Jordan Journal of Natural History, 7, 2020 Pages: 50- 59

The Current Conservation Status of some Wild Plant Species in the District of Bannu, Pakistan

Musharaf Khan [1]*, Farrukh Hussain [2], Abdurehman [3], Shahana Musharaf [4], Imdad Ullah [5] and Muhammad Khalil[6]

[1]Department of Biology, Federal Government College Mardan; [2]Department of Botany, Sarhad University Of Information Technology Peshawar; [3]Department of Botany, Government Post Graduate College Bannu; [4]Department of Chemistry, Government Girls Degree College S. Maltoon, Mardan; [5]Department of Chemistry, Government Post Graduate College Karak; [6]Department of Mathematics, Federal Government College Mardan, Pakistan.

Received: September 20, 2020; Revised: October 5, 2020; Accepted: October 13, 2020

Abestract: The present study documents the conservation status of 135 plant species belonging to 115 genera and thirty-eight families in Bannu. The information about conservation was collected through questioners, personal observation, group discussions and interviews. The Asteraceae constitutes a dominant family with twenty species followed by Poaceae with nineteen species. In the present report, fifty-two species (38.52 %) were found to be rare, vulnerable (45 Species; 33.33%), Infrequent (18 species; 13.33%), endangered (12 Species; 8.89%) and eight species (5.93%) were dominant. It was not possible through the present investigation to conclude that most wild plant species are going to become endangered due to urbanization and agriculture in the area though natural vegetation habitats are changing rapidly.

Keywords: Medicinal herbs, Conservation, Endangered Species.

Introduction

The conservation status of organisms indicates the features of plant species in the area. The conservation status of species depends on many factors affecting conservation such as fuel demand, farming land, grazing, deforestation, reproduction rates and the known threats. It is estimated that some 270,000-425,000 vascular plant species are already known (Govaerts, 2001). Based on the samples of species that have been evaluated, the percentage of endangered species is estimated at 40 percent of all organisms as calculated by the International Union for the Conservation of Nature (IUCN) (Anon., 2008).

Alam and Ali (2009) classified *Astragalus gilgitensis* as a Critically Endangered (CR). According to Khan *et al.*, (2011a) four flowering plant species are threatened. Khan *et al*., (2012a) reported one specie from Tehsil Takht-e-Nasrati, District Karak, Pakistan as a threatened plant. According to Khan *et al*., (2013a), habitat loss and removal, the preface of alien species, pollution and diseases, over-exploitation, and climate change are among the threats facing plants which are an important part of the ecosystem. Plant biodiversity is also under tremendous pressures due to population explosion, unplanned urbanization, deforestation and the over-exploitation of natural resources (Khan *et al*., 2013b).

Unfortunately, very little work has been done on the conservation status of plants in Pakistan and, extremely limited information is available on this subject (Khan 2013). Khan and Husssain (2013a) reported seven plant species form Takht-e-Nasratti Pakistan as threatened species. These studies are principally based on the IUCN criteria and with the support of quantitative data. In contrast, according to the recent red list of

*Corresponding author: k.musharaf@gmail.com

IUCN (Anon., 2008) only nineteen flowering plants species have been listed from Pakistan. Regarding Pakistan, previous workers have classified plant species as threatened or rare on the basis of literature or herbarium specimens. Less work has been done based on the IUCN red list categories or criteria (Khan 2013). The research area has a rich biodiversity consisting of different types of plants, some of which are used for their medicinal values. Different studies across various areas of Pakistan have been carried out (Hussain, *et al.,* 2006; Shinwari, 2010; Murad, *et al.,* 2011; Khan, *et al.,* 2011a, 2012c, 2013c). The present research is aimed at collecting, compiling, and documenting the conservation position of plants on the basis of the diverse and disperse traditional local information in the District of Bannu. Such a study makes the conservation position of some plant species available in the future for plant ecologists.

Methods

Research Area

The District of Bannu lies between 32.43^0 to 33.06^0 North and from 70.22^0 to 70.57^0 East. It is bounded in the North by the Tribal Area, in the East by the District of Karak, and in the South by Lakki Marwat (Figure 1). The district has a total area of 1227 km2. The total population of the district is estimated at 677350 people with an annual growth rate of 2.81 %. The greater part of the population lives in villages. The climate of the research area is warm during summers and cold in winters. The summer season starts from May till August. June is the hottest month for this area. In July and August, the weather is hot and moist, while June is the hottest month with mean minimum and maximum temperatures of 30 C° and 42 C° respectively. Winter months include December, January, and February. The mean maximum rainfall occurs during the month of August and that is 111.25 millimeters. About 45% area of the district is irrigated mostly through canals, while 10 % of the people have their own tube wells for the purpose of irrigation. This is why abundant crops during both summer and winter seasons are harvested each year. The area has a broad spectrum of plant biodiversity, but no regular forestation. The distribution of trees is of the patchy type. Every kind of crop and fruit i.e. wheat, maize, rice, barley and sugarcane can be grown there, and bananas, dates, figs and rice are unique in their taste, smell, and shape.

