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Ethnobotanical study of some wild herb medicinal Xerophytes of district Bannu, Khyber Pakhtunkhwa, Pakistan

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ABSTRACT

Introduction: Xeric land is the most productive, which is very diverse ecologically and economically and has a wide geographic range. It is consist of desert; grassland and woodland. Most plants are used for medicinal purposes. Therefore present study was planned to analysis the ethnobotanical properties of some wild herb medicinal xeric plants of District Bannu.

Materials and Methods: The present study was conducted during 20012-2014. Plants were identified with help of literature and using herbarium of Botany Department, University of Science and Technology, Bannu.

Results: The present investigation comprises the indigenous used 12 species belonging to 9 families of Angiosperm. All 12 plants are used as a fuel and 6 species are used as fodder for cattle. These plant families having medical importance are *A*maranthaceae, Cucurbitaceae, Cuscutaceae, Euphorbiaceae, *Solonaceae* and *Zygophyllaceae*. The most common wild medicinal plants in this area are *Solanum surratense, Citrulus colocynthis* L.

Conclusions: Some medicinal plants are depleting in Bannu District due to their over uses by the local people e.g. *Fagonia critical*, decrease due to more use of the plant by the local community for different purposes. If local community does not give proper attention to the plant then this species will be depleted from the area.

Key word: Ethenobotany, Xerophytes, Folk, Bannu.

INTRODUCTION

Xeric land is the most productive area, which is very diverse ecologically and economically and has a wide geographic range. It is included desert; grassland and wood land (Paukert *et al*., 2011). Deserts or drought areas are very important area for human evolution and adaptation. Flora of such region is slightly better, soil; topography and composition play a key role in distribution of vegetation (Gill, 2012). Deserts is 20% of the total area of the world i.e. 25,500,000 2km, approximately in which 720,000 ha area is covered by salt (saline) which is commonly used for production of common salt; plants of such area have been specially adapted to withstand such extreme condition, xeric societies studies have been given some of the most valuable and fertile land for debate showing adaptation for human being (Arora *et al*., 2010). Salinity become the major problems due a large numbers of factors which may be manmade or natural such as use of more chemical fertilizer or due to making of dams. In the desert area, water supply is less but population is increase which exerts further more pressure on less supply of water (Khan and Qaiser, 2006). Xerophytes have been under the constant observation of ecologists to study the adaptation which occur in different groups under various environments (Mehsud *et al*., 2013). Desert areas have limited water and rainfall but temperature is high. Xeric or dry nature of a plant is an adaptation to grow (survive) plant in extreme or drought environment (extreme temperature and less supply of water) by changing their demands according to environment (Arora *et al*., 2010).

In the course of evolution, different plant species have physiologically and structurally adapted to the habitat. Plants which grow habitually where evaporation is high and water supply is low, show specific adaptation to decrease water content, such type of adapted plants are known as xerophytes, or xerophytes are those plants which suffer from greatest difficulties in securing

water; the term xerophytes is derived from two Greek words i.e. xeros means dry and phyton means plant (The plants which grow in desert or dry places are called xerophytes). They can survive a prolonged period of drought without injured; (Sharma, 2006). A variety of modification occurs to grow (survive) in such extreme environment. Xeric plant may get water from their succulent organ (storage organ), allocate water specifically to sites of growing region (new tissue growth), or utilize less amount of water to manage water supply and plant become able to grow (survive) such as *Cappris*, *Cacti*, *Opuntia* and other common succulent's plants. In this research study the extremes conditions of soil water (Hydric or xeric) show some of the most important situation that plant often face such as the distribution limit of plants depend upon specific sets of characters which are required for existence of plants under such extreme condition. The plant stresses under drought condition have received much attention (Jackson and Colmer, 2005). Plants that live under arctic condition also show xeric characters, because water is present but not available for uptake of plant when the ground is frozen. Xerophytes adapt the following characteristics. The present study was carried out, to assess record and report the ethnobotanical properties of some wild herb medicinal xeric plants of District Bannu.

MATERIALS AND METHODS

The present study was conducted during 20012-2014, Work plan was prepared and general information about the area, culture and vegetation was collected before the start of field work. Topo sheets and maps were obtained from concerned offices.

