Pak. J. Weed Sci. Res., 20(3): 335-346, 2014

WEED DIVERSITY IN WHEAT AND MAIZE WITH SPECIAL REFERENCE TO THEIR ETHNOMEDICINAL USES AT RECH VALLEY, HINDOKUSH RANGE, CHITRAL, PAKISTAN

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ABSTRACT

District Chitralis located in the extreme north-east of Pakistan with unique phytogeography having Irano-Turanian and Sino-Japanese floristic regions. The present study reports the weeds of wheat and maize crops of Rech valley, Torkow, Upper Chitral, Pakistan with special reference to their medicinal uses. There were 31 weeds distributed in 27 genera and 15 families. Asteraceae was leading family with 8 species (25.8 %) followed by Brassicaceae with 5 species (16.12%). Chenopodiaceae has 4 species (12. 90%), Papilionaceae and Polygonaceae have 2 species (6.45%) each. The remaining families Apiaceae, Caryophyllaceae, Convulvulaceae, Euphorbiaceae, Lamiaceae, Malvaceae, Oxalidaceae, Plantaginaceae, Schrophulariaceae and Solanaceae have one species (3.22%) each. Life form classes revealed that there were 26 (83.88%) therophytes, 4 (12.90%) geophytes and one (3.22%) hemicryptophyte. Similarly, leaf size spectra showed 12 (38.71%) mesophylls, 9 (29.10%), 4 (12.90%) macrophylls and 3 (9.67%) each leptophylls and microphylls The same weeds also have important ethnobotanical values and used as astringent, constipation, diuretic, laxative, anthelmintic, to cure jaundice, ulcer, cosmetics, dried skin, skin freckles, piles, abdominal pains and diabetes.

Key words: Chitral, ecological characteristics, Hindo-kush range, maize, medicinal values, Pakistan, weed diversity, wheat.

Citation: Hadi, F., Aziz-ur-Rahman, M. Ibrar, G. Dastagir, M. Arif, K. Naveed and M. Adnan. 2014. Weed diversity in wheat and maize with special reference to their ethnomedicinal uses at Rech valley, Hindokush Range, Chitral, Pakistan. Pak. J. Weed Sci. Res. 20(3): 335-346.

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INTRODUCTION

Chitral is located in the extreme north-east of Khyber Pakhtunkhwa province of Pakistan, parallel to the pan handle shaped Wakhan corridor of Afghanistan. It is the largest district and covering about 20% of the provincial landscape. It lies within 35^0 15´ 06" to 36^0 55´32" North and 71^0 11´ 32" to 73^0 51´ 34" East (Anonymous, 1998). District Ghizer of Gilgit-Baltistan is located to its east while on the south Chitral is bordered by districts of Dir and Swat. Nooristan and Wakhan areas of Afghanistan are bordered to the West and North-West respectively separating Pakistan from Tajikistan. The elevation of Chitral varies from about 1070 m (about 3500 ft) in the extreme south in Arandu to 7,690 m (25,230 ft) at Tirich Mir in the Hindu Kush range, (Ali and Qaiser, 2009).

The study area Rech valley has important strategic location in the region having borders with Chitral areas like Yarkhoon in the East and Ujnu in the south. On the north-west it is surrounded by Wakhan strip of Afghanistan. The famous localities of the area are Amunate, Murech, Niser, Noghor, Ruwa, Sha-junali and Surech. Sha-junali is focused internationally for the famous and possible gas pipe line track between Pakistan and Tajikistan through Anoshah pass crossing the Wakhan strip of Afghanistan.

Weeds grow in every crop and vegetables field to offer competition, allelopathy and habitats for other harmful organisms and cause problems during harvesting, plowing, seed purification and management of the land that ultimately leads to reduction in the yield of crops and vegetables. The concept of weed originated when man first started to grow plants for food, hence undesired plants were eradicated from fields. Weeds invasion has been under serious debate among scientific communities for about three decades all over the world and their potential impact and allelopathic effect has been vigorously stressed. Measures have been taken to eradicate the weeds. The need for weed control got extraordinary importance as technological advances prevailed (Marwat and Hashim, 2002). Different fields have diverse weed flora due to altitude, climate, locality, soil, topography and agronomic practices. Thus, the proper ecological management, identification and assessment of weeds have always been an important task. Therefore, different authors have worked out the weeds of different fields (Hanif *et al.,* 2004; Akhtar and Hussain, 2007; Shah *et al.,* 2008; Marwat *et al.,* 2008; Shah *et al.,* 2008; Hussain *et al.,* 2009; Hadi *et al.,* 2009; Waheed *et al.,* 2009).

