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ZOOLOGY

The First Record of Morphologically Identified Some New Rotifer Species from Kumaraswamy Lake, Coimbatore District, Tamil Nadu, India

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Abstract—Rotifer species are widely used as biomonitoring agents of water quality parameters. Therefore, assessment of rotifer diversity is very important to get current information about the status of the aquatic environment. Hence, during the study period seven new rotifer species were identified for the first time in Kumaraswamy Lake, Coimbatore district, Tamil Nadu, India, and they were described based on their morphological features by referring to standard manuals and textbooks. In addition, some hydrographical characteristics like water temperature, pH, dissolved oxygen, total dissolved solids, and electrical conductivity were analysed during the study period.

Keywords: Rotifer, Frist record, Kumaraswamy Lake, Coimbatore district

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INTRODUCTION

Zooplankton is composed of minute creatures that drift on the surface of water currents. They occupy central positions between primary producers and tertiary consumers in the aquatic environment (Covich et al., 2010; Mohan and Priyadarshinee, 2022). The freshwater zooplankton comprises Rotifera, Cladocera, Copepoda, and Ostracoda. Most of them depend to a large extent, on various phytoplankton and bacterio-plankton for food. Some of them are detritivore feeders, browsing and feeding on the substrate attached with organic matter, phytoplankton or concentrating on the freely suspended organic matter particles or those lying on the bottom sediment (Wilson and Fleeger, 2012; Ojha and Kumar, 2022). The zooplankton communities respond to a wide variety of disturbances including climate change, global warming, mixing of industrial waste, nutrient loading, acidification, and sediment of input in the aquatic ecosystem. The density of zooplankton communities is essential for maintaining fish fauna in aquatic environment. They are widely used to assess the status of pollution levels in aquatic ecosystems. Among the four major groups of zooplankton species, Rotifers are mainly used as bio-indicator, because they are abundantly found only in eutrophicated water bodies (Bera, 2021; Rahim et al., 2022). Hence, the rotifer density is used to determine the present status of the aquatic environment. However, during the study period, seven new pollution-tolerant rotifer species were identified for the first time in the Coimbatore district from Kumaraswamy Lake, and they were described based on their morphological features.

MATERIALS AND METHODS

Kumaraswamy lake is located in (Lat. 11.01° N and Long. 76.94° E) of Coimbatore city, Tamil Nadu, India, and is fed by canals derived from Noyyal River and Selva Chinthamani Lake located upstream in the north (Fig. 1). The surface water samples were collected during the early morning hours between 5.00 am to 7.00 a.m. at sampling sites of Kumaraswamy Lake, to analyse physical-and chemical characteristics like water temperature, pH, dissolved oxygen, total dissolved solids, and electrical conductivity. At the same time, zooplankton samples were collected at depth of 1 meter by using Towing-Henson's standard plankton net (mouth diameter 0.35 nm) made up of nylon bolting cloth (mesh size 50 μm). The collected zooplankton biomass was immediately transferred to 100 mL specimen bottles containing 5% of neutralized formalin, and they were subjected to microscopic analysis. The taxonomic identification was done under the compound light microscope at a magnification of 40× to 100× and they were photomicrographed by using, Inverted Biological Microscope (Model Number INVERSO 3000 (TC-100) CETI) attached to the camera (Model IS 300). The zooplankton species were identified based on morphological features the by referring to the standard manuals, textbooks,

Fig. 1. Satellite view of Kumaraswamy Lake.

and monographs (Edmondson, 1959; Donner, 1966; Fulton, 1968; Battish, 1992; Shiel, 1995; Ricci and Balsamo, 2000).

RESULTS AND DISCUSSION

Here with we reported seven new pollution-tolerant rotifer species in the Coimbatore district from Kumaraswamy lake, Tamil Nadu, India, and they were described based on their morphological features depicted in Table 1 and Fig. 2.

Rotifers are multicellular eukaryotes and as such, it would be impossible to consider them bacteria or protozoa. Members of the phylum Rotifer share several key characteristics that separate them from other microscopic creatures (Dusenbery, 2009). Thousands of rotifer species were floating around inside the aquatic ecosystems, and they are widely used as bio-indicator or bio-monitoring agents of water quality parameters because they are abundantly found only in eutrophicated water bodies (Singh et al., 2013; Surajit, et al., 2019). Therefore, assessing rotifer diversity in the aquatic environment is very important, to get current knowledge about aquatic ecosystems (Gabaldón et al., 2017). In Rotifer communities, particularly *Lecane calcaria, Keratella tropica, Keratella valga,* and *Philodina acuticornis* have been reported as good indicators of eutrophication. The presence of all these pollution indicator species suggests that the Kumaraswamy lake is moderately polluted by organic pollutants (Kalpana et al., 2017; Baloch et al., 2000). In addition, some physico-chemical parameters were analysed during the study period and their average values of water temperature ranged between (°C) 25.22 ± 0.78 to 26.38 ± 0.75, pH ranged between 7.44 ± 0.27 to 8.23 ± 0.36, dissolved oxygen ranged between (mg/L^{-1}) 7.16 ± 0.57 to 7.63 ± 0.61, TDS (mg/L^{-1}) 1012 ± 13.05 to 1021 ± 24.05, and electrical conductivity ranged

Table 1. Morphologically identified Rotifer species recorded in the Kumaraswmay Lake, Coimbatore district