Research Protocol

The study was prepared by frequently conducting surveys. The plant specimens were collected from Jun, 2017 to September, 2019. The samples were pressed, dried, and mounted on herbarium sheets. They were identified with the help of floristic literature (Nasir and Ali, 1970-1989; Ali and Nasir, 1990-1992; Ali and Qaiser, 1992- 2009.

The correctly-identified specimens were deposited in the herbarium of the Department of Biological sciences, FGCB Mardan. The area is divided based on plant accessibility. Habit, habitat, altitudinal range, population size, distribution range, impacts of multiple threats including habitat destruction, erosion, fuel wood cutting, grazing, poultry farms, and invasive species have been studied in the habitat. Plant specimens were collected from different parts of the research area. The nature of the habitat has been analyzed through soil erosion, invasive species, and the impacts of anthropogenic activities. Demographic information (age, sex) and conservation status data were gathered at each site using semi-structured questionnaires of the standard method according to Khan, (2013). During the surveys, personal observations were also recorded. The analysis of the data was made possible with the help of group discussions and questions directed at different age groups which included both sexes of the society. The data were classified, tabulated, analyzed to reach conclusions for the final report.

Figure 1. Map of the District of Bannu showing the research spot.

Results

In the present study, the conservation status of some wild plant species was determined in the District of Bannu. A total of 135 species belonging to 115 genera and thirty-eight families were found.

The *Asteraceae* was dominant with twenty species followed by *Poaceae* with nineteen species, *Amaranthaceae, Euphorbiaceae* and *Papilionaceae* with seven species. *Malvaceae* and *Polygonaceae* with five species. *Chenopodiaceae* with four species. *Plantaginaceae* and *Zygophyllaceae* with three species. *Apiaceae*, *Caryophyllaceae, Convolvulaceae, Cucurbitaceae, Gentianaceae* and *Verbenaceae* have two species. *Aizoaceae, Apocynaceae, Asclepiadaceae, Asphodelaceae, Cyperaceae, Fumariaceae, Iridaceae, Lamiaceae, Linaceae, Nyctaginaceae, Orchidaceae, Orobanchaceae, Oxalidaceae, Papaveraceae, Primulaceae, Ranunculaceae, Resedaceae, Tiliaceae* and *Typhaceae* with a single species (Figure 2; Table 1).

The plants were divided on the basis of their conservation status into five classes, and these are: endangered, vulnerable, rare, infrequent, and dominant. In the present report, fifty-two species (38.52 %) were found to be rare, vulnerable (45 Species; 33.33%), Infrequent (18 species; 13.33%), endangered (12 Species; 8.89%) and eight species (5.93%) were dominant (Figure 3; Table 1).

Discussion

Since the beginning of civilization, people have used plants to fulfill the various daily life requirements. The study has been designed to report on the conservation status of plants through anthropogenic activities in the District of Bannu. One of the objectives of this study is to record the conservation status of plants in the research area, which has a great wealth of medicinal plants. The work can be considered as a bird's-eye view as the information collected and described here is, with no doubt, little, but without such information the botanical aspects of the area remain incomplete.

The work will surely provide much help for future workers in this field. The area consists of both irrigated and rain-dependent, regions which are much different in their floristic composition. Due to irrigation facilities the

