

WEEDS AS A SOURCE OF MEDICINES FOR THE DESCENDANTS OF ALEXANDER THE GREAT IN KALASH VALLEY, DISTRICT CHITRAL, HINDUKUSH RANGE, PAKISTAN

Fazal Hadi^{1*} and Muhammad Ibrar²

ABSTRACT

The Kalash valley of district Chitral is famous for its inhabitants considered to be the descendants of Alexander the Great, which are practicing an unique religion and culture and spoke an indigenous language for thousands of years. The present survey was carried out in all the three sub-valleys viz: Bumburet, Birir and Rumbor of Kalash valley during 2014 to 2015 to record the medicinal weeds of wheat crops. The result indicated 27 species of weeds belonging to 23 genera and 17 families used by locals for treatment of different diseases. The leaves of 15 (55.55%) species, shoots of 5 (18.52%), fruits and seeds of 3 (11.11%), flowers of 2 (7.41%) and the roots and whole plant of one (3.70%) species each were used as medicines locally. Similarly, 17 (63%) species were used in abdominal problems, 3 (5.43%) each as blood purifier and in jaundice, 2 (7.41%) each for fever and wound healing and one (3.70%) species each was used to treat cardiac problems, eye pain, kidney pains, mouth diseases and sunburn. Asteraceae was dominant family with 6 (6.66%) species followed by Chenopodiaceae with 3 species (5.43%). Brassicaceae, Polygonaceae and Plantaginaceae had 2 species (7.41%) each. All other families have contributed with one species each. The present findings provide first hand information about medicinal weeds of the area and their local uses and might also be helpful for proper management and control of these weeds.

Keywords: Weeds, wheat crops, medicinal uses, Kalash valley, district Chitral, Pakistan.

Citation: Hadi, F. and M. Ibrar. 2015. Weeds as a source of medicines for the descendants of Alexander the Great in Kalash valley, district Chitral, Hindukush range, Pakistan. *Pak. J. Weed Sci. Res.* 21(4): 565-574.

INTRODUCTION

¹ Centre of Plant Biodiversity, ²Department of Botany, University of Peshawar, Peshawar, Pakistan.

*Corresponding authors Email: hadibotany@yahoo.com

Chitral is the extreme north-east district of Khyber Pakhtunkhwa, Pakistan and lies between $71^{\circ} 11' 32''$ to $73^{\circ} 51' 34''$ east longitude and $35^{\circ} 15' 06''$ to $36^{\circ} 55' 32''$ north latitude (DCR, 1998). It is bounded to east by Gilgit-Baltistan, in south by Dir and Swat and in the west and north-west respectively by Nooristan and Wakhan areas of Afghanistan. The present study area Kalash valley is consisting of three sub-valleys viz: Bumburet, Rumbor and Birir that inhabit the historical and unique cultured Kalasha peoples living in these rugged mountainous series of Hindukush range for thousands of years. They are considered to be the descendants of "Shalak-Shaw" who was an invading Army General of Alexander the Great. Wheat (*Triticum aestivum* L.) is most commonly cultivated crop in the foothills along the rivers in all the three localities of the valley. The present study is the first ever attempt to record the medicinal uses of weeds in wheat crops of Kalash valley, district Chitral. Many workers have contributed in weed study of other parts of Chitral and Pakistan i.e. Hussain *et al.* (2004) studied the weeds in wheat fields of Tehsil Mastuj, Chitral and established three communities. Hadi *et al.* (2014) enlisted the ethnomedicinal uses of 31 weed species from Rech valley, Chitral. Shah *et al.* (2014) worked out the weeds of wheat crop of Mastuj valley, Chitral and reported 52 species. Hadi and Ibrar (2015) studied the wheat weeds of Kalash valley, Chitral and reported 59 species. Hamayun 2003; Mohammad *et al.* 2005; Naveed and Hussain 2007; Hussain *et al.* 2009; Qureshi *et al.* 2009; Khan *et al.* 2012 and 2013; Marwat *et al.* 2013; Ullah & Rashid 2013; Khan *et al.* 2014 and Ullah *et al.* 2014 worked on weeds of different crops in different parts of Pakistan.

