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INVENTORY OF ZOOPLANKTON DIVERSITY FROM KASHYAPI DAM, RAJAPUR, DISTRICT NASHIK, MAHARASHTRA

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Abstract:

Kashyapi dam was constructed in 1998 on river Kashyapi near Rajapur, Nashik in Maharashtra. Planktons are also reliable bio-indicators of water and play a major role in the biogeochemical cycles of many important processes. Present investigation has recorded 37 species of Rotifera, 09 species of Copepodes, 13 species of Cladocera and 8 species of Ostracoda. It is observed that throughout the year Rotifer community dominates followed by cladocera, Copepoda and ostracopoda respectively. Total count of Zooplanktons per liter was recorded highest in the month of May.

Rotaria and Asplanchuna were found relatively abundant in collected water sample which is indicator of water pollution. Eutrophication indicators Brachionus forficula, Brachionus nilsoni, and Trichocerca sp are also recorded from the collected water samples.

Key words: *Zooplanktons, Bio-indicators, Kashyapi Dam*

Introduction:

Godavari is the longest river of Peninsular India that flows through Nashik district. Gangapur Dam is an earthfill dam on the Godavari river near Nashik in Maharashtra. The dam is one of the oldest dam in Maharashtra that provides drinking water to the ever increasing Nahshik population. Due to silt deposition in the reservoir area, the storage capacity of the Gangapur Dam has gradually reduced. The right side canal running towards Nashik is also closed due to the high civilization in the area. To overcome this Kashyapi dam was constructed in 1998 on river Kashyapi near Rajapur, Nashik in Maharashtra (Dams under NID). It is located at 20.0692741°N 73.6012318°E. The height of the dam above lowest foundation is 41.75 m (137.0 ft) while the length is 1,380 m (4,530 ft). The volume content is 0.05174 km^3 (0.01241 cu mi) and gross storage capacity is 0.05269 km^3 (0.01264 cu mi) (Water Resource System in India).

The climate of Nashik district is characterized, by general dryness throughout the year except during the south-west monsoon season. The winter season is from December to about the middle of February followed by summer season which last up to May. June to September is the south-west monsoon season, whereas October and November constitute the post-monsoon season. The maximum temperature in summer is 42.5°C and minimum temperature in winter is less than 5.0°C. Relative humidity ranges from 43% to 62%. The normal annual rainfall in the district varies from about 500 mm to 3400 mm. The city has a semi-arid climate under the Koppen climate classification. Nashik city is one of the fastest growing industrial city in Maharashtra. Earlier Nashik was famous for its cold climate but now a day's temperature increase, air and water pollution are the main penalties of urbanization and fast growing industrialization. Agricultural activities like frequent tilling, use of fertilizers and pesticides that dissolve in agricultural runoff and flow in the reservoir along with domestic sewage also add up in the water pollution.

Plankton are a mixed group of tiny, living plants and animals that float, drift freely or feebly swim in water column independent of the shore and bottom (Sommer, 1994) and occupy the base level of food chains (autotrophs) that lead up to commercially important fisheries. They are also reliable bio-indicators of water quality (Keller et al., 2008). Additionally, plankton communities play a major role in the biogeochemical cycles of many important processes such as the carbon cycle, nitrification, denitrification, remineralization, and methanogenesis. Planktons are the source of life for most of aquatic organism especially in their larval stages. Many fish species depend on it as a food source after absorbance of yolk sac. It has been professed from long time back that Planktons are the main source of nutrition for

fish larvae. Planktons are the main link in the energy transmission at secondary level; they play a considerable role in the production potency of any aquatic ecosystem.

Zooplanktons community include Rotifera, Copepoda, Cladocera and Ostracoda. The relative abundance of each other is influential over community structure, which depends upon the relative range of tolerance towards changing seasonal physic-chemical properties of water as well as relative abundance of resource available. Planktons feeding on same resource in a homogenous environment cannot co-exist because of competitive exclusion (Hutchinson 1961). Planktons are bioindicators of the pollution.

Materials and Methods:

For the present study, water samples were collected from four different sites of *Kashayapi* dam randomly. The samples were collected according to standards and procedure for examination of water and waste water American Public Health Association (APHA-1989) and 17th edition of Beuro of Indian standard methods of Sampling and Test (Physical and Chemical) for water and waste water (BIS-3025) as a manual for analysis. Planktons were observed under a light microscope and identified by using standard Key, other literature (APHA, 1998; Dhanpati 2000, Permak 1989).