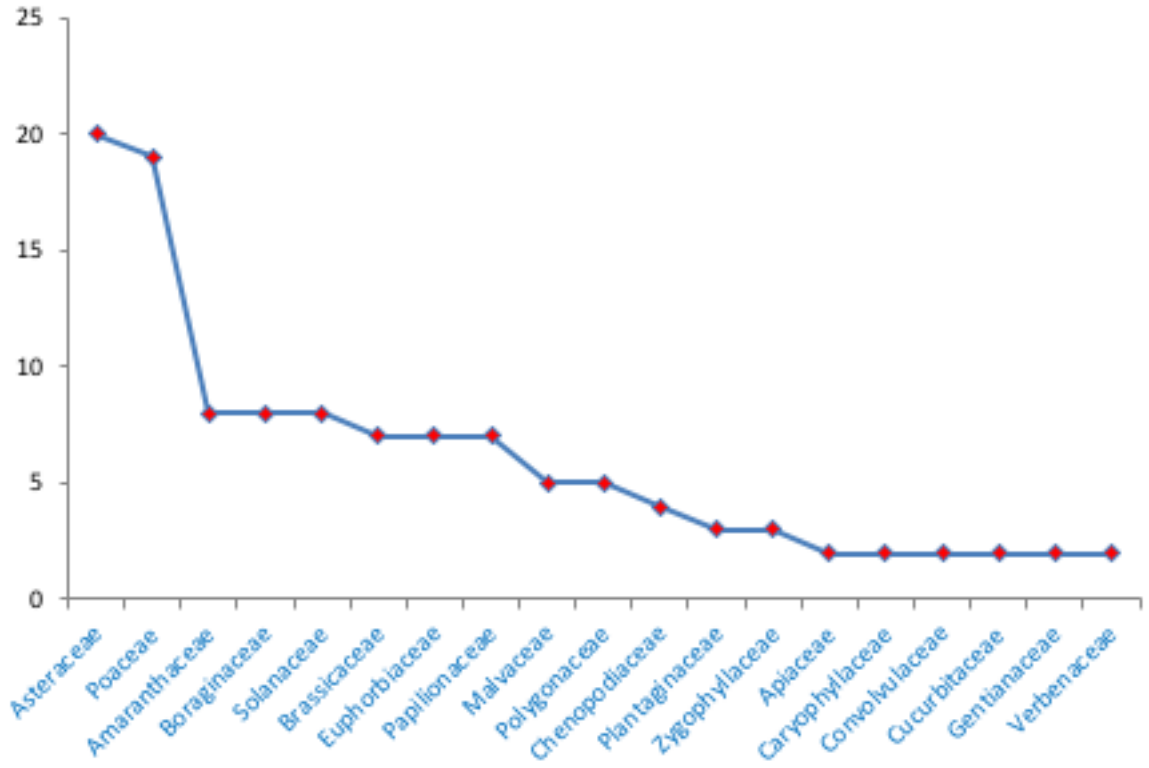

Figure 2. Families in the research area.

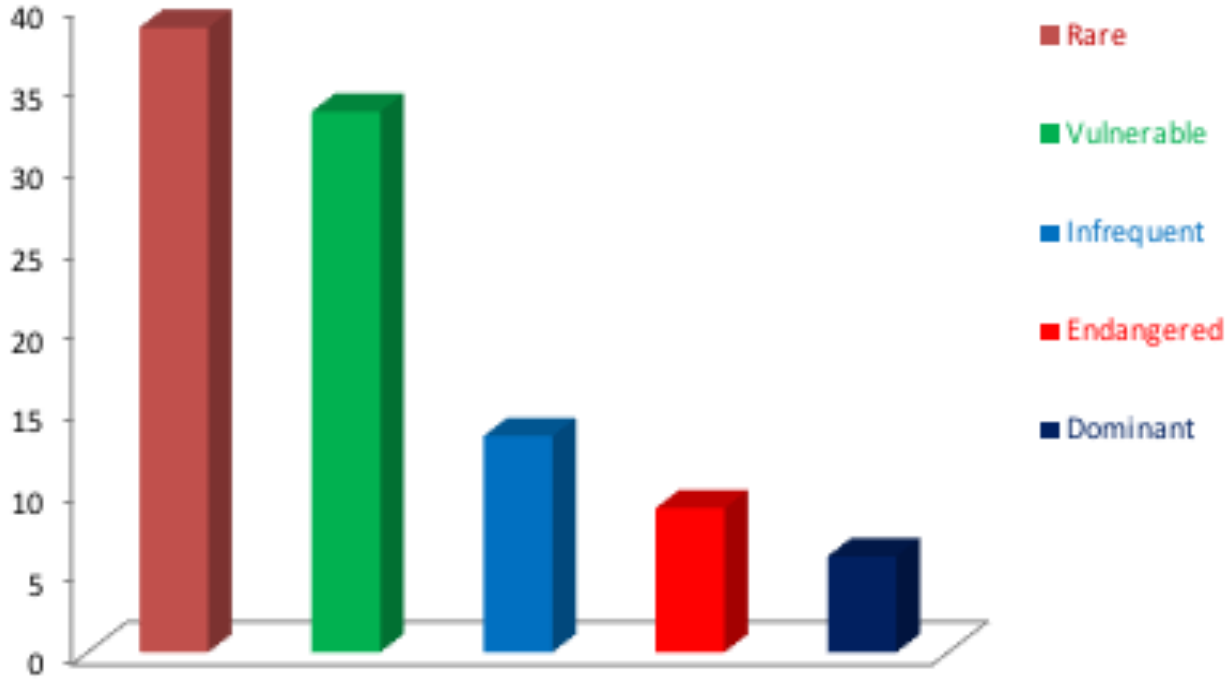

Figure 3. Conservation status of plant species in the research area.

flora, particularly cultivated flora, is very much different from the plants in the rain-dependent areas. Few fruit orchards can be seen in the research area. From the present investigation, it is noticed that each species have limited to a slight distribution range and definite habitat. The species habitat is concerned with the changes in location.

The main reasons behind the intermission and destruction of the environment of plants in the area include road structure, red bricks factories, oil and gas

Table 1. Floristic list and conservation status of some wild plant species in the Bannu District AY= Availability, CN= Collection, GH= Growth, PU= Plant used, TS= Total score, SS= Status, R= Rare, V= Vulnerable, I= Infrequent, E= Endangered, D= Dominant.

