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ETHNO-MEDICINAL USES OF WILD HERBS AND SHRUBS OF TEHSIL YAZMAN, PUNJAB, PAKISTAN

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The present study was conducted to document the ethno-medicinal uses of wild herbs and shrubs of Tehsil Yazman, District Bahawalpur, Punjab. Information was gathered by interviewing local people. The collected plants were identified with the help of Flora of Pakistan. Plants were preserved and mounted on herbarium sheets and placed in the Department of Botany, Government Sadiq College Women University, Bahawalpur, Pakistan. A total of 118 species belonging to 35 families were identified. It was noticed that the indigenous people of the study area use plants in different ways in their daily life such as medicines, fuel, fruit, vegetable, forage/fodder, ornamental etc. Three families were found in abundance i.e. Poaceae, Fabaceae and Asteraceae. To the best of our knowledge, it is the first report on the ethno-medicinal uses of wild herbs and shrubs of Tehsil Yazman. It will be helpful in providing a baseline for future studies relating to pharmacological as well as biochemical studies of these wild plant species.

Keywords: Ethnobotany, biodiversity, medicinal plants, ethno-medicines, phytochemicals.

INTRODUCTION

Total area of Pakistan is 80,943 km², it comprises of unique biodiversity including about 6,000 plant species (Ali and Qaiser, 1986). Yazman tehsil is sub-division of Bahawalpur District in the Punjab province of Pakistan. Its original name (with diacritics) was Yazman Mandi. The human population comprises of different races, i.e. Kutwal, Sheikh, Makhy, Mahar, Bhain, Bohar, Jam, Arain and Tanwari (Ahmad *et al*., 2012).

Ethnobotany is the study of relationship between people and plants, and documentation of indigenous knowledge for conservation and sustainable usage of plant resources (Zereen and Khan, 2012). It is an investigation of plants valuable to individuals. Pakistan, like many other countries of the world, is bestowed with rich plant assets utilized for medicinal and also for different purposes (Ali and Qaiser, 1986). The poor people around the world trust medicinally valuable plants for treatment of different ailments. Some species are specific for a particular disease while some species have multiple uses; but, sometimes they have mixed usage (Shinwari *et al*., 2011). The interest for medicinal plants is rising day by day across the globe because of unsatisfactory performance and high expenses of modern medicines.

The plants have been used as timber to build shelters, firewood to keep places warm, to cook food, as medicine to treat themselves and to graze the livestock. Plants play a dynamic role in our lives mainly because of phytochemicals possessing variety of biological activities (Ajaib *et al*., 2010). Hence, ethno-medicinal research is very useful in the development of new drugs. Although many ethnobotanical surveys have been conducted by different workers (Qureshi *et al*., 2011; Ahmad *et al*., 2012; Malik *et al*., 2013; Choudhary *et al*., 2014; Wariss *et al*., 2014; Butt *et al*., 2015) in different areas of Pakistan but to our knowledge no systematic studies on ethno-medicinal potential of wild herbs and shrubs of Tehsil Yazman has been made. Hence, studies were conducted to explore the floristic biodiversity of the area and to record the traditional and medicinal uses of wild herbs and shrubs of the area.

MATERIALS AND METHODS

***Study area*:** Yazman tehsil is rich in natural plant resources especially wild herbs and shrubs. The mean winter temperature of the area is 6.5°C and mean summer temperature is 34-38°C. Annual rainfall of 100-250 mm, usually occurs in winter and spring whereas subsoil water is brackish (Ahmad *et al*., 2012). Economic activity depends on favorable climatic and agricultural yield. The vegetation mainly comprises of xeromorphic species, which are adapted to various environmental stresses, such as high salinity, high temperature and low nutrient availability. Local plants are used as ethnobotanical, as well as pharmacological activities by inhabitants.

