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Full Length Research Paper

Plants profile of Malakand Pass Hills, District Malakand, Pakistan

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An ethnobotanical survey was conducted in Malakand Pass Hills, District Malakand, Pakistan, during 2010, in order to document vegetation information and indigenous knowledge about plant use. The area has rich vegetation and a high potential for ethnobotanical utilization. Information was collected through semi structured questionnaire. A total of 169 species of 140 genera from 76 families were recorded. These consisted of 63 dicot families, five monocot families, four pteridophytes families and a single family of gymnosperm. Poaceae was the last family with 16 species, followed by Asteraceae with 12 species and Lamiaceae with 11 species. It was observed that shoots were the most frequently used part (34.91%) followed by leaves (27.21%), whole plant (21.89%) and fruits (18.93%). Generally, ethnobotanical uses were: Medicinal (83.83%), fodder (24.85%), vegetable/fruit edible (23.68%), fuel (18.93%), fencing (11.24%), veterinary medicines (10.65%), thatching/timber (8.87%), furniture (8.82%), ornamental (15.38%), honey bee (5.91%), poisonous (4.37%) and a miscellaneous (13.6%). The area is under intense pressure of deforestation and overgrazing, which has reduced the renewal of woody plants. Proper ecological management is necessary to protect the wildlife and ethnobotanical resources for the future generations.

Key words: Malakand Pass, ethnobotanical profile, part used, deforestation.

INTRODUCTION

Plants have been used since the dawn of civilization by human beings for ready made food, medicines for various ailments, fodder/forage for cattle, burning, flower for celebration, services to earn, honey collection, making agricultural tools, timber for construction and many more useful items (Ahmad et al., 2006; Ilyas et al., 2006). Indigenous uses of plants are many and varied, playing an integral role in the realm of human health (Nair et al., 2004; Kufer et al., 2005) and forming the economic basis of peoples of remote areas (Barkatullah et al., 2009). 80% of the world population uses plants for their primary health care, as plants are easy approachable and have fewer side effects than pharmaceuticals. Ethnobotanical knowledge characterizes traditional knowledge to establish priorities in the local communities (Ibrar et al., 2007) and establish an interaction of man and plants for sustainable development (Ahmad et al., 2006). These studies have become increasingly valuable in the development of health care systems in different parts of the world (Sardar and Khan, 2009). In Pakistan, traditional medicinal uses are in practice in far remote and mountainous areas and this makes an opportunity to study natural resource management of the people of mountains and remote area (Ilyas et al., 2006). Ethnobotanical information also helps ecologists, pharmocologists, taxonomists, watershed and wild life managers in their efforts for improving the economic status of the locals in the remote area (Ibrar et al., 2007).

In the present study, the plant profile took place in historical Malakand Pass Hills, Khyber Pukhtunkhwah, Pakistan (34°35′N 71°57′E/ 34.583°N 71.95°E). The pass starts from Dargai, a town in the foothills Malakand Pass Hills and end at the top of District Malakand and where famous Malakand fort guards the road on both sides of the pass. Malakand is a fertile valley with mostly, sandy loamy soil surrounded by hills with moderate winters and pleasant summers having an annual rainfall of 600 to 650 mm (Anon, 2008). The ascending road in the pass has many turns, a small tunnel and has been widened and improved recently. Being a key route to Swat, Dir, Buner,

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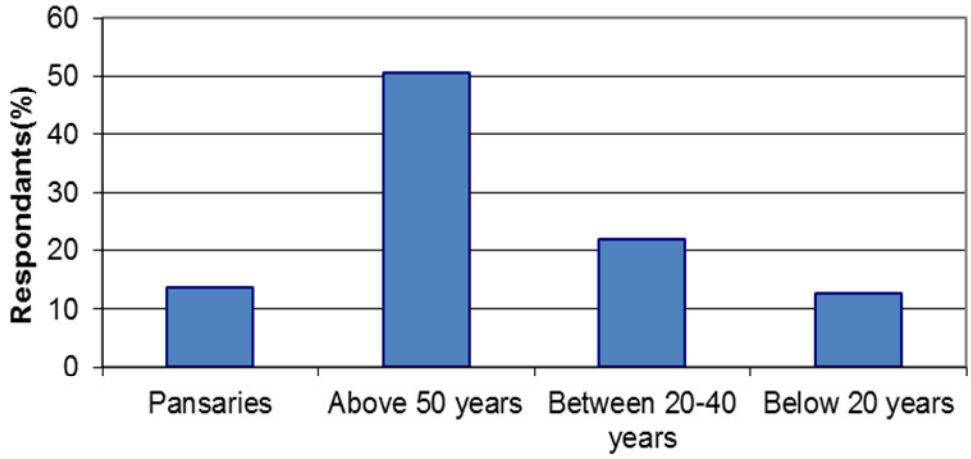

Figure 1. Percent respondants interviewed in Malakand Pass Hills.

Shangla and Chitral Districts, the Malakand Pass has remained for years the target of foreign invasions. Underneath Malakand Hills, the waters of the River Swat pass through a three-mile long Benton tunnel which starts from near Batkhela Town, and has a descent of 350 feet. There are three hydroelectric power generation stations (Malakand I, II and III), the water from which also irrigate thousands of acres of land of Malakand, Mardan, Swabi and Charsada Districts. Former prime minister of England, Sir Winston Churchill, served as a military officer during the British rule and wrote his famous book "The story of Malakand field force" about this area.

The investigated area includes three villages, that is, Malakand khas situated at the top of Malakand Pass, Jaban is at the foot hills and Banj at the opposite sides of the Malakand Pass Hills. Gujars are the original inhabitants, occupying foothills on the northern and southern sloping faces of the hills. They speak Gujro language but can also speak Pashto. The inhabitants of the investigated area earn their daily commodities on cattle rearing, selling their products and on forest resources. Overuse and unmanaged cutting of the forest resources has placed the vegetation under intense pressure, which is impacting wildlife and plants habitat.

Ethnobotanical literature was reviewed for medicinal and other useful plants in neighboring countries (Jain, 2001; Rashiduzzafar and Ahmad, 2003; Mahishi et al., 2005; Ignacimuthu et al., 2006; Jeruto et al., 2008). Some of the ethnobotanical studies from Pakistan are Ahmad et al. (2003), Badshah et al. (2004), Durrani and Hussain (2006), Ibrar et al. (2007), Qureshi et al. (2007), Shah and Hussain (2008), Qureshi et al. (2007, 2008, 2010), Rahmatullah and Bhatti (2008) and Sardar and Khan (2009). Similar studies made in the Malakand division include those of Khan et al. (2003, 2005), Sher et al. (2004), Hussain et al. (2005), Zabihullah et al. (2006), Barkatullah et al. (2009) and Jan et al. (2009) but review of the literature shows that no such work has been undertaken in the present study area.

