THE STUDY ON ETHNOBOTANICAL INSIGHTS FROM AQUATIC FLORA OF THREE WETLANDS OF BERHAMPORE, MURSHIDABAD

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ABSTRACT

Wetlands are ecologically critical ecosystems that harbor rich biodiversity and sustain a wide range of cultural practices. In rural Bengal, particularly in the Murshidabad district of West Bengal, wetlands serve not only as ecological hotspots but also as vital reservoirs of traditional ethnobotanical knowledge. This present work investigates the ethnobotanical relevance of twenty aquatic and semi-aquatic plant species across three wetlands named Bistupur Bill, Chatrar Bill, and Dhopghati—situated in the Berhampore subdivision, Murshidabad. Through a combination of ecological field surveys and structured interviews with local communities, including traditional healers and elders, the research documents how these aquatic species are used in folk medicine, daily sustenance, spiritual rituals, and ecological practices. Noteworthy species such as *Centella asiatica*, *Bacopa monnieri*, and *Trapa bispinosa* are widely used for their medicinal properties, while others like *Typha angustifolia* and *Eichhornia crassipes* play roles in craft-making and environmental management. The findings highlight both the functional and symbolic value of wetland flora, emphasizing the intricate relationship between community livelihood and ecological stewardship. However, this biocultural knowledge is increasingly threatened by urbanization, pollution, and habitat degradation. The study underscores the urgency of conserving both the wetland ecosystems and the intangible cultural heritage embedded within them. By systematically documenting these practices, the research aims to contribute to ethnobotanical preservation, environmental policy discourse, and sustainable wetland management strategies in Eastern India.

KEYWORDS: Wetlands, ethnobotanical, environmental policy, biocultural knowledge.

INTRODUCTION

Wetlands are among the most ecologically vital and culturally resonant ecosystems globally, recognized for their indispensable role in maintaining ecological balance and supporting livelihoods. Defined by the Ramsar Convention (1971) as 'areas of marsh, fen, peatland, or water, whether natural or artificial, permanent or temporary, wetlands perform multifaceted ecological functions.' These include regulating hydrological cycles, controlling floods, recharging groundwater, purifying water, and serving as habitats for a vast array of flora and fauna (Mitsch & Gosselink, 2015). Importantly, they also function as repositories of traditional ecological knowledge, particularly in regions where communities maintain longstanding relationships with their surrounding environments.

In South Asia, and more specifically in the Indian subcontinent, wetlands have historically served not only ecological but also socio-cultural functions. In rural parts of Bengal, wetlands are interwoven with local livelihoods and cultural identity. Communities residing near these ecosystems have long relied on aquatic and

semi-aquatic plant species for food, medicine, fodder, rituals, and even artisanal crafts (Ghosh & Sen, 2017). These interactions are preserved through oral traditions and are transmitted across generations, forming a substantial part of indigenous knowledge systems. Ethnobotany, as an interdisciplinary science, explores the reciprocal relationships between people and plants, uncovering how local flora are used in healing practices, spiritual traditions, and daily subsistence (Martin, 2020). Within this field, aquatic ethnobotany—an area focusing specifically on the use of water-bound plant species—has received comparatively less scholarly attention. While terrestrial medicinal plants are well-documented in Indian literature (Jain, 2010; Singh et al., 2017), aquatic flora remain underrepresented, despite their therapeutic significance and accessibility to marginalized communities.

Numerous aquatic plants hold prominent places in folk and traditional medicine. For instance, *Centella asiatica*, commonly used for wound healing and memory enhancement, is featured in Ayurveda and folk systems across Asia (Devkota et al., 2021). Similarly, *Bacopa monnieri* has been scientifically validated for its neuroprotective properties (Calabrese et al., 2008), and *Trapa bispinosa* (water chestnut) is traditionally employed as a cooling agent and nutritional supplement during religious fasting (Upadhyay et al., 2014). These plants not only serve medicinal purposes but are also entwined with local rituals and seasonal cultural practices (Kumar et al., 2020). In West Bengal, wetland ecosystems such as ponds (bills), oxbow lakes, and marshes support a wide diversity of aquatic and semi-aquatic plant species. Murshidabad district, with its intricate network of natural wetlands, serves as a representative region where ethnobotanical knowledge thrives amidst ecological complexity. Past studies have highlighted the use of aquatic plants in districts such as Nadia and Cooch Behar, but localized documentation specific to Murshidabad remains sparse (Das & Bhattacharya, 2016).

