ROLE OF ECONOMIC PLANTS IN THE COMMUNITY DEVELOPMENT OF DIR VALLEY KHYBER PAKHTUNKHWA, PAKISTAN

ALI HAZRAT*[1, 2], MUHAMMAD NISAR[2], KHAN SHER[1] AND SHAH ZAMAN[1]

[1]Department of Botany, Shaheed Benazir Bhutto University, Sheringal, Dir Upper
[2]Department of Botany, University of Malakand, Chakdara, Dir Lower, Pakistan
**Corresponding author email: ali_hazrat8@yahoo.com*

Abstract

The study was carried out in Dir Valley; district Dir Upper of the Province, Khyber Pakhtunkhwa, Pakistan, to explore the flora of Taxo-ethnobotanical potential and estimation economic value of the local flora. It is the first attempt to document such type of study in the selected area. About 144 Angiospermic species were recorded, which consisted of 61 families and 111 genera. Among these Poaceae was the leading families represented by 13 species, followed by Rosaceae are represented by 10 species. Similarly Asteraceae and Lamiaceae had 9 species each. The ethnobotanical study identified that these species for 46 different uses. The part used data shows that mostly the whole plant, leaves, fruit, roots and stem were in common use.

Introduction

The study was conducted in District Dir Kohistan (DDK), which is located in Malakand division Khyber Pakhtunkhwa (KPK), Pakistan. The area is situated between 34º 10 N latitude and 72 º 20 E longitudes in sub-tropical dry temperate portion of Hindukush series. However, some area also lies in the moist temperate zone of the Pakistan. Geographically the Swat area lies in the East, Bajur Agency and Afghanistan in the West, District Dir lower in the South while Chitral in the North. The Dir Kohistan area is situated in the North East of Dir Upper which is encircled by the Hindu Raj on the North, North West by the Torwal and Gabral area in the East. Doddbah Sar Ghaer and Bataraei Ghaer located toward the South and South-west respectively (Khan *et al.,* 2010). District Dir Upper (DDU) is one of among the 25 districts of KP province and covers an area of 3,699 sq km^2. Kohistan valley starts with its gate way called "Khawgo Ooba" and extended to up to Kumrat about 120 km. However, according to forest division the area of Dir Kohistan 645 square miles. Out of this an area of 1, 40, 351 acres were covered by coniferous/pines forests (DCR, 1998).

The present project was carrying out in order to evaluate the ethnobotanical uses of vegetation including herbs, shrubs and trees. Dir Kohistan has a diverse habitat for medicinal plants. However, no extensive study has so far been undertaken to examine the ethnobotanical uses with some additional of other uses of plants species. This chapter describes a brief account of the ethnobotanical work carried out in Pakistan. However, it is worth to mention that the description is mainly based on the literature. The ethnobotanical study in Pakistan is still at pioneer stage. In the beginning the ethnobotanical studies carried out in Pakistan were mostly observational and most of the information was carried out by interviewing the local inhabitants. In this prospect Ibrar and Khan, (2000) conducted ethnobotanical studies in Margalla Hill National Park. They reported that the local inhabitants in and around the National Park are dependent on herbal plants since time immemorial. Many plant species were reported which were using by the local inhabitant for different ailments. A similar approach was used by Mujtaba and Khan, (2001) and documented the ethnomedicinal folk recipes that used to cure different disorders in their study area. They approached the knowledgeable people including Hakims, old women and old men who are consider the primary user of medicinal plants. Their work was systematic and helpful in terms of exploration of different plant species used in folk recipes.Addition was made by Rahman *et al.,* (2002) by summarizing the available literature on antidiabetic activities of 343 plant species and described the pharmacological activities of some extracts. Irshad and Buth, (2002) conducted a detailed study of an ancient medicinal system of the world while Shinwari and Gilani, (2003) focused on plant resources for their conventional uses under *in-situ* and *ex-situ* conservation, training of the community regarding collection of medicinal plants and their marketing. They highlighted the ethnobotanical uses of 33 plant species which were being used by the local communities for various diseases. Their study also exposed the suitability of *Ephedra gerardiana* and *Bunium persicum* for cultivation in Vitro in order to obtain immediate profits in future.