MATERIALS AND METHODS

Frequent trips were made to the investigated area from January, 2009 to May, 2010. During these trips, visual observations about collection, grazing, cutting and availability of the plants in the area were made. Various information was recorded about the traditional ethnobotanical uses and collection of the specimens in the study area. A total of 87 respondents were interviewed, including 13.79% pansaries (Plant sellers), 50.57% elders (knowledgeable people) including both men and women above the age of 50 years, 21.83% people in the age class of 20 to 40 years, and 12.64% of young people aged below 20 years (Figure 1). Ethnobotanical information including local names, local uses of plants and other information was collected from these people through open-ended questionnaire on the spot as most of the respondents were illiterate. The information was considered authentic and was only reported when at least 10 interviewees testified the name and usage of the plants. The plants were collected, dried, preserved, and identified using Flora of Pakistan (Nasir and Ali, 1971–1995; Ali and Qaiser, 1995–2010), which were then confirmed and deposited in the Herbarium of Botany Department, University of Peshawar, Peshawar Pakistan. Each species was given voucher specimen number for the sake of future reference. The plants are arranged alphabetically in Table 1. A list of frequently used medicinal plants with their local uses is also summarized in Table 2.

RESULTS

Total of 169 species of 140 genera were recorded from Malakand Pass Hills. These belonged to 76 families and including 82.82% dicot (63 families), 6.57% monocot (5 families), 5.06% pteridophytes (4 families) and 1.3% gymnosperm (one family that is, Pinaceae). Among dicot, Asteraceae was the largest family with 12 species, followed by Lamiaceae (11 species) Rosaceae (7 species), Papilionaceae, Polygonaceae and Solanaceae (6 species each), Amaranthaceae (5 species) and Moraceae (4 species). The number of species in the rest of the families ranged from 1 to 3 species. Monocots were represented by Poaceae (16 species), Cyperaceae (3 species), Asperagaceae (2 species) Arecaceae and Liliaceae (1 species each). Dryopteridaceae and

Table 1. Ethnobotanical profile of plants of Malakand Pass Hills, District Malakand.

1	2	3	4	5	6	7. Local ethnobotanical use											
						a	b	c	d	e	f	g	h	i	j	k	L
S/N	Voucher number	Specie name	Family	Local name	Part used	Medicinal uses	Fodder /grazing	Vegetables/ Fruits	Fuel	Fencing	Veterinary uses	Buildings / thatching	Furniture	Ornamental plants	Honey bee species	Poisonous plants	Miscellaneous uses
1.	10401	*Acacia modesta* Wall	Mimosaceae	Palosa	L, F, G, W	+	+	-	+	+	-	+	+	-	+	-	Tooth brush
2.	10402	*Acacia nilotica* (L.) Willd. ex Del.	Mimosaceae	Kekar	L, F, G, W	+	+	-	+	+	-	+	+	-	+	-	-
3.	10403	*Achyranthes aspera* L.	Amaranthaceae	Spey botey	Sh	+	-	-	-	-	-	-	-	-	-	-	-
4.	10404	*Adiantum venustum* - D.Don.	Adiantaceae	Sumbal	Sh	+	-	-	-	-	-	-	-	+	-	-	-
5.	10405	*Aerva javanica* (Burm.f.) Juss. ex Schult	Amaranthaceae	Kharbotey	L	+	-	-	-	-	-	-	-	-	-	-	-
6.	10406	*Ailantheus altissima* (Mill)Swingle	Simarubaceae	Angrezi shandai	L, B, W	+	+	-	+	-	-	+		-	-	-	-
7.	10407	*Ajuga bracteosa* Wall ex. Benth.	Lamiaceae	Boti	WP	+	-	-	-	-	-	-	-	-	-	-	-
8.	10408	*Ajuga parviflora* Benth.	Lamiaceae	Boti	WP	+	-	-	-	-	-	-	-	-	-	-	-
9.	10409	*Albizia lebbeck* (L.) Benth.	Mimosaaceae	Sreekh	Fr, L.,F	+	+	-	+	-	-	+	+	-	+	-	-
10.	10410	*Alnus nitida* (Spach)Endl	Betulaceae	Gerey	F, W	+	-	-	-	-	-	-	-	-	-	-	Soil binder plant
11.	10411	*Amaranthus caudatus* L.	Amaranthaceae	Chalwai	L	+	-	+	-	-	-	-	-	-	-	-	-
12.	10412	*Amaranthus spinosus* L.	Amaranthaceae	Ghano chalwae	L	+	-	+	-	-	-	-	-	-	-	-	-
13.	10413	*Amaranthus viridis* L.	Amaranthaceae	Ganhar	L	+	-	+	-	-	-	-	-	-	-	-	-
14.	10414	*Ammi visnaga* (L.)Lam	Apiaceae	Sperke	Fr	+	-	-	-	-	-	-	-	-	-	-	-
15.	10415	*Andrachne cordifolia* (wall. ex Decne.) Müll. Arg.	Euphorbiaceae	Prewatke	L	+	-	-	-	-	-	-	-	-	-	-	-
16.	10416	*Apluda mutica* L.	Poaceae	Wakha	Sh	+	+	-	-	-	-	-	-	-	-	-	-
17.	10417	*Aristida cyanantha* Nees ex Steud.	Poaceae	Mashkeeza	Sh	+	+	-	-	-	-	-	-	+	-	-	-
18.	10418	*Artemisia scoparia* Waldest	Asteraceae	Jokey	Sh	+	-	-	+	-	-	+	-	-	-	-	Broom making

Table 1. Contd.

19.	10419	Asparagus adscendens Roxb.	Asparagaceae	Tendoney	WP	+	-	-	-	-	+	-	-	-	-	-	-
20.	10420	*Asparagus officinalis* **L.**	Asparagaceae	Tendoney	WP	+	-	-	-	-	+	-	-	-	-	-	-
21.	10421	*Asphodelus tenuifolius* Cavan	Liliaceae	Piazakey	L	+	-	+	-	-	-	-	-	-	-	-	-
22.	10422	*Avena sativa* L.	Poaceae	Jawdar	WP	-	+	-	-	-	-	-	-	-	-	-	-
23.	10423	*Barberis lyceum* Royle	Berberidaceae	Ziarlarge, Kwarey	L, R, Fr, B	+	-	+	-	+	-	-	-	-	-	-	-
24.	10424	*Bauhinia variegata* L.	Ceasalpinaceae	Kulyar	F	+	-	-	+	+	+	-	-	-	-	-	-
25.	10425	*Bistorta amplexicaulis* (D.Don) Greene	Polygonaceae	Phalpolak	L	+	-		-	-	+	-	-	-	-	+	Used for fish catching
26.	10426	*Boerhavia diffusa* L.	Nyctaginaceae	Ensut	L, R	+	-	-	-	-	-	-	-	-	-	-	-
27.	10427	*Bromus japonicus* Thomes ex murr	Poaceae	Jawkey		-	+	-	-	-	-	-	-	-	-	-	Soil binder plant
28.	10428	*Butea monosperma* (L.) Taub.	Fabaceae	Palae	F, W	+	-	-	+	-	-	-	-	-	+	-	-
29.	10429	*Buxus wallichiana* Baill.	Buxaceae	Shamshad	L, W	+	-	-	+	-	-	-	-	-	-	-	Utensils making plant
30.	10430	*Calendula arvensis* L.	Asteraceae	Ziar guley	L, F	+	-	-	-	-	-	-	-	+	+	-	-
31.	10431	*Calotropis procera* (Ait) R. Br	Asclepiadaceae	Spalmay	WP	+	-	-	-	-	-	-	-	-	-	+	-
32.	10432	*Cannabis sativa L.*	Cannabaceae	Bhang	Sh	+	-	-	-	-	-	-	-	-	-	+	-
33.	10433	*Caralluma fimbriata* Wall	Apocynaceae	Pamankey	Sh	+	-	+	-	-	-	-	-	-	-	-	-
34.	10434	*Carthamus lanatus* L.	Asteraceae	Kareza	S	+	-	-	-	-	-	-	-	-	-	-	-
35.	10435	*Carthamus oxycantha* Bieb	Asteraceae	Kareza	S	+	-	-	-	-	-	-	-	-	-	-	-
36.	10436	*Celtis australis* L.	Ulmaceae	Tagha	L, F, W	+	-	+	+	-	-	-	-	-	-	-	-
37.	10437	*Cenchrus ciliaris* L.	Poaceae	Barwaz, Wakha	Sh	-	+	-	-	-	-	-	-	-	-	-	-
38.	10438	*Cheilanthes pteroides* Sw	Pteridaceae	Sumbal	WP	+	-	+	-	-	-	-	-	-	-	-	-
39.	10439	*Chenopodium album* L.	Chenopodiaceae	Sarmey	Sh	+	-	+	-	-	-	-	-	-	-	-	-
40.	10440	*Chenopodium botrys* L.	Chenopodiaceae	Kharawa	Sh	+	-	-	-	-	-	-	-	-	-	-	-
41.	10441	*Chrysopogon aucheri* (Boiss.) Stapf	Poaceae	Spin wakhe	WP	-	+	-	-	-	-	-	-	-	-	-	-
42.	10442	*Cichorium intybus* L.	Asteraceae	Shin guley	WP	+	-	-	-	-	+	-	-	+	-	-	-

