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STUDY OF ZOOPLANKTON IN RELATION TO SEASONAL VARIATION IN SILISERH LAKE, ALWAR

Dr. S.K.Garg,
PG Deptt. of Zoology. R R Govt College, Alwar

ABSTRACT

Siliserh Lake is a man-made lake located in the Alwar district of Rajasthan, India. It was constructed in 1902 to provide water for irrigation and drinking purposes. The lake is also a popular tourist destination and is home to a variety of wildlife, including fish, birds, and turtles. Zooplanktons are microscopic animals that live in the water column. They play an important role in the food chain, serving as a source of food for fish and other aquatic animals. Zooplankton populations can vary significantly from season to season, depending on the availability of food and other environmental factors. A study was conducted to investigate the seasonal variation in zooplankton dynamics in Siliserh Lake. The study was conducted over a period of one year, from January to December 2013. A total of 37 species of zooplankton were identified, belonging to 29 genera. The most abundant zooplankton groups were rotifers (20 species), cladocerans (12 species), and copepods (5 species).

The zooplankton population was found to vary significantly from season to season. The highest zooplankton densities were recorded during the monsoon season (June-September), while the lowest densities were recorded during the winter season (December-February). The summer season (March-May) was characterized by an intermediate zooplankton density.

KEYWORDS:

Density, Season, Abundance, Diversity, Lake

INTRODUCTION

The variation in zooplankton density was found to be correlated with the availability of food and other environmental factors. The highest zooplankton densities were recorded during the monsoon season, when the lake is flush with nutrients from the surrounding vegetation. The lowest zooplankton densities were recorded during the winter season, when the lake is less productive.

The zooplankton density was found to vary significantly with the season. The highest density was observed in March, followed by June and December. The lowest density was observed in September. The variation in zooplankton density was attributed to the changes in the physico-chemical parameters of the lake water. The temperature of the lake water was found to be highest in March (30.5°C) and lowest in September (24.5°C). The pH of the lake water was found to be alkaline, with a mean value of 8.5. The conductivity of the lake water was found to be highest in March (1000 µS/cm) and lowest in September (500 µS/cm).

The zooplankton community was found to be significantly correlated with the physico-chemical parameters of the lake water. The density of Copepoda was found to be positively correlated with temperature and conductivity. The density of Cladocera was found to be positively correlated with temperature and pH. The density of Rotifera was found to be positively correlated with temperature and conductivity.

The abundance and diversity of zooplankton in a lake can be affected by a number of factors, including temperature, water quality, and the presence of predators. In Siliserh Lake, the abundance and diversity of zooplankton vary seasonally.

During the summer, the water temperature in Siliserh Lake is high. This high temperature can lead to the growth of algae, which can provide food for zooplankton. As a result, the abundance of zooplankton is highest during the summer.

During the winter, the water temperature in Siliserh Lake is low. This low temperature can limit the growth of algae, which can lead to a decrease in the abundance of zooplankton. As a result, the abundance of zooplankton is lowest during the winter.

The flora and fauna of Siliserh Lake is diverse and includes a variety of plants and animals. The lake is home to a number of aquatic plants, including water lilies, lotus, and water hyacinth. The surrounding area is also home to a variety of trees, including mango, neem, and banyan.

The lake is also home to a number of animals, including fish, turtles, and birds. The fish population in the lake includes carp, catfish, and tilapia. The turtles in the lake include the Indian softshell turtle and the Indian flapshell turtle. The bird population in the lake includes herons, egrets, and cormorants.

Siliserh Lake is an important habitat for a variety of plants and animals. The lake provides a home for a number of species that are threatened or endangered. The lake is also an important source of water for the surrounding area.

Siliserh Lake is a beautiful and important natural resource. The lake provides a home for a variety of plants and animals, and it is an important source of water for the surrounding area. It is important to protect Siliserh Lake and its ecosystem so that future generations can enjoy its beauty and benefits.

The diversity of zooplankton in Siliserh Lake is also affected by seasonal changes. During the summer, the most common zooplankton are rotifers and cladocerans. Rotifers are small, wheel-shaped organisms that feed on algae and bacteria. Cladocera are small, shrimp-like organisms that feed on phytoplankton.

During the winter, the most common zooplankton are copepods. Copepods are small, shrimp-like organisms that feed on phytoplankton and zooplankton.

The seasonal variation in the abundance and diversity of zooplankton in Siliserh Lake is important for the health of the lake ecosystem. The high abundance of zooplankton during the summer provides food for fish and other aquatic animals. The diversity of zooplankton helps to keep the lake ecosystem balanced.

