**International Journal of Applied and Universal Research** **E-ISSN No: 2395-0269**
**Volume IX, Issue V, Sept – October 2022** **Available online at: www.ijaur.com**
**Impact Factor- 5.908**

# ZOOPLANKTON DIVERSITY OF GHUNGHUTTA DAM SURGUJA DISTRICT (C.G)

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***ABSTRACT:-*** The zooplanktons form a link between phytoplanktons and microscopic invertebrates which they provide food to fish and aquatic birds. Zooplanktons are microscopic aquatic organisms that are non-motile or swimmers and float in water columns of sea or fresh water to cover any great distance. These are heterotrophs that play an important role in linking the primary producers and high trophic level to the food chain. Protozoans, Rotifers, Cladocerans, Copepods and Ostracods etc. have been included in fresh water zooplanktons. The present study has been done to find out the diversity of zooplankton of Ghunghutta dam of Surguja District (C.G.) for duration of one year from January 2020 to December 2020. The Ghunghutta dam is located in Surguja district ($22^0$94N latitude & $83^0$164E Longitude) of northern Chhattisgarh in India. Ghunghutta is a medium irrigation project which was constructed in 2002 across the river Ghunghutta which is a tributary of Rehar Sub basin Sone in the Ganga basin. The Dam is 14 km. from the district head quarter Ambikapur. The Dam water use is domestic purposes, irrigation, aquaculture etc. The surrounding area of dam semi urban semi agricultural and to generate electricity. In present investigation Zooplankton were belong to the groups of Rotifera, Cladocera, Copepoda, Crustaceans, and Protozoa. During investigation period 44 genera of zooplankton population have been identified during the research period from different station of Ghunghutta dam.

**KEYWORDS:** - Zooplankton, Diversity, Ghunghutta dam

**INTRODUCTION:-**

Water is vital for life and plays an important role as a medium in all biological processes. Ghungutta dam is one of the important water body of Surguja (C.G). This is an important source of water in Surguja district (C.G.) and it is called the lifeline. The branch of science that deals with the study of organisms found in stagnant and fresh water is called limnology (Wetzel, 2001). Population dynamics is study of how and why population changes in size and structure over time. Important factors in population dynamics include rates of reproduction, death and migration.

Plankton-meaning "Wanderer" and "drifter". The zooplanktons form a link between phytoplanktons and microscopic invertebrates which they provide food to fish and aquatic birds. Zooplanktons are microscopic aquatic organisms that are non-motile or swimmers and float in water columns of sea or fresh water to cover any great distance. These are heterotrophs that play an important role in linking the primary producers and high trophic level to the food chain. Protozoans, Rotifers, Cladocerans, Copepods and Ostracods etc. have been included in fresh water zooplanktons.

Zooplanktons are the link in the water by which energy in transferred from the lower trophic level to higher thophic level (Agnieszka et al., 2015). Zooplanktons respond quickly to changing environment. So by studying them we can find out the population dynamics.

**Aim of study**- The objective of the study was to observe the population dynamics of zooplanktons of Ghunghutta dam at Suguja district (C.G.).

**REVIEW OF LITERATURE:-**

Sarang et al., (2017) The zooplankton found during the study were classified into major 5 groups Protozoa, Cladocera , Rotifera, Copepoda and Ostracoda. Rotifera consisted highest generic diversity. The taxonomic

diversity of Rotifera were 38.71%, Cladocera 25.80%, Copepoda 16.13%, Protozoa 9.68%, Ostracoda 9.68% were noted in Tapi River. Pandit et al.,(2020), obtained 23 genera of zooplanktons out of which 6 of Rotifera (43.60%), 5 of Protozoa(18.10%), 5 of Cladocera (31.11 %), 4 of Copepods (22.93% ) and 3 genera of Ostracods(13.4 %) were identified from Ganga river. Similar results were reported by various researchers (Negi et al., 2013, Sharma, 2020).

