

**ETHNOBOTANICAL AND ETHNOVETERINARY IMPORTANCE OF PLANTS OF SCRUB AREAS OF DACHIGAM NATIONAL PARK, JAMMU AND KASHMIR, INDIA**ARIF YAQOOB MALIK<sup>1\*</sup>, D.P SINGH<sup>1</sup><sup>1</sup>Department of Environmental Science BBA, Central University, Lucknow, Uttar Pradesh, India. Email: arifmalikenv@gmail.com

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**ABSTRACT**

**Objective:** The rich plant diversity of mountains has been used by the indigenous people for thousands of years as health-care remedies. A study on the important plant communities of scrub ecosystems of Dachigam National Park was carried out with the special aim of enlisting the ethnobotanical, and ethnoveterinary uses of plants being used by the people of the area.

**Methods:** Data were collected by visual appraisal approach, rapid rural approach, and questionnaire methods coupled with group meetings and field discussions.

**Results:** Data collected from the present investigation indicate that 59 plants belonging to 33 families with Rosaceae, the dominant family, were exclusively used for ethnobotanical purposes and 10 plant species belonging to 8 families were having ethnoveterinary use. These species include 14 medicinal species, 10 vegetable species, 10 with edible species, 6 fodder species, 6 species used as tea substitutes, 3 species for menstrual problems, 3 species used for religious ceremonies, 2 species used for chutney, 2 art and craft species, and 1 species used for ornamental, fuelwood, and agricultural tools each.

**Conclusion:** The people of the area are exclusively dependent on medicinal plants using traditional knowledge that provides them with the best therapeutic and economic benefits. Such traditional knowledge could be valuable for developing local and regional conservation strategies for these fragile ecosystems. There is an urgent need to thoroughly analyze the secondary metabolite properties of such plants to validate their authenticity in the local health-care systems.

**Keywords:** Ethnobotany, Ethnoveterinary, Diversity, Traditional knowledge, Open scrub.

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**INTRODUCTION**

Traditional knowledge is a cultural asset which can be used for the recognition and preservation of valuable species as well as habitats in long-term management [1,2]. Ethnobotany is one of the precious cultural heritages of an area that involves the interaction between plants and people and foremost among these are the traditional use of medicinal plants and sustainable management of plant biodiversity by these indigenous communities [1]. The recent gradual shift to natural medicine worldwide has also highlighted the importance of compiling information about medicinal plant species used by ethnic and indigenous communities [3,4]. A plant that possesses therapeutic properties naturally synthesizes and accumulates some secondary metabolites such as alkaloids, glycosides, volatile oils, vitamins, and minerals in different body parts such as leaves, fruits, seeds, and rhizome [5,6] and possesses a special importance in these mountain ecosystems [7]. These plants play a significant role in providing health care and improving the economy of the country [8].

As increased market demand for herbal medicine and recent controversies regarding biopiracy, such documentation and compilation of ethnoecological knowledge are of top priority [9,10]. Moreover, integrating traditional knowledge is gaining importance in many parts of the world [11] and people having long-term associations with vegetation can provide a valuable observation [12] for conservation and management plans for vegetation of these ecosystems that give food security to indigenous as well as people of low lands [13,14]. Apart from plants being social and ecological indicators when employed together with traditional knowledge can play a significant role in conservation strategy designing [15]. Ethnoecological knowledge if supplemented with the latest scientific insights can provide new dimensions of

sustainable development that environmentally, economically, and socially acceptable and effective tools against the scenario of climate change and economic instability [16].

Since not many studies have been carried out to document the ethnobotanical uses of plants growing in the Kashmir Himalaya [17,18] especially on scrub ecosystems, so the current study was undertaken to prepare an ethnobotanical inventory of the plant resources of the study area that will prove to be beneficial for both traditional communities and for sustainable utilization of biodiversity.

**METHODS****Study area**

Dachigam National Park is located within the heart of Kashmir Himalaya located at the North West tip of the Himalayan biodiversity hotspot. The study was carried out from January to December 2014.

**Ethnobotanical survey**

Regular trips were made on a monthly basis throughout the year in different altitudinal zones using visual appraisal approach, rapid rural appraisal, and questionnaire to compile information about different aspects of plants such as local name, local uses, part used, method of collection, collection time, mode of administration, curative properties, and method of preparation. In general, the respondents were elderly people especially women, local vaid and herbal healers in the neighborhood of the study area. About 150 households and 51 vaid and herbal healers were interviewed, and the information was documented through a questionnaire. In addition, the pastoralists migrating to the area during summer for grazing were also contacted and interviewed about the plant resources they use during their stay in the area.

