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Full Length Research Paper

Ethnobotanical importance of halophytes of Noshpho salt mine, District Karak, Pakistan

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The present study documents the traditional knowledge of medicinal halophytes of Noshpho Salt Mine District Karak, Khyber Pakhton Khwa (KPK), Pakistan. These medicinal halophytes are wide spread and are common in Noshpho Salt Mine. We have documented the use of 33 species belonging to 18 families. The dominant families are Asteraceae with 6 species, followed by Chenopodiaceae and Poaceae with 3 species, Asclepiadaceae, Capparidaceae, Mimosaceae, Rhamnaceae, Solanaceae and Zygophyllaceae with 2 species each. These medicinal plants are used to cure about 30 to 35 types of diseases. The main diseases in this area were cough, diabetes, stomach problem, headache, jaundice, toothache and skin diseases. Leaves are the most frequently used plant part against diseases. The area was investigated for the first time ever and information about the traditional remedies were collected and documented before they are lost. With a little support, the cultivation and conservation of such natural resources may result in sustainable maintenance and utilization of this plant wealth and uplift the socio-economic status of the people. It is also recommended that both the public and private sector should be encouraged to invest in these plants which have potential to become an economically viable industry.

Key words: Medicinal halophyte, conservation, Noshpho salt mine, Pakistan.

INTRODUCTION

Soil salinization is one of the most important constraints for plant growth and crop production all over the world. Around 800 million hectares of land (about 6% of the world's total land area) are salt affected (Munns and Tester, 2008). Menzel and Lieth (1999) indicated that halophytes or salt tolerant plants have multiple uses for the local inhabitants and are an underutilized resource. In Pakistan about 26% of total irrigated land is saline (Anonymous, 2008). Even now days most of the population of the area of district Karak is still depend on the folk medicines as they live in far flung areas where the facilities of the medical treatment are scarcely available. In view of the wide spread usage of medicinal plants in Unani, Greeco-Arabic systems, it seems worth while to carry out a study on the medicinal flora of Pakistan and particularly on halophytes and delineates important and persistent usage of these remedies in different countries. Such a study will bear out a very fruitful evidence for their authenticity in a particular disease and hence it will provide a very interesting and rewarding prepharmacological ground for undertaking its investigation on scientific basis (Farooq, 1990). Ethnobotanical studies in various areas of Pakistan have also been carried out (Shinwari, 2010; Shinwari and Khan, 2000; Shinwari and Gilani, 2003; Hussain et al., 2006; Qureshi and Bhatti, 2008) including those of the northern mountainous regions (Adnan et al., 2010) which include a considerable number of halophytes.

The present research was aimed to collect and document traditional local information about the uses of some halophytes plants of district Karak in KPK. Pakistan.

Study area

The district Karak is situated at 32° 47 to 33° 28 N and 70° 30 to 71° 30 E. The total population of district Karak is about 536000. The total area of district is 264,775 ha. It

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is the only district of KPK Province of Pakistan having the salt mine (Figures 1 and 2). Majority of the study area consists of curved dry hills and rough fields areas. Although the hills are very dry, but it is a fact that it contains precious minerals like salt, gypsum and gas etc. There is shortage of drinking water, so the people bring water from remote area (Figures 3 and 4). The Rainfall is scanty in the area. In the year 2005, 300 to 400 mm of rainfall per annum recorded on district level (Table 1). The area is very hot in summer and very cold in winter. In the year 2005 the mean maximum temperature was 42°C, in the month of the June, where as the mean minimum temperature was as low as 4°C, in the month of December and January, recorded on district level (Table 1).

The salt quarries are at Noshpho where the hills present great amount of exposed rocks salt (Khan, 2007).