**MATERIALS AND METHODS:-**

Sample Collection and Analysis In the present study the zooplankton diversity and the physico-chemical properties of the dam water were studied for monsoon and post monsoon season. Monthly collections of water samples were collected from sampling site for one complete year from January 2020 to December 2020.

Samples are collected from sampling sites on months first week at 6.00 a.m. to 10.00 a.m. Plankton net of bolting silk no. 25 was used for sampling purpose. Samples were taken at mid-stream 0.5 to 1 m below the surface of water. A glass beaker of 50ml capacity was fixed at the lower narrow end of the net and collected sample was transferred into small plastic bottles and the sample to bring to the laboratory and the estimation was carried out by standard methods of which was given by Kodarkar (1992), Trivedi and Goel (1983, 87, 99), Wetzel R.G. (1983), WHO (1984), World lake vision committee (2003), and APHA (1989), Welch P (1952), Yadav and H.G. Verma (1994), etc. Samples were observed under light microscope at 40 – 100X resolution power and identified up to genus and species level with the help of books and keys. (Patterson, 1998 Adoni, 1985).

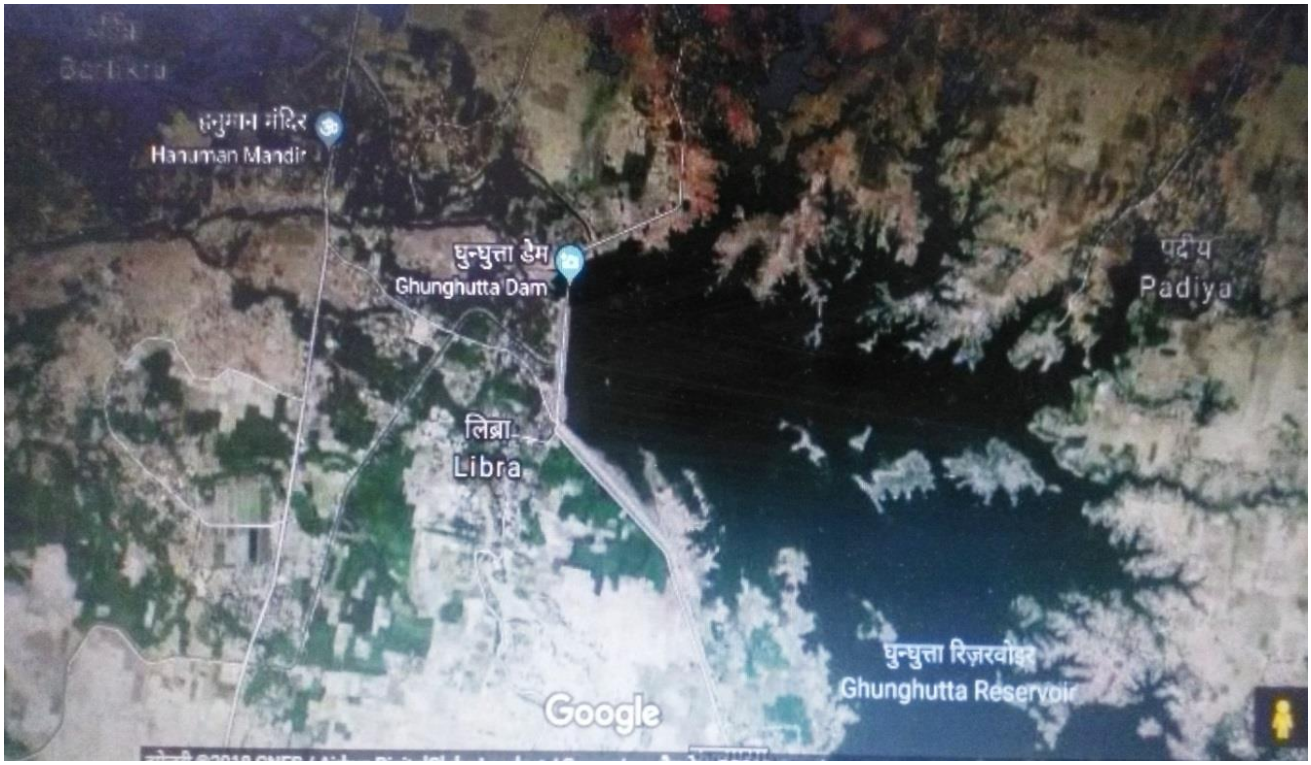