## RESULTS AND DISCUSSION

The scrub area is a rich abode of medicinal plants which are decreasing day by day due to increasing biotic pressures such as deforestation, grazing, unregulated collection, and overexploitation by pastoralists. Although the thorny and prickly species are resistant to grazing pressures, rest of the herbs are sensitive to it. Species such as *Berberis lyceum* and *Artemisia scoparia* were present in most of the areas while as *Podophyllum hexandrum*, *Iris hookeriana*, *Bergenia ciliata*, *Sassurea lappa*, and *Dioscorea deltoids* were reported a few places of the study area with *Dryopteris balanfordii* and *Adiantum capillus-veneris* being restricted to moist locations.

The study revealed that the scrub ecosystem harbors a diverse plant wealth valuable for ethnoecological knowledge (Tables 1 and 2). The present investigation reveals that 59 species (including 14 medicinal species, 10 vegetable species, 10 with edible species, 6 fodder species, 6 species used as tea substitutes, 3 species for menstrual problems, 3 species used for religious ceremonies, 2 species used for chutney, 2 art and craft species, and 1 species used for ornamental, fuelwood, and agricultural tools each) belonging to 33 families are exclusively being used by locals for ethnobotanical purposes while as 10 species belonging to 8 families are used for treating livestock ailments. Most of the species are having more than one local use. Our study confirms that the scrub vegetation offers valuable ecosystem services to ethnic groups of the region. The questionnaire and RAA analyses indicate that the inhabitants of Kashmir Himalaya possess prized knowledge about the local plant biodiversity and the services that it provides are significantly important to them. The plant species are utilized by the ethnic groups as per their traditional knowledge. Different plant parts such as leaves, roots, seeds, flowers, and rhizome are used to cure common human ailments while a few others are either used to treat livestock diseases or used as cosmetic substitutes [19]. The absence of market, poverty and climatic constraints make the ethnic groups chiefly

dependent on many different species to supplement their diet in terms of vegetables and wild edibles [20].

Among the species the edible fruits of *B. lyceum*, *Elaeagnus* spp., *Fragaria nubicola*, *Prunus prostrata*, *Rosa webbiana*, *Rubus fruticosus*, *Rubus ellipticus*, *Viburnum grandiflorum*, and *Ziziphus jajuba* are eaten especially by the young children who provide a continuous supply of essential minerals and nutrients to them. For species such as *Taraxicum officinale*, *Malva neglecta*, *Rumex acetosa*, *Polygonum plebeum*, *Oxalis corniculata*, and *Plantago major*, fresh and tender leaves are collected washed and cooked as vegetables and for others such as *Dipsacus inermis* and *R. webbiana* the leaves are dried and are cooked as vegetables. While in few species such as *Hypericum perforatum* and *Sibbaldia cuneata* leaves are used and for *Viola odorata* and *Viola betanosifolia* flowers are used for preparing local tea. Similarly, *Thymus linearis* is used to add flavors to various dishes and for preparation of Achar a local pickle. The utilization of these wild species for consumption by these communities clearly indicates the dependence of their food habits on wild species. Species such as *D. deltoids*, *Verbascum thapsus*, *Plectranthus rugosa*, *Ajuga parviflora*, and *Geranium wallichianum* are also used in case of livestock to treat different troubles such as open wounds, indigestion, gas bowels, throat infection, swelling, and inflammation of hooves and *Silene vulgare* is used to improve milk production in cows while *Asparagus filicinus* is used to ensure easy delivery in cattle and sheep.

As most of the herb species are sensitive to grazing and harvesting; their existence in the community may provide a significant indication of the presence of other keystone species such as thorny and prickly shrub species that provide (nurse effect) conducive habitat for such herbs [21]. Plants provide food, fodder, fiber, medicines, etc., and these global resources are used ruthlessly especially in Kashmir Himalaya where the quality, as well as quantity of such resources, is deteriorating more rapidly [22].

