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REGULAR ARTICLE

A PRELIMINARY SURVEY OF PLANKTON IN IRRUKKANGUDI RESERVOIR, VIRUDHUNAGAR DISTRICT, T.N., INDIA

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SUMMARY

Aquatic organisms, especially plankton from the most sensitive component of the ecosystem and signal environmental disturbances. Apart from primary production, phytoplankton play an important role as food for herbivorous animals and act as biological indicators of water quality in pollution studies. Zooplankton occupy a vital role in the trophic structure of an aquatic ecosystem and play a key role in the energy transfer. The inadequate knowledge of plankton and their dynamics is a major handicap for the better understanding of the life process of fresh water bodies. Hence the present investigation was carried out a newly constructed water reservoir, (Sattur Taluk, Virudhunagar District, Tamilnadu) Irrukkangudi reservoir for a period of eight months from August 2005 to March 2006. The surface samples of water were collected following standard methods and phytoplankton zooplankton were identified using standard keys. The phytoplankton and zooplankton diversity were studied during the period of this investigation. Twenty six different species of phytoplankton belonging to six classes were identified. Twenty five different species of zooplankton belonging to four classes Rotifera, Cladocera, Ostracoda and Copepoda were identified.

Keywords: Phytoplankton, Zooplankton, Freshwater, Species richness index, Diversity index, Evenness index.

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1. Introduction

The study on the seasonality of Indian freshwater plankton initiated by Sewell (1934) that was followed by a long series on hydro biological studies mostly from the central and northern parts of our country many of which were aimed at attaining only a baseline information on plankton and water chemistry for use in fishery practices (Michael, 1986). Aquatic organisms are especially important as they form the most sensitive component of the ecosystem and signal environmental disturbances (Carle, 1979).

Phytoplankton, being the primary producer, forms the lowest trophic level in the food chain of fresh water ecosystem, moreover, number and species of phytoplankton serves to determine the quality of a water body (Bahura 2001). Distribution of phytoplankton and their variation at different zones of a water body is known to be influenced by physiochemical parameters of water. Phytoplankton study provides a relevant and convenient point of focus research on the mechanism of eutrophication and its adverse impact on an

aquatic eco-system (Meshram and Dhande, 2000).

Zooplankton species have different types of life histories influenced by seasonal variations of biotic factors, feeding ecology and predation pressure. Zooplankton forms a major link in the energy transfer at secondary level in aquatic food webs between autotrophs and heterotrophs (Deivanai et al., 2004). The distribution and diversity of zooplankton in aquatic ecosystems depend mainly on the physico-chemical properties of water (Harikrishnan and Azis, 1989). Zooplankton communities of fresh water bodies constitute an extremely diverse assemblage of organisms represented by most of the invertebrate phyla (Sivakumar *et al.*, 2001).

The main objectives of the research were to determine the diversity and abundance of plankton in the Irrukkangudi reservoir, and to make an attempt to complete quantitative indices, characterizing species richness and evenness of planktonic organisms of reservoir, using the computer programme.

2. Materials and Methods

The area selected for the present study is Irrukkangudi reservoir that is situated near a village Irrukkangudi, Sattur Taluk, Virudhunagar District figure-1and 2. It is situated 8 km away from nearby town, Sattur. It is a newly constructed water reservoir (2004) across two major rivers such as, Vaippar and Arjuna river. The materological data of the reservoir is as follows. The total capacity of water is about 14.156 million m^3. The water used for irrigation purpose is about 13.218 million m^3. The maximum height is about is about 54.85m. The number of sluices in the reservoir is twenty one and the dimension of sluices 10m x 4.85m (17 No.), 10m x 7.35m (4 No). The speed of water coming out from each sluices is 5012 m^3/second.

