



# International Journal of Research in Agronomy

E-ISSN: 2618-0618

P-ISSN: 2618-060X

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2024; SP-7(2): 99-101

Received: 24-11-2023

Accepted: 29-12-2023

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## Checklist of the lake aquatic macrophytes in Dhamdha block, Durg district, Chhattisgarh state of India

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DOI: <https://doi.org/10.33545/2618060X.2024.v7.i2Sb.340>

### Abstract

During this study 26 lakes are investigate for aquatic macrophyte diversity and to understand the lake ecosystem dynamics and aquatic macrophytes species composition of Dhamdha in 2021-22. It is widely known that Chhattisgarh has abundant freshwater resources. There are 1.64 lakh hectares of water accessible for fish cultivation in Chhattisgarh. In Chhattisgarh, Dhamdha is renowned for its abundant natural water resources. However, the natural resources were disappearing daily.

Twenty-five different species of aquatic macrophytes were found in the lake that was the subject of the investigation. These species were distributed throughout 38 genera, encompassing the taxonomic categories angiosperms, bryophyta, and charophyta. Among the year-round species are *Eichornia crassipes*, *Vallisneria spiralis*, *Hydrilla verticillata*, *Ipomoea aquatic* and *Ipomoea carnea*. During the monsoon, several species of floating aquatic macrophytes were found, including *Ipomoea aquatic*, *Vallisneria spiralis*, *Hydrilla verticillata*, and *Eichornia crassipes*. As the depth of the water increased, these species flourished and took over the auqa-regime. Prominent phytosocial connections have been seen between a number of aquatic macrophytes, including *Hydrilla verticillata*, *Vallisneria spiralis*, and *Chara* sp. *Vallisneria spiralis*, *Najas minor*, *Potamogeton pectinatus* and *Valisneria* were shown to have similar associations.

**Keywords:** Chhattisgarh, Dhamdha, aquatic macrophytes, lake

### Introduction

The village of Dhamdha is located in Chhattisgarh State's Durg District. 38 kilometers from Durg, on the Durg-Bemetara road. Dhamdha was one of the thirty-six kings and kingdoms that gave rise to the state's name, Chhattisgarh. It is a historical, religious, and culturally rich kingdom belonging to the Gondwana dynasty. Which is renowned for having a distinct identity. Another name for it is "Talabo Ki Nagari." The Gond king, who built 126 ponds in this tiny block. The purpose of this pond is to shield the fort from enemy attack. One kori is equivalent to twenty, so six kori is one hundred and twenty, and one agar is one, so it becomes six total is one hundred and twenty-six taria is pond, which means kingdom of one hundred and twenty-six pond. This is also known as "Chhai Kori Chhai Agar Taria Ka Gad" in Chhattisgarh. Although safety was the primary reason for building this pond, people soon began using it for their daily needs. They raise fish and lotuses in the pond to meet the demand for water and to make money. However, because of urbanization, only twenty-six ponds remain in Dhamdha now.

Neiff (1978, 1986) <sup>[12-13]</sup> asserts that aquatic macrophytes play a significant role in shallow ecosystems, such as river-floodplain ecosystems and lake, since they spread widely and have high rates of primary productivity. Furthermore, because they improve nutrient cycling, promote habitat variability, and serve as a food source for a range of animals, macrophytes are an essential part of river floodplain ecosystems and lake (Esteves 1998) <sup>[15]</sup>. In wetlands, lakes, and rivers, macrophytes act as a bridge between the sediment, water, and occasionally the atmosphere. Primary producers are the most prominent role that plants play in the environment. But macrophytes also play a part in other ecosystem processes as transpiration, sedimentation, biomineralization, elemental cycling, material transformation, and atmospheric emission of biogenic trace gases (Carpenter and Lodge, 1986) <sup>[2]</sup>.

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Macrophytes are essential to shallow lakes because they can have two stable equilibria: one with clear water, where aquatic macrophytes predominate, and another with murky water, where phytoplankton does (Scheffer *et al.*, 1993; Moss *et al.*, 1994, Jeppesen *et al.*, 1998) [5, 11, 6]. Macrophytes use a number of methods, the relative importance of which is presumably varied, to maintain the clear-water state (Madsen *et al.*, 2001) [9]. Macrophytes, or aquatic weeds, are an essential part of the aquatic environment. The primary productivity and complexity of tropical states are influenced by their diversity and biomass (Kumar and Singh, 1987) [8]. In wetlands, lakes, and rivers, macrophytes act as a bridge between the sediment, water, and occasionally the atmosphere. Primary producers are the most prominent role that plants play in the environment.

Therefore, studies on the macrophytes found in wetlands and lakes have become increasingly important. This is due to the fact that these plants have an impact on the functional values of wetlands and lakes, in addition to the fact that systematic biodiversity stock taking is currently given top attention. In addition to taking stock and evaluating the ecological roles of various forms, a thorough analysis of the pattern of Lake Biodiversity is conducted. Lakes should be understood as complex mosaics of habitats with unique structural and functional properties, with vegetation pattern likely to govern important aspects of Lake Biogeochemistry and tropic dynamics (Rose and Crompton, 1996) [14]. The literature on aquatic macrophytes is extremely limited. Therefore, the goal of the current study is to examine the species composition of aquatic macrophytes in a specific lake located in the Durg District in Chhattisgarh's Dhamdha Block.

