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ETHNOBOTANICAL ASSESSMENT OF THE MEDICINAL FLORA OF KHYBER AGENCY, PAKISTAN

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ABSTRACT

The valley of Khyber Agency is blessed with a diverse and rich flora. This ethnobotanical study in the said area provides the indigenous information for the traditionally used native medicinal plants that are cheaper and locally accessible to the inhabitants of the locality. The present study was carried out to document and preserve the indigenous knowledge of native community about the local flora of Khyber Agency, Pakistan during spring, summer, autumn and winter seasons of 2014-15. Data were collected from the local farmers (both males and fermales) and herbalists with the help of a comprehensive questionnaire. Interviews were conducted from 130 respondents about the ethnobotanical uses of medicinal plants of the locality. A total of 30 local plants were documented to be used by the local people. These plants are distributed in 23 different plant families and were used for various ethnobotanical purposes i.e. medicine, timber wood, construction, fodder and making different tools as well. Among these families, Papilionaceae and Solanaceae were represented by three species (10%) each, followed by Apocynaceae, Asteraceae, Rhammaceae (10%), Umbeliferaceae (5%) and Brassicaceae (40%) with two species (6.6%) each while the remaining families i.e. Amaranthaceae, Arecaceae, Asclepiadaceae, Cannabaceae, Capparidaceae, Chenopodiaceae, Convovulaceae, Euphorbiaceae, Fumariaceae, Malvaceae, Meliaceae, Mimosaceae, Moraceae, Oxalidaceae and Poaceae by one (3.33%) species. The respondents used different plants parts for a variety of ethonobotianical uses. The plant parts included whole plants (used by 63% of the respondents) followed by leaves (22%), seeds (9%), fruits and roots each used by only 3%of

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the interviewed community. Highest number of the plant species was used for just the stomach disorders and antipyretics. In conclusion, the target area is solely depended on medicinal plants for the treatment of the ailments. Moreover, this ethnobotanical study was important to preserve the precious indigenous knowledge of the aged people before it is lost for ever.

Key words: Ethnobotanical study, indigenous knowledge, Khyber agency, medicinal plants, preservation.

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INTRODUCTION

Khyber agency lies on $33^0$45' to $34^0$20' north latitudes and $70^0$27' to $71^0$32' east longitudes. The total area of Khyber agency is 2576 km^2. The district Peshawar is situated towards its east, Khuram agency towards west, Afghanistan, Muhmand agency towards north and Kohat is located to its south (Ullah *et al*., 2013). Due to different climatic zones, Pakistan has very rich flora (Haq *et al*., 2010). Ethnobotany is the study of humans, plants and their relationship which may be useful and harmful as well. In Pakistan, about 10% of the vascular plants are used for medicinal values. Several ethnobotanical surveys have been conducted in many sites as well as in different parts of the Khyber Pakhtunkhwa (KP) province (Waheed *et al*., 2013; Hassan *et al*., 2015; Begum *et al*., 2005; Ibrar *et al*., 2007; Sher and Hussain, 2009; Hussain *et al*., 2006).

The local people traditional use the medicinal plants for different ailments and remedies (Waheed *et al*., 2013). Similarly, the local community of the target area has potential knowledge about the uses of plants. They prioritized the use of medicinal flora because of the accessibility and cheapness. The main purpose of the present study was to collect and compile the traditional information of Khyber agency, Pakistan before the knowledge gets vanished with the death of the old people, as the new generation has no interest in the new technological era.

In the previous investigation at Dir (Lower), the collection of 40 important plant species was used as medicinal, fodder, wood, bee keeping, vegetable, shelter, timber, agricultural tools and ornamental purposes (Shuaib *et al*., 2014). Then, similar findings were obtained in Dir (Upper) district by Khan *et al*. (2016), who explained 64 different wild plant species in the area.

Figure 1. Map of the Khyber agency, Pakistan.

MATERIALS AND METHODS

Field activities were conducted during 2014-15 to record the ethnobotanical data of the important species. The information about the survey area was collected before starting the research work. Questionnaires containing various questions about medicinal plants were designed. Thus, the ethnomedicinal knowledge was obtained from various people of different age and sex, however priority was given to aged experienced people and hakims (Herbalists).

Data were collected during all the summer, autumn, spring and winter seasons. In light of the 130 respondents interviewed, the ethnobotanically used medicinal plant species were collected, dried and pasted on herbarium sheets. The identification and nomenclature of the collected plant specimens was carried out with the help of the available literature and methods describe by Nasir and Ali (1978-2007) in details. The voucher specimens were deposited in the herbarium of the Department of Botany of the Islamia College Peshawar, Pakistan for future references.

