



Diversity and distribution of macrophytes in Govindgarh Lake of Rewa district (M.P.)

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Abstract

The study of macrophytes diversity was carried out during November 2017 to July 2018. In the present study, a total of 24 macrophytes were recorded from littoral and sub littoral zones of the lakes at four selected sampling stations. The dominant species like, *Hydrilla*, *Lemna*, *Nymphaea*, *Nelumbo*, *Ceratophyllum* and *Utricularia* were recorded. The present study provides new base line information on the diversity of various types of macrophytes.

Keywords: diversity, distribution, Macrophytes, Govindgarh lake

1. Introduction

Aquatic plants grow profusely in lakes and waterways all over the world and have in recent decades their negative effects magnified by man's intensive use of natural water bodies. Eradication of the weeds has proved almost impossible and even reasonable control is difficult. Submersed plants in rivers and irrigation canals increase the bed and bank roughness increasing drag and decreasing flow (Peter, 1968) ^[1]. As plant biomass increases seasonally this effect is magnified. Plant biomass displaces part of the canals cross sectional area resulting in higher water levels and increased likelihood of flooding. Floating plants increase water loss through evapotranspiration. Brezny *et al.* (1973) ^[2] reported evapotranspiration for water hyacinth was 130 to 150% higher than evaporation from a free water surface under equivalent conditions while Timmer and Weldon (1967) ^[3] reported values 370% higher than a free water surface.

The presences of these unwanted and undesirable aquatic plants certainly pose serious threat to the productive potential of the aquatic body. The problem of weeds in fishery waters is more acute in tropical and subtropical countries than the temperature countries. However, aquatic weeds now pose a 'global problem.

2. Methodology

The Govindgarh dam is one of the unique water body in India and located in south of Rewa, district in Madhya Pradesh at a distance of 20 km. from Rewa, with a longitude 24°20'25" and latitude 81°15'20". The dam is connected with all weather Rewa-Shahdol and Satna-Sidhi road. The dam was formed by impounding of small nalla originating from Kaimore hill. With a view to storing rain water, the Maharaja of Rewa at that time built a bandh across the nalla to form a tank in the year 1958.

The lake is a big water body and rich in its flora and fauna. Lake water is used for various purposes like Pisciculture, irrigation, horticulture, water supply to Rewa city, recreation and for drinking, bathing, washing clothes, cattle swallowing and vehicle servicing etc. The lake has been providing irrigation facilities since the year 1956. The lake was designed to provide irrigation to 1000 acres in the

village Amin, Dhobahat and Parasias of Satna district and Nakta, Semaria and Kolwaru in Rewa district.

The poor and the labour class people use the lake water for washing and bathing leading to pollution and also affect the aesthetic environment. The socio-economic conditions of the people must be improved for a better infrastructure and lake restoration. Govindgarh lake is also under serious threat due to damaging land use practice in the catchments area. The lake choking with weeds, silting and encroached from all sides is shrinking in size with deterioration in its quality and loss of its varied flora, fauna and other resources.

Macrophytes were collected during three different seasons such as rainy, winter and summer. The survey was conducted seasonally to collect the information regarding littoral and submerged vegetation. The macrophytes were collected by land pricking from the littoral one and exposed marginal areas of the lake near to sampling stations and then brought to laboratory immediately, prepared in 10% formalin and observed. The collected specimens were identified and confirmed with regional floras (Abbasi, 1986; Cook, 1996 ^[4, 5] and regional checklist for hydrophytes (Begum, Tasleem 2016 and Udaykumar & Ajithadoss, 2010) ^[6, 7].

3. Results & Discussion

Aquatic plants serve as good source of food to mankind and animals thus forming a palatable food for water birds and a best for aquatic wild life conservation practices (Kiran, *et al.* 2006) ^[8]. Aquatic vesicular plants are important indicators of water pollution (Seddon, 1972) ^[9]. Many workers contributed recent aspects of production studies of macrophytes (Kashyap, Vinita R. 2016; Adoni, 1985) ^[10-11]. But, comparatively, the productivity studies of macrophytes in the ponds situated near the industries are less (Suvarna, 1992) ^[12]. The submerged aquatic macrophytes are important constituents of water body which take up elements by well-developed root or rhizome. Aquatic plants are important as they supply food and shelter for many aquatic organisms. They serve as substratum to different micro and macro organisms (Raut and Madhuri, 2005) ^[13]. According to Kudryavtsev and Yeshov (1980) ^[14] dead parts of the macrophytes act as excellent substrate for the

development of micro-organisms. During the period of investigation the macrophytes of the tank were observed and recorded. Total 24 macrophyte species were recorded from littoral and sub littoral zones of the tank nearby sampling stations. In the free floating macrophytes, 6 species were recorded of which *Hydrilla spp.* and *Lemna spp.* were dominant on all the sampling stations. Among rooted floating, *Nymphaea spp.* and *Nelumbo spp.* recoded from all the sampling stations. In free submerged, two species were recorded *Ceratophyllum* and *Utricularia* species showed its appearance on all the four stations. Sharma and Singhal (1988) [15] recorded 11 species of macrophytes of which 4 were floating, 5 submerged and 2 emerged from a tropical lake and recorded fluctuations in macrophytic biomass value, higher during summer (March to May) and lower during monsoon and post monsoon period (July to October). Meshram (2003) [16] recorded

