

## ETHNOBOTANICAL SURVEY OF PLANTS FROM NEELUM, AZAD JAMMU & KASHMIR, PAKISTAN

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### Abstract

This study documents the ethnobotanical values of the most commonly used plants of the Neelum Valley, AJK, Pakistan and reports on the indigenous knowledge of different communities of the study area. A total 40 plant species belonging to 31 families were found to be valuable for medicinal, food, fodder/forage, fuel, timber, shelter and agricultural purposes. Local people used indigenous plants for their common day ailments. Plant species were used to treat various ailments: stomach (25%), diarrhea, cough, cold and rheumatism (16%), piles (12.5%), asthma (11%), diabetes, jaundice and toothaches (7.5%), liver and gastric problems (5%), small tumors, hepatitis and allergies (2.5%).

### Introduction

Ethnobotany plays an important role in understanding the dynamic relationships between biological diversity and social and cultural systems (Husain *et al.*, 2008; Mahmood *et al.*, 2011a). Ethnobotanical approaches are significant in highlighting locally important plant species, particularly for new crude drugs. Documentation of indigenous knowledge, in particular the medicinal values of plant species, provided various vital modern drugs (Cox, 2000). About 25% of drugs originate from plants and many other drugs are synthetic analogues of compounds isolated from plants. About 80% of the people of developing countries are still dependent on traditional indigenous medicines for their basic healthcare (Anon., 2002; Malik *et al.*, 2010).

Pakistan has a high diversity of plants that are being used by local communities for medicinal purposes. Proper usages of these plants are commonly practiced at the community and end-user level (Bibi *et al.*, 2008). However, there are many parts of the country which remain unexplored by ethnobotanists; there is no report available for the proper usage of plants (Bibi *et al.*, 2008). Azad Jammu and Kashmir (AJK) is rich with medicinal plants and diversified plant habitats. Reports on the traditional medicinal uses of plants by the local communities of AJK are increasing (Qureshi *et al.*, 2007; Mahmood *et al.*, 2011a; b; c). The present study reports on the ethnobotanically important resources from the Neelum Valley, AJK, Pakistan and analyzes the indigenous traditional knowledge on the utilization of the most commonly used medicinal plants.

### Materials and Methods

**Study area:** The Neelum Valley lies between 73° – 75° E longitude and 32° – 35° N latitude, covering an area of 3737 km<sup>2</sup> situated north-east of Muzaffarabad at an altitude of 900-6325 meters above sea level (a.s.l). The study area includes high mountains, deep valleys, dissected small terraces, gentle to steep slopes and inclined spurs. The maximum daily temperature varies from 20 to 30°C during summer and average temperature ranges from 4-0°C in winter (Dar, 2003).

**Data collection:** Ethnobotanical surveys were conducted during April-May 2010. Information on local uses of plants was collected from various localities by arranging meetings, interviews, dialogues and discussions with rural, knowledgeable people, hakims and shepherds.

Open-ended and semi-structured questionnaires were filled in the field. The plant species collected during surveys were identified by taxonomists using the Flora of Pakistan (Nasir & Ali, 1970-1989; Ali & Nasir; 1989-1991; Ali & Qaiser, 1993-2011) and voucher specimens were submitted to the Herbarium of Quaid-i-Azam University, Islamabad.

### Results and Discussion

Table 1 presents information for plant species: plant parts used as drugs, their therapeutic uses, non-medicinal uses, status and habit and flowering period. A total of 40 plant species were identified belonging to 31 different families. Primary sources of medicines were wild herbs (57%) followed by trees (17%), cultivated herbs (12%), shrubs (5%), fungi (3%) and spiny shrubs (3%) (Fig.1). Information related to number of plant species used to treat different ailments is presented in Figure 2. The following species were the most important, based upon their medicinal properties: *Berberis lycium* Royle, *Podophyllum hexandrum* Royle, *Oxyria digyna* (L.) Hill, *Rheum australe* D. Don (*Rheum emodi*) syn. Wall. ex Meissn., *Aconogonon alpinum* (All.) Schur, *Angelica cyclocarpa* (C.Norman) Cannon, *Arnebia benthamii* (Wall. ex G.Don) I.M.Johnst., *Geranium wallichianum* D.Don ex Sweet, *Morchella esculenta* (L.) Pers. ex Fr., *Jurinea himalaica* R.R. Stewart, *Rhus succedanea* L., *Solanum nigrum* L., *Saussurea lappa* (Decne.) Sch. Bip., and *Viola canescens* Wall.

