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Plants That No Body Wanted: An Assessment of the Conservation Status of Plant in Mohmand Agency FATA, Pakistan

Shah Khalid*, Syed Zahir Shah

Islamia College Peshawar, Pakistan

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Key words: Biotic Stress, Conservation status, Wild Flora, IUCN Criteria, Mohmand Agency.

Abstract

The current study was an attempt to encompass the conservation status of plants of Mohmand Agency, (FATA) Pakistan. IUCN Criteria was followed for the assessment of the conservation status of the plants in the area. Total 170 plants, belonging to 48 families were reported from the area out of which 13 (7.6%) plants were found to be endangered. These plants include *Albizia lebbek Tamarix indica*, *Tecomella undulata*, *Acacia modesta*, *Acacia nilotica*, *Pinus roxburgii*, *Ziziphus mauritiana*, *Caralluma tuberculata*, *Cotoneaster nummularia*, *Dodonaea viscosa*, *Nannorhops ritchiana*, *Olea ferruginea* and *Salvadora persica*. Biotic stress is extremely high due to anthropogenic disturbances and overgrazing, making 32 (18%) plants vulnerable, 87 (51%) rare and 38 (22%) plants infrequent. Fabaceae family was the most affected one, with 3 species being endangered, followed by Apocynaceae, Arecaceae, Bignoniaceae, Oleaceae, Pinaceae, Rhamnaceae, Rosaceae, Salvadoraceae, Sapindaceae and Tamaricaceae with 1 species each. In vulnerable status, Poaceae was the highest threatened family with 7 species, followed by Brassicaceae with 4, fabaceae with 3 and Apocynaceae and Rhamnaceae with 1 species each. There were 13 rare plants each in family Asteraceae and Poaceae. Highest number of infrequent plants belong to Asteraceae family (7), followed by Lamiaceae and Brassicaceae with 5 species each. Current status of the plants was attributed to the biological disturbance, habitat loss, habitat modification and political instability of the region, which has decreased the wild flora over the last few decades decreased over the last few decades due to intense biotic stress.

***Corresponding Author:** Shah Khalid ✉ shahkhalid@icp.edu.pk

Introduction

Plants are an important part of biodiversity, which have an enormous effect on the ecosystem. They live of other living organism, including human (Ahmad *et al*., 2010; Bocuk *et al*., 2011) having all the essential requirement for their life (Morgan, 1981). It is observed that loss of many plants form the tropical forest is due to the destruction and degradation of natural habitats by the activities of humans (Wilson, 1998). In the same manner the plants in the Himalayan region of Pakistan are facing this problem due to intense anthropogenic disturbance (Khan *et al*., 2014).

The destruction of fauna is not only the destruction of plants, but a threat human civilization (Dyke, 2003). It is not the loss of a single plant, it's a loss of an ecosystem (Ellison *et al*., 2005). It has been noted that with the extinction of a single species whole surroundings are affected; single species can structure and define an ecological system (Ellison *et al*., 2010). It has been reported that loss of a single species can result in the loss of 30 different other species (Krishnamurthy, 2003).

It is widely accepted that extinction rate of plants has a touched a level that we are losing one species each day, which is ten to ten thousand time faster than its natural rate (Hilton-Taylor, 2000; Akeroyd, 2002). Loss of this level is due to loss and alteration of habitat, urbanization, introduction of new invasive species, plant disease and pollution along with global climatic change (Thomas *et al*., 2004). Number of plants, that are threatened, have almost crossed 80,000 species (Butt *et al*., 2015). We are endangering the plants now with our own activities (Hamilton & Hamilton, 2006).

