



REGULAR ARTICLE

# ENUMERATION OF MACROPHYTES IN A POLLUTED POND OF SHAHJHANPUR U.P. (INDIA)

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## SUMMARY

In the present study an attempt have been made to enumerate the macrophytes and their distributional pattern (Sharma and Dhakre 1993) in a polluted pond of Shahjahanpur, U.P. India, receiving domestic wastes. Total 21 species of macrophytes belong to 14 families have been reported. It is observed that these macrophytes were very much affected by pollutants.

Saltanat Ara Malik and Atul Namdeo. Enumeration of Macrophytes in a Polluted Pond of Shahjhanpur U.P. (India). J Phytol 2/9 (2010) 14-17.

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## 1. Introduction

Natural fresh water resources all over the world often serve as suitable environment for the colonization of different types of Macrophytes. Due to rapid industrialization, urbanization and population explosion the problem of water pollution has disturbed the congenial environment of water bodies in the last few decads. The pollution of water adversely affects aquatic flora and fauna. Macrophytic vegetation of lentic and lotic water bodies play an important role in the determining, the structure and function of aquatic ecosystem.

Works on the floristic composition, phenology, ecology and distribution of hydrophytes in different parts of India were carried by several workers. Pioneer work was made by cooke (1901-08) who studied the aquatic plant in Bombay. Omni (1972) observed that the growth of distribution of aquatic plants are well influenced by the addition of pollutants in the aquatic ecosystem. Patil Singh and Hershey (1984) Studies macrophytes of a fish tank, Jabalpur. Sharma and Singhal (1988) observed that the growth and distribution of aquatic plants are well developed by the addition of pollutions in the aquatic system. Shah *et. al.* (1979) studies macrophytes of the river Ganges at Darbhanga Kumar *et. al.* (1988) studied on plant species at Dehradun Pandey *et. al.* (1989) studied macrophytes of Mcpherson lake Allahabad. Salgare and Sobha (1990)

studies macrophytes of patale Ganga, Pande (1993) studied macrophytes of patale Ganga, Pande (1993) studied macrophytes of Ghagra belt at Gonda district.

In the present attempts have been made to enumerate the macrophytes and their distributional pattern in a pond receiving domestic wastes at Lodhipur Village. This pond is situated at the east corner of Shahjahanpur city. Shahjahanpur city is situated in the Tarai belt of upper Gangetic plain Uttar Pradesh, India at 27°5 51' N latitude and 79° 55' E longitude. It also receives the waste water from the houses of Indira Nagar colony as well as NTI colony. In addition, dairy wastes, agricultural discharges are also carried by water to the pond. The pond shows luxurient growth of algae, Pteridophytes, dicots & monocots. The pond is 340 meter in length and 120 meter in width while the depth varies at different places but is 12 meter in the centre.

## 2. Experiment procedure

In the present communication the domestic and dairy wastes get passed in to drainages which join the pond. The spot on the bank of the pond were selected depending upon the degree of pollution. The macrophytes were collected from the bank of it.

The Macrophytes of the site have been identified with the help of permanent

literature available on the taxonomy and were preserved in the Herbarium of P.G. Department of Botany G.F. College Shahjahanpur. The distribution pattern of macrophytes from this site was studied for a period of one year. All the macrophytes collected from this site were alphabetically arranged along with their family names according to Bentham and Hooker system of classification. For distributional pattern the classification proposed by Sharma and Dhakre (1993) was followed.

### Observation

The data (table 1.1) all, 21 species of macrophytes have been recorded from the site. The distribution pattern of each species was also recorded as shown in the table (1.1). The 21 species belonging to 14 families indicate that this pond supports rich vegetation. They are classified in to three classes viz. Pteridophytes (2), Monocots (10) and dicots (9). The distributional pattern of macrophytes was very much affected by the pollutants amongst different forms, the submerged plants were 2 free floating hydrophytes were 4, floating attached hydrophytes were 3 emergent amphibious hydrophytes were 7 and wetland hydrophytes were 5.

Table 1.2- Distribution of aquatic macrophytes in a Pond having domestic wastes at Lodhipur Village

