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ETHNOBOTANICAL STUDY OF KOHAT PASS (PAKISTAN)

SHEHLA SHINWARI[1], RAHMATULLAH QURESHI[2] AND ELIAS BAYDOUN[3]

[1]*Department of Plant Sciences, Quaid-i-Azam University, Islamabad*
[2]*Department of Botany, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan*
[3]*Department of Biology, American University of Beirut, Beirut, Lebanon*

Abstract

The purpose of this study was to collect information on how people of a particular culture and region make use of indigenous plants. For this purpose, an ethnobotanical survey was conducted in Kohat Pass, Khyber Pakhtunkhwa (KPK), Pakistan. The study revealed that there were 60 plants belonging to 49 genera and 30 families which are being used to overcome six use categories by the natives. Most of the species (90%) were used as cruse medicine, followed by food (31.7%) and fodder & fuel (25%). An ethnobotanical inventory along with their local names is provided in this communication.

Introduction

Ethnobotany is the scientific study of the relationships between people and plants. The term "Ethnobotany" was coined in 1896 by the US botanist John Harshberger, though the history of ethnobotany began long before that. The term ethnobotany thus deals with the dynamic relationships and interactions among human beings, their cultural values, and plants. Human interactions with plants vary due to their uses, relative importance and varying social, cultural and ethnic factors (Pahnwar & Abro, 2007). Ethnobotanical studies generally identify locally important plant species, especially for the discovery of crude drugs. Ethnobotanical documentation of traditional knowledge has identified many important plant sources of modern-day drugs.

Medicinal plants are also important for the livelihoods of poor communities all over the world. There are about 258,650 species of higher plants (Shinwari, 2010) of which more than 10 percent are used medicinally (Gilani & Atta-ur-Rahman, 2005).The global market for medicinal and aromatic plants was $62 billion in 2002 and may reach $5 trillion by 2050 (Shinwari, 2010). A major reason why plants are used as medicines is that medicinal plants contain synergistic and/or side-effect neutralizing combinations of active compounds (Gilani & Atta-ur-Rahman, 2005).

Pakistan has more than 6,000 species of higher plants, 12% of which are used medicinally (Shinwari, 2011). Both human and animal ailments are treated through the use of medicinal herbs. In most instances, certain plant species are considered specific for a particular illness, but occasionally plants have multiple usages. Women, followed by children, are the principal collectors of medicinal plants. Due to over-collection, however, several species have gone extinct in the Hindukush-Himalayan regions (Shinwari, 2010).

Arshad & Akram (1999) reported 41 medicinal species from the area around the University of Arid Agriculture, Rawalpindi. Asteraceae, Euphorbiaceae, Malvaceae, Solanaceae, Amaranthaceae and Papilionaceae were the most important families found.

There are a number of studies that were conducted in the remote areas of Pakistan, and our studies provide additional information on ethnobotanically important species. For example, Shinwari *et al.*, (2002) studied the current status of medicinal plants of Bar and Shinaki Valleys, Northern Area of Pakistan. They found that 22% of the plants were used by the locals for gastro-intestinal troubles, followed by 11% of plants used for bronchial and pulmonary ailments. Shinwari *et al.*, (2003) surveyed the Astore valley (Gilgit) and collected information on plant diversity, the potential income to local people from plant harvesting, and monitored the harvesting levels of medicinal plants. Of 34 medicinal plants, five were found to be endangered, 18 vulnerable, and 19 rare. Shinwari *et al.*, (2006) published "Pictorial Guide of Medicinal Plants of Pakistan", which listed more than 500 species of flowering plants. There are various papers published on the topic from various region of the country (Hussain *et al.*, 2008; Ilahi. 2008; Qureshi & Bhatti, 2008; 2009; Qureshi *et al.*, 2009; Abbasi *et al.*, 2010; Qureshi *et al.*, 2010; 2011; Khan *et al.*, 2011).

Kohat Pass lies to the north of city which is rich in flowering plants that are collected by local people for use in treating various diseases. Local people know that some preparations of milk thistle may contain iron and should therefore be avoided by people with liver diseases associated with iron overload (Shinwari *et al.*, 2006). Previously no information is available reporting documentation of traditional uses of native plant. Present study was designed to record ethnobotanical uses of plants of Kohat Pass.

