ETHNOBOTANICAL STUDIES OF SHRUBS AND TREES OF AGRA VALLEY PARACHINAR, UPPER KURRAM AGENCY, PAKISTAN

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Abstract

Aboriginal folks live diligently connected with nature and predominantly depend on it for their persistence. The present study conducted in 11 villages of Agra Valley, Parachinar and reported 18 Angiospermic shrubs belonging to 3 monocot (Poaceae, Cyperaceae, Typhaceae) and 10 dicot families (predominantly Apocyanaceae, Rosaceae, Lamiaceae); in addition to 27 trees of ethnobotanical importance including 1 Gymnosperm (Pinaceae) and 26 Angiosperms having single monocot (Arecaceae) and 18 dicot families (predominantly Moraceae, Salicaceae, Fabaceae). Nearly one-third species had single-usage. Two-usage and multi-usage shrubs were consumed for crafting (25%), medicinal (22.5%), culinary (11%) and miscellaneous other purposes. 11% single-usage, 30% two-usage and 59% multi-usage trees were employed for medicinal (22%), fuel (21%), crafting (19%) and for several other purposes. Different parts of plants were utilized either in powder form, decoction, infusion or whole plant extract to cure various diseases. Unfortunately, the knowledge of commercial and remedial possessions of many plants attained by methods of trial and error, gathered and supplemented through peers and delivered from one generation to another, was deprived of any written documentation. Therefore, the documentation of plants along with their important uses should be beneficial, not only for the indigenous people of the area but also for the country as a whole. Also, there is a need of sustainable use of the plants to preserve them for future generations and prevent their extinction.

Introduction

Ethnobotany is the study of how individuals of a specific philosophy and constituency make of use of aboriginal flora. The study of the wide spectrum of complex relationships found between people and plants (Choudhry *et al.*, 2008). Fortunate enough, this discipline has evolved in a multidisciplinary mode, integrating not only assemblage and certification of local uses but also ecology, economy, pharmacology, public health and other disciplines (Schultes, 1992).

Aboriginal folks live diligently connected with nature and predominantly depend on it for food, fuel, fiber, oil, herbs, spices and as forage and fodder for domesticated animals. Their reliance on plants nearby them made them attain the understanding of commercial and remedial possessions of many plants by methods of trial and error. Subsequently, they became the store-house of information of numerous beneficial as well as detrimental plants, gathered and supplemented through peers and delivered on from one generation to another, deprived of any written documentation (Heywood, 1992; Khan *et al.*, 2011).

The present study was conducted owing to the significance of rich floral biodiversity in Agra Valley, Parachinar - the administrative head quarter of Kurram Agency. It lies in between 33º20' to 34º03' N and 69º50' to 70º45' E at an elevation of about 6000 feet above sea level. The climate of Kurram varies at different altitudes and presents striking contrasts from sultry oppressive heat to bitter cold. Summer and spring is quite pleasant. But winter is extremely harsh as it is quite usual that mercury drops up to -10°C. The annual rainfall in Parachinar is 1239.96 mm. Humidity is found higher in morning than found in evening.

Materials and Methods

The materials required included: Notebook, blotting paper, pencil, newspaper, knife, polythene bags, map and plant presser.

The ethnobotanical study was carried out in the following steps:

1. **Survey of the area:** 11 villages were visited on weekly basis and plants alongwith the information regarding their usage were collected from these areas. Information was compiled from the local endemics of the area, i.e. aged man and women, hakims, farmers, pansaries and shopkeepers, etc. through formal as well as informal interviews in Pushto language and a questionnaire. Personal observations had also added more knowledge to the research work. Major areas visited include Malayano Kalay, Malyawarti, Wazir Kalay,

Laghara, Chaka Agra, Dinga Agra, Mirza Kalay, Noor Gul Kalay, Khatchan Kalay, Uzbak and Sher Ali Khan Kalay.

2. **Laboratory study:** The laboratory work was done by:

- **Pressing and drying:** The plants collected from the field were initially pressed immediately before wilting in between the sheets of newspapers, followed by blotting papers to remove all their moisture content in laboratory. Finally, wooden pressers were used to remove wrinkles.

- **Mounting and identification:** After drying, individual plant specimen was identified with the help of Flora of Pakistan and mounted on each standard herbarium sheet via glue and fiber tape provided with local name, botanical name, family name, habit, habitat, and other suitable information regarding the plant specimen.