Contemporary threats to wetland ecosystems include urban expansion, agricultural intensification, climate change, and pollution. These pressures result not only in the degradation of biodiversity but also in the erosion of associated traditional knowledge (MEA, 2005; Kumar & Singh, 2018). In many areas, younger generations are becoming detached from ethnobotanical traditions, leading to a decline in the cultural transmission of knowledge systems. Without proper documentation and conservation efforts, valuable insights into plant-based healing and sustainable use may be irretrievably lost. The urgency to document, preserve, and interpret ethnobotanical knowledge in wetland ecosystems has led to an emerging body of literature emphasizing participatory and community-based research methods (Alexiades, 1996; Singh & Singh, 2019). These approaches recognize local communities not just as informants but as co-stars of ecological heritage. Involving elders, traditional healers, and folk practitioners helps in capturing culturally nuanced information, which often escapes mainstream scientific inquiry (Tiwari et al., 2010).

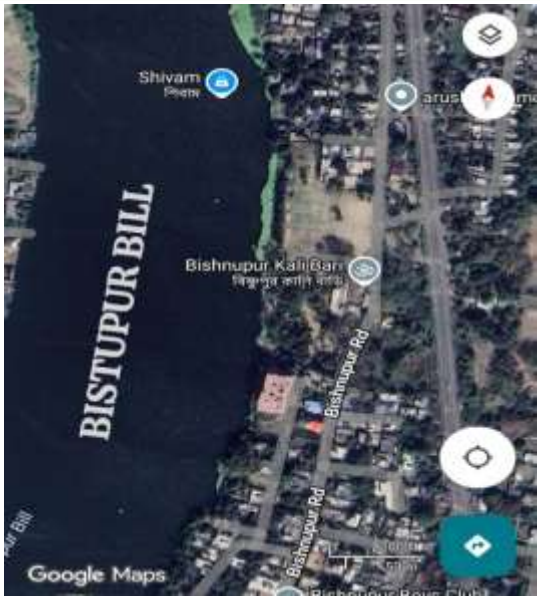
The present study contributes to this growing ethnobotanical discourse by examining twenty aquatic and semi-aquatic plant species from three wetlands—Bistupur Bill, Chatrar Bill, and Dhopghati—in the Berhampore subdivision of Murshidabad. The methodology integrates ecological field surveys with qualitative interviews, focusing on how plants are used for medicinal, nutritional, and ritualistic purposes. Species like *Typha angustifolia* are used in mat weaving and wound treatment, while *Eichhornia crassipes*, despite its classification as an invasive species, is utilized for composting and wastewater remediation (Malik, 2007). By synthesizing ethnographic data with botanical classification, this study aims to bridge the gap between scientific taxonomy and local cultural practice. It underscores the value of aquatic ethnobotany in the larger framework of biodiversity conservation, traditional healthcare, and sustainable development. Furthermore, it advocates for the incorporation of indigenous knowledge into wetland management policies, aligning with the goals of the Convention on Biological Diversity (CBD, 2010).

Ultimately, this research serves as both a scientific and cultural archive—a testimony to the intricate bond between wetland ecology and human resilience. In documenting these practices, we not only preserve a disappearing knowledge system but also provide a foundation for future research, conservation strategies, and biocultural education.