Materials and Methods

Study area: Kohat is a medium sized town in Khyber Pakhtunkhwa of Pakistan. It is located at 33°35'13 N, 71°26'29 E, with an altitude of 489 m, and is the capital of the Kohat District. Kohat Division has three distinct ecological zones. To the west and northwest, in Parachina and the Orakzai and Federally Administered Tribal Areas (FATA), winters are severely cold, summers are mild, and peaks remain snow-covered. In the south lies a vast sandy terrain adjoining mountains with stony soil; typical vegetation includes *Zizyphus* spp. and other xerophytes. Summer temperatures usually shoot above 50^{o}C and winters are mild. The central Kohat region exhibits weather in between the above two extremes.

Specimen collection, preservation and identification: The area was visited and plant specimens were collected from October, 2010 to September, 2011. These were pressed, dried and mounted on herbarium sheets and identified with the help of floristic literature (Nasir & Ali, 1970-1989; Ali & Nasir, 1990-1992; Ali & Qaiser, 1992-2009). The correctly identified specimens were deposited in the herbarium of Pir Mehr Ali Shah (PMAS), Arid Agriculture University, Rawalpindi.

Interviews with locals: We interviewed about 100 individuals (Table 1) through employing questionnaires and interviews. Interviewees were selected from among the locals who had knowledge about the plants or were dependent on the local resources for survival. We collected data on various aspects of ethnobotanical usage, e.g. local name; parts used and use categories of individual species.

Table 1. Age groups of the interviewees during the study.

Age group	Percentage of interviewees
20-30	20
30-45	35
45-60	27
60+	18
Total	**100**

Results

A total of 60 plants belonging to 49 genera and 30 families are recorded from the study area, being used traditionally for various daily life requirements (Table 2). The highest number of species (90%) was used as medicinal purpose. It was followed by food (31.7%), fodder & fuel (25%) and ornamental (21.7%) (Table 3). With reference to plant parts use, leaves were highly utilized part (90%) for fulfilling various daily life requirements, followed by stem (60%), root (58.30%) and flower (35%), while rest of the parts were less used.

Discussion

Since the beginning of civilization, people have used for accomplishing various daily life requirements. One of the objectives of this study was to record the indigenous knowledge about plants in the Kohat District, which has a great wealth of medicinal plants. A total of 60 plants (Table 2) belonging to 49 genera and 30 families, were collected and their local traditional uses were recorded. With reference to medicinal uses, people in the local communities, especially the elderly who use these plants heavily, believe them to have no side effects.

The observations from the local communities were that the richness and diversity of medicinal plants was decreasing at the same time that the percentage of plants used as medicine was steadily increased with increasing awareness in District Kohat. The interview data indicated that the number of people with sound knowledge of herbal drugs is declining because of a shift to Western medicines. It is feared that knowledge of traditional uses of plants may be lost. It is therefore imperative to study and record uses of plants in a scientific manner. Such studies may also provide information to biochemists and pharmacologists for screening of individual species and for rapid assessment of phytochemical constituents. Local people use plants for medication, food, fodder for cattle, and even as cosmetics. The number of women using allopathic medicines is negligible because of their dependence on medicines from local plants. These plants are also a source of interaction between the women and the natural resources of the area. It is very important that the precious ethnobotanical knowledge about the plants (which is disappearing very fast) should be transferred to the younger generation.

Table 3. Ethnobotanical uses of surveyed plants.

Ethnobotanical use	%
Fuel	25
Fodder	25
Medicine	90
Ornamental	21.7
Food	31.7

Table 4. Part of plant used in different purposes.

Parts of plants used	%
Bark	6.7*
Leaves	90.0
Stem	60.0
Root	58.3
Seed	20.0
Flower	35.0
Fruit	20.0
Latex /Juice	1.7
Extracted Oil	6.7

*E.g. 6.7% of the plants we surveyed had bark used for medicinal purposes

Table 2. Parts of plant used in different purposes.

