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Chapter

Historical Evidence and Documentation of Remedial Flora of Azad Jammu and Kashmir (AJK)

Fozia Abasi, Muhammad Shoaib Amjad and Huma Qureshi

Abstract

Determining the pharmacognostic specifications of medicinal plants used in several drugs is very necessary and actually crucial. Ethnobotany has significant role in understanding the active relations between the biological diversity and cultural systems. Azad Jammu and Kashmir (AJK) is gifted with variety of medicinal plants. The theme of this chapter is to present information about wild medicinal plants in different areas of Azad Jammu and Kashmir. Common woody species are *Diospyros lotus, Taxus wallichiana, Viburnum cylindricum*, and perennial herbs comprise *Geranium nepalense, Oxalis acetosella* and *Androsace umbellata. Betula utilis, Berberis lycium, Cedrus deodara, Abies pindrow, Pinus wallichiana, Juglans regia* and *Salix* species with large number of herbal diversity at elevations are common. Most of people use wild plants as traditional food and medicine. This ethnic flora not only plays important role in human health care but it is also an important source for present and future drug development. There is need for correct documentation, conservation of plants samples in herbarium of research institutes, and growing plants in gardens.

Keywords: medicinal plants, Himalaya Kashmir, ethno-veterinary resources, ethno mycological data, plant parts, sustainable use

1. Introduction

Azad Jammu and Kashmir valley extends between 34°22′25 North latitude and 73°28′14 East longitude. Muzaffarabad is capital city of Kashmir and total area covered by Kashmir valley is 13,297 square kilometers. Estimated population of Azad Jammu and Kashmir is about 4-million. Mean maximum temperature was documented during summer (16 °C–24 °C) while −4 °C was recorded mean minimum temperature during winter. AJK is rich in diversity of plants because of its expanded habitations, such as streams, springs, nullahs, lakes, rivers, steep mountain slopes and roads, waste lands and cultivated fields, etc.

2. Geographical conditions and topography

The area of valley can be divided into two geographical zones; East and North are mostly hilly and mountainous categorized by undulating terrain, deep ravines,

Figure 1.
(a) Sudhen Gali district Bagh (b) Tolipeer district Poonch (c) Neelum valley (d) Areng khel Neelum valley (e) Leepa valley (f) Las Dana.

and rugged (Neelum, Muzaffarabad, Hattian, Bagh, Haveli, Poonch, and Sudhnoti) while South and West are valleys and plains (Kotli, Mirpur, Bhimber) (**Figure 1**).

3. Flora and plant diversity

In AJK, vegetation can be divided into four groups:

i. Subtropical vegetation is further divided into Dry scrub forest vegetation and Pine forest vegetation

ii. Temperate forest vegetation further divided into Moist Temperate and Dry Temperate Forest vegetation

iii. Sub alpine vegetation

iv. Alpine vegetation

The Himalaya Kashmir is documented as worldwide epicenter of endemism and plant diversity. Accordance to the report of Pei [1], in Himalayan range,

total number of plant species is about 25,000 and total number of angiosperms in Kashmir Himalaya is about 3,054 [2]. About 80% endemic angiosperms is in Pakistan are confined to Northern and Western mountains [3, 4]. 70–80% of population in this region depends on traditional medicines for health care and in Himalayan ranges; at least 70% of the medicinal plants and animals in the region consists of wild species [5]. A total of 104 medicinal plant species including tree, shrubs and herb species used ethnobotanically by the local people of Muzaffarabad were reported from Machyara National Park Muzaffarabad [6, 7]. Most of People living in mountains regions use plants in different ways such as medicines, fire wood, timber wood, food, fodder etc. [8].