**Fig.1- Satellite view of study site Ghunghutta Dam**

**RESULT AND DISCUSSION-**

In present investigation Zooplankton were belong to the groups of Rotifera, Cladocera, Copepoda, Crustaceans, and Protozoa. During investigation period 44 genera of zooplankton population have been identified during the research period and listed in table no. 1,2 &3 and Graph no. 1 &2. The species identified in this study and their characteristics are as follows:

E-ISSN No: 2395-0269
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**Table No. 1-The number of genera belonging to different Groups and their percentage.**

| S.No. | Group | No. of Genera | Percentage |
|---|---|---|---|
| 1. | Rotifera | 14 | 31.81% |
| 2. | Cladocera | 08 | 18.18% |
| 3. | Copepoda | 05 | 11.37% |
| 4. | Crustaceans | 12 | 27.27% |
| 5. | Protozoa | 05 | 11.37% |
| **Total** | | **44** | **100 %** |

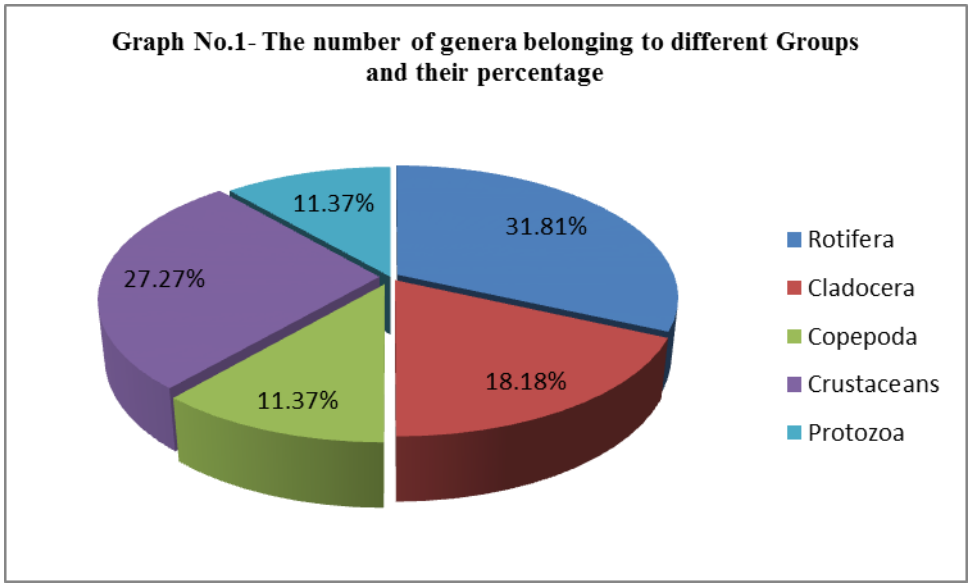


**Table No. 2- Zooplankton Genera Encountered at different sampling stations of Ghungutta Dam.**

| S.No. | ZOOPLANKTON GENERA | Sampling Stations | | | | |
|---|---|---|---|---|---|---|
| | | A | B | C | D | E |
| **ROTIFERA** | | | | | | |
| 1. | *Asplanchnopus multiceps* | + | + | + | + | + |
| 2. | *Brachionue angularis* | + | + | + | - | + |
| 3. | *Chromogaster ovalis* | + | + | + | + | + |
| 4. | *Cyclops bicuspidatus* | + | + | + | + | + |

