	Herb	Th	Mac	Wild	Whole plant	Fodder
	5. <i>Taraxacum officinale</i> Weber.	Zyar gulai	Dandelion	Herb	G	Mes	Wild	Whole plant	Fodder, Plants are Diuretic, Laxative, Stomachic, Tonic and carminative
3.	Boraginaceae 6. <i>Buglossoides arvensis</i> (L.) I.M.Johnst	Pulpulak	Corn Gromwell	Herb	Th	Mic	Wild	Seed oil	Leaves are used as diuretic

4.	Brassicaceae 7. <i>Brassica campestris</i> L.	Sharsham	Mustard	Herb	Th	Mes	Wild and cultivated	Seed and leaves	Fodder, potherb, Edible oil and vegetable
	8. <i>Coronopus didymus</i> (L.) Sm.	Sakha botay	Swinecress	Herb	Th	Lep	Wild	Leaves and shoots	Fodder and used for blood pressure
5.	Cannabinaceae 9. <i>Cannabis sativa</i> L.	Bhang	Marijuana	Herb	Th	Mic	Wild and cultivated	Leaves and flowering tops	Latex is narcotics and used for fuel and broom
6.	Caryophyllaceae 10. <i>Cerastium glomeratum</i> L.	Patewah	Sticky mouse-ear	Herb	Th	Na	Wild	Whole plant	Juices are obtained and applied to relieve headaches.
	11. <i>Silene conoidea</i> L.	Mangotai	Cone catchfly	Herb	Th	Na	Wild	Whole plant	It is cooked as vegetable and is highly able fodder.
	12. <i>Stellaria media</i> (L.) Vill	Shamokay	Chickweed	Herb	Th	Na	Wild	Whole plant	It is used as fodder, carminative
7.	Euphorbiaceae 13. <i>Euphorbia helioscopia</i> L.	Zaher botay	Sunspurge	Herb	Th	Na	Wild	Whole plant	Latex of the plant are used in skin problems Also used for stoppage of mences in female

8.	Fabaceae 14. <i>Lathyrus aphaca</i> L.	Mater guli	Yellow-Flowered Pea	Herb	Th	Na	Wild	Whole plant	Seeds are edible Mostly used as fodder
	15. <i>Medicago lupulina</i> L.	Peshtari sagh	Burr medic	Herb	Th	Na	Wild and cultivated	Whole plant	Cooked as vegetable, used as fodder, potherb and laxative
	16. <i>Medicago polymorpha</i> L.	Peshtari	Burclover dutch	Herb	Th	Na	Wild and cultivated	Whole plant	Cooked as vegetable And fodder
	17. <i>Trifolium repens</i> L.	Shautal	Clover	Herb	Th	Na	Wild and cultivated	Whole plant	It is mostly used as fodder
	18. <i>Vicia sativa</i> L.	Palli	Common vetch, Garden vetch	Herb	Th	Mic	Wild	Whole plant	Fodder, fruits are used for bitter taste
9.	Fumariaceae 19. <i>Fumaria indica</i> Pugsley.	Papara / shatara	Fumitory	Herb	Th	Lep	Wild	Seeds	The seeds are boiled and used for diarrhea and fever
10.	Lamiaceae 20. <i>Lamium amplexicaule</i> L.	Sor gulai	Henbit	Herb	Th	Na	Wild	Whole plant	Plants are used as laxative and stimulant.
11.	Liliaceae 21. <i>Tulipa clusiana</i> Red.	Kanwal	Lady tulip	Herb	G	Meg	Wild and cultivated	Whole plant	Ornamental and insects attractants
12.	Oxalidaceae 22. <i>Oxalis</i>	Zmakai Tarokai	Woodsorrel	Herb	Th	Lep	Wild	Whole plant	Containing oxalic acid used as fodder and for constipation. Leaves are used for sour

	<i>corniculata</i> L.								taste.
13.	Papaveraceae <i>23. Papaver dubium</i> L.	Zangli doda	Long-Head Poppy, Blindeyes	Herb	Th	Mic	Wild	Flowerin g buds	Latex is used as diaphoretic Flowers are bees attractants
14.	Poaceae <i>24. Alopecurus myosuroides</i> Huds.	Boda ghwaghi	black-grass, twitch grass	Herb	Th	Mes	Wild	Whole plant	Used as fodder
	<i>25. Avena fatua</i> L.	Jaudar	Wild oat	Herb	Th	Mic	Wild	Whole plant	Collected as fodder
	<i>26. Cynodon dactylon</i> (L.) Huds.	Kabal	Bermuda grass	Herb	Th	Na	Wild	Whole plant	Grazed by animals, roots are used for children dysentery
	<i>27. Phalaris minor</i> Retz	Ghondoky	Canarygrass , Littleseed	Herb	Th	Mes	Wild	Whole plant	Used as fodder
	<i>28. Poa annua</i> L.	Narai wakha	Blue grass	Herb	Th	Mic	Wild	Whole plant	Utilized as fodder
15.	Plantaginaceae <i>29. Plantago lanceolata</i> L.	Isphaghhol	Narrow leaf plantin	Herb	Th	Mes	Wild and cultivated	Whole plant	Fodder, digestive, constipation, diarrhoea and vomiting
16.	Polygonaceae <i>30. Rumex dentatus</i> L.	Shalkhay	Dock	Herb	G	Mes	Wild	Leaves	Fodder, cooked as vegetable , carminative, constipation, healing of external wounds

17.	Ranunculaceae								
	31. <i>Adonis aestivalis</i> L.	Pyazi gulai	Summer pheasant's eye	Herb	Th	Mic	Wild	Whole plant	Cardiotonic, Diuretic and Laxative
	32. <i>Ranunculus arvensis</i> L.	Ziar gulay	Corn buttercup	Herb	Th	Mic	Wild	Whole plant	Fodder
	33. <i>Ranunculus muricatus</i> L.	Ziar gulay	Rough-fruited buttercup	Herb	Th	Mic	Wild	Whole plant	Used as fodder, toxic and cause laxative effect
18.	Scrophulariaceae								
	34. <i>Veronica persica</i> Pairett	Mekhaki	Creeping speedwell	Herb	Th	Lep	Wild	Whole plant	Grazed as fodder

Keys: Life form classes: Th-Therophytes, G-Geophytes

Leaf sizes classes: Lep-Leptophylls, Mic-Microphylls, Na-Nanophylls, Mac-Macrophylls, Mes-Mesophylls, Meg-Megaphylls

Table-2. Summary of ecological characteristics of weed of Charbagh Valley.