- **Preservation:** Voucher specimens were assigned with voucher number and were then submitted to Dr. Sultan Ahmad Herbarium, Botany Department GC University Lahore, Pakistan.

Results and Discussion

In Agra valley, Parachinar, Kurram Agency, 18 shrubs of ethnobotanical importance belonging to 13 families were recorded; including 5 plant species from 3 families of monocots, i.e., Cyperaceae (2), Poaceae (2), Typhaceae (1). Among 13 dicot families Asclepiadaceae, Lamiaceae, Rosaceae were represented by 2 species each and Apiaceae, Berberidaceae, Caprifoliaceae, Myrtaceae, Sapindaceae, Solanaceae, Thymelaceae possessing only 1 species each. Moreover, 27 ethnobotanically significant trees from 20 families were also reported from Agra valley including only one monocot from Arecaceae. The dicot families include Moraceae with 4 species; Salicaceae with 3 species and Fagaceae with 2 species each. The remaining families Anacardiaceae, Cannabaceae, Ebenaceae, Eleagnaceae, Juglandaceae, Lythraceae, Meliaceae, Oleaceae, Platanaceae, Rhamanaceae, Rosaceae, Sambucaceae, Sapotaceae, Simaroubaceae and Pinaceae possess only single species each (Table 1).

Agra Valley Parachinar, Upper Kurram Agency has large diversity of vegetation because of its proximity to River Kurram and wide range of climatic fluctuations (Fig. 1, 2). Despite of this fact, unfortunately almost no ethnobotanical research has been conducted there. The little knowledge about plant usage transferred to generations was in verbal form and there is no written form of data existing, thus leading to the loss of this information as reported by Azaizeh *et al.*, (2003). Nowadays, ethnobotanical knowledge is only restricted to old aged and those people living in far flung areas as indicated by Ajaib *et al.,* 2010; 2012 while working with shrubs and climbers of District Kotli, Azad Jammu and Kashmir.

Single-Usage plants are those plants which are used for only one specific purpose. Out of 18 shrubs, 6 (33.3%) were single-usage (Fig.3). Most of the single-usage shrubs are of medicinal importance including *Calatropis procera* (Ait.), *Withania coagulans* (Stocks) Dunal in DC. as well as of crafting importance like *Schoenoplectus litolaris* (Schrad.) Palla, *Typha domingensis* Pers. Moreover, *Otostegia limbata* (Benth.) Boiss. is utilized as an insecticide and *S. lacustris* (L.) Palla as fodder. Out of 27 trees, 3 (11%) were single-usage (Fig. 4). Most of the single-usage trees are of employed for fuel purpose including *Celtis australis* L. and *Quercus baloot* Griff. While, *Ficus palmata* Forssk. was used for as medicinal purpose. Two-usage plants are those used for two purposes. Out of 18 shrubs, 6 (33.3%) were two-usage. From double usage plants, medicinal shrubs are most prominent. These include *Berberis lyceum* Royle, *Dodonaea viscosa* Jacq., *Rosa indica* L. and *Rubus fruticosus* L. While, 2 shrubs having dual-usage were utilized for culinary purposes i.e., *Periploca aphylla* Dcne., *Rubus fruticosus* L. and crafting purposes i.e., *Berberis lyceum* Royle, *Saccharum spontaneoum* L. each. Moreover, for fuel *Dodonaea viscosa* Jacq., for additive snuff (Naswar) *Periploca aphylla* Dcne., for ornamental aim *Rosa indica* L. and to check soil erosion *Saccharum spontaneoum* L. is considered. Out of 27 trees, 8 (30%) were two-usage. Among these, trees employed as fuel including *Monotheca buxifolia* (Falc.) A.DC., *Olea ferruginea* Royle, *Pinus roxburghii* Sarg., *Populus alba* L., *Salix tetrasperma* Roxb. and for crafting objectives like *Melia aezdarach* L., *Nannorrhops ritchiana* (Griff.) Aitch., *Olea ferruginea* Royle, *Pinus roxburghii* Sarg., *Platanus orientalis* L. are most prominent. 2 trees having dual-usage were utilized for agriculture like *Melia azedarach* L., *Salix tetrasperma* Roxb.; culinary i.e., *Monotheca buxifolia* (Falc.) A.DC., *Nannorrhops ritchiana* (Griff.) Aitch. and medicinal purposes including *Platanus orientalis* L., *Populus alba* L.