MATERIALS AND METHODS

The study was conducted by frequently surveying in winter, spring and summer during 2006 to 2007. Information on demographic (age, gender) and ethnobotanical information was gathered from each site by using a semi-structured questionnaire. During survey personal observation was also recorded. Information about the local uses of the species as medicinal, fuel wood, timber and fodder etc were obtained through random sampling by interviewing 300 respondents from different walks of life because different age group and gender use these plant for different purposes. Individual questionnaire was filled from plant collectors, housewives, shopkeepers, elders, plant traders, those working in salt mines and local healers (Hakims), who are the actual users and have a lot of indigenous knowledge about the plants and their traditional uses. Analysis of data was made with the help of group discussions among different age classes of district Karak that include genders, village people and medicine men (Hakims) of the society. The data was classified, tabulated, analyzed and concluded for final report. The plants were collected, dried and preserved for identification. Plants were identified with the help of available literature (Stewart, 1972; Nasir and Ali, 1971 to 1995) and voucher specimens have been deposited in herbarium, Department of Botany, University of Science and Technology, Kohat, KPK. Pakistan.

The information about the medicinal uses of the plants was obtained from local experienced people through personal interview.

RESULTS

The present study includes indigenous knowledge of medicinal wild halophytes of Noshpho salt mine district Karak. All plant species are alphabetically arranged mentioning botanical name; voucher number; family; local name; parts used; method of preparation and application. A total of 33 species belonging to 18 families are reportedfrom the study area. The dominant families are steraceae with 6 species, followed by Chenopodiaceae and Poaceae with 3 species, Asclepiadaceae, Capparidaceae, Mimosaceae, Rhamnaceae, Solanaceae and Zygophyllaceae with 2 species each. This study is mainly focused on traditional uses of plants of the area used by the local people. The local inhabitants use 50 species of plants for treating various ailments. Most species had multi uses. The plants were mostly used in the crude form. The main diseases in this area were cough, diabetes, stomach problem, headache, jaundice, toothache and skin diseases. The most common plants used by the locals for multiple purposes are; *Zizyphus maurtiana* Lam., *Withania coagulans* Dunal., *Rhazya stricta* Dcne., *Fagonia cretica* L., *Kochia prostrate (*L) Schrad, *Peganum harmala* L. and *Solanum surratens* Burm. f. (Figure 5)

The ethnobotanical inventory is presented in Tables 2, 3 and 4.

DISCUSSION

These medicinal plants which are growing naturally in different seasons of year in this area are used for different purposes. The benefits of about 33 wild medicinal halophyte were studied and described by local people and habitants. All these species are the main source of medicine and other requirements of the local communities, because of the shortage of trained manpower and resources. Health authorities in Pakistan are not able to provide services to greater part of the rural population. Therefore, the wide spread use of folk herbal remedies appears to be not only a case of preference but also a situation without other native choices. Such a system of medical treatment on which the majority of the population has been relying upon for generations with considerable success, should not be overlooked for further medical investigation, specially on those plants which have not been looked at for medical research, although the same have been in use by local inhabitants over hundreds of years.

So the indigenous knowledge, accordingly, continue to provide the building blocks for development in rural communities because the medicinal plants are the precious economic resources of the area and wild are used in the crude form locally or collected and transported into the drug markets inside the area and country. The people depend upon the local resources around them particularly on plants. 300 Individual questionnaires were filled from plant collectors, housewives, shopkeepers, elders, plant traders, those working in salt mines and local healers (Hakims) (Figure 6). It was observed that 75% among men and 25% among women were knowledgeable about plants. It was noted that elderly people had more knowledge about the folk uses of medicinal plants than younger generation. In the remote areas like Charpara, modern health care facilities are lacking.

