

Traditional Medicinal and Economic uses of Gymnosperms of Kaghan Valley, Pakistan

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Issued 5 March 2006

Abstract

The ethnobotanical data of total 12 gymnosperms belonging to four families was collected from the local people of the Kaghan Valley. 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 Kaghan Valley which are not only source of timber but also utilized as fuel wood and for medicinal purposes.

Key words: Ethnobotanical uses, gymnosperms, Kaghan Valley-Pakistan.

Introduction

The Kunhar river catchments area is commonly known as, "Kaghan Valley". The valley is situated in the northern part of North West Frontier Province of Pakistan (NWFP). It is 161 Km long scenic wonderlands, with its towering Himalayan peaks, peaceful lakes, majestic glaciers and splashing waterfalls. Even, today, when few places have escaped man's meddlesome fingers, is still in an unbelievably pristine state, an unspoilt paradise. It is situated between 34⁰-17' to 35⁰-10' North latitudes and 73⁰-28' to 74⁰-7' East longitudes. Total area of the valley is about 1627 Sq. Km. Kaghan valley is a watershed area of the River Jhelum and the large water reservoir, "Mangla Dam" built on this river.

The Kaghan valley, of which the forests are an essential part, has great tourist attraction. The visitors, mostly outdoor recreationists visit the beautiful spots like, Shogran, Sari, Naran, Lalazar, Saif-ul-Malook, Lulusar, Dudipatsar and Sharan during summer season. The entire area is mountainous and the mountains flank the Kunhar River on either side forming transverse spurs ending in a series of lofty peaks. General topography of the land is undulating, often cut up by numerous small streams.

Kaghan valley is bounded on the east as well as on the southern side by Azad Jammu Kashmir, on the north by Chilas and Gilgit agencies and on the west by Allai Kohistan and Mansehra. The altitude in the area ranges from 915 metres at Balakot to 5280 metres at Malika Parbat (*Queen of the Mountains*), the highest peak in the valley bordering the beautiful lake, "Saif-ul-Malook". The river Kunhar emerges from the lake Lulusar in the Babusar pass at an elevation of 4146 metres and flows north eastern to southwestern direction in the upper part of the valley down to Balakot. After a very troublesome and complicated course of 177 Km, it joins the river Jhelum at "Pattan". It traverses deep mountains gorges from its source up to Balakot, "The Gateway to the Kaghan valley", where it enters the plain and flows down to Ghari

Habib-Ullah. Below which it once again enters through deep gorges until it joins Kishenganga”.

Lakes are confined to the upper mountainous region in the Kaghan valley. The three world fame lakes are Lulusar, Dudipatsar and Saif-ul-Malook Sar. “Sar” means a lake. Climate of the tract as a whole is temperate with distinct seasonal variations. Winters are severe with heavy snowfall, which may be expected any time from middle of November to middle of April. The total average annual precipitation both at Balakot and Naran are almost same. Naran receives most of precipitation as snowfall during winter season, where as lower part of the valley receives its major portion in the form of rainfall during summer season. On the whole, the tract receives a good deal of annual precipitation as snowfall, which is heavier on upper ridges.

The population of Kaghan valley is entirely rural and mostly poverty stricken and under nourished. Their economy is mostly agro-pastoral. Agriculture is the principal occupation, although sheep and cattle rising are practiced over the adjacent mountainous area. Few people are engaged in trade, local labour and employment in bigger cities of the country. Principal tribes (ethnic groups) in the valley are Syed, Swati, Gujar and Awan. Syed and Swati are economically dominant. Gujars are in numerical majority. Most of the people speak Hindko and Gujri languages. Literacy rate according to 1981 census was 16.5% and according to 1998 census, it was 30.9%. Increase in literacy rate during seventeen years is not encouraging. High illiteracy in the area is because of the poverty and less educational facilities. Maize is grown as major crop, wheat and rice is also grown. Potatoes and peas yield fair return. Vegetables and fruits are less common. The most commercially grown important fruits are apple, walnut, plum, pear and apricot.