Botanical Name	**Family**	AY	CN	GH	PU	TS	SS
Abutilon indicum (L) Sweet	*Malvaceae*	2.5	0.4	1.4	3.6	7.9	V
Achyranthes aspera L.	*Amaranthaceae*	0.4	2.1	0.3	3.7	6.5	V
Achyranthes bidentata Blume	*Amaranthaceae*	2.9	2.5	2.7	2.9	11	R
Aerva javanica (Burm. f.) Juss.	*Amaranthaceae*	1.3	3.5	1.3	3.5	9.6	R
Alhagi maurorum Medic.	*Papilionaceae*	0.4	1.5	3.2	2.7	7.8	V
Alopecurus nepalensis Trin ex Steud	*Poaceae*	1.5	2.5	3.5	2.2	9.7	R
Alternanthera sessiles (L.) R.Br. Ex.Dc	*Amaranthaceae*	2.7	2.4	3.4	2.4	10.9	R
Amaranthus blitoides S. Watson	*Amaranthaceae*	2.6	2.4	3.4	2.4	10.8	R
Amaranthus viridis L.	*Amaranthaceae*	2.8	2.1	2.3	3.2	10.4	R
Anagallis arvensis L.	*Primulaceae*	2.3	1.4	0.9	3.8	8.4	R
Aristida adscensionis L.	*Poaceae*	2.1	1.6	0.8	3.4	7.9	V
Aristida cyanantha Nees ex Steud.	*Poaceae*	0.4	0.7	0.4	1.3	2.8	E
Arnebia hispidissima (Lehm.) A. DC.	*Boraginaceae*	2.5	2.5	3.7	3.6	12.3	I
Asphadelus tunifolius Car.	*Asphodelaceae*	1.3	0.7	1.5	2.8	6.3	V
Astragalus hamosus L.	*Papilionaceae*	1.6	2.2	3.6	3.5	10.9	R
Atriplex stocksii Boiss.	*Chenopodiaceae*	1.5	2.3	3.7	3.7	11.2	R
Avena fatua L	*Poaceae*	1.5	2.4	3.5	3.5	10.9	R
Boerhavia procumbens Banks ex Roxb	*Nyctaginaceae*	1.4	0.8	1.4	3.1	6.7	V
Brassica compestris L.	*Brassicaceae*	3.8	3.8	3.6	3.9	15.1	D
Brassica tournefortii Gouan	*Brassicaceae*	3.7	3.7	3.8	3.9	15.1	D
Calendula officinalis L.	*Asteraceae*	1.4	2.1	0.9	3.4	7.8	V
Calotropis procera (willd.) R. Br.	*Asclepiadaceae*	0.5	0.6	1.9	3.6	6.6	V
Carduus argentatus L.	*Asteraceae*	3.4	1.6	3.6	3.7	12.3	I
Carthamus persicus Willd	*Asteraceae*	3.2	1.7	3.8	3.7	12.4	I
Carthamus tinctorus L.	*Asteraceae*	2.4	1.3	3.8	3.7	11.2	R
Celosia argentea L.	*Amaranthaceae*	1.4	2.7	3.7	3.6	11.4	R
Cenchrus ciliaris L.	*Poaceae*	3.2	1.7	3.7	3.7	12.3	I
Centaurea iberica Spreng.	*Asteraceae*	0.7	0.7	1.3	0.7	3.4	E
Centaurium pulchellum (Sw.) Druce	*Gentianaceae*	0.6	0.8	1.2	0.6	3.2	E
Chenopodium ambrosioides L	*Chenopodiaceae*	1.2	1.3	1.2	3.7	7.4	V
Chenopodium album L.	*Chenopodiaceae*	1.3	2.5	3.7	3.8	11.3	R
Chenopodium murale L	*Chenopodiaceae*	2.4	3.7	3.6	3.7	13.4	I
Chrozophora plicata (Vahl) A. Juss. ex Spreng	*Euphorbiaceae*	2.8	2.9	3.6	3.6	12.9	I
Cirsium arvense (L) Scop	*Asteraceae*	2.8	2.8	3.7	3.8	13.1	I