MATERIALS AND METHODS

The weeds were collected from the wheat fields of all the three sub-valleys viz: Bumburet, Rumbor and Birir of Kalash valley during year 2014. The data on medicinal uses of these weeds was obtained by interviewing the local community, while the ecological characteristics of each species were recorded in the field. The plants were pressed, dried and identified by using different volumes of Flora of Pakistan (Nasir and Ali, 1970-1989; Ali and Nasir, 1989-1991; Ali and Qaiser, 1993-2013). The leaf-size classes and life form spectrum were determined after Raunkiaer (1934) and Hussain (1989). Phenological data was obtained in the fields to classify the plants into Pre-reproductive (vegetative), reproductive (flowering) and post-reproductive (fruiting) stages. The percentage distribution of each species in the area was determined through consistency classes and five classes were identified that showed maximum distributed species in class-V and minimum distributed in Class-I.

RESULTS AND DISCUSSION

The present study was conducted to collect the weeds of Kalash valley, district Chitral, used as medicines by the locals. 27 different weed species were collected from the area belonging to 23 genera and 17 families (Table-2). Asteraceae was dominant family with 6 (22.22%) species followed by Chenopodiaceae with 3 species (11.11%). Brassicaceae, Plantaginaceae and Polygonaceae had 2 species (7.41%) each. The remaining families like Adiantaceae, Apiaceae, Cannabaceae, Caryophyllaceae, Convolvulaceae, Fumariaceae, Lamiaceae, Malvaceae, Oxalidaceae, Portulacaceae, Schrophulariaceae and Solanaceae were represented by single species each (Fig. 1). The life form classes showed that therophytes was leading group with 21 (77.78 %) species followed by geophytes with 4 (14.81%) species and Hemicryptophytes and Chamaephytes with one (03.70%) species each. Similarly, nannophylls was dominant leaf size class with 13 (48.15%) species followed by mesophylls with 9 (33.33%) species, leptophylls and macrophylls 2 (7.41%) species each and microphylls with one species (table-3). Phenological data showed that 21 (77.78%) species were at reproductive stage (flowering) and 03 (11.11%) species each were in post-reproductive (fruiting) and pre-reproductive (vegetative) stages (Table-3). Consistency classes were used to find the percentage distribution of each species in the area. Species having 0-20 % distribution were grouped in consistency class-I, 21-40 % in consistency class-II, 41-60 % in consistency class-III, 61-80 % in consistency class-IV and 81-100 % in consistency class-V. The result showed maximum (9) species were distribution in consistency class-II followed by class-III having 6 species, consistency class-I had 5 species, consistency class-IV had 4 species and consistency class-V had 3 species (Table-3).

The medicinal uses of these weeds showed that leaves of 15 (55.55%) species, shoots of 5 (18.52%) species, fruits and seeds of 3 (11.11%) species, flowers of 2 (7.41%) species and roots and whole plant of one (3.70%) species each were used as medicines (Figure 3). Similarly, 17 (63%) species were used in abdominal problems, 3 (5.43%) each as blood purifiers and in jaundice, 2 (7.41%) each for fever and wound healing and one (3.70%) species each was used to treat cardiac problems, eye pain, mouth diseases, kidney pains and sunburn (Fig. 2).