S. No.	Name of Plant	Family	Distribution Pattern
1.	<u>Azolla pinnata</u> R.Br.	Azoceae	FFH
2.	<u>Ceratophyllum demersum</u> L.	Ceratophyllaceae	SH
3.	<u>Carex fedia</u> Nees	Cyperaceae	WLH
4.	<u>Cyperus exelatus</u> Retz.	Cyperaceae	WLH
5.	<u>Eichhornia crassipes</u> (Mort) Soims	Pontederiaceae	FFH
6.	<u>Eriocaulon cinereum</u> R.Br	Eriocaulaceae	EAH
7.	<u>Echinochloa colonum</u> (L.) Link	Poaceae	WLH
8.	<u>Hydrilla verticillata</u> (L.F.) Royle	Hydrocharitaceae	SAH
9.	<u>Ipomoea aquatic</u> Forsk	Convolvulaceae	EAH
10.	<u>Lemna paucicostata</u> Hegelm	Lemnaceae	FFH
11.	<u>Ludwigia perennis</u> L.	Onagraceae	SFA
12.	<u>Hydrolea zeylanica</u> (L.) vahl	Hydrophyllaceae	EAH
13.	<u>Marsilea minima</u> L.	Marsileaceae	EAH
14.	<u>Nymphaea nouchali</u> Burn f.	Nymphaeaceae	EAH
15.	<u>Polygonum limbatum</u> Meissn	Polygonaceae	EAH
16.	<u>Sagittaria sagittifolia</u> L.	Alismataceae	EAH
17.	<u>Scirpus articulatus</u> L.	Cyperaceae	EAH
18.	<u>Spirodela polyrhiza</u> (L.) schleid	Lemnaceae	FFH
19.	<u>Typha angustata</u> Bory & Chaub	Typhaceae	WLH
20.	<u>Wolffia arrhiza</u> (L.) wimmer	Lemnaceae	FFH
21.	<u>Zannichellia palustris</u> L.ssp Pedicellata Wahlen and Rosen	Zannichelliaceae	SAH

FFH = Free floating hydrophytes SH = Suspended hydrophytes

WLH = Wetland hydrophytes EAH = Emergent amphibious

hydrophytes SAH= Submerged attached hydrophytes SFA = Shoot floating attached hydrophytes

Table 1.2- Compression of present work site with the works of other authors in Indian water bodies

S. No.	Author's Name	No. of Families	No. of Species	Locality
1.	Bami, Ahmed and Siddiqui (1989)	9	10	Pond at Darbhanga Bihar
2.	Patil et. al. (1984)	14	17	Tannk at Jabapur
3.	Pande, Tiwari & Pandey (1989)	7	8	Mcpherson lake, Allahabad
4.	Pandey & Habib (1982)	7	7	Baghla Lake Allahabad
5.	Singh (1989)	—	43	Rawapuri pond at Nalanda
6.	Present Study	14	21	Lodhipur pond at Shahjahanpur

### 3. Results and Discussion

The data (table 3.1) revealed that in all, 21 species of macrophytes have been recorded from this site-1. The distributional pattern of macrophytes was very much affected by the pollutants. The submerged plant were 2, free floating hydrophytes were 4, floating attached hydrophytes were 3, emergent amphibious hydrophytes were 7 and wetland hydrophytes were 5. Out of 9 were recorded growing well in contact with polluted water while remaining 12 species were sensitive to pollution of water, therefore, they grow as emergent hydrophytes. In present study it was observed that plants like Hydrilla verticillata, Cyperus exalatus, Scirpus articulatus, sagittaria sagittifolia, Zannichellia palustris ssp pedicellata are well distributed throughout the pond. Carex fedia, Ceratophyllum demersum, Spirodela polyrrhiza were occurring at very restricted spots of the pond. Eichhornia crassipes and Typha angustata survive till early summer and again rejuvenate after the summer is over. Similar results were reported by (Unni, 1972 and Patil et. al., 1984). The submerged plants were found throughout the year as they were much affected by the changes in the abiotic factors. The present results confirm with those Bazmi and Ahmad (1989). In present investigation emergent amphibious hydrophytes and wetland hydrophytes like Carex fedia, Cyperus exalatus, Eriocaulon cynerium, Echinochloa colonum, Ipomoea aquatica, hydrolea, zeylanica, Marsilea minima, Nymphaea nouchali, Polygonum limbatum, Scirpus articulatus and Typha angustata were found growing abundantly as indicating the

pollution tolerance. These plants however, absorb minerals from the pond which accumulate in the pond from sewage whereas the free floating species like Azolla pinnata, Eichhornia crassipes, Lemna paucicostata, Spirodela polyrrhiza and Wolfia arrhiza were found commonly at certain spots of the pond. The distribution of shoot floating attached hydrophytes Ludwigia perennis was rare.

In the present investigation the pond with higher transparency developed high density of submerged plants and when water becomes turbid, floating plant dominate. This observation is similar with that of Zuthshi (1975). The excessive growth of Hydrilla Verticillata, Ceratophyllum demersum, Lemna paucicostata may be due to eutrophication. Goulder and Boatman (1971) opine that Ceratophyllum demersum requires high inorganic level in the medium. This may explain the nuisance level reached by this and other plant species in the pond receiving wastes from domestic and agricultural lands (Pandey et. al. 1989).

A report of the authors along with the number of families and species of different localities of India is given in table (3.3). From pond at Darabhanga Bihar (10 species), from tank of Jabalpur (17 species), from Macpherson lake at Allahabad (8 species), from Baghela lake at Allahabad (7 species) from Ravapuri pond Nalanda (43 species) however, have been reported by Bazmi et. al. (1989). Patil et. al. (1984), Pandey et. al. (1989), Pande and Habib (1982) and Singh (1989) respectively. In present investigation, however 21 species have been reported from Lodhipur pond at Shahjahanpur.

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