

Original Paper

Ethnobotanical Aspects of Plant Diversity Along Kol Dam Water Reservoir In Himachal Pradesh, India

Romita Devi

Department of Bio Sciences, MLSM College Sundernagar, District Mandi, Himachal Pradesh

E-mail: romitasharma10@gmail.com

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Abstract: Ethnoflora used by the indigenous people in Himachal Pradesh. It is a well-known fact that Himachal Pradesh is a treasure house of traditional knowledge and biodiversity, ethnobotanical aspects of Kol Dam water reservoir area in the state have not yet been explored. An attempt has, therefore, been made presently to study the traditional uses of plant diversity along the Kol Dam water reservoir in the region of district Bilaspur of Himachal Pradesh. Findings delineate the use of 1 bryophyte, 2 pteridophytes, 1 gymnosperm and 64 angiosperms. Out of which 51 are dicots and the remaining taxa are monocots. Out of these, plants like *Abrus precatorius* L., *Acorus calamus* L., *Ajuga bracteosa* Wall. ex Benth., *Artemisia indica* Waldst. & Kit., *Bacopa monnieri* (L.) Pennell, *Bauhinia vahlii* Wight & Arn., *Cannabis sativa* L., *Centella asiatica* L., *Cissampelos pareira* L., *Cuscuta reflexa* Roxb., *Datura stramonium* L., *Euphorbia hirta* L., *Ficus religiosa* L., *Gloriosa superba* L., *Hedera helix* Clarke, *Ipomoea carnea* Facq., *Urtica dioica* L., and *Vitex negundo* L. are predominantly employed for various purposes such as edible (source of food), fodder, fish food and in treatment of various diseases by the local communities.

Keywords: Ethnobotany, Traditional knowledge, Wetland, Kol Dam water reservoir, Plant diversity

Introduction

Himachal Pradesh, the land of 'Rishies' and 'Munies', having a geographical extent of 55,673 sq kms ranging from 244-6,750 m elevation under the lesser Himalayas. State is well known for its rich natural resources and biodiversity. However, information pertaining to documentation of indigenous knowledge and practices relating to utilization of the plant species of the state is very meagre (Cook, 1996, Srivastava, 2003a, b; Seth, 2006); and an attempt has therefore been made to fill this gap in our understanding. Extensive anthropogenic interventions on natural ecosystems in recent times have been resulting in loss of biodiversity. Due to the formation of Kol Dam Lake big wetland area is formed. The area is rich with ethnobotanical and ethnomedicinal plants species (Awasthi *et al.* 1999, Samant *et al.* 2007). The study highlighted that ethnomedicinal plant species are used to manage human diseases

and associated traditional knowledge in Kol Dam Lake region. The study highlighted that ethnomedicinal plant species are under threat due to many factors. There is urgent need for their conservation and sustainable utilization. The focus of the study to document the richness and diversity of ethnoflora and conservation for the protection of ethnoflora of the region.

Study Area: The Kol dam, Hydropower station situated in the Shivalik hills of Bilaspur district of Himachal Pradesh, India. It is a manmade reservoir on the river Sutlej. The reservoir created by the dam hold 560 million cubic meters of water and form a lake and has natural aquatic beauty. It encompasses an area in the district with lush green mountains adding greatly to its beauty. Many villages along the reservoir ethnobotanical diversity and wetland plants employed for various purposes by rural inhabitants of villagers near Kol Dam reservoir. Some of the villages travelled for the collection of data are Jamthal, Chamyon, Kothi, Kasol, Kangoo, Sunni and Mundkhar.

Data Collection: For documenting information relating to ethnobotanical aspects, the data has been collected from the elders and knowledgeable persons inhabiting different villages along The Kol dam as per the methodology outlined by Jain (1987). Herbarium sheets of the plants were made as per the known herborizing practices outlined by Jain & Rao (1977). Botanical identification of the collected species was done with the help of regional floras and research papers (Chauhan, 1999; Chowdhery & Wadhwa, 1984; Collett, 1902; Dhiman, 1976, Gaur 1999, Naithani 1984-1985, Polunin & Stainton, 1984; Stainton, 1988).