The extreme north area of the country has rich flora and cultural diversity. However, the ethnobotanical information's regarding these floras in these areas is scanty. Though some fragmentary information's are available like Qureshi *et al*., (2005) presented the ethnobotanical uses of different medicinal plants of District Gilgit and adjacent areas while Saqib and Sultan, (2005) conducted a detail ethnobotanical survey in Palas valley, and attempted to sum up the preexisting ethnobotanical information's. They collected 139 plant species which is ethnobotanically very important plant species belonging to 72 families are being reported from the current study area. Similarly, Abid *et al*., (2005) worked on medicinal plants that constituted an excellent source

of traditional and modern medicines. On the other hand Mushtaq *et al*, (2005) worked out on ethnobotanical studies of Galliyat area and mainly gathered information about the indigenous uses of plants for medicines and also used for other purposes that are relaxing for the local inhabitants. For this purpose they documented the ethnobotanical data of 40 species of plants with 37 genera and 26 families, during winter and summer.

The literature surveys reflect that majority of residential and road able areas are extensively studies for folk/ indigenous, but the harsh and tough area of Dir, kohistan is not yet been explore for ethnobotanical studies.

Materials and Methods

Widespread field studies were conducted throughout the Dir valley. Starting from June-August, continuously for two years i.e., 2007-2009. A total of 30 localities were studied systematically. The emphasis was given to the remote and non visited localities during field trip. These trips were conducted with the help of local guides, using horses for transportation of plants and plant pressers. Plant specimens were collected along with extensive field notes including habit, habitat, life form, phenological status, abundance, photograph of the plant species. The local inhabitants were interviewed regarding the local names and various indigenous uses. For each plant, ethnobotanical information was collected from people of different ages belonging to different tribal groups. All the collected plants are properly pressed, dried and mounted on standard herbarium sheets and the voucher specimens are deposited at Shaheed Benazir Bhutto University and Malakand University. Specimens were identified with the help of relevant Floras. The nomenclature is based on Flora of Pakistan (Nasir & Ali, 1970-1979: Nasir & Ali, 1980-1989: Ali & Nasir, 1989-1992: Ali & Qaiser, 1993-2009).

Results and Discussion

The plants collected from research area consists of 144 species belonging to 61 different families. Out of these 144 species 131 were dicot and 13 monocot (Table 1). The medicinal plants usage data showed that 20 plants were used as wild fruit, 19 pot herb, 3 beverage, 50 fodder, 20 hay fodder, 94 medicine, 7 poison, 3 green pesticide, 3 graveyard things, 35 fuel wood, 01torch wood, 10 agricultural tools, 9 soil binder, 2 soil fertilizer, 6 wind break, 10 shade tree, 6 spice/flavoring agent, 10 ornamental, 4 dye, 01 Ink, 3 Incense/perfume, 01 paper, 01 beads, 7 packing/ roping, 3 stick/handles, 2 timber, 3 cushion plant, 01 resin, 18 fence, 11 furniture, 4 fish poison, 2 soil reclamation, 2 dry fruits, 01 brooms, 3 miswak, 10 hedge plant, 11 utensils, 7 construction, 3 bee attractants, 3 smoking medicine, 2 wood carving, 01 root stock, 01 charcoal, 2 fishing checks, 2 snuff ash, 01 granary/basketry (Table 2). The species of medicinal uses are classified on their utilitarian basis. Plant utilization by the isolated communities for curing various ailments have supplied tremendous information which can be properly utilized in planning for utilization of the endemic knowledge for better planning of the plant natural resources for the well-being of the community in general and for medicinal plants utilization in particular (Table 1).

Medicinal plants are used by the human beings since long (Lama *et al.,* 2001; Partel *et al.,* 2005). While, Rigveda between 4500-1600 BC and Ayurveda Between 2500-600 BC are the first medicinal books in the sub-continent. The medicinal plants practice is very old and in present era of technology still people believe in traditional use of medicinal plants (Ali and Qaiser, 2009).

Table 1. Check list of some economically important plants of Dir valley.