According to standard classification of “Forest types of Pakistan” (Champion, Seth and Khattak, 1965) the Kaghan valley forests fall under the major type “Montane Temperate Forests” and “Himalayan Dry Temperate Forests”. As a broad division of forests beyond Dewanbela are representative of later type. Blue Pine “*Pinus wallichiana*” locally called “Biar and Kail” is found as a pure crop in Lachi Khan, Mukhair, Malkandi, Nagan, Manoor and Kamalban forests. Depending upon aspect, its distribution varies from 1370 to 2590 metres. It is generally confined to the warmer, southern and western slopes as typically represented by Malkandi forests. 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 3203 hectares.

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. Total area of these forests is 1712 hectares.

Fir “*Abies pindrow*” locally known as “Rewar” is generally available as pure crop at varying altitude from 2130 to 3190 metres. And with spruce “*Picea smithiana*” locally called “Kachhal” at lower elevation, besides other areas such forests may be noticed in Malkandi, Nuri, Manshi, Nagan, Kamalban, Dewanbela, Karkana and Battal 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*. Total area covered by these forests is 9296 hectares.

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 Kaghan Valley was carried out during November 2004 and June 2005. A semi structured questionnaire method was followed to collect ethnobotanical uses of gymnosperms of the valley. Interviews of about ~100 informants including local community, herds men, herbalists and pansaries were conducted on random basis. The outcome of the results were rechecked and compared with literature. Analysis of the data was done and indigenous knowledge was documented. Various samples were taken randomly. The collected material was pressed and dried using blotting papers for about two weeks at room temperature. The dried material was disinfected using mercuric chloride and absolute alcohol .After poisoning; the plants were mounted on the standard size herbarium sheets. The data taken in the field was transferred to the slip pasted on the herbarium sheets. 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- I-Azam, University, Islamabad.

Results

FAMILY: CUPRESSACEAE

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. (Baquar, S.R.1989). The wood is used in carpentry and for furniture making. Planted as ornamental tree. (Baquar, 1995). Pollen grain causes hayfever (Wodehouse, 1945).

Juniperus communis L. var. *saxatilis* Pallas.

Vernacular Name: Common Juniper (English), Abhal (Urdu), Bhenri (Hindko), Bantha (Kohistani), Pama, Petthri (Punjabi), Pethra, Betar, Benth Sukpa, (Kashmiri).

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

Occurrence: Form dense patches near the tree limit and up to 4200 metres in the Kaghan Valley.

Flowering Season: April - May.

Medicinal and Economic Properties: 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. Lot of folk remedies recorded by Duke. (Kaul, 1997). The fruit and oil are diuretic, carminative, stimulant, and is used in dropsy, gonorrhoea, gleet, 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. (Zaman *et al.* 1970). Wodehouse (1945) claimed that the pollen cause hay fever. The ash is mixed with tobacco and best quality “*Naswar*” (Snuff) is prepared.

***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.

Occurrence: Form dense patches near the tree limit and up to 4200 metres in the upper Kaghan Valley.

Flowering Season: May - June.

Medicinal and Economic Properties: 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*. (Kaul, 1997). The wood is hard and fragrant, used locally as fuel wood, for beam making and for making pencil. (Baquar, 1997). Fruit diuretic, carminative, stimulant, used in dropsy, gonorrhoea, gleet, leucorrhoea and some cutaneous diseases. (Baquar, 1989). Properties of the fruit are the same as of *Juniperus communis* and also used for flavouring the “Gin” and other products. (Zaman, *et al.* 1970). The ash is mixed with tobacco and best quality “*Naswar*” (Snuff) is prepared.

***Juniperus squamata* Buch.**

Vernacular Name: Cedar (English), Chalai (Hindko), Aprus (Baluchi), Luir, Shur (Punjabi), Bantha, Oobakht (Kohistani).

Distribution: Common and often with *Juniperus communis* above the tree line. Especially in Kashmir, Chitral, near Mastaj, Upper Kaghan and Kurram 2400 to 4200 meters.

Occurrence: Form dense patches near the tree limit and upto 4200 metres in the Upper Kaghan Valley.

Flowering Season: June - July.

