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Biodiversity And Ethnomedicinal Use Of Pteridophytes In Chandraprabha Wildlife Sanctuary, Chandauli, Uttar Pradesh

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Abstract

Indigenous peoples' long-held understanding of pteridophytic plants' medicinal uses is the focus of this research. In order to gather ethnobotanical information on the Chandraprabha Wildlife Sanctuary (CPWLS), we went on extensive field visits. Through questionnaires—local names, used parts, treatment of diseases, methods of administration, and preparation—an attempt was made to collect information about the strategy. The natives of Chandauli have long depended on the medicinal properties of sixteen plant species from eleven different families.

Keywords: Ethno medicinal, Pteridophytes, Herbal, Chandraprabha Wildlife Sanctuary

Introduction

India has many indigenous tribes that have been here for a long time and possess a wealth of traditional knowledge that addresses many important issues, including health. As healers, indigenous people rely on local practitioners and their own herbal medicines. Various socio-cultural traditions, beliefs, and the service of traditional healers contribute to the use of herbal medicines by tribal communities. Due to their isolation from contemporary healthcare facilities, these individuals have developed strong relationships with their natural surroundings and rely on them for fundamental needs. The hilly regions held a special place for the forest dwellers; they have kept tribal traditions alive and have inspired a strong connection between these people and their natural environment. Pteridophytes are important for the economy. Dioscorides (50 AD) and Theophrastus (327–287 BC) both mentioned the therapeutic properties of some ferns. In folklore, ferns played a significant role. Many different medical traditions, including Ayurveda, Unani, Homoeopathy, and others, have made effective use of these herbs throughout history. According to Uddin et al. (1998), pteridophytes are used by practitioners of the Unani system of medicine. Native Chinese physicians commonly prescribe pteridophytes to their patients (Kimura and Naro, 1965). In subsequent decades, other researchers in the fields of modern

biology and pharmaceuticals examined pteridophytes. In 1984, Dixit and Vohra documented pteridophytic plants in India that were both edible and medicinally significant. The ethnobotanical significance of ferns from the Indian state of Rajasthan was highlighted by Kaushik (1998). According to Singh et al. (1989) and Dhiman (1998), the ethnobotanical applications of this distinct group are quite significant. Some of the most important research on the culinary and medicinal uses of pteridophytes was conducted by Hodge (1973), Nayar (1957), and Dixit (1974, 1975). More recently, some pteridophytes have been described as edible crops and medicinal plants (Ghosh et al., 2004). Various parts of the plant—including the rhizome, stem, fronds, pinnae, and spores—are used to alleviate a range of ailments.

While there are a plethora of articles on the taxonomy, ecology, and cytology of pteridophytes, surprisingly few studies focus on their therapeutic properties and applications. Dixit (1984) and Chandra (2000) have compiled comprehensive lists of pteridophytes found in India. The wetlands of the Palani Hills were the subject of ecological research conducted by Manickam and Ninan (1984).

The aim of this research is to explore the application of pteridophytes within anthropological and botanical sciences. Pteridophytes are utilized in various traditional medical systems, including Ayurveda and Unani. Additionally, several pteridophytes are used in the homoeopathic industry.

Study Area

This research focuses on the Chandraprabha Wildlife Sanctuary, located in the northern Indian state of Uttar Pradesh. Situated on the hillocks of Vijaigarh and Naugarh in the Chandauli Vindhya forest range, the Chandraprabha Sanctuary spans an area of 78 square kilometers and serves as a nature preserve. The sanctuary is adorned with spectacular waterfalls like Devdari and Rajdari, as well as scenic picnic spots, which attract a large number of visitors. Located approximately 70 miles from Varanasi, the sanctuary was established in 1957. In 1958, it became home to Asiatic Lions. The sanctuary, which draws visitors from across the country, harbors a rich diversity of plant and animal life.

Material & Methods

The Chandraprabha Wildlife Sanctuary, located in the Chandauli district of Uttar Pradesh, was the site of a pteridophyte study and collection. A herbarium was prepared by collecting specimens of each species. Information was gathered on common names, traditional uses, and the various ways in which local communities utilized the plants and their parts.