Table-1. Medicinal weeds growing in Kalash valley, district Chitral, Pakistan

S#	Plant name	Family	Local name	Part used	Disease cured	Description
1.	<i>Adiantum venustum</i> D. Don.	Adiantaceae	Sumbal	Fronds	Diuretic, cardiac probs.	The extract of fronds is used as cardiac tonic. The spores are pour on wounds.
2.	<i>Coriandrum sativum</i> L.	Apiaceae	Danu	Shoots	Carminative, digestive	Shoots are cooked with food or eaten as such as appetizer, carminative.
3.	<i>Artemisia brevifolia</i> Wall. Ex DC.	Asteraceae	Droon	Shoots	Stomachic	The herbal tea of shots is used as stomachic and treats gastric problems.
4.	<i>Artemisia parviflora</i> Roxb.		Kharkhalich	Seeds	Anthelmintic and stomachic	One tea spoon seeds boiled in one glass water are drunk to release worms and relief abdominal pain.
5.	<i>Calendula arvensis</i> L.		Bodeki	Leaves, flowers	Relieve Joints pain	The leaves and flowers are crushed in cooking oil and applied to relieve joint pain.
6.	<i>Cichorium intybus</i> L.		Kasti	Roots	Relieve typhoid fever	Roots are eaten as such or boiled and the extract is taken to relieve typhoid and general fever.
7.	<i>Matricaria chamomilla</i> L.		Shirisht	Flowers	Gastric pain	Herbal tea is prepared from flowers to relieve abdominal pain.
8	<i>Taraxicum officinale</i> L.		Phowoo	Leaves	Diuretic, kidney pain, ulcer, laxative	Boiled and taken as vegetable
9.	<i>Lepidium sativum</i> L.	Brassicaceae	Troak kardachi	Leaves	Stomachic	Fresh leaves are eaten or cooked as stomachic
10	<i>Sisymbrium irio</i> L.		Kheli kheli	Seeds	Stabbing pain, sunburn	Paste of Powdered seeds is applied externally for stabbing pain and also used to cure sunburn.
11	<i>Cannabis sativa</i> L.	Cannabinaceae	Bong	Leaves and seeds	Narcotic and stimulant	Leaves are crush to prepare a narcotic drug "chars". Leaves and seeds are eaten as stimulant
12	<i>Silene conoidea</i> L.	Caryophyllaceae	Apopar	Leaves	Laxative, purgative	Leaves are cooked as laxative and purgative
13	<i>Chenopodium murale</i> L.	Chenopodiaceae	Dar kunak	Leaves	Blood purifier, jaundice, anthelmintic	Leaves are cooked as vegetable and used

14	<i>Chenopodium album</i> L.		Pililiomrach	Fruits	Blood purifier, jaundice, piles.	Powdered fruits boiled in water and taken
15	<i>Chenopodium foliosum</i> Asch.		Pililio March	Fruits	Softening of skin	The powdered fruits are mixed with water for external use
16	<i>Convolvulus arvensis</i> L.	Convolvulaceae	Bakar bali/ Mishk	Leaves	Stomach disorder,	Leaves are cooked to relief stomach disorder and pain
17	<i>Fumaria indica</i> (Hauskn.) H. N. Pugsley	Fumariaceae	Shahtara	Shoots	Blood purifier, antipyretic, stomachic	The shoots are shade dried and herbal tea is prepared, used to relief stomach pain, fever and blood purifier.
18	<i>Mentha longifolia</i> (L.) Huds	Lamiaceae	Bain	Whole plant	Stomachic, vomiting, gas trouble	The leaves are eaten to relief stomach pain, vomiting and gastric trouble. Herbal tea of the plant is used to control fever.
19	<i>Malva neglecta</i> Wallr.	Malvaceae	Sawachal	Shoots	Antispasmodic	The shoots are cooked and eaten to relief constipation and are antispasmodic.
20	<i>Oxalis corniculata</i> L.	Oxalidaceae		Leaves	Gastric troubles, wound bleeding, anthelmintic	Extract of fresh leaves is used. Leaves are used as vegetables as well.
21	<i>Plantago lanceolata</i> L.	Plantaginaceae	Brono Achar	Leaves	Laxative, mouth diseases	The leaves are cooked as vegetable
22	<i>Plantago major</i> L.		Ustanbash	Leaves, seeds	Diarrhea, heartburn, jaundice	The leaves are cooked as vegetable for heartburn and jaundice. One teaspoon seeds are soaked in one glass water and taken to treat diarrhea.
23	<i>Polygonum dumetorum</i> L.	Polygonaceae	Barekijoshu	Leaves	Constipation	Fresh leaves are cooked and eaten
24	<i>Rumex hastatus</i> L.		Sirkonzo	Leaves	Astringent, constipation, purgative	The leaves are cooked as vegetable and taken
25	<i>Portulaca oleracea</i> L.	Portulacaceae	Pecheli	Shoots	Digestion, laxative	The shoots are cooked as vegetable to improve digestion and as laxative
26	<i>Verbascum thapsus</i> L.	Schrophulariaceae	Gordogh karo	Leaves	Wounds healing	Paste of fresh leaves is used to care wound or inflammation
27	<i>Solanum nigrum</i> L.	Solanaceae	Pirmelic	Leaves, fruits	Eye diseases, fever, cough	Fruit juice cures sore eyes while leaves are cooked and eaten to relief cough, fever.