The present report is the first ever record of weeds flora found in the wheat and maize fields of Rech valley, upper Chitral, Pakistan. The only data available on the plants of the area is that after Hadi *et al.* (2013) who listed 29 ethnobotanically important woody plants of

Rech Valley. The present study is adding knowledge to the existing weed ecology and also serves as first base line data for future researchers working on the dynamics and management of weeds in the area and surroundings including war affected Afghanistan.

MATERIALS AND METHODS

The present study was conducted during years of 2013 and 2014 in thefields of wheat and maize crops of Rech valley, Torkow, Upper Chitral, Khyber Pakhtunkhwa Pakistan.

The weeds were collected from wheat and maize fields and were pressed, dried and identified with the help of different volumes of flora of Pakistan and other related literatures (Nasir and Ali, 1970-1989; Ali and Nasir, 1989-1991; Ali and Qaiser, 1993-2008). The Life form and leaf size spectra were determined after Hussain (1989).

RESULTS AND DISCUSSION

There were 31 weed species distributed in 27 genera and 15 families in the wheat and maize crops of Rech valley, upper Chitral, Pakistan. Asteraceae was leading family with 8 species (25.8 %) followed by Brassicaceae with 5 species (16.12%). Chenopodiaceae has 4 species (12.9%), Papilionaceae and Polygonaceae have 2 species (6.45%) each. The remaining families Apiaceae, Caryophyllaceae, Convulvulaceae, Euphorbiaceae, Lamiaceae, Malvaceae, Oxalidaceae, Plantaginaceae, Schrophulariaceae and Solanaceae have one species (3.22%) each (Table-1).

In the present study the ethnobotanical use of weeds was also investigated. For this purpose local 15 males and 10 females were interviewed about the indigenous use of these weeds. It was found that the weeds are locally used as Astringent, constipation, diuretic, laxative and anthelmintic. They are also used in jaundice, ulcer, cosmetics, dried skin, skin freckles, piles, abdominal pain and diabetes (Table-1).

The ecological studies of the weeds revealed that there were 26 (83.88%) therophytes, 4 (12.90%) geophytes and one (3.22%) hemicryptophyte. Leaf size spectra showed 12 (38.71%) mesophylls, 9 (29.10%), 4 (12.90%) macrophylls and 3 (9.67%) each leptophylls and microphylls (Table-2 and -3). Our findings agree with those of Hussain *et al.* (2004), Shah *et al.* (2008), Waheed *et al.* (2009) and Akhtar and Hussain (2007), who also observed that therophytes weeds are always dominant in cultivated fields including wheat.

Similarly, the constancy classes showed that 4 weed species had minimum distribution and fall in constancy class I. Constancy class II had 7 species, 8 species were in constancy class III, 4 species fall in constancy class IV, and remaining 8 species were constant species that fall in constancy class V with maximum distribution (Table-2). Maximum weeds were annual that spread by seeds only. So, such weeds must be removed before seed production to minimize the chances in future emergence. However, even under best agronomic practices the annual weeds can germinate, because soil always remains seed reservoir that is a constant source of weed persistence. Weed seeds enter the cultivated fields through water, animals, wind and as contamination in seeds. Therefore, it becomes more difficult to completely eliminate them.

CONCLUSION

It is concluded that the studied area is diverse in weed flora where wheat and maize are two important crops grown in rabi and kharif seasons, respectively. All the studied weeds belonged to 15 different families which are documented here in this article. The families are mentioned below in terms of their diversity in descending order viz. Asteraceae, Brassicaceae, Chenopodiaceae, Papilionaceae, Polygonaceae, Apiaceae, Caryophyllaceae, Convulvulaceae, Euphorbiaceae, Lamiaceae, Malvaceae, Oxalidaceae, Plantaginaceae, Schrophulariaceae and Solanaceae. Life form classes were therophytes, geophytes and hemicryptophyte. Leaf size spectra were mesophylls, macrophylls, leptophylls and microphylls. In addition to their identification and classification, the ethnobotanical values of these weeds were also documented as per the indigenous knowledge of the farming community.