Pakistan, along with other issues, has this important issue of loss of biodiversity (Alam and Ali, 2010). This region of the world, supporting a wide range of different ecosystems (Khan *et al*., 2014), has 6000 different plant species (Ali and Qaisere, 2010). Rapid urbanization (Butt *et al*., 2015) and lack of proper knowledge and techniques for the collection and use of plants (Ahmad, 2007; Razzaq *et al*., 2015) has led to the extinction of many plants. About 10% of the total reported flora of Pakistan is endangered (Shinwari *et al*., 2012). The data about the current conservation status of plants in Pakistan has some controversies as in some reports 709 plants are threatened (Chaudhri and Qureshi, 1991), according to some others, 580 plants (Nasir, 1991); a recent studies showed that only 21 plants are at threatened level (Ali and Qaiser, 2010). Walter and Gillet (1998) have stated that only 14 plants are threatened. IUCN is considered the most authoritative and comprehensive source of the global biodiversity conservation status (IUCN, 2004; Jamal, 2009). According to IUCN (1994) report, 20 plants species are under the title of threatened species (Shah and Baig, 1999). In 2008 IUCN survey showed 19 plants to be threatened.

It is the job of ecologist to find out to understand the intimate ties, that human has with other form and biodiversity, and make him aware of the importance of biodiversity (Davis and Richardson, 1995). This will result in a changed approached towards biodiversity (Ramakrishnan *et al*. 1998, Mishra *et al*. 2003). Conservation awareness should be given proper weightage and it must be promoted just like our culture (Long Chunlin and Pei Shengji, 2003). In Pakistan a few projects have been launched for the assessment and conservation of natural flora (Jan *et al*., 2014).

The present study is an effort to understand the relationship of human with plants, and their role in the conservation status of the plants in Mohmand Agency. Mohmand Agency (FATA) is a district in Pakistan, lying on Durand Line between Pakistan and Afghanistan (34.5000° N, 71.3333° E). It is part of a narrow strip of land that is lying on the Pakistan-Afghanistan border. People of the area are having a high degree of dependency on the plants; and the plants are used as fuel, fodder, medicine, timber and for many other purposes. Due to the less development

and conservative nature of the people (Ahmad, 1980), they very much related to natural resources of the region and mostly with plants, for their various daily uses. Extensive usage of the plants, made many of plants very rare in the area (locals of the area.).

Materials and methods

Mohmand Agency was thoroughly visited and interviews were taken from the 100 local individuals including elder men (40%), and women (15%), as elders are considered more informative about the uses of the plants (Mussarat *et al.*, 2014), "hakeems"- a local medical practitioner who prescribe mostly herbal medicines (15%) some youngsters (10%) and herders (20%), following the Code of Ethics (The ISE Code of Ethics, 2006). The plants were collected, identified and confirmed from flora of Pakistan, mounted and vouchered, and were submitted to Department of Botany, Islamia College Peshawar.

For identification of the conservation status, IUCN criteria (Anon, 2001; Shah and Hussain, 2012; Bacha, 2013) was followed, and the plants were divided into 5 categories, on the bases of their availability, collection, growth and part used. Scores were assigned to the plants according to the given criteria (Table 1).

Results

Plants were divided into 5 categories that were reflecting their conservation status. Total 170 plants belonging to 48 families were found in Mohmand agency that were assessed for their conservation status. It was reported that 13 plants were found to be endangered.

Table 1. IUCN Criteria Followed For Assigning Plant to Different Conservation Categories.

Score	*Availability*	*Collection*	*Growth*	*Part used*	
0	Uncommon or very rare	< 1000 kg/yr	Regrowth in more 3 years	Root/Whole plant	
1	Less common or rare	500-1000 kg/yr	Regrowth within 3 years	Bark	
2	Occasional	300-500 kg/yr	Regrowth within 2 years	Seeds, Fruits	
3	Abundant	100-200 kg/yr	Regrowth within 1 year	Flowers	
4	NA	NA	Regrowth in a season	Leaves/Gum/Latex	
Plants in Different Categories on the Bases of Their Score					
Total	0-4	5-8	9-12	13-14	15-16
Category	E	V	R	I	D

E: Endangered; **V**: Vulnerable; **R**: Rare; **I**: Infrequent; **D**: Dominant.

