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PLANKTON DIVERSITY OF TWO TEMPLE PONDS OF SILCHAR, ASSAM, NORTH EAST INDIA

Arpita Dalal & Susmita Gupta*
Department of Ecology and Environmental Science, Silchar, Assam, India, 788011
*Corresponding Author Email - susmita.au@gmail.com

ABSTRACT
A study was carried out in two temple ponds- Radhamadhav akhra pond (RM) and Mandir dighi (MD) in Silchar town of Cachar district on the plankton diversity. A total of twenty-six phytoplankton and twenty-six zooplankton were recorded from both RM and MD. Six classes of phytoplankton were recorded from RM and eight classes from MD. Fifteen species were common at both the ponds. Four orders of zooplankton were recorded from RM and three orders from MD. Ten species were common at both the ponds.

KEY WORDS: Zooplankton, Phytoplankton,Temple pond.

INTRODUCTION

Phytoplankton is of great importance as a major source of organic carbon located at the base (Gaikwad *et al*., 2004). Their sensitivity and large variations in species composition are often a reflection of significant alteration in ambient condition within an ecosystem (Devassy and Goes, 1988, 1989). Zooplankton is tiny animals found in all aquatic ecosystems, particularly the pelagic and littoral zones in the ocean, also in ponds, lakes, and rivers. According to Murugan *et al*. (1998) and Dadhich and Sexena (1999) the zooplankton plays an integral role and serves bio indicators and it is a well suited tool for understanding water pollution status (Ahmad, 1996; Contreras *et al*., 2009). Hence for any scientific utilization of water resources plankton study is of primary interest.

Ponds are relatively shallow bodies of water and are collectively exceptionally rich in biodiversity (Williams *et al*., 2004). Recent research, driven by the need to improve pond conservation strategies (Biggs *et al*., 2005; McAbendroth *et al*., 2005), has started to shed interesting new light on pond ecosystem structure and function. Despite their small size, ponds often constitute biodiversity ‘‘hot spots’’ within a region or a landscape, challenging conventional applications of species-area models (‘big is best’) in practical nature conservation (Scheffer *et al*., 2006). In the present study plankton (phyto and zoo) richness of two temple ponds (Radhamadhav akhra pond and Mandir dighi) of Silchar city (24 ° 49’47" N Lat, 92 ° 46’80" E Long) have been investigated and compared.

MATERIALS AND METHODS

Both Pond 1 (Radhamadhav akhra pond) and Pond 2 (Mandir Dighi) are around 100 years old. Pond 1 is smaller in size (930 sq. m) located inside the temple compound while pond 2 (12590.56 sq. metre) is located in one residential area and one temple is located at the middle of the pond. There were five visits during the study period. Qualitative estimation of zooplankton and phytoplankton of the two ponds were carried out with the help of Dewinter compound microscope and identified using standard literature (Battish, 1992; Anand, 1998; Michael & Sharma, 1988).