Species and Voucher No.	Family	Local name (Pushto)	Traditional local uses
16. *Typha domingensis* Pers. GC.Herb.Bot.2294	Typhaceae	Dali	L: Used to make ropes. Wp: Used in thatching purpose.
17. *Vitex negundo* L. GC.Herb.Bot.2295	Lamiaceae	Shinai Gul	L: Yield essential oil, applied to rheumatic swellings of joints. R: Strong, deep and suckers profusely. Can be used as hedge in sandy arid areas for soil retention and moisture conservation. Sh: Used as feul, in basket making. Wp: Used as ornamental.
18. *Withania coagulans* (Stocks) Dunal GC.Herb.Bot.2296	Solanaceae	Khapyanga	S: Added to milk which thickens it, known as "Prunt" that promotes sexual vigor.
Trees			
19. *Ailanthus altissimia* (Mill.) Swingle GC.Herb.Bot.2297	Simaroubaceae	Draka	B: Possess vermifuge properties against round worms and earthworms. L: Feed to cattle for killing internal worms, insect-repellent. R: Used to treat cardiac palpitations, asthma and epilepsy. W: Used as fuel, also used in paper-making. Wp: Extract is bactericidal, tolerant of soil pollution so used in land reclamation schemes.
20. *Broussonetia papyrifera* (L.) L'Her. ex Vent. GC.Herb.Bot.2298	Moraceae	Speen Inzar	B: Used in making paper, cloth, rope, etc. L: Juice used in treatment of dysentery. W: Used for fuel.
21. *Celtis australis* L. GC.Herb.Bot.2299	Cannabaceae	Tagho	W: Used as fuel.
22. *Diospyros lotus* L. GC.Herb.Bot.2300	Ebenaceae	Tor Amlook	F: Edible, also given in flu and common cold. W: Used for fuel purposes.
23. *Elaeagnus angustifolia* L. GC.Herb.Bot.2301	Elaeagnaceae	Sinzala	F: Edible, used as seasoning in soups, can also be made into jellies or sherbets. Fl: Juice used in treatment of malignant fevers, essential oil used in perfumery. S: Oil used in treatment of bronchial affections. W: Used for posts, beams, domestic items, also used for carving, excellent fuel. Wp: Fixes atmospheric nitrogen so makes hedge that enriches soil rather than depriving it of nutrients.
24. *Ficus palmata* Forssk. GC.Herb.Bot.2302	Moraceae	Inzar	F: Given to breast feeding women for increasing milk, used as part of diet to treat constipation.
25. *Juglans regia* L. GC.Herb.Bot.2303	Juglandaceae	Waghz	B: Dry bark termed locally as Dandasa used for cleaning of teeth. F: Edible. L: Anthelmintic, used to treat constipation, chronic coughs, asthma, diarrhoea, also used to treat skin ailments and purify the blood, insect repellent. S: Edible, used in confections, cakes, ice cream, etc., drying oil is obtained from the seed. It is used in soap making, paints, etc. W: Used in construction, furniture making, veneer etc.

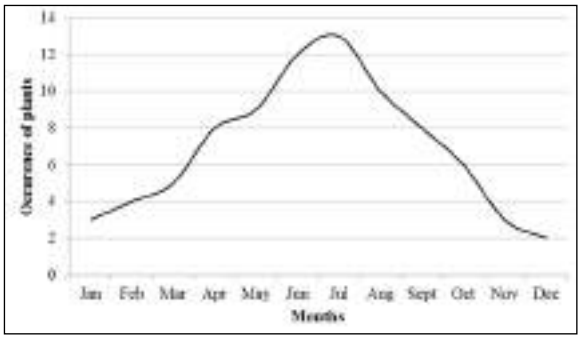

Fig. 1. Annual distribution of ethnobotanically important shrubs in Agra Valley Parachinar, Kurram Agency.

