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Ecology of Some Selected Zooplankton in Tropical Lentic Water Ecosystems

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Abstract

At site 1, the zooplankton population showed two peaks, the primary maxima (482u/L) was observed in August, 2024 and the secondary maxima (400u/L) in January, 2024 in the first year, whereas during the second year the primary maxima (404u/L) was recorded in February, 2025 and secondary (386u/L) in June, 2025. At this site total zooplankton showed their peak in different season during the two years of the present study while the lowest number (126 and138u/L) was recorded in October, 2023 and November, 2024 during the subsequent year.

The zooplankton abundance slightly rose in population at site 2, and showed definite seasonality with one peak in a year. The peak (750 u/L) was recorded in June, 2024 during the first annual cycle and the second year the maxima (1010 u/L) was observed in May, 2025. The total abundance and distribution showed definite seasonality, the first peak was noticed during summer and the second peak in winter months. The lowest number (270 and 294 u/L) was collected in October, 2023 and November, 2024 during first and second year of population density (236 u/L).

Keywords: Zooplankton population, Asplanchinidae, Testidunellidae, etc.

Introduction

Odum (1971) suggested to bring out a comparative picture by investigating the physical, chemical and biological charactenshes of lentic water bodies. It is in this area. With this objective the author have studied the comparative account of the zooplankton conditions in a lentic water bodies with a view to asses qualitatively and quantitatively.

Although, studied on the occurrence and seasonal distribution of freshwater zooplankton of India have been made by several investigators, most probably the first investigation on Indian zooplantokton was initiated by Anderson (1889), who collected 47 species of rotifers from Calcutta and its environment in west Bengal. Prasad (1910); was the first Indian worker who studied the seasonal conditions concerning the pond life in Punjab Later on, a more detailed account has been given by Pruthi (1933), on the variability of water and plankton production in the Indian museum tank at Calcutta. The Indian rotifers was reported by Edmondson, Hutchinson (1934), from Kashmir and Punjab. Sewell (1934), studied on the bionomics of freshwater plankton. Species composition of fresh-water zooplankton was reported from the different water bodies of India by Choodamani (1945), Alikuhni (1946-47). Chacko (1949, 51, 53), Chacko and Krishnamurthi (1945), but they could not establish any correlation between zooplankton and the important bydrobiological factors. Zooplankton abundance was also reported from the garden pond (Ganapati, 1943). Species composition of zooplankton indifferent freshwater bodies was reported by Brehm (1950). Alikuhni *et al*. (1955) Das and shrivastava, (1956-59). Arora (1961, 61, 65), George (1961-66), Sreesnivasan (1966), Vashist (1908), Michael (1969), Mitra and Mukheji (1972), Tandon and Singh (1972) jana (1973), Dhanapati (1974, 76) Patil (1976), Sharma and Vashisth (1978-77)

Materials and Methods

Zooplanktons were sampled at fortnightly intervals. Zooplanktons were collected from each lentic site by using No - 25 (Mesh size 64) plankton net made of bolting silk. Fifty litres of water from different places of the water body was fittered through the polankton net. The plankton filtered was present in 4%. formalin and the analysis was made using sedgewick Rafter plankton counting cell (IM capacity).The identification of the zooplankton was carried out following Ward and whipple (1963) and Needham and Needham (1978). All organisms

Were counted and computed by using the formula:

$$\text{ni} = \frac{(a.1000)c}{L}$$

Where,

ni = number of planktons.

a = the mean numbers of zooplanktons per counting unit.

C = Volume of concentrated plankton in ml

L = Volume of sample of water sieved i.e. 30 litres.ni = number of planktons.

a = the mean numbers of zooplanktons per counting unit.

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L = Volume of sample of water sieved i.e. 30 litres.