RESULTS AND DISCUSSION

During this ethnomedicinal survey, a total of 30 plant species belonging to 23 various families were documented and an inventory was made (Fig. 4). Among these species, whole plants were used most frequently by 63% of the respondents for medicinal uses, followed by 22% of the respondents who used leaves and 9% of them used seeds

(Fig. 2). Thus, out of the 30 plant species, 21 were reported to be used for medicinal purpose, followed by 5 plant species each used for fodder, fruiting and fuel purposes (Table-2). Hassan *et al*. (2015) reported similar results which confirmed the present findings. The local people utilized these plant species in their daily lives and also these were the main sources of their economy and health care. Many human disorders were treated by the local hakeems (herbalists) including stomach disorders, chest problems and so on.

The research area is rich in medicinal flora (Table-1). The findings were in analogy with the report of Waheed *et al*. (2013). The local people of the target area frequently used only the herbs for their various ethnomedicinal and medicinal uses. However, woody plants were also used for fuel, construction, protection and ailments curing as well. The results also indicated that stomach and chest disorders were common in the research area for which various plant species were used by the hakeems (Herbalists).

Most of the medicinal flora reported has been found to treat more than one disorder. For instance, *Fumaria indica* is utilized against stomach disorder, eye infection and also in fever. *Solanum suretense* is used as expectorant and for chest problem as well. Beside these plants, *Coriandrum sativum* and *Foeniculum vulgare* were used frequently for chest and stomach problems. Hassan *et al*. (2015) also reported different plant species used to treat more than one disorder similar to the findings in this instant research exploration. *Ziziphus jujube* honey is the most expensive and famous among the people of the target area due to its taste and ethnomedicinal value. A similar report of Waheed *et al*. (2013) showed the importance of *Ziziphus* species. *Capparis desidua*, *Acacia modesta*, *Zizphus jujubea* are also utilized by local people for fuel and tools making purpose.

Hassan *et al*. (2015) reported that cutting and over grazing are the main causes of loss of plant diversity similar to the present findings. Ibrar *et al.* (2007) also reported ethnobotanical study of district Shangla where the findings are analogous to the findings over here.

The plants diversity in the target area is under threat from overgrazing, over-exploitation and excessive collection of wood for fuel. The cows, buffalos, sheep and goats are the common grazers in the research area which caused considerable damage to the medicinal flora of the area. The plants which were used as fodder include *Cynodon dactylon, Brassica compestris, Chenopodium murale.* The plant species like *Capparis desidua*, *Acacia modesta*, *Ziziphus jujuba, Melia azedarach* and *Dalbergia sisso* are utilized by the local people as fuel. The results of Khan *et al*. (2003), Ibrar *et al*. (2007) and Shuaib *et al*. (2015) were in similarity with the present findings.

Thus, the people of the study area were much depended on native flora for their basic needs including fuel, medicine and animal fodder. The cutting of medicinal flora will ultimately cause the deterioration in diversity that may eventually lead to extinction. People were unaware of the proper collection and harvesting methods of the plants. Therefore, they must be trained for the judicious cutting and collection of the medicinal herbs. Some trees like *Capparis desidua*, *Acacia modesta*, *Ziziphus jujube* were also cut for their multipurpose usage. Overgrazing is another massive threat to the flora of the reported area. Immediate precautionary measures are needed for conservation of endangered plant species.

CONCLUSION

The local area of Khyber agency is rich in medicinal plants that are used for treating different diseases instead of using imported allopathic medicine. The important plant species are decreasing day by day due to deforestation and some species are becoming extinct in the near future. Urbanization is rapidly increasing and human needs are increasing accordingly with the population pressure. So the ratio of these precious plants is also decreasing for the last several years. The majority of people in the locality are ignorant of the proper methods of collection and mode of administration of these medicinal plants. So, the government and NGOs are needed to arrange seminars and workshops to make the local inhabitants aware of importance of these medicinal plants, the proper methods of collection, preservation, administration, conservation and uses of these plant species. The documentation of the indigenous knowledge about these species is also needed for utilization in future. There is dire need to adapt horticulture in the area and to impart the knowledge of planting to the local communities. This will help in sustainable use of the medicinal flora for future generations.