*Betula utilis* D. Don is a commonly occurring plant in the study area and is used for various medicinal purposes. Its bark is made into an acrid, pungent tonic which is useful for convulsions, bronchitis, leprosy and earaches. Plant species such as *Taraxacum officinale*, *Chenopodium album*, and *Solanum nigrum* are used to cure jaundice. *Podophyllum hexandrum* is used to cure small tumors and its powder is an antiseptic for the healing wounds. *Geranium wallichianum* is used to treat hepatitis and it is suggested that it should be screened for further pharmacological studies. Asthma is also a common problem among the elderly in the study area and *Artemisia macrocephala* is effective against asthma. Diseases such as rheumatism, pneumonia and different fevers (such as Daira) spread during harsh weather conditions. Local communities have no contact with urban areas in the winter, when heavy snowfall prevents travel, and available plant resources are used to cure ailments. Species such as *Saussurea lappa*, *Amaranthus viridis*, *Jurinea himalaica* and *Berberis lycium* are commonly used to cure rheumatism.

Table 1. Medicinal plant species and parts used to cure ailments based on the information gathered from the locals by using the semi-structured and open ended questionnaires.

Family	Species name accession & voucher No.	Vernacular name	Plant part used (Drug)	Therapeutic uses	Non Medicinal uses	Status and Habit	Flowering period
Adoxaceae	<i>Sambucus wightiana</i> Wall. ex Wight & Arn. (125430)	Gihunola	Root	Root is applied to injured parts/ organs of animals and causes rapid healing.		Wild herb	June – September
Amaranthaceae	<i>Amaranthus viridis</i> L. (125123)	Gunhar	Whole plant	Rheumatism; as a tonic. Given to cows as a tonic, soon after they give birth to calves.	Fodder for cattle. Seeds as flavoring agents. Leaves as vegetables.	Cultivated annual herb	July – October
Anacardiaceae	<i>Rhus succedanea</i> L. (125234)	Urkhur	Leaves, fruit	Leaf extract is used as antidote, fruit juice as ointment.	Stem and branches are used as fuel wood.	Wild tree	June – September
Apiaceae	<i>Angelica cyclocarpa</i> (C.Norman) Cannon (125038)	Chora	Roots	Roots are used for stomachache and gas trouble.	Flavoring agent & used as condiment.	Wild herb	July – September
Apiaceae	<i>Coriandrum sativum</i> L. (125267)	Dhania	Whole plant	Used in piles, headache, cold and flu. Seeds stimulate the appetite.	Condiment & flavoring agent.	Cultivated herb	June – September
Asteraceae	<i>Artemisia macrocephala</i> Jacquem. ex Besser (125478)	Jahoo	Shoot, leaves	Leaves are used for cough & asthma.	Shoot is used as fresh as well as dried fodder.	Wild herb	July – September
Asteraceae	<i>Helianthus annuus</i> L. (125190)	Gul-e-Aaftab	Whole plant	Seeds are used as tonic for cattle and are highly energetic.	Fodder; dried stem is used as fuel on very small scale.	Cultivated herb	Summer
Asteraceae	<i>Jurinea himalaica</i> R.R.Stewart (125191)	Thendi-Jeri	Roots & leaves	Roots are used for rheumatism, as tonic. For sexual power juice of root is used. Poulice of roots & leaves is applied to swollen internal injured organs.	Fodder, uncooked roots are chewed. These become chigum-like after chewing.	Wild herb	July – September
Asteraceae	<i>Saussurea lappa</i> (Decne.) Seh.Bip. (125120)	Kuth	Roots	Powder of root is used for cough and toothache, also as vermifuge for intestinal worms. Juice of roots is used with a sweetener to cure rheumatism.		Wild herb	July – September
Asteraceae	<i>Senecio chrysanthemoides</i> DC. (125359)	Buggo	Leaves and flowers	Flowers and leaves are ground and juice is extracted to treat stomach-burning & liver problems.	Food plant for honey bees.	Wild herb	July – September
Asteraceae	<i>Taraxacum officinale</i> Weber (125412)	Hund	Young shoot & leaves	Leaf decoction is used as tonic, diuretic, a cure for jaundice and as a blood purifier.	Leaves are cooked and used as wild vegetable (saag).	Wild herb	April – July
Balsaminaceae	<i>Impatiens brachycentra</i> Kar. & Kir. (125342)	Bentel	Shoot, seeds	Seeds are applied to burns and wounds.	Seeds are edible, shoots are used as fodder.	Wild herb	May – July
Berberidaceae	<i>Berberis lycium</i> Royle (125461)	Sumble	Root & fruit	Decoction or boiled water of roots is used to treat rheumatism and internal wounds, especially bone fractures. Berries are used for stomachache.	Shepherds use the spiny branches as fuel wood.	Spiny shrub	July – September
Betulaceae	<i>Betula utilis</i> D.Don (125460)	Birch	Bark	Pungent, tonic and useful for convulsion, bronchitis, leprosy and earache.	Bark layers are peeled off and used as paper for writing. Peeled sheets are used to decorate homes.	Wild tree	Summer