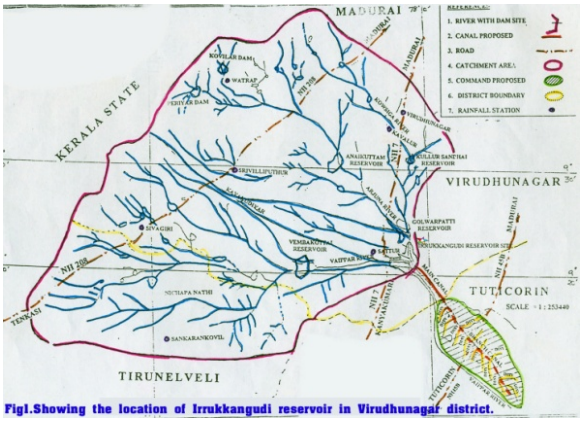


Fig1.Showing the location of Irrukkangudi reservoir in Virudhunagar district.

Fig2.Showing the Irrukkangudi reservoir.

The investigation was carried out in Irrukkangudi reservoir for a period of eight months from August 2005 to March 2006. The phytoplankton and zooplankton diversity their relative abundance were studied during the period of this investigation. The systematic identification of plankton was made by using standard keys of Adoni *et al.*, (1985), IAAB, (1998), Santhanam and Venkataramanujam (1997), Michael and Sharma (1988), Krishnaswamy (1973), Dhanapathi (2000) and Altaff (2004). The qualitative and qualitative analysis of planktonic organisms was carried out using Sedgewick Rafter's plankton counting chamber.

Species richness index, Diversity index and Evenness index were worked out

following Ludwig and Reynolds (1988) using their software packages (SPDIVERS BAS).

3. Results and Discussion

3.1. Phytoplankton

The monthly variations in the occurrence of phytoplankton in Irrukkangudi reservoir have been noticed and presented in the table 1. Totally 26 different species of phytoplankton belonging to six different classes were noticed. The members of Cyanophyceae such as, *Aphanocapsa koordersi* and *Aphanocapsa montana* were found to be the predominant species. The selected species of phytoplankton were photographed and presented in plate – 1.

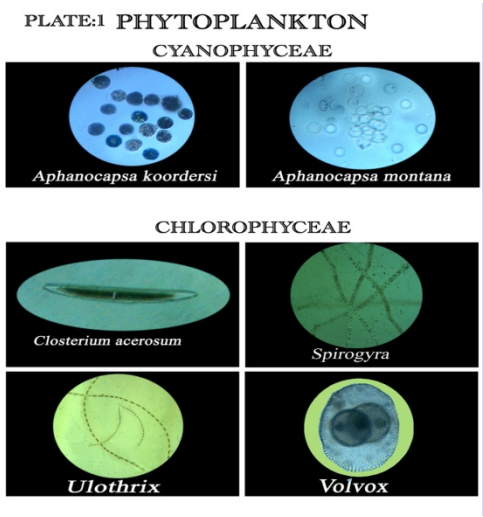


Table 1. Monthly Variations of occurrence of phytoplankton species in Irrukkangudi reservoir (Units/ml) $\overline{X}$ ± SD of three observations.

