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Utilitarian Aspects of Weeds of Wheat Fields in Charbagh Valley, District Swat, Pakistan

Muhammad Nauman Khan^{1*}, Fazal Hadi¹, Maryam Bibi¹, Naushad Khan¹, Syed Mukaram Shah²

¹Department of Botany, University of Peshawar, Peshawar, Pakistan

²Centre of Plant Biodiversity, University of Peshawar, Peshawar, Pakistan.

***Corresponding Author**

Email: nomiflora@uop.edu.pk

Abstract: The weed survey was conducted from February 2016 to May 2016, in the fields of wheat crops 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 the 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%) as the major size class followed by microphyll having 10 species (29.41%), mesophylls with 6 species (17.64%), and leptophyll with 5 species (14.70%), while macrophyll and megaphyll had single species each (2.941%). Weeds were used as vegetables, medicine, 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 weeds' ecology of Charbagh Valley. This may help the future intensive and extensive researches on weed diversity in the area.

Keywords: Weed Diversity, Ecological Evaluation, Economic Importance, Wheat Crop, Charbagh Valley, Pakistan

INTRODUCTION

The research area Charbagh is located in district Swat. The valley lies from 34° 34' to 35° 55' North latitude and 72° 50' East longitude. It is bounded on the North by districts of Chitral and Ghizer, on the west by Kohistan and Shangla districts, on the South by Buner and Malakand districts, and on the east by districts of Lower Dir and Upper Dir. The climate of the research area is moderate 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 temperature remained 11°C and -2°C, respectively. The winter is long, and extends from November to March. Rain and snowfall occur during this season and temperature falls below freezing point. The amount of rainfall received during winter is more than that of summer season. The highest rainfall recorded during the month of March is about 242 mm. The major crops of the area are vegetables, wheat, maize and rice. Sources of water supply include river water and monsoon rain. Weeds' ecological attributes vary from place to place due to edaphic and climatic factors. Most of the weeds

are 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 kinds 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 weeds studies that the weeds do not only result in low quality crops but they considerably decrease the biomass and productivity of the crops (Inayat et al., 2014). It was found that the weeds were locally used as astringent, constipation, diuretic, laxative and anthelmintic. They were also used in jaundice, ulcer, cosmetics, dried skin, skin freckles, piles, abdominal pain and diabetes (Hadi F et al., 2014). Weeds are undesirable on account of their competitive and allelopathic behavior and providing habitats to harmful organisms (Sher Z et al., 2011). The highly competitive nature of grassy weeds could be attributed to their rapid and luxurious growth in weeds of wheat field (Siddiqui et al., 2010). (Hussain F et al., 2009) screened out sixty-two species of weeds including 15 monocots, and one pteridophyte of 24 families as weeds 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. (Ali S et al., 2015) reported 46 weed species belonging to 21 families and 43 genera. Since invasiveness does not involve sowing and establishing the suspected species on bare land as well as in the established communities (Khan IU et al., 2011). (Ullah F et al., 2016) reported 40 weed species belonging to 21 families including two monocots (five species) and 19 dicot families (35 species) from Maidan Valley. So, the current report is the first ever record of weeds growing in wheat crop fields of this valley.

Materials and Methods

Regular field surveys were carried out in Charbagh Valley, district Swat, during February and May in 2016 for collection of weeds from wheat fields. The weeds were dried, pressed and identified with the help of Flora of Pakistan (Stewart, 1972; Ali SI & Nasir, 1971-1991; Nasir & Ali SI, 1991-1993; Ali SI & Qaiser M, 1995-2016) and other available literature. Life forms, leaf sizes were determined following (Raunkiaer, 1934) and (Hussain F., 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 Department of Botany, University of Peshawar for future references.

Results and Discussion

The recent study revealed that 34 species of 18 families were growing in the wheat crops of the research area. 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 (8.823%) and Brassicaceae had 2 species (5.882%). The remaining 12 families were monophilitic and contributed to have single species (2.941%) each. The present work agrees with that of (Hussain F et al., 2009; Sher Z et al., 2011; Badshah L et al., 2013; Ullah A. & Rashid A., 2013; Hussain F et al., 2015) who also reported that Fabaceae and Poaceae were leading families in their species. Life form classes (Table-2) showed that therophyte with 31 species (91.76%) was the leading life form class followed by geophyte which had 3 species (8.823%). The findings agree with those of (Hussain F et al., 2009; Sher Z et al., 2011; Badshah L et al., 2013; Inayat et al., 2014; Hadi F et al., 2014; Hussain F et al., 2015; Ali S et al., 2015; Ullah F et al., 2016; Haq ZU et al., 2016) who also observed the dominancy of therophytic weed in the cultivated crops. Leaf size classification (Table-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 (2.941%). The present research agrees with that of (Hussain F et al., 2009; Hussain F et al., 2015; Haq ZU et al., 2016) who concluded that most of weed species have small leaf sizes. The major used parts of the plants were leaves, shoots, flowering tops, seeds, seed oil, and the whole plant. Some weeds species are cultivated in this area, but the majority of the weeds are wild. Locally these plants were used for different purposes such as fodder (38 species), carminative (15), laxative (12), potherb (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 weeds for food and fodder. Weeds reduce the productivity of the crops, and are also a major component of a natural ecosystem (Ullah A. & Rashid A, 2013; Hadi F. et al., 2014; Ullah F. et al., 2016). There was a similarity in the above cited studies that shows *Cirsium arvense* as the dominant species in pre harvesting stage which might be due to the similarity in the climatic factors and edaphic factors of weeds species in the wheat fields. We can increase the production of crops by removing weeds at their initial stages or by using less dangerous herbicides and weedicides (Akhtar N. & Hussain F., 2007; Iqbal M et al., 2015; Haq ZU et al., 2016). Plant scientists usually study the economically important and wild plant species. Many studies conducted include (Ullah I et al., 2011) who reported 93 species of 82 genera and 34 families as weeds of wheat fields of FR Bannu. Before eradication and application of weedicides, the weeds must be categorized into various economically used classes.

