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Traditional Medicinal and Economic Uses of Gymnosperms of Dir Kohistan Valleys, NWFP, Pakistan

Gul Jan[1], Mir Ajab Khan[1] and Farzana Jan[2]

[1]Department of Plant Sciences Quaid-i-Azam University, Islamabad
[2]Department of Micro Biology Quaid-i-Azam University, Islamabad
Address for correspondence: guljan_mashal@yahoo.com

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Abstract

The ethnobotanical data of four families of gymnosperms with 11 species were collected from Dir Kohistan Valleys. These are Cupressaceae, Ephedraceae, Pinaceae and Taxaceae. A complete list of the plants is given with their name, family and ethnobotanical use, distribution and occurrence. Indigenous knowledge of local inhabitants about the use of native plants were collected during field trips through questionnaire. The inhabitants of the area have to use the medicinal plants for various purposes and have for a long time been dependent on surrounding plant resources for their food, shelter, fodder's, health, care and other cultural purposes. *Pinus roxburgii, P. wallichiana, Cedrus deodara, Abies pindrow and Taxus wallichiana* are prominent gymnosperms of Dir Kohistan Valleys which are not only source of timber but also utilized as fuel wood and for medicinal purposes.
Key words: Ethnobotanical uses, gymnosperms, Dir Kohistan Valleys Pakistan.

Introduction

Kohistan, the place of mountains was called "Yaghistan", the land of rebels, during the British rule. It is the name although given to all the hilly areas, as Swat Kohistan, Dir Kohistan and Indus Kohistan. Literally the word; "Kohistan" means the place of mountains (Hamayun, 2005). The Kohistan under focus is generally called as Dir Kohistan. Dir Kohistan Valley covers 1 40,351 acres of the coniferous forests situated between latitude 35^0- 9′ to 35^0-47′ and longitude 71^0-52′ to 72^0-22′ in the northern position of the watershed of Panjkora river. The Hindu Raj range bound the area generally known as Dir Kohistan on the north and northwest, by the Torwal and Gabral range on the east, by Dodbah Sarghar on the south, and by Btarai ghar on the Southwest. Pangkora is a pashtu word meaning five streams; the five tributaries of the rivers are Azgologh, Zandrai, Shandoor, Gwaldai and

Dokdara khwars. Territories adjoining the tract are Chitral on the north as well, on the West, Swat Kohistan and Upper Swat on the east, and Painda khel and Dir on the South.

Forests

The Forests of Dir Kohistan Valley, can be broadly described under the following major types and the total area covered given below.

1. Shrub oak forests
2. Pure deodar forests
3. Mixed deodar, kail, fir and spruce forests
4. Mixed fir and spruce forests
5. Alpine pastures

The shrub and oak forests are grown on the lower areas. It ranges from 4000 to 5500 feet. These are subjecting to heavy lopping. The regeneration is scanty as lopping stops the growth. Deodar, kail, fir, and spruce grow at altitude ranging from 7000 to 11000 feet above the tree limit i.e. 11000 feet. Generally the elevation above 11000 feet is devoid of tree growth. Total area covered (in acres) by forests in Dir Kohistan are given below.

Table 1. Total area covered (in acres) by forests in Dir Kohistan.

Forest Type	**Area Covered/ Acres**	**Percentage**
Pure deodar forests	517	0.13
Mixed fir and spruce forests	1325	0.35
Mixed deodar, kail, fir and spruce forests	136277	35.98
Shrub oak forests	11917	3.15
Alpine pasture	226387	59.78
Total		100.00

(Sources: District Census Report, Dir Kohistan 1999).

The natural phenomenon of Fir colonizing in the cooler aspects and Blue Pine in warmer reaches may be distinctly noticed in some parts of Malkandi, Nuri and Kamalban Forests. The broad-leaved associates are *Juglans regia, Aesculus indica, Prunus cornuta, Acer caesium* and *Populus ciliata*. Undergrowth generally consists of *Viburnum spp; Indigofera spp; Lonicera spp; Skimmia laureola, Berberis lycium, Rosa spp;* and *Rubus spp.* Ground cover is thick, particularly in moist and cool localities. The ground flora consists of *Rumex spp; Trifolium spp; Fragaria vesca, Geranium spp;*

Atropa acuminata, Viola spp; Ferns and various species of grasses. The total area covered by these forests is is given in table 1.

