Journal of Advanced Zoology

ISSN: 0253-7214

*Volume **42** Issue **1** Year **2026** Page 74 - 79*

Assessment of the community structure of Zooplankton Community of Nigeen Lake, Kashmir

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Received: 05/02/2026
Revised: 17/03/2026
Accepted: 09/03/2026
Published: 25/03/2026

Abstract

This study investigated the zooplankton community structure of Nigeen Lake from June 2013 to November 2013. Over the course of the research,18 distinct zooplankton taxa were identified. Cladocera emerged as the dominant group in both density and species diversity, contributing 09 taxa. Rotifera accounted for 07 taxa, whereas Copepoda was the least represented group with only 02 taxa. Cladocera Density: Represents the dominant group by population count (10,884 across 6 months), peaking in July (2,105) and October (2,106). Rotifera Density: Represents 7 recorded species with a combined count of 6,451 across 6 months, demonstrating maximum abundance in July (1,700) and September (1,600). Copepoda Density: Comprising 2 key species (Bryocamptus sp. and Cyclops sp.), showing a steady increase from June (151) to November (999).

Keywords: Nigeen lake, cladocera, copepods, rotifers, zooplankton

INTRODUCTION

Located in the Himalayan region of northern India, the Kashmir Valley is home to numerous freshwater bodies whose remarkable diversity stems from varying altitudes and origins. However, rapid population growth is increasingly subjecting these fragile ecosystems to detrimental environmental changes. Zooplankton are heterotrophic organisms that play a crucial role in aquatic environments. As primary consumers within aquatic food webs, they transfer energy from primary producers, such as phytoplankton and bacteria, to higher trophic levels like aquatic insects and fish (Dodds, 2002). Zooplankton play a vital role in freshwater ecosystems by shaping the overall aquatic structure and helping monitor water quality (Pandit, 1980, 1999; Gannon & Stumberger, 1970; Caroni & Irvine, 2010)). Within this community, rotifers are key to lake trophic analysis and serve as effective indicators of pollution and water health (Dirica et al., 2009). Crustaceans, another critical group, provide rich n nutrient value and drive nutrient recycling throughout aquatic systems (Patalas, 1972; Urabe et al., 2002). These organisms are highly sensitive to environmental stressors, reacting to nutrient loading, acidification, contaminants, and sediment inputs (Carins et al., 1993)). Today, rapid population growth and urban pressures—such as encroaching residential and hotel developments, domestic wastewater discharge, and the conversion of open waters into agricultural floating gardens—severely degrade lake health. Given these growing environmental pressures, this study evaluates how zooplankton diversity and community structure have shifted over time.

Study Area

Nigeen Lake, often referred to as the "Jewel in a Ring," is an offshoot of Dal Lake situated 9 km northeast of Srinagar at 34°7′13″ N latitude and 74°49′40″ E longitude, at an elevation of 1,584 m above mean sea level (Rather et al., 2013). Hydro-logically, the lake is fed on its northeast side by Dal Lake through a narrow channel at Ashaibagh Bridge. On its northwest end, it drains into Khushalsar Lake via Nallah Amir Khan, while an elongated channel to the southwest directs water directly into the Jhelum river (Plate 1).

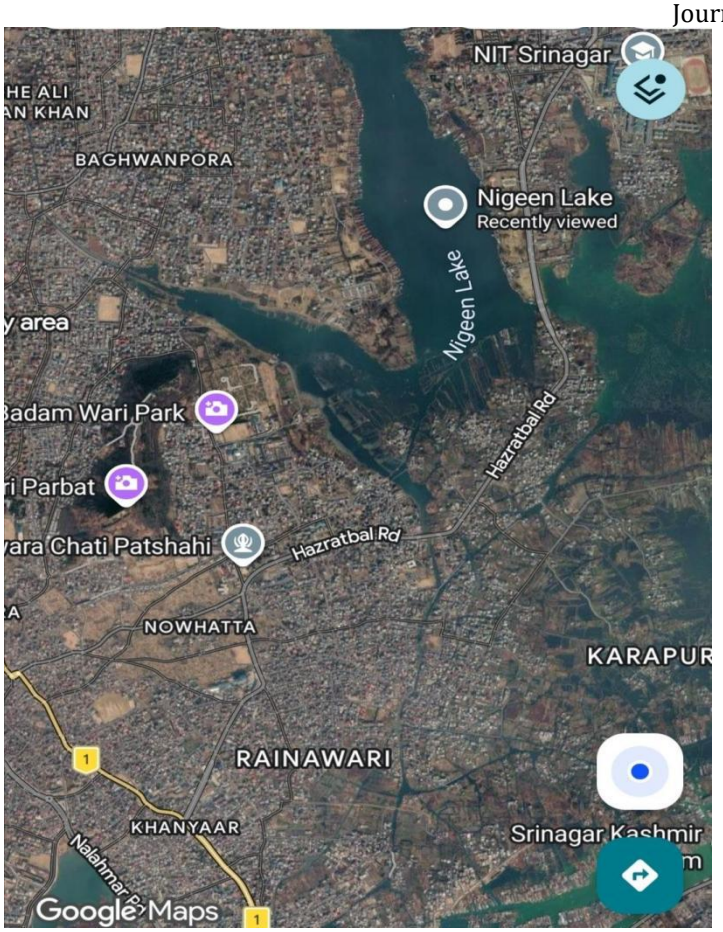

Plate 1: Map of Nigeen lake (courtesy: google maps)