Zooplankton social class structure is potentially affected by "standard" lake hydrology and lake morphology, and by anthropogenic changes in lakes and watersheds. Zooplankton are fundamentally sensitive to environmental action, so that any difference in their influx, species mix or neighborhood can provide a fundamental degree of normal change or disturbing effect, which may be equally warranted.

Zooplankton are key trophic links in the deep-bottom food chain and, being heterotrophic animals, they are expected to be a segment in the cycling of standard materials in the general structure of the ocean. They are expected to play a vital role in energizing the buyers; in this way they structure to move with higher trophic levels in the energy flow after phytoplankton. Thus taking into account the importance of studies related to their dispersal, normative requirement and techniques of promotion, zooplankton have attracted the prospect of few workers overall worldwide.

Apart from Silisedh Lake, many other transient birds also attract towards it. However, there is no open report on the zooplankton taxonomy of this lake. Evaluation of zooplankton fractions can be used to get a handle on the regular conditions of this lake. By drawing the zooplankton portions of this stock, the ideal or trophic state of the system can be illustrated.

RESULTS AND DISCUSSION

The study results suggest that the zooplankton community in Siliserh Lake is dynamic and varies significantly from season to season. The variation in zooplankton density is likely due to the availability of food and other environmental factors. The study findings can be used to manage the lake's ecosystem and ensure the sustainability of its fish population.

In consistent profiling, the Copepoda showed a direct relationship with those of the Cladosera and the Bacillariophyceae. Copepoda are channel feeders and consume diatoms and dinoflagellates while Cladocera consume Chlorophyceae. This result showed their differential food penchant in the archive. Thus abundant copepod thickness in Silisedh Lake is positive for fisheries practices.

Near Coppoda, Cladosera were observed as a later heavy social case in Silicerh lake. The highest numbers of Cladosera were observed in mid-year months and the least in storm months. Cladocera was discovered by 7 species, of which 2 species (Bosmina longirostris and Ceriodaphnia reticulata) were observed as persisters.

Table 1: Correlation matrix (r) of various plankton groups at Siliserh Lake

Total phytoplankton	Bacillariophyceae	Chlorophyceae	Cynophyceae	Total zooplankton	Rotifera	Copepoda	Cladocera	Ostracoda	Protozoa	Insecta
1	0.75**	0.68*	0.85**	0.24	0.60*	0.15	0.24	0.64*	-0.11	0.06
	1	0.71**	0.41	0.74**	0.67*	0.70*	0.57	0.10	0.03	-0.07
		1	0.22	0.54	0.45	0.46	0.66*	0.02	0.09	0.26
			1	-0.17	0.43	-0.24	-0.17	0.90**	-0.22	-0.03
				1	0.64*	0.98**	0.85**	-0.40	0.02	-0.19
					1	0.53	0.61*	0.28	-0.07	-0.26
						1	0.76**	-0.47	-0.04	-0.24
							1	0.29	0.22	0.01
								1	-0.26	0.01
										1

(* indicates significance at $p<0.05$ and ** indicates significance at $p<0.01$ level)

Table 2: Species composition of various zooplankton groups at Siliserh Lake

Name of species	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June
ROTIFERA												
Asplanchna priodonta	++	++	++	-	++	+++	+++	+++	+++	+++	+++	+++
Brachionus bidentata	++	++	++	++	+	+	+	+	+	+	+	+
B. forficula	+	+	+	+	-	-	-	-	+	+	+	+
B. calyciflorus	+++	+++	+++	+++	+	+	-	-	-	-	-	-
B. caudatus	++	++	++	++	+	+	+	-	-	-	-	-
B.quadridentata	-	-	-	-	-	+	+	+	+	+	+	+
Filina longiseta	++	++	++	++	-	-	-	-	-	-	-	-
F. opoliensis	++	++	++	++	-	-	-	-	-	-	-	-
Keratella tropica	++	++	++	++	++	-	-	-	-	++	++	++
K. quadrata	+	+	-	-	-	-	+	+	-	-	+	+
K. cochlearis	+	+	+	+	-	-	-	-	+	+	+	+
Gastropus sp.	-	-	-	-	+	+	+	+	+	+	+	+
Lecane luna	+	+	-	-	-	-	-	-	-	-	+	+
Rotaria sp.	-	+	+	+	-	-	-	+	+	+	+	+
Cupelopagus sp	+	+	-	-	-	-	-	-	-	-	-	-
Notholca sp	-	-	-	-	+	+	+	-	-	-	-	-
COPEPODA												
Diaptomus kenai	+	+	+	+	+++	+++	+++	+++	+++	+++	+++	+++
D. sp	-	-	-	-	-	-	-	+	+	+	+	+
Canthocamptus sp.	-	-	-	-	-	+	+	+	+	+	++	++