4. Historical evidence of wild plants usage

Medicinal plants are considered as safe medication and it is also naturally valuable remedy for many human sufferings in rural and remote hilly regions of Kashmir [9]. Due to the lack of advanced medicinal services, usage of flora as ethno medicine is renowned. Traditional curative usage of herbal plants by indigenous populations of AJK has been stated ([10] a&b; [11]). Saghir et al. [12] found 53 plant species useful mostly as medicinal, fuel, fodder, fruit, timber and vegetables reported from Chikar and allied areas of District Muzaffarabad. Gorsi and Shahzad [13] documented medicinal flora and suggested regeneration work to save the traditional knowledge about plants of Dirkot. Ishtiaq et al. [14] stated that plants are indirectly related to the culture and they stated 36 plant species used for the treatment of various diseases in Samahni valley. Khan et al. [15] indicated that the inhabitants of Poonch Valley utilized 169 plant species for more than 30 domestic needs. Ajaib et al. [16] provided ethnobotanical data on medicinal flora of district Kotli by reporting 38 species of shrubs. Saqib et al. [17] studied the medicinal flora of mountainous areas of AJK. Some of medicinally important plant species include *Saussurea lappa, Aconitum heterophyllum, Jurinea dolomea, Bistorta amplexicaule, Plectranthus rugosus,, Geranium wallichianum, Ajuga bracteosa, Taraxacum offincinale, Quercus incana, Berberis lyceum* and *Viola canescens* [18]. 70% of the therapeutic flora in the area comprise of wild species; 70–80% inhabitants dependent on traditional medications [19]. People of Azad Jammu & Kashmir are still dependent mainly on medicinal plants for folk remedies, hence creating immense pressure on native vegetation by overexploiting them, particularly in the mountainous region of Kashmir [20].

5. Documentation on remedial flora of Azad Jammu and Kashmir (AJK)

The original printed data of plants as medication initiating from the Himalayas date back to ancient scripts of the Rigveda, monitored by Auryveda (600–100 BC) and Atharveveda (2000–1000 BC). Northern mountains of Pakistan located at intersection of three Mountain ranges i.e., Himalaya, Karakorum and Hindu Kush are well recognized for their biodiversity [21]. Azad Jammu and Kashmir is endowed with productive variety of medicinal plants. It has been stated on many curative practices of plants by the indigenous populations [10, 14, 22, 23]. For above 10,000 classes of curative and scented plants, 600 million folks exist in in Himalayan section. In Himalayan ranges, 70% of therapeutic flora comprise of wild species [19]. Northern regions including Kashmir are in pressure from indigenous people and tourists. Primary reasons include unselective displacing and storing systems of remedial plants. Therefore, therapeutic tradition needs to be recognized

and protected. Hundreds of species are currently endangered for the reason of excessive harvesting. Northern mountainous areas have several climatic and vegetation regions. These diverse natural regions have distinctive ethnobotanical vital plants that are significant for the economy of a nation. For traditional medications People of AJK are generating massive stress on flora by damaging those [20]. In north-western zones of Pakistan, several ethnobotanical trainings have been convoyed and which have assembled evidence on the usage of therapeutic flora [4]. The valuable ethnobotanical data is declining owing to the deficiency of awareness and information.

6. Folklore of wild plants in medicine

Azad Jammu and Kashmir is gifted with dynamic variety of medicinal plants. Below, we discuss some wild fruits and vegetables commonly used by indigenous people of AJK. Main wild fruits of the valley are *Ficus palmata Malus pumila, Prunus persica, Prunus cerasus, Morus alba, Diospyros lotus, Rubus fruticosus, Vitis vinifera, Viburnum foetens* and *Punica granatum*. Fruit of *Juglans regia* L. (Juglandaceae) is used as dry fruit. Fruit also remove gall bladder stones and is aphrodisiac. Fruits of *Morus nigra* L. (Moraceae) are dried and sold in market as a dry fruit. Fresh fruit is ground and used as tonic and for cough and throat irritation. Fruits of *Rubus ellipticus* Smith (Rosaceae) are edible. *Withinia somnifera* (L.) Dunal (Solanaceae) is used in Ayurvedic medicinal purposes and fruits are edible. Fruits of *Zanthoxylum alatum* DC. (Rutaceae) are aromatic, condiment and carminative and are used in sauce. They are also used for the treatment of piles. *Ziziphus nummularia* (Burm.f.) Wight & Arn. (Rhamnaceae) fruit is edible and laxative and leaves are used as fodder for goat. *Punica granatum* L. (Punicaceae) is used as treatment for Cancer, Osteoarthritis and other diseases. It has been used in natural and holistic medicine to treat sore throats, coughs, urinary infections, digestive disorders, skin disorders, arthritis. *Pyrus pashia* L. (Rosaceae) fruit is superlative to eat when it is slightly decaying. It is set apart from the cultivated pears by having a grittier quality. The fully ripe fruit has a reasonable taste and, when bletted, is sweet and very pleasant to eat. *Viburnum grandiflorum* Wall. (Caprifoliaceae) fruit is edible used against malaria [24] (**Table 1**). Miscellaneous uses of plants in the area comprise spices and condiments, ornamental plant species, vegetables and pot herbs, s agricultural tools, basket making, cosmetics, dish cleaner, house decoration, feed, field fencing, furniture, narcotics, packing material, curing snake and scorpion bite, soil binder, sticks and handles, shade tree, herbal tea and for making utensils. Maswak made from the roots of *J. regia* and branches of *A. modesta, O. ferruginea* and *Z. alatum* is used for cleaning their teeth. Plants are used as a major source of veterinary medicine. Interest of such use in the veterinary sector has resulted primarily from the increasing cost of livestock maintenance and the introduction of new technology in the veterinary medicines and vaccines. The important medicinal plant species showed the highest fidelity such as: *Rumex nepalensis*, *Primula denticulata*, (100%) used for dysuria, red urination, *Skimmia laureola* (100%), *Swertia paniculata* (99%), and *Angelica glauca* (97%), used for ague, cold, shivering, gastric ailments, *Melia azedarach* (100%), used to reduce intestinal worm load in cattle showing the conformity of knowledge on these species (**Table 2**). Plant communities have been largely disturbed due to deforestation for fuel, over consumption of medicinal resources for the population explosion, treatment of diseases, increased tourism and lack of awareness. Vulnerable species include *Sorghum halepense, Acacia modesta* and *Solanum nigrum*. Medicinal species like *Cissus carnosa, Butea monosperma Ajugabracteosa, Mallottus philippinensis*