Samplin Methodology

A total of 22 samples were collected across various locations in Nigeen Lake between June and November 2013 (spanning the summer and autumn seasons). Srinagar, Jammu & Kashmir experiences distinct seasonal variations—primarily summer, autumn, and winter—which significantly influence biological community structures. Sampling was omitted during the winter season due to partial freezing of the lake surface.

Zooplankton Collection, Identification, and Quantitative Analysis

Zooplankton samples were collected by filtering 30 L of surface lake water using a standard bolting silk plankton net (No. 25; mesh size 64 µm). The concentrated samples were transferred to 100 mL polyethylene bottles and immediately preserved in a 5% formalin solution.

In the laboratory, qualitative identification and quantitative enumeration were performed under a compound light microscope using a 1 mL Sedgwick-Rafter (S-R) counting cell. Zooplankton density was expressed as individuals per cubic meter (\text{ind/m}^3), while community composition percentages were calculated following standard limnological procedure (APHA 2005).

Results and Discussion

The present study was carried out on the zooplankton community of Nigeen Lake from June 2013 to December 2013. During the study period, a total of 18 taxa of zooplankton were recorded, of which Cladocera constituted the most dominating group represented by 9 taxa, Rotifera contributed 7 taxa, and Copepoda was the least represented group registering only 2 taxa. The monthly variation in the abundancd of the zooplanktons was reported with the highest abundance of cladocera, copepoda and rotifers inthe months of October, November and July respectively (Table 1).

ROTIFERA (7 Species)

Anuraeopsis sp.

Brachionus sp.

Cephalodella sp.

Keratella sp.

Platyias sp.

Testudinella sp.

Trichocerca sp.

CLADOCERA (9 Species)

Alona affinis Macrothrix rosea Bosmina longirostris Camptocercus sp.

Chydorus sphaericus Chydorus sp.

Graptoleberis sp.

Alonella sp.

Simocephalus sp. COPEPODA (2 Species)

Bryocamptus sp.

Cyclops sp.

Table 1: Monthly Variation of Cladocera, Rotifers, and Copepods (June – November)

Month	Cladocera Count	Rotifers Count	Copepods Count	Total Zooplankton
June	1,518	1,033.00	151	2,702.00
July	2,105	1,700.00	171	3,976.00
August	1,701	786.00	541	3,028.00
September	1,503	1,600.00	765	3,868.00
October	2,106	899.00	789	3,794.00
November	1,951	433.00	999	3,383.00
Total (June–Nov)	10,884	6,451.00	3,416	20,751.00

Cladocera Density: Represents the dominant group by population count (10,884 across 6 months), peaking in July (2,105) and October (2,106).

Rotifera Density: Represents 7 recorded species with a combined count of 6,451 across 6 months, demonstrating maximum abundance in July (1,700) and September (1,600).

Copepoda Density: Comprising 2 key species (Bryocamptus sp. and Cyclops sp.), showing a steady increase from June (151) to November (999).

Overall Abundance: The total zooplankton population count across the 6-month period reached 20,751 (Fig.1).