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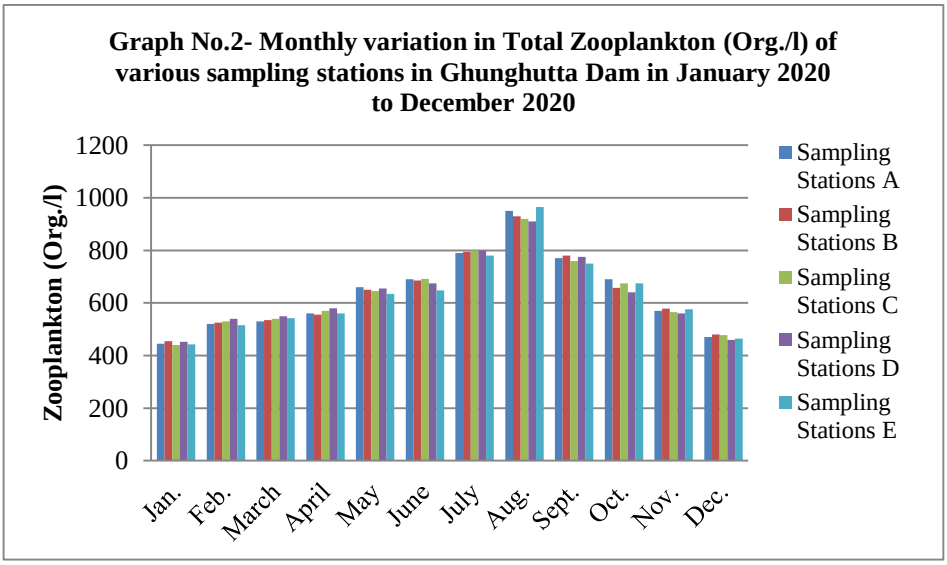
| S.No. | ZOOPLANKTON GENERA | Sampling Stations | | | | |
|---|---|---|---|---|---|---|
| | | A | B | C | D | E |
| 5. | *Filinia longiseta* | + | + | + | + | + |
| 6. | *Keratella cochlearis* | + | - | + | + | + |
| 7. | *Monostyla bulla* | + | - | + | + | + |
| 8. | *Mytilina mucronate* | + | + | - | + | + |
| 9. | *Notholca acuninata* | + | + | + | - | + |
| 10. | *Platyias quandricornis* | + | - | + | + | + |
| 11. | *Polyarthra vulgaris* | + | + | + | + | + |
| 12. | *Synchacta pectinata* | + | - | + | + | + |
| 13. | *Scaridium longicaudum* | + | + | + | + | + |
| 14. | *Trichocerca similes* | + | - | + | + | + |
| **CLADOCERA** | | | | | | |
| 15. | *Alona sps* | + | + | + | + | + |
| 16. | *Ceriodaphnia sps* | + | + | - | + | + |
| 17. | *Daphnia lumholtizi* | + | + | + | + | + |
| 18. | *Diaphanosoma sps.* | + | + | + | + | + |
| 19. | *Leydigia sps* | + | + | - | + | + |
| 20. | *Monia sps* | + | + | + | + | + |
| 21. | *Nauplii larva* | + | + | + | + | + |
| 22. | *Simocephalus* | + | + | - | + | + |
| **COPEPODA** | | | | | | |
| 23. | *Cyclops scutifer* | + | - | + | + | + |
| 24. | *Mesocyclops sps.* | + | + | + | - | + |
| 25. | *Macrocyclops sps.* | + | + | - | + | + |
| 26. | *Microcyclops sps.* | + | + | + | - | + |
| 27. | *Neodiaptomus sps* | + | + | + | + | + |
| **CRUSTACEANS** | | | | | | |
| 28. | *Bosmina coregoni* | + | + | - | + | + |