Medicinal and Economic Properties: Twigs are burnt as incense and berries used similarly as that of *Juniperus communis* and *J. excelsa*. The wood is used locally as fuel wood. The ash is mixed with tobacco and best quality “*Naswar*” (Snuff) is prepared.

***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.

Occurrence: Commonly planted as ornamental.

Flowering Season: February - March.

Medicinal and Economic Properties: Planted as an ornamental tree. The fruit and wood are anthelmintic and astringent. (Baquar, S.R.1989). Pollen grain may cause hayfever (Wodehouse, 1945).

FAMILY: EPHEDRACEAE

Ephedra gerardiana Wall.

Vernacular Names: Asmani Booti (Hindko), 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 metres.

Occurrence: Form dense patches near the tree limit and up to 4200 metres in the Upper Kaghan Valley.

Flowering Season: May – July.

Medicinal and Economic Properties: Chiefly used in treatment of bronchitis, asthma, and relieving bronchial spasm. Useful heart stimulant. Also used in hepatic diseases, as blood purifier and cleaning of teeth. 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. (Kaul, 1997). The tincture is cardiac and circulatory stimulant. Liquid extract is used for controlling asthmatic attack. Decoction of stem and root considered a remedy for rheumatism and syphilis. Juice of berry is given in affection of respiratory passage. (Baquar, 1989). Used as alterative, diuretic, stomachic, tonic, anti-asthmatic, sudorific, effective in the management of bronchospasm, in reversible airway obstruction associated with stable asthma or chronic bronchitis, for the relief of unproductive cough accompanied by congestion of the upper respiratory tract, including congestion by allergy. Ephedrine exerts a sympathomimetic action similar to that of adrenaline. Specific action is anti-asthmatic (anti-histamine bronchodilator). History reveals its use over the centuries as “*Soma*” of the Aryans in the East. (Said, 1996). The drug, ephedrine obtained from the plant, used to treat coughs, asthma and hayfever. It stimulates the heart and constricts blood vessels. It is also used in anaesthesia, and, because it may be taken orally, it is prescribed frequently for treatment of cold, sinusitis, hayfever and bronchial asthma. “*Ma huang*” has been in use in China for more than 5000 years, for the treatment of asthma. Branches and roots treat asthma, influenza, coughs, lung fever, chronic bronchitis, rheumatism, whooping cough and sweating in the night. (Chin, *et al.* 1990) Used in hay fever, laryngitis and asthma. The seeds are used as cooling medicine. (Anonymous, 1956).

FAMILY: PINACEAE

Abies pindrow Royle.

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

Distribution: Afghanistan to Kumaon 2100 to 3200 metres, common.

Occurrence: Kaghan, Malkandi, Nuri, Manshi, Nagan, Kamalban, Dewanbela, Karkana and Battal forests. Generally available as pure crop at varying altitude from 2130 to 3190 metres.

Flowering Season: April – May.

Medicinal and Economic Properties: Tincture or decoction of the dried terebinthinous 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. (Nadkarni, 1927). Grown as ornamental tree. (Baquar, S.R. 1995). Wood is used for construction purpose i.e. doors, windows, houses, furniture and as fuel wood. (Awan, M.R. 1999-2001).

Cedrus deodara (Roxb.ex Lamb) G. Don.

Vernacular Names: 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 our mountains. Termites usually leave it alone).

Occurrence: Kamalban, Malkandi, Nuri, Naran and Battal at an altitude from 1520 to 2430 metres, mostly on warmer aspects.

Flowering Season: October.

Medicinal and Economic Properties: The wood is carminative, diaphoretic, useful in fever flatulence, pulmonary and urinary disorders, rheumatism, piles, stone in kidney and also antidote to snake bite. Bark is astringent, useful in fever, diarrhoea and dysentery. Oil is diaphoretic, useful in skin diseases and for ulcer. (Baquar, 1989). Oil extracted from root is used for skin diseases of goats and camels. Wood of this tree is of an excellent quality and used for construction and furniture purposes. (Awan, 1999-2001). Oleoresin and dark colored oil or turpentine, are applied to ulcers and skin diseases. They are valuable in horses and sore feet of cattle. Cedar wood oil is used in microscopic work.