The equipments during the Research work were Note Book, Map of the area, Pencil, Plant Presser, old English News Papers and Blotting Papers, Polythene Bags, Knife, Compass, Altimeter and Camera.

Methodology: The methodology comprises the following phases as; collection of medicinal data,

taxonomic work, collection of medicinal data.

***Field work*:** Frequent trips were arranged during the spring, summer, autumn and winter seasons. Plants were classified according to their economic traditional, local uses and other related information was gathered through interviewing and filling questionnaires from farmers, timber dealers, and common people but priority was given to elder people who were real user and had a lot of information about the plants and their traditional uses. Literature survey and general observation added some more information's. These information's were then compared with each other and people of other villages of the district were provoked to share and exchange their experiences. This effort will help to awake the local people about the conservation of useful plants for their coming generations. Repeated queries were made to get the data confirmed. Outcome of the result were rechecked and compared with literature. Different maps were obtained from concerned offices. To study the medicinal and ethno-botanical study of the plants, I made a profile or proforma on which different characteristic of plants were mentioned. I visited the following area i.e. Khujari, Bharat, Kakki, Mandan, Mira Khel, Ismail Khel, Sokari, Bada Mir Abas, Mandew, Domel, Townshhip Bannu, Azim kala Bannu. The equipment like Compressor, Altimeter, Note Book, Pencil and Polythene bags were carried to the site. The working plan was prepared according to the life form of the plants and utilization of the plant product by local people.

Ethnobotanical Inventory: The Ethno botanical inventory consists of families names in alphabetical order followed by Botanical name, local name, part used, flowering period, voucher specimen no. and Ethno botanical uses.

Plant collection and preservation: Plants were collected from various sites during the period of research work. The specimens were dried in folded newspapers. The plants were tagged with

signified data, local and other characteristic about the plant species. The specimens were pressed in a presser with blotting paper b/w the adjacent specimen. The blotting papers and News Papers were changed from time to time depending upon the weather and situation of plant. Dried species were poisoned by 2% solution of Mercuris Chloride and Ethyl Alcohol, mounting of specimens was made on standard herbarium of sheets of size (41.25cm) x 28,75cm.

Identification and voucher specimen number: Plants were identified with help of literature and using herbarium of Botany Department, University of Science and Technology Bannu and Herberium of Biological Sciences, Quaid-e-Azam University, Islamabad. They were accessioned and submitted in the Herbarium, Department of Botany, University of Science and Technology Bannu.

RESULTS

***Xerophytic plants of Bannu*:** The species studied were 12 wild herb to 9 families, all species belonging to angisperm, in which all species were Dicot. Based upon their utility all plants are wild, all species are wild medicinal. The most common wild medicinal plants in the area are *etc*. Some common wild medicinal plants are *Solanum surratense*, *Amaranthus viridis* (L.), *Achyranthus aspera* (L.). Some are veterinary Medicinal Plants used as a whole or in part. Veterinary medicinal plants are *Citrulus colocynthis* (L.).

1) Botanical Name: *Achyranthus aspera* L. (Amaranthaceae)

Local/Common Name: Prickly chaff flower.

Habit and Habitat: *Achyranthes aspera* L. is an erect or procumbent, annual or perennial, small, much branched, perennial sub shrub of about1-2 meter in height, often with a woody base. It is found on road sides, waste places and fields; field boundaries (Table 1).

Flowering Period: June-October.

Parts Used: Leaves, stem and root.

Folk Medicinal Uses: *Achyranthes aspera* is used as a fuel and hedging plant by the Gardner. The leaf juice applied on cuts and wounds.

This Pant is purgative, diuretic, astringent and emetic. It is also used in dropsy piles, skin eruption and colic.

2) Botanical Name: *Aerva javanica* (Burm) (Amaranthaceae)

Local name: Unknown.

Habit and habitat: *Aerva javanica* (Burm) is a perennial, erect shrub. The plant is herbaceous, multi-stemmed, and soft-wooded, with broad leaves; it often has an erect habitat. It is mostly found growing on calcareous or sandy soils in arid or semi-arid,also grow in better organic matter (Table 1).