Table-1. Weeds in Wheat and Maize fields along with their potential uses in Rech valley, Torkhow, District Chitral, Pakistan

S.#	Families/ Botanical Names	Local names	Wheat	Maize	Part used/Recipes	Uses
1.	Apiaceae					
1	*Coriandrum sativum* L.	Danu	+	+	Fruit, leaves and stem are taken as spice	Used as anti malarial, carminative and diuretic drug
2.	Asteraceae					
2	*Artemisia brevifolia* Wall. Ex. D.C.	Droon	+	+	Extraction of powder leaves boiled in water	Gastric problem and jaundice
3	*Artemisia parvifolia* Roxb ex. D. Don.	Kharkhalich	+	+	The seeds are boiled with flavor and taken	Abdominal pain, anthelmintic, blood purifier, blood pressure, diabetes and weight loss
4	*Calendula officinalis* L.		+	+	Crushed flowers mixed with vegetable oil and the paste is applied on affected parts.	Joints pain
5	*Carum carvi* L.	Sounj-mik	-	+	Decoction of seed, stem and leaves is used	It is recipe of bronchitis, cough, diarrhea and scurvy
6	*Cichorium intybus* L.	Kasti	+	+	Teamade from flowers and also boiled with milk.	Constipation, fever, jaundice, typhoid and promote digestion
7	*Lactuca vicminia* L.		+	+	Given to animal as forage	For milk production in animals
8	*Matricaria chamomilla* L.	Shirisht	+	+	Herbal tea is prepared from flowers and taken	Diuretic, stomach ache and typhoid

9	*Taraxicum officinale* L.	Phowoo	+	+	Boiled and taken as vegetable	Diuretic, kidney pain, stomachache, ulcer, laxative and stimulant
3.	Brassicaceae					
10	*Brassica campestris* L.	Sarsoo	-	+	Oil from crushed seed is used	cardiotonic, Hair tonic, for massage
11	*Capsella bursa-pastoris* L.	Jalajali	+	+	Boiled and used as vegetables	Vegetable
12	*Eruca sativa* (Miller) Thell.		+	-	Leaves and flowers	Vegetable and as fodder
13	*Lepidium sativum* L.	ChakJalajali	+	-	Leaves are dried, powdered and used. seeds are also taken	For abdominal Problems
14	*Sisymbrium irio* L.	Khelikheli	+	+	Seeds are powdered and a paste is prepared & applied externally	For stabbing pain. Also used for clearing facial pimples and against sunburn.
4.	Caryophyllaceae					
15	*Sileneco noidea* L.	Apopar	+	-	Paste is prepared by grinded seeds and young leaves and applied. Cooked fresh and dried leaves are used as vegetable.	Pimples, backache and as stomachic.
5.	Chenopodiaceae					
16	*Chenopodium album*	Pililiomrach	+	+	Syrup is prepared from powdered fruits by boiling in water	Blood purifier, diarrhea, jaundice, laxative, piles, and stomach pain
17	*Chenopodium botrys* L.	Khodur	+	+	Young plant is taken as vegetable	Antiasthmatic

18	*Chenopodium foliosum* Asch.	Pililio March	+	-	The fruits are grinded and mixed with water for external use	Softening of skin
19	*Chenopodium murale* L.	Dar kunakh	+	-	Whole plant is taken as vegetable	The plant is used for abdominal pain, as anthelmintic, diuretic, aphrodisiac, constipation, for piles and sore eyes
6.	Convulvulaceae					
20	*Convolvulus arvensis* L.	Meeshk	+	+	Stem and leaves are crushed to prepare decoction.	Epilepsy, sexual debility and stomach disorder
7.	Euphorbiaceae					
21	*Euphorbia peplus* L.		+	-	Whole plant	Toxic
8.	Lamiaceae					
22	*Mentha longifolia* L.	Bain	+	-	Whole plant	Fresh leaves are eaten to improve digestion. Fresh roots are boiled and drunk to treat fever
9.	Malvaceae					
23	*Malva neglecta* Wall.	Leganuj oshu	+	+	The roots are boiled and mixed with the seeds of Lepidiumsativum and used.	As purgative for young cattles
10.	Oxalidaceae					
24	*Oxalis corniculata*L.		-	+	Juice is extracted from fresh leaves and is used. Leaves are also used as vegetables.	For stomach troubles. To stop bleeding from Wounds. Decoction of the root is anthelmintic