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Table-1. Different categories of the ethnobotanical uses of the reported species with their number and percentage

S.No.	Ethnobotanical features	No of species	Percentage
1.	Ethno medicinal plant species	20	66.6
2.	Fodder plant species	5	16.5
3.	Fencing species	5	16.5
4.	Fruiting plant species	5	16.5
5.	Fuel plant species	5	16.5
6.	Furniture making species	3	10.0
7.	Condiment species	2	6.7
8.	Poisonous species	1	3.3
9.	Ornamental species	1	3.3

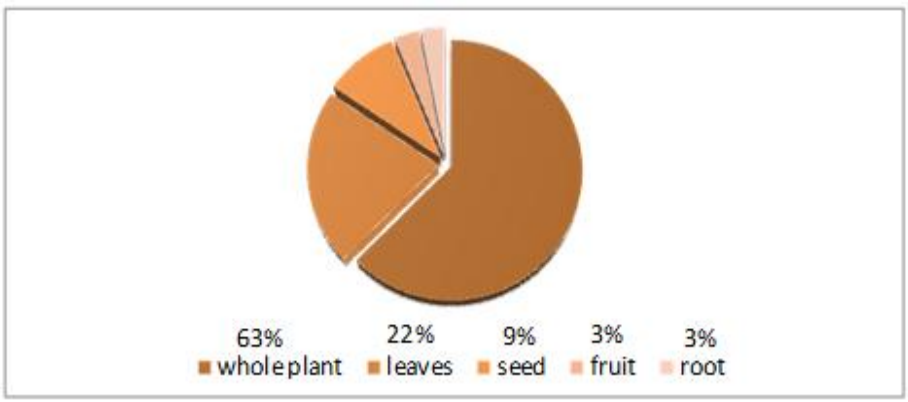

Figure 2. Percent use of plant parts in Khyber agency, Pakistan

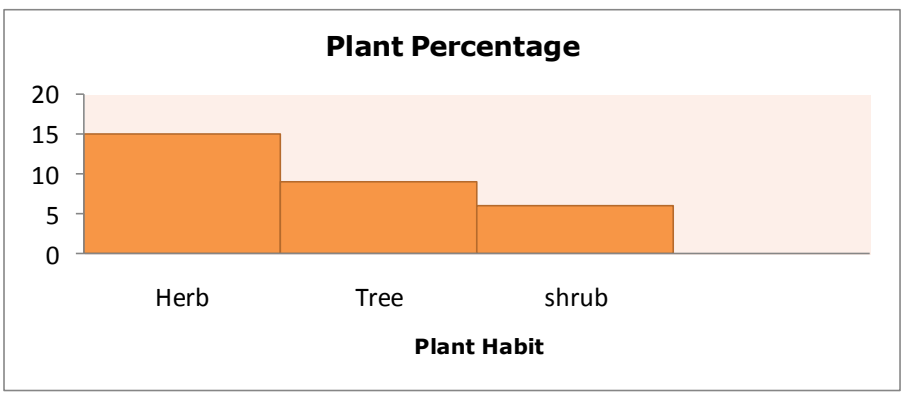

Figure 3. Habit of medicinal plants in Khyber agency, Pakistan

Table-2. Checklist of plant species of Khyber Agency, Pakistan for their ethnobotanical and medicinal uses

S.No.	Family name	Botanical Name	Local name	Habit	Part used	Ethnobotanical uses
1.	Amaranthaceae	*Amaranathus viridis* Linn.	Arakhy	Herb	Leave	It is use for gastro intestinal problem and fodder as well
2.	Apocynaceae	*Nerium olender* Griff.	Gandara	Shrub	Whole plant	Use for ornamental purpose
3.		*Rhazya stricta* Dcne	Unknown	Shrub	Roots and leaves	The extracts of leave are used for toothache and for anti-cancer.
4.	Arecaceae	*Phoenix dactylifera* L.	Kajora	Tree	Whole plant	Its fruit is very tasty and laxative. Ropes are made of from its leave
5.	Asclepiadaceae	*Calotropis procera* R.Brown.	Spulmay	Shrub	Whole plant	It is used as anthelmintic and expectorant. Their flowers were used for tumor.
6.	Asteraceae	*Calendula arvensis* L.	Zirguly	Herb	Leave	Leave are used in digestive disorder usually in spleen enlargement
7.		*Parthenium hysterophorus* Linn.	Banga	Herb	Leave and branches	It is used for urine infection, fever and heart problem.
8.	Brassicaceae	*Brassica compestris* L.	Zyarsharsham	Shrub	Whole plant	It is used as fodder and vegetable
9.		*Eruca sativa* Mill.	Sharshamy	Herb	Whole plant	Oil obtained from seeds, which is used for cooking and as anti scabic. Used as fodder and fuel.
10.	Cannabaceae	*Cannabis sativa* L.	Bhang		Whole plant	It is used as chars, diuretic and anodyne
11.	Capparidaceae	*Cappris deciduas* Forssk.	Kirra	Tree	Whole plant	Fruit used for eating, in making jams. Wood used in tool making
12.	Chenopodiaceae	*Chenopodium murale* L.	Sarmy	Herb	Leave	Used as fodder
13.	Convolvulaceae	*Convolvulus arvensis* L.	Perwata	Herb	Whole plant	It is used in skin disease and in chest infection. Used as fodder.
14.	Euphorbiaceae	*Euphorbia helioscopia* L.	Gandabotay	Herb	Whole plant	Plant extract used for antipyretic.
15.	Fumariaceae	*Fumaria indica* Linn.	Shshtry	Herb	Whole plant	It is useful in stomach disorder, eye infection and in fever
16.	Malvaceae	*Malva neglecta* Wall.		Herb	Whole plant	Used as fodder and in cooking.
17.	Meliaceae	*Melia azedarach* L.	Bakyana	Tree	Leave and seed	Plant used as fuel and for shelter. Leaves used as antiseptic and seeds used in blood disorders.