Table 1: Ethnobotanical Uses of Wetland Plants of Kol Dam Reservoir, Bilaspur (H.P.)

Taxa	Family	Local Name	Parts Used	Ethnobotanical uses	Method of uses
<i>Abrus precatorius</i> L.	Fabaceae	Raten	Root, Leaf, Seed	Medicinal	Decoction of leaf is taken orally to cure stomach pain. Root extract is used to cure joint pain.
<i>Achyranthes aspera</i> L.	Amaranthaceae	Puthkanda	Whole plant	Medicinal	Root and leaf paste is used to cure ring worm and insect bite.
<i>Achyranthes bidentata</i> Bl.	Amaranthaceae	Golda	Whole Plant	Medicinal	Paste of leaf applied on skin problems.
<i>Acorus calamus</i> L.	Araceae	Barae	Whole Plant	Medicinal	Decoction of plant is used to cure stomachache.
<i>Aconitum heterophyllum</i> Wall. ex. Royle	Ranunculaceae	Ateesh	Root	Medicinal	Paste of dried root used for the treatment of fever and headache.
<i>Aegle marmelos</i> (L.) Correa	Rutaceae	Bil	Fruit, Leaf, Bark	Medicinal, Wild edible, Religious	Fruit juice taken to treat fever and cold.
<i>Agave americana</i> L.	Agavaceae	Ramban	Leaf	Fish poison	Leaf is used to catch fish.
<i>Ageratum conyzoides</i> L.	Asteraceae	Ukal Booty	Leaf, Stem	Medicinal	Decoction is used to kill worm.

<i>Ajuga bracteosa</i> Wall. ex Benth.	Lamiaceae	Neelkanthi	Leaf	Medicinal	Extract of leaves is taken orally in gastric troubles.
<i>Ajuga parviflora</i> Benth.	Lamiaceae	Neelkanthi	Whole plant	Medicinal	Leaf extract is used in diabetes and indigestion.
<i>Albizia lebbek</i> (L.) Benth.	Fabaceae	Siris	Leaf, Stem	Fodder, Fuel, Timber	Leaf used as fodder and stem used as timber.
<i>Amaranthus viridis</i> L.	Amaranthaceae	Cholai	Leaf, Stem	Medicinal	Decoction of plant is used to cure fever
<i>Argemone mexicana</i> L.	Papaveraceae	Chooly	Leaf	Medicinal	Paste of leaves used to cure skin problems
<i>Artemisia indica</i> Waldst. & Kit.	Asteraceae	Charmaar	Leaf	Medicinal	Decoction is used orally and leaf paste is used externally to cure skin problems
<i>Azadirachta indica</i> A. Juss.	Meliaceae	Neem	Stem, Leaf Flower	Medicinal	Raw leaves and stem used to cure mouth problems.
<i>Bacopa monnieri</i> (L.) Pennell	Scrophulariaceae	Jalnema	Whole plant	Medicinal	Paste is used to cure headache.
<i>Barleria cristata</i> L.	Acanthaceae	Morni	Leaf, Stem	Fodder	Used as fodder.
<i>Bauhinia vahlii</i> Wight & Arn.	Fabaceae	Torr	Leaf	Fodder	Used to form green plates(patals) and katories(dunu) and as fodder
<i>Bauhinia variegata</i> L.	Fabaceae	Karyala	Flower, Leaf, Stem	Medicinal, Fodder, Timber, Wild edible	Flower decoction used to cure stomachache ulcer. Leaf used as fodder and stem as timber to made furniture.
<i>Berberis aristata</i> DC.	Berberidaceae	Kasmal	Root, Bark	Wild edible	Root decoction made in water used to cure eye infection.
<i>Boehmeria platyphylla</i> D. Don	Urticaceae	Khagsa	Whole plant	Fodder	Used as fodder for animals.
<i>Boerhaavia diffusa</i> L.	Nyctaginaceae	Punernava	Whole plant	Medicinal	Stem paste is used on wound and cuts. Decoction is used orally.
<i>Bombax ceiba</i> L.	Bombacaceae	Simbal	Bark, Leaf	Wild edible	Decoction of leaves and bark taken orally to treat diarrhea.
<i>Calotropis procera</i> (Aiton) Dryand	Asclepiadaceae	Aak	Leaf	Medicinal, Fuel	Warm leaf with turmeric paste tied on joints to cure pain.
<i>Cannabis sativa</i> L.	Cannabinaceae	Bhang	Leaf, Stem, Flower	Medicinal, Fodder, Fuel	Seed and leaf extract is used to cure cough and fever. Whole plant is used as fodder and fuel.
<i>Cassia floribunda</i> Cav.	Fabaceae	Aeluan	Leaf, Stem	Fodder	Used as fodder.
<i>Cassia occidentalis</i> L.	Fabaceae	Badi-aeluan	Leaf, Stem	Medicinal	Decoction taken orally in stomach problems. Also used as fodder.