The present study indicated that the leaves and fruit are the most common parts of plant used against diseases. Similar finding were also reported from other areas of Pakistan (Shinwari and Khan, 2000; Shinwari

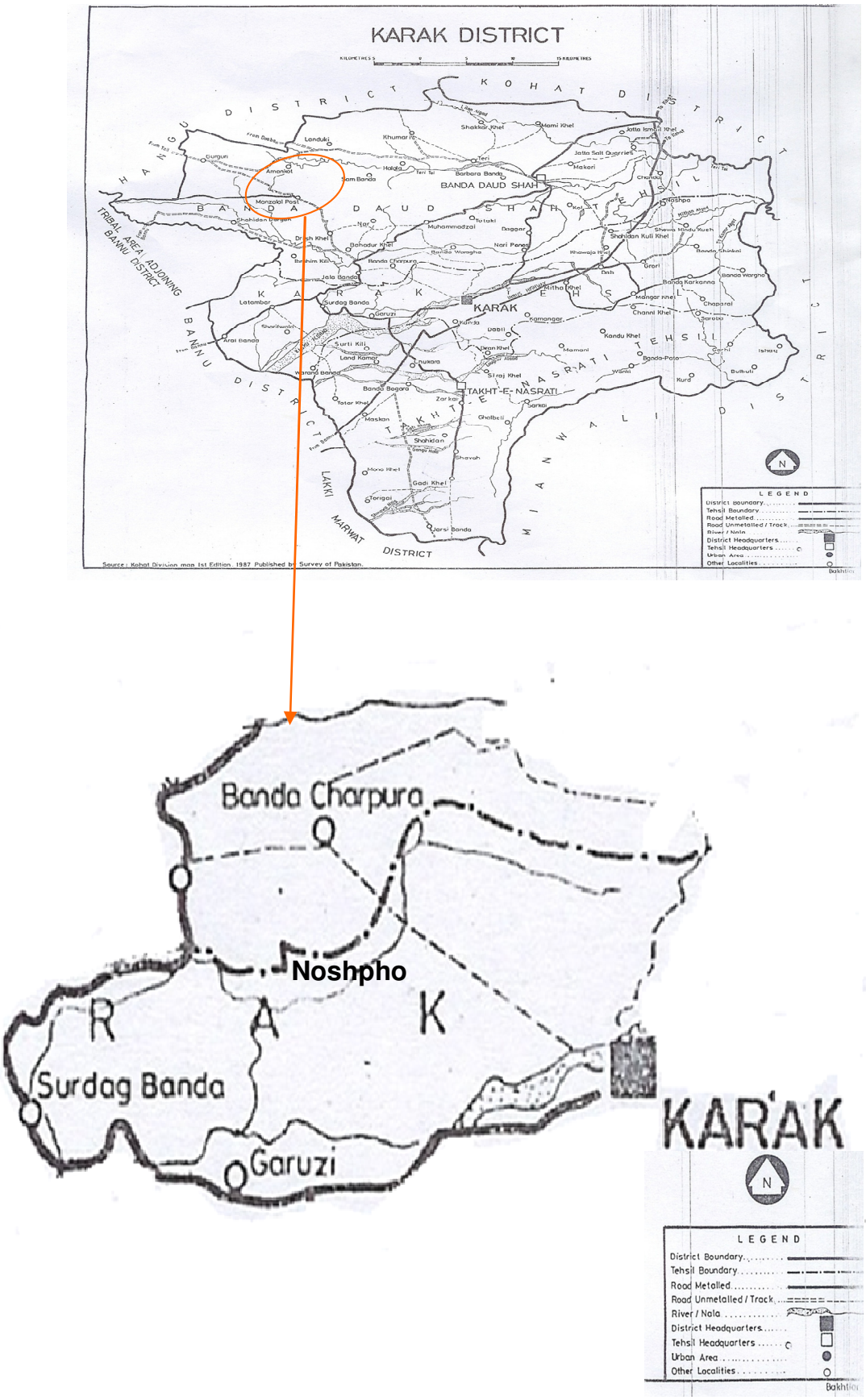

Figure 1. Map showing Noshpho Salt Mine area in district Karak (Khan, 2004).

Figure 2. Study area site.

Table 1. Climatic data of district Karak for the year 2005.