## Materials and Methods

The research area, or this region, is fortunate to have many

freshwater lakes, the Shivanth River, and dams that support a wide range of aquatic macrophytes.

To comprehend the lake ecology, knowledge of the phytosociological data for aquatic macrophytes in any body of water is crucial. The phytosociology of many macrophytic species in various freshwater bodies in India and outside has been extensively studied. A monthly survey was conducted in the current study in 2020 to 2021 to gather submerged aquatic macrophytes. Aquatic macrophytes were analyzed qualitatively and quantitatively using the methods of Biswas and Calder (1984) [1] and Mishra (1974) [10]. The aquatic macrophytes in each body of water were examined, and specimens were recognized down to the genus and species level.

## Results

In the lake under study, aquatic macrophytes showed a heterogeneous collection of twenty-five species. The distribution of these species was found in 18 genera, which included charophyta, bryophyta, and angiosperms as taxonomic groups. *Eichornia crassipes*, *Vallisneria spiralis*, *Hydrilla verticillata*, *Ipomoea aquatica*, and *Cynodon dactylon* are among the species that are present all year round. Some floating aquatic macrophyte species, such as *Eichornia crassipes*, *Vallisneria spiralis*, *Hydrilla verticillata*, and *Ipomoea aquatica* were discovered during the monsoon. These species flourished and dominated the aqua-regime at increasing depths of water. Prominent phytosocial relationships have been seen between several aquatic macrophytes, such as *Chara sp.*, *Vallisneria spiralis*, and *Hydrilla verticillata*. Similar relationships were discovered between *Vallisneria spiralis*, *Najas minor* and *Potamogeton perfoliatus*.

**Table 1:** Checklist of Some Aquatic Macrophytes Found in Dhamdha Lake

Sr. no.	Species Name	Family	Life Form
1.	<i>Acorus calanius</i> (Sweet flag)	Acoraceae	Submerged
2.	<i>Azolla caroliniana</i>	Salviniaceae	Free floating
3.	<i>Cabomba caroliniana</i>	Cabombaceae	Submerged
4.	<i>Chara globularis</i> (Musk grass)	Characeae	Submerged
5.	<i>Eichornia crassipes</i>	Pontederiaceae	Free floating
6.	<i>Hydrilla verticillata</i>	Hydrocharitaceae	Submerged
7.	<i>Ipomoea aquatica</i>	Convolvulaceae	Rooted floating
8.	<i>Ipomoea carnea</i>	Convolvulaceae	Rooted floating
9.	<i>Lemna perpusilla</i>	Lemnaceae	Free floating
10.	<i>Lythrum portula</i>	Myrtales	Submerged
11.	<i>Marsilea villosa</i>	Marsileaceae	Submerged
12.	<i>Najas minor</i>	Hydrocharitaceae	Submerged
13.	<i>Nelumbo nucifera</i> (Lotus)	Nelumbonaceae	Submerged
14.	<i>Nymphaea nouchali</i>	Nymphaeaceae	Surface
15.	<i>Persicaria hydropiperoides</i>	Polygonaceae	Submerged
16.	<i>Pistia</i> (Water cabbages)	Araceae	Free floating
17.	<i>Potamogeton crispus</i>	Potamogetonaceae	Submerged
18.	<i>Potamogeton gramineus</i>	Potamogetonaceae	Submerged
19.	<i>Potamogeton perfoliatus</i>	Potamogetonaceae	Submerged
20.	<i>Rotala rotundifolia</i>	Lythraceae	Emergent
21.	<i>Syngonium podophyllum</i>	Araceae	Submerged
22.	<i>Trapa natans</i>	Lythraceae	Submerged
23.	<i>Typha angustata</i>	typhaceae	Emergent
24.	<i>Vallisneria spiralis</i>	Hydrocharitaceae	Submerged
25.	<i>Water hyacinth</i>	Potederiaceae	Surface

## Conclusion

The study's check list is meant to help further research in lake, especially with regard to ensuring the continuation of long-term ecological initiatives that are now underway. A listing of

wetlands and deep water habitats for macrophytes in the United States was provided by Cowardin *et al.* in 1979 [4]. Keddy (2000) [7] categorized macrophytes based on their habitat in wetlands. The submerged, floating, and emerging aquatic

macrophytes are those that grow in and are covered by at least 25 centimeters of water. The existence of the lake is seriously threatened, nevertheless, by the other recently discovered macrophytic species. Chambers *et al.* (2010) <sup>[3]</sup> examined the global macrophyte species checklist. Comparable to what our current investigation has found. Variations in species diversity and genera' identities between these surveys show that macrophyte assemblages in this lake are dynamic and constantly evolving.

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