Table 1. (Cont'd.).

Family	Species name accession & voucher No.	Vernacular name	Plant part used (Drug)	Therapeutic uses	Non Medicinal uses	Status and Habit	Flowering period
Boraginaceae	<i>Artemisia benthamii</i> (Wall. ex G. Don) I.M. Johnston (125110)	Gaho-Zaban	Whole plant	Juice of leaves and flowers is used for liver problems, navel pain (Gola-Durd, Nar-Durd), burning during urination. Roots boiled in water are used for fever and thirst.		Wild herb	July – September
Brassicaceae	<i>Erysimum hieracifolium</i> L. (125112)	Muneri	Leaves and flowers	Leaves and flowers are ground and juice is used to kill lice.		Wild herb	May – August
Cannabaceae	<i>Cannabis sativa</i> L. (125119)	Bhung	Whole plant	Sedative, tonic, rheumatism and throat infection.	Stems are used to make ropes.	Wild herb	July – September
Caprifoliaceae	<i>Viburnum grandiflorum</i> Deene. (125211)	Okloon	Branches, fruit	Leaves and flowers are given to cattle for constipation. Fruits are used for stomachache.	Fruit is delicious and edible. Bark is used to make ropes.	Wild shrub	February – May
Chenopodiaceae	<i>Chenopodium album</i> L. (125288)	Buthwa	Whole plant	Shoots are used as a laxative for constipation. Roots are used against jaundice and urinary problems.	Young shoots are used as vegetable and fodder.	Wild herb	June – October
Cupressaceae	<i>Juniperus macropoda</i> Boiss. (125289)	Challai	Whole plant	Bark of the tree is used for making tea.	Wood is used as building material, fuel.	Tree	June – August
Geraniaceae	<i>Geranium wallichianum</i> D. Don ex Sweet. (125179)	Ratan Joge	A perennial herb	Tonic; hepatitis, liver problems, old fever, premature delivery and leucorrhoea are cured by its roots.	Fodder.	A perennial herb	June – October
Helveticaceae	<i>Morehella esculenta</i> (L.) Pers. ex Fr. (125457)	Guchhi	Fruiting body	Powder of the fruiting body is poured over wounds. It causes rapid healing & act as antiseptic. Stomachache.	Vegetable. Local people export it outside the country.	Fungus	April – May
Juglandaceae	<i>Juglans regia</i> L. (125126)	Khorri	Whole plant	Kernels are eaten as a remedy for physical weakness, bark and fresh branches are used for toothaches.	Fire and furniture wood, leaves as fodder, bark as dye. Wedges of good quality are made from its wood.	Wild tree	May – October
Lamiaceae	<i>Mentha longifolia</i> (L.) Huds. (125410)	Poodina	Whole plant	Shoot is used for stomachache and gas trouble. Juice of leaves expels worms from the stomach.	Condiment, younger shoots are used as vegetables.	Wild herb	May – August
Malvaceae	<i>Malva neglecta</i> Wallr. (125404)	Sonchal	Shoot & leaves	Shoot is used for constipation. Leaves are used for dry cough, bladder wounds; also useful for diabetes.	Vegetable and fodder.	Wild herb	May – July
Papilionaceae	<i>Indigofera heterantha</i> Wall. ex Brand. (125401)	Kanthi	Bark & Shoots	Juice of bark is vermifuge.	Shoots as fodder, branches as ropes, brooms and fuel.	Wild shrub	May – September
Pinaceae	<i>Cedrus deodara</i> (Roxb. ex D. Don) G. Don (125409)	Diyar	Wood	Oil of wood is used for toothache, applied to skin for skin problems, used as flea & insect repellent.	Timber and fuel wood, boxes for storage of maize (grain), best building material for homes.	Tree	