S. No	PHYTOPLANKTON	Aug. 2005	Sep. 2005	Oct. 2005	Nov. 2005	Dec. 2005	Jan. 2006	Feb. 2006	Mar. 2006
	CYANOPHYCEAE								
1	*Anabaena*	Nil	Nil	Nil	Nil	2±0.1	Nil	Nil	Nil
2	*Arthrospira*	Nil	Nil	Nil	1±0.0	4±0.2	1±0.0	Nil	Nil
3	*Aphanocapsa koordersi*	21±1.0	22±1.1	22±1.1	21±1	Nil	Nil	Nil	Nil
4	*Aphanocapsa montana*	21±1.0	22±1.1	20±1	20±1	Nil	Nil	Nil	Nil
5	*Gamphosphaeria*	Nil	Nil	Nil	Nil	Nil	Nil	3±0.1	3±0.1
6	*Spirulina*	Nil	Nil	Nil	Nil	6±0.3	6±0.3	Nil	Nil
	CHLOROPHYCEAE								
7	*Ankistrodesums*	Nil	Nil	Nil	Nil	Nil	2±0.1	3±0.1	6±0.3
8	*Closterium acerosum*	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1±0.0
9	*Chlorococcum*	Nil	Nil	Nil	1±0.0	1±0.0	2±0.1	2±0.1	2±0.1
10	*Oedogonium*	1±0.0	2±0.1	Nil	2±0.1	Nil	2±0.1	Nil	Nil
11	*Pediastrum simplex*	Nil	Nil	Nil	1±0.0	Nil	Nil	Nil	Nil
12	*Spirogyra*	Nil	Nil	Nil	Nil	2±0.1	2±0.1	3±0.1	7±0.3
13	*Scenedesmus*	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1±0.0
14	*Tetraedron*	Nil	Nil	Nil	Nil	17±0.8	Nil	Nil	Nil
15	*Ulothrix*	Nil	Nil	Nil	2±0.1	1±0.0	2±0.1	3±0.1	5±0.2
16	*Uronema*	Nil	Nil	Nil	3±0.1	Nil	Nil	Nil	Nil
17	*Volvox*	Nil	Nil	Nil	Nil	3±0.1	Nil	Nil	Nil
	BACILLARIOPHYCEAE								
18	*Asterionella*	Nil	Nil	Nil	Nil	1±0.0	Nil	Nil	Nil
19	*Nitzschia*	Nil	Nil	2±0.1	1±0.0	Nil	Nil	Nil	Nil
20	*Navicula*	Nil	Nil	Nil	Nil	1±0.0	Nil	Nil	Nil
21	*Surirella*	Nil	1±0.0	Nil	Nil	2±0.1	Nil	Nil	Nil
22	*Merlosira*	Nil	Nil	Nil	Nil	Nil	1±0.0	2±0.1	2±0.1
	CLADOPHORACEACE								
23	*Caladopohora*	Nil	Nil	Nil	Nil	Nil	1±0.0	Nil	Nil
	CHARAPHYCEACE								
24	*Chara*	Nil	Nil	Nil	Nil	1±0.0	2±0.1	2±0.1	3±0.1
	RHODOPHYCEACE								
25	*Batrachospermum*	Nil	Nil	Nil	Nil	Nil	Nil	1±0.0	2±0.1
	NYMPHAEACEAE								
26	*Nymphae nouchali*	Nil	Nil	Nil	Nil	Nil	1±0.0	Nil	Nil
	Total no. of individual	43	47	44	52	41	22	18	32
	Total No. of Species	3	4	3	9	12	11	8	10

Among Cyanophyceae, *Anabaena*, *Aphanocapsa koordersi*, *Aphanocapsa montana*, *Arthrospira*, *Gamphosphaeria* and *Spirulina* were observed during the period between August 2005 and March, 2006. Totally 6 genera were identified in Cyanophyceae group. Chlorophyceae was encountered in large numbers throughout the study period. *Tetraedron* was superior in December 2005. *Closterium acerosum* and

Pediastrum simplex were observed only one month (March 2006 and November, 2005). There were 11 gernera, such as *Ankistrodesmus, Closterium acerosum, Chlorococcum, Oedogonium, Pediastrum simplex, Spirogyra, Scenedesmus, Tetraedron, Ulothrix, Uronema* and *Volvox* observed during the period of study. Bacillariophyceae group was represented by 5 genera such as *Asterionella, Nitzschia, Navicula, Surirella* and *Merlosira* observed during the period of study.