***Ethnobotanical data collection and analysis*:** Field trips, to collect information about the ethno-medicinal uses of plants by local people in Tehsil Yazman (Pakistan), were conducted during 2016. Plant specimens were collected and identified with the help of The Flora of Pakistan (Nasir and Ali, 2001). Specimens were dried, pressed and mounted on herbarium sheets. All collected specimens were deposited in the

Government Sadiq College Women University Bahawalpur for future references. Data was grouped according to use, i.e. vegetables, fruits, medicinal, fodder, fuel wood, fencing, hedges and ornamental.

RESULTS

Total 118 wild species belonging to 35 families were investigated ethno-medicinally during field trips. Poaceae was found to be the largest family with 21 species followed by Fabaceae (9 species), Asteraceae (8 species) Chenopodiaceae (7 species) and Aizoaceae and Amaranthaceae (6 species each) while Capparidaceae and Solanaceae comprised of 5 species each and rest of the families included 1-4 members. The collected plant species were arranged in alphabetically as per family name. Uses of all the collected plant species along with their parts used were recorded (Table 1).

Table 1. Ethno-medicinal uses of some wild herbs and shrubs of Tehsil Yazman, Pakistan.

S. No.	Botanical name	Growth Form	Parts Used	Fd	Fw	F& H	Orn.	Fr. & Veg.	Medicinal Uses
Acanthaceae									
1.	*Blepharis scindica*	Herb	Sds, rts	√	√				General debility, urinary discharge
Aizoaceae									
2.	*Gisekia pharnaceoides*	Herb	Lvs, sds	√				√	Cure asthma and diarrhea, purgative
3.	*Limeum indicum*	Herb	Ap	√	√			√	Treatment of burns
4.	*Sesuvium sesuvioides*	Herb	Stm,rts					√	Small pox, measles, cough, cold
5.	*Trianthema portulacastrum*	Herb	Wp	√				√	Cough, poultice, fungal infections, gonorrhea and venereal discharge
6.	*Trianthema triquetra*	Herb	Ap	√					Ulcer and chronic fever
7.	*Zaleya pentandra*	Herb	Wp	√					Stomach ailment, influenza, kidney stones.
Amaranthaceae									
8.	*Achyranthes aspera*	Herb	Wp		√				Diuretic, hepatitis, cough and treat asthma, depression, headache and skin diseases
9.	*Aerva javanica*	Shrub	Wp	√	√	√	√		Cure acne, gall stone and vesicle, Used in jaundice, urinary trouble and rheumatism and for headache
10.	*Amaranthus hybridus*	Herb	Ap	√				√	Constipation and fever
11.	*Amaranthus viridis*	Herb	Ap	√				√	Used as emollient and for dysentery and constipation
12.	*Digera arvensis*	Shrub	Wp	√					Diuretic and dyspepsia
13.	*Digera muricata*	Herb	Wp	√			√	√	Digestive system disorders, urinary disorders
Apiaceae									
14.	*Anethum graveolens*	Herb	Wp	√			√	√	Diabetes, menstrual cycle, bone development, stomachic, diuretic, insomnia, cramps, inflammation of respiratory tract
15.	*Coriandrum sativum*	Herb	Ap	√			√	√	Digestive complaints, small pox, anemia, fever, measles and cold.
Apocyanaceae									
16.	*Calotropis procera*	Shrub	Wp		√				Fever, rheumatism, indigestion, cold and diarrhea
17.	*Carissa carandas*	Shrub	Wp	√			√	√	Constipation, diarrhea, mouth ulcer, sore throat, scabies, epilepsy
18.	*Leptadenia pyrotechnica*	Shrub	Wp	√				√	Fever, cough, stomach and kidney disorders, urinary disorders
Asphodelaceae (Xanthorracaeae)									
19.	*Aloe barbadensis*	Herb	Lvs	√	√		√	√	Osteoarthritis, bowel diseases, fever, itching and inflammation
20.	*Asphodelus tenuifolius*	Herb	Wp	√				√	Diuretic, inflammation, blood purification and skin diseases
Asteraceae (Compositae)									
21.	*Cichorium intybus*	Herb	Wp	√				√	Diarrhea and fever, improving bowel function
22.	*Conyza bonariensis*	Herb	Wp				√		Constipation, diarrhea
23.	*Echinops echinatus*	Herb	Wp	√					Liver disorder, jaundice, anorexia, skin itching
24.	*Eclipta alba*	Herb	Ap	√	√				Hair growth and color
25.	*Launaea resedifolia*	Herb	Lvs	√					Hepatic pains, bacterial infections