S.No.	Parameters	No of Species	Percentage
A. Life form Classes			
1.	Therophytes	31	91.18
2.	Geophytes	3	8.82
Total		34	
B. Leaf Size Classes			
1.	Nanophylls	11	32.35
2.	Microphylls	10	29.41
3.	Mesophylls	6	17.64
4.	Leptophylls	5	14.70
5.	Macrophylls	1	2.94
6.	Megaphylls	1	2.94
Total		34	-

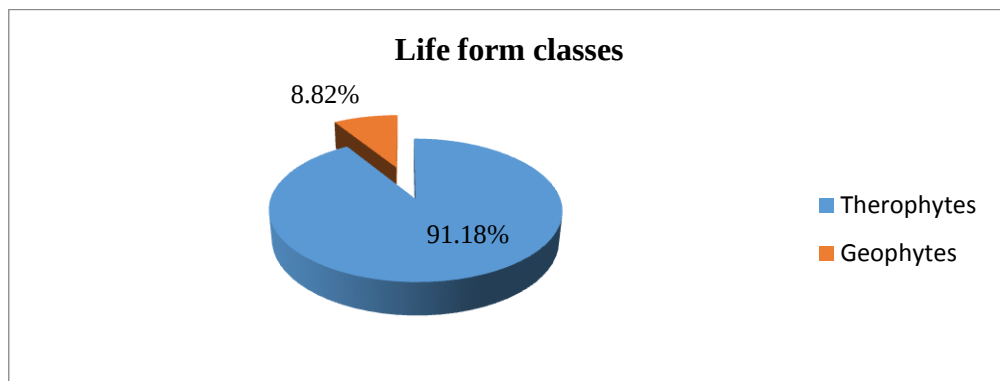


Fig.1. Graphical representation of Life Form Classes.



1. *Papaver dubium*



2. *Tulipa clusiana*



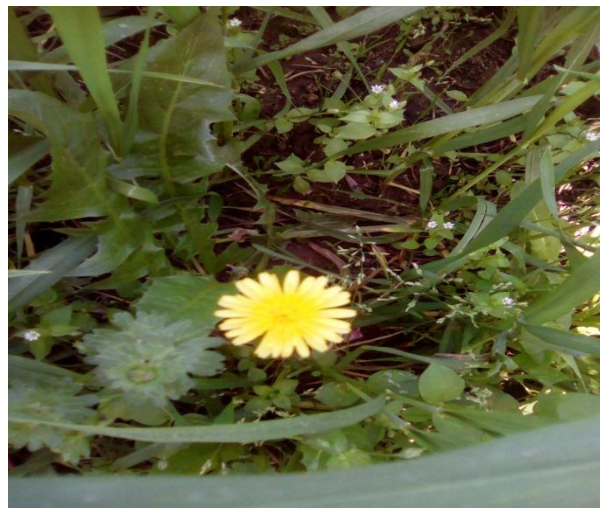
3. *Sonchus oleraceus*



4. *Fumaria indica*



5. *Rumex dentatus*



6. *Taraxacum officinale*

Fig. 2. Photographs of some selected weed species infesting wheat fields of Charbagh Valley, Swat, Pakistan.

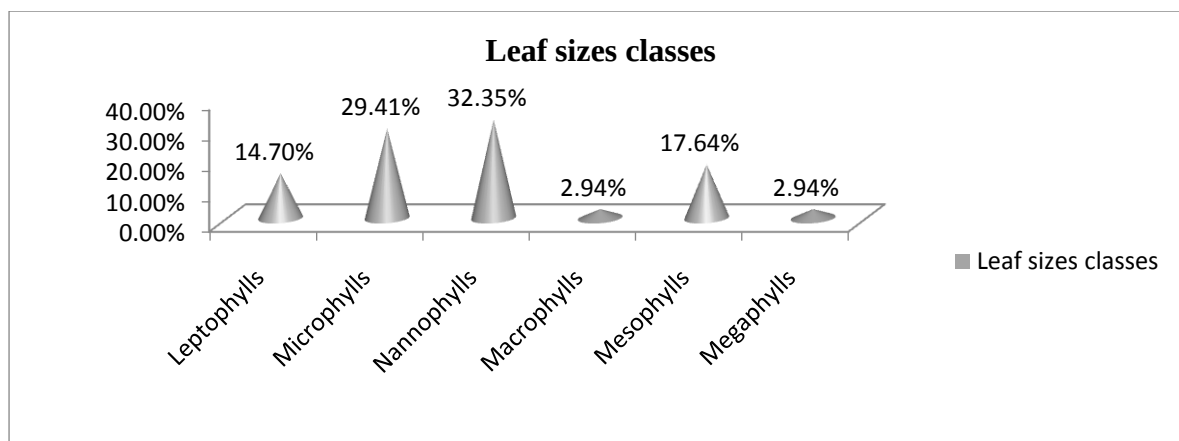


Fig. 3. Graphical representation of Leaf Size Classes.

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