Cistanche tubulosa (Shehenk.) Wight.	*Orobanchaceae*	0.5	1.7	0.8	0.9	3.9	E
Citrullus colocynthis (L.) Shred.	*Cucurbitaceae*	0.3	2.6	1.7	2.6	7.2	V
Convolvulus arvensis L	*Convolvulaceae*	0.5	2.1	0.4	3.6	6.6	V
Convolvulus spicatus Peter ex Hallier f.	*Convolvulaceae*	0.4	1.8	0.7	0.7	3.6	E
Conyza bonariensis (L.) Cronquist	*Asteraceae*	0.4	2.1	0.3	3.7	6.5	V
Corchorus depressus (L.) Stocks	*Tiliaceae*	2.9	2.5	2.7	1.7	9.8	R
Croton bonplandianus Bat.	*Euphorbiaceae*	2.4	2.5	2.9	1.7	9.5	R
Cymbopogon distense Schutt.	*Poaceae*	2.6	2.6	3.1	2.3	10.6	R
Cynodon dactylon (L.) Pers	*Poaceae*	0.4	2.3	3.2	1.7	7.6	V
Cyperus rotundus L.	*Cyperaceae*	1.5	2.5	3.5	2.2	9.7	R
Datura alba Nees.	*Solanaceae*	3.9	3.8	3.7	3.8	15.2	D
Dichanthium annulatum Forssk	*Poaceae*	1.5	0.9	1.4	3.5	7.3	V
Digera muricata (L.) Mart	*Amaranthaceae*	2.6	2.4	3.4	2.4	10.8	R
Dinebra retroflexa (Vahl) Panzer	*Poaceae*	2.3	1.4	0.9	3.8	8.4	R
Echinochloa crus-galli (L) P. Beauv	*Poaceae*	2.1	1.6	0.8	3.4	7.9	V
Echinops echinatus L.	*Asteraceae*	0.5	0.5	0.7	2.1	3.8	E
Eclipta alba (L.) Hassk.	*Asteraceae*	0.6	0.4	0.5	1.9	3.4	E
Eleusine indica (L) Gaertn	*Asteraceae*	1.3	0.7	1.5	2.8	6.3	V
Enneapogon avrnuceus (Lindl.) C. E. Hubbard	*Poaceae*	1.2	0.3	1.7	3.7	6.9	V
Eragrostis pilosa (L.) P. Beauv.	*Poaceae*	1.5	2.3	3.7	3.7	11.2	R
Eruca sativa Mill.	*Brassicaceae*	0.7	0.8	0.3	1.6	3.4	E
Erythraea ramosissima DC.	*Gentianaceae*	3.4	1.7	3.6	3.7	12.4	I
Euphorbia helioscopia L.	*Euphorbiaceae*	3.2	1.8	3.5	3.7	12.2	I
Euphorbia oblongata Griseb.	*Euphorbiaceae*	1.4	2.1	0.9	3.4	7.8	V
Euphorbia prostrata Ait.	*Euphorbiaceae*	1.7	0.4	1.8	3.5	7.4	V
Fagonia cretica L.	*Zygophyllaceae*	2.4	1.3	3.8	3.7	11.2	R
Farsetia jacquemontii (Hook.f. and Thoms.) Jafri	*Brassicaceae*	1.4	2.7	3.7	3.6	11.4	R
Filago pyramidata L.	*Asteraceae*	3.2	1.7	3.7	3.7	12.3	I
Fumaria parviflora Lam.	*Fumariaceae*	2.9	1.4	3.7	3.6	11.6	R
Galium tricorne Stokes	*Boraginaceae*	3.3	1.6	3.7	3.6	12.2	I
Helianthus annus L.	*Asteraceae*	1.2	1.3	1.2	3.7	7.4	V
Heliotropium crispum Desf.	*Boraginaceae*	1.4	1.4	0.9	3.4	7.1	V
Heliotropium europaeum (F. and M.) Kazmi	*Boraginaceae*	0.7	2.9	3.4	3.9	10.9	R
Heliotropium strigosum Willd.	*Boraginaceae*	0.5	0.4	0.7	2.2	3.8	E
Hibiscus trionum L.	*Malvaceae*	0.4	0.3	0.8	1.9	3.4	E
Hyoscyamus niger L.	*Solanaceae*	3.7	3.7	3.8	3.9	15.1	D
Hypecoum pendulum L.	*Papaveraceae*	0.5	2.5	1.6	2.5	7.1	V
Ifloga spicata Forssk.	*Asteraceae*	0.3	2.6	1.7	2.6	7.2	V
Iris lactea Pallas	*Iridaceae*	2.4	0.6	1.3	3.5	7.8	V
Lactuca serriola L.	*Asteraceae*	2.5	0.4	1.4	3.6	7.9	V
Lathyrus aphaca L.	*Papilionaceae*	2.9	2.5	2.7	1.7	9.8	R