METHODOLOGY

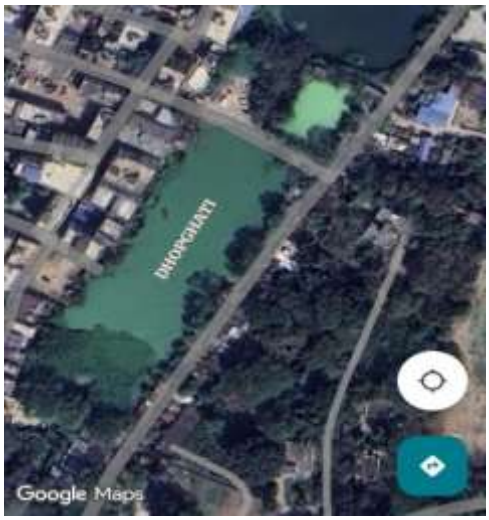
Murshidabad district, located in the northern part of West Bengal, India, is an agriculturally dominant region comprising 26 administrative blocks and 1,937 villages. It spans a geographical area of approximately 5,341 square kilometers and lies between latitudes 24° 50′N to 23° 43′N and longitudes 88° 46′E to 87° 49′E. The district is characterized by an intricate network of rivers, wetlands, ponds, and marshes that provide a rich aquatic ecosystem conducive to ethnobotanical exploration. The present study focused on three freshwater wetlands located in the Berhampore subdivision of the district: Bistupur Bill, Chatrar Bill, and Dhopghati Wetland. These sites were purposefully selected based on their (i) ecological diversity, (ii) proximity to human settlements, and (iii) the presence of ongoing community interactions with aquatic flora. Each wetland represents a unique micro-ecological niche, shaped by hydrological patterns, plant diversity, and traditional livelihood practices.

The study was conducted from January to June 2024 and followed a multi-phase ethnobotanical fieldwork approach. Samples of each plant were collected from the field and identified with the help of expert botanists and reference books. The plants were grouped according to their scientific names, families, local names, and uses—such as for food, medicine, rituals, or environmental purposes. The collected information was organized in tables and compared across the three wetlands to find patterns in how people depend on aquatic plants in different areas.



VISITING SITE 1: BISTUPUR BILL,

VISITING SITE 2: CHATRAR BILL, BERHAMPORE



VISITING SITE 3: DHOPGHATI,

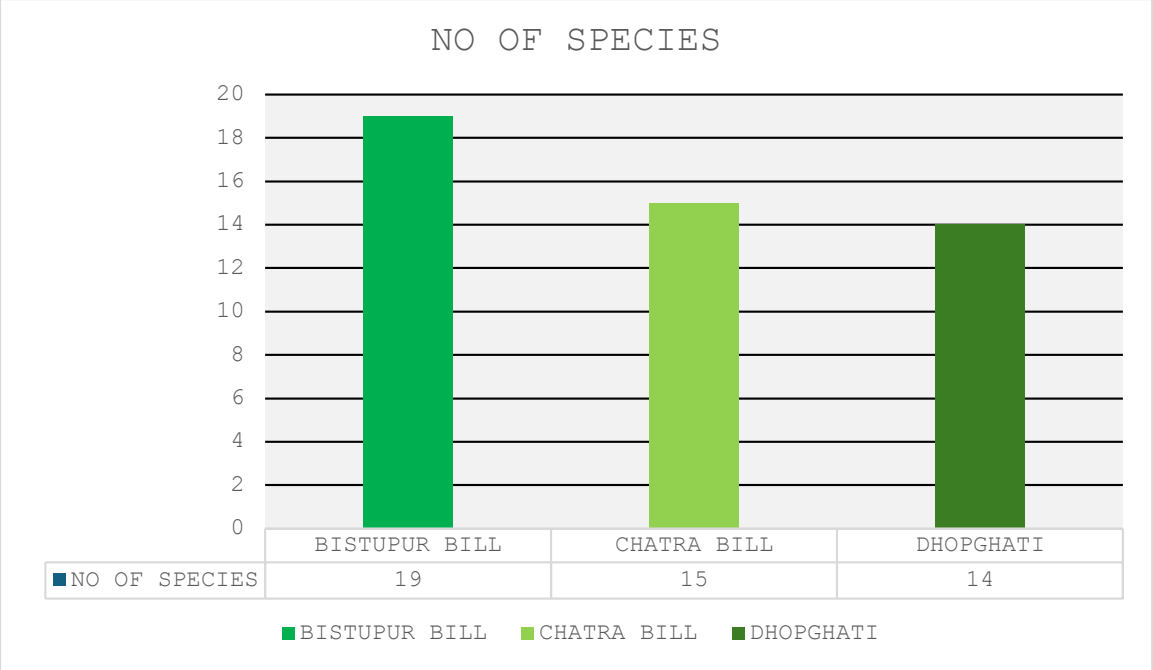
RESULTS & DISCUSSIONS

The present study documented the ethnobotanical usage of twenty aquatic and semi-aquatic plant species across three freshwater wetlands—Bistupur Bill, Chatrar Bill, and Dhopghati—located in the Berhampore subdivision of Murshidabad district, West Bengal. Data was compiled through ecological field surveys and community interviews. The findings reveal significant variation in species occurrence, cultural usage, and community dependence across sites.