	Botanical name	Family	Common name	Traditional uses
1.	*Ajuga bracteosa* Wall.ex. Benth.	Lamiaceae	Heri-booti	A decoction is used for curing intestinal ulcer, jaundice, throat infection and high blood pressure
2.	*Argemone mexicana* L.	Papaveraceae	Dudhli kandyari	Seeds are analgesic and laxative.
3.	*Alstonia scholaris* (L.) R.Br.	Apocynaceae	—	The bark is used to treat malaria, fever, asthma and tumors.
4.	*Amaranthus viridis* L.	Amaranthaceae	Ganar	Leaves are used on scorpion sting and snake bite. Root juice is used to treat constipation and inflammation during urination
5.	*Alternanthera pungens* Kunth	Amaranthaceae	Itsit	Roots and leaves are blood purifier and diuretic.
6.	*Anisomeles indica* (L.) S. Kurz.	Lamiaceae	—	Decoction of leaves is anti-rheumatic and used in stomachic and toothache.
7.	*Achyranthes aspera* L.	Amaranthaceae	Puth kanda	Leaves are used in pneumonia and asthma.
8.	*Albizzia lebbeck* (L.) Benth.	Mimosaceae	Sreeia	Seeds are used for curing kidney infection
9.	*Bauhinia veriegata* L.	Caesalpiniaceae	Katchnar	Fruit is edible and useful for leprosy and skin diseases.
10.	*Butea monosperma* (Lam.) Taubert	Papilionaceae	Chechra	Gum is tonic given for backache after birth.
11.	*Buddleja asiatica* Lour.	Buddlejaceae	Batta	Used for skin disease, and as a cure for loss of weight
12.	*Barleria cristata* L.	Acanthaceae	—	Seeds are antidote for snake bites and for serious catarrhal infections
13.	*Boerhavia diffusa* L.	Amaranthaceae	Sanati	Improve eyesight, diuretic and useful in controlling blood sugar levels
14.	*Buglossoides arvensis* (L.) Johnston	Boraginaceae	Kalu	Leaves infusion is sedative
15.	*Croton bonplandianus* Baill	Euphorbiaceae	—	Leaves control blood pressure
16.	*Cissampelos pareira* L.	Menispermaceae	Batrarr	A rhizome decoction and pounded leaves are externally applied as a febrifuge and stomachic, cough and snake bite
17.	*Carissa opaca* Staplf ex. Haines	Apocynaceae	Grunda	Fruit is edible and blood purifier
18.	*Cassia fistula* L.	Caesalpiniaceae	Amaltas	The root helps in reliving the symptoms of fever, asthma, leprosy and heart related diseases