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Results and Discussion

Seasonal population densities of zooplankton showed a high degree of seasonality within and between the groups. Some species were present throughout the year while others make sporadic appearance. During the present study only two major groups of zooplankton were taken into consideration. At site 1, the zooplankton population showed two peaks, the primary maxima (482u/L) was observed in August, 2024 and the secondary maxima (400u/L) in January, 2024 in the first year, whereas during the second year the primary maxima (404u/L) was recorded in February, 2025 and secondary (386u/L) in June, 2025. At this site total zooplankton showed their peak in different season during the two years of the present study while the lowest number (126 and138u/L) was recorded in October, 2023 and November, 2024 during the subsequent year.

The zooplankton abundance slightly rose in population at site 2, and showed definite seasonality with one peak in a year. The peak (750 u/L) was recorded in June, 2024 during the first annual cycle and the second year the maxima (1010 u/L) was observed in May, 2025. The total abundance and distribution showed definite seasonality, the first peak was noticed during summer and the second peak in winter months. The lowest number (270 and 294 u/L) was collected in

October, 2023 and November, 2024 during first and second year of population density (236 u/L) was observed (952 u/L) in May, 2025.Seasonal distribution of total rotifer, at this site showed a definite trends as the peaks were recorded in summer.

Family-: Asplanchinidae

Asplanchana sp. was the only representative of the family Asplanchinidae in both the habitat, visually their abundance was extremely thin during the winter months. At site 1 it was lowest (2 & 4 u/L) in various months, whereas the maximum (30 u/L) was recorded in February, 2024and (42 u/L) in December, 2024 during the first and second years of study, respectively. However, at site 2, lowest (6 u/L) was recorded in November, 2023, while the highest (54 u/L) in January, 2024. It is quite interesting to mention here that the lowest and the highest numbers were observed only at an interval of one month during the first year of study, while in the second year the lowest (4 u/L) was recorded in May, 2025 and the highest (46 u/L) in February, 2025.

Family: Testidunellidae

Testidunellidae was the second most abundant family of rotifer fauna. At site 1 representative of this family were collected. *Testudinella* sp. was found in less number throughout the years with the (14 u/L and 28 u/L) recorded in May, 2024 and 2025. *Filnia longista* was most abundant although did not depict any seanonality, their highest number (54 u/L and 10 u/L) were recorded in February, 2024 and 2025, while the lowest (4 u/L) was encountered in several months. *Filnia terminalis* was found in abundance, especially during the second year. The lowest value (2 u/L) recorded during several months whereas, the highest 24 u/L) and (56 u/L) in March, 2024 and 2025 during both the annual cycles. *Horaella brehmi* was thinly populated, the highest (8 u/L) was recorded in July, 2024 and December, 2024 whereas, lowest (2 and 4u/L) was collected in several months during their respective cycles at site 2, the family, Testidunellidae was represented by *filinia terminalis* only. Their lowest (4 and 8 u/L) was recorded in April, 2024 and June, 2024, while the highest (90 u/L and 10 u/L) in January, during both the annual cycles respectively. The entire study period, this species flourished and dominated during winter month.