Among the 20 recorded species, Bistupur Bill showed the highest species richness with 19 plants documented. Chatrar Bill followed with 15 species, while Dhopghati Wetland had 14 (TABLE: 1). This distribution may reflect differences in microclimatic conditions, water retention, anthropogenic pressure, and land use patterns. Seven species (*Pani-notey, Brahmi, Durba, Kochu, Water hyacinth, Kalmi shak, Shaluk, and Hogla*) were found commonly across all three wetlands, indicating their widespread availability and cultural integration within the local communities. In contrast, species like Padma (*Nelumbo nucifera*) and Water lettuce (*Pistia stratiotes*) were recorded only in Bistupur and Chatrar, suggesting site-specific preferences or ecological limitations.

SL No.	Local Name	Bistupur	Chatrar	Dhopghati
1	Pani-notey	☑	☑	☑
2	Water Amaranth	☑	☑	
3	Kulekhara	☑		☑
4	Brahmi	☑	☑	☑
5	Thankuni	☑		☑
6	Durba grass	☑	☑	☑
7	Kochu	☑	☑	☑
8	Water hyacinth	☑	☑	☑
9	Kalmi shak	☑	☑	☑
10	Sushni shak	☑		☑
11	Nilpadma	☑		
12	Water lettuce	☑	☑	
13	Padma	☑		
14	Arrowhead plant	☑	☑	☑
15	Water chestnut	☑	☑	☑
16	Shaluk	☑	☑	☑
17	Helencha shak	☑	☑	
18	Ghetu		☑	☑
19	Topapana	☑	☑	
20	Hogla	☑	☑	☑

(TABLE 1 SHOWS PRESENCE/ABSENCE OF SPECIES ACROSS THREE SITES)



(DIAGRAM SHOWS TOTAL NO OF SPECIES ACROSS EACH SITE)

The documented species were categorized based on their primary use: medicinal, nutritional (edible), ritual/spiritual, and ecological/practical functions. Most species had multiple roles, demonstrating the multifunctionality of aquatic plants in rural livelihoods (TABLE 2). Over 75% of the species had reported medicinal properties. Commonly used species include *Centella asiatica* (Thankuni), *Bacopa monnieri* (Brahmi), and *Marsilea minuta* (Sushni shak) for ailments such as fever, indigestion, skin diseases, and memory enhancement. Notably, *Asteracantha longifolia* (Kulekhara) was used as a blood purifier and liver tonic, indicating its therapeutic value in traditional herbal practices. Edible greens like *Ipomoea aquatica* (Kalmi shak), *Alternanthera sessilis* (Pani-notey), and *Enhydra fluctuans* (Helencha shak) are consumed as

seasonal vegetables. Their inclusion in the daily diet reflects a close integration of wild aquatic species into subsistence farming and food security strategies, particularly among economically marginal communities. Species like *Typha angustifolia* (Hogla) and *Eichhornia crassipes* (Water hyacinth) are used beyond direct consumption. *Hogla* leaves are employed in mat weaving and thatching, while *Water hyacinth*, despite being an invasive species, is valued for composting and phytoremediation. This reflects local adaptive strategies in utilizing available biomass for environmental management and livelihood needs.