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

S.#	Families/ Botanical Names	Local Names	English Names	Habit	Life form	Leaf size	Local Distribution status	Part used	Economic and Medicinal uses
1.	Apiaceae 1.Scandix pectin- veneris L.	Kali ziri	Shepherd's needle	Herb	Th	Lep	Wild	Shoots and leaves	Used as salad
2.	Asteraceae 2. Cirsium arvense (L.) Mill	Azghakay	Canada thistle	Herb	Th	Mic	Wild	Whole plant	Fodder and decoction is used for softness of skin
	3. Sonchus asper (L.) Hill.	Shodapay	Sowthistle	Herb	Th	Na	Wild	Whole plant	Fodder, increase milk production in cattles.
	4. Sonchus oleraceus L.	Shodapay	Sowthistle	Herb	Th	Mac	Wild	Whole plant	Fodder
	5. Taraxacum officinale Weber.	Zyar gulai	Dandelion	Herb	G	Mes	Wild	Whole plant	Fodder, Plants are Diuretic, Laxative, Stomachic, Tonic and carminative
3.	Boraginaceae 6. Buglossoides arvensis (L.) I.M.Johnst	Pulpulak	Field Gromwell, Corn Gromwell	Herb	Th	Mic	Wild	Seed oil	Leaves are used as diuretic
4.	Brassicaceae 7. Brassica campestris L.	Sharsham	Mustard	Herb	Th	Mes	Wild and cultivated	Seed and leaves	Fodder, potherb, Edible oil and vegetable
	8. Coronopus didymus (L.) Sm.	Sakha botay	Swinecress	Herb	Th	Lep	Wild	Leaves and shoots	Fodder and used for blood pressure
5.	Cannabinaceae 9. Cannabis sativa 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. Cerastium glomeratum L.	Patewah	Sticky mouse-ear	Herb	Th	Na	Wild	Whole plant	Juices are obtained and applied to relieve headaches.
	11. Silene conoidea L.	Mangotai	Cone catchfly	Herb	Th	Na	Wild	Whole plant	It is cooked as vegetable and is highly palatable fodder.
	12. Stellaria media (L.) Vill	Shamokay	Chickweed	Herb	Th	Na	Wild	Whole plant	It is used as fodder, carminative
7.	Euphorbiaceae 13. Euphorbia helioscopia 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. Lathyrus aphaca L.	Mater guli	Yellow- Flowered Pea	Herb	Th	Na	Wild	Whole plant	Seeds are edible Mostly used as fodder
	15. Medicago lupulina L.	Peshtari sagh	Burr medic	Herb	Th	Na	Wild and cultivated	Whole plant	Cooked as vegetable, used as fodder, potherb and laxative
	16. Medicago polymorpha 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 corniculata</i> L.	Zmakai Tarokai	Woodsorrel	Herb	Th	Lep	Wild	Whole plant	Containing oxalic acid used as fodder and for constipation. Leaves are used for sour taste.
13.	Papaveraceae 23. <i>Papaver dubium</i> L.	Zangli doda	Long-Head Poppy, Blindeyes	Herb	Th	Mic	Wild	Flowering buds	Latex is used as diaphoretic. Flowers are bees attractants
14.	Poaceae 24. <i>Alopecurus myosuroides</i> Huds.	Boda ghwaghi	black-grass, twitch grass	Herb	Th	Mes	Wild	Whole plant	Used as fodder
	25. <i>Avena fatua</i> L.	Jaudar	Wild oat	Herb	Th	Mic	Wild	Whole plant	Collected as fodder
	26. <i>Cynodon dactylon</i> (L.) Huds.	Kabal	Bermuda grass	Herb	Th	Na	Wild	Whole plant	Grazed by animals, roots are used for children dyesentry
	27. <i>Phalaris minor</i> Retz	Ghondokys	Canarygrasses, Littleseed	Herb	Th	Mes	Wild	Whole plant	Used as fodder
	28. <i>Poa annua</i> L.	Narai wakha	Blue grass	Herb	Th	Mic	Wild	Whole plant	Utilized as fodder
15.	Plantaginaceae 29. <i>Plantago lanceolata</i> L.	Isphaghool	Narrow leaf plantain	Herb	Th	Mes	Wild and cultivated	Whole plant	Fodder, digestive, constipation, diarrhoea and vomiting
16.	Polygonaceae 30. <i>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. Veronica persica Pairett	Mekhaki	Creeping speedwell	Herb	Th	Lep	Wild	Whole plant	Grazed as fodder
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Keys: Life form classes: Th-Therophytes, G-Geophytes