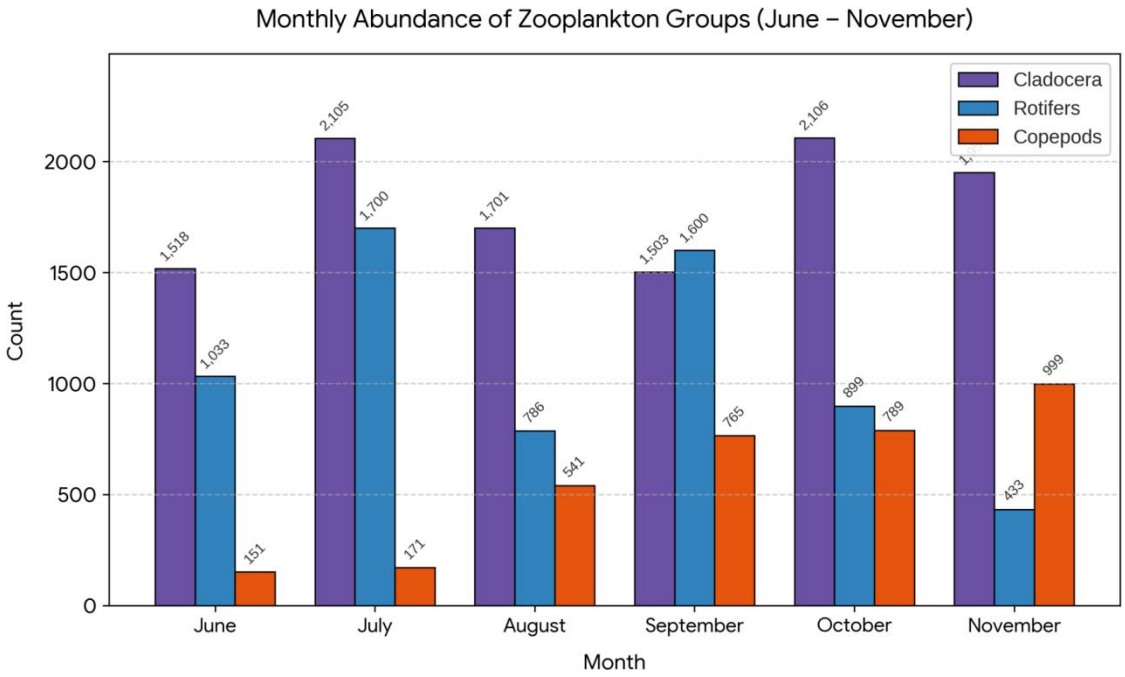

Fig.1 Monthly abundance of Cladocera, and rotifers

Conclusion

Numerically, Cladocera was the dominant group throughout the study period both in terms of density (10,884 individuals across 6 months) and diversity (9 taxa). Although 18 zooplankton taxa were identified in Nigeen Lake, species such as Alona affinis, Alonella sp., Chydorus sphaericus, Chydorus sp., Bosmina longirostris, Graptoleberis sp., Brachionus sp.,Cephalodella sp., Keratella sp., Cyclops sp. were commonly encountered across the study sites. The frequent occurrence and high abundance of these zooplankton species indicate the general eutrophic nature of the lake ecosystem.

Acknowledgements

We are highly thankful to the research scholars of limnology laboratory, University of Kashmir who helped us in the identification of zooplanktons.

References

1. APHA. (2005). Section 4500-H^+: pH Value. In A. D. Eaton, L. S. Clesceri,
2. E. W. Rice, A. E. Greenberg, & M. A. H. Franson (Eds.), Standard Methods for the Examination of

Water and Wastewater (21st ed.). American Public Health Association.

3. Cairns, J., McCormick, P. V., & Niederlehner, B. R. (1993). A proposed framework for developing indicators of ecosystem health. Hydrobiologia, 263(1), 1–44. https://doi.org/10.1007/BF00006084

4. Caroni, R., & Irvine, K. (2010). The potential of zooplankton communities for ecological assessment of lakes: Redundant concept or political oversight? Biology and Environment: Proceedings of the Royal Irish

5. Academy, Section B, 110(1), 35–53. https://doi.org/10.3318/BIOE.2010.110.1.35

6. Dodds WK. Freshwater ecology: concepts and environmental applications. San Diego: Academic Press; 2002.

7. Dirican, S., Musul, H., & Çeker, S. (2009). Some physicochemical characteristics and rotifers of Çamlıgöze Dam Lake, Susehri, Sivas, Turkey. Journal of Animal and Veterinary Advances, 8(4), 715–719.

8. Gannon, J. E., & Stemberger, R. S. (1978). Zooplankton (especially crustaceans and rotifers) as indicators of water quality. Transactions of the American Microscopical Society,97(1), 16–35. https://doi.org/10.2307/3225680

9. Pandit, A. K. (1980). Biotic factor and food chain structure in some typical wetlands of Kashmir [Doctoral dissertation, University of Kashmir]. Srinagar, J&K, India.

10. Pandit, A. K. (1999). Trophic structure of plankton community in some typical wetlands of Kashmir, India. In S. R. Mishra (Ed.), Limnological research in India (pp. 190–224). Daya Publishing House.

11. Patalas, K. (1972). Crustacean plankton and the eutrophication of St. Lawrence Great Lakes. Journal of the Fisheries Research Board of Canada, 29(10), 1451–1462. https://doi.org/10.1139/f72-226

12. Rather, G. M., Rashid, H., & Yousuf, A. R. (2013). Phytoplankton Dynamics of Nigeen Lake in Kashmir Himalaya. International Journal of Environmental Bioenergy, 6(1), 13–27.

13. Urabe, J., Kagami, M., Yoshida, T., & Gurung, T. B. (2002). Direct and indirect effects of zooplankton on algal composition in situ grazing experiments. Oecologia, 133(3), 356–363. https://doi.org/10.1007/s00442-002-1038-0