dominant macrophytes as *Hydrilla verticillata*, *Ceratophyllum spp.* and *Chara spp.* in Wadali Lake. Das (2005) [17] reported *Potamogetan pectinatus*, *P. natans*, *Polygonum*, *Iocharis*, *Ceratophyllum*, *Vallisneria*, *Hydrilla* and *Lemna* in the descending order of abundance from lake Nainital Kumaun. Giri *et al.* (2008) [18] also recorded total of 84 macrophytic species belonging to 73 genera and 34 families were observed during the study period. Among these, 55 terrestrial plants (66%), 11 aquatic plant species (13%) and 18 semi aquatic plant species (21%) have been found.

The Govindgarh lake is surrounded by agricultural plains with scanty tree growth. The entire vegetation of this area can be classified as Terrestrial vegetation and Aquatic vegetation (Table No. 1). Aquatic vegetation can be studied with emergent, submerged and free floating.

Table 1: The diversity of macrophytes in Govindgarh lake during June 2017 to May 2018.

S. No.	Name of the Macrophytes	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
1.	<i>Ipomea pisolosa</i>	+	+	+	+	+	+	+	+	+	+	+	+
2.	<i>Ipomea aquatica</i>	+	+	+	+	+	+	+	+	+	+	+	+
3.	<i>Eichhornia crassipura</i>	+	+	+	+	+	+	+	+	+	+	+	+
4.	<i>Hydrilla verticillata</i>	+	-	-	-	-	-	-	+	+	+	+	+
5.	<i>Chara zeylanica</i>	+	-	-	-	-	-	-	+	+	+	+	+
6.	<i>Ceratophyllum demersum</i>	+	+	-	-	+	+	+	+	+	+	+	+
7.	<i>Spherodela polyrhiza</i>	+	+	-	-	+	+	+	+	+	+	+	+
8.	<i>Nymphoides hydrophylla</i>	+	+	-	+	+	+	+	+	+	+	+	+
9.	<i>Vallisneria spiralis</i>	-	-	-	-	-	-	+	+	+	+	+	+
10.	<i>Potamogeton orispus</i>	+	+	-	-	+	+	-	+	+	+	+	+
11.	<i>P. pestinata</i>	-	-	-	-	+	+	-	+	+	+	+	-
12.	<i>P. perfoliatus</i>	+	+	-	-	+	+	-	+	+	+	+	+
13.	<i>Sagittaria sgittiphotia</i>	-	-	+	+	-	-	-	+	+	+	-	-
14.	<i>Utricularia spp.</i>	-	+	-	-	+	+	+	-	-	-	-	-
15.	<i>Lymnophyton</i>	+	+	-	-	+	+	+	-	-	+	+	+
16.	<i>Mucoria vaginalis</i>	-	-	-	-	+	+	+	-	-	-	-	-
17.	<i>Nymphaea pubescens</i>	+	+	+	-	-	+	+	+	+	+	+	+
18.	<i>Alternanthera philoxioides</i>	+	+	-	-	+	+	+	+	+	+	+	+
19.	<i>Typha angustata</i>	+	+	+	+	+	+	+	+	+	+	+	+
20.	<i>Ottelia elismoides</i>	-	-	-	-	-	-	-	-	+	+	+	+
21.	<i>Marcelia spp.</i>	+	-	-	+	+	+	+	+	+	+	+	+
22.	<i>Pistia stratiotes</i>	+	+	+	+	+	+	+	+	+	+	+	+
23.	<i>Cyperus spp.</i>	-	-	+	+	+	+	+	+	+	+	+	+
24.	<i>Cynodon dactylon</i>	-	-	-	-	-	-	+	+	+	+	+	+

(+) = Present., (-) = Absent.

Hydrophytes

Emergent Plants: These plants grow on the exposed or semi submerged soils. Plants produce serial reproductive and vegetative organs, which are *Typha augustatus*, *Vallisneria spiralis*.

Submerged plants: These plants grow in below the surface of water and the plants identified in Govindgarh lake, *Hydrilla verticillata*.

Free Submerged plants: *Ceratophyllum demersum* and *Utricularia spp.* **Free floating hydrophytes:** These occur on standing and slow flowing waters. *Pistia stratiotes* and *Azolla pinnata*.

Terrestrial vegetation

Govindgarh lake is covered by dominant trees of *Mangifera indica*, *Azadiracta indica*. In this lake *Eichhornia crassipura*, *Ipomea spp.* and *Vallisneria spiralis* forming thick mats in the stagnant water. The shallow water is getting enriched with high bottom sediments which are the ideal habitat for luxuriant growth of aquatic plants.

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