Table 1. (Cont'd).

Family	Species name accession & voucher No.	Vernacular name	Plant part used (Drug)	Therapeutic uses	Non Medicinal uses	Status and Habit	Flowering period
Plantaginaceae	<i>Plantago lanceolata</i> L. (125301)	Chumchi-pater	Whole plant	Seeds & fruit are laxative and used for stomach & intestinal problems, constipation and piles.	Fresh leaves are used as vegetable.	Wild herb	May – August
Platanaceae	<i>Platanus orientalis</i> L. (125308)	Chinar	Bark	The bark is used for toothache and diarrhea.	Shade tree, fuel wood.	Wild tree	April – July
Berberidaceae	<i>Podophyllum hexandrum</i> Royle (125169)	Khakhri	Rhizomes, fruit	Powdered rhizome is applied to wounds for rapid healing, antiseptic, applied to small tumors.	Fruit is an edible red berry.	Wild herb	April – June
Polygonaceae	<i>Aconogonon alpinum</i> (All.) Schur (125234)	Chukroo	Whole plant	Roots are carminative, used for stomachache	Uncooked stems are eaten with salt. Young shoots are used as fresh vegetable and used in winter as dried food. Roots are also eaten.	Wild herb	May – September
Polygonaceae	<i>Oxyria digyna</i> (L.) Hill (125243)	Khutery	Shoot	Juice of shoots is used for constipation, liver disorders and stomachache.	Shoot is eaten as food and fodder.	Wild herb	June – August
Polygonaceae	<i>Rheum australe</i> D. Don (125253)	Chotial	Rhizome and roots	Rhizomes and roots are used as vermicide; applied to swellings of internal injuries, as an antiseptic for wounds, burns. It is used against piles, asthma, bruises, and stomachache.	Leaves are dried after boiling in water or dried uncooked for the oncoming winter and used as vegetable. Fresh and dried leaves are used as fodder for goats, sheep and cattle.	Wild herb	June – August
Pteridaceae	<i>Pteridium aquilinum</i> (L.) Kuhn (125267)	Nunoor	Fronds	Fresh and dried younger fronds are used for dysentery.	Used as vegetable, known as "Langroo". Older fronds are used as thatching material on newly built houses.	Wild fern	July – September
Ranunculaceae	<i>Actaea spicata</i> L. (125230)	Munera	Roots	Juice of roots is used to kill lice.	Poisonous.	Wild herb	July – September
Scrophulariaceae	<i>Pterorhiza kurroa</i> Royle ex Benth. (125210)	Kore	Root	Roots powder is used for stomachache, diabetes, fever, and as a vermifuge. Crushed leaves are applied to eczema. Leaf juice is used for liver problems.		Wild herb	July – October
Solanaceae	<i>Capsicum annuum</i> L. (125297)	Hari-Mirch	Fruit	Used for common cold, dyspepsia and diarrhea.	Flavoring agent and condiment.	Cultivated herb	June – September
Solanaceae	<i>Solanum nigrum</i> L. (125479)	Mako	Fruit	Juice of berries is the best cure of jaundice. Fruit eaten as a good blood purifier.	Fruit is edible.	Wild herb	August – October
Taxaceae	<i>Taxus baccata</i> L. (125504)	Thonri	Whole plant	Leaves are used for bronchitis and asthma. The leaves and seeds are used as a sedative and antiseptic. Bark peeled from the trunk is used for making tea.	Timber and fuel wood. Leaves are used as forage for cattle when grass is scarce.	Tree	February – April
Violaceae	<i>Viola canescens</i> Wall. ex Roxb. (125101)	Thundi-Jeri	Whole plant	Extract of crushed leaves & flowers is used for liver problems.	Vegetable (fresh plant and dry)	Wild herb	April – August