Table 1. Contd.

43.	10443	*Citrullus colocynthis* (L.) Schrad.	Cucurbitaceae	Kakora	Fr	+	-	-	-	-	-	-	-	-	-	-	-
44.	10444	*Convolvulus arvense* Linn.	Convolulaceae	prewatkey	Sh	+	+	-	-	-	-	-	-	+	-	-	-
45.	10445	Conyza canadensis (L.) Cronquist	Asteraceae	Dhnya botey	Sh	+	-	-	-	-	-	-	-	-	-	-	Condiment
46.	10446	*Cotoneaster nummularia* Fischer & C. A. Meyer	Rosaceae	Mumanra, Kharawa	WP	-	-	-	+	+	-	+	-	-	-	-	-
47.	10447	*Cuscuta reflexa Roxb*	Cuscutaceae	Maraz botey	WP	+	-	-	-	-	-	-	-	-	-	-	-
48.	10448	*Cymbopogon distans* (Nees ex Steud	Poaceae	Sargare	Sh	-	+	-	-	-	-	-	-	-	-	-	-
49.	10449	*Cynodon dactylon* (L.) Pers	Poaceae	Kabal	Sh	-	+	-	-	-		-	-	-	-	-	Lawn ornamentation
50.	10450	*Cyperus rotundus* L	Cyperaceae	Drab	Sh	-	+	-	-	-	-	-	-	-	-	-	-
51.	10451	*Dalbergia sissoo* Roxb. ex DC.	Fabaceae	Shawa	L, W, Fr	+	-	-	+	-	-	+	+	-	-	-	-
52.	10452	*Daphne oleoides* Schreb	Thymeleaceae	Leghoney	Fr	+	-	+	+	-	-	-	-	+	-	-	-
53.	10453	*Datura innoxia* Miller	Solanaceae	Bathora	L, S	+	-	-	-	-	-	-	-		-	+	-
54.	10454	*Debregeasia saeneb* (Forsskal) Hepper and Wood,	Utricaceae	Ajlae	Sh , Fr	+	-	+	-	+	-	-	-	-	-	-	-
55.	10455	*Desmostachya bipinnata* (L.) Stapf	Poaceae	Dela	Sh	-	+	-	-	-	-	-	-	-	-	-	-
56.	10456	*Dichanthium annulatum* (Forsk.) Stapf	Poaceae	Gaya, Wakha	Sh	-	+	-	-	-	-	-	-	-	-	-	-
57.	10457	*Dodonaea viscosa* (L.) *Jacq*	Sapindaceae	Ghwaraskey	WP	+	-	-	+	+	-	+	-	+	-	-	-
58.	10458	*Dryopteris crenata* (Forssk.) Kuntze,	Dryopteridaceae	Sumbal		+	-	-	-	-	-	-	-	-	-	-	-
59.	10459	*Dryopteris jaxtaposta* christ.	Dryopteridaceae	Sumbal	Sh	+	-	-	-	-	-	-	-	+	-	-	-
60.	10460	*Duchesnea indica* (Andr.) Focke	Rosaceae	Zmakey toot	Fr	+	-	+	-	-	-	-	-	-	-	-	-
61.	10461	*Ebretia obtusifolia* Hoches	Boraginaceae	Ghata boti	L	+	-	-	-	-	-	-	-	-	-	-	-
62.	10462	*Equesetum arvensis* L.	Equistaceae	Bandakey	Sh	+	-	-	-	-	-	-	-	-	-	-	-
63.	10463	*Eryngium biebersteinianum* Nervski ex Bobrov	Asteraceae	Manzari panja	Sh	+	+	-	-	-	-	-	-	-	-	-	-
64.	10464	*Eucalyptus camaldulensis* L.	Myrtaceae	Lachi	L, O, W	+	-	-	+	-	-	+	+	-	-	-	-
65.	10465	*Euphorbia granulate* Forssk	Euphorbiaceae	Warmaga	WP	+	+	-	-	-	-	-	-	-	-	-	-
66.	10466	*Euphorbia helioscopia L.*	Euphorbiaceae	Mandanu	Sh	+	-	-	-	-	-	-	-	-	-	+	-
67.	10467	*Euphorbia hirta* Linn	Euphorbiaceae	Pae botey	Sh	+	-	-	-	-	-	-	-	-	-	-	-
68.	10468	*Euphorbia prostrata* Aiton.	Euphorbiaceae	Warmaga	WP	+	+	-	-	-	-	-	-	-	-	-	-
69.	10469	*Fagonia cretica* L.	Zygophylaceae	Azghakey	WP	+	-	-	-	-	-	-	-	-	-	-	-

Table 1. Contd.