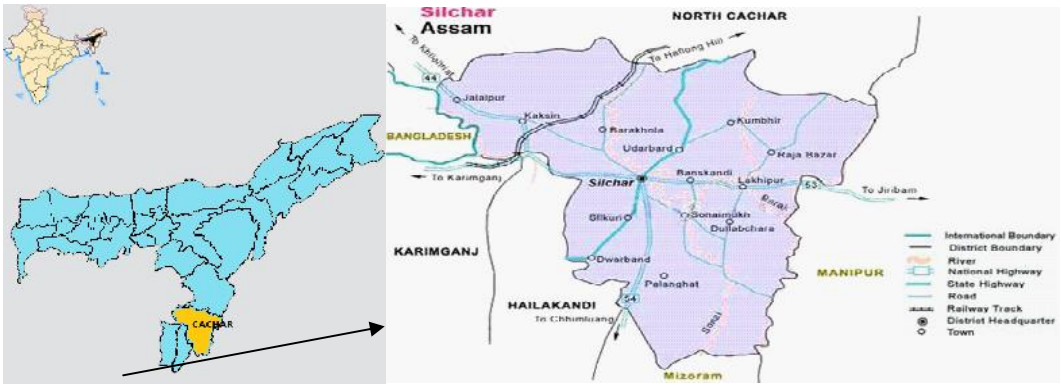


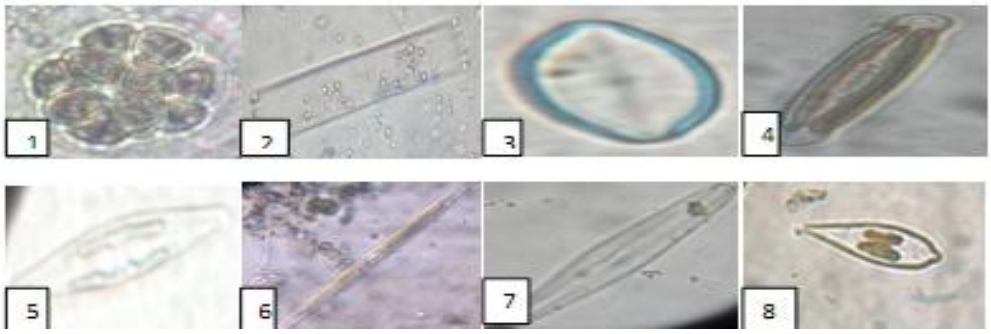
FIGURE 1. Map of district Cachar, Assam showing the city Silchar

RESULTS

Six classes of phytoplankton (Cyanophyceae, Bacillariophyceae, Zygnemophyceae, Chlorophyceae, Zygnematophyceae and Trebouxiophyceae) were recorded from Radhamadhav akhra pond and eight classes (Cyanophyceae, Bacillariophyceae, Zygnemophyceae, Chlorophyceae, Zygnematophyceae, Xanthophyceae, Coleochaetophyceae and Trebouxiophyceae) from Mandir dighi. Species found in Radhamadhav akhra pond were *Closterium* sp., *Gomphosphaeria* sp., *Eunotia* sp., *Navicula* sp., *Amphipleura* sp., *Frustulia* sp., *Stauroneis* sp., *Gomphonema* sp., *Cymbella* sp., *Synedra* sp., *Fragilaria* sp., *Desmidium* sp., *Cosmarium* sp., *Eudorina* sp., *Gloeocystis* sp., *Spirogyra* sp. and *Dicloster* sp. Species found at Mandir dighi were *Closterium* sp., *Gomphosphaeria* sp., *Eunotia* sp., *Navicula* sp., *Caloneis* sp., *Frutulia* sp., *Gomphonema* sp., *Cymbella* sp., *Rhopalodia* sp., *Synedra* sp., *Fragilaria* sp., *Desmidium* sp., *Euastrum* sp., *Pleurotaenium* sp., *Eudorina* sp., *Gloeocystis* sp., *Pediastrum* sp., *Spirogyra* sp., *Tribonema* sp., *Dicloster* sp. *and Coleochaete* sp. (Table 1). At Radhamadhav akhra pond four orders (Cyclopoida, Calaoida, Cladocera and Ploima) while at Mandir dighi three orders (Cyclopoida, Cladocera and Ploima) of zooplankton were found. Species found at Radhamadhav akhra pond were Nauplius larva, Cyclopoid male, *Tropocyclops* sp., *Mesocyclops* sp., *Acanthocyclpos* sp., *Microcyclops* sp., *Paracyclops* sp., *Macrocyclops* sp., *Diacyclops* sp., *unknown* sp.(Calanoida), *Bosmina* sp., *Polyphemus pediculus, Monostyla* sp., *Lecane* sp., *Lepadella* sp. and *Branchionus* sp. Species found at Mandir dighi were Nauplius larva, Cyclopoid male, *Tropocyclops* sp., *Microcyclops* sp., *Paracyclops* sp., *Cyclops* sp., *Polyphemus pediculus, Chydorus* sp., *Alona* sp., *Pleuroxus* sp., *Ceriodaphnia* sp., *Simocephalus* sp., *Macrothrix* sp., *Monostyla* sp., *Lecane* sp., *Lepadella* sp., *Trichotria* sp., *Branchionus* sp., *Anuraeopsis* sp. *and Trichocera* sp. (table 2).

TABLE 1: Phytoplankton diversity and distribution at Radhamadhav akhra pond and Mandir dighi during February to May, 2012.