To gain insights into the sustainable use of pteridophytes, interviews were conducted with several groups, including tribesmen, herbalists, forest guards, watchers, medicine men, witch doctors (ojha), and ordinary villagers. Additionally, data were collected on methods of preparing decoctions and their practical applications. A total of sixteen species were identified as having potential uses among the indigenous communities. Documentation included common names, diseases treated, medicinal applications, methods of preparing pastes, and dosage of treatments. Presented below is an in-depth analysis of the sustainable use and beneficial characteristics of pteridophytes as they relate to the livelihood and healthcare practices of the local indigenous communities.

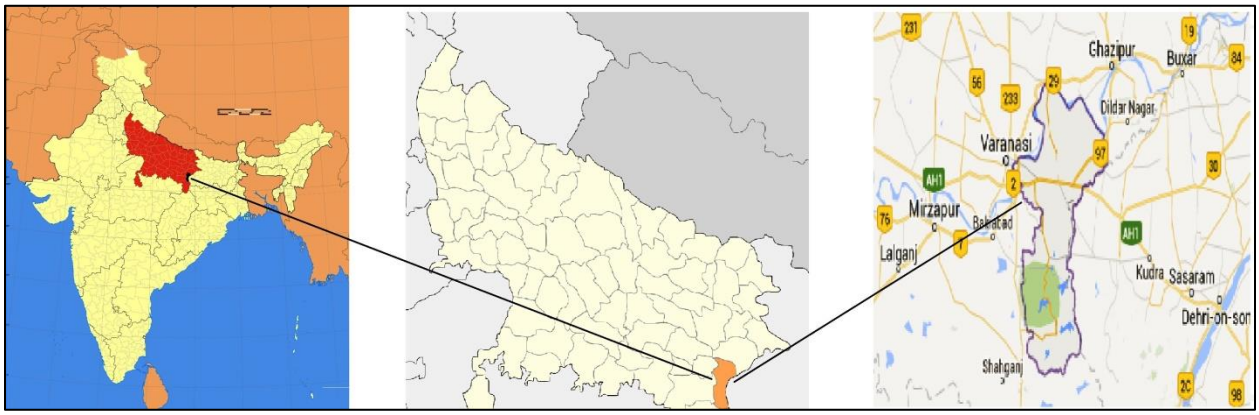

Fig-1. Map of study area

Results

From 2020 to 2025, researchers at the Chandraprabha Wildlife Sanctuary in the Chandauli district of Uttar Pradesh collected the data presented here. All specimens were collected in triplicate and preserved in the Department of Botany, B.R.A. Bihar University, Muzaffarpur, Bihar. The wildlife sanctuary yielded approximately sixteen species of pteridophytes with known therapeutic uses. The following information is provided for one such species:Scientific Name: *Adiantumphilippense* L.Family: AdiantaceaeLocal Names: Hanswati, Kali Sundhiya, KaanteJharParts Used: Stem, rachis, fronds, rhizome, leavesMethods of Usage:Stems and rachis are worn as decorative ear studs.A paste made from the plant mixed with mustard oil is used to treat boils.According to Khare and Kumar (2007), fresh leaves can be used to alleviate seizures (fits).The rhizome is prescribed for infertility.Tea made from the fronds is administered to patients with lung infections.

The rhizome may help alleviate conditions such as dysentery and glandular oedema (Sen&Ghosh, 2011). A paste made from the leaves is traditionally used to treat leprosy and hair loss. It is also believed to help relieve obsessive thoughts. To treat infertility, women are administered rhizome preparations. For flatulence, the entire plant is crushed and applied around the navel. For indigestion, 2 grams of fresh leaf paste is taken orally on an empty stomach for ten consecutive days (Rout et al., 2009; Singh &Khare, 2011).