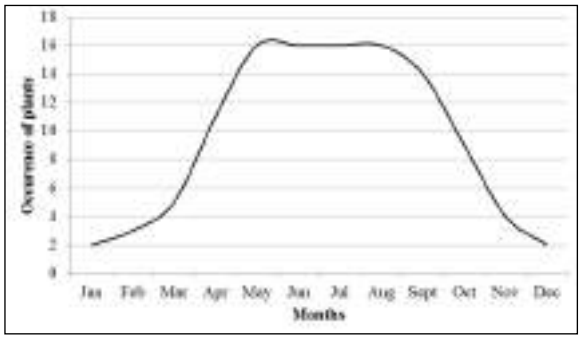

Fig. 2. Annual distribution of ethnobotanically important trees in Agra Valley Parachinar, Kurram Agency.

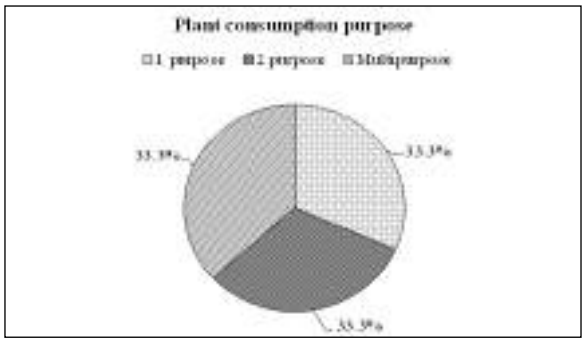

Fig. 3. Shrub consumption by the people in Agra Valley Parachinar, Kurram Agency (N=18)

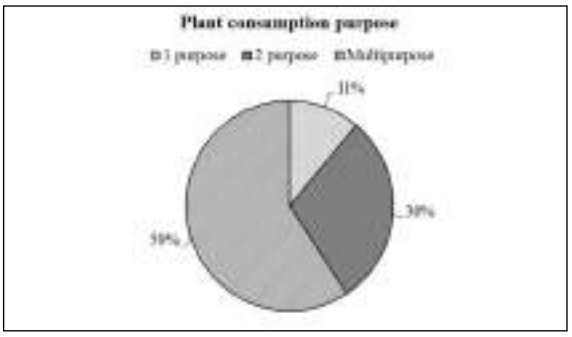

Fig. 4. Tree consumption by the people in Agra Valley Parachinar, Kurram Agency (N=27)

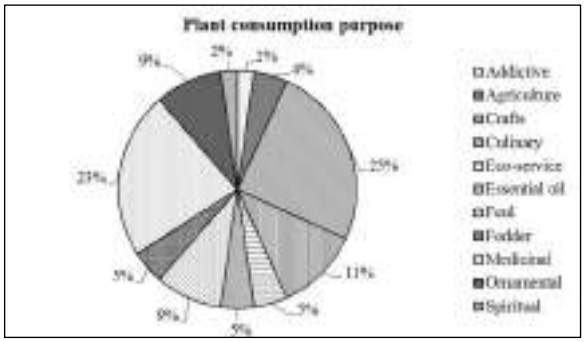

Fig. 5. Percentage of shrub ethnobotanical consumption by people in Agra Valley Parachinar, Kurram Agency.
Note: Some plants are used for more than one purpose.

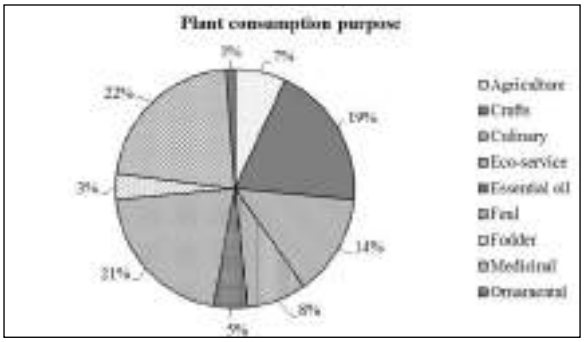

Fig. 6. Percentage of trees ethnobotanical consumption by people in Agra Valley Parachinar, Kurram Agency.
Note: Some plants are used for more than one purpose.

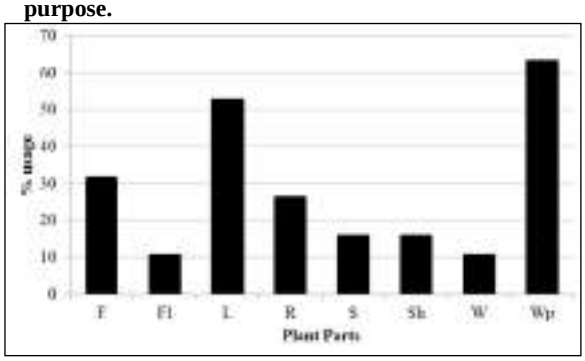

Fig. 7. Plant parts of shrubs used in Agra Valley Parachinar, Kurram Agency.