No.	Family name	Botanical name	Local name	Habit	Part used									Ethnobotanical use						
					Le	St	R	Fl	Se	Fr	O	B	L	Fo	Fu	Me	O	E	P	M
1.	Acanthaceae	*Barleria cristata* L.	Tadrelu	Herb	+	-	+	-	-	-	-	-	-	-	-	+	-	+	-	-
		Dicliptera roxburghiana Nees	Makhao	Herb	+	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-
2.	Amaranthaceae	*Achyranthes aspera* L.	Gishkay/Puthkanda	Herb	+	+	+	+	+	+	-	-	-	+	+	+	-	-	-	-
3.	Apocyanaceae	*Nerium oleander* L.	Ghanderay/Kanair	Shrub	+	-	-	+	-	-	-	-	-	-	-	+	+	-	-	-
4.	Araliaceae	*Hedera nepalensis* K.Koch	Zalai/Palul	Shrub	+	-	-	-	-	+	-	-	-	+	-	+	+	-	-	-
5.	Asclepiadaceae	*Calotropis procera* R.Br.	Spulmaey/Ak	Shrub	+	-	+	+	-	-	-	-	+	-	+	+	-	-	-	-
6.	Asteraceae	*Ageratum houstonianum* Mill.	Osary/Neeli boti	Herb	+	-	+	-	-	-	-	-	-	+	-	+	-	-	-	-
		Artemisia brevifolia Wall.	Jaukay/Afsateen	Herb	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-
		Carthamus oxyacantha M.Bieb.	Konzala/ Pholi	Herb	-	-	-	-	+	-	-	-	-	-	+	+	-	-	-	-
		Chrysanthemum leucanthemum L.	Chitti pulari	Herb	+	-	-	+	-	-	-	-	-	-	-	+	+	+	-	+
		Conyza bonariensis (L.) Cronquist	Gidarwar	Herb	+	+	+	+	-	-	-	-	-	-	-	+	-	-	-	+
		C. canadensis (L.) Cronquist	Malooch/Paleet	Herb	+	+	+	-	-	-	-	-	-	+	-	+	-	-	-	-
		Parthenium hysterophorus L.	Chatak chandni	Herb	+	-	+	+	-	-	-	-	-	-	-	+	+	-	+	+
		Sonchus asper (L.) Hill	Spingul/Garwa	Herb	+	+	+	+	-	-	-	-	-	-	-	+	-	-	-	-
		S. oleraceous L.	Dodak	Herb	+	+	+	+	-	-	-	-	-	-	-	+	-	+	-	-
		Tagetes minuta L.	Ban hanjari	Herb	+	+	+	+	-	-	+	-	-	-	-	+	-	+	-	-
		T. patula L.	Genda phool	Herb	+	+	+	+	-	-	+	-	-	-	-	+	+	-	-	+
7.	Boraginaceae	*Cynoglossum lanceolatum* Forssk.	Pachy	Herb	+	+	+	-	-	-	-	-	-	+	-	+	-	+	-	-
		Trichodesma incanum Bunge	NA	Herb	+	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-
		T. indicum (L.) Sm.	Chota kulfa	Herb	+	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-
8.	Brassicaceae	*Lepidium sativum* L.	Halim	Herb	+	+	+	+	+	+	-	-	-	+	-	+	-	+	-	-
9.	Cannabinaceae	*Cannabis sativa* L.	Bung/Bhang	Herb	+	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-
10.	Chenopodiaceae	*Chenopodiun album* L.	Samaray/Bathu	Herb	+	+	+	+	-	-	-	-	-	+	-	+	-	+	-	-
11.	Celastraceae	*Maytenus royleana* M.A.Rau	Pataki	Shrub	+	+	-	-	+	-	-	-	-	+	-	+	-	-	-	-
12.	Convulvulaceae	*Convolvulus microphyllus* Sieber	Shankpuspi	Shrub	+	+	+	+	-	-	-	-	-	-	-	+	-	-	-	-
13.	Cyperaceae	*Cyperus niveus* Retz.	NA	Herb	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-
14.	Euphorbiaceae	*Ricinus communis* L.	Herhanda/Arind	Shrub	+	-	-	-	+	-	-	-	-	-	-	+	-	-	+	+
15.	Lamiaceae	*Anisomeles indica* Kuntze	Catmint	Shrub	+	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-
		Leucas capitata Desf.	Galloda/Chatra	Herb	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
		L. cephalotes (Roth) Spreng.	Gomma	Herb	+	+	+	+	-	-	-	-	-	-	-	+	-	+	-	-
		Mentha longifolia Huds.	Zangali nana/jungli pudina	Herb	+	+	+	+	-	-	-	-	-	-	-	+	-	+	-	-
		Ocimum basilicum L.	Kashmalay/Naizbow	Shrub	+	+	-	-	-	-	-	-	-	+	-	+	+	+	-	-

Table 2. (Cont'd.).