Flowering period: June-July.

Parts used: Leaves, stem and root.

Folk medicinal uses: *Aerva javanica* have been used to dissolve urinary stone. Roots and flowers possess medicinal properties against rheumatism; it is also used for treatment of headache, anthelmintic and diuretic disorder. The decoction of the plant is used for swelling problems. Locally also used as a fuel .

3) Botanical Name: *Amaranthus viridis* L. (Amaranthaceae)

Local name: Surrma.

Habit and habitat: *Amaranthus* is highly tolerant of a drought environment. It is an annual erect glabrous weed, 30-60 cm high very common in waste places. It is found in well drained soils, in open waste places and cultivated land, especially in volcanic soils. The plant grows best in soils with no standing water and has good development in soils rich in organic matter and nitrogen

(Table 1).

Flowering period: October-July.

Part used: Branches and leaves.

Folk medicinal uses: *Amaranthus viridis* (*L)* is a fodder of cattle and it is also used as "sag", Leaves are used as emollient. It is also used as anti helminthes. The leaves are cooked as "sag" and eaten in the same amount as; "sag" for anti helminthes purposes. It is also used in scorpion sting and snake bite. The whole plant is antidiabetic, antioxidant and antihyperlipidiemic

4) Botanical Name: *Citrulus colocynthis* L. (Cucurbitaceae)

Local name**:** Maragania.

Habit and habitat: *Citrullus colocynthis* is a desert plant which grows in sandy arid and semi-arid soils. It can grow very fast on sandy loam, sub-deserts soil. It is small scabrid perennial creeping herb (Table 1).

Flowering period: March-may.

Part used: Seeds.

Folk medicinal uses: *Citrullus colocynthis* L. is a medicinal plant of family cucurbitaceae, there are various medicinal uses of this plant. Fruit and seeds are purgative, also used in constipation, fever and intestinal disorder. Fruit and root are considered as antidote to snake-poison. Hakims prepare different medicine from the seed of this plant.

5) Botanical Name: *Convolvulus pluricaulis* L. (Convolvulaceae)

Local name**:** Parwati

Habit and habitat: *Convolvulus pluricaulis* is a prostrate, creeping, perennial, and spreading plant which is not common but restricted to certain area. It is a wild herb, commonly found on sandy, alluvial and rocky ground under xeric conditions (Table 1).

Flowering period: March-may.

Part used: Whole plant.

Folk medicinal uses: The whole plant is used in various formulae as a nervine tonic for improvement of memory and intellect. The leaves and flowers possess hypertensive properties used for treating anxiety neurosis. It is recommended as a brain tonic to promote intellect and memory, eliminate nervous disorders and to treat hypertension. This plant is used as a brain tonic. It is also used in bowel complaints especially dysentery. Locally used as a fodder plan for cattle (Table 1).

6) Botanical Name: *Cuscuta reflexa* Roxb. (Cuscutaceae)

Local name**:** Zara parwathi.

Habit and habitat: *Cuscuta reflexa* obligate holoparasites with low host specificity. This plant is a perennial parasitic herb. A leafless twining total yellow stem parasite found commonly on *Zizyphus*. This plant is by wrapping itself around the host plant after attaching to it (Table 1).

Flowering period: April-May.

Part used: Whole plant.

Folk medicinal uses: *Cuscuta reflexa* has been reported for forantispasmodic, haemodynamic, bradycardia, antisteroidogenic, antihypertensive, musclerelaxant, cardiotonic psychopharmacological. Locally this plant is used for anthelmintic and blood purification purposes; whole plant is grind and juice is extracted, two cup juice of this plant is used for the mentioned purposes. It is also used as a carminative, alterative, purgative and diuretic, used in jaundice, pain of joints, paralysis and vomiting. Seeds are carminative, alterative, anthelmintic. Stem used in bilious disorder.

7) Botanical Name: *Euphorbia helioscopia* L. (Euphorbiaceae)

Local name: Parparay.

Part used: Whole plant.