Deodar "*Cedrus deodara*" locally called as "Diar" in lower and "Paludar" in the upper part of the valley is found rarely pure in Kamalban, Malkandi, Nuri, Naran and Battal forests at an altitude from 1520 to 2430 metres, mostly on warmer aspects. Common broad-leaved associates are *Aesculus indica, Populus spp; Acer spp; Prunus spp.* and *Quercus spp.* The shrub layer varies considerably, being thin under a close canopy of Deodar, but well developed under an open canopy. Common shrubs are *Parrotia spp; Viburnum spp; Lonicera spp; Berberis spp; Sorbaria spp.* and *Cotoneaster spp.* The ground flora consists of *Viola, Fragaria, Dicanthum, Anemone spp.* and ferns.

Climbers like *Clematis* and *Rosa* are also found in some places. Fir *"Abies pindrow"* locally known as "Achar" is generally available as pure crop at varying altitude from 2130 to 3190 metres and with spruce *"Picea smithiana"* locally called "Rawn" at lower elevation, besides other areas such forests may be noticed in Thall, Jaz Banda and Shandoor forests. The undergrowth is usually of *Viburnum spp. Skimmia laureola, Indigofera spp; Spiraea spp; Rubus spp.* and *Lonicera spp.* The herbaceous flora consists of *Valeriana wallichii, Viola spp; Paeonia emodi, Fragaria spp; Bergenia spp; Atropa acuminata, Aconitum spp* and *Primula spp.*

Ethnobotany is a very broad discipline and it includes all sorts of human-plants interactions. It is the study of how people of a particular culture and region make use of indigenous plants. However, there are other definitions also. The most widely accepted and used is "the use of plants in primitive societies". Richard Evans Schultes, one of the modern fathers of ethnobotany defined ethnobotany as "the study of human evaluation and manipulation of plant materials, substances, and phenomenon, including relevant concepts, in primitive or unlettered societies."

In Pakistan, nearly 50 % of the drug presently used in modern medicine is prepared synthetically from petrochemical-based raw materials. (Hussain, 1987). Hocking (1958) estimated that in early 1950 up to 84% of the Pakistani population was dependent on traditional medicine for all or most of their medicinal needs. Haq (1993) surveyed Mansehra District and collected 53 wild and 17 cultivated medicinal plants. He enlists these plants with botanical, English and vernacular names; families, parts used, distribution, constituents, medicinal and local uses. Nasir *et al*., (1969) described gymnosperms of W. Pakistan. They classified them in 5 orders and 9 families, key to the families, key to the genera, key to the species, general characteristics of the species, distribution and important uses.

Methods and Material

Ethnobotanical survey of Dir Kohistan Valleys was carried out during July 2007 - August 2008. A semi structured questionnaire method was followed to collect ethnobotanical uses of gymnosperms

of the valleys. Interviews of about 100 informants including local community, herds men, herbalists and pansaries were conducted on random basis. The out come of the results were rechecked and compared with literature. Analysis of the data was done and indigenous knowledge was documented. The plants were identified with the help of taxonomic literature, manuals and floras (Parker 1952., Qaiser, 1986., Ali, S.I. and E.Nasir. 1970-2002). Stereomicroscope was used for critical examination of the material. The voucher specimens were deposited in the herbarium of Department of Plant Sciences, Quaid -I-Azam, University, Islamabad.

Results

Four families of gymnosperms with 11 species were collected from Dir Kohistan Valley. These are Cupressaceae, Ephedraceae, Pinaceae and Taxaceae. The genus *Cupressus*, *Thuja* and *Juniperus* represent the family Cupressaceae. The two species i.e., *Thuja orientalis* and *Cupressus sempervirens* are commonly cultivated for ornamental purposes. The *Juniperus* species occur naturally at very high altitudes are important medicinally.