In Cladophoraceace only one genus *Caladophora* was observed in month of January, 2006. In Charaphyceae only one genus *Chara* was observed during the period of investigation. Among Rhodophyceae only one genus *Bactrachospermum* was observed in month of February 2006 and March 2006. In Nymphaeaceae only one genus *Nymphae nouchali* was observed in month of January 2006 only. Sreenivasan (1964) reported that excessive flooding is the causative factor of low population of phytoplankton in rainy seasons. It was high downpour recorded as 237.1 mm. This report gains support from (Kannan and Job 1980). However, from December 2004 onwards the turbidity of water declined gradually and increased the phytoplankton population. Similar observations were made by Chandran Bohra and Arvind Kumar (2004).

3.2. Diversity indices of phytoplankton

Phytoplankton community characteristics such as species richness, evenness and diversity were calculated in the Irrukkangudi reservoir during August 2005 to March 2005 and presented in the Table –2.

Table 2 . The monthly variations of the various diversity indices for the phytoplankton observed in Irrukkangudi reservoir.

INDICES		Aug. 2005	Sep. 2005	Oct. 2005	Nov. 2005	Dec. 2005	Jan. 2006	Feb. 2006	March 2006	___ X
Richness	N0	3	4	3	9	12	11	8	10	7.5
	R1	0.531	0.779	0.528	2.024	2.962	3.235	2.421	2.596	1.885
	R2	0.457	0.583	0.452	1.248	1.874	2.345	1.885	1.767	1.326
Evenness	E1	0.716	0.668	0.769	0.6612	0.788	0.927	0.977	0.919	0.803
	E2	0.732	0.631	0.776	0.475	0.591	0.840	0.954	0.830	0.729
	E3	0.598	0.508	0.664	0.409	0.554	0.824	0.948	0.811	0.665
	E4	0.978	0.924	0.962	0.765	0.708	1.189	1.541	1.086	0.019
	E5	0.960	0.874	0.934	0.694	0.661	1.212	1.622	1.097	1.007
Diversity	λ	0.465	0.428	0.446	0.305	0.198	0.909	0.849	0.110	0.464
	H'	0.787	0.926	0.845	1.452	1.959	2.224	2.033	2.116	1.543
	N1	2.197	2.526	2.329	4.275	7.096	9.247	7.636	8.303	5.451
	N2	2.15	2.334	2.241	3.274	5.030	11.00	11.769	9.618	5.927

KEYS

NO - Number of species
R1 - Margalef index
R2 - Menhinick's index
E1 - Pielou evenness
E2 - Sheldon evenness
E3 - Heip evenness
E4 - Hill evenness
E5 - Alatalo evenness

Lambda (λ) - Simpson's index
H' - Shannon index
N1 - Hill's first diversity (Those most sensitive to changes in rare species)
N2 - Hill's second diversity (Those most sensitive to changes in common species)

The Margalef index (R1) of phytoplankton was minimum (0.528) during October 2005 and maximum (3.235) during January 2006. An increasing trend was observed from October 2005 to January 2006 (0.528, 2.024, 2.962, 3.235). In the remaining period fluctuations were observed. The Menhinick index (R2) was maximum (2.345) during January 2006 and minimum 0.452 in October 2005. An increasing trend was observed from October 2005 to January 2006 (0.452, 1.248, 1.874, 2.345).

The Alatalo evenness (E_5) of phytoplankton was maximum in February 2006 (1.622) and minimum during December 2005 (0.661). Fluctuation in readings was observed during the entire period of study. Evenness indices E1, E2, E3, E4, and E5 refer to how the species abundances are distributed among the species. Ludwig and Reynolds (1988) have reported that evenness indices are more difficult to interpret. The most common evenness index used by ecologists is reported E1. E2 is an exponentiated from of E1. Alatalo (1981) is of the opinion that when a single species become more and more dominant in a community, E5 approaches zero. This is why E5 is preferred over E4.