Habit and habitat: *Euphorbia helioscopia L*. is an annual wild winter weed of cultivated lands. In nature the plant grows on grassy hillsides. This plant is a widespread and noxious weed of crops grow in each type of soil but prefer loam soil (Table 1).

Flowering period: March-April.

Part used: Shoot, root and latex (juice).

Folk medicinal uses: *Euphorbia helioscopia* L. is used as a fodder for cattle and also used for different disease of animals. It is cathartic, anthelmintic. Juice is applied to eruption latex is poisonous and causes swelling and irritation on skin. It is also used as fishpoison. When it is cooked with other pot herbs, it depresses their flower.

8) Botanical Name: *Fagonia cretica* L. (Zygophyllaceae)

Local name: Spelaghzai.

Part used: Fruits.

Habit and habitat: *Fagonia cretica* is a small spiny annual creeping herb or sub shrub with woody branches which is commonly found in dry calcareous and dry rocks throughout Pakistan. Typically found at an altitude of 0 to 1,478 meters (Table 1).

Part used: Young branches, leaves and fruits.

Flowering period: April-June.

Folk medicinal uses: *Fagonia cretica* juice is used for allergy. This Plant is astringent. It is externally applied as a paste on tumors and other swellings of neck. Leaves and twigs are used in snake bite. It is astringent, febrifuge and used for prevention of small-pox. The plant is bitter and also used for the treatment of thirst, fever, asthma, vomiting, dysentery, urinary discharges,

typhoid, liver trouble, skin disease toothache and for stomach troubles. It is reported to be a medicinal plant in scientific and folkloric literature, and its medicinal values are well known. This plant is bitter and used for the treatment of fever, thirst, vomiting, dysentery, asthma, urinary discharges, liver disease, typhoid, toothpain, dyslipidemia, stomach problems and skin problems. Leaves and young branches are grind up and mixed with water and sugar then one glass is used for purification of blood and allergies. It is also used in summer for cooling. It is used as a one glass two times for the whole season.

9) Botanical Name: *Heliotropium europaeum* L. (Boraginaceae)

Local name: Unknown.

Part used: Young branches, leaves or whole plant

Habit and Habitat: *Heliotropium europaeum* L., is an annual wild herb occupy area of semi-dry habitats. It is mostly considered a weed of fields and pastures. It is mostly considered a weed of fields and pastures (Table 1).

Flowering period: April-June.

Folk Medicinal Uses: *Heliotropium europaeum* L., has been used for medicinal purposes to treat warts, stimulate bile secretion, menstruation cycle regulation, decrease fever temperature and soothe insect bites, gouts, and inflammation of joints. Plant is emetic, useful against scorpion sting. Leaves applied as a cleaning and healing agent to boils and ulcers.

10) Botanical Name: *Peganum harmala* L. (Zygophyllaceae)

Local Name: Spelanii.

Part used: Fruits, Stem, leaves and flowers.

Flowering period: April-May.

Habit and Habitat: *Peganum harmala* L. is a medicinal herb native to dry areas. It is drought

tolerant. This plant grows in sandy and loam type of soils (Table 1).

Folk medicinal uses: *Peganum harmala* L. is used to treat pain and to treat skin inflammations. The "root is used to kill lice" and whenburned, the seeds kill insects. The herb is aphrodisiac. The seeds are anti-spasmodic, hypnotic, antiperiodic, emetic, alterative, anthemintic and narcotic. Seed powder is recommended as anthelmintic. Leaf decoction is given in rheumatism.

11) Botanical Name: *Solanum surratense* Burm (Solanaceae)

Local name: Wara-mara-ghinrhye.

Part used: Fruit and leaves.

Habit and habitat: A thorny more or less prostrate annual wild herb. It is found throughout India and Pakistan in dry situations as weed on roadsides and wastelands; thorny more or less prostrate annual wild herb. It is found throughout India and Pakistan in dry situations as weed on roadsides and wastelands. Best growth occurs at sandy and stony area (Table 1).

Flowering period: June-July.