Class	Order	Family	Species	Distribution
Cyanophyceae	Chroococcales	Gomphosphaeriaceae	*Gomhosphaeria* sp.	RM & MD
Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia* sp.	RM & MD
	Naviculales	Naviculaceae	*Navicula* sp.	RM & MD
			Caloneis sp.	MD
		Amphipleuraceae	*Amphipleura* sp.	RM
			Frustulia sp.	RM & MD
		Stauroneidaceae	*Stauroneis* sp.	RM
	Cymbellales	Gomphonemataceae	*Gomphonema* sp.	RM & MD
		Cymbellaceae	*Cymbella* sp.	RM & MD
	Rhopalodiales	Rhopalodiaceae	*Rhopalodia* sp.	MD
	Fragilariales	Fragilariaceae	*Synedra* sp.	RM & MD
			Fragilaria sp.	RM & MD
Zygnemophyceae	Desmidiales	Desmidiaceae	*Desmidium* sp.	RM & MD
			Cosmarium sp.	RM
		Closteriaceae	*Closterium* sp.	RM & MD
	Zygnematales	Desmidiaceae	*Euastrum* sp.	MD
			Pleurotaenium sp.	MD
Chlorophyceae	Chlamydomonadales	Volvocaceae	*Eudorina* sp.	RM & MD
	Chlorococcales	Scenedesmaceae	*Scenedesmus* sp.	RM & MD
		Chlorococcaceae	*Tetraedron* sp.	MD
	Sphaeropleales	Radiococcaceae	*Gloeocystis* sp.	RM & MD
		Hydrodictyaceae	*Pediastrum* sp.	MD
Zygnematophyceae	Zygnematales	Zynemataceae	*Spirogyra* sp.	RM & MD
Xanthophyceae	Tribonematales	Tribonemataceae	*Tribonema* sp.	MD
Trebouxiophyceae	Chlorellales	Chlorellaceae	*Dicloster* sp.	MD
Coleochaetophyceae	Coleochaetales	Coleochaetaceae	*Coleochaete* sp.	MD



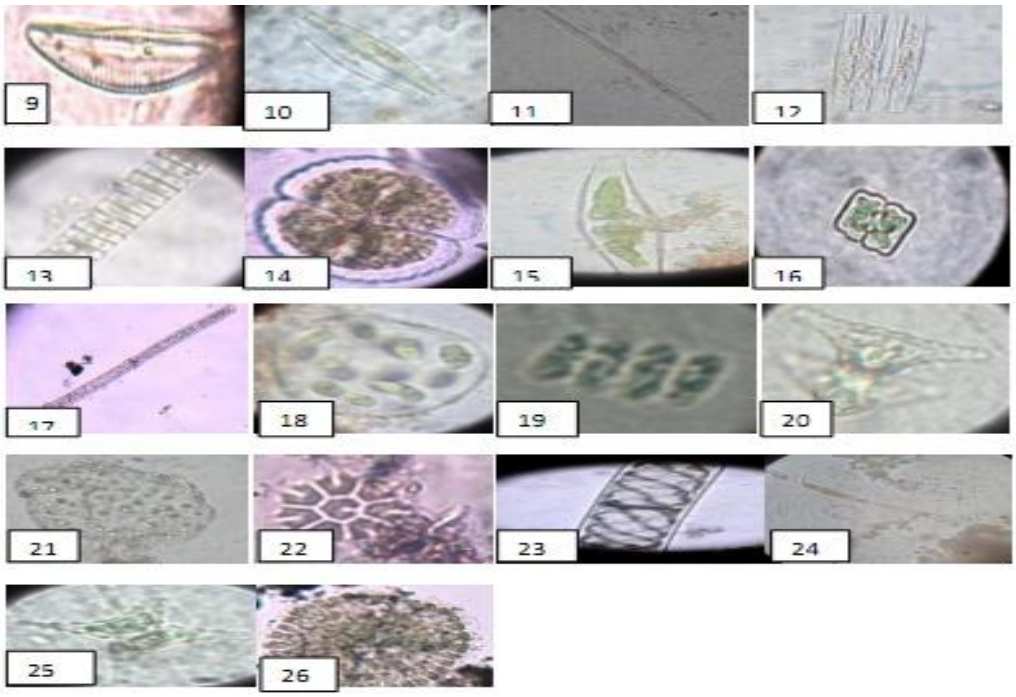


PLATE 1- Phytoplankton

FIGURE 2: 1-*Gomphosphaeria sp*. 2-*Eunotia sp*. 3-*Navicula sp*. 4-*Caloneis sp*. 5-*Amphipleura sp*. 6-*Frustulia sp*. 7-*Stauroneis sp*. 8-*Gomphonema sp*. 9-*Cymbella sp*. 10-*Rhopalodia sp*. 11-*Synedra sp*. 12-*Fragilaria sp*. 13-*Desmidium sp*. 14-*Cosmarium sp*. 15-*Closterium sp*. 16-*Euastrum sp*. 17-*Pleurotaenium sp*. 18-*Eudorina sp*. 19-*Scenedesmus sp*. 20-*Tetraedron sp*. 21-*Gloeocystis sp*. 22-*Pediastrum sp*. 23-*Spirogyra sp*. 24-*Tribonema sp*. 25-*Dicloster sp*. 26-*Coleochaete sp*.