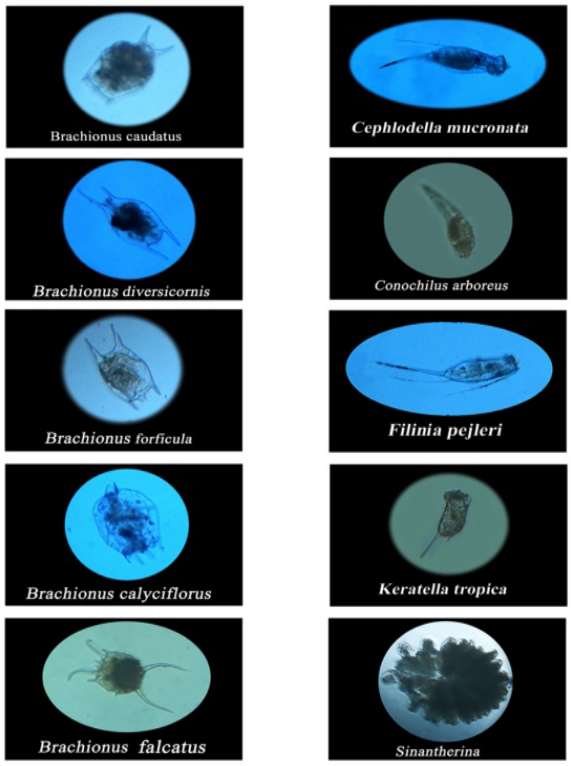
The Simpson's index (n) for the phytoplankton community was ranging from 0.110 in March 2006 to 0.909 in January 2006 The low during the month of 0.110 March 2006 and high during the month of 0.909 in January 2006. The Shannon index (H') of phytoplankton was low during the month of August, 2005 (0.787) and high during month of January, 2006 (2.224). While the values of Hill's first diversity (N1) ranged between 2.329 in October, 2005 and 9.247 January, 2006. The value increased from September, 2005 to January, 2006. The fluctuation of readings was observed during August, 2005, September, 2005, February, 2006 and March, 2006 (2.197, 2.526, 7.636, 8.303).

The Hill's second diversity (N2) ranging from 2.15 to 11.769 August, 2005 to February, 2006.The fluctuated readings (2.15 August, 2.334 September, 2.241 October, 3.274 November, 5.030 December, 11.00 January, 11.769 February, 9.618 March). India is one of the richest countries of the world in its variety of flora and fauna. The species diversity consists of two major components, namely species richness and species evenness. The term species richness (or) variety component is expressed by simple ratio between total number of species (S) and total number of individuals (n). There are two types of richness indices, namely, Margalef's Index (R1) and Menhinick's Index (R2) (Ludwig and Reynolds, 1988).

3.3. Zooplankton

The monthly variations in the occurrence of zooplankton in Irrukkangudi reservoir have been noticed and presented in the table 3, totally 25 different species of zooplankton belonging to four different classes namely Rotifera, Cladocera, Ostracoda and Copepoda. The selected species of zooplankton belonging to Rotifera were photographed and presented in plate 2; Cladocera and Ostracoda were photographed and presented in (Plate 3); Copepoda were photographed and presented in (Plate 4).

Plate 2. Rotifera



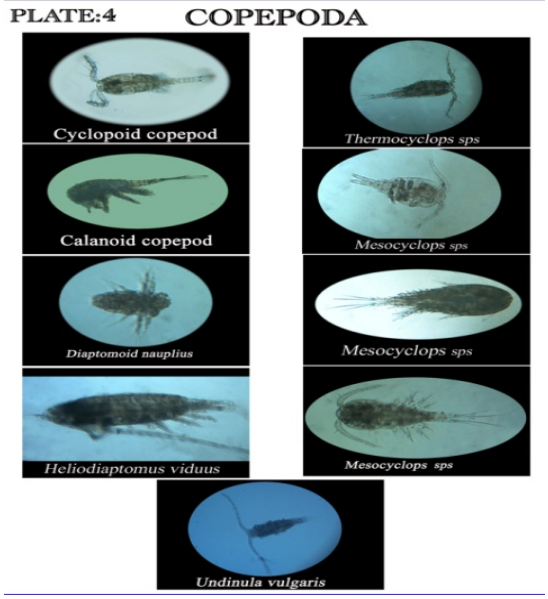


Table 3. Monthly variations of occurrence of zooplankton species in Irrukkangudi reservoir (Units / ml) $\overline{X}$ ± SD of three observations.