These plants include *Albizia lebbek Tamarix indica*, *Tecomella undulata*, *Acacia modesta*, *Acacia nilotica*, *Pinus roxburgii*, *Ziziphus mauritiana*, *Caralluma tuberculata*, *Cotoneaster nummularia*, *Dodonaea viscosa*, *Nannorhops ritchiana*, *Olea ferruginea* and *Salvadora persica* (Table 2, Fig. 1).

Monotheca buxifolia, *Rhazya stricta*, *Sageretia thea*, *Ziziphus nummularia*, *Peganum harmala*, *Periploca aphylla*, *Ephedra intermedia* and *Withania coagulans*, along with other 32 plants were found to be vulnerable. *Fagonia indica*, *Nerium indicum* and *Cassia senna* were among 88 plants that are rare. Thirty two plants were found to be infrequent, including *Forskaolea tenacissima*, *Aristida cyanantha*, *A. adscensionis* and *Verbascum thapsus* (Table 2).

There was no dominant species in the area, which is clear from the environmental condition and annual rain fall of the area.

Among the 48 families, Fabaceae was the most affected family with 3 endangered species, followed by Apocynaceae, Arecaceae, Bignoniaceae, Oleaceae, Pinaceae, Rhamnaceae, Rosaceae, Salvadoraceae, Sapindaceae and Tamaricaceae with 1 species each. In vulnerable status, Poaceae was the highest threatened family with 7 species, followed by Brassicaceae with 4, fabaceae with 3, Apocynaceae and Rhamnaceae with 1 species each (Table 2).

Table 2. Plants with Families and Conservation Status.

Serial	*Family*	*Plant*	*A*	*C*	*G*	*PU*	*TS*	*Status*
1	1.Acanthaceae	*Diclipetra bupleuroides* Nees	1	3	3	4	11	Rare
2		*Justicia adhatoda* L.	1	3	3	4	11	Rare
3	2.Aizoaceae	*Trianthema portulacastrum* L.	1	2	4	0	7	Vulnerable
4	3.Amaranthaceae	*Achyranthes aspera* L.	0	3	3	4	10	Rare
5		*Aerva javanica* (Burm. f.) Juss.	2	3	4	4	13	Infrequent
6		*Chenopodium album* L.	3	3	3	0	9	Rare
7		*Chenopodium murale* L.	3	3	3	0	9	Rare
8		*Pupalia lappacea* (L.) Juss.	1	3	4	4	12	Rare
9		*Salsola kali* L.	2	3	4	4	13	Infrequent
10		*Suaeda aegyptiaca* (Hasselq.) Zohary	2	3	4	4	13	Infrequent
11	4.Amaryllidaceae	*Allium griffithianum* Boiss.	1	3	4	4	12	Rare
12	5.Apocynaceae	*Calotropis procera* (Aiton) W.T. Aiton	2	3	2	4	11	Rare
13		*Caralluma tuberculata* N.E. Br.	0	1	3	0	4	Endangered
14		*Nerium indicum* Mill.	3	3	0	4	10	Rare
15		*Periploca aphylla* Decne.	1	3	0	4	8	Vulnerable
16		*Rhazya stricta* Decne.	3	2	0	0	5	Vulnerable
17	6.Arecaceae	*Nannorrhops ritchiana* (Griff.) Aitch.	0	0	0	4	4	Endangered
18	7.Asparagaceae	*Asparagus gracilis* Salisb.	1	3	3	4	11	Rare
19		*Asparagus setaceus* (Kunth) Jessop	1	3	3	4	11	Rare
20		*Scilla griffithii* Hochr.	1	3	3	4	11	Rare
21	8.Asteraceae	*Artemisia maritima* Ledeb.	1	3	4	0	8	Vulnerable
22		*Calendula arvensis* L.	3	3	3	4	14	Infrequent
23		*Carthamus lanatus* L.	3	3	3	4	13	Infrequent
24		*Carthamus oxycantha* M.Bieb.	3	3	3	2	11	Rare
25		*Centauria iberica* Trevir. ex Spreng.	2	3	4	4	13	Infrequent
26		*Cousinia prolifera* Jaub. & Spach	3	3	3	4	13	Infrequent
27		*Crepis sancta* (L.) Babc.	3	3	4	4	14	Infrequent
28		*Echinops echinatus* Roxb.	2	3	1	4	10	Rare
29		*Erigeron trilobus* (Decne.) Boiss.	1	3	3	0	7	Vulnerable
30		*Filago hurdwarica* (Wall. ex DC.) Wagenitz	3	3	4	0	10	Rare
31		*Filago pyramidata* L.	2	3	4	0	9	Rare
32		*Ifloga spicata* (Forssk.) Sch. Bip.	2	3	3	4	12	Rare
33		*Lactuca serriola* L.	3	3	3	4	13	Infrequent
34		*Lactuca tatarica* (L.) C.A. Mey.	2	3	3	4	12	Rare
35		*Launaea procmbens* (Roxb.) Ramayya & Rajagopal	2	3	3	4	12	Rare
36		*Pentanema vestitum* Y. Ling	2	3	3	4	12	Rare
37		*Phagnolon niveum* Edgew.	2	3	3	4	12	Rare
38		*Pterachaenia stewartii* (Hook.f.) R.R.Stewart	1	3	3	4	11	Rare
39		*Saussurea heteromalla* (D. Don) Hand.-Mazz.	2	3	3	4	12	Rare
40		*Silybum marianum* (L.) Gaertn.	2	3	3	2	10	Rare
41		*Sonchus asper* (L.) Hill	3	3	3	4	13	Infrequent
42		*Taraxacum officinale* F.H. Wigg.	3	3	4	4	14	Infrequent