70.	10470	*Ficus carica* L.	Moraceae	Inzar	Fr, W	+	+	+	+	-	-	-	-	-	-	-	Sacred plant
71.	10471	*Ficus racemosa* Linn	Moraceae	Oormal	Fr, W	+	+	+	+	-	-	-	-	-	-	-	-
72.	10472	*Fimbristylis squarrosa Vahl*	Cyperaceae	Barwaz	Sh	-	+	-	-	-	-	-	-	-	-	-	-
73.	10473	*Forsskaolea tenacissima* Linn.	Utricaceae	Stikar botey	L	-	-	-	-	-	-	-	-	-	-	-	-
74.	10474	*Fragaria indica* Andrew	Rosaceae	Balmange mewa	Fr	+	-	+	-	-	-	-	-	-	-	-	-
75.	10475	*Fumaria indica* Pugsley	Fumariaceae	Papra	WP	+	-	-	-	-	+	-	-	-	-	-	-
76.	10476	*Geranium Wallichianum D.Don Ex Sweet.*	Geraniaceae	Sra zela	WP	+	-	-	-	-	+	-	-	-	-	-	-
77.	10477	*Grewia optiva* J. R. Drumm. ex Burret.	Tiliaceae	pastawooney	Fr, W	+	-	+	-	-	-	-	-	-	-	-	-
78.	10478	*Gymnosporia royleana* Wall. ex Lawson	Celastraceae	Soor azghey	WP	+	+	-	+	+	-	-	-	-	-	-	-
79.	10479	*Heteropogon contortus* (L.) Beauv. ex Roemer and JA Schultes	Cyperaceae	Soormal	Sh	-	+	-	-	-	-	-	-	-	-	-	
80.	10480	*Hyoscyamus niger* L.	Solanaceae	Bargak	Sh	+	-	-	-	-	+	-	-	-	-	+	Poisonous plant
81.	10481	*Hypericum perforatum* L.	Hypericaceae	Shin chey	Sh	+	-	-	-	-	+	-	-	-	-		Used as green tea
82.	10482	*Imperata cylindrica* (L.) Beauv.	Poaceae	Pesholakey	Sh	-	+	+	-	-	-	-	-	-	-	-	-
83.	10483	*Indigofera heterantha* L.	Papilionaceae	Ghwareja	Fr, Sh	+	+	-	-	-	-	-	-	+	-	-	-
84.	10484	*Jasminum humule* Linn	Oleaceae	Zyar Rambail chambail	WP	+	-	-	-	+	-	-	-	+	-	-	-
85.	10485	*Jasminum officinale* L.	Oleaceae	Rambail chambail	WP	+	-	-	-	+	-	-	-	-	-	-	Seeds edible. Bark used as toothbrush
86.	10486	*Juglans regia* L.	Juglandaceae	Ghwaz	B, L, S, W	+	-	-	+	-	-	-	+	-	-	-	-
87.	10487	*Justicia adhatoda* Linn.	Acanthaceae	Baikar	WP	+	-	+	-	-	-	-	-	-	+	-	-

Table 1. Contd.

88.	10488	*Lathyrus aphaca* L.	Papilionaceae	karkumaney	Sh, Fr	-	+	+	-	-	+	-	-	-	-	-	-
89.	10489	*Lathyrus cicera* L.	Papilionaceae	Marghae khpa	Sh, Fr	-	+	+	-	-		-	-	-	-	-	-
90.	10490	*Lathyrus sativus* L.	Papilionaceae	Ghata chio	Sh, Fr	-	+	+	-	-		-	-	+	-	-	-
91.	10491	*Launaea arborescens* (Batt.) Murb.	Asteraceae	Shawda pae	Sh, L	+	-	-	-	-		-	-	+	-	-	-
92.	10492	Limonium gilessi (Hemst and Aitech)Rech.f	Plumbaginaceae	Watwatakey	WP	-	-	-	-	-		-	-	-	-	-	Red die obtained from fruit
93.	10493	*Lotus corniculatus* L.	Fabaceae	Fathkhaney	Sh	+	-	-	-	-		-	-	-	-	-	-
94.	10494	*Mallotus philippensis* (Lam.) Műll. Arg.	Euphorbiaceae	Kanbela	WP	+	-	-	+	-		-	-	-	-	-	-
95.	10495	*Malva neglecta* Wall	Malvaceae	Panerak	Sh,	+	-	+	-	-		-	-	+	-	-	-
96.	10496	*Medicago minima* (L.)Grub	Papilionaceae	Peshtarey	Sh	+	+	+	-	-		-	-	-	-	-	-
97.	10497	*Melia azedarach* Linn	Meliaceae	Tora Shandae	L ,Fr, W, F	+	+	-	+	-		+	+	-	-	-	-
98.	10498	*Melothria heterophylla* (Lour.) Cogn.	Cucurbitaceae	Kakora	Fr	+	-	-	-	-		-	-	-	-	-	-
99.	10499	*Mentha longifolia* - (L.)Huds.	Lamiaceae	Enaley	L	+	-	-	-	-		-	-	-	-	-	-
100.	10500	*Merabilus jalapa* L.	Nyctaginaceae	Gulebada	L	+	-	-	-	-		-	-	+	+	-	-
101.	10501	*Micromeria biflora* (Buch.-Ham. ex D. Don) -Benth.	Lamiaceae	Narey Shamakey	WP	+	-	-	-	-		-	-	-	-	-	-
102.	10502	*Monotheca buxifolia* (Falc.) A.DC.	Sapotaceae	Gwargwara	Fr, W	+	-	-	+	+		-	-	-	-	-	-
103.	10503	*Morus alba L.*	Moraceae	Spin Toot	Fr, L, W	+	-	-	-	+		-	-	-	-	-	-
104.	10504	*Morus nigra L.*	Moraceae	Toor Toot	Fr, L, W	+	-	-	-	+		-	-	-	-	-	-
105.	10505	*Myrsine Africana* L.	Myrsinaceae	Manro	Fr, L, W	+	-	-	+	-		-	-	-	-	-	-
106.	10506	*Nannorrhops ritchiana* - (Griff.)Aitch	Arecaceae	Mezarey	L	-	-	-	-	-		+	-	-	-	-	Leaves used in carpet making for mosque
107.	10507	*Narcissus tazetta* L.	Amaryldaceae	Gulengus	WP	+	-	-	-	-		-	-	+	-	-	-
108.	10508	*Nasturtium officinale* C.Br	Tropaeolaceae	Tarmera	Sh	+	-	+	-	-		-	-	-	-	-	-
109.	10509	*Nerium indicum - Mill.*	Apocynaceae	Ganderey	WP	+	-	-	-	-		-	-	+	-	-	toothbrush

Table 1. Contd.

