Inventory of aquatic macrophytes from Johila Reservoir of Sanjay Gandhi Thermal Power Plant, Birsinghpur, Umaria (M.P.)

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Abstract

The present study enumerates different species of macrophytes from Johila reservoir. This reservoir is the main source of water to Sanjay Gandhi Thermal Power Plant (SGTPP) Birsinghpur-Pali at Umaria district in Madhya Pradesh. The study was carried out from October 2013 to September 2015. Seventeen species of aquatic plants belonging to 13 families were encountered from Johila Reservoir. The average density of aquatic macrophytes was recorded to be 17.30/m^2. The dominant aquatic plant species were *Hydrilla verticillata* followed by *Ceratophyllum demersum, Potamogeton crispus, Vallisneria americana, Ipomoea aquatica, Najas indica, Vallisneria natans* etc.

KEYWORDS: Macrophytes, Johila Reservoir, Thermal Power Plant.

INTRODUCTION

Aquatic macrophytes are plants that grow in or near water sources. They play vital role in providing food for fish and other aquatic animals, provide shelter to algae and some animals along with cycling of nutrients in the water bodies. Aquatic macrophytes comprises a diverse group of organisms including angiosperms, ferns, mosses, liverworts and some freshwater macro-algae that occur seasonally or permanently in wet environments (Lacoul and Freedman, 2006; Chambers *et al.*, 2008). Aquatic macrophytes are useful plant groups to assess and determine anthropogenic activities and their impact on aquatic ecosystem (Solak *et al.*, 2012). The study pertains to the impact of polluted water on macrophytic diversity of the study sites. The Sanjay Gandhi Thermal Power Plant is one of the coal based power plants of M.P. Power Generation Company Limited with an installed capacity of 1340 MW, and located between latitude 23° 15’ to 23° 30' N and longitude 81° 0’ to 81° 30’ E″. The power plant is situated on the bank of Johila River. Johila reservoir is made on Johila River with a catchment area and submergence area of 1634.39 sq. km and 1810 hectares respectively. Johila Dam is a concrete cum earthen dam with the capacity of 171 million cu m. The water of this reservoir is mainly used by the thermal power station to cool down the steam, used in a stream turbine.

MATERIAL AND METHODS

Study Area

The Johila Reservoir is located about 10 km from Birsinghpur Railway station (Latitude 23° 19′ 00.1″ N and longitude- 081° 02′ 20.4″).This reservoir is made on Johila River. For efficient monitoring and systematic field studies, regular sampling of aquatic macrophytes at four permanent sampling stations were fixed in the Johila reservoir.

Collection of macrophytes and identification

The Johila Reservoir was surveyed for its aquatic macrophytes. Field assessments were carried out from October 2013 to September 2015. For the assessment of aquatic macrophytes, a quadrat method of sampling was adopted. Quadrat size of 1m x1m was used for sampling and 5 quadrats were laid in each study sites. The samples were collected by simply cutting its 5 cm appox twig with scissor and kept aside in plastic bags (Nagare and Dummalod, 2012). Collected samples were preserved in 4% formalin and herbarium of specimens is maintained in the laboratory. The collected macrophytes were identified with the help of standard literature Oommachan and Shrivastava (1996), Gupta (2001), and Smagula and Connor, 2007).

RESULTS AND DISCUSSION

Aquatic macrophytes are the large, predominantly angiospermic/algal plants of aquatic ecosystems. The aquatic macrophytes of Johila reservoir during present investigation are listed in Table-1 along with their families and average density in m^2. A total of 17 plant species were identified belonging to 13 families such as Hydrocharitaceae (4), Potamogetonaceae (2), Ceratophyllaceae (1), Convolvulaceae (1), Polygonaceae (1), Characeae (1), Amaranthaceae (1), Typhaceae (1), Lentibulariaceae (1), Lythraceae (1), Menyanthaceae (1), Alismataceae (1) and Pontederiaceae (1).

The average density of aquatic macrophytes was recorded to be 17.30/m^2. The dominant aquatic plant species were *Hydrilla verticillata* (4.92) followed by *Ceratophyllum demersum* (3.62), *Potamogeton crispus* (2.23), *Vallisneria americana* (1.84), *Ipomoea aquatica* (1.21), *Najas indica* (0.97), *Vallisneria natans* (0.82) etc. (Table -1).

Aquatic macrophytes present in any fresh water bodies play an important role in determining its hydrobiological characteristics. Normally reservoir and other surface waters are classified into oligotrophic and eutrophic. According to Agarkar *et al*., (1994) eutrophic conditions can be generally characterized by increasing number of aquatic plants in water body that can cause further eutrophication. Varshney (1981) have noted that certain aquatic macrophytes like *Lemna*, *Myriophyllum*, *Eichhornia*, *Nuphar*, *Utricularia* and *Potamogeton* can be used as pollution indicator. Oommachan *et al*., (1980) also noted *Potamogeton pectintus*, *P. crispus*, *Utricularia* sp. *Trapa bispionsa*, *Marsilea polygonum* and *Cyperus salopecuroides* as pollution indicator. In the present investigation *Potamogeton*, *Utricularia, Trapa* and *Eichhornia* were found in Johila reservoir.

Table-1: Average density of aquatic macrophytes in Johila Reservoir during study period from October, 2013 to September, 2015.

S. No.	Plant species	Family	Average density in (1m×1m quadrat)
1	*Hydrilla verticillata* (L.f.) Royle	Hydrocharitaceae	4.92
2	*Ceratophyllum demersum* L.	Ceratophyllaceae	3.62
3	*Potamogeton crispus* L.	Potamogetonaceae	2.23
4	*Vallisneria americana* Michx.	Hydrocharitaceae	1.84
5	*Ipomoea aquatica* Forssk.	Convolvulaceae	1.21
6	*Najas indica* (Willd.) Cham.	Hydrocharitaceae	0.97
7	*Vallisneria natans* (Lour.) H.Hara	Hydrocharitaceae	0.82
8	*Persicaria barbata* (L.) H.Hara	Polygonaceae	0.51
9	*Chara vulgaris* L.	Characeae	0.28
10	*Potamogeton perfoliatus* L.	Potamogetonaceae	0.27
11	*Alternanthera philoxeroides* (Mart.) Griseb.	Amaranthaceae	0.21
12	*Typha latifolia* L.	Typhaceae	0.12
13	*Utricularia stellaris* L.f.	Lentibulariaceae	0.09
14	*Trapa natans* L.	Lythraceae	0.07
15	*Nymphoides indica* (L.) Kuntze	Menyanthaceae	0.06
16	*Sagittaria sagittifolia* L.	Alismataceae	0.05
17	*Eichhornia crassipes* (Mart.) Solms	Pontederiaceae	0.03
		Total	**17.30**

In the present investigation, we found considerable aquatic macrophytes in the Johila reservoir during study period. The increased number of aquatic macrophytes indicates that the water quality of these reservoirs is going towards eutrophied condition.

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