Family Pinaceae is the largest family and are very widely distributed throughout the valley. The genera *Abies*, *Cedrus*, *Picea* and *Pinus* are representing this family. *Pinus* with two species i.e., *Pinus wallichiana*, *Pinus roxburghii*. The remaining three genera are represented with a single species each, namely *Abies pindrow*, *Picea smithiana* and *Cedrus deodara*. *Ephedra intermedia* and *Ephedra geradiana* representing Ephedraceae. *Taxus wallichiana* representing Taxaceae.

Abies pindrow, *Picea smithiana* and *Cedrus deodara* occur naturally and are found at high altitudes. All members of family are very important from economic, cultural, social and ecological point of views for the area. Family Ephedraceae has two species *Ephedra intermedia* and *Ephedra geradiana* are found at high altitude and are medicinally important.

Family Taxaceae has a single genus *Taxus* with a single species called *Taxus wallichiana*. The ethnobotanical importance are given below:

Family: Cupressaceae

Botanical name: ***Cupressus sempervirens*** L.

Vernacular Names: Graveyard Cypress (English), Saro (Urdu, Punjabi, Hindko).

Distribution: Cultivated in plains and lower hills.

Occurrence: Plain and lower hills up to 1200 meters, Common in graveyards.

Medicinal and Economic Uses: The fruit and wood are anthelmintic and astringent. The wood is used in carpentry and for furniture making. Planted as ornamental tree.

Botanical name: ***Juniperus communis*** L.

Vernacular Name: Gojar (Pushto), Common Juniper (English), Abhal (Urdu), Bhentri (Hindko), Bantha (Kohistani), Pama, Petthri (Punjabi).

Distribution: Common and gregarious, Kurram, Chitral, Swat, Astor, Gilgit, Baltistan, Dras, Kaghan Valley, Ladak, Kashmir, 2400 to 4200 metres.

Part used: Whole plant

Medicinal and Economic Uses: Infusion of berries is diuretic. Berries, wood and oil reported to be used in folk remedies for cancer, indurations, polyps, swellings, tumors and warts. Reported to be carminative, stimulant in dysmenorrhoea, skin diseases, kidney diseases, deobstruent, diaphoretic, digestive, stimulant in dysmenorrhoea, skin diseases, and kidney diseases. Also used in alcoholic and non-alcoholic beverages. Generally wood and leaf burnt as incense. The fruit and oil are diuretic, carminative, stimulant, and is used in dropsy, gonorrhea, gleets, leucorrhoea and some cutaneous diseases. The berries are given in scanty urine, cough and pectoral affections. Locally, powder of berries is rubbed on rheumatic and painful swellings. They are also used for the preservation of meat and the preparation of Juniper brandies. Juniper berries are roasted ground and are used as substitute of coffee. Ash of the bark is applied in certain skin affections. The berries are also recommended in infantile tuberculosis and diabetes.

Botanical name: ***Juniperus excelsa*** M.B.

Vernacular Name: Pencil Cedar (English), Chalai (Hindko), Apurs, Abasht (Baluchi), Luir, Shurgu (Punjabi), Padam (Kashmiri).

Distribution: Common, forming open forests, Baluchistan and dry inner valleys from Chitral eastward, 2000 to 4000 metres.

Part used: Whole plant

Medicinal and Economic Uses: Used in stomach cramps, asthma. The chief importance of wood lies in its suitability for pencil making. Twigs are burnt as incense and berries used similarly as that of *Juniperus communis.* The wood is hard and fragrant, used locally as fuel wood, for beam making and for making pencil. Fruit diuretic, carminative, stimulant, used in dropsy, gonorrhoea, gleets, leucorrhoea and some cutaneous diseases. Properties of the fruit are the same as of *Juniperus communis*.

Botanical name: ***Thuja orientalis*** L.

Vernacular Names: Thuja (English), More Pankh (Urdu, Punjabi, Hindko).

Distribution: Native to China and Japan, Commonly Cultivated in plains and lower hills.

Part used: Whole plant

Medicinal and Economic Uses: Planted as an ornamental tree. The fruit and wood are anthelmintic and astringent. Pollen grain may cause hayfever.