110.	10510	*Olea ferruginea* Royle	Oleaceae	Khona	L, Fr, W,	+	-	-	+	-	-	+	-	-	-	Sacred plant
111.	10511	*Opentia dilleni* Haw	Cactaceae	Zuqam	Fr	+	-	+	-	-	-	-	+	-	-	-
112.	10512	*Origanum vulgare* L.	Lamiaceae	Shamakey	Sh	+	-	-	-	-	-	-	-	-	-	-
113.	10513	*Otostegia limbata* (BTH.) BOISS	Lamiaceae	Spin Azghey	WP	+	+		-	+	-	-	-	-	-	-
114.	10514	*Oxalis corniculata L.*	Oxalidaceae	Taruke	Sh	+	-	-	-	-	-	-	-	-	-	-
115.	10515	*Papaver rhoes* L.	Papaveraceae	Redey	Fr, Sh	+	-	-	-	-	-	-	-	-	-	-
116.	10516	*Parthenium hystero*phorus L.	Asteraceae	Tarkha	Sh	+	-	-	-	-	-	-	-	-	-	-
117.	10517	*Peganum harmala* L.	Rutaceae	Spelaney	S, L	+	-	-	-	-	-	-	+	-	-	Sacred plant
118.	10518	*Periploca aphylla* Dcne.	Apocynaceae	Barara	WP	+	-	-	-	-	-	-	-	-	-	Latex used as chewing gum
119.	10519	*Pinus roxburghii* Sarg.	Pinaceae	Nakhtar	Sh, S, W	+	-	-	+	-	+	+	-		-	-
120.	10520	*Pistacia integerrima* Stew ex. Brandis	Anacardaceae	Shnae	L, W	+	+	-	+	-	-	-	+	-	-	-
121.	10521	*Plantago lanceolata* L.	Plantaginaceae	Jabey	S	+	-	-		-	-	-	-	-	-	-
122.	10522	*Plantago major* L.	Plantaginaceae	Speghol	L, Fr, S	+	-	-		-	-	-	-	-	-	-
123.	10523	*Platanus orientalis*	Platanaceae	Chinar	WP	+		+	+	-	-	+	+		-	-
124.	10524	*Plectranthus rugosus* Wall. ex Benth	Lamiaceae	Sperkey	Sh	+	-	-		-	-	-	-	-	-	-
125.	10525	*Poa annua* L.	Poaceae	Wakha	Sh	-	+			-	-	-	-	-	-	-
126.	10526	*Polygonum barbatum* L.	Polygonaceae	Palpolak	Sh	+	-			-	-	-	-	-	+	-
127.	10527	*Portulaca olearaceae* L.	Portulaceae	Warkharey	Sh	+	-	+		-	-	-	-	-	-	-
128.	10528	*Pteridium aquilinum* (L.) Kuhn	Pteridaceae	Sumbal	Sh	+	-	-		-	-	-	-	-	-	-
129.	10529	*Punica granatum* L.	Punicaceae	Anangonrey	Fr	+	-	+		-	-		-	-	-	-
130.	10530	*Quercus* incana Roxb	Fagaceae	Banj	L, W	+	-	-	+	-	-	+	-	-	-	-
131.	10531	*Ranunculus equetalis* L.	Ranunculaceae	Jaghagha	Sh	+	-	-		-	-	-	-	-	-	-
132.	10532	*Rheum officinale L.*	Polygonaceae	Shalkhe	Sh	+	-	-		-	-	-	-	-	-	-
133.	10533	*Ricinus communis* L.	Polygonaceae	Arhanda	L,S,O	+	-	-		-	-	-	-	-	+	-
134.	10534	*Robinia pseudocacia* L.	Papilionaceae	Kekar	F, W	+	+	-	+	-	-	+	-		-	-
135.	10535	*Rosa moschata* J.Herm	Rosaceae	Zangali Gulab	WP	+	-	-	-	+	-	-	+	-	-	-
136.	10536	*Rosa webbiana* Wall ex Royle	Rosaceae	Palwari	WP	+	-	-	-	+	-	-	+	-	-	-
137.	10537	*Rubus ellipticus* Smith.	Rosaceae	Baganra	WP	+	-	+	-	+	-	-	+	-	-	-
138.	10538	*Rubus fruticosus* L.	Rosaceae	Karwara	WP	+	-	+	-	+	-	-	+	-	-	-
139.	10539	*Rumex dentatus* L.	Polygonaceae	Shalkhe	Sh	+	-	-	-	-	-	-	-	-	-	-
140.	10540	*Rumex hastatus* D. Don	Polygonaceae	Tarokey	Sh	+	-	-	-	-	-	-	-	-	-	-

Table 1. Contd.

141.	10541	*Saccharum bengalensis* Retz.	Poaceae	Shalghashe	Sh	-	+	-	-	-		-	-	-	-	-
142.	10542	*Saccharum griffthii* Munro. Ex Boiss.	Poaceae	Bogara		-	+	-	-	-	+	-	-	-	-	Broom making
143.	10543	*Saccharum spontaeum* L.	Poaceae	Kahe	Sh	-	+	-	-	-	+	-	-	-	-	-
144.	10544	*Salix babylonica* L.	Salicaceae	Wala	WP	+	-	-	+	-		+	-	-	-	Used for cricket bat making
145.	10545	*Salix tetrandra* Willd	Salicaceae	Wala	WP	+	-	-	+	-		+	-	-	-	Used for cricket bat making
146.	10546	*Salvia lanata* Roxb.	Lamiaceae	Kayan	Sh	+	-	-		-		-	-	-	-	-
147.	10547	*Salvia moorcroftiana* Wall.	Lamiaceae	Khardag	L	+	-	-		-		-	-	-	-	-
148.	10548	*Salvia plebia* R.Br.	Lamiaceae	Gwamrey	Sh	+	-	-		-		-	-	-	-	-
149.	10549	*Sarcococca saligna* (D.Don)Muell.Arg	Buxaceae	Lada	L, F	+		-	+	-		-	-	+	-	-
150.	10550	*Silene vulgaris* Garck	Caryophylaceae	Mangotey	WP	+	-	-	-	-		-	-	-	-	-
151.	10551	*Solanum nigrum L.*	Solanaceae	Kachmacho	Sh	+	+	-	-	-		-	-	-	-	-
152.	10552	*Solanum surattense* Burm.f.	Solanaceae	Maraghoney	Sh, Fr	+	-	-	-	-		-	-	-	-	-
153.	10553	*Sonchus asper* L.	Asteraceae	Shawdapae	Sh	-	-	-	-	-		-	-	-	-	-
154.	10554	*Tagetes minuta* L.	Asteraceae	Hamesha	WP	-	-	-	-	-		-	+	-	-	-
155.	10555	*Tamarix aphyla* (L) Karst.	Tamaricaceae	Ghaz	L, F, W	-	-	+	-	-	+	+	-	-	-	-
156.	10556	*Teucrium stocksianum* Boiss	Lamiaceae	Aspabotey	Sh	+	-	-	-	-		-	-	-	-	-
157.	10557	*Tribulus terestris* L.	Zygophylaceae	Markundae	WP	+	-	-	-	-		-	-	-	-	-
158.	10558	*Urtica dioica* L.	Urticaceae	Sezonkey	Sh	+	-	-	-	-	-	-	-	-	-	Poisonous plant
159.	10559	*Verbascum thapsus* L.	Scrophulariaceae	Khardag	L	-	-	-	-	-	-	-	-	-	-	Leaves used by girls after “hina”
160.	10560	*Verbena officinale Linn.*	Verbenaceae	Shamakey	Sh	+	-	-	-	-	-	-	-	-	-	-
161.	10561	*Vitis jacquemontii* R.Parker	Vitaceae	Gedar kwar	Fr	-	-	+	-	+	-		-	-	-	-
162.	10562	*Voila odorata L.*	Violaceae	Benafsha	WP	+	-	-	-		-	-	-	+	-	-
163.	10563	*Withania coagulans* (Stocks) Dunal	Solanaceae	Spera botey	L, Fr	+	-	-	-		-	-	-	-	-	-
164.	10564	*Withania somnifera* (L. Dunal),	Solanaceae	Kotilal	L, Fr	+	-	-	-		-	-	-	-	-	-
165.	10565	*Xanthium strumarium* L.	Asteraceae	Geshey	L, Fr	+	-	-	-		-	-	-	-	-	-
166.	10566	*Vitex negundo* L.	Verbinaceae	Vermondey	Sh	+	-	-	+	+	-	-	-	-	-	

Table 1. Contd.