No.	Family name	Botanical name	Local name	Habit	Part used									Ethnobotanical use						
					Le	St	R	Fl	Se	Fr	O	B	L	Fo	Fu	Me	O	E	P	M
16.	Liliaceae	*Aspagarus gracilis* Royle	Lachgawa/Allipali	Herb	+	+	-	-	-	-	-	-	-	-	-	+	+	+	-	+
17.	Menispermaceae	*Cissampelos pareira* L.	Ghori sumbi	Twiner	+	+	-	-	-	-	-	-	-	+	-	+	-	-	-	-
		Tinospora cordifolia Miers	Giloe	Twiner	+	+	+	+	-	-	-	-	-	-	-	+	-	-	-	-
		T. malabarica Miers	Satilo	Twiner	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-
18.	Mimosaceae	*Mimosa himalayana* Gamble	Shiahkanta	Tree	+	+	+	+	-	-	-	+	-	-	+	+	-	-	-	-
19.	Myrtaceae	*Callistemon citrinus* Stapf		Tree	+	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-
		Eucalyptus globulus Labill.	Lachi	Tree	+	-	-	-	-	-	+	+	-	-	+	+	-	+	-	+
20.	Oleaceae	*Nyctanthes arbor-tristis* L.	Parijat	Shrub	+	-	-	+	+	-	-	-	-	+		+	-	-	-	-
21.	Papilionaceae	*Lepedeza juncea* (L.f.) Pers.	Oormary	Herb	+	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-
		Rhynhcosia minima (L.) DC.	Hulhul	Twiner	+	+	-	-	-	-	-	-	-	+	-	+	-	+	-	+
		Trifolium repens L.	Shoutal/Trepatra	Herb	+	+	+	+	-	-	-	-	-	+	-	-	+	-	-	-
22.	Poaceae	*Eragrotis pilosa* (L.) P.Beauv.	NA	Herb	+	+	+	+	-	-	-	-	-	-	-	+	-	-	-	-
23.	Polygonaceae	*Polygonum plebeium* R.Br.	Dremak	Herb	+	+	+	+	-	-	-	-	-	-	-	+	-	+	-	-
		Rumex hastatus D.Don.	Tarookay/ Hamaz	Shrub	+	+	-	-	-	-	-	-	-	-	+	-	+	-	+	+
24.	Proteaceae	*Grevillea robusta* A.Cunn.	NA	Tree	-	-	-	-	-	-	-	+	-	+	+	+	-	+	-	+
25.	Rhamnaceae	*Ziziphus nummularia* (Burm.f.) Wight & Arn.	Kurkanda/Ber	Herb	+	+	+	+	+	+	-	-	-	-	-	+	-	-	-	-
26.	Rosaceae	*Duchesnea indica* (Andrews) Focke	Dazamake toot/jungle toot	Herb	-	-	+	-	-	+	-	-	-	-	-	+	-	+	-	-
27.	Rutaceae	*Murraya paniculata* (L.) Jack	Kamini	Shrub	+	+	+	+	+	+	-	-	-	-	-	+	+	+	-	+
28.	Solanaceae	*Cestrum nocturnum* L.	Rat ki rani	Shrub	+	-	-	+	-	-	-	-	-	-	-	+	-	-	+	-
		Datura innoxia Mill.	Mangaz/Dhatura	Herb	+	-	-	-	-	+	-	-	-	-	-	+	-	-	-	+
		Solanum americanum Mill.	Makoy	Herb	+	+	+	+	+	+	-	-	-	-		+	-	-	-	-
		S. incanum L.	Asind	Herb	+	+	+	+	+	+	-	-	-	-	-	+	-	-	-	-
		S. surattense Burm.f.	Manraghonay/Kandiari	Herb	+	+	+	+	+	+	-	-	-	-	-	-	+	-	-	-
29.	Verbenaceae	*Citharexylum spinosum* L.	NA	Tree	+	-	+	-	-	-	-	+	-	-	-	+	-	-	-	-
		Lantana camara L.	Panch phul	Shrub	+	+	+	+	+	+	-	-	-	-	-	+	-	-	-	+
		Verbena officinalis L.	Shamakay	Herb	+	+	+	+	-	-	-	-	-	-	-	-	+	-	-	-
		V. tenuisecta Briq.	NA	Herb	+	+	+	+	-	-	-	-	-	-	-	+	-	-	-	-
30.	Zygopyllaceae	*Tribulus terrestris* L.	Markondai	Herb	-	-	+	-	-	+	-	-	-	-	-	+	-	-	-	-

Part used = Le = Leaf; St = Stem; R = Root; Fl = Flower; Se = Seed' Fr = Fruit; O = Oil; B = Bark; L = Latex

Ethnobotanical use = Fo = Fodder; Fu= Fuel; Me = Medicinal; O = Ornamental; E = Edible; P = Poisonous; M = Marketing

References

Abbasi, A.M., M.A. Khan, M. Ahmad, R. Qureshi, M. Arshad, S. Jahan, M. Zafar and S. Sultana. 2010. Ethnobotanical study of wound healing herbs among the tribal communities in Northern Himalaya Ranges District Abbottabad, Pakistan. *Pak. J. Bot.,* 42(6): 2777-2782.