43	9.Bignoniaceae	*Tecomella undulata* (Sm.) Seem.	0	2	0	0	2	Endangered
44	10.Boraginaceae	*Anchusa arvensis* (L.) M. Bieb.	2	3	3	4	7	Vulnerable
45		*Arnebia griffithii* Boiss.	2	3	3	4	12	Rare
46		*Ehretia obtusifolia* Hochst. ex A. DC.	1	3	0	4	8	Vulnerable
47		*Heliotropium europaeum* L.	3	3	4	4	14	Infrequent
48		*Heliotropium ovalifolium* Forssk.	3	3	4	0	10	Rare
49		Nonea caspica (Willd.) G. Don	2	3	3	4	12	Rare
50		*Nonea edgeworthii* A. DC.	1	3	3	4	11	Rare
51		*Onosma hispida* Wall. ex G. Don	1	3	3	4	11	Rare
52	11.Brassicaceae	*Alyssum desertorum* Stapf	3	2	3	0	8	Vulnerable
53		*Arabidopsis thaliana* (L.) Heynh.	2	2	3	0	7	Vulnerable
54		*Capsella bursa-pastoris* (L.) Medik.	2	3	3	0	8	Vulnerable
55		*Cardaria draba* (L.) Desv.	1	3	3	0	7	Vulnerable
56		*Coronopus didymus* (L.) Sm.	2	3	4	4	13	Infrequent
57		*Farsetia jacquemontii* Hook. f. & Thomson	2	3	4	4	13	Infrequent
58		*Goldbachia laevigata* (M. Bieb.) DC.	2	3	3	4	12	Rare
59		*Lepidium apetalum* Willd.	2	3	4	4	13	Infrequent
60		*Malcolmia africana* (L.) W.T. Aiton	3	2	4	4	13	Infrequent
61		*Malcolmia cabulica* (Boiss.) Hook. f. & Thomson	3	2	4	4	13	Infrequent
62		*Sisymbrium irio* L.	2	3	3	4	12	Rare
63	12.Cannabaceae	*Cannabis sativa* L.	2	3	3	4	12	Rare
64	13.Capparaceae	*Capparis decidua* (Forssk.) Pax	1	3	3	4	12	Rare
65	14.Caprifoliaceae	*Lonicera japonica* Thunb.	0	3	0	4	7	Vulnerable
66		*Scabiosa olivieri* Coult.	1	3	4	4	12	Rare
67	15.Caryophyllaceae	*Arenaria serpyllifolia* L.	2	3	3	0	8	Vulnerable
68		*Herneraria cinerea* DC	2	3	4	0	9	Rare
69		*Herneraria hirsuta* L.	3	3	4	0	10	Rare
70		*Silene apetala* Willd.	3	3	4	4	14	Infrequent
71		*Spergula arvensis* L.	1	3	3	4	11	Rare
72		*Vaccaria hispanica* (Mill.) Rauschert	2	3	3	4	12	Rare
73		*Velezia rigida* L.	2	2	4	0	8	Vulnerable
74	16.Cleomaceae	*Cleome brachycarpa* M. Vahl ex Triana & Planchon	2	3	3	0	8	Vulnerable
75	17.Cucurbitaceae	*Citrullus colocynthis* (L.) Schrad.	0	3	4	4	11	Rare
76	18.Ephedraceae	*Ephedra intermedia* Schrenk ex C.A. Mey.	0	3	0	4	7	Vulnerable
77	19.Euphorbiaceae	*Euphorbia granulata* Forssk.	2	3	4	4	13	Infrequent
78	20.Fabaceae	*Acacia modesta* Wall.	3	0	0	0	3	Endangered
79		*Acacia nilotica* (L.) Willd. ex Delile	3	0	0	0	3	Endangered
80		*Albizia lebbeck* (L.) Benth.	1	1	0	0	2	Endangered
81		*Astragalus hamosus* L.	3	3	3	0	9	Rare
82		*Astragalus pyrrhotrichus* Boiss.	2	3	3	0	8	Vulnerable
83		*Astragalus scorpioides* Pourr. ex Willd.	1	3	3	4	11	Rare
84		*Astragalus tribuloides* Delile	3	2	1	4	10	Rare
85		*Cassia senna* L.	0	3	3	2	8	Vulnerable
86		*Medicago minima* (L.) L.	3	3	4	4	14	Infrequent