167.	10567	*Zizyphus mauritiana* Lamk	Rhamnaceae	Bera	L, W, Fr	+	+	+	-	+	-	-	-	-	-	-
168.	10568	*Zizyphus nummularia* (Burm. f.) Wight and Arn.	Rhamnaceae	Karkana	L, W, Fr	+	+	+	-	+	-	-	-	-	-	-
169.	10569	*Zizypus oxyphyla* Edgrew	Rhamnaceae	Elanae	L, W, Fr	+	+	+	-		-	-	-	-	-	-

B: Bark, Br: branches, F: flower, Fr: fruit, G: gum, L: leaves, O: Oil, R: root, S: seeds, Sh: shoot, W: wood, WP: whole plant.

Pteridaceae (2 species each), Adiantaceae and Equesitaceae (1 species each) were the representative families of pteridophytes. Gymnosperms were represented by single family Pinaceae (Figure 2). On the basis of habit, there were 106 herbs (62.72%), 32 shrubs (18.93) and 31 tree (18.69 %) species (Figure 3). Parts used in the area of the recorded plants are summarized in Figure 4. It was observed that shoots were the most used part (34.91%) followed by leaves (27.21%), whole plant (21.89%) and fruits (18.93%). On the bases of ethnobotanical uses, all the plants were grouped into 12 classes. These are medicinal species, fodder/ grazzing species, vegetable/fruit species, fuel plants, fencing plants, plants used as veterinary medicines, building materials plants. Plants used in furniture, ornamen-tal plants, honey bee plants, poisonous plants and a miscellaneous class which includes rare ethnobotanical uses (Figure 5). Ethnobotanical information of the plants along with their voucher number are summarized in Table 1.

DISCUSSION

Medicinal plants have been used for centuries for the treatment of various ailments (Atta-ur-Rahman et al., 2000). Similarly, in the present study, it was observed that 141 species (83.83%) of the recorded plants were used by the local inhabitants of Malakand Pass Hills for various ailments as local remedies. Most of the recorded plants were used for more than one purpose. Some of the most frequently used plants with their local traditional uses are summarized in Table 2. Similar studies have been carried out by other workers like Hussain et al. (2005), Ibrar et al. (2007), Jani et al. (2008), Qureshi et al. (2008), Barkatullah et al. (2009) and Qasim et al. (2010) which are in line with our findings. Medicinal flora of this area is under great anthropogenic pressures as they are not collected in a sustainable way by the inhabitants and also by the Hakims and Pansaries with the result, these species are going to be declining day by day. These results are similar to the findings of Shinwari and Khan, (2000) who observed that there has been consistent growth in the demand for plant-based drugs and products from a variety of species.

This has given rise to large-scale improper collection and habitat degradation. It has resulted in scarcity of a number of valuable medicinal plant species, and their wide range of chemical and genetic diversity will diminish if improper and mismanaged collection from natural habitats continues at the present rate.

Inhabitants of Malakand Pass Hills rely on cattle for their livelihood. Fodder and forage for their cattle were recorded to be obtained from 42 species (24.85%): *Acacia modesta, Albizia lebbeck, Gymnosporia royleana, Melia azedarach, Morus alba, Morus nigra, Robinia pseudocacia and Zizyphus mauritiana* were the most frequently used species as fodder/forage used by the goat and sheep. *Apluda mutica, Cenchrus ciliaris, Chrysopogon aucheri, Cymbopogon distans, Cynodon dactylon, Dichanthium annulatum, Fimbristylis squarrosa* and *Poa annua* were the most valuable grasses grazed by cattle. The residents of the area also cut and store these and other forage plants for use during rain and winter seasons. The vegetation in this area constitutes a natural source of fodder and forage, therefore ranchers and herders have no problem by keeping live stock under their control. Unmanaged grazing uprooted many valuable plants, thus declining their availability in the area. These results are strengthened by similar studies of Khan et al. (2003), Zabihullah et al. (2006), Manan et al. (2007) and Shah and Hussain (2008) regarding to fodder/forage species in other parts of Malakand division.

People of the investigated area are poor. They fulfill their food requirements by using different plants as vegetable both in fresh and cooked form. Similarly some valuable edible fruit yielding plants were also observed. A total of 40 species (23.68%) were recorded consumed as vegetable and fruit species. *Amaranthus caudatus, Asphodelus tenuifolius, Bauhinia variegate, Caralluma fimbriata, Chenopodium album, Malva neglecta* were the most valued vegetables in this remote area. Similarly, fruits of *Barberis lyceum, Daphne oleoides, Ficus carica, Ficus racemosa, Fragaria indica, Punica granatum Juglans regia*, *Monotheca buxifolia, M. alba, M. nigra*, *Olea*

Table 2. Plant with their local medicinal uses in Malaknd Pass Hills.

S/N	Specie name	Medicinal use
1	*Acacia modesta* Wall	Ant diarrheal, demulcent, stimulant, tonic
2	*Achyranthes aspera* L	Antipyretic, demulcent, diuretic
3	*Adiantum venustum* - D. Don.	Aphrodisiac, stimulant, tonic
4	*Ajuga bracteosa* Wall ex. Benth.	Antipyretic, anti sour, blood purifier, refrigerant
5	*Asparagus adscendens* Roxb.	Anti spasmodic, blood purifier, tonic
6	*Barberis lyceum* Royle	Ant diabetic, aphrodisiac, tonic
7	*Butea monosperma* (L.) Taub.	Anti hepatic
8	*Cannabis sativa L.*	Hypnotic, narcotic, sedative
9	*Caralluma Fimbriata* Wall	Anti diabetic, anti pyretic, vermifuge
10	*Carthamus lanatus* L.	Anti diuretic
11	*Citrullus colocynthis* (L.) Schrad	Anti diarrheal, insecticidal, vermifuge
12	*Cynodon dactylon* (L.) Pers	Astringent
13	*Equisetum arvensis* L.	Diuretic, vermifuge, refrigerant
14	*Fagonia cretica* L.	Anti diabetic, antipyretic, anti sour, blood purifier
15	*Fumaria indica* Pugsley	Antipyretic
16	----------	----------
17	*Juglans regia* L.	Anti scorbic, stimulant, tonic
18	*Melia azedarach* Linn	Ant diabetic, blood purifier, vermifuge
19	*Olea ferruginea* Royle	Analgesic, antiscorbic, demulcent
20	*Pinus roxburghii* Sarg.	Antidote, emollient, vermifuge
21	*Plantago lanceolata* L.	Anti gonorrhea
22	*Punica granatum* L.	Anti diuretic
23	*Rosa moschata* J.Herm	Emollient, laxative
24	*Rubus fruticosus* L.	Antispasmodic, purgative
25	*Salvia plebia* R.Br.	Anti eczema
26	*Solanum nigrum L.*	Analgesic, ant diuretic
27	*Solanum surattense* Burm.f.	Antiscorbic, Expectorant
28	*Tribulus terestris* L.	Antidiabetic, antispasmodic
29	*Zizyphus mauritiana* Lamk	Antidiabetic
30	*Zizyphus oxyphyla* Edgrew	Antidiabetic

