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RESEARCH ON THE DIVERSITY OF ZOOPLANKTON AT AANASAGAR AJMER, (RAJASTHAN) (RAJASTHAN) DURING (2023-2024)

Zoology

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ABSTRACT

The purpose of this study was to learn more about the diversity of zooplankton in freshwater systems and the ways in which these animals are dispersed. A total of 25 species of zooplankton were found in the Aanasagar, Ajmer, Rajasthan. Rotifera was the most common of the 25 species, with 11 species. Copepoda and Cladocera each had 6 species, while ostracod had 2 species. In this study, all over population of zooplankton was high in summer and winter season; and low in mansoon season. Throughout the year, copepods and rotifers outnumbered cladocerans and ostracods in terms of population. Terminology: Pond, Rajasthan, zooplankton, alkalinity, physicochemical, and hydrology; plankton, Cladocera, Copepoda, crustaceans, rotifers, and protozoans.

KEYWORDS

INTRODUCTION

Water is a resource that is both valuable and limited, and there is no life without it. It accounts for approximately seventy-five percent of the material that constitutes the earth's crust. Because water is a universal solvent, many minerals will dissolve when they come into contact with it.

The foundation of the food chain is formed. Plankton is microscopic organisms that move with streamlined water in aquatic settings. The word "plankton" refers to all creatures that are nonmotile and resistant to water currents, and can be found in both freshwater and marine settings. They are carried forward by the water currents. They can be as little as 0.2 mm or as large as over 20 cm, and they include tiny microbes as well as large species like jellyfish. The amount of light and nutrients available affects the way they are distributed. They are the most prominent category among all water bodies since they are the primary source of food for huge aquatic species, which demonstrates the dynamic nature of the aquatic environment.

Crustaceans, rotifers, and protozoans are the three main groups that most organisms in the zooplankton community belong to. Rotifers are a phylum that are found almost entirely in freshwater (Wallace & Snell, 1991). Crustaceans are plentiful, particularly those that belong to the order Cladocera and the class Copepoda. All three of these primary groups are able to survive in pelagic, littoral, and benthic habitats. Dodson and Frey (1991) and Williamson (1991) provide detailed descriptions of the biology of cladocerans and copepods, respectively.

Many studies have been conducted on zooplankton communities in a variety of bodies of water, including reservoirs, lakes, and shallow water bodies (Arunachalam et al., 1982; Sharma & Pant, 1984; Yousuf, 1989; Subla et al., 1992; Sugunam, 1995). The prevalence of zooplankton in shallow water bodies by rotifers Cladocera or copepods changes depending on the level of organic pollution (Rao & Durve, 1989; Nasar, 1983; Moitra & Bhowmik, 1968; Verma & Munshi, 1987). Abdul Kader et al. (1978) conducted an intriguing investigation on a pond with a high level of pollution. They discovered that there were no phytoplankton present and that zooplankton were completely dependent on the bacteria.

Methodology

A study was carried out, at Aanasagar in Ajmer, which is in Rajasthan, was selected as the site for the study. To collect phytoplankton samples, the water from the pond was filtered through a plankton net with a mesh size of 25 µm.

The filtrate was immediately preserved using formaldehyde at a concentration of 4%. The phytoplankton samples were thoroughly examined with a microscope, and their identification was made possible by consulting authoritative literature. Furthermore, a few physicochemical parameters were evaluated in accordance with the protocols that are typically followed.

The Drop count method of Lackey (1938) was used to measure population density, and the following formula of Lackey (1938) was used to calculate it: N = n × v / V Where, N = Total no. of organisms/ lit of water filtered, n = Number of zooplankton counted in 1 ml plankton sample, v = Volume of concentrate plankton sample (ml), V= Volume of total water filtered through (L

RESULTS

The Aanasagar was found to have a total of 25 different kinds of zooplankton. Out of 25 species, Rotifera was the most common, with 11 species. This was followed by Copepoda and Cladocera, which each had 6 species, and ostracod, which had 2 species (Table 1). Table 2 shows the recorded zooplankton population for each month.

Table 1. Checklist of Zooplankton from Aanasagar, Ajmer.

Rotifera:
1. Brachionus calyciflourus
2. Brachionus caudatus
3. Brachionus forficule
4. Brachionus angularis
5. Brachionus bidentata
6. Trichotria tetractis
7. Polyarthra major
8. Filinia terminalis
9. Asplanchna priodonta
10. Lecane luna
11. Trichocerca SPP.