Table-2. Ecological characteristics of medicinal weeds of wheat field of Kalash valley, Chitral

S#	Plant name	Family	Life-form	Leaf size	Phenology	Consistency class
1.	<i>Adiantum venustum</i> D. Don.	Adiantaceae	G	N	PR	I
2.	<i>Coriandrum sativum</i> L.	Apiaceae	Th	N	Rep	I
3.	<i>Artemisia brevifolia</i> Wall. Ex DC.	Asteraceae	H	L	PR	I
4.	<i>Artemisia parviflora</i> Roxb.	Asteraceae	Th	Mes	PR	I
5.	<i>Calendula arvensis</i> L.	Asteraceae	Th	Mes	Rep	III
6.	<i>Cichorium intybus</i> L.	Asteraceae	Th	Mes	Rep	III
7.	<i>Matricaria chamomilla</i> L.	Asteraceae	Th	N	Rep	IV
8	<i>Taraxicum officinale</i> L.	Asteraceae	G	Mes	Post-Rep	II
9.	<i>Lepidium sativum</i> L.	Brassicaceae	Th	N	Rep	II
10	<i>Sisymbrium irio</i> L.	Brassicaceae	Th	Mic	Post-Rep	V
11	<i>Cannabis sativa</i> L.	Cannabinaceae	Th	N	Rep	II
12	<i>Silene conoidea</i> L.	Caryophyllaceae	Th	N	Post-Rep	IV
13	<i>Chenopodium murale</i> L.	Chenopodiaceae	Th	N	Rep	II
14	<i>Chenopodium album</i> L.	Chenopodiaceae	Th	N	Rep	I
15	<i>Chenopodium foliosum</i> Asch.	Chenopodiaceae	Th	N	Rep	IV
16	<i>Convolvulus arvensis</i> L.	Convolvulaceae	Th	Mes	Rep	III
17	<i>Fumaria indica</i> (Hauskn.) H. N. Pugsley	Fumariaceae	Th	N	Rep	II
18	<i>Mentha longifolia</i> (L.) Huds	Lamiaceae	Th	N	Rep	V
19	<i>Malva neglecta</i> Wallr.	Malvaceae	Th	Mes	Rep	V
20	<i>Oxalis corniculata</i> L.	Oxalidaceae	Th	Mes	Rep	II
21	<i>Plantago lanceolata</i> L.	Plantaginaceae	Th	Mes	Rep	III
22	<i>Plantago major</i> L.	Plantaginaceae	G	Mac	Rep	IV
23	<i>Polygonum dumetorum</i> L.	Polygonaceae	Th	N	Rep	II
24	<i>Rumex hastatus</i> L.	Polygonaceae	Ch	N	Rep	III
25	<i>Portulaca oleracea</i> L.	Portulacaceae	Th	L	Rep	II
26	<i>Verbascum thapsus</i> L.	Schrophulariaceae	G	Mac	Rep	II
27	<i>Solanum nigrum</i> L.	Solanaceae	Th	Mes	Rep	III

Key: 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: PR. Pre-reproductive, Rep. Reproductive, Post-rep. Post-Reproductive.