S. No.	Botanical name	Growth Form	Parts Used	Fd	Fw	F& H	Orn.	Fr. & Veg.	Medicinal Uses
26.	*Sonchus arvensis*	Herb	Lvs, rts	√					Asthma, cough, chest infections, inflammations, kidney pains
27.	*Sonchus asper*	Herb	Lvs, stm	√				√	Wound healing, sedative and tonic
28.	*Xanthium strumarium*	Herb	Lvs					√	Fever, nasal and sinus congestion
Boraginaceae									
29.	*Heliotropium indicum*	Herb	Ap	√					Diuretic, skin problems, inflammations and tumors
30.	*Heliotropium strigosum*	Herb	Wp	√					Hepatitis, arthritis, sore eyes, blood purification, laxative, diuretic, snake bite.
Brassicaceae									
31.	*Coronopus didymus*	Herb	Wp	√					Respiratory disorder and diabetes
32.	*Malcolmia africana*	Herb	Ap	√			√	√	Microbial infections
33.	*Sisymbrium irio*	Herb	Sds					√	Asthma and eye disease, detoxify liver and spleen, cough and chest congestion.
Capparidaceae									
34.	*Capparis decidua*	Shrub	Ap		√	√	√	√	Toothache, gum infection, hepatitis, jaundice, ulcers, bone fraction and to release obesity
35.	*Capparis spinose*	Herb	Wp				√	√	Gastro-intestinal infections, liver disorders, diuretic, cough, anemia
36.	*Cleome viscosa*	Herb	Lvs, sds					√	Infections, fever, headache, rheumatism
37.	*Dipterygium glaucum*	Herb	Ap	√					Asthma, expectorant, stimulant
38.	*Gynandropsis gynandra*	Herb	Lvs, sds, rts	√			√	√	Gastro-intestinal disease, anemia, scabies, anti-inflammatory
Caryophyllaceae									
39.	*Spergula arvensis*	Herb	Wp	√					Diuretic
40.	*Stellaria media*	Herb	Wp	√				√	Cough, kidney pains, constipation
Chenopodiaceae									
41.	*Chenopodium album*	Herb	Ap	√		√		√	Abdominal pain, tooth decay, throat troubles, constipation, insect stings and bites, laxative
42.	*Chenopodium murale*	Herb	Ap	√				√	Treat ringworms, diuretic and eye diseases
43.	*Haloxylon recurvum*	Shrub	Wp	√					Intestinal ulcers
44.	*Haloxylon salicornicum*	Shrub	Wp		√				Dyspepsia, anti-diabetic, anti-bacterial.
45.	*Salsola baryosma*	Shrub	Wp					√	Skin disease
46.	*Salsola imbricate*	Shrub	Wp	√					Abdominal pain and constipation
47.	*Suaeda fruticose*	Shrub	Wp						Eye problem, skin disorder
Convolvulaceae									
48.	*Convolvulus arvensis*	Herb	Lvs	√			√		Diuretic, fever, laxative
49.	*Cress cretica*	Herb	Wp				√		Expectorant, anti-fungal and anti-cancer
Cucurbitaceae									
50.	*Citrullus colocynthis*	Herb	Lvs, sds, rts	√				√	Stomach and digestive disorder, diabetes, constipation, asthma
51.	*Cucumis melo*	Herb	Fr	√		√	√	√	Hyperacidity, constipation, anorexia
52.	*Mukia maderaspatana*	Herb	Lvs, rts	√	√				Constipation and gas problems
Cyperaceae									
53.	*Cyperus flat*	Herb	Ap	√					Cure skin disease
54.	*Cyperus rotundus*	Herb	Wp	√				√	Diarrhea, diabetes, inflammation, malaria, stomach and bowel disorders
Euphorbiaceae									
55.	*Euphorbia granulata*	Herb	Lvs	√					Dysentery, jaundice, digestive problems, tumors, cough, asthma
56.	*Euphorbia hirta*	Herb	Ap	√	√				Cough, asthma, dysentery, jaundice, digestive problems, tumors
57.	*Euphorbia prostrata*	Herb	Wp	√					Hemorrhoids, fever and cure skin problems
58.	*Jatropha diocia*	Shrub	Ap	√			√		Bleeding gums, toothache, laxative
Fabaceae									
59.	*Alhagi maurorum*	Shrub	Wp					√	Used to treat piles, migraine, to remove kidney stones and as a laxative and diuretic

