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Review Article

Ethnomedicinal Uses of Pteridophytes of Garhwal Region, Uttarakhand

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ABSTRACT

Background: In this research paper efforts have been made to document the ethno-botanical knowledge of important ferns and ferns allies found in Garhwal Region. The area has many climatic and vegetation zones or biomes. Locals residing in mountainous areas belonging to various ethnic groups are traditionally utilizing plants over many generations; these ethnic groups have their distinct life style, belief, traditions and cultural heritage.

Methods: Plant collection and data regarding traditional uses in various areas of Garhwal has been done. Locals of old age belonging to various ethnic groups were personally interviewed for establishing uses of plants. Photography is done for easy identification and habitat recognition.

Collected plant specimens were preserved. Plant species were dried, mounted, identified and authenticated.

Result: 76 species were known to have traditional and ethno botanical uses. Plants have been utilized for many generations. Ethnic groups have distinct life style and have different economic uses for these plants. Due to unsustainable exploitation of natural habitats scarcity of drug plants has occurred. As consequence some species are depleting and may become extinct in near future.

Conclusion: All ethno-botanically significant ferns should be conserved and measures should be taken to prevent their extinctions. Also their medicinal value should be discussed and disseminated throughout the world for the benefit of human beings. It is expected that this research paper will be beneficial for students, researchers, farmers, foresters and general public.

Keywords: Ethno botanical study; Ethnomedicine; Garhwal; Pteridophyte uses

INTRODUCTION

The ancient medical knowledge of various tribes and folklore systems of medicine, sometimes referred to as ethno-therapeutics, has therefore provided a more powerful and effective strategy for the discovery of clinically useful compounds. The ferns are thought by most people to be quite useless members of the plant kingdom. The deleterious effects of rapid fern growth are well publicized, but their useful aspects are largely ignored. Ferns are found to provide food, medicine, fiber, crafts and building material, abrasives and of course decoration. But recently ethno botanical studies have attracted a number of field workers and they have supplied a lot of information about different uses of plants world-wide. Today, ethnobotany has become an important and crucial area of research and development in resource management, conservation of biodiversity at genetic, species and ecosystem levels, and socio-economic development of the region.

The geographical setting, topogeological contrast and variable climatic conditions have important role in rich floristic composition in Garhwal. Major population of India resides in rural areas and depends upon forest plant to fulfil their various needs like food, fodder, fuel, medicine, timber etc.

It is aimed to collect indigenous knowledge about the various uses of plants acquired by untired efforts of our older generation. Because of various reasons the forests are depleting in alarming ways. Many species are in endangered stage, thus affecting the whole biodiversity. The same is the case with indigenous knowledge which is in threatened stage. Researchers have stressed the need of conservation of the various pteridophytes [1]. This knowledge is retained only by some older people. The area has been surveyed by a number of workers [2-7].

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LITERATURE REVIEW

Plants for this study were collected by the authors during the ethnobotanical survey at different occasions and from the different parts of the region. This region comprises of different districts i.e. Haridwar, Chamoli, Dehradun, Tehri, Pauri, Rudraprayag and Uttarakashi.

The field data were cross checked at various places and were considered authentic. The habitat, range of distribution and local uses of each plant area also mentioned. These plants are identified by the authors matching with the authentic herbarium specimens and the photographs.

Observations

During the interaction with the people of different societies, caste, folks, tribes and local physicians (Vaidya or Local Ayurvedic Physician) etc. of the region we found that the ferns and ferns allies were being used for various purpose.