Months	Temperature (℃)				Rainfall (mm)	Relative humidity (%)		Soil temperature (℃) average	Wind speed (km per hour)
	Mean maximum	Highest recorded	Mean minimum	Lowest recorded		5 A.M	5 P.M		
January	16.9	20	4	0	64.8	83.1	37.2	4.6	2.4
February	16.8	24	7	2	95.1	82.6	42.7	6.8	2.7
March	24.38	29	12.6	10	80.6	85	39	13.2	3.3
April	32	38	16	10	14.6	65.9	24.3	22.1	3.4
May	33.2	39	20.8	16	34.8	58.7	28	15.4	6.2
June	42	49	26	19	19.8	47.2	22	22	5.3
July	36.7	41	26.1	22	19.8	77.4	38.6	22.7	4.6
August	37	41	26.1	21	73.40	79.6	40.5	23.22	4.2
September	35.9	40	24.7	19	82.2	75.6	39.5	23.1	3.1
October	33.1	37	18.3	10	54	65.3	28.4	17.7	4.2
November	26	29	10	9	Nil	62	35	11.2	3.8
December	22.9	26	4	1	Nil	60	30.3	5.8	3.6

Source: Agricultural Research Farm Ahmadwala Karak. Economically important halophytes of district Karak.

Figure 3. In search of water that become extinct due to salinity.

Figure 4. Brackish water in well.

Table 2. Tree. Economically important halophytes of district Karak.

S/N	Plants	Vernacular name	Family	Uses
1	*Acacia modesta* Wall	Palosa	Mimosaceae	Emollient and demulcent .
2	*Acacia nilotica* (Linn.) Delile	Kiker	Mimosaceae	Diarrhea and tonic.
3	*Phoenix sylvestris* Roxb.	Kajoor	Arecaceae	Tonic and fodder.
4	*Tamarix articulata* Vahl	Ghaz	Tamaricaceae	Hair colouration and pain killer.
5	*Zizyphus maurtiana* Lam	Bare	Rhamnaceae	Fodder, hedge plant and scabies, honey.

Table 3. Shrub. Economically important halophytes of district Karak.

S/N	Plants	Vernacular name	Family	Uses
1	*Calotropis procera* (Willd.) R. Br.	Spalmi	Asclepiadaceae	Hand pain, stomach ulcer and fever.
2	*Capparis decidua* (Forssk.) Edgew	Tap	Capparidaceae	Pickles, fuel wood, bird hunting and white ants.
3	*Capparis spinosa* L.	Berri	Capparidaceae.	Pickles, diuretic and tonic.
4	*Periploca aphylla* Dcne.	Barara	Asclepiadaceae	Swollen joints, cough and flu.
5	*Rhazya stricta* Dcne.	Ganderi	Apocynaceae	Cooling agent, skin rashes, blood purifier and sore eyes.
6	*Saccharum griffithii* Munro ex Boiss.	Sormal	Poaceae	Fodder, making kites and fuel.
7	*Withania coagulans* Dunal	Shopyanga	Solanaceae	Stomach ulcer, skin rashes and blood purifier.
8	*Zizyphus nummularia* (Burm. f.) Wight and Arn.	Kerkana	Rhamnaceae	Fodder, hedge plant, laxative, bird hunting and Haney bee spp.

Table 4. Herb. Economically important halophytes of district Karak.