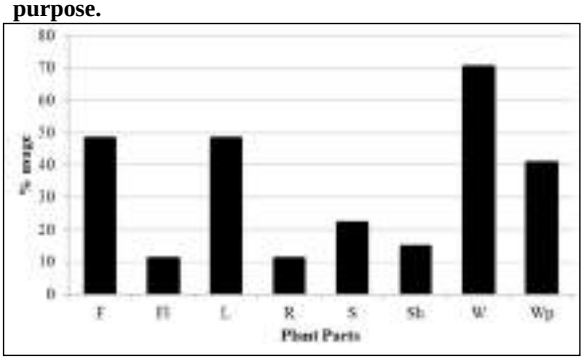

Fig. 8. Plants parts of trees used in Agra Valley Parachinar, Kurram Agency.
Note: More than one part of some plants is used. F: Fruit, Fl: Flower, L: Leaf, R: Root, S: Seed, Sh: Shoot/Stem, W: Wood, Wp: Whole plant.

The current study revealed that the indigenous people use some plants for more than one purpose to fulfill their needs. Those plants which are used for more than two purposes are called multi-usage plants. Out of 18 shrubs, 6 (33.3%) were of multi-usage comprising *Daphne mucronata* Royle, *Foeniculum vulgare* Mill., *Lonicera quinquelocularis* Hardwicke., *Myrtus communis* L., *Saccharum ravennae* (L.) L. and *Vitexne gundo* L. Of these 6 serve for crafting purpose, 3 serve for medicinal purpose, 3 were used as fuel, culinary and ornamental purposes each, 2yield essential oil and 1 each serve for fodder, spiritual, agricultural and ecological purposes (Fig.5). Moreover, out of 27 trees, 16 (59%) were of multi-usage. Few important multi-usage plants included *Alianthus altissimia* (Mill.) Swingle, *Broussonetia papyrifera* (L.) L'Herit. ex Vent., *Diospyros lotus* L., *Eleagnus angustifolia* L., *Juglans regia* L., *Morus alba* L., *M. nigra* L., *Prosopis glandulosa* Torr, *Prunus cerasifera* Ehrh., *Punica granatum* L., *Robinia pseudo-acacia* L., *Quercus semecarpifolia* Sm., *Salix babylonica* L., *Sambucus nigra* L., *Schinus molle* L. and *Ziziphus jujuba* Mill. Of these, 16 serve for medicinal purpose, 12 serve for crafting purpose, 11 were used as fuel, 10 serve for culinary purpose, 7 were consumed in ecological services, 4 yield essential oil, 4 used for agricultural aims, 3 were utilized as fodder and 1 serve as ornamental (Fig. 6).

Old aged people and local hakims had great familiarities with medicinal plants and their uses. Different parts of the plants were utilized either in powdered form, decoction, or whole plant extract to cure various diseases (Fig.7, 8), like the decoction of *Berberis lyceum* Royle used to treat rheumatism; *Calatropis procera* (Ait.) Ait. is heated in oil to be applied externally to treat joint pain or added in milk to treat cholera patients; juice of *Eleagnus angustifolia* L. is used in treatment of malignant fevers; tincture of *Morus alba* L. used to relieve toothache and *Punica granatum* L. is crushed with sugar and given to heart patients early morning.

Fuelwood gathering was observed to be the most important factor that caused the forest deforestation. Due to unavailability of natural gas people depend upon the fuel wood to fulfill their daily needs of fuel for cooking. The nomads had their business to cut the plants and sell, to earn their livelihood. Due to this imbalance cutting of valuable trees and shrubs for fuel wood purpose plant species like *Dodonaea viscosa* Jacq., *Pinus roxburghii* Sarg., *Quercus semecarpifolia* Sm., *Nannorrphs ritchiana* (Griff.) Aitch. quickly vanished from the area. A parallel concern related to the use of plant species as fuel wood during the ethnobotanical research of Kharan District, Baluchistan is documented by Shinwari (1996).