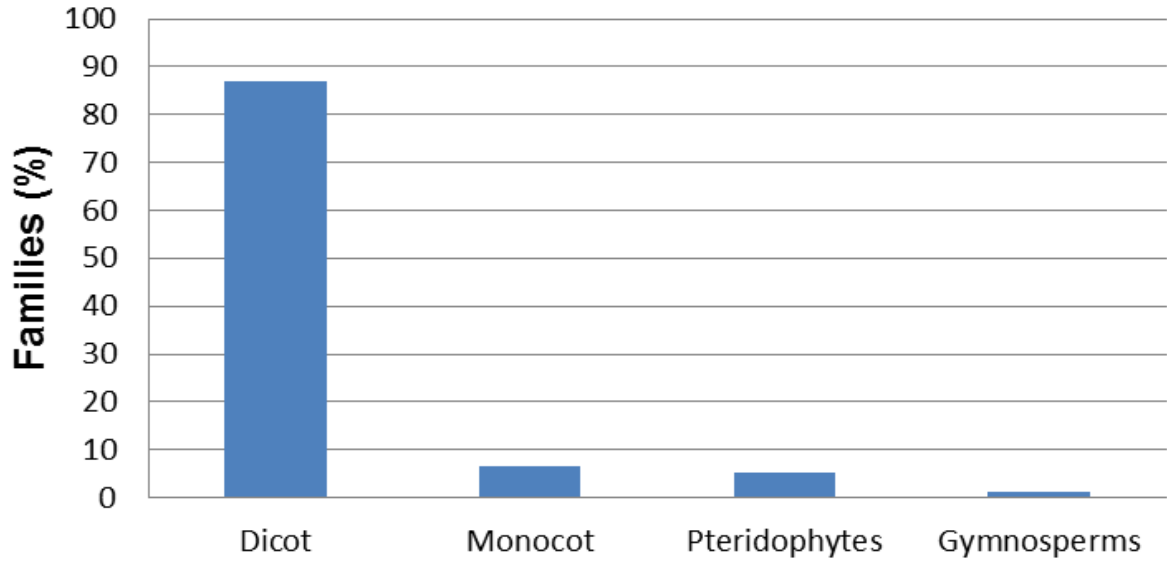

Figure 2. Percent contribution of various plants groups in the ethnobotany of Malakand Pass Hills.

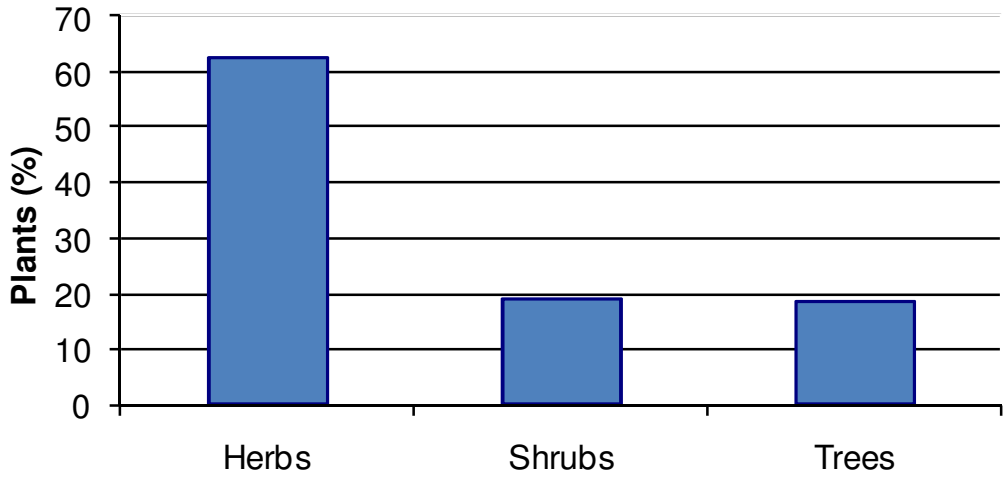

Figure 3. Percent contribution of herbs, shrubs and trees Malakand Pass Hills.

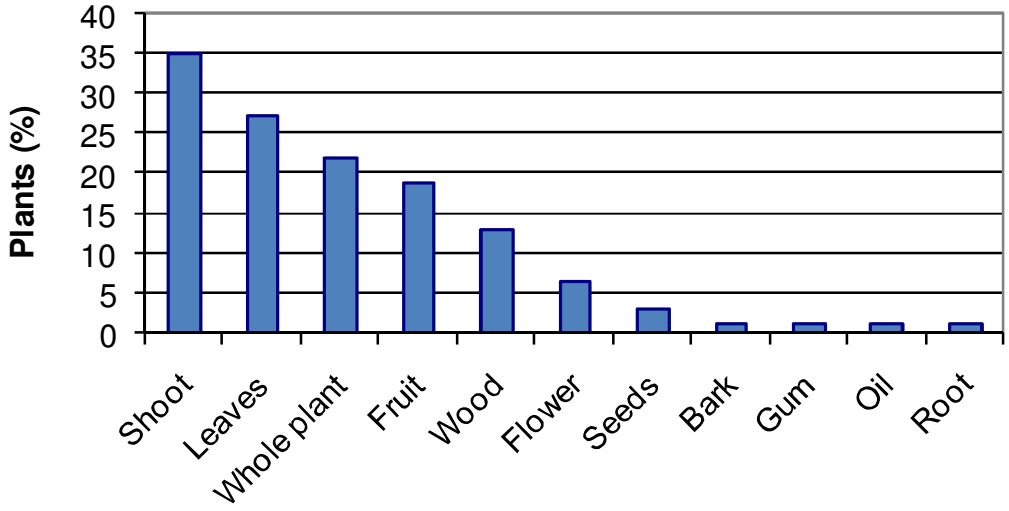

Figure 4. Part used of the plants used in Malakand Pass Hills.

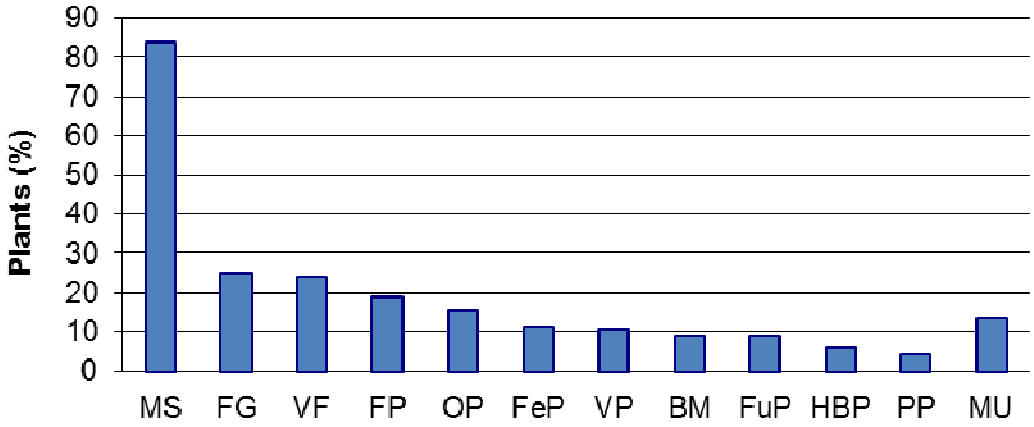

Figure 5. Ethnobotanical classess of the plants of Malakand Pass Hills. MS: Medicinal species, FG: fodder/ grazzing species, VF: vegetable/ fruits edible plants, FP: fuel plants, OP: ornamental plants, FeP: fencing plants, VP: plants of veterinary uses, BM: building materials plants, FuP: furniture plants, HBP: Honey bee plants, PP: poisonous plants, MU: miscellaneous uses.

ferruginea, Vitis jacquemontii and *Zizyphus mauritiana* were the most valued fruit yielding species in this area. *Caralluma fimbriata* and *Vitis jacquemontii* are the most valued species for the poor people of the area as these were sold in the nearby market, thus contributing to their earning. Similar findings were also reported by Hamayun et al. (2005), Ishtiaq et al. (2007) and Barkatullah (2009) who described plants used as vegetables and fruits in other parts of the country.