Ali, S.I. and M. Qaiser. 1992-2009. Flora of Pakistan. No. 194-217. Department of Botany, University of Karachi, Karachi.

Ali, S.I. and Y.J. Nasir. 1990-1992. Flora of Pakistan. No. 191-193. Department of Botany, University of Karachi, Karachi.

Arshad, M. and S. Akram. 1999. Medicinal Plants of University of Arid Agriculture, Rawalpindi. *Hamd. Med.,* 42: 46-49.

Gilani, A.H. and Atta-ur-Rahman. 2005. Trends in ethnopharmacology. *J. Ethnopharmacol*., 100: 43-49.

Hussain, K., A. Shahzad and S. Zia-ul-Husnain. 2008. An Ethnobotanical Survey of Important Wild Medicinal Plants of Hattar District Haripur, Pakistan. Ethnobotanical Leaflets.

Ilahi, I. 2008. Ethnobotanical problems associated with the regeneration of herbals in the Kohat Region. *Pak. J. Bot.,* 40(4): 1743-1753.

Khan, B., A. Abdukadir, R. Qureshi and G. Mustafa. 2011. Medicinal uses of plants by the inhabitants of Khunjerab National Park, Gilgit, Pakistan. *Pak. J. Bot*., 43(5): 2301-2310.

Nasir, E. and S.I. Ali. (Eds.) 1970-89. Flora of West Pakistan. No. 1-190. Department of Botany, University of Karachi, Karachi.

Panhwar, A.Q. and H. Abro. 2007. Ethnobotanical studies of Mahal Kohistan (Khirthar National Park). *Pak. J. Bot.,* 39(7): 2301-2315.

Qureshi, R. and G.R. Bhatti. 2008. Ethnobotany of plants used by the Thari people of Nara Desert, Pakistan. *Fitoterapia* 79: 468-473.

Qureshi, R. and G.R. Bhatti. 2009. Folklore uses Amaranthaceae family of Nara Desert, Sindh, Pakistan. *Pak.J.Bot.,* 41(4): 1565-1572.

Qureshi, R. M. Maqsood, M. Arshad and A.K. Chaudhry. 2011. Ethnomedicinal uses of plants by the people of Kadhi areas of Khushab, Punjab, Pakistan. *Pak. J. Bot.,* 43(1): 121-133.

Qureshi, R., A. Waheed, M. Arshad and Tallat Umbreen. 2009. Medico-Ethnobotany of Tehsil Chakwal. *Pak. J. Bot*., 41(2): 529-538.

Qureshi, R., G.R. Bhatti and R.A. Memon. 2010. Ethnomedicinal uses of herbs from Nara Desert, Pakistan. *Pak. J. Bot.,* 42(2): 839-851.

Shinwari, Z.K. 2010. Medicinal plants research in Pakistan. *Journ. Med. Pl. Res.,* 4(3): 161-176.

Shinwari, Z.K. 2011. International Workshop on "Medicinal Plants: Conservation & Sustainable Use. http://www.molecular-systematics.org/index.php?option=com_content&view=article&id=31:international-workshop-on-medicinal-plants-conservation-a-sustainable-use-&catid=3:news&Itemid=25.

Shinwari, Z.K., A.A. Khan and T. Nakaike. 2003. Medicinal and other useful plants of district Swat-Pakistan. Published by WWF-Pakistan.

Shinwari, Z.K., M. Rehman, T. Watanabe and Y. Yoshikawa. 2006. Medicinal and Aromatic Plants of Pakistan (A Pictorial Guide). Kohat University of Science and Technology, Kohat, Pakistan. pp. 492.

Shinwari, Z.K., S.S. Gilani and M. Shoukat. 2002. Ethnobotanical resources and implications for curriculum. In: Proceedings of workshop on curriculum development in applied ethnobotany (Eds.): Z.K. Shinwari, A. Hamilton and A.A. Khan. May, 2-4, 2002, Nathiagali, Abbotabad. WWF-Pakistan. pp. 21-34.

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