Table 1: Ethnobotanical uses of plants

Species	Local name	Family	Part used	Name of the disease/other medicinal importance
<i>Adiantum capillus veneris</i>	Gew theer	Pteridaceae	Leaves	Leaves are boiled in water with sugar and the decoction is used for the treatment of prolonged asthma and chest congestion
<i>Artemisia absinthium</i>	Tethwen	Asteraceae	Shoot	Extract from shoot mixed with water taken orally to treat uneven menstrual cycles
<i>Artemisia maritiama</i>	Tethwen	Asteraceae	Leaves	Leaf extract is used as a digestive tonic and in treating intermittent fever
<i>Achillia millefolium</i>	Berguer	Asteraceae	Leaves	Leaf extract is used to treat pain, inflammation and gastrointestinal disorders and extract mixed with oats flour is used to treat snake bites
<i>Androsac rotundifolia</i>	Uzm posh	Primulaceae	Twigs Roots	Paste made from tender twigs is used to treat stomach ache and pertussis. Infusion of the root is used to treat eye poisoning
<i>Berberis Aristata</i>	Dandleder	Berberidaceae	Bark Roots	Roots used in piles. Fruit juice is used to relieve toothache. Powdered bark is used to treat wounds
<i>Cotoneaster ramicifolia</i>	Luhni	Rosaceae	Whole plant	Fuel/Art and craft, Bark paste is used to treat mild fractures
<i>Capsella bursa pastrolis</i>	Kralmond	Brassicaceae	Tender leaves	Leaves are cooked and taken as a vegetable
<i>Crategus songarica</i>	Reng Kul	Capridaceae	Fruits	Fruits used to prepare jams and jellies; fruit extract is used to treat hypertension
<i>Cuscuta europea</i>	Kukli Port	Cuscutaceae	Stem	Decoction of stem is used to treat hair fall and swelling of testicles
<i>Colchicum leuteum</i>	Janglikong	Lilliaceae	Bulbs	Powder of the ground corms mixed with ghee is used to treat inflammation, and joint pain, stigma of flowers is used as a dye in local tea-kehwa
<i>Cynoglossum glochidatum</i>	Cherun	Boraginaceae	Seeds	Seeds are taken to treat impotency and infertility
<i>Dipsacus inermis</i>	Wopalhawk	Dipsacaceae	Leaves	Leaf extract is used by women for bathing after delivery
<i>Dioscorea deltoids</i>	Krees	Dioscoreaceae	Rhizome	Dried rhizome is taken orally to treat snake bites and mixed with milk to treat menstrual cramps. It yields diosgenin - used as a herbal contraceptive
<i>Erodium cicutarium</i>	Gardyan	Euphorbiaceae	Whole plant	Whole plant is used as a uterine sedative
<i>Fragaria nubicola</i>	Budmewa	Rosaceae	Fruits Rhizome	Fruits are eaten when ripe. Tea made from rhizome is used by women to improve lactation
<i>Galium aparine</i>	Thapheh gass	Rubiaceae	Seeds	Seeds are grinded and used to make coffee

(Contd...)

Table 1: (Continued)