The collected information revealed that 31 plants (18.93%) were used for fuel. Lack of knowledge, unavailability of natural gas and poor economic status of the research area has increased cutting wood trees for fuel. *Dodonea viscosa and Pinus roxburgii* were the most preferred species as fuel especially in winter, where there is a greater demand of fuel because of severe cold in the area. Some of the woody plants cut in unmanaged manner for fuel purpose include: *A. modesta, A. lebbehck, Bauhinia variegate, Dalbergia sissoo, Eucalyptus camaldulensis, M. azedarach, Robiania pseudocacia and Zizyphus mauritiana.* Similar observations are also reported by Ali and Benjaminsen (2004), Ibrar et al. (2007), Khan et al. (2007) and Sardar and Khan (2009), from other parts of KPk, which are in line with our findings.

The ornamental use of wild and cultivated plants is observed more frequently in mountainous regions, where higher diversity and prevalence of appealing herbaceous, shrubby and arboreal life forms has influenced the aesthetic sense of residents, who have grown many of these species into their gardens as ornamentals for their own enjoyment. In few cases, these are propagated and sold on small scale operations especially by children, for example *Narcissus tazetta*. Estrada et al. (2007) also reported similar observations. Another trend observed in the area is that wild plants were grown for ornamental purposes (26 plants, 15.38%). Some of the valued plants in this category were *Caledula arevense, Convolvulus arvense, Cynodon dactylon, Daphne oleoide, Merabilis jalapa, Narcissus tazetta, Rosa moschata, Rosa webbiana* and *Tagetus minuta* etc. other workers like Hamayun et al. (2003), Zabihullah et al. (2006), Ibrar et al. (2007), Barkatullah et al. (2009) and Sardar and Khan (2009) also reported similar results.

People of Malakand Pass Hills live in mud houses, most of which are without boundary walls. They make fences around their houses by using thorny plants species. They also used these plants to make fences around their terraces to prevent passage ways near their houses and to prevent grazing of their crops by cattle. 19 plants (11.24%) were reported to be used for this purpose. *A. modesta, A. nilotica, Barberis lyceum, Cotoneaster numularia, Otostegia limbata, Rosa moschata, Rosa webbiana, Rubus fruiticosus* and *Rumex dentatus* were the most widely species used as fencing plants. Similar plants were also reported by Ibrar et al. (2007), Jan et al. (2008) and Barkatullah et al. (2009) from the adjoining areas which support our results.

18 plants (10.65%) were reported as veterinary medicines. Some of the plants used as ethnoveterinary medicines were *Asparagus adscendens, Bauhinia variegate, Cichorium intybus, Fumaria indica, Hyoscyamus niger, Myrsine africana, Salvia moorcroftiana and Urtica dioica.* Iqbal and Hamayun, (2005) have also described the role of ethnoveterinary medicines; Choudhry et al. (2006) reported ethno-veterinary medicinal plants from Bhimber, (Azad Kashmir) Pakistan. Farooq et al. (2007) reported ethno-veterinary practices in Cholistan desert (Pakistan). Sindhu et al. (2010) also reported ethno-veterinary practices in hilly areas of Pakistan.

15 plants (8.87%) were used by the local inhabitants for house construction especially for roof making. Large sized logs are used as supporting beams, upon which tree and shrubby branches are spread to make a roof. Some trees and shrubs are cut illegally and supplied to the settled area for selling, thus earning their livelihood by the inhabitants. Some of these plants included *A. modesta, A. nilotica, Albizia lebbeck, Artemisia scoparia, Dodoneae viscose, Melia azedrach and Pinus roxburghii.* Hamayun et al. (2005), Ibrar et al. (2007) and Barkatullah et al. (2009) also described similar results from different area of Malakand division.

During the study it was observed that 14 plants (8.82%) were used for making furniture. *Dalbergia sisoo*, *Juglans regia*, *M. azadrach* and *Quercus incana* were preferred for their resistant and durable wood. Other plants were also used for making low grade furniture. Because of illegal cutting of the woody plants for commercial purposes, these plants are declining in number day by day in the area. Reported observation of Ibrar et al. (2007), Khan and Khatoon (2007), Barkatullah et al. (2009) and Khan et al. (2009) are in line with our findings.

Some of the inhabitants of the area as well as honeybees professionals were reported to be involved in keeping honeybees for honey production. They collected honey from hives and sold them in the local market. For this purpose they utilized 10 species (5.91%). Some of the plants preferred by honeybees included *A. modesta, A. nilotica, Albizia lebbeck, Butea monosperma, Caledula arvensis, Justicia adhtoda, Merabilis jalapa,* and *Sarcococca saligna.* Honey is considered restorative in many ailments. It is also considered a nutritious food. Hamayun (2005), Zabihullah et al. (2006) and Sher and Hussain (2009) also described some plants as honey bee attractants, thus playing a significant role in apiculture.

Eight plants (4.73%) were considered poisonous by the local residents in the area. *Bistorta amplexicaulis, Calotropis procera, Canabis sativa, Dathura innoxia, Euphorbia helioscopia, Hyocymus niger*, *Polygonum barbatum*, *Ricinus communis* and *Utrica dioica* were included in this category. Although they are considered poisonous but local Hakims and Punsari used these in their formulations for various ailments. Sher et al. (2004),

Durrani and Hussain (2006) and Rahmatullah and Bhatti (2008) also recorded some poisonous plants in different parts of Pakistan, which include many of the present reported plants.

Other uses in the investigated area included three species considered to be sacred by indigenous locals (1.77%), three toothbrushing species (1.77%), two basket making species (1.18%), two broom making species (1.18%), two carpet making species (1.18%), two condiments and spices (1.18%), two cricket bat making species (1.18%), two species (1.18%) used after mehindi, two soil binder species (1.18%), one green tea species (0.59%), one dye making species (0.59%) and one chewing gum species (0.59%) (Table 1).

It was observed in many instances, that two or more species were given the same name for example, *Adiantum venustum, Cheilanthes pteroides, Dryopteris crenata* and *Dryopteris jaxtaposta* were locally named as sumbal*, Ammi visnaga* and *Plectranthus rugosus* as sperkey, *Andrachne cordifolia* and *Convolvulus arvense* as prewatkey*, Artemisia scoparia* and *Bromus japonicus as* jawkey*, Carthamus lanatus* and *Carthamus oxycantha* as kareza.

Commercial and illegal cutting of the plants, particularly for fuel, building and furniture purposes has badly affected the flora to an extinction state and can no longer resist further pressure even for local uses. Long and short term policies should be initiated with the participation of local community to protect this precious vegetation of Malakand Pass Hills. It is also mandatory to inform the locals about the importance of plants and their sustainable use. The area is highly disturbed and degraded due to over exploitation by the people. It is needed to carry out forestation/ reforestation in the area with active participation of the local inhabitants and to keep strict check on illegal cutting of the plants.

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