Table-3. Life-form, Leaf-size and Phenology of weeds flora of wheat crops of Kalash valley, District Chitral, Pakistan

S #	Ecological characteristic	No. of weed species	% age
I.	Life-form classes		
1.	Therophytes	21	77.78
2.	Geophytes	04	14.81
3.	Hemicryptophytes	01	03.70
4.	Chamaephytes	01	03.70
II.	Leaf-size classes		
1.	Nanophylls	13	48.15
2.	Mesophylls	09	33.33
3.	Macrophylls	02	07.41
4.	Leptophylls	02	07.41
5.	Microphylls	01	03.70
III.	Phonological classes		
1.	Reproductive stage (Flowering)	21	77.78
2.	Post-reproductive stage (Fruiting)	03	11.11
3.	Pre-reproductive stage (Vegetative)	03	11.11
IV.	Consistency classes		
1.	I	05	18.52
2.	II	09	33.33
3.	III	06	22.22
4.	IV	04	14.81
5.	V	03	11.11

Any undesirable and unwanted plants in the crops are weeds. They are mostly allelopathic species and give tough time to crops due to their competition for resources and they also provide habitat for other harmful living organisms. All these factors can affect the growth and development of crops which reduces the per acre production of crops. Therefore, weeds must be properly identified and managed to minimize their growth in the crops which will increase crops production. Asteraceae, Chenopodiaceae, Brassicaceae, Plantaginaceae and Polygonaceae were leading families and most of the species (77.78%) are annuals. Thus proper Pre-reproductive management of these weeds can reduce weeds distribution and will increase the yield of wheat in the area. However, the present study shows that these weeds may be used as medicines in treatment of different diseases and mostly the vegetative parts (Leaves) were used. Thus, the proper management and utilization of these weed species might increase their positive aspect.

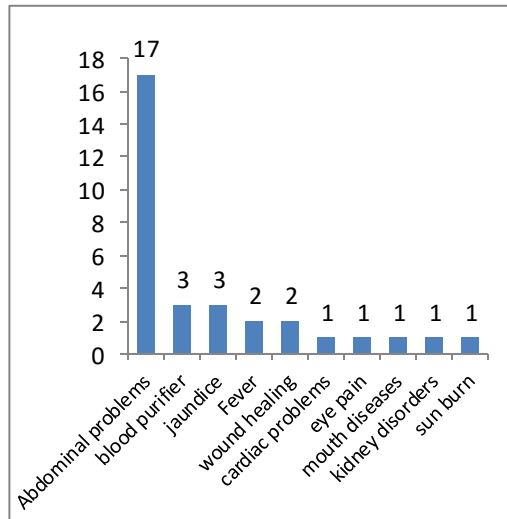


Figure 1. Leading families in respect to pecies distribution

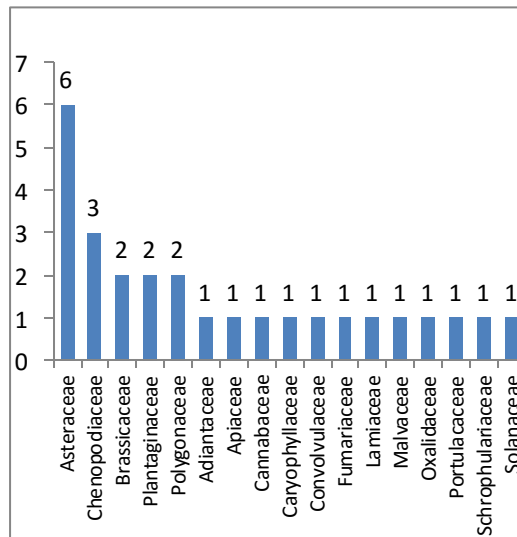


Figure 2. No. of weed species used in treatment of a disease

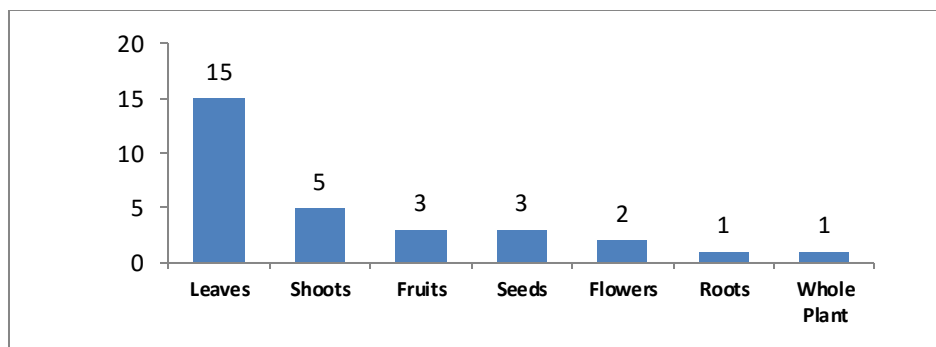


Figure 3. The number of species that's parts is used as medicine

ACKNOWLEDGEMENT

The present study is the part of Ph.D. dissertation of the first author.