S/No	Family	S/No	Botanical Name	Description of plant use
1	Acanthaceae	1	*Adhatoda vasica Nees.*	6, 10, 40
2	Amaranthaceae	2	*Achyranthus aspera* L.	6,4
		3	*Amaranthus caudatus* L.	2, 4, 5
		4	*A. viridis* L.	2, 4, 5
3	Myrtaceae	5	*Myrtus communis* L.	13, 6, 10, 24
4	Araceae	6	*Sauromatum venosum* (Ait) Scoth.	7, 6
5	Araliaceae	7	*Hedera nepalensis* K. Koch	4, 6, 10
6	Ascelpiadceae	8	*Periploca aphylla* Dene.	6, 45, 28
7	Balsaminaceae	9	*Impatiens bicolor* Royle.	19,4, 16, 20
		10	*Impatiens brachycentra* Kar. &Ker.	4,6,19
		11	*Impatiens edgeworthii* Hook.	19,4, 6
8	Berberidaceae	12	*Berberis lycium* Royle	6,29,10,1
		13	*Berberis pseudumbellata* Parker *ssp pseudumbellata*	6,29,10,1
9	Betulaceae	14	*Alnus nitida* (Spach.)	32,16,10,15,26

S/No	Family	S/No	Botanical Name	Description of plant use
		15	*Betula utilis* D. Don.	22
10	Brassicaceae	16	*Capsella bursa-pastoris* (L.) Medik	6,4
		17	*Sisymbrium irio* L.	6,4
		18	*Nasturtium Officinale* R. Br.	6, 30, 2, 4, 9
11	Cannabiaceae	19	*Cannabis sativa* L.	6, 10,40
12	Caprifoliaceae	20	*Viburnum nervosum*. D. Dom.	1, 6, 29, 36, 10
13	Caryophyllaceae	21	*Silene conodiea* L.	4, 5
		22	*Stillaria media* (L.) Chy	2, 4, 5
14	Chenopodiaceae	23	*Chenopodium album* L.	2, 6, 4
		24	*Chenopodium ambrosoides* L.	6
15	Asteraceae	25	*Achillea millefolium* L	6
		26	*Artemisia santolinifolia* Turcz. Ex Krasch.	6, 7, 8
		27	*A. scoparia* L.	6, 34, 10
		28	*Calendula arvensis* L.	6
		29	*Cichorium intybus* L.	2, 6
		30	*Cnicus benedictus* L.	4,5,2
		31	*Onopordeum acanthium L*.	6,4
		32	*Sonchus asper* L.	4
		33	*Taraxicum officinale* Weber.	6
16	Convolvulaceaee	34	*Cuscuta reflexa* Roxb.	8
17	Cucurbitaceae	35	*Cucurbita maxima* Duch. Ex La	6
18	Dioscoraceae	36	*Dioscorea deltoidea* Wall. Ex Kunth	31,6,27
19	Ebenaeceae	37	*Diospyrus lotus* L.	1,30,6,12,10,16
20	Sapotaceae	38	*Monotheca buxifolia* (Falc.) A. DC.	1,10,36,29, 6
21	Orchidaceae	39	*Cephalanthera longifolia* (L.) Fritsch	6
22	Euphorbiaceae	40	*Euphorbia hirta* L.	7
		41	*Euphorbia prostate* Act.	6
		42	*Ricinus communis* L.	6, 10
23	Fagaceae	43	*Quercus incana* Roxb.	10,4,1,12,29,43,38,26
24	Hypericaceae	44	*Hypericum perforatum* L.	3, 6
25	Iridaceae	45	*Iris hookeriana* Foster	18, 6
26	Juglandaceae	46	*Juglans regia* L.	33,1,4,6,17,18,19,12,35,41 ,10
27	Lamiaceae	47	*Ajuga bracteosa* Wall. Ex. Benth	6, 31
		48	*Mentha longifolia* (L.) L.	6, 31
		49	*Isodon rugosus* (Wall, ex Benth.) Codd.	38,27, 10, 39,4,6
		50	*Mentha spicata* L.	17, 6 ,3,40
		51	*Mentha arvensis* L.	6,17,3
		52	*Nepeta laevigata* (D. Don) Hand.-Mazz.	6, 39
		53	*Origanum vulgare* L.	39,6
		54	*Ocimum basilicum* L.	18,6,17,21
		55	*Salvia moorcraftiana* Roxb	6
28	Liliaceae	56	*Asparagus adscendens* Roxb.	35,6
29	Malvaceae	57	*Malva neglecta* Wall.	2,4,5
		58	*Hibiscus syriacus* L.	2,4,5
		59	*Malva sylvestris* L.	6,4,2,5
30	Meliaceae	60	*Cedrela serrata* Royle	31,12,7
		61	*Melia azedrach* L.	16,4,6,30,10
31	Moraceae	62	*Ficus palmata* Forssk.	10,6,1,4
		63	*Morus alba* L.	1,4,12,30,10,15,16
		64	*Morus nigra* L.	1, 4,12,30,10,15