*Adiantumincisum*Forssk., commonly known by names such as Mayurshikha, Sumble, Hansraj, and Raja Hans, also belongs to the Adiantaceae family. The leaves are traditionally used to treat coughs, fevers, and chest pains. In addition to internal use for managing diabetes, external application of the leaf paste helps alleviate skin ailments. Furthermore, the plant exhibits antimicrobial properties.

Adiantumcapillus-veneris L., a member of the Adiantaceae family, is traditionally known by several names, including Hansraj, Hanspadi, Samalpatti, Pursha, and Dumtuli. Extracts from the fronds are used to treat smallpox, bronchial infections, coughs, colds, throat discomfort, fever, and menstrual irregularities. The plant is also known to promote hair growth, which is why it is commonly called the "Maidenhair Fern." Additionally, it is used as an astringent, purgative, tonic, and diuretic. For bronchial congestion, a decoction of the leaves is prescribed. In the case of eye problems, an extract of the plant mixed with honey is used. The fronds are also valued for their magical and religious significance.

Cheilanthestenuifolia Swartz, commonly known as ResamLumut or Narrow-leaved Lip Fern, belongs to the Sinopteridaceae family. In folk medicine, its roots are used to treat ailments believed to be caused by evil spirits or the "evil eye." A poultice made from the leaves is applied to inflamed extremities. Indigenous communities also prepare a general tonic from the rhizome and root extract.

Cheilanthesbicolor (Griff. ex Fras.-Jenk.)Roxb., another member of the Sinopteridaceae family, is commonly known as Silver Fern or Kali Sanka. According to ethnomedical practices, a mixture of plant powder and cow’s ghee is burned as incense to reduce anxiety in children. Children also decorate their noses and ears with the plant’s brown stipes. The species is traditionally used as a medicinal herb.

Ophioglossumpetiolatum Hook. (Ophioglossaceae) is known by several local names, including Shaambli, Ekpatiya, Jibiya, and Jibhi. It is a well-loved leafy vegetable that is carefully harvested

wherever it grows, due to its ethnomedicinal value. The plant can be eaten raw in salads or cooked with other vegetables. However, if the leaves are not boiled slowly, they tend to become slimy. In India, the leaves are used as a spinach substitute for their anti-inflammatory and anti-swelling properties. Cooked leaves in oil are applied to wounds for healing. For hair loss, a thick paste made from fresh rhizomes and tubers is traditionally used.

Ophioglossumcostatum R. Br., also a member of the Ophioglossaceae family, shares the same common names—Shaambli, Ekpatiya, Jibiya, and Jibhi. Traditional medicinal uses include its application as a pain reliever, anti-inflammatory agent, and wound dressing. The roots are also used as a tonic and styptic.

Selaginellabryopteris L. (Family: Selaginellaceae) Common Names: Sanjeevani, DevbootiUsed in traditional medicine as a diuretic and for treating diarrhea. In indigenous American rituals, dried plants are used with tobacco in ceremonies of witchcraft and deception. Research on Selaginellatamariscina revealed antifungal activity of amentoflavone, prompting further study of S. bryopteris's antibacterial properties. Local tribes, including the Songhati population, recognize its anti-inflammatory and "vipathic" properties. The plant's robustness is due to its highly developed thermoproteins. Aqueous extracts help prevent oxidative stress-induced cell death. Herbal extracts (1–10%) show up to 50% inhibition of thermal radiation after 1 hour.It is also used to ease childbirth and to treat jaundice (yellow lints).

Azollapinnata R. Br. (Family: Azollaceae)Common Name: Mosquito Fern. Its ethnomedicinal value has grown recently. Widely used as organic fertilizer for tropical lowland rice in Southeast Asia.Can be grown in dual culture with wet rice or used as a cover crop and plowed in as green manure. Forms a symbiotic relationship with the nitrogen-fixing blue-green alga Anabaena azollae.Also used with crops like arrowhead, Manchurian wild rice, and taro. Azolla compost is now produced commercially. Local populations found that a thick layer of Azolla on water helps repel mosquitoes. Waste from Azolla is used for growing edible mushrooms, such as Pleurotus species.