Launaea angustifolia (Desf.) Kuntze	*Asteraceae*	2.4	2.5	2.9	1.7	9.5	R
Launaea procumbens (Roxb.) Ramayya and Rajagpal	*Asteraceae*	2.6	2.6	3.1	2.3	10.6	R
Leptochloa panicea (Retz) Ohwi	*Poaceae*	1.3	3.5	1.3	3.5	9.6	R
Linum corymbulosum Reichenb.	*Linaceae*	0.4	2.3	3.2	1.7	7.6	V
Malcolmia Africana (L.) R.Br.	*Brassicaceae*	1.5	2.5	3.5	2.2	9.7	R
Malva neglecta Wallr	*Malvaceae*	2.3	1.6	0.7	3.2	7.8	V
Malvastrum coromandelianum (L.) Garcke	*Malvaceae*	1.5	0.9	1.4	3.5	7.3	V
Medicago polymerpha L.	*Papilionaceae*	2.6	2.4	3.4	2.4	10.8	R
Melilotus parviflora (L) All.	*Papilionaceae*	2.8	2.1	2.3	3.2	10.4	R
Nerium indicum Mill.	*Apocynaceae*	0.4	1.6	0.7	0.7	3.4	E
Neslia apiculata Fisch.	*Brassicaceae*	2.1	1.6	0.8	3.4	7.9	V
Nicotiana plumbaginifolia Viv.	*Solanaceae*	2.2	1.7	0.4	3.1	7.4	V
Nonea philistaea Boiss.	*Boraginaceae*	1.7	0.4	1.8	3.5	7.4	V
Nonea pulla (L.) DC.	*Boraginaceae*	1.5	0.7	1.4	3.6	7.2	V
Oligomeris linifolia (Vahl.) Macbride	*Resedaceae*	1.5	2.3	3.7	3.7	11.2	R
Onosma chitralicum I. M. Johnston	*Boraginaceae*	1.5	2.4	3.5	3.5	10.9	R
Oxalis corniculata L.	*Oxalidaceae*	2.9	2.5	2.6	2.7	10.7	R
Oxyria digyna (L.) Hill	*Polygonaceae*	2.5	0.4	1.4	3.6	7.9	V
Parthenium hysterophorus L.	*Asteraceae*	0.4	2.1	0.3	3.7	6.5	V
Pegnum harmala L.	*Zygophyllaceae*	2.9	2.5	2.7	2.9	11	R
Phalaris minor Retz	*Poaceae*	1.3	3.5	1.3	3.5	9.6	R
Phyla nodiflora L.	*Verbenaceae*	0.4	1.5	3.2	2.7	7.8	V
Phyllanthus niruri L.	*Euphorbiaceae*	1.5	2.5	3.5	2.2	9.7	R
Physalis angulata L	*Solanaceae*	2.7	2.4	3.4	2.4	10.9	R
Plantago lanceolata L.	*Plantaginaceae*	2.6	2.4	3.4	2.4	10.8	R
Plantago ovate Forssk	*Plantaginaceae*	2.8	2.1	2.3	3.2	10.4	R
P*oa botryoides* (Trin. ex Griseb.) Kom.	*Poaceae*	2.3	1.4	0.9	3.8	8.4	R
Poa bulbosa L.	*Poaceae*	2.1	1.6	0.8	3.4	7.9	V
Polygonum barbatum L.	*Polygonaceae*	3.8	3.9	3.6	3.8	15.1	D
Polygonum biaristatum Aitch and Hemsl	*Polygonaceae*	2.5	2.5	3.7	3.6	12.3	I
Polygonum plebejum R.Br	*Polygonaceae*	1.3	0.7	1.5	2.8	6.3	V
Portulaca oleracea L.	*Aizaaceae*	1.6	2.2	3.6	3.5	10.9	R
Psammogeton biternatum Edgew.	*Apiaceae*	1.5	2.3	3.7	3.7	11.2	R
Ranunculus muricatus L.	*Ranunculaceae*	1.5	2.4	3.5	3.5	10.9	R
Ricinus communis L.	*Euphorbiaceae*	2.5	1.4	3.8	3.7	11.4	R
Rumex dentatus (Meisn)Rech.f	*Polygonaceae*	3.8	3.8	3.6	3.9	15.1	D
Sacharum arundinaceum H. K. F	*Poaceae*	0.4	0.7	0.4	1.3	2.8	E
Salvia plebeia R.Br	*Lamiaceae*	1.4	2.1	0.9	3.4	7.8	V
Setaria pumila (Poir.) Poam	*Poaceae*	0.5	0.6	1.9	3.6	6.6	V