Results and Discussion:

Among zooplanktons Rotifera, Copepoda, Cladocera and Ostracoda are recorded from the study area. In summer season especially in the month of May all the zooplanktons counted highest in number that is organisms per litter. In winter season that is in December organisms count is less (Table.1). Zooplankton count lowered with the arrival of rainfall in the month of June due to influx of rainwater. In summer season Rotifera, Copepoda, Cladocera and Ostracoda predominate in terms of quantity and diversity than other seasons.

Rotifera dominates the zooplankton community. 37 species of Rotifera are recorded from collected water samples (Table.1). *Brachinus* species dominate among the Rotifera. Among zooplanktons 09 species of Copepodes (Table.1), 13 Cladocera (Table.1), and 08 species of Ostracoda (Table.3), are recorded from the collected samples. It has been observed that rotifera dominated the community throughout the year followed by Ostracoda and then Copepoda and least is Cladocera. Growth rate of population may be highest in summer season especially in the month of May which follow high temperature and count is lowest in winter season during November and December. Thus temperature is the important physical factors that govern the community either directly by influencing the population growth rate or indirectly that is by influencing other physic-chemical parameters. Besides rainfall and quality of runoff influx influence the zooplankton community structure.

Rotaria and *Asplanchuna* were found relatively abundant in collected water sample which is indicator of water pollution. Eutrophication indicators *Brachionus forficula*, *Brachionus nilsoni*, and *Trichocerca* sp are also recorded from the collected water samples.

Table 1: Total Count of Zooplanktons recorded from the water samples of Gangapur Dam (Organisms / Lit.):

Month	Rotifera	Copepoda	Cladocera	Ostracoda
January	108	45	37	38
February	126	50	42	30
March	142	44	55	31
April	148	65	82	42
May	169	74	64	58
June	163	74	53	47
July	142	62	34	38
August	116	47	49	21
September	118	67	58	36
October	128	69	55	40
November	139	55	45	41
December	109	52	42	40

Table 2: List of Zooplanktons observed from the water samples of Gangapur Dam, Nashik

List of Rotifers			
Asplanchna sp.	*Brachionus angularis*	*Brachionus ureceolaris*	*Brachionus calyciflorus*
Brachionus diversicornis	*Brachionus folculus*	*Brachionus falcatus*	*Brancionous calciflorus*
Brachionus quadridentatus	*Brachionus caudatus*	*Brachionus forficula*	*Cephalodella exigna*
Colurella adriatica	*Cephalodella forficula*	*Dicranophorus dolerus*	*Euchlanis dilatata*
Epiphanes clovulata	*Filinia longiseta*	*Filinia opoliensis*	*Keratella tropica*
Kertella valga	*Keratella procura*	*Keratella cochlearis*	*Lecane bidentata*
Lecane bulla	*lecane depressa*	*Lecane pyriformis*	*Lepadella ovalis*
Lepadella patella	*Monostyella sp.*	*Notholca acuminata*	*Rotaria spp*
Pseudoharringia similis	*Proales decipiens*	*Testudinella patina*	*Trichocerca tigris*
Tripleuchlanis spp			
List of Copepoda			
Cyclops sp.	*Cyclops viridis*	*Diaptamus spp.*	*Eudiaptomus gracilis*
Heliodiaptomus contortus	*Mesocyclop sps*	*Mesocyclops leuckarti*	*Megacyclops sp.*
Nauplius larvae			
List of Cladocera			
Alona guttata Sars	*Bosmina longirostris*	*Biapertura Moina mircura*	*Biapertura affinis (Leydig)*
Cypris Flurcularia	*Ceriodaphnia pulchella Sars*	*Daphnia cucullata Sars*	*Daphnia sp*
Grimaldina brazzai (Richard)	*Ilyocryptus sordidus (Lievin)*	*Macrothrix goeldii (Richard)*	*Macrothrix spinosa (King)*
Scapholeberis kingi Sars			
List of Ostracoda			
Candocypris spp.	*Candona Centrocypris*	*Cyprides Cyprinotus*	*Cypris spp.*
Darwinula Ilyocypris	*Limnocythere*	*Metacypris*	*Potamocypris*

Conclusion:

Present investigation has recorded 37 species of Rotifera, 09 species of Copepodes, 13 species of Cladocera and 8 species of Ostracoda. It is observed that throughout the year Rotifer community dominates followed by cladocera, Copepoda and ostracopoda respectively. Total count of Zooplanktons per liter was recorded highest in the month of May.

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