SL NO	LOCAL NAME	SCIENTIFIC NAME	FAMILY	PARTS USED	IMPORTANCE
1	**Pani-notey**	*Alternanthera sessilis*	Amaranthaceae	Whole plant	Edible vegetable; anti-inflammatory; used for stomach disorders
2	**Water Amaranth**	*Alternanthera philoxeroides*	Amaranthaceae	Aerial parts	Fodder plant; known to have antioxidant properties
3	**Kulekhara**	*Asteracantha longifolia*	Acanthaceae	Leaves, roots	Blood purifier; used for anemia, liver tonic
4	**Brahmi**	*Bacopa monnieri*	Scrophulariaceae	Whole plant	Memory enhancer; used in Ayurvedic formulations for cognitive health
5	**Thankuni**	*Centella asiatica*	Apiaceae	Leaves	Used for wound healing, skin diseases, and mental clarity
6	**Durba grass**	*Cynodon dactylon*	Poaceae	Leaves, roots	Sacred grass: treats cuts, fever, and is used in religious rituals
7	**Kochu**	*Colocasia esculenta*	Araceae	Corms, leaves	Edible vegetable; source of dietary fiber and antioxidants
8	**Water hyacinth**	*Eichhornia crassipes*	Pontederiaceae	Whole plant	Used in compost, paper, and has phytoremediation potential
9	**Kalmi shak**	*Ipomoea aquatica*	Convolvulaceae	Tender shoots, leaves	Edible: treats constipation, jaundice, and promotes digestion
10	**Sushni shak**	*Marsilea minuta*	Marsileaceae	Leaves	Edible green; used to treat dysentery and skin eruptions
11	**Nilpadma**	*Nymphaea alba*	Nymphaeaceae	Flowers, rhizomes	Used in rituals; sedative and cooling properties
12	**Water lettuce**	*Pistia stratiotes*	Araceae	Whole plant	Used in wastewater treatment and skin ailments in folk practice
13	**Padma**	*Nelumbo nucifera*	Nelumbonaceae	Seeds, flowers, rhizomes	Sacred; used in rituals, diabetes management, and skincare remedies
14	**Arrowhead plant**	*Sagittaria montevidensis*	Alismataceae	Tubers	Edible; potential anti-inflammatory properties (less documented locally)
15	**Water chestnut**	*Trapa bispinosa*	Trapaceae	Fruit	Edible cooling agent, used during fasting

SL NO	LOCAL NAME	SCIENTIFIC NAME	FAMILY	PARTS USED	IMPORTANCE
16	**Shaluk**	*Nymphaea nouchali*	Nymphaeaceae	Flowers, rhizomes	Sacred in rituals; used for fever, inflammation, and as a cooling agent
17	**Helencha shak**	*Enhydra fluctuans*	Asteraceae	Leaves, stems	Edible green; used for liver disorders, skin diseases, and as a laxative
18	**Ghetu**	*Clerodendrum indicum*	Lamiaceae	Leaves, roots	Used in treating rheumatism, fever, and snakebite in folk medicine
19	**Topapana**	*Monochoria hastata*	Pontederiaceae	Leaves, flowers	Applied for skin infections; used in traditional wound healing
20	**Hogla**	*Typha angustifolia*	Typhaceae	Leaves, pollen	Leaves used for mat weaving; pollen used in traditional wound dressing

(TABLE 2 SHOWS PLANTS LIST WITH THEIR SCIENTIFIC NAME, FAMILY, PARTS USED & THEIR USES)

CONCLUSIONS

This study highlights the vital ethnobotanical knowledge embedded within the wetland ecosystems of Murshidabad, West Bengal, with a focus on three ecologically and culturally rich sites: Bistupur Bill, Chatrar Bill, and Dhopghati. Through field surveys and community interviews, twenty aquatic and semi-aquatic plant species were documented, each with diverse applications in traditional medicine, nutrition, rituals, and ecological practices. The findings reveal that several species, such as *Centella asiatica*, *Bacopa monnieri*, *Ipomoea aquatica*, and *Trapa bispinosa*, are not only important for healthcare and sustenance but are also deeply intertwined with the spiritual and cultural fabric of rural communities. The consistent use of multiple species across all three wetlands indicates a shared ethnobotanical knowledge base, while the presence of site-specific plants suggests localized traditions shaped by ecological availability and cultural memory. This points to a rich but vulnerable biocultural landscape where human-plant interactions have evolved through generations. However, these traditional knowledge systems are under growing threat due to urbanization, environmental degradation, and declining intergenerational knowledge transmission.

Considering these challenges, the study emphasizes the urgent need for biocultural conservation, which integrates ecological protection with the safeguarding of traditional knowledge. Conservation strategies should involve local communities as knowledge holders and ecological stewards, and educational programs must be developed to reengage younger generations with their natural and cultural heritage. Furthermore, this documentation can serve as a foundational step toward broader initiatives in sustainable wetland management, ethnobotanical research, and policy development.

Ultimately, preserving the ethnobotanical insights of Murshidabad's wetlands is not merely an act of cultural preservation, it is a necessary step toward ecological resilience, community health, and sustainable development in a region where nature and tradition remain deeply interconnected.

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