S. No	Zooplankton	Aug. 2005	Sep. 2005	Oct. 2005	Nov. 2005	Dec. 2005	Jan. 2006	Feb. 2006	March
	ROTIFERA								
1	*Brachinous caudatus*	1±0.0	Nil	Nil	Nil	1±0.0	1±0.0	Nil	2±0.1
2	*B. diversicornis*	Nil	Nil	Nil	Nil	Nil	Nil	10±0.5	12±0.6
3	*B. forficula*	2±0.1	4±0.2	2±0.1	1±0.0	Nil	Nil	Nil	Nil
4	*B. calyciflorus*	5±0.2	5±0.2	3±0.2	3±0.2	Nil	Nil	4±0.2	Nil
5	*B. falcatus*	2±0.1	4±0.2	4±0.2	1±0.0	Nil	Nil	6±0.3	Nil
6	*Cephalodella mucronata*	Nil	Nil	Nil	Nil	Nil	1±0.0	9±0.4	Nil
7	*Conochilus arboreus*	Nil	Nil	Nil	Nil	Nil	Nil	4±0.2	3±0.2
8	*Filinia pejleri*	Nil	Nil	Nil	Nil	Nil	2±0.1	2±0.1	Nil
9	*Keratella tropica*	1±0.0	3±0.2	1±0.0	Nil	Nil	Nil	4±0.2	10±0.5
10	*Sinatherina*	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1±0.0
11	*Testudinella*	Nil	Nil	Nil	1±0.0	Nil	Nil	Nil	Nil
12	*Trichocera*	Nil	Nil	Nil	1±0.0	Nil	Nil	1±0.0	Nil
	CLADOCERA								
13	*Ceriodaphnia cornula*	Nil	Nil	Nil	4±0.2	5±0.2	17±0.8	3±0.2	2±0.1
14	*Diaphanosoma sarsi*	Nil	Nil	Nil	2±0.1	Nil	Nil	1±0.0	2±0.1
15	*Macrothrix*	Nil	Nil	Nil	Nil	Nil	1±0.0	2±0.1	Nil
16	*Moina micrura*	Nil	Nil	Nil	Nil	7±0.3	4±0.2	Nil	1±0.0
17	*Moina brachiata*	Nil	Nil	Nil	Nil	1±0.0	2±0.1	Nil	Nil
	OSTRACODA								
18	*Stenocypris*	Nil	Nil	1±0.0	Nil	Nil	Nil	Nil	2±0.1
	COPEPODA								
19	*Calanoid copepod*	Nil	Nil	Nil	Nil	Nil	Nil	2±0.1	1±0.1
20	*Cyclopoid copepod*	Nil	Nil	Nil	1±0.0	1±0.0	1±0.0	3±0.2	3±0.2
21	*Diaptomoid nauplius*	1±0.0	2±0.1	1±0.0	Nil	5±0.2	3±0.2	8±0.4	2±0.1

Table 3 Contd.,

22	*Heliodiaptomus viduus*	Nil	Nil	Nil	2±0.1	Nil	Nil	2±0.1	Nil
23	*Mesocyclops sp*	Nil	1±0.0	1±0.0	3±0.2	15±0.7	6±0.3	5±0.2	1±0.0
24	*Thermocyclops sp*	Nil	Nil	Nil	Nil	Nil	1±0.0	2±0.1	Nil
25	*Undinula vulgaris*	Nil	Nil	Nil	Nil	1±0.0	1±0.0	2±0.1	3±0.2
	Total No. Individual	12	19	13	19	36	40	70	45
	Total No. Species	6	6	1	10	8	12	10	14