| S.No. | ZOOPLANKTON GENERA | Sampling Stations | | | | |
|---|---|---|---|---|---|---|
| | | A | B | C | D | E |
| 29. | *Ceriodaphnia reticulate* | + | + | + | - | + |
| 30. | *Cypris sp.* | + | - | + | + | + |
| 31. | *Eubranchipus* | - | - | + | + | + |
| 32. | *Gammarus pulex* | + | + | + | + | + |
| 33. | *Lathonura sp.* | + | + | + | + | + |
| 34. | *Macroblachium* | + | + | + | + | + |
| 35. | *Micrithrix sp.* | + | - | + | + | + |
| 36. | *Moinodaphnia sp.* | + | + | + | + | + |
| 37. | *Neodiaptomus* | + | + | + | + | - |
| 38. | *Pseudosida bidantata* | + | - | + | + | + |
| 39. | *Senecella calanoides* | + | + | + | + | - |
| **PROTOZOA** | | | | | | |
| 40. | *Amoeba proteus* | + | - | + | + | + |
| 41. | *Diffusia sps.* | + | + | + | + | + |
| 42. | *Euglena viridis* | - | + | + | + | + |
| 43. | *Paramaecium cordatum* | + | - | + | + | + |
| 44. | *Vorticella nebulifera* | + | + | + | + | + |
| ***Total*** | | **42** | **33** | **39** | **41** | **42** |

**Table No. 3-Monthly variation in Total Zooplankton (Org./l) of various sampling stations in Ghunghutta Dam in January 2020 to December 2020.**

| S.No. | Months | Sampling Stations | | | | | Mean±SD |
|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | |
| 1. | Jan. | 445 | 455 | 440 | 452 | 442 | 446.80±6.46 |
| 2. | Feb. | 520 | 525 | 530 | 540 | 515 | 526.00±9.62 |
| 3. | March | 530 | 535 | 540 | 550 | 542 | 539.40±7.54 |
| 4. | April | 560 | 555 | 570 | 580 | 560 | 565.00±10.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5. | May | 660 | 650 | 645 | 655 | 635 | 649.00±9.62 |
| 6. | June | 690 | 685 | 692 | 675 | 648 | 678.00±18.01 |
| 7. | July | 790 | 795 | 800 | 798 | 780 | 792.60±7.99 |
| 8. | Aug. | 950 | 930 | 920 | 910 | 965 | 935.00±22.36 |
| 9. | Sept. | 770 | 780 | 760 | 775 | 750 | 767.00±12.04 |
| 10. | Oct. | 690 | 658 | 675 | 640 | 675 | 667.60±19.14 |
| 11. | Nov. | 570 | 578 | 565 | 560 | 576 | 569.80±7.50 |
| 12. | Dec. | 470 | 480 | 478 | 460 | 465 | 470.60±8.47 |
| **Range** | **Min** | **445** | **455** | **440** | **452** | **442** | |
| | **Max** | **950** | **930** | **920** | **910** | **965** | |
| ANOVA one way test for Zooplankton there is a not significant difference between sampling sites (p=1.0) | | | | | | | |




**Quantitative analysis of zooplankton-**

The values of total number of zooplankton recorded in Ghunghutta dam was 965 org/l in the month of August 2020 at the sampling station E, while the lowest value of total zooplankton was recorded 440 org/l in the month of January 2020 at the sampling station C. Then a sharp decline was observed from September onwards up to December. Similar result were reported by Das et al (2016). Sarang et al., (2017) The zooplankton found during the study were classified into major 5 groups Protozoa, Cladocera , Rotifera, Copepoda and Ostracoda. Rotifera consisted highest generic diversity. Pandit et al.,(2020), obtained 23 genera of zooplanktons out of which 6 of Rotifera (43.60%), 5 of Protozoa(18.10%), 5 of Cladocera (31.11 %), 4 of Copepods (22.93% ) and 3 genera of Ostracods(13.4 %) were identified from Ganga river. Similar results were reported by various researchers (Negi et al., 2013, Sharma, 2020).

**CONCLUSION:-**

The present investigation has been focused on zooplankton diversity of Ghunghutta dam water with specific environmental associations. The study of the above mentioned zooplankton shows that the dam water is suitable for irrigation and for fish culture. The number of animals was found more in summer and less in rainy season. Similarity of zooplankton was found at various sites. No bio indicator species of zooplankton related to pollution was found, so the water of dam is potable, cultivable and suitable for fish farming. This investigation also focuses on reducing the water pollution due to human activity and helps in improve social and cultural importance of dam and its scenario. Our results will help for assessing the potable nature of dam water.

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