S. No.	Botanical name	Growth Form	Parts Used	Fd	Fw	F& H	Orn.	Fr. & Veg.	Medicinal Uses
60.	*Cassia occidentalis*	Shrub	Sds, Lvs	√			√		Cough, fever, bronchitis, asthma, liver complaints, tuberculosis
61.	*Crotolaria burhia*	Shrub	Wp	√		√			Swellings, kidney pains, rheumatism
62.	*Lathyrus aphaca*	Herb	Fl, sds	√			√		Skin infections
63.	*Medicago polymorpha*	Herb	Ap	√			√	√	Constipation, indigestion
64.	*Melilotus officinalis*	Herb	Wp	√				√	Vomiting, headache and to increase appetite
65.	*Sesbania sesban*	Shrub	Lvs, Sds	√	√				Throat infections, skin infections, cough, cold, constipation
66.	*Vicia sativa*	Herb	Ap	√				√	Skin infections, asthma, bronchitis, urinary diseases
67.	*Vigna radiata*	Shrub	Lvs, sds	√			√		Refresh mentality, alleviate heat stroke and reduce swelling
Fumaraceae (Papaveraceae)									
68.	*Fumaria indica*	Herb	Wp	√					Fever, influenza, diarrhea, purification of blood
Gentianaceae									
69.	*Centaurium pulchellum*	Herb	Flw	√					Fever, kidney stones, high blood pressure, indigestion
Malvaceae									
70.	*Abutilon indicum*	Shrub	Wp		√		√		Purify the blood, cure cough, asthma and chest infection, Used as laxative, emollient and demulcent
71.	*Malvastrum coromendelianum*	Shrub	Wp	√					Anti-inflammatory, liver infections, diarrhea, sore throat, cough
Mazaceae									
72.	*Mazus pumilus*	Herb	Wp				√		Cure typhoid, febrifuge, emmenagogue
Molluginaceae									
73.	*Mollugo cerviana*	Herb	Ap	√				√	Laxative, microbial infections
Neuradaceae									
74.	*Neurada procumbens*	Herb	Lvs,, frt	√					General debility, impotency, nerve tonic
Nyctaginaceae									
75.	*Boerhavia rapens*	Herb	Ap	√					Asthma, diuretic, laxative
Oxalidaceae									
76.	*Oxalis corniculata*	Herb	Wp	√				√	Skin disease, anti-dysentery and increase appetite
Papaveraceae									
77.	*Argemone maxicana*	Herb	Wp				√		Malarial fever, ulcer, skin problem
Poaceae									
78.	*Aeluropus lagopoides*	Herb	Wp	√					Wound healing, pain killer
79.	*Aristida funiculata*	Herb	Ap	√					Itching and skin problems
80.	*Brachiaria reptens*	Herb	Wp	√					Diuretic, kidney problems
81.	*Cenchrus biflorus*	Herb	Sds	√					Diuretic
82.	*Cenchrus ciliaris*	Herb	Wp	√					Lactagogue, kidney pains, tumors, sores and wounds
83.	*Cenchrus setigerus*	Herb	Ap	√					Oxidative stress
84.	*Cymbopogon jwarancusa*	Herb	Wp	√		√	√		Headache, respiratory infections, stomachache, abdominal and muscle pain, fever
85.	*Cynodon dactylon*	Herb	Ap	√	√		√		Vomiting, leprosy, scabies, dysentery, blood and skin diseases
86.	*Dactyloctenium aegyptium*	Herb	Ap	√					Astringent, bitter tonic, intestinal and urinary diseases
87.	*Desmostachya bipinnata*	Herb	Ap	√					Dysentery, diuretic
88.	*Dicanthium annulatum*	Herb	Ap	√					Dysentery, menorrhagia, bacterial and fungal infections
89.	*Eleusine indica*	Herb	Wp	√					Liver and kidney problems, oxidative stress
90.	*Lasiurus scindicus*		Ap	√	√				Cold and cough, bacterial infections
91.	*Panicum antidotale*	Herb	Sds	√	√				Treatment of bone fracture
92.	*Phalaris minor*	Herb	Ap	√					Cough and dysentery