87		*Trigonella incisa* Hornemann ex Fischer & Meyer	3	3	4	0	10	Rare
88		*Vicia sativa* L.	1	2	3	0	6	Vulnerable
89	21.Geraniaceae	*Erodium alnifolium* Guss.	2	3	4	4	13	Infrequent
90		*Erodium ciconium* (L.) L'Hér. ex Aiton	2	3	4	4	13	Infrequent
91		*Erodium cicutarium* (L.) L'Hér. ex Aiton	2	3	4	4	13	Infrequent
92		*Geranium rotundifolium* L.	2	3	1	4	10	Rare
93	22.Lamiaceae	*Ajuga bracteosa* Wall. ex Benth.	2	3	4	4	13	Infrequent
94		*Mentha longifolia* (L.) Huds.	2	2	4	4	12	Rare
95		*Micromeria biflora* (Buch.-Ham. ex D. Don) Benth.	2	3	4	4	13	Infrequent
96		*Nepeta raphanorhiza* Benth.	1	3	3	4	11	Rare
97		*Otostegia limbata* (Benth.) Boiss.	2	3	2	4	11	Rare
98		*Salvia aegyptiaca* L.	3	3	4	4	14	Infrequent
99		*Salvia moocroftiana* Wall. ex Benth.	2	3	4	4	13	Infrequent
100		*Teucrium stocksianum* Boiss.	2	3	3	4	12	Rare
101		*Ziziphora tenuior* L.	3	3	4	4	14	Infrequent
102	23.Linaceae	*Linum corymbulosum* Rchb.	2	3	4	4	13	Infrequent
103	24.Malvaceae	*Malva neglecta* Wallr.	2	2	4	4	12	Rare
104		*Malva parviflora* L.	1	2	4	4	11	Rare
105	25.Nitrariaceae	*Peganum harmala* L.	3	2	3	0	8	Vulnerable
106	26.Nyctaginaceae	*Boerhavia procumbens* Banks ex Roxb.	2	3	4	0	9	Rare
107	27.Oleaceae	*Olea ferruginea* Royle	2	2	0	0	4	Endangered
108	28.Papveraceae	*Fumaria indica* Pugsley	2	3	4	4	13	Infrequent
109		*Papaver rhoeas* L.	2	3	3	2	10	Rare
110	29.Pinaceae	*Pinus roxburgii* Sarg.	0	3	0	0	3	Endangered
111	30.Plantaginaceae	*Kickxia incana* (Wall.) Pennell	2	3	3	4	12	Rare
112		*Kickxia ramosissima* Janch.	2	3	3	4	12	Rare
113		*Misopates orontium* (L.) Raf.	1	3	3	4	11	Rare
114		*Plantago lanata* Lag. & Rodr.	3	3	3	2	11	Rare
115		*Plantago ovata* Forssk.	2	3	3	2	10	Rare
116		*Veronica biloba* L.	1	3	3	4	11	Rare
117	31.Plumbaginaceae	*Limonium macrorhabdon* Kuntze	1	3	3	4	11	Rare
118	32.Poaceae	*Agrostis viridis* Gouan	2	2	4	0	8	Vulnerable
119		*Aristida adscensionis* L.	3	2	4	4	13	Infrequent
120		*Aristida cyanantha* Nees ex Steud.	2	3	4	4	13	Infrequent
121		*Brachypodium distachyon* (L.) P. Beauv.	3	2	4	0	9	Rare
122		*Bromus pectinatus* Thunb.	3	1	3	0	7	Vulnerable
123		*Cenchrus ciliarus* L.	2	2	4	0	8	Vulnerable
124		*Chrysopogon serrulatus* Trin.	2	3	3	0	8	Vulnerable
125		*Cymbopogon jwarancusa* (Jones) Schult.	2	2	4	4	12	Rare
126		*Cynodon dactylon* (L.) Pers.	3	3	4	0	10	Rare
127		*Eragrostis papposa* (Roem. & Schult.) Steud.	2	3	4	0	9	Rare
128		*Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult.	2	2	4	4	12	Rare
129		*Hordeum jubatum* L.	3	2	4	0	9	Rare

