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Studies on phsico-chemical parameters & zooplankton of kankaleshwar lake from Beed city Dist. Beed (M.S.) India

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Abstract :-

Zooplankton species have special forms of existence histories inspired via seasonal versions of biotic elements, feeding ecology & predation strain. An ecofriendly synthesis series of 4- arylidene -2 phenyl -5 (4H) – oxazolones or azlactones (3a-f) catalyzed by acotic anhydride and base catalyzed starring from easily available reactant molecules under reflux method. The reaction performed in combination of water and ethanol as green solvent under the simple conventional technique with good to excellent yields (90 – 96 %). The cyclisation followed by condensation of Hippuric acid 1 with various aldehydes 2 (a-f) catalyzed by sodium acetate and catalytic amount of acetic anhydride. The final products were characterized by 1 HNMR, mass and compared there report method.

Key - words :- *water ethanol, conventional technique oxazolone or Azlactones, Hippuric acid, Aldehyde, Zooplankton.*

1. Introduction:

Aquatic environment are tormented by several fitness stressors that considerably expend biodiversity. In future, the loss of biodiversity and its outcomes are expected to be more in aquatic atmosphere than terrestrial surroundings. Zooplankton species have unique forms of life histories inspired by means of seasonal variations of biotic factors, feeding ecology and predation pressure. The zooplankton feeds upon phytoplankton and secondary consumers feeds upon zooplankton. They offer a proper away link between producers and consumers including fish. Nearly all fish depend upon zooplankton for food in their larval stages, and a few fish keep devouring zooplankton for his or her entire lives. The distribution and diversity of zooplankton in aquatic surroundings rely particularly at the physico–chemical factors of water. The prevailing observes identifies the range and abundance of zooplankton on the subject of physico-chemical parameters from KankaleshwarLake of BeedCity was studied on monthly basis from January to December 2017 for the period of one year.

2. Materials and Methods:

2.1 Study Area:

The zooplankton diversity in Kankaleshwar Lake of BeedCity (Latitude, 18° 90' 93" N and Longitude 75° 73' 84"E), Maharashtra, India was observe along with the physico-chemical characteristics for the period of 12 months from January, 2017 to December, 2017.

2.2 Collection and preservation of samples:

In the present study water samples were collected at fortnight interval from collection sites from January, 2017 to December, 2017. The water samples were collected at morning hours from 7.00am to 9.00am. Water samples were collected in smooth plastic cans of 1 liter capacity. The outcomes such as turbidity and temperature were recorded at the sampling sites whereas the others were recorded in the laboratory, Department of Zoology, S.M.D.M.College,Kallamb, Dist. Osmanabad. Zooplanktons were preserved with 5% of neutral buffer (10 ml) formalin solution. The plankton samples varied each qualitative (by means of-towing) in addition to quantitative (by way of-filtering) analysis in the study period. The parameters found have been colour, pH, Temperature, DO, Alkalinity, Salinity COD and BOD. The colour of water was observed visually. The diverse physico-chemical parameters had been analyzed by using way of following the protocols by Trivedy and Goel (1984) and APHA (2005). Fortnightly information obtained has been compiled to get the statistical analysis and diversity indices. The statistical evaluation have been executed the use of software programmed for total zooplankton numbers of individual species diversity indices namely; Shannon's diversity index (H'), species evenness and species richness were calculated.

3. **Analysis of Physico-chemical and Biological Parameters:**

The seasonal wise physico-chemical parameters viz., air and water temperature, pH, salinity, dissolved oxygen, and total dissolved solids were estimated by using "µP Based Water & Soil Analysis Kit". The freshwater zooplankton species were studied under microscope and identification was made referring the standard works (Edmondson, 1959 and Battish, 1992). The seasonal sensible physico-chemical parameters viz., Air and Water temperature, pH, Salinity, Dissolved Oxygen (DO), and Total Dissolved Solids (TDS) had been estimated by using "µp based totally Water & Soil Analysis Kit'. The freshwater zooplankton species were studied under microscope and identification made by referring Protocols of Edmondson (1959) and Battish (1992). Plankton counting was done by drop method. Quantitative evaluation made by using Plankton-Counting Chamber and observed under Stereoscopic Microscope (Magnus). 1 ml of sample was taken in wide mouthed pipette and poured into the Counting Cell. After allowing for settle a while they were counted. At least 5 such counting was made for each sample of the plankton. The average values have been taken. The average diversity of plankton present in 1 liter of water sample was calculated (Santhanam et al., 1989 and Altaff, 2004).

3.1 **Statistical analysis and diversity indices:**

The statistical evaluation performed with the aid of using software program for ecological evolutions, diversity indices namely; Shannon's diversity index (H), Species Evenness and Species Richness was calculated with statistical software package PAST, 2017 (Table 3).