Group	Class	Family	Genus	Species
Rotifer	Monogonata	Lecanidae	*Lecane*	*Lecane calcaria* (Harring & Myers, 1926)
				Lecane luna (Muller, 1776)
				Lecane lunaris (Ehrenberg, 1832)
				Lecane brachydactyla (Stenroos, 1898)
	Eurotata	Brachionidae	*Keratella*	*Keratella tropica* (Apstein, 1907)
				Keratella valga (Ehrenberg, 1834)
	Bdelloidea	Philodinidae	*Philodina*	*Philodina acuticornis* (Murray, 1906)

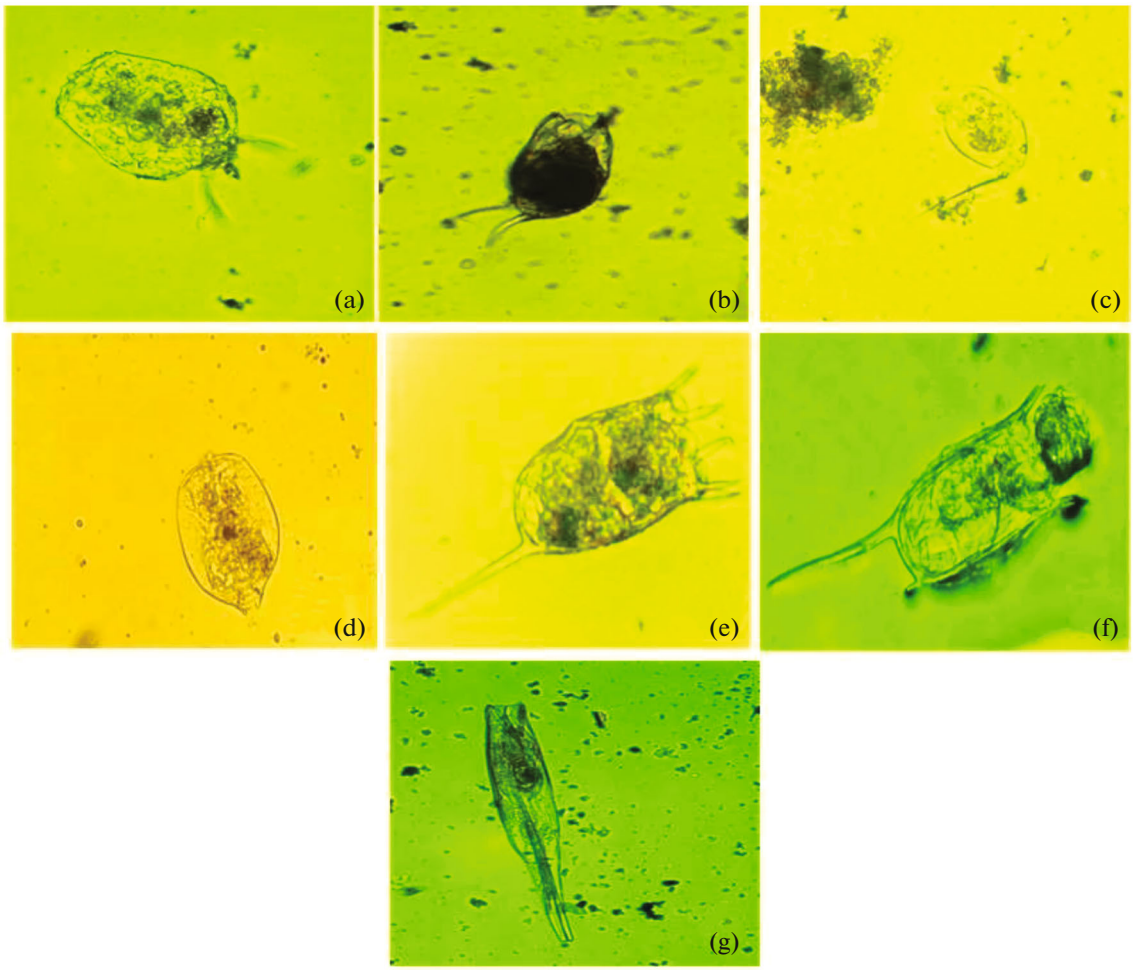

Fig. 2. Morphologically identified Rotifer species (400×) recorded in the Kumaraswamy Lake. (a) *Lecane calcaria*; (b) *Lecane luna*; (c) *Lecane lunaris*; (d) *Lecane brachydactyla*; (e) *Keratella tropica*; (f) *Keratella valga*; (g) *Philodina acuticornis.*

between 1.127 ± 0.136 to 2.035 ± 0.224 respectively. The maintenance of physical and chemical characteristics is very important for the life of aquatic biota (Sahni and Yadav, 2012). Results from the study revealed that physico-chemical parameters positively support the life of aquatic organisms inside the Kumaraswamy Lake. The identification of new species from the environment is very important, because they will use by young researchers and scientists who are willing to work on their adaption, evolution, and habitats for their futuristic purposes. In the present study, 7 new rotifer species were identified for the first time such as *Lecane calcaria*, *Lecane luna, Lecane lunaris, Lecane brachydactyla, Keratella tropica, Keratella valga,* and *Philodina acuticornis* in Coimbatore district, from Kumaraswamy Lake.

CONCLUSIONS

Results from the study revealed that, a total of 7 new rotifer species were identified for the first time in the Coimbatore district from Kumaraswamy Lake. The Kumaraswamy Lake is moderately polluted due to the presence of *Lecane calcaria, Keratella tropica, Keratella valga,* and *Philodina acuticornis*. They were found abundantly in organically polluted water bodies. In addition, some physico-chemical characteristics were analysed during the study period, and they also positively supported the life of aquatic biota.

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COMPLIANCE WITH ETHICAL STANDARDS

The author declares no conflicts of interest. This article does not contain any studies involving animals or human participants performed by the author.

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