Marsileaminuta L. (Family: Marsileaceae)Common Name: Chilchilejhar Used as an aphrodisiac and to enhance reproductive health. For dyspepsia, crushed leaves are boiled with rice.Leaf juice is used to treat nosebleeds. For swollen gums, the leaves are rolled in a Shorearobusta leaf, boiled, and applied as a compress. Leaf extract significantly reduces blood and liver triglycerides and cholesterol.

Salvinianatans L. (Family: Salviniaceae)Common Names: Kamraj, Majurkutti,Majurpair, Bankand, JhotphokriTraditional use includes antifungal properties.

Helminthostachyszeylanica L. Hook. (Family: Ophioglossaceae)Traditional Uses: Leaves have aperient, intoxicating, anodyne, and sciatica-relieving properties. Rhizomes are used to treat dysentery, catarrh, malaria, snake venom, and impotence (via decoction).Leaf juice is used for tongue blisters. Stems are consumed as a vegetable. Used as an aphrodisiac—both rhizome extract and whole plant. A tonic of rhizome and herbs is used for waist pain.

C*eratopteristhalictroides*(L.)Brongn. (Family: Parkeriaceae)Common Name: Not specified Ethnomedicinal Uses:Uncurled fronds are eaten as salads or asparagus substitutes.Used as green manure in rice fields.Applied as a poultice for skin diseases.Grown as a decorative aquatic plant in fish aquariums.

Diplaziumesculentum(Retz.) Sw. (Family: Athyriaceae)Common Names: Kochiya, Lukda, Dheki, Pani-neureUses:Young fronds are cooked as vegetables.Entire plant is fodder for cows and goats.Crozier is eaten fresh in salads or pickled.Boiled young fronds with salt promote general well-being (Shil&Choudhury, 2009).Rhizome is used as an insecticide during seed storage.For spermatorrhea, a root decoction with 2 mL of honey is taken on an empty stomach (Rout et al., 2009; Singh &Khare, 2011).

Thelypterisdentata (Forssk.) (Family: Thelypteridaceae)Common Names: Macchi-neure, LimraEthnomedicinal Use:Alcoholic and chloroform extracts show antibacterial properties.Whole plant is used as fodder, while young fronds are consumed as vegetables.

*Pterisvittata*L. (Family: Pteridaceae)Common Name: Brake Fern. Ethnomedicinal Use:Leaves used in ritual worship during illness.Wedels (possibly leaflets or immature fronds) are used as pillow stuffing.Leaf juice is traditionally used to treat tongue blisters.

Discussion

Pteridophytes play a critical part in the ethnomedicinal and social practices of the indigenous communities in the Chandauli locality of Uttar Pradesh. These ancient, non-flowering vascular plants are not only valued for their ecological significance but are also deeply embedded within the everyday lives and healthcare systems of local tribal populations. This study reports the ethnobotanical relevance of more than sixteen species of pteridophytes, belonging to sixteen

different plant families, which are commonly utilized by the local tribes as dietary supplements and traditional remedies.

The findings reveal that several pteridophyte species serve dual purposes: as leafy vegetables and as therapeutic agents used to treat a range of ailments including digestive disorders, skin diseases, respiratory issues, fever, reproductive health problems, and inflammatory conditions. Indigenous knowledge, passed down through generations, includes detailed methods of preparation such as decoctions, pastes, and infusions, highlighting the deep-rooted botanical wisdom preserved among these communities.

Importantly, the study emphasizes the need for the conservation of both these plant species and the traditional knowledge systems associated with them. With increasing pressure from modernization and habitat loss, there is a growing risk of losing valuable ethnomedicinal knowledge. The documentation of these uses not only enriches the scientific understanding of pteridophytes but also underlines the potential for discovering bioactive compounds that could contribute to future pharmacological research.

This research contributes to the broader field of ethnobotany by validating indigenous practices and highlighting the sustainable use of native flora. It encourages further studies and conservation efforts to protect this valuable natural and cultural heritage.