Species	Local name	Family	Part used	Name of the disease/other medicinal importance
<i>Geranium wallichianum</i>	NA	Geraniaceae	Rhizome	Rhizomes are powdered and mixed with sugar and prepared in ghee, and the preparation is given as tonic for backache
<i>Hypericum perforatum</i>	Chai Kul	Hypericaceae	Leaves	Extract mixed with olive oil is used to treat wounds and ulcers
<i>Indigofera heterantha</i>	Kats	Papilionaceae	Stem	Art and craft, branches used to make broom. Powdered roots taken orally to treat headache
<i>Iris hookriana</i>	Besal	Iridaceae	Rhizome	Rhizome powder is mixed with milk to treat constipation and flower decoction is considered to have antioxidant property
<i>Juniperus communis</i>	Wethur	Juniperaceae	Whole plant	Fuelwood, fruit helps in digestion and relieves gas
<i>Jasminum humile</i>	Chamayli	Oleaceae	Shoot	Ornamental, extracts from flowers is used as a mouth freshener
<i>Jurinea ceratocarpa</i>	Gogaldhup	Asteraceae	Leaves	Religious ceremonies, Spiritual therapies
<i>Lavatera kashmiriana</i>	Sozposh	Malvaceae	Flowers	Dried flower powder is mixed with milk and used for the treatment of mumps in children
<i>Lonicera quinquelocularis</i>	Pakhur	Caprifoliaceae	Leaves, branches	Fodder, earlier branches were used to make arrow shafts
<i>Malva neglecta</i>	Sonchal	Malvaceae	Shoot	Leaves and young shoots are cooked as vegetable, leaf extract used as a nerve tonic
<i>Marubium vulgare</i>		Lamiaceae	Leaves	Leaf extract is used as an eye drop, to treat ophthalmic infections
<i>Nasturtium officinale</i>	Kulhaak	Brassicaceae	Young leaves	Leaves are cooked and taken as vegetables and used in salad, leaf juice used in stomach ulcers
<i>Oxalis corniculata</i>	Choak chin	Oxalidaceae	Whole plant	Extract from leaves is mixed with sugar and used in jaundice, juice used for making cheese
<i>Parrotiopsis jacquemontiana</i>	Poh	Hamamelidaceae	Whole plant	Stem used for making handles of plough, axes, sickle, and saw
<i>Polygonum plebeum</i>	Drouba	Polygonaceae	Leaves	Young leaves are cooked and used as a vegetable
<i>Polygonum alpinum</i>	NA	Polygonaceae	Above ground parts	Tender leaves and stem are cooked after washing with hot water
<i>Poa bulbosa</i>	NA	Poaceae	Shoot	Fodder
<i>Podophyllum hexandrum</i>	Wanwangun	Podophyllaceae	Fruits	Fruits are eaten, Rhizome is used in the treatment of cancer
<i>Prunella vulgaris</i>	Kalveoth	Lamiaceae	Flowers	Religious ceremonies, Spiritual therapies
<i>Prunus prostrata</i>	Gurdaal	Rosaceae	Fruits	Fruits are a rich source of vitamins
<i>Plectranthus rugosa</i>	NA	Lamiaceae	Whole plant	fuelwood, antiseptic, anti-inflammatory, used in jaundice
<i>Plantago major</i>	Gulla	Plantaginaceae	Leaves	Tender leaves are cooked as vegetables, leave infusion used to reduce excessive bleeding during periods
<i>Rheum webbianum</i>	Pambhaak	Polygonaceae	Leaves	Tender leaves are used in chutney and salad and stalks are cooked and used as vegetable, Rhizome is used to treat burned skin
<i>Rhododendron anthopogon</i>	Vethur	Ericaceae	Leaves	Leaves are sometimes used for making tea
<i>Rumex acetosella</i>	Obj	Polygonaceae	Young leaves and stem	Washed with hot water to remove sour taste and then cooked like spinach and taken as a vegetable. Leaves used in chutney
<i>Rumex patienta</i>	Jangli Obuj	Polygonaceae	Leaves	Occasionally it is an ingredient of Chutney
<i>Rosa webbiana</i>	Jangli gulab	Rosaceae	Fruits	Fruits are eaten rarely
<i>Rubus fruticosus</i>	Akhray	Rosaceae	Shoot	Leaf infusion is used to stop diarrhea. Fruits are eaten to improve digestion power
<i>Rubus ellipticus</i>	Allaj	Rosaceae	Whole plant	Fruits are edible, plant used for hedges and fences
<i>Salvia moorcraftiana</i>	Shollari	Lamiaceae	Leaves	Leaves are warmed with oil and applied on swollen areas to release pus, honey bee plant
<i>Setaria viridis</i>	Gumen	Poaceae	Shoot	Fresh and dried fodder
<i>Sibbaldia cunneata</i>	NA	Rosaceae	Leaves	Juice of the leaves is used for making tea rarely
<i>Sorborea tomentosa</i>	NA	Rosaceae	Flower	Inflorescence is mixed with mustard oil and applied on skin to remove rashes
<i>Taraxicum officinale</i>	Handh	Asteraceae	Leaves	Flowers are boiled and mixed with honey to treat cough, special diet for ladies who have given birth
<i>Trifolium pretense</i>	Batak Neur	Papilionaceae	Leaves	Fodder, leaves are rarely cooked as vegetables
<i>Trifolium repens</i>	Batak Neur	Papilionaceae	Shoot	Fodder, dried flowers, and seeds are used to treat cough and cold
<i>Thymus linearis</i>	Jaind	Lamiaceae	Whole plant	Used as a spice in pickle, flowers used to make tea, decoction of leaves used to suppress urine
<i>Verbascum Thapsus</i>	Tamokh	Plantaginaceae	Leaves	Inflorescence is used as tobacco and leaves are used to make bedi - a local cigarette
<i>Viburnum grandiflorum</i>	Kulmauch	Caprifoliaceae	Leaves and fruits	Fodder, fruits are edible
<i>Viola betanosifolia</i>	Namposh	Violaceae	Flowers	Flowers soup is used as a substitute for tea
<i>Viola biflora</i>	Bunafsha	Violaceae	Flowers	Its soup is used as a substitute for tea, used in the making jam for treatment of fever, cough, and cold
<i>Ziziphus jujuba</i>	Brai	Rhamnaceae	Berries	Dried fruits are used as blood purifier; seed decoction is used to treat jaundice