Cladocera:
1. Moina macrocopa
2. Moina micrura
3. Diaphanosoma excisum
4. Daphnia longirimis
5. Leydigo acanthocercoids
6. Ceriodaphnia cornuta

Copepoda:
1. Heliodiaptomus viduus
2. Trpocyclop prasinus
3. Paracyclop fermbrialis
4. Mesocyclop leucarti
5. Eodiaptomus japonicus
6. Mesocyclops hyalinus

Ostracoda
1. Hemicypris fossulata

Table 2. Seasonal Variations In Zooplankton Population Density (org/lit) In Aanasagar During Feb. 2023 To Jan. 2024

Month/Group	Summer	Monsoon	Winter
Rotifera (org/lit)	880	496	366
Cladocera (org/lit)	38	39	35
Copepoda (org/lit)	447	32	261
Ostracoda (org/lit)	23	19	15

Rotifera:

Rotifers are important to the trophic layers of freshwater impoundments and act as a living capsule of nourishment (Suresh Kumar et al., 1999). In the current study, they outnumbered other groupings of zooplankton with 11 species. Taxonomic dominance has been observed in a number of bodies of water (Kudari et al., 2005; Kanagasabhapati and Rajan, 2010). Lakes, ponds, reservoirs, and rivers commonly exhibit this pattern (Neves et al., 2003). The population density of rotifers was high in the summer (880 org/lit) and low in the winter (366 org/lit). According to Majagi and Vijay kumar (2009), the increase in the number of rotifers during the summer may be attributed to the higher population of bacteria and organic waste from dead and decaying vegetation. According to Segers (2003), the rotifer population was dominant because it preferred warm waters. When conditions are optimal in terms of temperature, food, and photoperiod, planktonic rotifers have a very short life cycle. Because rotifers have brief reproductive phases, they can quickly expand in number when the environment is favorable (Dhanapathi, 2000).

Copepoda:

Freshwater copepods are one of the most significant zooplankton populations found in all types of water bodies. They provide a food source for many fish and are an important part in ecological pyramids. Six species were documented in the current investigation. Copepods had a higher population density in the summer (447 org/lit) and a lower population density during the monsoon (32 org/lit). Mahor (2011) has discovered same trend of seasonal variation of copepods in the Trigha reservoir of Gwalior. The lake is rich in organic matter, which supports a higher number of Cyclopoids. This is why there are so many copepods in the summer and winter, demonstrating that they are more common in water with a higher trophic status. Somani and Pejavar (2004) obtained similar observations at Masunda Lake. The low population density of copepods during the monsoon season could be due to the fact that they do not have a parthenogenetic form (Mustapha, 2009).

Cladocera:

Cladocerans are the most beneficial and nutritious type of crustacean for higher members of the fish food chain. The current study documented a total of six species. During the monsoon season, the population densities of cladocera were greater (39 org/lit), while they were lower (35 org/lit) in the winter. Abundance has also been before recorded in monsoon season and decreased in summer by Pawar and Pulle (2005) in Pethwadaj dam in Nanded district.

Ostracoda:

Ostracods had a far lower diversity and population density than other types of zooplankton. Two species of ostracods were documented in the current investigation. The population density was 23 organisms per liter in the summer and 15 organisms per liter in the winter. Sukand and Patil (2004) reported this result in Fort Lake of Belgaum, and Kedar et al. (2008) observed it in Rishi freshwater lake of Washim district.

Rotifers have the greatest diversity and population density of all the zooplankton species in every season. The lake was eutrophic, which means that it had a lot of nutrients, and this is why rotifers were so abundant there (Sukand and Patil, 2004). The same is true for the Sona Dighi reservoir (Naz and Najia, 2008). The average number of copepods seen during the monsoon and winter seasons was low, but the quantity was even lower in the summer. Cladocera and Ostracoda had a very low population density in all seasons compared to rotifera and copepoda, and they did not display any significant seasonal fluctuations.

In this study, all over population of zooplankton was high in summer and winter season; and low in mansoon season. Throughout the year, copepods and rotifers outnumbered cladocerans and ostracods in terms of population. Das (2002) has made similar observations. During the summer, the population density of zooplankton increases due to primary production. The monsoon season is typically associated with lower population densities because it causes a dilution effect and reduces the amount of photosynthesis that occurs through primary output. Salve and Hiware (2010) obtained similar results in the Wan reservoir of Nagpur. Halbach et al. (1983) reported that the presence of a large number of certain zooplankton in the aquatic food web is a sign of eutrophication. The current study found that Rotifera and Copepoda were the most common species in the Aanasagar, which suggests that the river is experiencing eutrophication.

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