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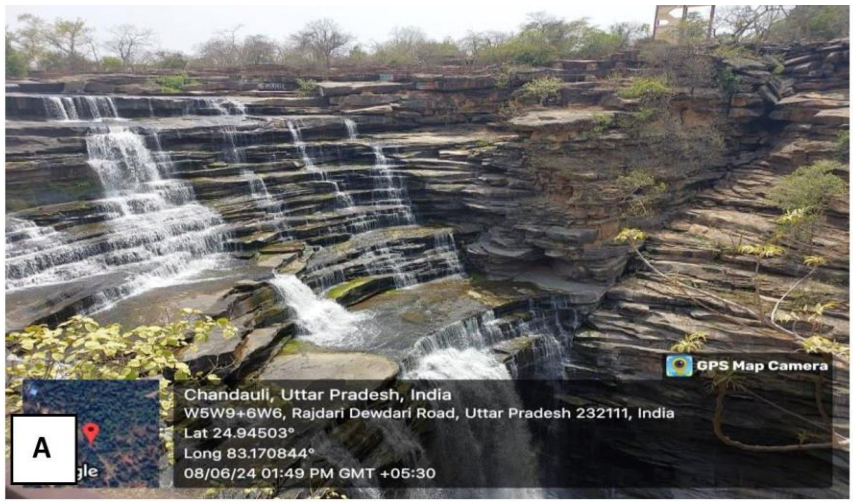
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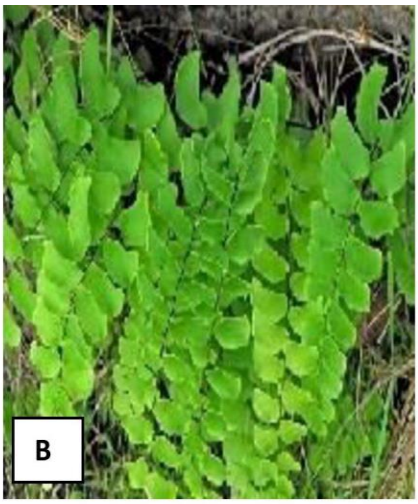
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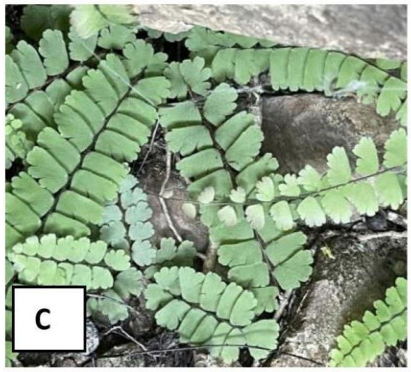
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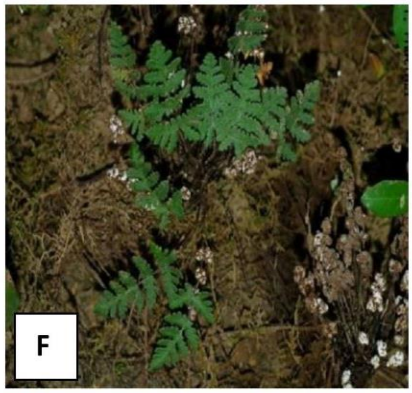
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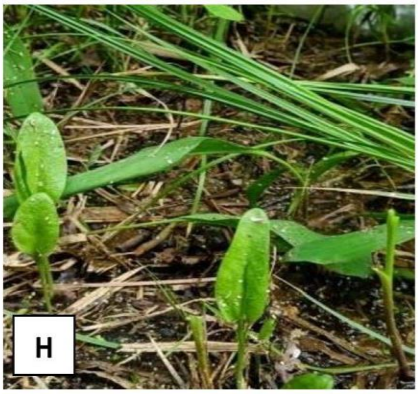
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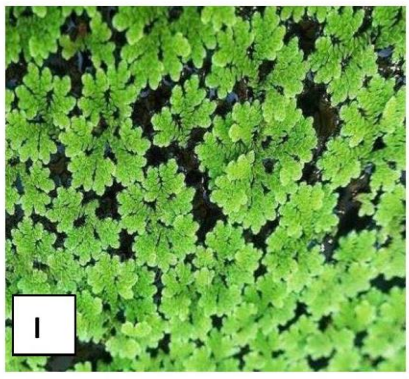
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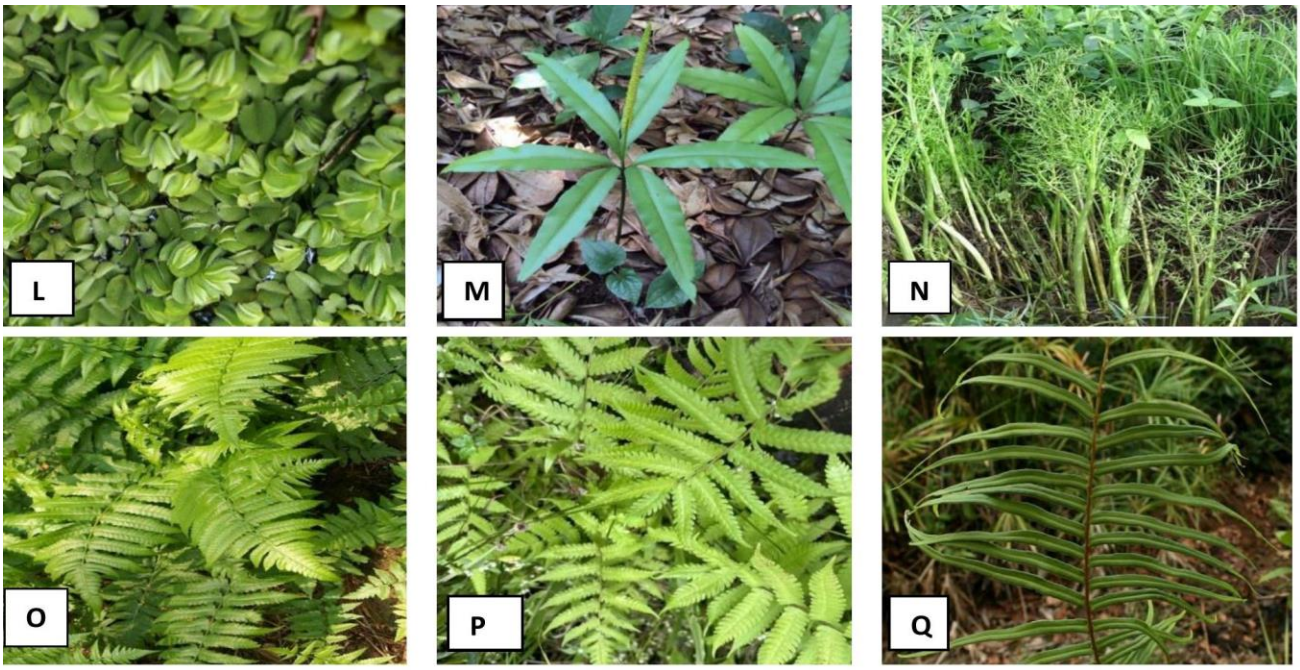

Figure-2. A . Devdari waterfall (CPWLS); **B.***Adiantumphilippense* L.; **C**.*Adiantumincisum*Forssk.;**D.***Adiantumcapillus*-veneris L.;**E.***Cheilanthestenuifolia* Swartz ; **F.***Cheilanthes bicolor* (Griff. ex Fras.-Jenk.) Roxb.;**G.***Ophioglossumpetiolatum* Hook;**H**. *Ophioglossumcostatum* R. Br;**I.**Selaginellabryopteris L.;**J.***Azollapinnata* R. Br.;**K.***Marsileaminuta* L.; **L**.*Salvinianatans* L.; **M**.*Helminthostachyszeylanica* L. Hook.;**N**.Ce*ratopteristhalictroides*(L.) Brongn.;**O**.*Diplaziumesculentum*(Retz.) Sw.; **P**.*Thelypterisdentata* (Forssk.), **Q**.*Pterisvittata*