Sida cardifolia L.	*Malvaceae*	3.4	1.6	3.6	3.7	12.3	I
Silene vulgaris (Moench) Garcke,	*Caryophyllaceae*	3.2	1.7	3.8	3.7	12.4	I
Sisymbrium irio L.	*Brassicaceae*	2.4	1.3	3.8	3.7	11.2	R
Solanum nigrum L	*Solanaceae*	1.4	2.7	3.7	3.6	11.4	R
Solanum surattense Burm. f	*Solanaceae*	3.2	1.7	3.7	3.7	12.3	I
Sonchus asper (L.) Hill	*Asteraceae*	2.9	1.4	3.7	3.6	11.6	R
Sorghum halepense (L.) Pers	*Poaceae*	3.8	3.9	3.9	3.9	15.5	D
Spergula fallax (Lowe) E. H. L. Krause	*Caryophyllaceae*	1.2	1.3	1.2	3.7	7.4	V
Taraxacum officinale F.H Wiggers	*Asteraceae*	1.3	2.5	3.7	3.8	11.3	R
Torilis nodosa (L.) Gaertn.	*Apiaceae*	2.4	3.7	3.6	3.7	13.4	I
Tribulus terrestris L.	*Zygophyllaceae*	2.8	2.9	3.6	3.6	12.9	I
Trichosanthes dioica Roxb	*Cucurbitaceae*	2.8	2.8	3.7	3.8	13.1	I
Trigonella corniculata (L.) Linn.	*Papilionaceae*	3.8	3.9	3.9	3.8	15.4	D
Typha orientallis C.Presl	*Typhaceae*	0.3	2.6	1.7	2.6	7.2	V
Verbena officinalis L.	*Verbenaceae*	0.5	2.1	0.4	3.6	6.6	V
Veronica agrestis L.	*Plantaginaceae*	2.5	0.4	1.4	3.6	7.9	V
Vicia hirsute (L) S.F. Gray.Nat.	*Papilionaceae*	0.4	2.1	0.3	3.7	6.5	V
Withania coagulans Dunal.	*Solanaceae*	2.9	2.5	2.7	1.7	9.8	R
Withania somnifera L.	*Solanaceae*	2.4	2.5	2.9	1.7	9.5	R
Xanthium strumarium L.	*Asteraceae*	2.6	2.6	3.1	2.3	10.6	R
Zeuxine strateumatica (L.) Schlechter	*Orchidaceae*	0.4	2.3	3.2	1.7	7.6	V

reservoirs. Khan *et al.,* (2011) and Khan and Hussain, (2013) stated that erosion causes a severe damage during rains, individuals of plant species growing in sandy and river banks were found to be more vulnerable to erosion than the plants found on slopes and cliffs. Such situation was also found in the research area and the results of the study agreed with the findings of these workers. The present study indicates that the whole plant is commonly used against different diseases and as food. The observations from the local people confirm that the richness and diversity of plants are declining, while at the same time, the number of plants used as medicine increased gradually with the increasing awareness in the research area.

Similar finding were also reported from other areas of Pakistan (Hussain, *et al*., 2006; Shinwari, 2010; Khan *et al*., 2011a,b, 2012, 2013b,c). According to Khan and Hussain (2012), the population size is often affected by the dry periods during the growing season. Those species which are found over a wide geographic range, but are consistently rare throughout their distribution, need immediate attention (Rabinowitz, 1981). Grazing is an ecological problem observed more in the rain-dependent areas than the irrigated areas, and is believed to change the habitat of the native flora.

The force and effect of grazing range from almost the invisible removal of plant materials to the harsh reduction of vegetation wealth and the following extensive erosion (Khan and Hussain, 2012b). From the conservation point of view, endangered species were reported from few localities in the research area. According to Davis *et al*., (1995), no accurate information has been published about the impacts of the unsustainable use of plant species. Hence, urgent conservation steps must be taken to avoid the eradication of wild plants from the research area.

The plant species are a major source

of medicine in addition to fulfilling other requirements for the local communities. The herbs are not used properly because of the shortage of trained manpower and resources. The local people collect whole plants along with their roots to be used as food and for treatment. According to (Engler, 2008; Khan, *et al*., 2012b; Khan and Musharaf, 2014), the over-exploitation of plant species for medicinal and food purposes by the local communities and migrants is a complex problem and a major cause of plant extinction.

It has been noted that the elderly people have more knowledge about the folk uses and conservation of medicinal plants than the younger generation. Most of the plants used by the local people are not conserved but are over-exploited in the research area. Therefore, there is an urgent need for conserving these plants so that the future generations may benefit from these valuable herbs that constitute a real gift from nature to mankind.

Conclusion

Local people use plants as medication, food, fodder for cattle, and even for cosmetic purposes. The number of women using allopathic medicine is negligible because of their dependence on medicines from local plants. These plants are also a source of relations between the women and the natural resources of the area.

The investigated area has a rich diversity of medicinal plants and provides a conductive habitat and ideal conditions for their growth. It is necessary to stop the collection of whole plants and their smuggling to other districts. Alternate environmentally-friendly and sustainable jobs should be provided for the local inhabitants for the sake of maintaining a living properly.

Acknowledgements

Authors are grateful to the local people of area, who have revealed the precious information about conservation position of plant species. Special thanks to Mr. M. Farman and Abdussamad for their hospitability during research work.

Disclosure of Conflict of Interest

The authors declare no conflict of interests.

References

Alam, J and Ali, SI . 2009. Conservation status of *Astraglus gilgitensis* Ali (Fabaceae): a critically endangered species in Gilgit district, Pakistan. *Phyton (Horn, Austria)*. **48(2):** 211-223.