130		*Hordeum murinum* L.	3	2	3	0	8	Vulnerable
131		*Lamarckia aurea* (L.) Moench	2	3	4	0	9	Rare
132		*Pennisetum oreintale* Rich.	2	2	4	0	8	Vulnerable
133		*Phalaris minor* Retz.	3	2	4	0	9	Rare
134		*Phleum paniculatum* Huds.	2	3	4	0	9	Rare
135		*Poa annua* L.	3	3	4	0	10	Rare
136		*Poa bulbosa* L.	2	3	4	0	9	Rare
137		*Rostraria cristata* (L.) Tzvelev	2	2	4	0	8	Vulnerable
138		*Tetrapogon villosus* Desf.	2	2	4	0	8	Vulnerable
139		*Themeda anathera* (Nees ex Steud.) Hack.	2	3	4	0	9	Rare
140	33.Polygalaceae	*Polygala hohenackeriana* var. rhodopea Velen.	2	3	3	4	12	Rare
141	33.Polygonaceae	*Emex spinosus* (L.) Campd. (Polygonaceae)	3	3	4	4	14	Infrequent
142		*Polygonum plebeium* R. Br.	2	3	4	4	13	Infrequent
143		*Rumex dentatus* L.	2	2	4	4	12	Rare
144		*Rumex hastatus* D. Don	2	2	4	4	12	Rare
145		*Rumex vesicarius* L.	2	2	4	2	10	Rare
146	34.Primulaceae	*Anagallis arvensis* L.	2	3	3	4	12	Rare
147	35.Rananculaceae	*Clematis graveolens* Lindl. (Rananculaceae)	1	3	3	4	11	Rare
148		*Rananculus muricatus* L.	2	3	4	4	13	Infrequent
149	36.Resedaceae	*Oligomeris linifolia* (Vahl) J.F. Macbr.	2	3	4	4	13	Infrequent
150	37.Rhamnaceae	*Sageretia thea* (Osbeck) M.C. Johnst.	1	2	0	2	5	Vulnerable
151		*Ziziphus mauritiana* Lam.	2	1	0	0	3	Endangered
152		*Ziziphus nummularia* (Burm. f.) Wight & Arn.	2	2	0	2	6	Vulnerable
153	38.Rosaceae	*Cotoneaster nummularius* Fisch. & C.A. Mey.	1	1	0	2	4	Endangered
154		*Duchesnea indica* (Andrews) Teschem.	2	3	4	0	9	Rare
155	39.Rubiaceae	*Galium aparine* L.	2	3	4	0	9	Rare
156	40.Salvadoraceae	*Salvadora persica* L.	1	3	0	0	4	Endangered
157	41.Sapindaceae	*Dodonaea viscosa* Jacq. (Sapindaceae)	3	1	1	0	4	Endangered
158	42.Sapotaceae	*Monotheca buxifolia* (Falc.) A. DC.	3	0	0	2	5	Vulnerable
159	43.Scrophulariaceae	*Scrophularia striata* Boiss.	1	3	3	4	11	Rare
160		*Verbascum thapsus* L.	2	3	3	4	12	Infrequent
161	44.Solanaceae	*Datura innoxia* Mill. Solanaceae	2	3	4	2	11	Rare
162		*Solanum nigrum* L.	2	3	4	0	9	Rare
163		*Solanum surattense* Burm. f.	2	3	3	2	10	Rare
164		*Withania coagulans* (Stocks) Dunal	3	3	1	4	7	Vulnerable
165		*Withania somnifera* (L.) Dunal	1	3	3	2	9	Rare
166	45.Tamaricaceae	*Tamarix indica* Willd.	1	1	0	0	2	Endangered
167	46.Thymelaeaceae	*Thymelaea passerina* (L.) Coss. & Germ.	2	3	3	4	12	Rare
168	47.Urticaceae	*Forsskaolea tenacissima* L.	3	3	4	4	14	Infrequent
169	48.Zygophyllaceae	*Fagonia indica* Burm. f.	3	3	4	0	10	Rare
170		*Tribulus terrestris* L.	3	2	4	0	9	Rare