Most of the ethnobotanically important plants are recorded in published form but still there is a variety of plants that remain unexplored. Therefore, it is necessary to document uses of such plants of an area for future use. Also, there is a need of sustainable use of the plants, so that they can be preserved for future generations and also prevent the extinction of plants.

Recommendations: For the conservation of plants and knowledge regarding their utilization, some important suggestions are as follows:

- Consciousness concerning preservation and sustainable uses of plants should be provided to local community.
- Management learning may be offered to the local population and their confined techniques may be incorporated in development strategies.
- There should be an alternative way of earning for nomads in order to prevent deforestation.
- Traditional coordination protection through community concern may be encouraged for sustainable forest and pasture use.

Table 1. List of Ethnobotanically useful shrubs and trees of Agra Valley Parachinar, Kurram Agency.

F: Fruit, Fl: Flower, L: Leaf, R: Root, S: Seed, Sh: Shoot/Stem, W: Wood, Wp: Whole plant.

Species and Voucher No.	Family	Local name (Pushto)	Traditional local uses
1. *Berberis lycium* Royle GC.Herb.Bot.2277	Berberidaceae	Sherazghye	L: Used to treat of jaundice. R: Decoction used to treat rheumatism, eye complaints, and joint pains, also used to make miswak to clean teeth.
2. *Calotropis procera* (Aiton) Dryand. GC.Herb.Bot.2278	Apocyanaceae	Spilmay	Fl & R: Decoction treats blood impurity, asthma, cough. L: Poultice applied for rheumatism, wounds, eczema, pigmentation and other skin inflammations, heated in oil to be applied externally to treat joint pain and swellings. Wp: Added in milk to treat cholera patients, dried to be used as tonic, antihelmintic and an expectorant.

Species and Voucher No.	Family	Local name (Pushto)	Traditional local uses
3. *Daphne mucronata* Royle GC.Herb.Bot.2281	Thymelaeaceae	Laghooni	F: Edible, also used as dye for leather. R: Dried to powder form and mixed with mustard oil to cure internal pains.
4. *Dodonaea viscosa* (L.) Jacq. GC.Herb.Bot.2279	Sapindaceae	Zairawoni	F: Have astringent qualities so used to treat diarrhoea and to heal wounds externally. L & B: Used to cure fever, reduce swelling caused by inflammation and bumps. Wp: Cut and used as fuel.
5. *Foeniculum vulgare* Mill. GC.Herb.Bot.2282	Apiaceae	Kogilini	F: Yield essential oil used medicinally to treat skin diseases, as anti-bacterial agent, as food flavouring, in toothpastes, soaps, perfumery, air fresheners, etc. L: Edible, used as garnish on raw or cooked dishes, very pleasant addition to salads. S: Used to treat abdominal pain, taken immediately after eating food as habit by many folks but highly beneficial for digestive system, also used as flavouring in cakes, bread, stuffings, etc. Wp: Help to treat kidney stones, used as gargle for sore throat, eyewash for sore eyes and conjunctivitis.
6. *Lonicera quinquelocularis* Hard. GC.Herb.Bot.2280	Caprifoliaceae	Dinka Raja	W: Used for walking sticks, as fuel. Wp: Grown for ornamental purposes.
7. *Myrtus communis* L. GC.Herb.Bot.2283	Myrtaceae	Manra	F: Edible. L: Sprinkled in graves because they are considered sacred. Sh: Used to make brooms.
8. *Periploca aphylla* Decne. GC.Herb.Bot.2285	Apocyanaceae	Barara	Wp: Ash used in making snuff locally called 'Naswar', chewing gum made from its milky latex.
9. *Rosa indica* L. GC.Herb.Bot.2286	Rosaceae	Zangli Gulab	Fl: Ornamental. L: Gulkand is made which is laxative and use to cure constipation.
10. *Rubus vulgaris* Weihe & Nees GC.Herb.Bot.2287	Rosaceae	Speengeer	F: Edible, made into syrups, jams and other preserves, also given to blood cancer patients. R: Used as gargle to treat sore throats, mouth ulcers and gum inflammations. Sh: Peeled to be eaten in salads.
11. *Rydingia limbata* (Benth.) Scheen & V.A.Albert GC.Herb.Bot.2284	Lamiaceae	Spinaghzai	S: Kept in cereals for killing insects.
12. *Saccharum ravennae* (L.) L. GC.Herb.Bot.2289	Poaceae	Shar	Wp: Ornamental, also used in thatching purpose and fodder.
13. *Saccharum spontaneum* L. GC.Herb.Bot.2288	Poaceae	Nari Shar	L: Used for thatching purposes, employed for cordage and broom and fodder. Wp: Planted to check soil-erosion.
14. *Schoenoplectus lacustris* (L.) Palla GC.Herb.Bot.2291	Cyperaceae	Pasta Dali	Wp: Used as fodder for cows.
15. *Schoenoplectus litoralis* (Schrad.) Palla GC.Herb.Bot.2292	Cyperaceae	Narai Dali	Wp: Used for thatching.

