

Girna River, Thengoda.Dist. Nashik. (Maharashtra): Zooplankton Diversity and Physical-Chemical Characteristics."

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ABSTRACT:

The goal of this study was to further our understanding of the richness of Girna River zooplankton. The western Indian state of Maharashtra is traversed by the Girna River. This location was named after Giraja, another form of Parvati. The Girna begins high in the Western Ghats, at Kem Peak, and flows east throughout Nashik District, eventually joining the Mosam River and draining into Malegaon. After making a dramatic curve to the north, the river finally empties into the Tapti. The two biggest dams on the river are the British-built Chankapur Dam near Abhona in the Kalwan tehsil where the Sarpganga River joins the Girna, and the Indian-built Girna Dam. The river's fertile valley is widely farmed since the Deccan Plateau is drained into it. Zooplankton play an important role in aquatic ecosystems as bioindicators of pollution and as a direct link in the food chain for fishes. It might provide essential nutrition for fish. The time frame for this investigation was from August 2022 to December 2022. A total of 10 distinct species of zooplankton were identified. There is one Copepod, two Cladocera, and one Ostracod species, in addition to the six Rotifer species.

KEY WORDS: Girna, Rotifer, Cladocera, Copepoda, Diversity, and Zooplankton.

INTRODUCTION: The aquatic food chain relies heavily on zooplankton, an essential component of the aquatic fauna. It also helps keep the water environment's biotic and abiotic components in check. Microscopic, free-floating animals called zooplanktons accumulated in all bodies of water. Both phytoplankton and other creatures rely heavily on them for energy. In the aquatic food chain, they are somewhere in the middle (Altaff, 2004). The development and population of zooplanktons are very sensitive to variations in the water's chemical composition and other environmental

conditions (Thirumala et al., 2007).

Therefore, water quality is a crucial role in determining the welfare of society (Dwividi and Pathak, 2000). Water quality is described as the physical, chemical, and biological characteristics by which consumers judge the acceptability of water (Nilima and Kumar). It also controls the amount of planktonic biomass that may be produced. Zooplankton are used to evaluate secondary tropic energy transfer. The four most common classes of zooplankton are rotifers, cladocerans, copepods, and ostracods. In terms of the food chain, they are somewhere in the

middle. In the natural world, water is essential to all forms of life. Water is essential to life, but it also has many practical applications in areas such as manufacturing, irrigation, laundering, transportation, and more. It's one of those things you may find in nature in great quantities. It may be found in nature in a wide variety of guises, including clouds, rain, ice, fog, etc. It serves as a limiting element that controls the richness and variety of the biotic community. Water, the primary component of Earth's streams, lakes, and seas as well as the fluids of most living species, is a clear, tasteless, odorless, and almost colorless chemical substance. Each of its molecules consists of one oxygen atom and two hydrogen atoms joined by covalent bonds; its chemical formula is H₂O. While the term "water" is most often used to refer to the liquid form of a material, it may also refer to its solid (ice) or gaseous (steam or water vapor) forms under certain conditions. Several groups of scientists have labored to better understand the zooplankton in various freshwater ecosystems. The zooplankton diversity in the river Kayadhu was investigated by Jayabhaye (2010). The rotifer population surrounding Washim area was analyzed by Tayade and Dabhade (2011), who also compiled a list of Rotifers found there. Pawar and Dabhade (2016) investigated the rotifer community's qualitative diversity in the freshwater Katepurna reservoir in the Akola region of Maharashtra (India). Seventy-one percent of Earth is covered by water. All known kinds of life depend on it.

Only a tiny fraction of the water on Earth's crust is found in the air as vapor, clouds (made of ice and liquid water suspended in the air), and precipitation, while the

remaining 96.5 percent is found in the seas and oceans. Fresh water accounts for just 2.5%, with the remaining 98.8% being in ice (excluding cloud ice) and groundwater. There is less than 0.3% of the world's freshwater in rivers, lakes, and the air, and an even smaller quantity (0.003%) is found in living organisms and man-made goods. The interior of the Earth is home to a larger supply of water.