REFERENCES CITED

- Ali, S.I. and Y. Nasir. 1989-1991. Flora of Pakistan. Department of Botany, University of Karachi.
- Ali, S.I. and M. Qaiser. 1993-2013. Flora of Pakistan. Department of Botany, University of Karachi.
- Anonymous, 1998. District Census Report of Chitral. PCO, Govt. of Pakistan.
- Hadi, F. and M. Ibrar. 2015. Ecology of weeds in wheat crops of Kalash valley, District Chitral, Hindukush Range, Pakistan. Pak. J. Weed Sci. Res. 21(3): 425-433.
- Hadi, F., Aziz-ur-Rahman, M. Ibrar, G. Dastagir, M. Arif, K. Naveed and M. Adnan. 2014. Weed diversity with special reference to their ethnomedicinal uses in wheat and maize at Rech valley, Hindukush Range, Chitral, Pakistan. Pak. J. Weed Sci. Res. 20(3): 335-346.
- Hamayun, M. 2003. Effects of spacing and weed free periods on the productivity of maize (*Zea mays* L.) Pak. J. Weed Sci. Res. 9 (3-4): 179-186.
- Hussain, F. 1989. Field and laboratory manual of Plant Ecology. UGC, Islamabad.
- 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, M.A., K. Ali, Z. Hussain and R.A. Afridi. 2012. Impact of maize legume intercropping on weeds and maize crop. *Pak. J. Weed Sci. Res.* 18(1): 127-136.
- Khan, R.U., S. Mehmood, S.U. Khan, A. Muhammad and Z. Hussain. 2014. Comparative study of weed species recorded in different field crops of Bannu, Khyber Pakhtunkhwa, Pakistan. *Pak. J. Weed Sci. Res.* 20(4): 489-504.
- Marwat, S.K., K. Usman, N. Khan, M.U. Khan, E.A. Khan, M.A. Khan and A. Rehman. 2013. Weed of wheat crops and their control strategies in Dera Ismail Khan District, Khyber Pakhtunkhwa, Pakistan. *Amer. J. Pl. Sci.* 4(1): 66-76.
- Mohammad, S., T.A. Cheema, Z. Bashir and R. Mehmood. 2005. Analytical characteristics of weeds of wheat crop of Tehsil Gojra, Toba Tek Singh, Pakistan. *Pak. J. Pl. Sci.* 11(1): 57-60.
- Nasir, E. and S.I. Ali. 1971-1989. *Flora of Pakistan*. PARC, Islamabad.
- Naveed, A. and F. Hussain. 2007. Weeds of wheat fields of village Gambar, District, Swat, Pakistan. *Pak. J. Plant. Sci.* 13(1): 31-35.
- Qureshi, R., A. Waheed and M. Arshad. 2009. Weed communities of wheat crop in district Toba Tek Singh, Pakistan. *Pak. J. Bot.* 41(1): 239-245.
- Raunkiaer, C. 1934. *The life forms of plants and Statistical Plant Geography*. Clarendon Press, Oxford.
- 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.
- Ullah, A. and A. Rashid. 2013. A checklist of the weeds growing in the maize crop at Mankial valley Hindukush range, Pakistan. *Pak. J. Weed Sci. Res.* 19(4): 481-492.
- Ullah, S., A. Ullah and A. Rashid. 2014. Medicinal diversity of weeds in the historical valley of Landikotal, Khyber Agency, Pakistan. *Pak. J. Weed Sci. Res.* 20(4): 531-539.