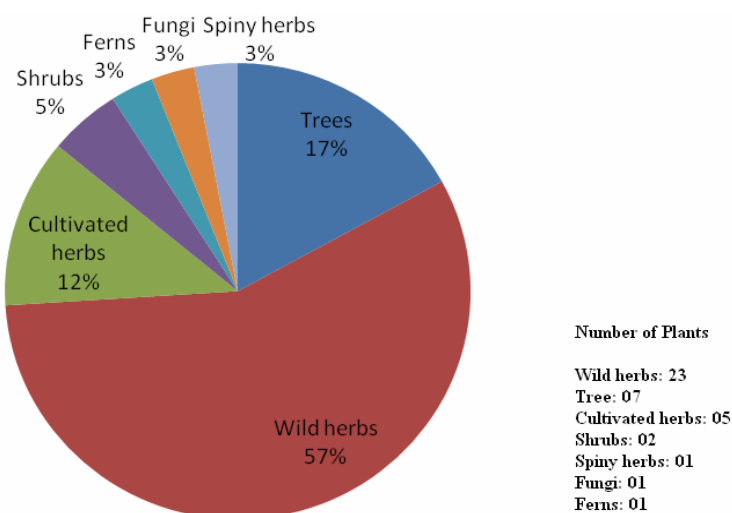


Fig. 1. Types of plants with ethnobotanical uses in the Neelum Valley

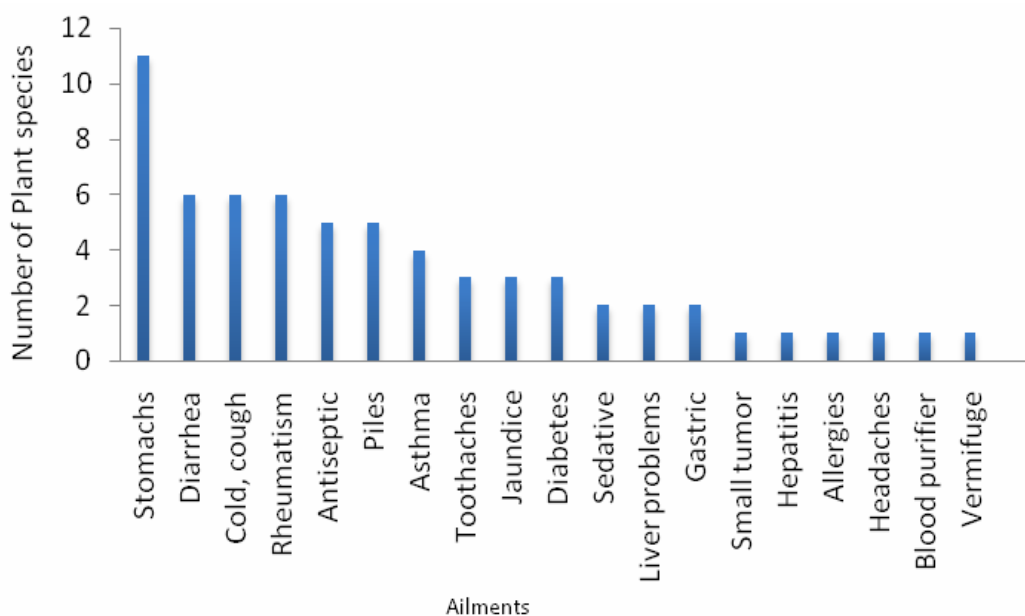


Fig. 2. Number of plants used to treat various ailments in the Neelum Valley

This study highlighted the valuable role of herbal medicines in the local health care system of the Neelum Valley; local healers (Hakims) extensively use plants for treating different ailments. Traditional medicines are used preferentially over allopathic medicines because they are inexpensive, easily available and normally self-administered. The modern generation is inclined towards the use of allopathic medicines and it seems that traditional knowledge of medicinal plant use is in severe danger of being lost. The results provide sound a foundation for the medicinal uses of various plant species and provide a basis for future detailed pharmacological studies.

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