<i>Centella asiatica</i> L.	Apiaceae	Brahmi	Whole plant	Medicinal	Leaf decoction with almond and milk taken orally for memory enhancement.
<i>Chenopodium album</i> L.	Chenopodiaceae	Bathu	Leaf	Medicinal, Wild edible	Leaf juice taken orally.
<i>Cissampelos pareira</i> L.	Menispermaceae	Bhatindu	Leaf, Stem	Fodder	Used as fodder.
<i>Coix lachryma - jobi</i> L.	Poaceae	Bajayanti mala	Whole plant, Seed	Fodder, Ornamental	Seeds used to make ornaments. Used as fodder.
<i>Commelina diffusa</i> Burm. f.	Commelinaceae	Kapala	Leaf, Whole plant	Medicinal, Fodder	Decoction used orally in fever. Whole plants used as fodder.
<i>Commelina paludosa</i> Burm.	Commelinaceae	Chura	Whole plant	Fodder	Used as Fodder.
<i>Convolvulus arvensis</i> L.	Convolvulaceae	Dudhua-bel	Leaf, Stem	Fodder	Used as fodder
<i>Cuscuta reflexa</i> Roxb.	Cordiaceae	Amer-bel	Whole plant	Medicinal	The whole plant extract is used in ear pain. Leaf paste is used for Skin itching.
<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Dhrub	Whole plant	Medicinal, Religious	Plant extract is used in dysentery and anemia.
<i>Dalbergia sericea</i> G. Don	Fabaceae	Shisham	Leaf	Fodder	Leaves used as fodder.
<i>Datura stramonium</i> L.	Solanaceae	Datura	Bulb, Fruit	Medicinal, Religious	Bulb crushed with Sesame seeds used in urinary problems. Fruits offers for Lord Shiva.
<i>Equisetum arvense</i> L.	Equisetaceae	Brahmgund	Stem	Medicinal, Fodder	Decoction used to cure dysentery. Used as Fodder.
<i>Eupatorium adenophorum</i> Sprengel	Asteraceae	Kalibasuti	Leaf, Stem	Medicinal, Fodder	Decoction used in fever. Also used as fodder.
<i>Euphorbia hirta</i> L.	Euphorbiaceae	Bada-dudhia	Whole plant	Medicinal, Fodder	Decoction with honey used in bronchial infection.
<i>Ficus palmata</i> Forssk.	Moraceae	Debru	Fruit, Leaf	Medicinal	Fruit and leaf decoction taken orally in dysentery.
<i>Ficus religiosa</i> L.	Moraceae	Pipal	Bark	Medicinal, Religious	Bark ash with garlic paste applied on swellings and joint pains.
<i>Gloriosa superba</i> L.	Liliaceae	Bajayantimala	Tuber, Seed	Medicinal	Tuber and seeds extract are used for the treatment of warts and skin swellings.
<i>Hedera helix</i> Auct Clarke	Araliaceae	Dakari	Leaf, Stem	Fodder	Leaf and stem used as fodder.
<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae	Jalbuti	Leaf	Medicinal, Fodder	Leaf extract used in intestinal worms.
<i>Ipomoea carnea</i> Facq.	Convolvulaceae	Jablota	Leaf	Medicinal	Leaf extract used in ulcer treatment.