4. **Result and Discussion:**

4.1 **Physical Parameters:**

The high atmospheric temperature was recorded 39°C in month of May and the low atmospheric temperature was recorded 21°C in December month, maximum water temperature 27.5°C was recorded in the month of May and minimum 20°C in January month at study area. The maximum salinity was recorded 0.870 (mg/l) in the month August and minimum was recorded 0.750 (mg/l) in the month of October. The maximum pH was recorded 8.5 in the month September and minimum was recorded 8 in the month of November. The maximum dissolved oxygen was recorded 8.4 mg/l in the month May and

minimum was recorded 6.3 mg/l in the month of February. Maximum TDS was recorded (0.84 mg/l) in May month and minimum was recorded in (0.63 mg/l) February 2017 (Table 2).

5. Diversity of Zooplanktons:

5.1 Rotifer:

In the present study total, 12 species of Rotifera belonging to 5 genera are recorded during the period of January, 2017 to December 2017 (Table 1). The population density of Rotifers was ranged between 315 and 526 (ind./L). A maximum density of 526 (ind./L) was noticed in the month of May and minimum of 315(ind./L) in November. The species dominance was found high (0.1132) during December and low (0.0916) in March. The Shannon diversity index (H) was found to be high (2.454) in September and low (2.287) in December. Simpson's diversity index was maximum (0.908) during March and minimum (0.886) in December. The high species evenness (0.969) was found during September and low evenness (0.890) was recorded in November. The Margalef species richness (R1) was found maximum (1.834) in September and minimum (1.675) in January 2017.

5.2 Cladocera:

Total 8 species of Cladocera belonging to 5 genera was recorded (Table 1) during the study period. The recorded population was ranged between 236-362 (org/L). A maximum cladocera population (362 org/L) was recorded in May and minimum population (236 org/L) was recorded in January. The species dominance was found high (0.160) during November and low (0.128) in October. The Shannon diversity index (H) was found to be high (2.064) in October and low (1.941) in November. Simpson's diversity index was maximum (0.871) during October and minimum (0.839) in November. The high species evenness (0.984) was found during October and low evenness (0.871) was recorded in November. The Margalef species richness (R1) was found maximum (1.281) in January and minimum (1.178) in August.

5.3 Copepods:

Total 6 species of Copepod belonging to 6 genera was recorded (Table 1); the recorded population density was ranged from 214-362 (org/L). A maximum copepod population (362 org/L) was recorded in May and minimum population (214 org/L) was recorded in October. The species dominance was found high (0.190) during January and low (0.172) in August. The Shannon diversity index (H) was found to be high (1.758) in June and low (1.689) in July. Simpson's diversity index was maximum (0.826) during April and minimum (0.803) in July. The high species evenness (0.985) was found during August and low evenness (0.902) was recorded in July. The Margalef species richness (R1) was found maximum (0.931) in October and minimum (0.851) in March 2017.

5.4 Ostracoda:

In present study 5 species of Ostracoda were recorded from 5 genera (Table 1), the recorded population density was ranged from 175-330 (org/L). A maximum copepod population (330 org/L) was recorded in April and minimum population (175 org/L) was recorded in January. The species dominance was found high (0.242) during January and low (0.200) in April. The Shannon diversity index (H) was found to be high (1.607) in April and low (1.503) in January. Simpson's diversity index was maximum (0.799) during April and minimum (0.757) in January. The high species evenness (0.997) was found during April and low evenness (0.899) was recorded in January. The Margalef species richness (R1) was found maximum (0.774) in January and minimum (0. 689) in May 2017.

In the present study, air and water, temperature had been recorded maximum in summer and minimal in winter season (Table 2). Air, temperature ranges from 21-390C. The variation in water temperature may be because of the clean sky except excessive air temperature (Tiwari et al., 2004). Temperature of water performs important role in survival of Zoo plankton (Gupta and Sharma, 1993). All metabolic and physiological hobby and life processes consisting of feeding, reproduction, motion and distribution of aquatic organism are substantially stimulated by way of water temperature. The pH values varies from 7.5- 8 all through the study period. Aquatic organisms are tormented by pH because maximum of their metabolic activities are on pH based (Wang et al., 2002). The physico-chemical parameters together with temperature and pH values ranging have been alkaline nature. Salinity acts as essential ecological component controlling the plankton populace of freshwater further to brackish water species, which appeared or disappeared relying upon the salinity situation. It's miles the most fluctuating parameter within the freshwater surroundings and exerts distinct ecological and physiological effect relying on the interaction with temperature, oxygen and ionic compounds (Odum, 1971). The recorded salinity in the present study became most in August and minimum in October.