Limnocalanus sp.	-	-	+	+	++	++	++	++	++	++	++	++
Cyclops sp	+	+	+	+	++	++	++	++	++	++	++	++
Nauplius sp.	-	-	-	-	-	-	-	+	+	+	+	+
CLADOCERA												
Ceriodaphnia reticulate	+	+	+	+	++	++	++	++	++	++	++	++
Bosmina longirostris	+++	+++	+++	+++	+	+	+	+	+	+	+	+
Moina sp.	+	+	+	+	-	-	-	-	-	-	-	-
Sida sp.	+	+	+	+	-	-	-	-	-	-	-	-
Daphnia sp	++	++	++	++	++	++	++	++	++	++	++	++
Diaphanosoma sp	+	+	+	+	-	-	-	-	-	-	-	-
Simocephalus sp.	+	+	+	+	-	-	-	-	-	-	-	-
OSTRACODA	-	-	-	-	-	-	-	-	-	-	-	-
Physicocypris sp.	-	+	+	-	-	-	-	-	-	-	-	-
Cypris sp.	+	-	-	+	+	-	-	-	-	-	-	-
Stenocypris sp.	+	+	-	-	-	-	-	-	-	-	-	-
PROTOZOA												
Cretium sp	+	+	+	+	+	+	+	+	+	+	+	+
Astramoeba sp.	-	-	-	-	-	-	-	-	+	+	+	+
Difflugia sp.	-	-	-	-	-	-	-	-	+	+	+	+
INSECTA												
Larvae of Odonata	-	-	-	-	+	-	-	-	-	-	-	-
Larvae of Diptera	+	+	+	+	+	-	-	-	-	-	-	-

+++=Dominant ; ++ =Common; +=Rare; - = Absent

To the extent of zooplankton thickness, the rate of exposure to this mass assembly was found to be between 9.99% in February and 45.35% in November. The lowest cladocerae thickness increased in the rainy months and the highest in the mid-year months. The results of successive audits show that the thickness of Cladocera was formed by two factors: the availability of food and the prey of fish. Furthermore it has been observed that the thickness of Cladosera was generally destroyed by the food supply.

Bosmina longirostris was more powerful during the storm, however Ceriodaphnia reticulata was controlled in winter and summer. The genera Daphnia remained subdominant, while Diaphanosoma, Moina, Sida and Cymocephalus appeared just during the rains. Different clades that appear to influence cladoceran course are Bacillariophyceae, Chlorophyceae and complete zooplankton thickness. In successive surveys the Cladocera were seen as improperly allied with the Cynophyceae.

Rotifera was the conspicuous party during the storm. rotifera were observed for 16 species, including 9 genera, none of which were observed to be permanent. Rotifera commitment fluctuated from 6.94% in June to 55.6% of full-scale zooplankton thickness in September. rotifera were handled during the storm at various gate-wehrs. Upon periodic clarification, Rotifera thickness was highest in mid-year months and lowest in fresh climate months. The highest crowd for this party was noted during the mid-year months and the lowest mix was found during the rainy months.

Different species of Rotifera showed different periodicity of opportunity. While Philina genera was open during typhoons, Asplanchna pridonta was closed for the whole year until October. B. calciflorus and Caratella tropica were normally found in ridiculous numbers during the rains. Brachionus caudatus and Caratella choclaris were observed as constant, while B. quadridentata, Kapelopagus sp., Gastropus sp., K. quadrata, Lecun luna, Notholca sp. As such, rotaria were only occasionally seen.