A total of 12 genera such as *Brachinous caudatus, B. diversicornis, B. forficula, B. calyciflorus, B. falcatus, Cephalodella mucronata, Conochilus arboreus, Filinia pejleri, Keratella tropica, Sinantherina, Testudinella* and *Trichocera* were recorded during the period of study. The *Keratella tropica* was more in number during March, 2006 (10 units/ml). *Brachinous diversicornis* was more in number recorded during month of February and March, 2006 (10 and 12 units/ml) *Cephalodella mucronata* was recorded more number in February 2006 (9 units/ml). *Sinantherina* and *Testudinella* was recorded only one month in (March and November). Taxonomic dominance of rotifera was reported in several water bodies (Nogueira 2001; Cavlli *et al*., 2001; Sampaio *et al*., 2002; Neves *et al*., 2003; Kudari *et al*., 2005). This pattern is common in tropical and subtropical fresh waters, whether in lakes, ponds, reservoirs, rivers or streams (Neves *et al*., 2003). The rotifers play a vital role in the trophic tiers of fresh water impoundments and they serve as living capsules of nutrition (Suresh Kumar *et al*., 1999). The species *B. calyciflorus* is considered to be a good indicator of eutrophication (Sampaio *et al*., 2002). Kudari *et al*., (2005) have identified 4 species of zooplankton in 19 water bodies of Haveri district.

3.4. Cladocera

This group was represented by 5 genera such as *Ceriodaphinia cornuta, Diaphanosoma sarsi, Macrothrix, Moina micrura* and *Moina brachiata*. The *Ceriodaphnia cornuta* was found more in number during January 2006 (17 units / ml). About 600 species of fresh water cladocerans have been reported (Korovchinsky, 1996), to occur throughout the world and in India 110 species have been recorded (Patil and Goudar, 1989), Uttangi (2001) reported eight species of cladocerans from 54 tanks of Haveri district.

3.5. Ostracoda

Stenocypris was the only representative genus during the investigation period. Their population recorded minimum only during October 2005 and March 2006 (1 and 2 unit/ml. Patil and Goudar (1989) the reported occurrence of seven species of ostracods in pharwad district.

3.6. Copepoda

This group was represented by 7 genera such as Cyclopoid copepod, Calanoid copepod, *Diaptomoid nauplius*, *Heliodiaptomus viduus*, *Mesocyclops* sp. *Thermocyclops* sp. and *Undinula vulgaris.* The *Diaptomoid nauplius* was found more in number during February (8 unit/ ml). The number of *Mesocyclops* was more in December (15 unit/ml). About 120 species of fresh water free-living copepods are known from India. Patil and Goudar (1989) reported seven species of copepods in Dharwad district.

3.7. Diversity indices of Zooplankton

Richness, Evenness and diversity of zooplankton of Irrukkangudi reservoir were computed and entered in Table 4.

The Margalef's index (R1) was maximum in February 2006 (4.001) and minimum in September (1.698). The fluctuation in readings was observed during entire period of study. The Menhinick index (R2) was low in December (1.333) and high in November (2.294). There were slight variations (1.732 in August, 1.376 in September, 1.941 in October, 2.294 in November, 1.333 in December, 1.897 January, 2.151 February, 2.086 March) observed during the study period.

The Alatalo evenness (E_5) of zooplankton was maximum in November (1.462) and minimum during January (0.651). The values gradually increased from August (1.162) to November (1.462). It fluctuated the months of December (0.808), January (0.651), February (1.010) and march (0.807).

Table 4. The monthly variations of the various diversity indices for the zooplankton observed in Irrukkangudi reservoir.