Dissolved oxygen performs an essential function in water satisfactory evaluation and reflects the physical and organic process of water. Most quantity of dissolved oxygen is an indication of healthy system in a water body (Fakruzzaman and Zaman1996). The present study showed that the water in all study sites possessed a high DO content and is sufficient to maintain aquatic life form. The maximum dissolved oxygen was recorded in the month of May and minimum in month of February. The total dissolved solids (TDS) in water were minimum in the month of February and maximum in the month of May. An important attention when there may be a predominance of smaller species in Dams is the feasible relation to suspended particles within the water column due to the regular influence of the wind. Kirk and Gilbert (1990) Documented that the presence of sediments in suspension in natural ecosystems can affect the structure of the zooplankton network by way of favoring rotifers. Several species of rotifers tolerate a high attention of suspended material because their corona and mastax are relatively efficient at identifying and deciding on the material to be able to be ingested through the sensorial bristles of the mouth, averting inorganic debris.

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6. Summary:

The present study indicate the, the diversity of zooplankton is relies upon at the physico-chemical parameters by helping environmental situations. The observation also suggests that temperature performs a crucial position in the distribution of zooplanktons in water body. Sooner pollutants by way of minimizing or stopping human interruptions and activities in Kankaleshwar Lake of BeedCity, Maharashtra, India. or later measures want to be taken to decrease the freshwater

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Table 1 List of Zooplanktons collected at Kankaleshwar Lake of BeedCity, Maharashtra, India from January to December-2017

Sr No.	Genus	Name of the Species
	Rotifera (12)	*Anuraeopsis*Lauterborn, 1900
1		*Anuraeopsisfissa*Gosse, 1851
2	*Asplanchna*Gosse, 1850	*Asplanchnaintermedia*Hudson, 1886
3	*Brachionus*Pallas, 1776	*Brachionusfalcatus*Zacharias, 1898
4		*Brachionusforficula*fSudzuki, 1995
5		*Brachionusbudapestinesis*Daday, 1885
6		*Brachionusquadridentatus*Hermann, 1783
7		*Brachionusbidentata*Anderson, 1889
8		*Brachionusrubens*Ehrenberg, 1838
9		*Brachionuscalyciflorus*Pallas, 1776
10	*Keratella*Vincent, 1822	*Keratellacochlearis*Gosse, 1851
11	*Lecane*Nitzsch, 1827	*Lecanepapuana*Murray, 1913
12	*Filinia*Vincent, 1824	*Filinialongiseta*Ehrenberg, 1834
	Cladocera (08)	*Diaphanosoma*Fischer, 1850
1		*Diaphanosomaexcisum*Sars, 1885
2	*Daphnia* Muller, 1785	*Daphnia carinata*King, 1853
3		*Daphnia magna* Straus, 1820
4	*Ceriodaphnia*Dana, 1853	*Ceriodaphniacornuta*Sars, 1853
5	*Moina*Baird, 1850	*Moinamicrura*Kurz, 1874
6		*Moinamacrocopa*Straus,1820.
7		*Moinabrachiata*Jurine, 1820
8	*Leydigo* Fischer, 1854	*Leydigoacanthocercoids*Fischer, 1854
	Copepoda	*Heliodiaptomus*Kiefer,1932

	(06)		
1		*Neodiaptomus* Kiefer, 1932	*Heliodiaptomusviduus*Gurney, 1916
2		*Paracyclop* Fischer, 1853	*Neodiaptomuslindbergi*Brehm, 1951
3		*Cletocamptus*Schmankevitch, 1875	*Paracyclopfermbrialis*Fischer, 1853
4		*Apocyclops*Lindberg, 1942	*Cletocamptusalbuquerquensis*Herrick, 1895
5		*Mesocyclops*Claus, 1893	*Apocyclopsdengizicus*Lepeschkin, 1900
6			*Mesocyclopshyalinus*Rehberg, 1880
	Ostracoda (5)	*Cyprinous*Brady, 1886	
1		*Cypris*Muller, 1776	*Cyprinotusnudus*Brady, 1885
2		*Hemicypris*Sars, 1903	*Cyprisprotubera*Muller, 1776
3		*Heterocypris*Claus, 1892	*Hemicyprisanomala*Furtos, 1993
4		*Strandesia*Stuhlmann, 1888	*Heterocyprisdentatomarginatus*Baird, 1859
5			*Strandesia elongate* Stuhlmann, 1888

Table 1.Physico-chemical parameters of water at Kankaleshwar Lake **of BeedCity, Maharashtra, India from January to December-2017**