Family: Ephedraceae

Botanical name: ***Ephedra gerardiana*** Wall.

Vernacular Names: Asmani botai (Pushtoo), Asmania (Urdu, Hindko), Chewa (Urdu), Ehewa, Budshur, Dundula, Kuchan (Punjabi), Chepat, Thayon, Cheldymb (Kashmiri).

Distribution: Urak Valley, South Wazirastan, Razmak, Chitral, Swat, Kalam, Gilgit, Baltistan, Ladak, Kashmir, Upper Kaghan Valley, 1600 to 4550 meters.

Parts used: Whole Plant

Medicinal and Economic Uses: The leaves used in treatment of bronchitis, asthma, and relieving bronchial spasm. Decoction of stem and roots used as remedy for rheumatism and syphilis. Fruit edible. The rhizome and dry plants used as fuel by the inhabitant. Juice of berry is given in affection of respiratory passage. Used as alterative, diuretic, stomachic, tonic, anti-asthmatic, effective in the management of bronchospasm.

Family: Pinaceae

Botanical name: ***Abies pindrow*** Royle.

Vernacular Names: Achar (Pushtoo), Himalayan silver fir (English), Paludar, Rewar (Hindko).

Distribution: Dir, Swat, Astor, Hazara, Murree Hills, often planted, only wild at Biran Gali near Dunga Gali, Kashmir and Kaghan Valley. Generally available as pure crop at varying altitude from 2130 to 3190 metres.

Parts used: Bark, leaves trunk, and cones.

Medicinal and Economic Uses: Decoction of the dried leaves is useful in case of cough, phthisis, asthma, chronic bronchitis and catarrh of the bladder and other pulmonary affections. Juice of the fresh leaves is administered in fever of infants during dentition and also in affections of the chest. The dose being 5-10 drops in water or mother's milk. Powder of leaves is given with juice of *Adhatoda vasica* and honey in cough, asthma and haemoptysis. Grown as ornamental tree. Wood is used for construction purpose i.e. doors, windows, houses, furniture and as fuel wood.

Botanical name: ***Cedrus deodara*** (Roxb.ex Lamb) G. Don.

Vernacular Names: Diyar (Pushtoo), Cedar (English), Deodar (Urdu), Diar (Hindko), Paludar (Upper

Kaghan).

Distribution: Chitral, Swat, Astor, Hazara, Murree Hills, often planted, only wild at Biran Gali near Dunga Gali, Kashmir and Kaghan Valley 1220 to 3050 metres. (The Deodar is the most valuable timber in Dir Kohistan Valleys.

Parts Used: Wood and bark

Medicinal and Economic Uses: The wood is carminative, diaphoretic, useful in pulmonary and urinary disorders, rheumatism, piles and stone in kidney. Bark is astringent, useful in fever, diarrhoea and dysentery. Wood of this tree is of an excellent quality and used for construction and furniture purposes.

Botanical name: ***Picea smithiana*** (Wall) Bois.

Vernacular Names: Rawn (Pushtoo), Spruce, Himalayan Spruce (English), Kachhal (Hindko).

Distribution: The Himalayan spruce is found in the Kurram, Dir, Chitral, Swat, Gilgit eastwards, Kaghan. Rare in the Murree hills. A few at Nathia Gali and the northern slope on Mokshpuri. Common in Kashmir 2000 to 3300 metres.

Parts Used: Whole tree

Medicinal and Economic Uses: Valuable timber wood, used for house building, making furniture, making bridges and beams. Cones are used as ornamental. The plant is also exported to other parts of the country.

Botanical name: ***Pinus roxburgii*** Sargent.

Vernacular Names: Nakhtar (Pushtoo), Long leaved pine (English), Chir (Hindko, Urdu, Punjabi).

Distribution: The Himalayan spruce is found in the Kurram, Dir, Chitral, Swat, Gilgit eastwards, Kaghan. Rare in the Murree hills. A few at Nathia Gali and the northern slope on Mokshpuri. 600 to 1500 metres, often growing in pure stands.