INDICES		Aug. 2005	Sep. 2005	Oct. 2005	Nov. 2005	Dec. 2005	Jan. 2006	Feb. 2006	March 2006	$\overline{X}$
Richness	N0	6	6	7	10	8	12	18	14	10.125
	R1	2.012	1.698	2.339	3.056	1.953	2.987	4.001	3.415	2.682
	R2	1.732	1.376	1.941	2.294	1.333	1.897	2.151	2.086	1.851
Evenness	E1	0.883	0.943	0.913	0.937	0.783	0.774	0.927	0.855	0.109
	E2	0.811	0.903	0.845	0.866	0.637	0.571	0.810	0.683	0.765
	E3	0.774	0.884	0.819	0.852	0.586	0.532	0.799	0.659	0.738
	E4	1.129	1.212	1.317	1.408	0.845	0.701	1.009	0.827	1.056
	E5	1.162	1.260	1.382	1.462	0.808	0.651	1.010	0.807	1.067
Diversity	λ	0.181	1.520	1.282	8.187	0.231	0.207	0.679	0.126	1.551
	H'	1.583	1.690	1.778	2.159	1.629	1.925	2.680	9.569	2.876
	N1	4.870	5.423	5.919	8.668	5.102	6.859	14.588	9.569	7.624
	N2	5.5	6.576	7.8	12.214	4.315	4.814	14.725	7.920	7.983

KEYS

NO - Number of species
R1 - Margalef index
R2 - Menhinick's index
E1 - Pielou evenness
E2 - Sheldon evenness
E3 - Heip evenness
E4 - Hill evenness
E5 - Alatalo evenness

Lambda (λ) - Simpson's index
H' - Shannon index
N1 - Hill's first diversity (Those most sensitive to changes in rare species)
N2 - Hill's second diversity (Those most sensitive to changes in common species)

The Simpson's index (λ) varied from 0.126 (March) to 8.187 (November). There were fluctuated readings, 0.181 August, 1.520 September, 1.282 October, 8.187 November, 0.231 December, 0.207 January, 1.010 February and 0.807 March.

The Shannon index (H') was found to be in the range of 1.583 -August to 9.569 - March. The value gradually increased from 1.583 (August) to 2.159 (November). It went decreased to (1.629) December & January (1.925) and increased during February (2.680) & March (9.569).

The values of Hill's first diversity (N1) ranged between 4.870 in August and 14.588 February. The values gradually increased from August (4.870) to November (8.668). Then decreased in December (5.102) & January (6.859) and increased in February 14.588 and slightly decreased (9.569) March. The values of Hill's second diversity (N2) ranged between 4.315 in December and 14.725 March. Their value gradually increased from August (5.5) to 12.241 November. It went down to December 4.315 & January 4.814 and increased during 14.725 February. Again it went down to 7.920 in March.

Among the diversity indices, N1 is a measure of abundant species and N2 is a measuring of very abundant species. The values of Hill's first diversity (N1) ranged between 2.329 in October 2005 and 9.247 January 2006. The Hill's second diversity (N2)

ranging from 2.15 and 11.769. Fluctuation in readings was observed in the entire period of study. The total number of species (S) in a community is an unambiguous index of species richness, but it depends on the sample size and the time spent on searching, its use as a comparative index is limited (Yapp, 1979). Hence two historically known indices namely Margalef index (R1) and Menhinick (R2) are used to denote species richness independent of sample size. These are based on the relationship between S and the total number of individuals observed (n) which increases with the increasing sample size (Ludwig and Reynolds, 1998).

4. Conclusion

From all these observations, it is very clear that the water of Irrukkangudi reservoir is the biodiversity of phytoplankton and zooplankton are also rich in nature. So it is felt worthwhile to recommend the authorities of Irrukkangudi reservoir (Public Welfare Department, Virudhunagar) to prevent the influx of domestic sewage and industrial effluents from nearby villages and industries so as to protect the reservoir for the restoration of flora and fauna in future.

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