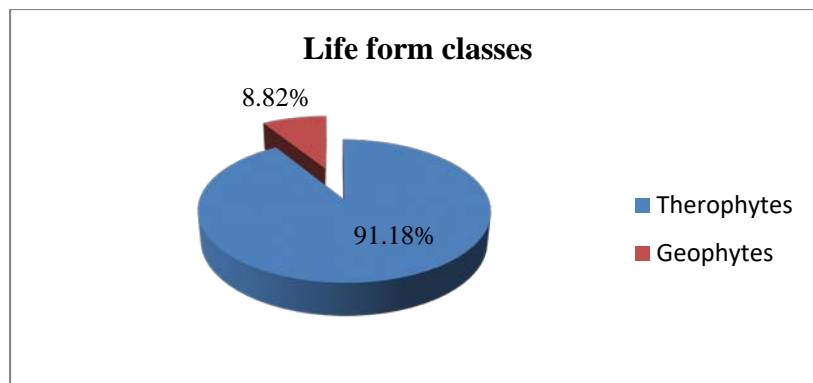
Leaf sizes classes: Lep-Leptophylls, Mic-Microphylls, Na-Nanophylls, Mac-Macrophylls, Mes-Mesophylls, Meg-Megaphylls

Table 2: Summary of ecological characteristics of weed of Charbagh Valley

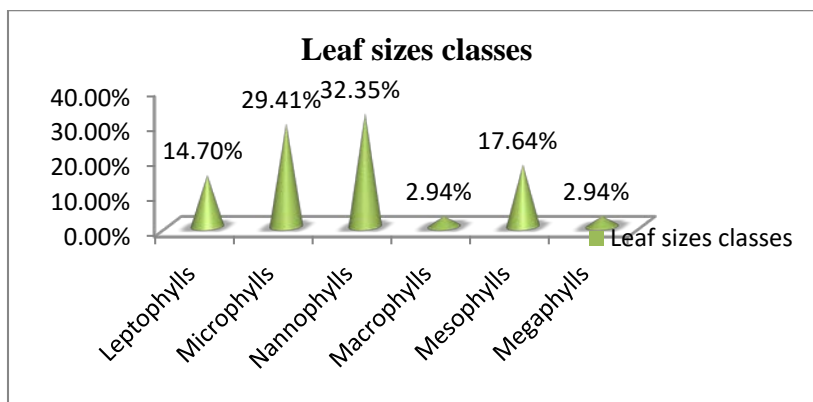
S.#	Parameters	No of species	Percentage
A.	Life form classes		
1.	Therophytes	31	91.176%
2.	Geophytes	3	8.8235%
	Total	34	99.9995

Table 3: Extention of the ecological characteristics

B.	Leaf sizes classes	No of species	Percentage
1.	Nanophylls	11	32.35%
2.	Microphylls	10	29.41%
3.	Mesophylls	6	17.64%
4.	Leptophylls	5	14.70%
5.	Macrophylls	1	2.941%
6.	Megaphylls	1	2.941%
	Total	34	99.982



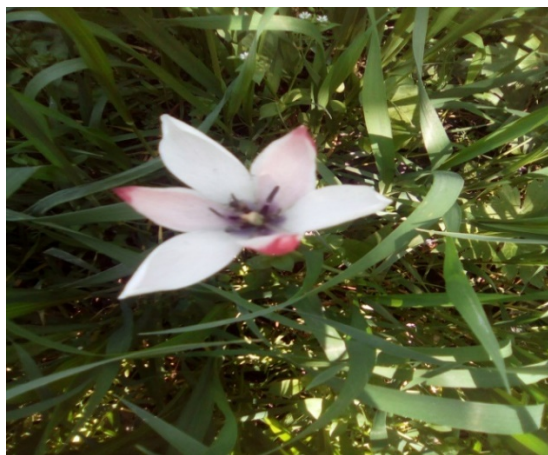
Graph 1: Graphical representation of life form classes



Graph 2: Graphical representation of leaf size classes



1. *Papaver dubium*



2. *Tulipa clusiana*



3. *Sonchus oleraceus*



4. *Fumaria indica*



5. *Rumex dentatus*



6. *Taraxacum officinale*