S.No.	Family name	Botanical Name	Local name	Habit	Part used	Ethnobotanical uses
18.	Mimosaceae	*Acacia modesta* Wall.	Palosa	Tree	Whole plant	Leaves used as cooling agent. Bark used as analgesic. Also used as fuel and for shelter.
19.	Moraceae	*Morus nigra* L.	Toot	Tree	Fruit and seed	Fruit is eaten wood is used as fuel
20.	Oxalidaceae	*Oxalis corniculata* L.	Trawaky	Herb	Whole plant	Used in stomach disorder and Cooling agent
21.	Papilionaceae	*Albizia lebback* L.	Sreekh	Tree	Whole plant	It is used as fuel and in making furniture
22.		*Dalbergia sisso* Roxb.	Shawa	Tree	Whole plant	Used as fuel and for shelter. Used also in making agriculture tools
23.		*Medicago sativa* L.	Peshteray	Herb	Whole plant	It is used as vegetable and fodder. Seed are used for digestive disorder and for pain
24.	Poaceae	*Cynodon dactylon* (L.) Peris.	Kabal	Herb	Whole plant	Plant is used as food and for ornamental purpose
25.	Rhamnaceae	*Ziziphus jujube* Mill.	Bera	Tree	Whole plant	Fruit is used for eating. Plant is used for shelter and for fuel. A honey bee species
26.		*Ziziphus nummularia* (Burm.f).	Karkana	Tree	Whole plant	Fruit is used for eating and digestive disorder. Used as fuel, shelter and in furniture.
27.	Solanaceae	*Solanum suretenses* Burn.	Azghaka	Herb	Leaves and roots	Used as expectorant and in cough. It is also used for chest problem.
28.		*Withania coagulans* Dunal.		Shrub	Whole plant	Fruit is used for stomach disorder
29.		*Whithania somnifera* (L.) Dunall.	Kotilal	Shrub	Whole plant	Fruit is used for abdominal pain.
30.	Umbeliferaceae	*Coriandrum sativum* L.	Dhanya	Herb	Whole plant	It is used as condiments used in digestive disorder. Used for cough and dysentery.
31		*Foeniculum vulgare* Mill.	Kaga	Herb	Seeds	Seeds used in digestive disorder and as condiments

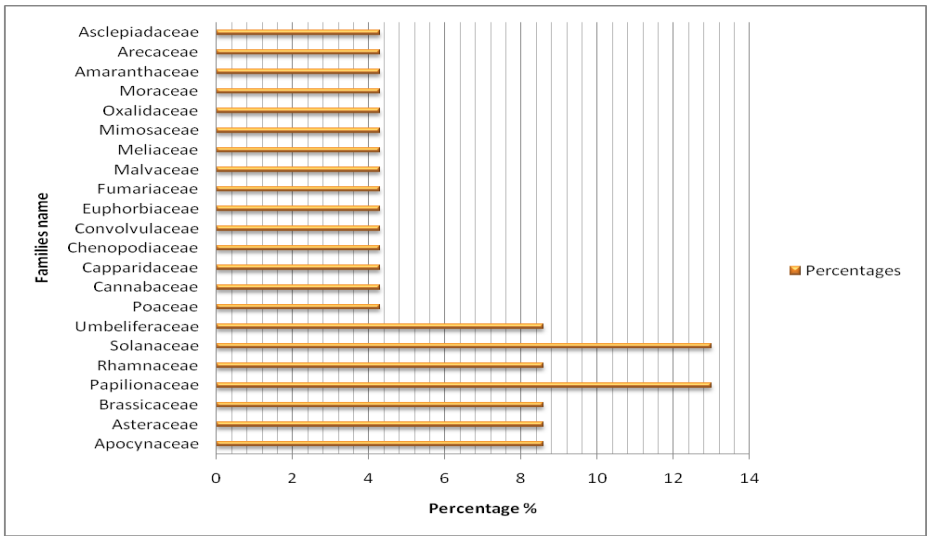

Figure 4. Family names and percentage of the local flora of Khyber agency, Pakistan

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