S. No.	Botanical name	Growth Form	Parts Used	Fd	Fw	F& H	Orn.	Fr. & Veg.	Medicinal Uses
93.	*Poa annua*	Herb	Lvs	√					Kidney and liver ailments, diuretic, digestive disorders
94.	*Saccharum bengalensis*	Shrub	Ap	√		√	√		Diuretic and demulcent
95.	*Saccharum spontaneum*	Shrub	Wp	√					Astringent, diuretic, burning sensation piles, gynecological troubles, respiratory problems
96.	*Stipagrostis plumosa*	Herb	Ap	√					Cold and cough
97.	*Sorghum halepense*	Herb	Ap	√	√				Demulcent, diuretic
98.	*Vetiveria zizaniodes*	Herb	Wp	√	√	√			Skin disorders, indigestion, tonic and blood purifier
Polygonaceae									
99.	*Calligonum polygonoides*	Shrub	Wp	√	√	√			Typhoid, urinary problems, heart burn and sun stroke
100.	*Polygonum plebeium*	Herb	Wp	√			√	√	Asthma, cough and pneumonia
101.	*Rumex dentatus*	Herb	Lvs	√				√	Constipation, diuretic, sooth irritation
102.	*Rumex crispus*	Herb	Wp					√	Cutaneous disorder, viral infections
Portulacaceae									
103.	*Portulaca oleracea*	Herb	Lvs					√	Diabetes, urinary bleeding
104.	*Portulaca quadrifida*	Herb	Ap	√					Fever, diuretic, rheumatism
Primulaceae									
105.	*Anagallis arvensis*	Herb	Wp	√	√	√	√		Diuretic, expectorant, emollient, purgative and skin infections
Ranunculaceae									
106.	*Ranunculus muricatus*	Herb	Ap	√	√				Intermittent fevers, gout, asthma
107.	*Ranunculus sceleratus*	Herb	Wp	√					Cold, general debility, rheumatism, stomach problems
Solanaceae									
108.	*Datura stramonium*	Shrub	Sds, Lvs	√			√		Earache, asthma, coma and hair fall
109.	*Solanum nigrum*	Herb	Lvs, fr	√				√	Fever, wound healing, stomach disease
110.	*Solanum surattense*	Herb	Wp	√				√	Jaundice, cough and asthma
111.	*Withania coagulens*	Herb	Lvs, Fr	√				√	Anorexia, jaundice, skin problem
112.	*Withania somnifera*	Shrub	Wp	√			√	√	Diuretic and swelling
Tamaricaceae									
113	*Tamarix dioica*	Shrub	Stm, fr	√	√			√	Cough, diarrhea, dysentery, piles, ulcer, spleen trouble
Verbenaceae									
114.	*Lantana camara*	Shrub	Lvs, fr		√	√	√		Stomach disorders, microbial infections
115.	*Phyla nodiflora*	Herb	Wp				√		Gastric disorder and cough
Zygophyllaceae									
116.	*Fagonia cretica*	Herb	Wp	√	√				Fever, dysentery, asthma, liver trouble, toothache, small pox, skin diseases, typhoid, urinary discharges
117.	*Peganum harmala*	Herb	Sds, rts	√			√		Asthma, fever, antiseptic, skin inflammations
118.	*Tribulus terrestris*	Herb	Wp				√		Urinary disorder, kidney disorder