Family: Brachionidae

The family Brachionidae was abundantly Present, highly represented by genus Brachionus, Keratella, Lacane, Monostyla and Polyenthra. At site 1, Brachionus angularis gradually increased in population from October, 2023 onwards and their peak (54 u/L) was recorded during January, 2024, after which they increased and dissappeared from March 10, 2024 to reappear in September, 2024, it then gradually increased in number and reaches the maximum (66 u/L) during December, 2024 then they decreased and again disappeared from March, 2025. It is interesting to note that they reappeared in May after two months of gap and showed their second peak (42u/L) during July, 2025 after which their abundance decreased. Brachionus biddentata showed slightly different peak in the two years of study. During the first year the total number (24u/L) was recorded in September, 2024 and the highest (72u/L) in March, 2024. In the second year however, minimum (24u/L) was collected in December, 2024 and minimum (64u/L) during May, 2025. Almost similar trend was discernable in both years, showing higher abundance in post winter months. Brachionus caudatus showed somewhat 4 L higher abundance and their lowest population was recorded in June, 2024 and February, 2025 (24 u/L and 8u/L), whereas, the highest (54 u/L and 74 u/L) was observed during May, 2024 and June, 2025 in the first and second year, respectively. This species was generally abundant mostly during the summer months. Their abundance showed a definite seasonal trends in both the annualcycles. The highest (944u/L) in January, 2024 during the first year. In the second year the lowest in August and February, 2013. B. calciflorous was abundantly dominant during winter months in both the annual cycles. However, the other species of genus Brachionus such as B. diversicornis, B. falcatus and B. forficula were thikly populated and encountered at interrupted intervals. Keratella lenzi was not frequently recorded, was found at interupted intervals and they depicted seasonal trends during both years. During the first year, minimum (34 u/L) was encountered in December, 2023, whereas, the maximum (112 u/L) in August, 2024, in the second year the lowest (24 u/L) was collected during January, 2025 and the highest (58 u/L) in July, 2025. Notholca sp. was poorly represented and encountered only during summer months. AT site 2; the rotifer family Brachionidae was apparently higher in abundance than that of site 1. The species composition was almost similar except a few like B. forficula, B. quadridentala and K. cochlearis were encountered at site2. At this site B. angularis was found abundantly in most of the samples their lowest number (8u/L) was recorded in April, 2024 and highest (944/L) during December, 2023 in first year. During the second year the minimum (64u/L) and the maximum (1444/L) was encountered in May, 2025 and November, 2024 respectively. Generally, their higher numbers were observed in winter months in both the annual cycles B. caudatus was the most dominant species encountered abundantly during both years. The lowest number (24u/L) was recorded in December 2023 and the highest (1724u/L) in April, 2024 in the first year, while during the second annual cycle the lowest (44u/L) was recorded in February, 2025 and the higest (1344u/L) in June, 2025. The abundance of this species were noticed during summer months in both years of investigation. B. calyciflorus was frequently found in any sample but their number was scarce and did not depict any seasonality. Their Minimum populations density (8 and 64u/L) was recorded in March and maximum (72 and 148u/L) was observed in September in both years. *B. quadridentata* was the second most dominant species of rotifers the lowest (6u/L) was collected in

April, 2024 and the highest (174u/L) in June, 2024 during the first year. In the second annual cycle the minimum (8u/L) and maximum (104u/L) was found in Julyand April, 2025 respectively. The occurrance of *B. diversicornis, B.* seasonal trends. *Keratella cochlearis* most dominaht and abundantly found almost throughout the study period. Their lowest number (58 u/L) in June 2024, in the first year while in the second year the minimum (124u/L) was found in February, 2025 and maxima (4/6u/L) in May, 2025. It is interesting to maintain that post winter and summer were the most favourable months for this species. *K. tropicana* was well represented, the lowest (4u/L) was collected during February, 2024 and the highest (54u/L) was collected during February, 2024 and the (54u/L) in July, 2024 in the first annual cycle. Whereas, during the second annual cycle the 8u/L) was recorded in March, 2025 and the highest (258u/L) in May, 2025.

Family: Lecanidae

Lecanidea was represented by a single species lecaane sp. site 1 which was scarcely found in few sample during both years. While at site 2 family lecanidae was represented by two species *Lecane sp.* and *monostyla* sp. they were encountered in less number in few of the samples.

Family Synchaetidae

During the present imestigation *Polyarthra multiappendiculata,* the only representative of syrnchaetidae was collected from both the habits, At site I this species was encountered in most of the samples but their population density was poor. The lowest (4u/L) was collected in many months during both the annual cycles. Whereas, the highest (52 and 28 u/L) was recorded in July, 2024 and June 2025 in their respective annual cycles. It was observed that they were abundantly present during the monsoon and winter months in the first annual cycle while in winter and summer months during the second annual cycle. AT site 2, *Polyarthra multiappendiculala* was mostly present in the summer months during both the annual cycles. The lowest (4u/L) was observed in August, 2024 and the highest (28 u/L) in April, 2024 during first annual cycle whereas in the second year the minimum (2u/L) and maximum (16u/L) where recorded in October, 2024 and July,2025 in both years.

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