	Botanical name	Family	Common name	Traditional uses
19.	*Chenopodium album* L.	Chenopodiaceae	Bathwa	This plant is laxative
20.	*Cissus carnosa* (L.) Lamk	Vitaceae	Dakh	Fruit is good for abdominal diseases
21.	*Calotropis procera*	Asclepiadaceae	Desi akk	Plant extract is applied on dog bite. Latex is used for skin diseases and ring worm.
22.	*Cannabis sativa* L. (Ait.)	Cannabinaceae	Bhang	Root is used for liver disorders. Leaves and flowers are analgesic, sedative, narcotic, laxative and aphrodisiac.
23.	*Cascuta reflexa* Roxb	Cuscutaceae	Neel Dhari	Its infusion is anti-lice. It is also used in skin diseases and weaknesses of children.
24.	*Chenopodium album* L.	Chenopodiaceae	Bathwa	Leaves are anthelmintic and laxative
25.	*Convolvulus arvensis* L.	Convolvulaceae	Rawari	Root is diuretic and purgative
26.	*Diplocyclos palmatus* (L.) C. Jeffery	Cucurbitaceae		Plant is used for skin diseases and cough
27.	*Dodonea viscosa* (L.) Jacq.	Sapindaceae	Sanatha	Decoction of wood is used as febrifuge and skin diseases
28.	*Dalbergia sissoo* Roxb.	Papilionaceae	Tali	Branches kill worms in sthe teeth
29.	*Eugenia jambolana* Lam.	Myrtaceae	Jaman	It is used for the treatment of cancer
30.	*Fumaria indica* (Hausskn.)Pugsley	Fumariaceae	Papra	Its infusion is used as diaphoretic, blood purifier and antipyretic
31.	*Ficus palmate* Forssk	Moraceae	Phugwara	Fruit is laxative, soothes bee sting
32.	*Gymnosporia royleana* (Wall.ex Lawson) Cuf	Celastraceae		It is used for treatment of cough, asthma, tonic and abdominal pain
33.	*Galium aparine* L.	Rubiaceae	Lahndara	Plant extract is diuretic
34.	*Hedera nepalensis* K.Koch.	Araliaceae		Leaves are used for treatment of diabetes
35.	*Justicia adhatoda* L.	Acanthaceae	Bhakar	It is used to treat colds, coughs, asthma, fevers, skin infections and inflammations
36.	*Juglans regia* L.	Juglandaceae	Khor	Root and leaves are antiseptic. Fruit is aphrodisiac, remove stones in gall bladder
37.	*Malva parviflora* L.	Malvaceae	Sonchul	Leaves extract is anthelmintic

	Botanical name	Family	Common name	Traditional uses
38.	*Mallotus philippinensis* (Lam.) Muell.	Euphorbiaceae	Kamella	Fruit is purgative and anthelmintic
39.	*Medicago polymorpha* L.	Papilionaceae	Sriri	Leaves are helpful in digestive disorders
40.	*Melia azadarach* (L.)	Meliaceae	Draik	Leaves and fruit are blood purifier, antipyretic and antidiabetic
41.	*Malvastrum Coromandelianum* (L.) Garcke	Malvaceae		Leaves paste relieve pain. Flowers are diaphoretic
42.	*Morus nigra* L.	Moraceae	Kala Toot	Fruit is tonic and used for throat irritation and cough
43.	*Mentha longifolia* Benth	Lamiaceae	Jangli podina	Leaves are carminative and stimulant. Leaves are antispasmodic
44.	*Nasturtium officinale* R.Br.	Brassicaceae	Chooch	The leaves and stem are used for internal tumors, scurvy and anemia
45.	*Nerium indicum* L.	Apocynaceae	Gandeera	Leaves decoction is applied on skin diseases
46.	*Oxalis corniculata* L.	Oxalidaceae	Khati Buti	Leaves decoction is used in dysentery and fever
47.	*Plantago lanceolata* L.	Plantaginaceae		Leaf extract is applied to wounds, sores and bruises; seeds are purgative
48.	*Pinus roxburghii* Sargent	Pinaceae	Cheer	Resin is used for bleeding wounds and tumors and cough. Leaves and bark powder is useful for dysentery
49.	*Papaver dubium* L.	Papaveraceae	Jangli post	Its infusion is blood purifier, antipyretic, and diaphoretic
50.	*Periploca aphylla* Decne	Asclepidiaceae	Bata	It is used for treatment of swellings and tumors
51.	*Rumex dentatus* L.	Polygonaceae	Herfli	Leaves are astringent and diuretic
52.	*Rhamnus triquetra* (Wall.) Brandis	Rhamnaceae	Clader	Fruit and leaves are used in hemorrhagic septicemia
53.	*Ranunculus muricatus* L.	Ranunculaceae	Kor-Kandoli	Fruits and leaves are useful on bursts and tumor

Table 1.
Important medicinal plant species with traditional uses in Azad Jammu and Kashmir.

and *Zanthoxylum armatum* are critically endangered. Among endangered species, *Juglans regia, Olean ferruginaea, Phyllanthus emblica, Viola canescens* are the notable species. Some medicinal plants like *G. wallichianum, J. dolomiaea, A. bracteosa,*