MATERIALS AND METHODS

In this study, we analyzed water samples taken from the Girna River between August and December of 2022. The water was taken at random from certain locations along the Girna River. Without a hitch, I was able to transfer the samples to the bottle and transport them to the lab. For 5 months, samples of water were taken at regular intervals from predetermined locations. Using a net with a 25 micron mesh and a net with a 25-micron bolting silk fabric, the samples were taken first thing in the morning. The most popular technique for collecting zooplankton is the use of a plankton net, which works as a filter. We gently moved the concentrated zooplankton samples to a new container. Two or three drops of glycerin were applied to 5 ml of 4% formalin. Each sample was placed in its own glass vial and labeled with the location, date, and time of collection. A compound microscope was used to identify the zooplankton. Mounted specimens were examined at 25-100X magnification using standard identification methods, monographs, and keys recommended by sources such as the American Public Health Association (1985), Tonapi (1980), Dodson and Frey (1991), and Williamson (1991), as well as

the systematic key by Battish (1992) and Altaff (2004). Main

Sontakke and Mokalsh (2014) suggest using the lorica and trophi type for identifying rotifers; the antenna, post abdomen, number and arrangement of spines, location of lateral setae, and rostrum for identifying cladocera; the antenna, caudal setae, and endopodite for identifying copepoda; and the antenna, valve shape, and setae for identifying ostracods.

Population density was quantified by Drop count method of Lackey (1938) and was calculated using the following formula of Lackey (1938):

$$N = n \times v / V$$

Where, N = Total no. of organisms/ lit of water filtered,

n =

Number

of

zooplankton

counted

in 1 ml

plankton

n

sample,

v =

Volume

of

concent

rate

plankton

n

sample

(ml),

V= Volume of total water filtered through (L)

RESULTS AND DISCUSSION

During present investigation we found total 10 species of zooplankton. Among which 06 species belonging to Rotifer, 01 species belonging to Copepoda, 02 species belonging to Cladocera and 1 species of Ostracoda were identified.

Rotifers identified were *Brachionus, filina, ketatela*, Copepoda is *cyclop*, Cladocera are *sida* and *Alona* And Ostracoda *Cypris* were identified from Girna reservoir body. All species are morphologically different. The number of Rotifers increased in summer which may be due to the higher population of bacteria and organic matter of dead and decaying vegetation (Majagi and Vijay Kumar, 2009). Copepoda population recorded in Girna River less in August and also Cladocera zooplankton population density recorded in August to December is less in the month of September. Ostracods are less in December. Various researchers carried out work on biodiversity of zooplankton. Sharma and Srivastava (1986), carried out work on ecological fluctuations of Rotifers. Shayestchfar (1995), studied biodiversity of zooplankton. Jindal and Thakur (2009),

studied composition and population dynamics of phytoplankton, zooplankton, nekton and productivity have been

correlated with seasonal variations in physico-chemical characteristics of water. Solanki and Dabhade (2016), studied the Rotifer communities in upper Morna reservoir of Medshi, Washim district and observed 18 species of Rotifera belonging to 6 genera and 5 families among which Brachionus species was found in highest number. Dabhade and Chhaba (2019), also studied zooplankton diversity around Washim region of Maharashtra and recorded different 27 zooplankton species from the different sampling sites of Washim region comprising of 11 species of Rotifera, 06 Copepods, 09 Cladocera and 1 Ostracoda. The community structure of zooplankton showed a mixed composition

of mesotrophic to eutrophic

species. Journal of Global Biosciences Vol. 10(5), 2021 pp. 8744-8751 ISSN 2320-1355 www.mutagens.co.in 8748 The distribution of various species depended on the physico-chemical parameters of water (Tonapi G.J.1980) such as temperature, conductivity, pH, chloride, and free CO₂ content. During the present study, among all groups of zooplanktons, the Rotifers were found dominant in all groups. Similar results were previously observed by many researchers (Banerjee et al. (2008), Abdullah et al.(2007),Adeyemi et al.(2009), APHA (1989), Balamurugan et al. Zooplankton Population Density (org/10 lit) in August 2022 to December 2022 Rotifera 6, Copepoda 2 Cladocera 1 and Ostracoda 1.

1.1 Group wise seasonal population density (No/Lit) of Zooplankton during Aug 2022-Dec 2022

Zooplanktons	August	September	October	November	December	Total
Rotifer	3	1	2	--	--	6
Copepod				1		1
Cladocera	--	----	---	1	1	2
Ostracoda	---	-----	---	---	1	1
Total						10

CONCLUSION

The present investigation reveals that the diversity of zooplankton plays very significant role in the functioning of freshwater ecosystem. We recorded 10

species of zooplankton among which 06 species belonging to Rotifera, 01 species belonging to Copepoda, and 02 species belonging to Cladocera and 1 species of Ostracoda. The Diversity and population of zooplanktons in water provided significant

information about the available sources for supporting life for fishery development. In present days, the biodiversity is in danger due to pollution and human activities. So, Conservation of biodiversity is essential so it is compulsory to keep update knowledge of every aquatic species diversity. The density of planktons in water body determined stocking rate of fishes because they were the chief sources of the food of commercially important fishes as well as development in production of inland fishery sector. The presence and dominance of zooplankton species played a very significant role in the functioning of freshwater ecosystem.

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