Folk medicinal uses: *Solanum surrattense* Bum. Extract is used for different diseases such as asthma and cough, influenza, difficult urination, bladder stones, rheumatism. Plant is bitter, digestive, alterative, astringent, expectorant, diuretic and anthelmintic; used in cough, asthema, fever, chest pain,. Juice of berry is useful in sore throat leaves are applied locally to relieve pain. This plant is used for eye irritation and for abdomen pain, fodder for camels. Crushed fruits are externally applied on head in melancholia and other mental disorders.

12) Botanical Name: *Xanthium strumarium* L. (Asteraceae).

Local name: Ghoski.

Part used: Whole plant.

Habit and Habitat: *Xanthium strumarium* L. grows as wild herb found throughout on waste lands

.Xanthium strumarium occasionally forms a dominant ground cover in open riparian woodlands, intermittent streambeds, and beach habitats. A common Xanthium, grow in sandy and saline soils. This plant also grows in barnyards, pastures (Table 1).

Flowering period: March-April.

Folk medicinal uses: *Xanthium strumarium* L. is locally used as a fuel. It was reported that the whole plants especially leaves are used by hakims as blood purifier and in scabies. This plant is also used as sedative; emollient; astringent, diuretic.

DISCUSSION

The present medicinal plants study provides information on the medicinal plants uses of the described plants. Pakistan being rich in indigenous herbal resources, offer a great scope for medicinal and pharmacological studies. The present ethnobotanical research of 12 indigenous xerophytes plants species belong to 9 families, which used is traditional medicine for the effective remedies of different diseases such as fewer, diarrhea, diabetes, jaundice, stomach, ulcer, cold and even cancer. These plants are also used by the local herbal healer and hakims as a traditional medicine. Plant derived drugs have been in used in various diseases from previous study so it is necessary to explore their uses (Dixit and Pandey, 1984; Humber, 2002; Ahmad *et al.,* 2003; Ahmad *et al.,* 2005; Gilani, 2005; Hamayun *et al.,* 2005; Mahmood *et al*., 2005; Saghir *et al*., 2005; Singh and Dubey, 2012; Mehsud *et al*., 2013).

Conclusion: The present ethnobotanical study provides the following useful information such as *Fagonia cretica* juice is used for allergy. *Cuscuta reflexa* is used for anthelmintic and allergy. In these medicinal xerophytes The seed and fruit of *Solanum surattense* are extensively used in curing diabetes, reported from different area of District Bannu similarly most of the people depend on agriculture agro forestry and mountain resources. The local people collect a lot of

medicinal plants for the fodder, fuel wood and timber wood plants from the forest results in environmental degradation. Some other cases included ignorance, poverty, joblessness and lake of scientific knowledge for the collection of medicinal plants are the factors which are responsible for degradation of flora of District Bannu so necessary action must be taken by government to prevent the degradation process.

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Availability of data: We have included all materials in the manuscript that were collected.

Authors' contributions: Khan designed this study and also write the manuscript; Mahmood and Khan critically analysis article.

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Table 1: List of Important Herb Medicinal Xerophytes

Sr.	Plant Name	Family	Local Name	Part used
1	*Aerva javanica*	Amaranthaceae	Unknown	Whole plant
2	*Achyaranthus asper*	Amaranthaceae	Prickly chaff flower	Leaves, root
3	*Amaranthus viridis* L.	Amaranthaceae	Surma	Whole plant
4	*Convolvulus pluricaulis*	Convolvuaceae.	Parwati	Whole plant
5	*Cuscuta reflexa*	Cuscutaceae	Zara parwathy	Whole plant
6	*Citrullus colocynthis*	Cucurbitaceae	Maraghandi	Fruit
7	*Euphorbia helioscopia*	Euphorbiaceae	Parpari	Whole plant
8	*Fagonia cretica* L.,	Zygophyllaceae	Spelaghzi	Whole plant
9	*Heliotropium europaeum*	Boraginaceae	Unknown	Whole plant
10	*Peganum harmala L*.	Zygophyllaceae	Spelanii	Seed, Leaves
11	*Solanum surratense* Burm	Solonaceae	maraghand	Fruit
12	*Xanthium strumarium L*	Asteraceae	Ghoski	Whole plant