11.	Papilionaceae					
25	*Glycyrrihza glabra* L.	Moyou	-	+	5 to 10 g roots are boiled to get extract and a glass is drunk once a day	To cure abdominal pain
26	*Melilotus officinalis* (L.) Desf.	Zarwak	+	+	Leaves	Anti-coagulant
12.	Plantaginaceae					
27	*Plantago lanceolata* L.	Legenijoshu	+	+	The leaves are taken as vegetable	Dysentery, Laxative,mouth diseases
13.	Polygonaceae					
28	*Polygonum dumetorum* L.	Barekijoshu	+	+	Fresh leaves are cooked and eaten	Constipation
29	*Rumex hastatus* D. Don	Shakhjoshu	+	+	The plant is taken as vegetable	Astringent, constipation, diuretic, jaundice, purgative and ulcer
14.	Solanaceae					
30	*Solanum nigrum* L.	Pirmilik	+	+	Fruits are crushed and applied externally	Cosmetics, dried skin, pimples, freckles and as sun block
15.	Scrophulariaceae					
31	*Verbascum thapsus* Medik.	Gordoghkaru	+	+	Leaves are placed over the effected part of the body	To cure inflammation and wounds

Table-2. Life form, leaf size and constancy class of weeds in wheat and maize fields in Rech valley, Torkow, District Chitral, Pakistan

S.#	Plant species	Family	Life form	Leaf size	Constancy class
1	*Coriandrum sativum* L.	Apiaceae	Th	N	II
2	*Artemisia brevifolia* Wall. Ex. D.C.	Asteraceae	H	L	I
3	*Artemisia parvifolia* Roxb ex. D. Don.	Asteraceae	Th	Mes	I
4	*Calendula officinalis* L.	Asteraceae	Th	Mes	III
5	*Carum carvi* L.	Asteraceae	Th	Mic	III
6	*Cichorium intybus*L.	Asteraceae	Th	Mes	II
7	*Lactuca sativa* L.	Asteraceae	Th	Mac	V
8	*Matricaria chamomilla* L.	Asteraceae	Th	N	V
9	*Taraxicum officinale* Weber	Asteraceae	G	Mes	V
10	*Brassica campestris* L.	Brassicaceae	Th	Mac	IV
11	*Capsella bursa-pastoris* L. (Medic.)	Brassicaceae	Th	Mes	V
12	*Eruca sativa*	Brassicaceae	Th	Mic	III
13	*Lepidium sativum* L.	Brassicaceae	Th	N	III
14	*Sisymbrium irio* L.	Brassicaceae	Th	N	V
15	*Sileneco noidea* L.	Caryophyllaceae	Th	N	V
16	*Chenopodium album* L.	Chenopodiaceae	Th	N	II
17	*Chenopodium botrys* L.	Chenopodiaceae	Th	L	II
18	*Chenopodium foliosum* (Merrich.) Aschers.	Chenopodiaceae	Th	N	III
19	*Chenopodium murale* L.	Chenopodiaceae	Th	N	II
20	*Convolvulus arvensis* L.	Convulvulaceae	Th	Mes	IV
21	*Euphorbia peplus* L.	Euphorbiaceae	Th	L	IV
22	*Mentha longifolia (*L.) Huds.	Lamiaceae	G	Mes	III
23	*Malva neglecta* Wall.	Malvaceae	Th	Mes	IV
24	*Oxalis corniculata* L.	Oxalidaceae	Th	Mic	V
25	*Glycyrrihza glabra* L.	Papilionaceae	G	Mes	III

26	*Melilotus indica* (L.) All.	Papilionaceae	Th	N	V
27	*Plantago lanceolata* L.	Plantaginaceae	Th	Mes	II
28	*Polygonum dumetorum* L.	Polygonaceae	Th	Mes	I
29	*Rumex longifolius* DC.	Polygonaceae	Th	Mac	II
30	*Solanum nigrum* L.	Solanaceae	Th	Mes	III
31	*Verbascum thapsus* Medik.	Schrophulariaceae	G	Mac	I

Keys: Life Form: 1. Th: Therophytes, 2. G: Geophytes, 3. H: Hemicryptophytes
Leaf Size:1. L: Leptophylls, N: Nannophylls, 3. Mic: Microphylls, 4. Mes: Mesophylls, 5. Mac: Macrophylls.