Fd: Fodder; Fw: Fuel wood; F & H: Fencing and hedges; Orn.: Ornamental; Fr. & Veg.: Fruits and vegetables; Ap: aerial parts; Wp: Whole plant; Lvs: Leaves; Fr.: Fruit: Sds: Seeds; Rts: Roots; Stm: Stem; Flw: Flowers**.**

Most of the collected plant species were found to be used as fodder for domestic animals (96 species) followed by 44 species used as fruit and vegetable. Other uses of plants by local inhabitants include ornamental (33 species), fuel wood for burning (24 species) and fencing & hedges (11 species) (Fig. 1). Herbs and shrubs were also observed to be used in herbal medicines to cure various diseases such as *A. indicum* is used to purify the blood, cure cough, asthma and chest infection and can be used as laxative, emollient and demulcent. Similarly, *H. recurvum* is used to cure intestinal ulcers and *C. flat* is used to cure skin diseases. People in different areas use different plant parts according to their knowledge transferred from their ancestors. The most important medicinal uses of plants were related to fever and cold (35 species such as *S. plumosa*) followed by urinary diseases (32 species such as *T. terrestris*), respiratory diseases (25 species such as *S. spontaneum*), skin diseases and diarrhea and constipation (20 species such as *F. indica* and *V. sativa*), digestive disorders (18 species such as *L. camara*), kidney disorders (12 species such as *B. reptens*), microbial infections (10 species such as *C. cretica*), liver disorders (9 species such as *C. occidentalis*), rheumatism and laxative (8 species such

as *C. burhia*), headache (6 species such as *A. aspera*), diabetes (5 species such as *C. didymus*), intestinal ulcers (4 species such as *T. triquetra*), general debility, eye disease and small pox and measles (3 species such as *S. fruticosa*) and hair growth and toothache/bleeding gums (2 species such as *E. alba*) respectively (Figure 2). Other medicinal uses include hepatitis, typhoid, jaundice, malaria, tuberculosis, anorexia, piles, dysentery, tumors and inflammations of different body parts. Results revealed that some species are used for various health problems like *Fagonia cretica* and *Calligonum polygonoides* were used for multiple diseases (Table 1).

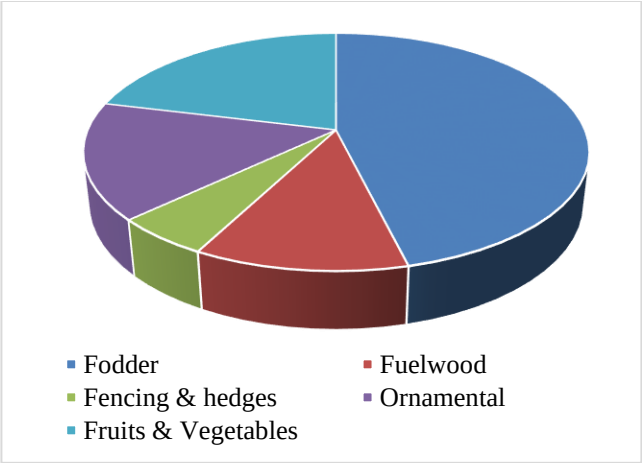

Figure 1. Comparative number of plants used for various purposes by local inhabitants of Tehsil Yazman, Pakistan.