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

Ali, SI and Nasir, YJ. 1990-1992. **Flora of Pakistan**. No. 191-193. Department of Botany, University of Karachi, Karachi.

Anonymous. 2001. IUCN Red List Categories: Version 3.1. Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.

Anonymous. 2008. IUCN Red List of threatened species, www.iucnredlist.org cited on December 27th 2009.

Davis, SD, Heywood,VH and Hamilton, AC. 1995. **Centers of Plant Diversity: a Guide and Strategy for their Conservation**, Vol. 2 (Asia, Australasia and the Pacific). Cambridge: IUCN.

Engler, M. 2008. The Value of International Trade. *Traffic Bulletin*, **22(1)**: 4-5.

Govaerts, R. 2001. How many species of seed plants are there? *Taxon*, **50(4):** 1085-1090.

Hussain, F, Badshah, L and Dastigar, G. 2006. Folk medicinal uses of some plants of South Waziristan, Pakistan. *Pakistan Journal of Plant Sciences,***12**: 27-40.

Khan, M. 2013. Dimension and composition of plant life in Tehsil Takht-e-Nasrati, District Karak, Khyber Pakhtunkhawa, Pakistan. PhD. Thesis (Plant Ecology), Department of Botany, University of Peshawar, Pesha-

war, Pakistan.

Khan, M and Hussain, F. 2012b. Palatability and animal preferences of plants in Tehsil Takht-e-Nasrati, District Karak, Pakistan. *African Journal of Agricultural Research*, **7(44):** 5858-5872. DOI: 10.5897/AJAR12.2095

Khan, M and Hussain, F. 2013. Conservation status of plant species in Tehsil Takht-e-Nasrati, District Karak, Khyber Pakhtunkhawa, Pakistan. *International Journal of Biodiversity and Conservation*, **5(1):** 20-26. DOI: 10.5897/IJBC12.003

Khan, M, Hussain, F and Musharaf, S. 2011 A fraction of fresh water algae of Kalpani stream and adjoining area of district Mardan, Pakistan. *International Journal of Biosciences*, **1(3):** 45-50.

Khan, M, Hussain, F and Musharaf, S. 2012a. Conservation Status of Tree species in Tehsil Takht-e-Nasrati, Karak Pakistan. *Journal of Biodiversity and Environmental Sciences*, **2(3):** 48-56.

Khan, M, Hussain, F and Musharaf, S. 2012b. Maturity dynamism of plant life in Tehsil Takht-e-Nasrati, District Karak, Pakistan. *International Journal of Biosciences*, **2(3):** 67-74.

Khan, M, Hussain, F and Musharaf, S. 2013b. Floristic composition and biological characteristics of the vegetation of Sheikh Maltoon Town, District Mardan, Pakistan. *Annual Review and Research in Biology*. **3(1):** 31-41.

Khan, M, Hussain, F and Musharaf, S. 2013c. Ethnobotanical profile of Tehsil Takht-e-Nasrati, District Karak, Pakistan. *Journal of Medicinal Plant Research*. **7(22):** 1636-1651, DOI: 10.5897/JMPR12.1168.

Khan, M and Musharaf, S. 2014. Conservation Position of Plant Species in Tehsil Katlang, District Mardan, Pakistan. *Medicinal Plant Research*, **4(7):** 9-15.

Khan, M, Musharaf, S and Shinwari, ZK. 2011b. Ethnobotanical importance of halophytes of Noshpho salt mine, District Karak, Pakistan. *Research In Pharmaceutical Biotechnology*, **3(4):** 46-52.

Khan, M, Shinwari, ZK and Musharaf, S. 2011a. Conservation and ecological characteristic of Trees in Tehsil Karak Pakistan. *Journal of Biodiversity and Environmental Sciences*, **1(6):** 155-164.

Khan. M, Hussain, F and Musharaf, S. 2013a. Biodiversity of plant species in Tehsil Takht-e-Nasrati, Pakistan. *International Journal of Biodiversity and Conservation*, **5(1):** 39-46. DOI: 10.5897/IJBC12.130.

Murad, W, Ahmad, A, Gilani, SA and Khan, MA. 2011. Indigenous knowledge and folk use of medicinal plants by the tribal communities of Hazar Nao Forest, Malakand District, North Pakistan. *Journal of Medicinal Plants Research*. **5(7):** 1072-1086.

Nasir, E and Ali, SI. 1970-89. **Flora of West Pakistan**. No. 1-190. Department of Botany, University of Karachi, Karachi.

Rabinowitz, D. 1981. Seven forms of rarity. *In*: Synge, H. (Eds), **The Biological Aspects of Rare Plant Conservation.** Wiley and Sons Ltd. 205-217.

Shenji, P. 1994. Himalayan Biodiversity Conservation Strategies. Himavikes Pub. No.3.

Shinwari, ZK. 2010. Medicinal plants research in Pakistan. *Journal of Medicinal Plants Research*, **4:** 161-176.