Species and Voucher No.	Family	Local name (Pushto)	Traditional local uses
26. *Melia azedarach* L. GC.Herb.Bot.2304	Meliaceae	Bakyana	S: Kept in rice and wheat to keep them free from insects and fungus. W: Used in construction, making agricultural tools.
27. *Morus alba* L. GC.Herb.Bot.2306	Moraceae	Speen toot	B: Tincture used to relieve toothache. F: Laxative, removes constipation, tonic effect on kidney energy. L: Given to goats as fodder, also antibacterial, astringent, hypoglycaemic, taken to treat colds, influenza, eye infections and nose bleeds. W: Valued for making sports equipment such as tennis rackets and cricket bats, also used for boat building, furniture, agricultural implements. It furnishes a medium grade fuel wood. Wp: Can be grown as part of shelterbelt.
28. *Morus nigra* L. GC.Herb.Bot.2307	Moraceae	Tor toot	F: Laxative, given to anemia patients. L: Fodder for goats. W: Used in joinery.
29. *Nannorrhops ritchiana* (Griff.) Aitch. GC.Herb.Bot.2308	Arecaceae	Mazri	F: Edible. L: Used to make mats, fans, ropes and baskets. Slippers are also made locally known as "Saplay".
30. *Olea ferruginea* Wall. ex Aitch. GC.Herb.Bot.2309	Oleaceae	Khawan	Sh: Erect branches used as handles for axes, toothbrush. W: Used as fuel.
31. *Pinus roxburghii* Sarg. GC.Herb.Bot.2310	Pinaceae	Nakhtar	W: Timber used for construction, for fuel purposes and durable furniture.
32. *Platanus orientalis* L. GC.Herb.Bot.2311	Platanaceae	Chinar/Sinar	B: Crushed and mixed with petroleum jelly to cure blisters, powder used to cure wounds in donkeys. L: Applied to eyes to treat ophthalmia. W: Used in construction, cabinet making, inlay work and wood pulp.
33. *Populus alba* L. GC.Herb.Bot.2312	Salicaceae	Zangli Spidar	Sh: Anti-inflammatory, antiseptic, astringent, diuretic and tonic, used to reduce fevers and relieve the pain of menstrual cramps. Wp: Used as fuel.
34. *Prosopis glandulosa* Torr. GC.Herb.Bot.2313	Fabaceae	Kekar	B & Sh: Used to treat fever, bladder infection, measles, used to make cloth, baskets and rope. F: Used to make eyewashes, treat sunburn. L: Used to treat intestinal problems, diarrhea, headache, painful gums and bladder infection. W: Used for building purpose, weapons, tools and furniture, good firewood. Wp: Used as fuel, to treat eye conditions, open wounds and dermatological ailments.
35. *Prunus cerasifera* Ehrh. GC.Herb.Bot.2314	Rosaceae	Arghinja	F: Used to make jam is made from ripened fruits. Wp: Used in Bach flower remedies: Desperation, Fear of losing control of the mind and Dread of doing some frightful thing. Also makes good wind-break hedge.
36. *Punica granatum* L. GC.Herb.Bot.2315	Lythraceae	Anar	S: Called Anardana, used as flavoring agent, crushed with sugar is given to heart patients early morning. W: Used as fuel.