S/No	Family	S/No	Botanical Name	Description of plant use
32	Myrsinaceae	65	*Myrsine africana* L.	6,10,38,27
33	Nyctaginaceae	66	*Mirabilis jalapa* L.	6,18
34	Oleaceae	67	*Jasminum grandiflorum* L.	4,36,10,29
		68	*Jasminum humile* Linn.	21,18,29,10
		69	*Jasminum officinale* L.	21,18,29,10
		70	*Olea ferruginea* Royle.	4,1,38,10,16,9,23
35	Paeoniaceae	71	*Paeonia emodi* Wall.	6
36	Fabaceae	72	*Astragalus anisacanthus* Bois	35,6
		73	*Sophora mollis* (Royle) Baker ssp *mollis*	30,37,38,10,12,41
		74	*Indigofera heterantha* Wall. Ex Brandis var. *Heterantha*	24,37,24,45,46,44
		75	*Lathyrus aphaca* L.	4,2,5
		76	*Medicago denticulata* L.	4,14,6,5
		77	*Robinia pseudoacacia* L.	36,10,4,29
37	Anacardiaceae	78	*Pistacia chinensis* Bunge ssp. *Integerrima* (J.L.S) Rech. f.	6,4,10,29
38	Plantaginaceae	79	*Plantago lanceolata* L.	4,6
		80	*Plantago major* L.	4,6
		81	*Plantago ovata* Forssk.	4,6
39	Platanaceae	82	*Platanus orientalis* L	16,30,12,18,11
40	Poaceae	83	*Aristida adscensionis* Nees.	4,5,24
		84	*Aristida cyanantha* Nees ex Steud.	4,5,24
		85	*Chrysopogon aucheri* (Boiss) Stapf	4,5,24
		86	*Chrysopogon gryllus*. (L.)	4,5,24
		87	*Chrysopogon serrulatus* Trin.	4,5,24
		88	*Avena fatua* L.	4,5
		89	*Cenchrus cilliaris* L.	4,5
		90	*Cynodon dactylon* L.	4,5,18
		91	*Saccharum spontaneum* L.	4,5
		92	*Phragmites australis* (Cav.) Tri	37
		93	*Arundo donax* L.	36,37,13
		94	*Themeda anathera* (Nees ex Steud.) Hack.	37,13
		95	*Sorghum helepense* (L.) Pers.	4,5
41	Polygonaceae	96	*Rumex acetosa* L.	2,6
		97	*Polygonum viviparum* L.	6,4
		98	*Rheum webbianum* Royle.	6
		99	*Rumex dentatus* L.	2,6
42	Portulaceae	100	*Protulaca oleracea* L.	2,6
43	Punicaceae	101	*Punica granatum* L.	1,29,10,6,17,9
44	Ranunculaceae	102	*Anemone obtusiloba* D. Don.	4,13
		103	*A. rupicola* Comb.	4,13
		104	*Aquilegia pubiflora* Wall.	6
		105	*Delphinium pyramidale* Royle.	18
		106	*Rananculus muricatus* L.	4,6
45	Rhamnaceae	107	*Ziziphus jujuba* Mill.	33,1,6,10,36,37,4.
46	Rosaceae	108	*Cotoneaster affinis* (Lindl.) Schn.	6,10,37
		109	*Cotoneaster microphyllus* Wall. Ex Lindl.	10,6,1,25
		110	*Cotoneaster numularia* Fisah &M	10,6,25
		111	*Fragaria indica* Andrews.	6,1
		112	*Pyrus pashia* Ham.ex D.Don.	42,10,29
		113	*Rosa brunonii* Lindl.	36,44