Picea smithiana (Wall) Bois.

Vernacular Names: 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.

Occurrence: Malkandi, Nuri, Manshi, Nagan, Kamalban, Dewanbela, Karkana and Battal forests at varying altitude from 2130 to 3190 metres.

Flowering Season: April – May.

Medicinal and Economic Properties: Wood is used for making matches. Wood pulp used for shingles, boxes and planking. (Baquar, 1995). The wood is not durable, but is easily available in the upper Kaghan Valley, used for construction purposes and as a fuel wood.

Pinus roxburgii Sargent.

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

Distribution: The long leaved pine (Chir, Chil) is the commonest conifer from Afghanistan to Bhutan and from 600 to 1500 metres, often growing in pure stands. It is cultivated in Punjab.

Occurrence: Lower Kaghan, found in areas where monsoon do not penetrate.

Flowering Season: February – April.

Medicinal and Economic Properties: Resin is stimulant. Internally it is used as stomachic and as remedy for gonorrhoea. Externally it is applied as a plaster to buboes and abscesses for suppuration. Wood is diaphoretic and stimulant. Used in burning of body, cough, fainting and ulceration. Wood and oleoresin is used in snake bite and scorpion sting. Wood is used as timber in construction, makes a good fuel. Good for reforestation and soil conservation. (Baquar, 1989). The oil has irritant action and most of its medicinal uses are due to that property. In controlled small doses it acts as a stimulant expectorant and is useful in chronic bronchitis. It cures flatulent. It has limited use also in typhoid, minor hemorrhages (such as from gums, nose etc.). Given as an enema, it cures constipation. Its commonest use, however, is as liniment in rheumatic pains. Inhaling the vapors of turpentine is useful in bronchitis. The timber of the tree is largely used for various purposes, e.g. house building, furniture, tea chests, match industry, sport goods, musical instruments, etc. Its resin *Biroja* is used for bangles. The bark has tannins and coloring matter, used for colouring the leather. (Jain, 1996). Wood is aromatic, antiseptic, deodorant, and stimulant, diaphoretic, refrigerant, rubefacient and carminative. Oleoresin is used for fumigations. Essential oil is used with success as a stimulant diuretic in gleet, long standing gonorrhoea. The tar is employed for chronic bronchitis phthisis and in skin diseases. The wood is not so durable. It may be used for construction purposes. It is also valuable for its resin extract. Used as fuel wood. Leaves are used in construction of roofs as “*Chanana*”. Resin is also used as hair remover. (Hussain, 1987).

Pinus wallichiana A.B.Jackson.

Vernacular Names: 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.

Occurrence: Lachi Khan, Mukhair, Malkandi, Nagan, Manur and Kamalban depending upon the aspect, its distribution varies from 1370 to 2950 metres. It is generally confined to the warmer, southern and western slopes as typically represented by Malkandi forests.

Flowering Season: April – June.

Medicinal and Economic Properties: Used similar as *Pinus roxburghii*. (Baquar, 1989). 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. (Awan, 1999-2001).

FAMILY: TAXACEAE

Taxus wallichiana Zucc.

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

Distribution: Not gregarious as a rule. Usually in mixed forest. Kurram, Chitral, Swat, Astor, Hazara, Murree Hills, Ponch, Kashmir, 2000 to 3500 metres.

Occurrence: Shogran near Payya. It is an endangered species.

Flowering Season: February – May.

Medicinal and Economic Properties: Recently Taxol, an anti cancer compound has been found in bark and leaves. This discovery has raised its demand and the tree is vulnerable to get extinct. Wood traditionally used for cabinet and furniture making. Tea of leaves is useful in high fever and asthma. (Kaul, 1997). Leaves are used in bronchitis, hiccough and asthma, for indigestion, epilepsy and as aphrodisiac. Leaves and fruit are sedative, antiseptic and emmenagogue Plant is poisonous, used as fish poison. Branches are lopped for fodder. (Baquar, 1989 and 1995)

Discussion

The present Ethnobotanical study provides information on the ethnobotanical uses of the 12 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. There is a dire need to protect this natural wealth with the involvement of community. *Taxus wallichiana* "Birmi" an important source of important anticancerous drug "Taxol" has been found critically endangered due to heavy lopping as fodder in the winter season.