S/N	Plants	Vernacular name	Family	Uses
1	*Arabis nova* Vill	Ger Beta	Brassicaceae	Fodder and forage.
2	*Asparagus capitatus* Baker	beta	Liliaceae	Chronic gout and insomnia.
3	*Blumea lacera* (Burm.f.)DC.	Beta	Asteraceae	Disinfectant.
4	*Chenopodium murale* Linn.	Tor Soba	Chenopodiaceae	Decoction and fodder
5	*Cynodon dactylon* (Linn.) Pers.	Barawa	Poaceae	Fodder, diuretic and fuel wood.
6	*Fagonia cretica* Linn	Aspalagzia	Zygophyllaceae	Laxative, constipation and blood purifier.
7	*Gnaphalium luteo-album* Linn.	Tetesi gul	Asteraceae	Astringent and vulnerary.
8	*Hertia intermedia* (Boiss.) O. Ktze.	Unknown	Asteraceae	Painkiller.
9	*Inula grantioides* Boiss.	Zir gul	Asteraceae	Asthma and tonic.
10	*Kickxia incana* (Wall.) Penn.	Shen beta	Scrophulariaceae	Antidiabetic, laxative and tonic.
11	*Kochia prostrate (*L) Schrad	Tanoba	Chenopodiaceae.	Used as a soap for washing utensils.
12	*Lactuca auriculata* Wall. ex DC.	Warhora	Asteraceae	Increase lactation and laxative.
13	*Launea procumbens* (Roxb.) Amin	Tariza	Asteraceae	Fodder for birds and tonic.
14	*Medicago polymorpha* Linn.	Karushka	Papilionaceae	Fodder and forage.
15	*Peganum harmala* Linn.	Sponda	Zygophyllaceae	Tonic, asthma, blood purifier and joint pain.
16	*Plantago psyllium* Linn.	Beta	Plantaginaceae	Dysentery.
17	*Solanum surratens* Burm. f.	Zyara marana	Solanaceae	Laxative, fodder and rheumatism.
18	*Stipa capensis* Thunb.	Her beta	Poaceae	Poisonous to sheep.
19	*Suaeda monoica* Forssk.	Babara	Chenopodiaceae	Ophthalmia…
20	*Teucrium stocksianum* Boiss.	Ger Beta	Lamiaceae	Expectorant, fever and sour throat.

Figure 5. *Fagonia cretica* L. (Spelaghzai).

Figure 6. *Fagonia cretica* L. (Spelaghzai).

and Gilani, 2003; Hussain et al., 2006; Shinwari et al., 2006; Shinwari, 2010). The local people depend on fuel wood and other needs on these halophytes. Overgrazing and up rooting of medicinal plants for fuel wood and commercial exploitation has resulted in poor vegetation cover, promoted soil erosion and deterioration of habitat. There is an urgent need of conserving the medicinal plants that are over harvested so that in future the coming generations could be benefited from these precious plants that are a real gift of nature for the mankind. It is a collaborative venture between people in local communities and various scientists and specialists. It is therefore necessary to find the ways of promoting the local people towards conservation as Shenji (1994) suggested that ethnobotany is the science of documenting the traditional knowledge on the use of plants by the indigenous people and for further assessing human interactions with the natural environment. A chief goal of present study is to ensure that local natural history becomes a living tradition in communities used with great interests and are active participants in the trade and economy of the country.

According to WHO reports more than 80% of Asia's population cannot afford formal health care facilities and therefore relies on wild medicinal plant species owing to their cultural familiarity, easy access, simple use and effectiveness (Anon, 2009). In China as many as 2394 traditional Tibetan medicines are used all from plants (1106), animals (448) and natural minerals (840) (Rizwana et al., 2009). Many of the important medicinal plants are sold at higher prices in the market. Most of the plants used by the local people are not conserved but are over exploited.

Conclusion

The present study show that the people of the area possessing good knowledge of herbal drugs but as people are going to modernization; their knowledge of traditional uses of plants may be lost in due course. The investigated area has a rich diversity of medicinal halophytes and provides a conductive habitat and ideal conditions for their growth. It is suggested that local people should be encourage to use the knowledge of their indigenous medicinal halophytes because of the shortage of trained manpower, resources and the health authorities in Pakistan are not able to provide services to greater part of the rural population. Such studies may also provide some information to biochemist and pharmacologist in screening of individual species and in rapid assessing of phyto-chemical constituent and bioanalysis for authentic treatment of various diseases.

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