Species and Voucher No.	Family	Local name (Pushto)	Traditional local uses
37. *Quercus baloot* Griff. GC.Herb.Bot.2317	Fagaceae	Sra Sairay	W: Used for fuel purposes.
38. *Quercus semecarpifolia* Sm. GC.Herb.Bot.2318	Fagaceae	Speena Sairay	B: Juice applied externally to treat muscular pains. L: Rubbed on pimples. S: Edible, roasted and serve as coffee substitute. W: Used as fuel, construction.
39. *Robinia pseudoacacia* L. GC.Herb.Bot.2316	Fabaceae	Chambeela	B: Used to make paper. Fl: Used in making jams and pancakes. Also antispasmodic, diuretic, laxative, eaten to treat eye ailments. Essential oil obtained is used in perfumery. W: Used as fuel. Wp: Ornamental.
40. *Salix babylonica* L. GC.Herb.Bot.2319	Salicaceae	Minjarwana	B: Infusion used to treat diarrhea, as wash to make hair grow. L: Decoction used to treat fever, rheumatism, skin diseases, ulcers, etc. R: Extensive root system make it useful for binding soils. S: Used in the treatment of haemorrhage, jaundice. Sh: Rubbed on tonsils in babies, also used to make baskets.
41. *Salix tetrasperma* Roxb. GC.Herb.Bot.2320	Salicaceae	Wana	W: Used as fuel, in making agricultural tools.
42. *Sambucus nigra* L. GC.Herb.Bot.2290	Sambucaceae	Khra Jara	B: Used in treatment of constipation, relieves asthmatic symptoms. F: Blue colouring matter used as litmus to test if something is acid or alkaline. It turns green in an alkaline solution and red in an acid solution. L: Used as insect repellent. W: Valued highly by carpenters, used for making skewers, mathematical instruments, toys etc. Wp: Used for fencing fields, as fuel.
43. *Schinus molle* L. GC.Herb.Bot.2322	Anacardiaceae	Mrachowana	B: Resinous gum obtained has been used to treat digestive disorders. F: Used as pepper substitute, essential oil distilled is used as spice in baked goods and candy. L: Rubbed on skin to cure skin allergy.
44. *Sideroxylon mascatense* (A.DC.) T.D.Penn. GC.Herb.Bot.2305	Sapotaceae	Gurguray	F: Edible. Wp: Used as fuel.
45. *Ziziphus jujuba* Mill. GC.Herb.Bot.2323	Rhamnaceae	Markhanay	F: Edible, can be used as a coffee substitute, aids weight gain, improves muscular strength, increases stamina. L: Given to diabetics after breakfast. R: Used in treatment of dyspepsia, fever, old wounds and ulcers. Wp: Can be grown as a hedge. W: Used for turnery, agricultural implements, etc. It makes an excellent fuel and good charcoal.

References

Ajaib, M., Khan, Z., and Siddiqui, M.F. (2012). Ethnobotanical Study of Useful Climbers/twiners of District Kotli, Azad Jammu & Kashmir. *Int. J. Biol. & Biotech.*, 9(4): 421-427.

Ajaib, M., Khan, Z., Khan, N. and Wahab, M. (2010). Ethnobotanical Studies on Useful Shrubs of District Kotli, Azad Jammu & Kashmir, Pakistan. *Pak. J. Bot.*, 42(3): 1407-1415.

Azaizeh H., Fulder, S., Khalil, K. and Said, O. (2003). Ethnomedicinal knowledge of local Arab practitioners in the Middle East Region. *Fitoterapia*, 74: 98-108.

Choudhry, K., Singh, M. and Pillai, U. (2008). Ethnobotanical survey of Rajhastan - An Update. *Am.-Eur. J. Bot.*, 1(2): 38-45.

Heywood, V.H. (1992). Conservation of germplasm of wild species. In: Conservation of Biodiversity for Sustainable Development. (O.T. Sandlund, K. Hindar and A.H.D. Brown eds.). Scandinavian University Press, Oslo, pp. 189-203.

Khan N., Ahmed, M., Shaukat, S.S., Wahab, M., Ajaib, M., Siddiqui, M.F. and Nasir, M. (2011). Important Medicinal Plants of Chitral Gol National Park (CGNP) Pakistan. *Pak. J. Bot.*, 43(2): 797-809.

Schultes, R.E. (1992). Ethnobotany and technology in Northwest Amazon: A partnership. *J. Env. Conser.*, 18(63): 264-267.

Shinwari, Z.K. (1996). Ethnobotany in Pakistan: Sustainable and participatory approach. National Agric. Res. Center, Islamabad, Pakistan, pp: 14-25.