There were 13 rare plants each in family Asteraceae and Poaceae. Boraginaceae was next in order of rare plants, with 5 species, followed by Fabaceae, Amaranthaceae, Caryophyllaceae, Lamiaceae, Plantaginaceae and Polygonaceae with 4 species each. Solanaceae, Asparagaceae and Scrophulariaceae each

were having 3 species in rare class, followed by Brassicaceae, Apocynaceae, Acanthaceae, Malvaceae and Zygophyllaceae with 2 species each. Thirteen families were reported to have only 1 plant each in rare class, while rest of the families did not has any plant in the said class (Table 2).

Highest number of infrequent plants belong to Asteraceae family (7), followed by Lamiaceae and Brassicaceae with 5 species each. Amaranthaceae and Geraniaceae were reported to have 3, while Poaceae and Polygonaceae had 2 species each in infrequent class. Eleven families were reported to have only 1 plants each in infrequent categories. From the results it can be concluded that Fabaceae and Asteraceae were the most affected families in terms of conservation status (Table 2).

Discussion

Conservation status of the plants is dependent upon grazing and uses by the locals (Humayun *et al.*, 2006) i.e. less palatable and unpalatable species are more conserved compared to palatable one (Ghazanfar and Osborne, 2010). Anthropogenic disturbances and overgrazing can lead to loss of 49 percent species from an area. Use of the fuel wood is the main cause in degradation of the forests (Humayun *et al.*, 2006).