<i>Lantana camara</i> L.	Verbenaceae	Ujadu	Leaf	Medicinal	Leaf pastes with turmeric used in joint pain.
<i>Marchantia palmata</i> Nees	Marchantiaceae	Matakain	Thallus	Medicinal	Thallus ash used in joint pain.
<i>Marsilea minuta</i> L.	Marsileaceae	Tripatre	Leaf	Medicinal, Wild edible	Leaf extract used in mouth ulcer. Leaves are used as vegetable.
<i>Nasturtium officinale</i> R. Br.	Brassicaceae	Chuch	Leaf, Flower	Medicinal, Wild edible	Leaf and flower extract used in stomach pain. Leaves are used as vegetable.
<i>Oxalis corniculata</i> L.	Oxalidaceae	Malora	Whole plant	Medicinal, Wild edible	Leaf extract taken orally in skin diseases. Leaf is used in vegetable for enhancement of taste.
<i>Pinus roxbughii</i> Sarg.	Pinaceae	Cheel	Resin, Stem	Medicinal, Timber, Fuel	Resin is used on foot to wheel cracks. Stem used to manufacture furniture.
<i>Polygala arvensis</i> Willd.	Polygalaceae	Bachhu	Leaf	Medicinal	Leaf paste used on skin diseases.
<i>Polygonum barbatum</i> L.	Polygonaceae	Katur	Leaf	Medicinal	Raw leaf with <i>Oxalis corniculata</i> taken in constipation.
<i>Pyrus pashia</i> Buch. Ham. ex A. Camus	Rosaceae	Kainth	Leaf	Medicinal, Fodder, Wild edible	Leaf juice used in eye problems.
<i>Rauwolfia serpentina</i> (L.) Benth. ex. Kurz.	Apocynaceae	Sarggandha	Root	Medicinal	Root paste is used in muscle pain.
<i>Reinwardtia indica</i> Dumort.	Linaceae	Peela phulnu	Leaf, Flower	Medicinal	Decoction of leaf is taken orally in Tounge boils.
<i>Ricinus communis</i> L.	Euphorbiaceae	Arand	Seed, Root	Medicinal	Extract of seed and root gum trouble and asthma.
<i>Roylea cinerea</i> Baill.	Lamiaceae	Kadvya	Leaf, Stem	Medicinal	Used to treat diabetes.
<i>Rubus ellipticus</i> Sm.	Rosaceae	Akhae	Leaf, Stem decoction	Medicinal, wild edible	Leaf and stem decoction given orally in dysentery. Fruits are edible.
<i>Solanum nigrum</i> L.	Solanaceae	Kale kyanun	Leaf, Fruit	Medicinal, Wild edible	Leaf paste is useful in Jaundice. Fruits are edible.
<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Jamun	Seed, Wood, Stem, Leaf	Medicinal, Timber, Fodder, Wild edible	Seed powder used to treat diabetes. Ripe fruits are used in urinary troubles.
<i>Taraxacum officinale</i> Wigg.	Asteraceae	Kanful	Root	Medicinal, Wild edible	Root paste used in fever.

<i>Urtica dioica</i> L.	Urticaceae	Kogsi	Leaf	Medicinal, Fodder, Fiber	Fresh leaf pastes with mustard oil used in dog bite. Also used as fodder.
<i>Vitex negundo</i> L.	Verbenaceae	Banna	Stem, Leaf	Medicinal, Fodder	Leaf extract used to cure wounds. Stem paste applied on joint pain.
<i>Withania somnifera</i> Dunal	Solanaceae	Ghodgandh	Root, Leaf	Medicinal	Extract of leaf is used in urinary disorders.
<i>Woodfordia fruticosa</i> (L.) Kurz	Lythraceae	Dhaol	Flower	Medicinal	Flowers used in dysentery.

Result and discussion

The results of the study are presented in Table 1. The genera of plant species from the study area are arranged in alphabetical order. For each species, scientific name, family, local name, part used, mode of use and traditional uses as medicinal, wild edible, fish poison, fodder, religious, timber and fuel as well as ornamental are provided. A total of 68 plant species in 43 families were documented for medicinal, edible and fodder purposes from the studied area. The local people and traditional healers were using these plants to treat various diseases of human.