	Scientific name	Family	Common name	Ethno veterinary practices	Ailments
1.	*Amaranthus viridis* L.	Amaranthaceae	Safed kannar	Decoctions	Malaria
2.	*Arisaema flavum* (Forssk.) Schoot	Araceae	Toosh	Infusion	Mouth and foot disease of cattle
3.	*Arisaema jacquemontii* Blume	Araceae	Tooshganda	As whole plant	Inflammation, cholera, dysentery, flu, dyspepsia and snake bite
4.	*Senecio chrysanthemoides* DC.	Asteraceae	Bghoo	Decoction	Antiscorbutic, anthelmintic, and diaphoretic
5.	*Lactuca brunoniana* (DC.) Wall. ex C.B. Clarke	Asteraceae	Korijari	The whole plant	Pinworms
6.	*Aesculus indica* (Wall. ex Cambess.) Hook.	Sapindaceae	Bankhorr	Decoction/dried plant powder is mixed with gurr and flour	Indigestion and constipation
7.	*Melia azedarach* L.	Meliaceae	Drek	Powder	Anthelmintic
8.	*Ficus palmata* Forssk.	Moraceae	Pagaaar	Whole	Anorexia
9.	*Bergenia ciliata* (Haw.) Sternb.	Saxifragaceae	Butpeewa	Powder	Stomachic and intestinal troubles
10.	*Fagopyrum acutatum* (Lehm.) Mansf. ex K.	Polygonaceae	Khattra	As fodder	Antimicrobial, bactericidal and diuretic
11.	*Primula denticulata* Sm.	Primulaceae	Chiatpatra	Decoction	Dysuria, hepatic fever and hemoglobinuria
12.	*Sorbaria sorbifolia* (L.) A. Braun	Rosaceae	Karleee	As fodder	Stimulant

Table 2.
Ethno-veterinary practices of important plants in Azad Jammu and Kashmir.

B. amplexicaule, S. lappa, A. heterophyllum, and *B. lyceum* are on the edge of extinction due to high rate of intake [25].

7. Wild mushrooms

Morel collection is an important activity during spring season and villagers take keen interest in collection of morels as it provides them a source of income. Mushroom flora and species diversity as important component of the natural environment in Azad Jammu and Kashmir. Wild mushrooms are sources of edible proteins, dietary fiber, essential amino acids, carbohydrates, and are an important

source of food, livelihood, and traditional ethnobotanical health care. Kashmir region is rich with unknown macro fungal wealth. Among total morel population of Pakistan, 90% was reported from the Himalayan mountain ranges of Northern Pakistan. Wild edible fungi dominate the global morel trade, with an estimated value of more than US$2 billion. Ullah et al. [26] reported 56 wild edible mushrooms in Pakistan, of which 44 are from the Kashmir region. Important species include *Agaricus campestris, Hydnum imbricatum, Sparassis crispa, Morchella esculenta, M. crassipes, M. elata, M. conica, Pleurotus ostreatus, Lycoperdon gemmatum, Helvella crispa, Tricholoma megnivelare* and *Gyrometra esculenta*. The local communities of valley well recognize the habitats, morphological features, and qualities of these mushrooms. Ethno mycological data were collected through the use of a questionnaire and found that these species have great medicinal value against different ailments. Four species (*A. campestris, H. imbricatum, P. ostreatus*, and *S. crispa*) are highly recommended for their frequent use as food based on nutritional analysis (proteins, fats, fiber, and moisture). The major identified species from AJK are *Agaricus arvensi, Amanita vaginata, A. fulva, Cantharellus cinereus, Coprinus micaceus, C. comatus, C. domesticus, Cycoperdon perlatum, Daedalea quercina, Helvella crispa, Hygrophuorus melizeus, Lepista nuda, Lactarius turpis, Marasmius alliaceus, Panaeolus campanulatus, Pleurotus ostreatus, Trametes versicolor,* and *Tricholoma ustaloides.*

Although Azad Jammu and Kashmir (AJK) have ample of medicinal plants to treat broad spectrum of ailments, there are many factors which are contributing for loss of ethnic flora e.g. over grazing, over exploitation, fire, deforestation etc. Lack of concern in the present generation has wiped out many rich wild flora of the area. It is necessary to create awareness about the usefulness of the flora. Cultivation of threatened medicinal plants should be encouraged by the local community in order to relieve pressure on wild plants. People should spread useful information on conservation and sustainable use of the natural resources of the area. There must be correct documentation, conservation of plants samples in herbarium of research institutes, and growing plants in gardens.

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