TABLE 2: Zooplankton diversity and distribution at Radhamadhav akhra pond and Mandir dighi during February to May, 2012

Phylum	Class	Sub-class	Order	Family	Species	Distribution
Arthropoda	Crustacea	Copepoda	Cyclopoida	cyclopidae	*Cyclops* sp. (Nauplius larva)	RM & MD
					(cyclopoid)	RM & MD
					Tropocyclops sp.	RM & MD
					Mesocyclops sp.	RM
					Acanthocyclops sp.	RM
					Microcyclops sp.	RM & MD
					Paracyclops sp.	RM & MD
					Macrocyclops sp.	RM
					Diacyclops sp.	RM
					Cyclops sp.	MD
			Calanoida	Diaptomidae	-	RM
	Branchiopoda	-	Cladocera	Bosminidae	*Bosmina* sp.	RM
				Polyphemidae	*Polyphemus pediculus*	RM & MD
				Chydoridae	*Chydorus* sp.	MD
					Alona sp.	MD
					Pleuroxus sp.	MD
				Daphniidae	*Ceriodaphnia* sp.	MD
					Simocephalus sp.	MD
				Macrothricidae	*Macrothrix* sp.	MD
Rotifera	Monogononta	-	Ploima	Lecanidae	*Monostyla* sp.	RM & MD
					Lecane sp.	RM & MD
				Branchionidae	*Lepadella* sp.	RM & MD
					Trichotria sp.	MD
					Branchionus sp.	RM & MD
					Anuraeopsis sp.	MD
				Trichocercidae	*Trichocera* sp.	MD