The highest number of ethno-botanical plants was recorded from the families Fabaceae, Asteraceae, having 7 and 4 plant species. Four families namely Amaranthaceae, Convolvulaceae, Lamiaceae and Solanaceae contributed three plant species each. Two species each were contributed by seven families namely Commeliniaceae, Euphorbiaceae, Moraceae, Poaceae, Rosaceae, Urticaceae and Verbenaceae each. Table 2 shows that total 68 plant species under 59 genera belongs to 43 families has been found to be common in use in the study area for different purposes.

Table 2 showing that there are 68 species of ethnic plants (50 dicots, 6 monocots, 1 bryophyte, 1 pteridophyte and 1 gymnosperm) employed for medicinal, wild edible, fodder, fuel and other purposes. Figure 1: Histogram showing various divisions of ethnobotanically used plants. All the delineated species hold a great potential for overall exploration for the welfare of mankind.

Table 2: Total No. of Ethnobotanically Collected Species, Genera and Families under various divisions

S. No.	Divisions	Genera	Species	Families
1	Dicots	50	58	35
2	Monocots	5	6	4
3	Bryophytes	1	1	1
4	Pteridophytes	2	2	2
5	Gymnosperm	1	1	1

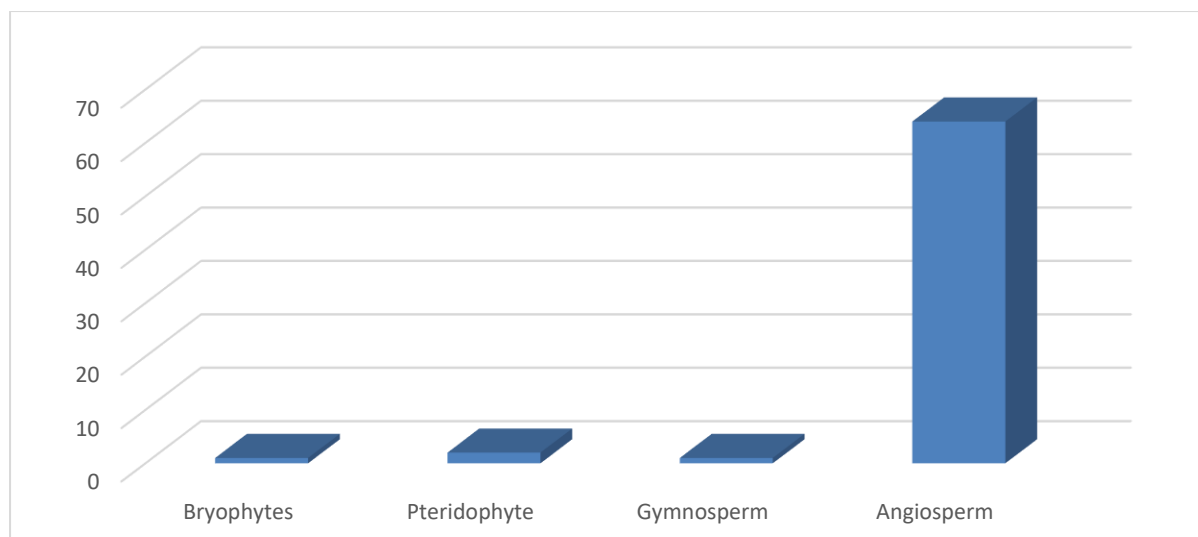


Figure 1: Histogram showing various divisions of ethnobotanically used plants

Conclusion

Today's system of allopathic treatment for many diseases has become a very costly affair. It is beyond the reach of low-income people living in far-flung areas. In contrast, the traditional system of medicine has played a pivotal role in providing healthcare to people living in remote areas. Hence the demand for time to explore the alterations to provide healthcare for all, and that lies with the wild species of medicinal and aromatic plants. So, this is a small effort towards ethnobotanical exploration.

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