S/No	Family	S/No	Botanical Name	Description of plant use
		114	*Rubus fruticosus* L.	29,1,6, 36,
		115	*Rubus niveus* Thunb. Non. Wall.	36,29,1,6
		116	*Sorbaria tomentosa* (Lindl.) Rehdr	29,1,6
		117	*Rubus ellipiticus* Smith.	29,1,6
47	Rutaceae	118	*Zanthoxylum armatum* DC.	25,36,29,17,6
48	Salicaceae	119	*Populus ciliata* Wall.	10,38,16,13
		120	*Populus alba* L.	14,30,37,13,15,38,37
		121	*Populus nigra* L.	30,37,10,15
		122	*Salix denticulata* Andersson	16,4,10,32,12,13,
49	Saxifragaceae	123	*Berginia ciliata* (Haw.) Scernb.	6,18
50	Scrophulariaceae	124	*Varbascum thapsus* L.	6
		125	*Veronica persica* Poir.	6
51	Simarubaceae	126	*Ailanthus altissima* (Mill.)Swingle.	10,4,13,15,30,29
52	Solanaceae	127	*Solanum nigrum* L.	2,6
		128	*Solanum surattense* Burm. f.	6
		129	*Withania somnifera* Dunal.	7,6
		130	*Datura metel* L.	6,7
		131	*Datura stramonium* L.	6,7
53	Thymeleaceae	132	*Daphne mucronata* Royle.	6,10
54	Ulmaceae	133	*Celtis australis* L.	6,12,30,16
		134	*Celtis caucasica* Willd.	1,37
55	Apiaceae	135	*Eryngium coeruleum* M-Bieb.	6,4
		136	*Trachyspermum ammi (L.)*	6
56	Utricaceae	137	*Urtica diocia* L.	2,6
		138	*Urtica pilulefora* L.	2,6
57	Valerianaceae	139	*Valeriana jatamansi* Jones	6
58	Verbenaceae	140	*Vitex negundo* L.	8,6
59	Violaceae	141	*Viola betonicifolia* Sm.	6,2
		142	*Viola biflora* L.	6,2
60	Vitaceae	143	*Vitis vinifera* L.	1,4,6
61	Zyghophyllaceae	144	*Tribulus terristris* L.	6

Key of plant use: 1, Wild fruit; 2, Pot herb; 3,Beverage; 4, Fodder; 5, Hay Fodder; 6, Medicine; 7, Poison; 8, Green Pesticide; 9, Graveyard things; 10, Fuel wood; 11, Torch Wood; 12, Agricultural tools; 13, Soil binder; 14, Soil fertilizer; 15, Wind Break; 16, Shade tree; 17, Spice/flavoring agent; 18, Ornamental; 19, Dye; 20, Ink; 21, Incense/perfume; 22, Paper; 23, Beads; 24, Packing/ roping ; 25, Stick/handles; 26, Timber; 27, Cushion plant; 28, Resin; 29, Fence; 30, Furniture; 31, Fish poison; 32, Soil reclamation; 33, Dry fruits; 34, Brooms; 35, Miswak; 36, Hedge plant; 37, Utensils; 38, Construction; 39, Bee attractants; 40, Smoking medicine; 41, Wood carving; 42, Root stock; 43, Charcoal; 44, Fishing Checks; 45, Snuff ash; 46, Granary/Basketry.

Table 2. Percent distribution of uses.

S/No	Type of use	Number of Species	%
1	wild fruit	20	13.79
2	Pot herb	19	13.79
3	Beverage	3	2.07
4	Fodder	50	34.48
5	Hay Fodder	20	13.79
6	Medicine	94	65.52

S/No	Type of use	Number of Species	%
7	Poison	7	4.83
8	Green Pesticide	3	2.07
9	Graveyard things	4	2.76
10	Fuel wood	35	24.14
11	Torch Wood	1	0.69
12	Agricultural tools	10	6.89
13	Soil binder	9	6.21
14	Soil fertilizer	2	1.38
15	Wind Break	6	4.14
16	Shade tree	10	6.90
17	Spice/flavoring agent	6	4.14
18	Ornamental	10	6.90
19	Dye	4	2.76
20	Ink	1	0.69
21	Incense/perfume	3	2.07
22	Paper	1	0.69
23	Beads	1	0.69
24	Packing/ roping	7	4.83
25	Stick/handles	3	2.07
26	Timber	2	1.38
27	Cushion plant	3	2.76
28	Resin	1	0.69
29	Fence	18	12.41
30	Furniture	11	7.59
31	Fish poison	4	2.76
32	Soil reclamation	2	1.38
33	Dry fruits	2	1.38
34	Brooms	1	0.69
35	Miswak	3	2.07
36	Hedge plant	10	6.90
37	Utensils	11	7.59
38	Construction	7	4.83
39	Bee attractants	3	2.07
40	Smoking medicine	3	2.07
41	Wood carving	2	1.38
42	Root stock	1	0.69
43	Charcoal	10	6.90
44	Fishing Checks	2	1.38
45	Snuff ash	2	1.38
46	Granary/Basketry	1	0.69

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