Where, NA: Not available

Table 2: Ethno-veterinary uses of plants

Species	Local name	Family	Part used	Medicinal uses
<i>Ajuga bracteosa</i>	Jane-adam	Lamiaceae	Aerial parts	Decoction of leaves is used to stop diarrhea. Powdered form of leaves added with oil is used to treat wounds and swelling
<i>Asparagus filicinus</i>	Halyun	Liliaceae	Seeds	Water extract with a pinch of sugar is given as infusion for easy delivery in cattle and goat
<i>Bergenia ciliata</i>	Zakhm-i-Heyat	Saxifragaceae	Whole plant	Leaf juice is used against an earache. Roots chewed and used to clean eyes of livestock
<i>Geranium wallichianum</i>	Ratan jog	Geraniaceae	Rhizomes leaves	Rhizome extract boiled in water and flour, cooked in ghee is used to treat inflammation of hooves. Leaves used to cure Diarrhea
<i>Plantago lanceolata</i>	Gull	Plantaginaceae	Leaves	Leaves rubbed to skin sting by insects. Fresh leaves are tightly tied with the muslin cloth to treat fractured bones in sheep
<i>Plectranthus rugosa</i>	Solie	Lamiaceae	Leaves	Dried leaves are given with fodder to treat throat infections in goats. Leaf extract used to treat snake bites
<i>Silene vulgare</i>	Takla	Caryophyllaceae	Rhizomes	Powder of dried rhizome mixed with wheat flour and water is served to cows for increasing milk production
<i>Taraxacum officinale</i>	Hund	Asteraceae	Aerial parts	Extracts from leaves boiled in water are given to cows and goats after delivery to get rid from general weakness
<i>Thymus linearis</i>	Ajwain	Lamiaceae	Seeds Leaves	Ripe seeds mixed with gour and flour are served to cattle to treat common cold and throat infection. Leaves as blood purifier
<i>Verbascum Thapsus</i>	Jangli tamookh	Scrophulariaceae	Above ground parts	The decoction prepared from the aerial parts boiled in water is mixed with fodder and served to cows and sheep to cure indigestion and food poisoning. Flower paste applied on burns

Where, NA: Not available

Besides poverty, ignorance, unemployment, lack of awareness; human interferences have exerted enormous stresses on vegetation and caused environmental degradation [23]. Due to their economic and medicinal valuability, these plant species are ruthlessly being collected that has threatened the survival of certain plant species such as *P. hexandrum* and *S. lappa* which are endangered while as *I. hookriana*, *Rheum webbianum*, etc., are threatened species. Among medicinal plants *Bergenia ciliata*, *P. hexandrum*, *D. deltoids*, and *R. webbianum* were once widely used, but now they are restricted in occurrence due to overexploitation for their unique medicinal properties [24].

There is a lack of proper management structure for sustainable collection and utilization of medicinal plants which has put the regeneration potential of these plants at risk and ultimately not only the conservation status of many plants is under threat but also the livelihood of thousands of indigenous people who depend on gathering and sale of medicinal plants [25-29]. Moreover, there is an evidence of declining use of such plants due to loss of interest among young and adult ones and as a result the wealth of knowledge possessed by the older members is hard to transfer among the young minds of these communities which ultimately will lead to fading away of indigenous knowledge associated with these plants [29].

## CONCLUSION

The present protocol was used as a technique to form a base for making useful recommendations to both public and private sectors for rising an awareness at local and country level with an urge to conserve such unique ecosystems. The study concluded that locals are highly dependent on medicinal plants but many plants need to be clinically tested for their secondary metabolites and additional investigation on the ethnobotanical studies of the plants will strive to elucidate specific uses, mode of preparation, and administration for future economic and cultural uses. Further, the intensity and acquisition of such knowledge are fading away among youth due to their changed lifestyle and reliance on chemical medicines. Documentation of such prized knowledge could be useful to formulate popular conservation technique-ethno conservation.

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## AUTHORS' CONTRIBUTIONS

Arif Yaqoob designed the study, performed the field survey, collected the data and plant species, and contributed in manuscript write up. DP Singh supervised the project, analyzed the data and provided the field equipment and technical support. All authors read and approved the final manuscript.

## CONFLICTS OF INTEREST

The authors have decided that they do not have any conflicts of interest.

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