Parts Used: Wood and resin

Medicinal and Economic Uses: Timber wood, fuelwood and furniture. Its resin is locally known, as "Jaula" is a stimulant and used for ulcer, snakebites, scorpion stings and skins dies. It is a blood purifier. Resin is stimulant.

Botanical name: ***Pinus wallichiana*** A.B.Jackson.

Vernacular Names: Nakhtar (Pushtoo), Blue pine (English), Biar, Kail (Hindko).

Distribution: The Blue Pine is abundant from Chitral eastward from 1800 to 3500 metres. It

often begins at the upper limit of Chir Pine and like it. Murree Hills, Kaghan, Swat, Dir, Chitral, Azad Kashmir.

Parts Used: Wood

Local Uses: Wood is used for preparation of body of trucks. Its wood is also used for construction purposes, i.e. doors, windows, etc. It is used for furniture and fuel purposes.

Family: Taxaceae

Botanical name: ***Taxus wallichiana*** Zucc**.**

Vernacular Names: Bonya (Pushtoo), Yew (English), Birmi (Hindko, Punjabi).

Distribution: Usually in mixed forest. Kurram, Chitral, Swat, Dir, Astor, Hazara, Murree Hills, Ponch, Kashmir, 2000 to 3500 metres.

Parts used: Wood and leaves

Medicinal and Economic Uses: Wood traditionally used for cabinet and furniture making. Tea of leaves is useful in high fever and asthma. Leaves are used in bronchitis, hiccough and asthma, for indigestion, epilepsy and as aphrodisiac. Leaves and fruit are sedative and antiseptic.

Discussion

The present Ethnobotanical study provides information on the ethnobotanical uses of the 11 gymnosperms belonging to four families. These plants are also used by the local herbal healers and hakims as traditional medicines. Chopra (1992) described and classified gymnosperms into five orders (including ancient gymnosperms). He also highlighted on the importance of gymnosperms in nature and in human life. Lal *et al.*, (1994) described fifty plant species (including *Taxus baccata* which is used against colds) used as ethnomedicines by Gaddis (migratory shepherds of western Himachal Pradesh) for treating cattle as well as humans. Most of the species were used for treating arthritis, rheumatism and stomach disorders. Most of the plant species are reported to be quite effective remedies for different diseases such as fever, diarrhea, diabetes, jaundice, backache, stomachache, ulcers, cold and even cancer. The gymnosperms are a major source of timber, fuel wood and fodder. Wood and other forest products are also sold to earn money, because the community is totally dependent on the forests for their needs. The forests are under heavy pressure of grazing, fuel wood collection, medicinal plants collection and ecotourism. Some trees like *Cedrus deodara*, *Abies pindrow*, *Picea smithiana* and *Taxus wallichiana* are at the verge of extinction in the area. They all are extensively used as fuel and timber. *Pinus roxburghii* and *P. wallichiana* are still abundantly growing in the area.

Recommendations

Due to this indiscriminate cutting, not only the forest area is declining but valuable indigenous species are in danger and if this trend continues, the ultimate result would be the extinction of these species from the area. For relieving pressure on fuel wood species, following recommendations are suggested.

- Natural gas should introduce in the area as an alternate fuel source. If presently not feasible for Government, liquid petroleum gas (L.P.G.) cylinders can serve the purpose. However, the prices should be kept in reach of locals.
- Introduction of fuel efficient stoves will also helpful in reducing pressure on forests for fuel wood requirements.
- The people of the area are ignorant about the importance of biodiversity and conservation status of the area. They also show poor selection of fuel wood species. As a result valuable indigenous flora is used as fuel wood species. Awareness programs at grass root level should be introduces in the area to solve the problem.
- The study area has a wast area. A-forestation projects should be launched on cultivated waste lands. These projects will not only help conserve that the local flora to improve the socio-economic conditions of the area.
- It is also suggested that replacement of old tree with new young plants will be vital. As most of the world forests had been destroyed due to the fact that old trees were not replaced by the young ones. As the old trees provide the site for most of the pathogens. In Pakistan *Dalbergia sisso* which previously represented establish population, is it present threatened due to Die-back disease. In case of *Dalbergia sisso* the old trees are finishing rapidly.

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