Ferns as food: Although not many fern species are used as food but some examples are given below:

- *Athyrium schimperl* Moung. ex fee (Athyriaceae) Kuthura Garhwal: The young coiled fronds are cooked vegetables in Garhwal [8].
- The young coiled (circulatory) fronds *of Botrychium lanuginosum, B. ternatum and B. virginiatum (Botrychiaceae)* are used as vegetables [2].
- The young fronds of *Ceratopteris thalictroides (L)* Pankeriaceae are cooked as food.
- *Cythea spinulosa*: Soft pith and roots are used in preparation of local drinks.
- *Ampelopteris prolifera*: Young or tender fronds are cooked and taken as vegetables by the local people.
- *Diplazium esculantum and D. frondosum (Athyriaceae)-Lingra*: Young fronds are used as green vegetable. In *D. frondosum* before cooking the hairs/scales are rubbed off [9,10].
- *Equistem arvense* (Equisetaceae) rhizome is cooked as vegetable.
- *Heminthostachys zeylanica* (Helminthostacheae): Young fresh rhizomes are used as vegetables.
- *Hypodematium crenatum* (Hypodemataceae): Young circulatory coiled fronds are eaten as vegetables. When food is scarce.
- *Marsilea minuta* (Marsilaceae): The stalk and lamina is cooked as vegetables.
- The fresh tubers of *Nephrolepis auriculata* (Naphrolepidaceae) are edible [1].
- *Ophioglossum reticulatum* (Ophioglossaceae): The leaves are eaten as salad and cooked as vegetable [9].
- *O. vulgatum*: Leaves are cooked as vegetable.

Fern as fodder and cattle beds: In May and June young growing fronds are available whereas during winters the mature fronds are abundant Local inhabitants collects these fronds and mix with dry stored grass. The common pteridophytes used as fodder and cattle beds are *Adiantum lunulatum, Cythea spinulosa* [7]. The fronds are used as fodder. Due to less succulent nature of *Christella dentate* (Forssk), Brownsey and Jerny (Thelypteridaceae) and Raunya (Raji Tribes), the whole plants are used as a cushion for cattles.

- *Pteris vittata* (Pteridaceae) the Raji tribes of Garhwal use fronds as cushion as it is less succulent in nature.
- *Botrychium ternatum, Microsorum memberanaceum* (D. Don), *Ophioglossum reticulatum (Linn)* and *Selaginella chrysocaulous* are used as fodder and uneaten, left fronds are used as cattle beds.

Ferns as medicines: Some pteridophytic plants are used as medicines (Figure 1), example

- The fronds of *Adiantum capillus-veneris* (Adiantaceae) are used for making cough decoction in Garhwal or chewed in treatment of mouth blisters. Extract of fronds with honey in eye ailments by local people.
- Fronds of *A. lunulatum* are given to cure fever in Garhwal [1].
- The fronds of *A. venustum* are used as tonic, expectorant diuretic etc. in Garhwal and the leaf decoction to patients suffering from fever.
- The whole plant of *A. trichomanes* is locally used against enlargement of spleen.
- The fronds of *Dryopteris chrysocoma* (Aspidiaceae) are the source of filicin and used as anthelmintic [1].
- In Garhwal the aerial shoot and rhizomes of *Equisetum ramosissimum* are given in gonorrhoea and the poultice made from the current plant along with red mud is applied in bone fracture.
- The rhizome of *Heminthostachys zylanica* is used in diabetes and impotency and the paste of its rhizome in cow's urine is said to cure skin diseases by Boxas.
- *Ophioglossum vulgatum* is said to be a panacea for wounds and to reduce inflammation.
- A poultice or lotion made from the roots of *Botrychium virginianum* is applied to snakebites, bruises, cuts and sores in the Himalayas.
- The powdered rhizomes of *Adiantum lunulatum* are used as an antidote to snakebite in India.
- *Dryopteris cochleata* is used in mental disorder. Filtered water extract of rhizome is given to the unconscious persons suffering from epilepsy.
- *Cheilanthes farinosa* is also used in mental disorder by the local people. The extract of washed rhizome freed from scales is useful to the unconscious patients suffering from epilepsy [11,12].
- The paste of the leaf of *O. reticulatum* is applied to the forehead to get rid of headache in India [9].
- *Adiantum lunulatum* mixed with black pepper is made into paste and pills. Two pills given twice a day for one month, cures bronchitis and asthma [13].

Figure 1: Some pteridophytes and their ethnomedicinal uses.