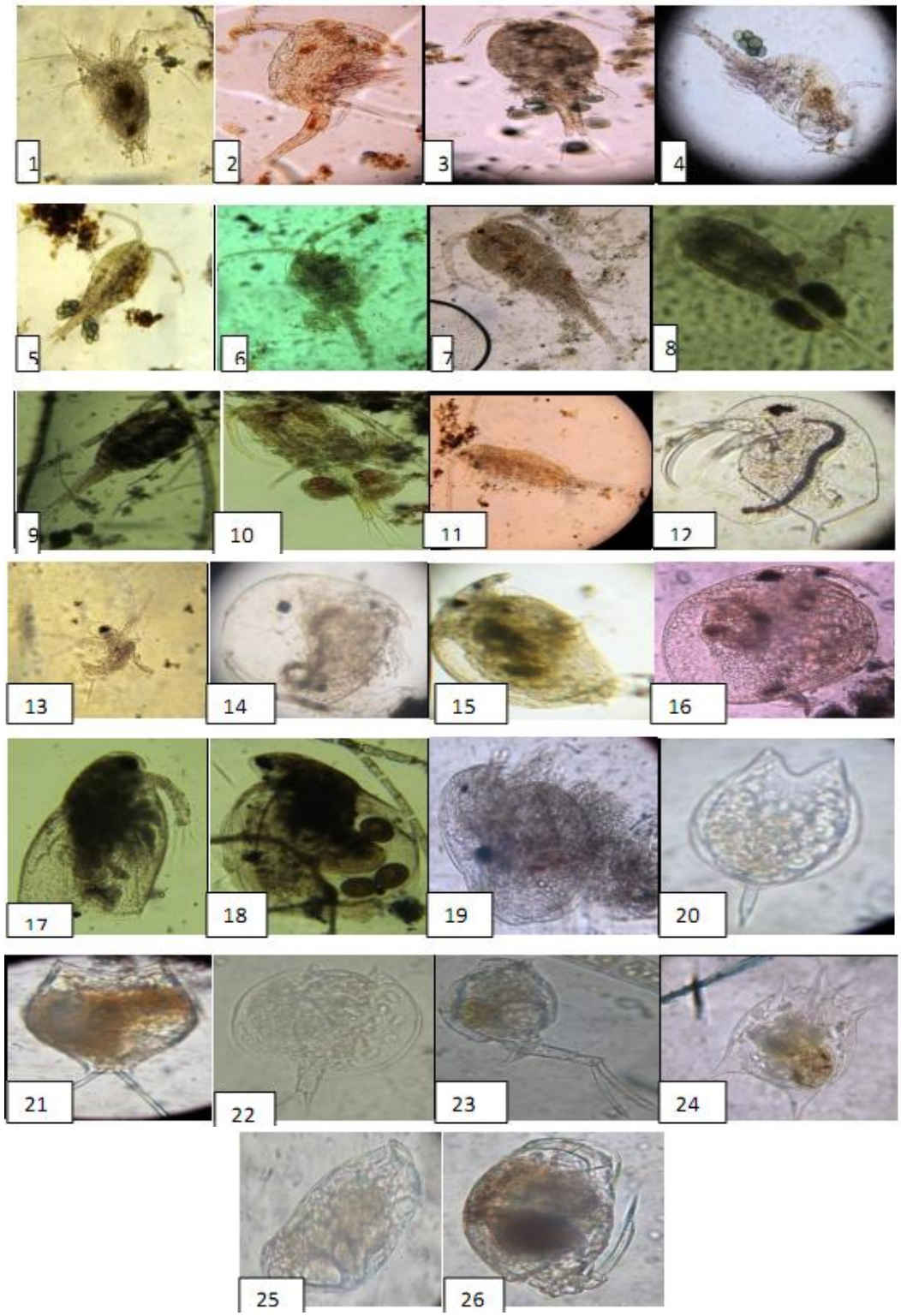


Plate 2- Zooplankton

Fig. 3: 1-Nauplius larva, 2- Cyclopoid male, 3-*Tropocyclops sp*. 4-*Mesocyclops sp*. 5-*Acanthocyclops sp*. 6-*Microcyclops sp*., 7-*Paracyclops sp*. 8-*Macrocyclops sp*. 9-*Diacyclops sp*. 10-*Cyclops sp*. 11-Order Calanoida, 12-*Bosmina sp*. 13-*Polyphemus pediculus*, 14-*Chydorus sp.* 15-*Alona sp*. 16-*Pleuroxus sp*. 17-*Ceriodaphnia sp*. 19-*Simocephalus sp*. 20-*Macrothrix sp*. 21-*Monostyla sp*. 22-*Lecane sp*. 23-*Lepadella sp*. 24-*Trichotria sp*. 25-*Branchionus sp*. 25-*Anuraeopsis sp*. 26-*Trichocera sp.*

DISCUSSION

For any scientific utilization of water resources plankton study is of primary interest. Phytoplankton forms the vital source of energy as primary producers and serves as a direct source of food to the other aquatic plants and animals (Senthilkumar and Sivakumar, 2008). Total twenty-six phytoplankton species were encountered in both the ponds. Fifteen species were found common at both the ponds. Seventeen species were recorded from RM and twenty-one species were recorded from MD. *Amphipleura* sp., *Stauroneis* sp. and *Cosmarium* sp. were the species that were recorded only from RM. *Caloneis* sp., *Rhopalodia* sp. *Euastrum* sp. *Pleurotaenium* sp. *Tetraedron* sp. *Pediastrum* sp. *Tribonema* sp. and *Coleochaete* sp. were the species that were recorded only from MD (Table 1). The pollution tolerant groups found at RM and MD were *Closterium* sp., *Gomphonema* sp., *Navicula* sp., *Scenedesmus* sp. and *Syndra* sp. They are generally found in organic polluted waters (Palmer 1969, Kumar *et al*., 2012).

Zooplankton are one of the most important biotic components influencing all the functional aspects of an aquatic ecosystem, such as food chains, food webs, energy flow and cycling of matter (Murugan *et al*., 1998). Total twenty-six zooplanktons had been found from RM and MD. Ten species were common at both the ponds. Sixteen species were recorded from RM and twenty species were recorded from MD. *Mesocyclops* sp., *Acanthocyclops* sp., *Macrocyclops* sp., *Diacyclops* sp., Diaptomidae (Calanoida), and *Bosmina* sp. were the species that were only recorded from RM. *Cyclops* sp., *Chydorus* sp., *Alona* sp., *Pleuroxus* sp., *Ceriodaphnia* sp., *Simocephalus* sp., *Macrothrix* sp., *Trichotria* sp., *Anuraeopsis* sp. and *Trichocera* sp. were the species that were only recorded from MD. (Table 2).

This preliminary study found high diversity of plankton in the two temple ponds of an urban area indicating the fact that urban biodiversity is an important area of study. Hence an indepth study should be undertaken to analyze the plankton community and its dynamics in urban ponds.

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