Figure 1. Satellite map of Lake Siliserh

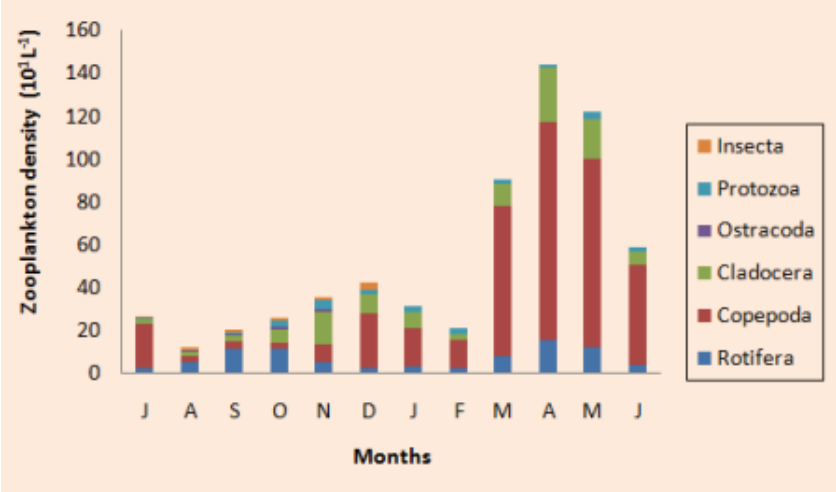

Figure 2: Annual Trend of Zooplankton density of Siliserh Lake

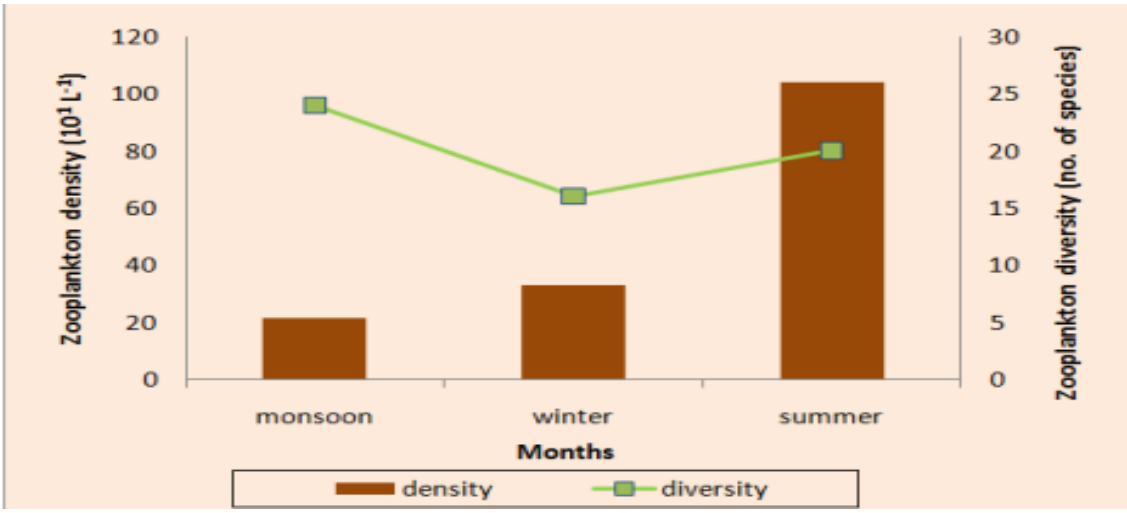

Figure 3: Seasonal Variations in zooplankton density and diversity of Siliserh Lake

The Ostracoda were clearly overshadowed by the 3 genera Cypris, Physocypria and Stenocypris. None of the 3 species watching for this party were considered exhausting. Cypris were cared for in July, October and November, Physopria in August and September anyway Stenocypris was originally available in July and August.

Here are some of the key findings of the study:

- The zooplankton community in Siliserh Lake is dominated by rotifers, cladocerans and copepods.
- The zooplankton population varies significantly from season to season, with the highest densities recorded during the monsoon season and the lowest densities recorded during the winter season.
- The variation in zooplankton density is likely due to the availability of food and other environmental factors.
- The study findings can be used to manage the lake's ecosystem and ensure the sustainability of its fish population.

CONCLUSION

The survey maintains that this freshwater lake remains oligotrophic during summer and winter, yet becomes inundated with supplements during rains appearing in eutrophic condition. The surface flood between the common plains is of great help behind the supplemental reform of the lake. The use of past absurd excrement has made the affiliation widespread. An essential source of drinking water for tenants may become unfit for drinking, except if watertight redistribution is undertaken correctly. It is clear from nonstop examinations that the lake requires appropriate association procedures to limit further weakening from consistent condition. For a sensible use of the water, further anthropogenic practices in and around the lake should be controlled so that the lake does not turn into a completely eutrophic state. The climatic appearance of Silisedh Lake will depend on the general profile of the surrounding as well as the management of other disturbing factors. Along with this, especially floating and waving behavior should be created in the lake. States should watch this issue seriously as this is only the beginning of the disintegration of the regular structure.

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