	Janu ary	Febru ary	Mar ch	Ap ril	Ma y	Ju ne	Ju ly	Aug ust	Septe mber	Octo ber	Nove mber	Decem ber
Air-T(°C)	22	24	28	33	39	38.5	32.5	31	30	34.5	30	21
Water-T(°C)	20	21.5	22	25.5	27.5	26	25.5	23	23	24.5	22.5	20
pH	8	8.25	8	8	8.5	8	7.5	7.5	8.5	8.5	8	8
Salinity(mg/L)	0.912	0.875	0.79	0.7 92	0.8 23	0.7 95	0.85	0.87	0.752	0.72	0.768	0.723
DO (mg/L)	6.8	6.3	8.3	7.7	8.4	8.2	7.1	7.3	7.1	7.2	6.5	6.3
TDS (mg/L)	0.65	0.63	0.71 5	0.8 1	0.8 4	0.7 3	0.74	0.74 5	0.69	0.64	0.76	0.78

Table 2 Diversity Indices of Zooplanktons collected at Kankaleshwar Lake of BeedCity, Maharashtra, India from January to December-2017

	Months	January	February	March	April	May	June	July	August	September	October	November	December
Rotifers	Individuals	391	452	426	480	526	461	443	428	402	448	315	342
	Dominance_D	0.106	0.09437	0.09163	0.09328	0.09534	0.09444	0.09807	0.1039	0.08869	0.09317	0.1045	0.1132
	Simpson_1-D	0.894	0.9056	0.9084	0.9067	0.9047	0.9056	0.9019	0.8961	0.9113	0.9068	0.8955	0.8868
	Shannon_H	2.313	2.418	2.439	2.417	2.414	2.419	2.392	2.363	2.454	2.428	2.369	2.287
	Evenness_e^H/S	0.9185	0.9356	0.9549	0.9339	0.932	0.9359	0.9114	0.8849	0.9692	0.9445	0.8909	0.8946
	Margalef	1.675	1.799	1.817	1.782	1.756	1.793	1.805	1.815	1.834	1.802	1.912	1.714
Cladocera	Individuals	236	276	319	320	362	345	345	381	276	360	197	248
	Dominance_D	0.1428	0.1325	0.1362	0.1412	0.1444	0.1377	0.1362	0.1407	0.1336	0.1286	0.1606	0.1528
	Simpson_1-D	0.8572	0.8675	0.8638	0.8588	0.8556	0.8623	0.8638	0.8593	0.8664	0.8714	0.8394	0.8472
	Shannon_H	2.013	2.05	2.036	2.014	2.005	2.028	2.038	2.014	2.044	2.064	1.941	1.959
	Evenness_e^H/S	0.9361	0.971	0.9576	0.937	0.9278	0.9503	0.9598	0.937	0.9655	0.9849	0.871	0.8861
	Margalef	1.281	1.245	1.214	1.214	1.188	1.198	1.198	1.178	1.245	1.189	1.325	1.27
Copepoda	Individuals	350	301	355	346	362	291	217	203	197	214	219	302
	Dominance_D	0.1907	0.1814	0.1851	0.1736	0.1741	0.1795	0.1962	0.1712	0.1849	0.1805	0.1762	0.1846
	Simpson_1-D	0.8093	0.8186	0.8149	0.8264	0.8259	0.8205	0.8038	0.8288	0.8151	0.8195	0.8238	0.8154
	Shannon_H	1.712	1.749	1.737	1.77	1.771	1.758	1.689	1.777	1.739	1.747	1.764	1.733
	Evenness_e^H/S	0.9237	0.958	0.9471	0.9783	0.979	0.9666	0.902	0.9856	0.949	0.9561	0.9722	0.9431
	Margalef	0.8535	0.8761	0.8515	0.8552	0.8487	0.8813	0.9294	0.9411	0.9464	0.9318	0.9278	0.8756
Ostracoda	Individuals	175	264	317	330	292	252	257	195	301	288	101	262
	Dominance_D	0.2423	0.2296	0.2014	0.2008	0.2014	0.2064	0.2261	0.2264	0.2064	0.2327	0.2075	0.2033
	Simpson_1-D	0.7577	0.7704	0.7986	0.7992	0.7986	0.7936	0.7739	0.7736	0.7936	0.7673	0.7925	0.7967
	Shannon_H	1.503	1.534	1.606	1.607	1.606	1.593	1.537	1.536	1.593	1.532	1.592	1.601
	Evenness_e^H/S	0.8993	0.9271	0.9964	0.9979	0.9966	0.9835	0.9305	0.9296	0.984	0.9254	0.9828	0.9918
	Margalef	0.7745	0.7174	0.6946	0.6898	0.7046	0.7234	0.7208	0.7586	0.7009	0.7063	0.8667	0.7183

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