- Whole plant of *Adiantum capillus veneris* is expectorant used in cough and throat and bronchial disorder. Leaves mixed with honey are useful in seasonal cold fever.
- The rhizome powder of *Lycopodium flexuosum* mixed with cow's urine is also used in skin disorder.
- In Garhwal a decoction of fresh tubers and fronds of *Nephrolepis auriculata* is given to cure cough.
- *Osmunda hugeliana* fronds are used as tonic and intestinal gripping [14,15].
- The decoction of the rhizomes of *Tectaria macrodonta* (Aspidiaceae) is given to children in stomach ache.

Miscellaneous uses:

For house building: because of global warming and increase in winter snow is now restricted to the higher elevation and to the inner Himalayan ranges. The people make storied community houses or huts which are primarily built on stones and plastered from outer and inside by mud mixed with fronds of pteridophytes. The dry fronds of *Cythea spinolosa* are used for thanching the house roofs [3].

The fronds of *Dicranopteris liniaris* are used for thatching the roofs and house walls. The villagers cut the fronds into small pieces mixed with mud and use it for plastering the mud floor. This makes the mud floor more durable. Sometimes before constructing the mud floor they put a layer of fronds upon the supporting beams and put the wet mud on it, in order to prevent the dry mud slipping down to the floor.

Abrasives: Throughout Garhwal the scouring rush Equisetum debile is used to clean the cooking and eating utensils. The stem of the plant accumulate crystals of silica and the fine abrasive action of these crystals make it a useful cleaning agent. The sand paper like qualities of Equisetum lead to its use in shaping and sometimes tools ornaments and weapons.

Fibres: Fern fibres are often used for weaving baskets, hats, mats, cigar cases, fishing traps, chair seats, stuffing and packing materials, foundation for wreaths and floral decorations.

Decoration: *Lygodium flexuosum* are used for decoration of rim and handles of basket. Glossy black strips of *Adiantum capillus-veneris* and sp. of Dryopteris are used into ornamental painting. Stems of *Aleichinia linearis* are used for pens and also woven into mat, walls of huts, fishing traps and chair seats, the long leaf stalk of

Dicranopteris linearis have long been woven into hats and cigars cases [16-20].

Ornamental ferns: Many species have been domesticated and widely grown in the gardens as the youth of leaf and the crozier is equally attractive. *Adiantum capillus-veneris*, *A. pedatum*, *Asplaenium ensiforme*, *A. nidus*, *Dicranopteris liniaris*, *Diplazium esculentum*, *Drynaria propinqua*, *Glaphyropteridopsis erubescence*, *Loxogramna involuta*, *Nephrolepis auriculata*, *Ophioglossum regalis*, *Phymatopteris oxyloba*, *P. sqyarossum*, *Pronephrium pennangianum*, *Pteris cretica*, *P. vittata* and *Pyrrosia beddomana* are some pteridophytic plants cultivated as ornamentals [21].

Substitute for jewellery: The stipe of *Adiantum lunulatum* is used as nose and ear studs by poor women and girls. It is preferred as it is very smooth. The glabrous stripe of *Cheilanthas farinosa* (Silver fern) is also used as ear and nose studs. The stipes are usually water resistant and have the antimicrobial activity [22].

As object of curiosities: The under surface of the fronds of *Cheilanthas farinosa* (Silver fern) is covered with white ferina. It provides fun to children who press the fronds on their hands for beautiful impression.

- The whole plant of *Adiantum capillus-veneris* is used by Bharara (Local Vaidya of Tharu tribe)in Jadu-Tona (Black Magic).
- The whole plant of *Cheilanthus farinose* powered and mixed with Cow's ghee is used as insane to drive off fear in childrens.
- The fresh plant of *Lycopodium japonicum* are occasionally used as rope for lying bundles of unrooted grasses.

CONCLUSION

All ethno-botanically significant ferns should be conserved and measures should be taken to prevent their extinctions. Today, ethnobotany has become an important and crucial area of research and development in resource management, conservation of biodiversity at genetic, species and ecosystem levels, and socio-economic development of the region. It is expected that this research paper will be beneficial for students, researchers, farmers, foresters and general public

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