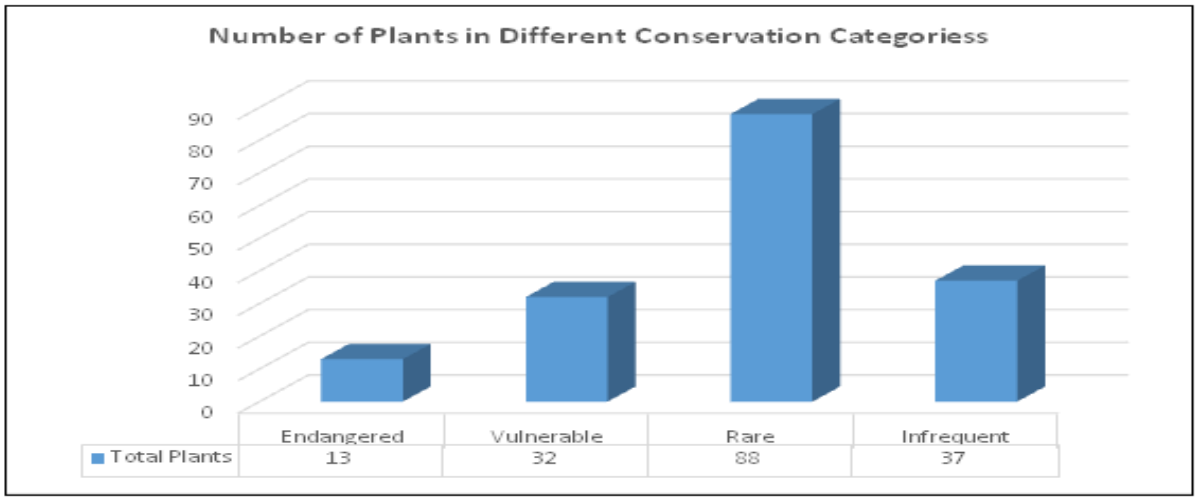

Fig. 1. Total Plants in each Endangered, Vulnerable, Rare and Infrequent Status.

Mohmand agency, being very rural and economically less developed has a population, which is dependent on natural sources up to maximum level, and that is why plants of this area are facing extreme biotic stress. We have reported almost the same trends, as by these workers, that there are many disturbances which can directly affect the conservation of a plants species. Almost all the above mentioned threats, that are dangerous the biodiversity are present in one form or the other in the study area, and that is the reason that status of the plant regarding its conservation is very poor.

Overall conservation status of plants in Pakistan is poor, and many plants are under the tag of threatened and endangered species. According to the locals, many areas, that were used to a site of different kinds of plants are now occupied by houses and cultivated land, which resulted in the loss of wild flora from the region. Many local said that the current diversity of the plants is very less compared to flora of this region 50 years ago. *Caralluma tuberculata* and *Nannorhops ritchiana* were the two most cited plants by the local for their conservation status. These plants had decreased to an alarming level in the area.

The possible decrease of *Caralluma tuberculata* is that it is a much liked and highly valued vegetable in the area, and that is why it is very extensively collected. The collection is unwise and uneducated,

which resulted in loss of the diversity of this plants form plain area in Mohmand agency. *N. ritchiana* plants is also having the same condition and its species number has been decrease for the past few decades. The possible reason for the decline of this species is that the plant is locally used for making various handicrafts (mats, caps, utensils etc.) generally by all locals, and specifically by a clan of Mohmand called Utmankhel. The excessive usage of this plants is possible reason for the decline of this species in the region.

The threat to the plants in the area has many dimensions. Locals are illiterate and economically poor. They are unable to grasp the importance of the biodiversity in the area. They do not know how to economically collect and use the plants so the plant could sustain for the coming generations. If some of them know the importance of plants, unfortunately they have no second option, and they have to cut plants, mostly for fuel purpose. Another dimension of this problem is the political instability of the region. The people have been displace several times in the las decade, and still the condition of the peace is very unpredictable, so the locals are unable to give proper attention to conservation issues. Population explosion is another aspect in this regard. With increase in number of people, biotic stress is increasing on the plants, and more plants are used by human directly, and there animals indirectly. The area is having a rich flora of medicinal plants, which are needed to be conserved in the earliest possible time.

Conclusion

Conservation status assessment of 170 plants of Mohmand agency showed that there were 13 plants in the area that are endangered.

There are 32 plants, which are vulnerable and it needs proper attention; eighty eight plants are vulnerable while only 37 plants are infrequent.

Family fabaceae, with 4 plants in endangered category is the most threated family.

The current status of the flora speaks for the unhealthy conservation status of the wild flora of Mohmand agency, which should be properly addressed on urgent bases.

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