Table-3. Life form and Leaf-size spectra of weeds in wheat and maize fields of Rech valley, Torkow, District Chitral, Pakistan

A. Life-form classes			
S. No.	Life-form	No. of Species	Percentage
1.	Therophytes	26	83.88
2.	Geophytes	04	12.90
3.	Hemicryptophytes	01	03.22
B. Leaf-size classes			
1.	Mesophylls	12	38.71
2.	Nannophylls	09	29.10
3.	Macrophylls	04	12.90
4.	Leptophylls	03	09.67
5.	Microphylls	03	09.67

REFERENCES CITED

Anonymous, 1998. District Census Report of Chitral. PCO, Govt. of Pakistan.

Akhtar, N. and F. Hussain. 2007. Weeds of wheat fields of village Qambar, District Swat, Pakistan. Pak. J. Pl. Sci. 13: 31-35.

Ali, S.I. and Y. Nasir.1989-1991. Flora of Pakistan. Department of Botany, University of Karachi.

Ali, S.I. and M. Qaiser. 1995-2007. Flora of Pakistan.Department of Botany, University of Karachi.

Ali, H. and M. Qaiser. 2009. The Ethnobotany of Chitral valley, Pakistan with particular reference to medicinal plants. Pak. J. Bot. 41(4): 2009-2041.

Hadi, F., A. Razzaq, A. Rahman and A. Rashid. 2013. Ethnobotanical notes on woody plants of Rech Valley, Torkhow, District Chitral, Hindu-Kush range, Pakistan. Scholarly J. Agri. Sci. 3(11): 468-472.

Hadi, F., M. Naseem, S. M. Shah, Asadullah and F. Hussain. 2009. Prevalence and ecological characteristics of summer weeds in crop and vegetable fields of Botanical Garden Azakhel, University of Peshawar, Pakistan. Pak. J. Pl. Sci. 15(2): 101-105.

Hanif, Z., S.A. Khan, K.B. Marwat, I.A. Khan and Ikramullah. 2004. Important weeds of wheat crop of Malkandher Farm, NWFP Agricultural University, Peshawar. Pak. J. Weed Sci. Res. 10: 109-112.

Hashim, S. and K.B. Marwat. 2002. Invasive weeds a threat to biodiversity. A case study from Abbottabad district, N-W Pakistan. Pak. J. Weed Sci. Res. 8(1-2): 1-2.

Hussain, F. 1989. Field and Laboratory Manuals of Plant Ecology.UGC. Islamabad. Hussain, F., M.Z. Quershi and S. Shaukat. 1998. Studies on some weeds in wheat fields of district Attock. Sarhad J. Agric. 4: 199-207.

Hussain, F., A. Murad and M.J. Durrani. 2004. Weed communities in the wheat fields of Mastuj, District Chitral, Pakistan. Pak. J. Weed Sci. Res. 10: 101-108.

Hussain, F., S. M. Shah, F. Hadi and Asadullah. 2009. Diversity and ecological characteristics of weeds of wheat fields of University of Peshawar Botanical Garden at Azakhel, district Nowshera, Pakistan. Pak. J. Weed Sci. Res. 15(4): 283-294.

Khan, N., I. Khan, M. A. Khan and H. Khan. 2004. Major Rabi and Kharif Weeds of agronomic crops of District Bannu. Pak. J. Weed Sci. Res. 10(1-2): 79- 86.

Marwat, K.B., Z. Hussain, B. Gul, M. Saeed and S. Din. 2008. Survey on weed problem in wheat crop in District Mardan. Pak. J. Weed. Sci. Res. 12: 353-358.

Shah, S.M., F. Hadi and F. Hussain. 2008. A check list of weeds of wheat fields of Palosi, District Peshawar, Pakistan. PUTAJ (Science), 15: 9-16.

Waheed, A., R. Qureshi, G.S. Jakhar and H. Tareen. 2009. Weed community dynamics in wheat crop of District Rahim Yar Khan, Pakistan. Pak. J. Bot. 41: 247-254.