References

- Ali, S.I. and E.Nasir. (Eds.) (1970-2002). Flora of Pakistan, 01- 215.
- Ali, S. I & Qaiser, M. 1986. A Phytogeographic Analysis of the Phanerogams of Pakistan and Kashmir, Proceeding of the Royal Society of Edinburgh 89B, 89-101.
- Anonymous (1956). A note on the plants of medicinal value found in Pakistan. Medicinal Plants Branch, Pakistan Forest Institute Peshawar (Reprinted in 1984).
- Awan, M.R. (1999-2001). Studies on Taxonomy and Traditional uses of Economically Important Plants of Chitral. Final Research Report. Project No. C-PMNH/Bio (295). Pakistan Museum of Natural History Islamabad. pp. 199.
- Baquar, S.R. (1989). Medicinal and Poisonous plants of Pakistan. Printas Karachi, Pakistan. pp. 506.
- Baquar, S.R. (1995). Trees of Pakistan. Their natural history characteristics and utilization. Royal Book Company Karachi. pp-634.
- Champion, H.G. Seth. S.K. and Khattak, G.M (1965). Forest Types of Pakistan. Pakistan Forest Institute Peshawar. pp 238.
- Chopra, G.L. 1992. A text book of Gymnosperms. Kitab Mahal Urdu Bazar, Lahore.
- Chuakul. W. 2000. Medicinal plants in Khao Kho District, Phetchabun Province, Thailand. Pharmaceutical Biology. 38 (1): 61-67.
- Chin, W.Y. and Keng, H (1990). An Illustrated Dictionary of Chinese Medicinal Herbs. Times Editions Pte. Ltd. Times Centre 1 New Industrial Road Singapore 1953. pp. 183.
- Haq, I. and Hussain, M. (1993). Medicinal Plants Of Mansehra. Hamdard Medicus, Vol.XXXVI, No.3, July- Sept. 1993, pp. 63- 100.
- Hussain, F. and Ilahi, I (1991). Ecology and vegetation of Lesser Himalayas Pakistan. Botany Department, Peshawar University. pp. 187.
- Hussain, M. (1987). Medicinal Plants of Mansehra. M.Sc. thesis. Botany Department University of Peshawar. pp. 174.
- Jain, S.K. (1996). Medicinal Plants; 6th Edition. National Book Trust India. pp. 216.
- Kaul, M.K. (1997). Medicinal Plants of Kashmir and Ladakh. Temperate and Cold Arid Himalaya. Indus Publishing Company New Delhi, India. pp. 173.
- Lal, B., S. K. Vats., R.D. Singh and A.K. Gupta. 1994. *Plants used as Ethnomedicine by Gaddis in Kantra and Chamba Districts of Himachal Pradesh, India* congress of Ehtnobiology, Lucknow, Uttar Pradesh, India. NBRI; Lucknow, India. 143.
- Nadkarni, K.M. (1927). The Indian Materia Medica Ed: III, Vol.I. Popular Book Department, Bombay, India.
- Naisr, E., M. A. Siddiqi and Z. Ali. 1969. Gymnosperms of West Pakistan. Botany Department, Garden College, Rawalpind.
- Parker, R.N. (1952). A forest flora of the Punjab with Hazara and Delhi, 2nd Ed. Govt. Print. Press Lahore, Pakistan.
- Said, H.M. (1996). Medicinal Herbal Vol.1. A Text Book for Medical students and Doctors. A Res. Publ.of Bait-Al-Hikmah at Madina- Al Hikmah Karachi. Printed at MAS Printers Karachi. p. 29.
- Wodehouse, R.P. (1945). Hayfever Plants. Waltham, Mass., U.S.A. Published by the Chronica Botanica Company. pp. 245.
- Zaman, M.B. and Khan, M.S. (1970). Hundred Drug Plants of West Pakistan. Pakistan Forest Institute Peshawar, Pakistan.