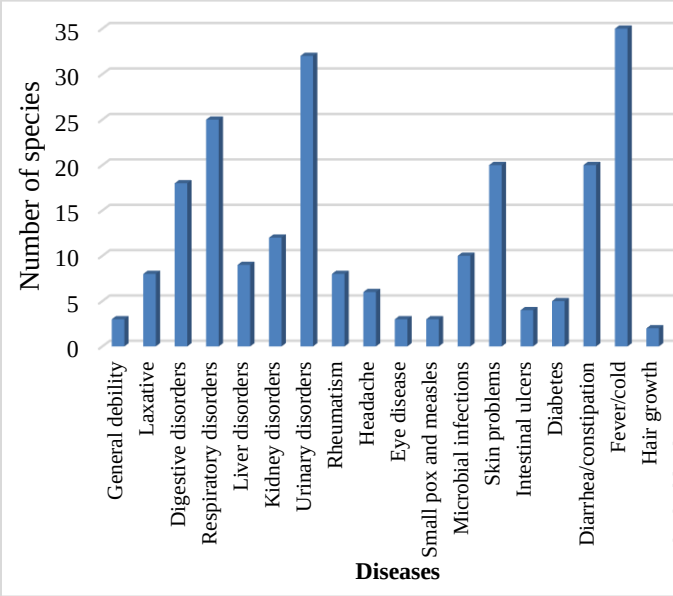

Figure 2. Distribution of medicinal plants with respect to their use in medicine for different diseases in Tehsil Yazman, Pakistan.

DISCUSSION

Man has been depending upon plants for his survival since ancient time. Both wild and cultivated plants are vital to many aspects of traditional life (Salinitro *et al*., 2017). The present study was carried out to assess the ethno-medicinal knowledge about the species of Tehsil Yazman with general information and their folk uses. Tehsil Yazman has a great diversity of vegetation and people living there depend upon plants for their needs. Most of the nomads in the area especially cut the trees and sell them as fuelwood. They also use the plants for many other purposes that include thatching (craft of building a roof with dry vegetation) and as ornamental etc. Most of the people have domestic animals that feed on these herbs and shrubs and also use different plants to cure various diseases of animals. Due to poverty and lack of modern health facilities, most people still use traditional medicines for their common day diseases.

Many plants are used as traditional herbs or foods in many countries since ancient times (Wu *et al*., 2015). In present study, total 118 species belonging to 35 families have been documented. Most of the species were reported to have multipurpose uses by the inhabitants of the respective areas e.g., *Sesbania sesban, Calotropis procera* and *Aloe barbadensis*. Similar studies have been done in different areas of Pakistan. Sardar and Khan (2009) conducted ethnobotanical studies of Tehsil Shakargarh, District Narowal, Pakistan and recorded traditional uses of 102 species belonging to 62 families. Mahmood and Shah (2012) conducted survey of medicinal plants in Poonch, District of Jammu and Kashmir and reported total of 65 species in use to cure various diseases. Similarly, Ahmad *et al*. (2014) conducted ethnobotanical study of Chail valley of District Swat, Pakistan and documented 50 plant species belonging to 35 families. Moreover, Yaseen *et al*. (2015) also conducted ethnobotanical studies of medicinal plants in the Thar Desert of Pakistan and reported medicinal uses of 87 plant species belonging to 32 families respectively.

People prefer local herbs and shrubs due to low cost, easy availability and more effectiveness to cure different diseases and disorders. According to the 'Hakeems' and 'Pansaries', there are many threats to medicinal plants due to over exploitation and over consumption (Amjad and Arshad, 2014). Present study revealed that Tehsil Yazman possess great diversity of plants that meet the needs of inhabitants. There is no ethnobotanical/ medicinal data available from this remote area. This study contributes to the establishment of an inventory of plant based medicines used in Tehsil Yazman, Pakistan. The data analyzed in this paper show that indigenous knowledge on medicinal plants uses is still alive in this area. The significance of this knowledge has provided us with novel information that can provide basis for new avenues in future pharmacological screening that leads to natural drugs discovery development to improve healthcare

systems all over the world. However, to validate such information, detailed pharmacological studies must be done to improve the use of medicinal plants. Overall, the present study provided a baseline study for the conservation of the local species. Hence, major attention is required to conserve these wild species for future utilization and to retain the natural glory.

***Conclusion*:** In present studies, the natural flora of Tehsil Yazman has been explored. This area is embraced with ample herbs and shrubs notably utilized by the local people for various purposes including fuelwood, fruit and vegetable, forage/fodder and ornamental. These species are also used for treating various ailments such as stomach, liver and kidney disorders, eye diseases, microbial infections, headache, small pox and measles, fever and cold etc. Hence, this information can be used further to determine the biological potential of species so that they can be effectively employed in pharmaceutical industries. Moreover, present studies can be used for the conservation purposes to protect the valuable flora from biotic stress for future generation.

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