



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

IJDR

International Journal of Development Research
Vol. 09, Issue, 03, pp.26092-26097, March, 2019



ORIGINAL RESEARCH ARTICLE

OPEN ACCESS

A STUDY OF ZOOPLANKTON IN SHIVNATH RIVER AT MADKU DWEEP DISTRICT MUNGELI (C.G.)

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ARTICLE INFO

Article History:

Received 03rd December, 2018

Received in revised form

19th January, 2019

Accepted 21st February, 2019

Published online 29th March, 2019

Key Words:

Protozoa, Rotifera, Cladocera,
Copepoda, fresh water zooplankton.

ABSTRACT

In this study, we compared the species composition respectively diversity of planktonic (Protozoa, Rotifera, Copepoda, Cladocera) in Shivnath River water. Investigation was carried out from December-2016 to December-2017. Diversity of zooplankton tends to be the highest in River ($r = +0.988$) and the lowest ($r = -0.746$). The relatively high species number despite of zooplankton supported by river. Shivnath River water body seems to contribute considerably higher total abundance of zooplankton in the other two types of ecosystem. Data analysis highlighted significant difference in zooplankton abundance among the different types of water body. The zooplankton abundance was influenced by physical factor of the water bodies. Correlation analysis revealed a strong positive relationship between Location I & II and location III & IV, while there exists a correlation analysis session winter, summer and rainy. Correlation of temperature b/w location I & II is ($r = +0.999$) and location III & IV is ($r = +0.123$). The analysed pH correlation b/w location I & II is ($r = +0.447$) and location III & IV is ($r = +0.102$). Findings of the present study provide useful knowledge on the spatial organization of zooplankton diversity in different types of fresh water ecosystem. The result of investigation that (*Daphnia*) particular species of zooplankton density is higher in Shivnath River at Madku Dweep, Mungeli district.

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Citation: Sarita Chandrawanshi, Dr. Singh, R.K. and Dr. Sahu, K.R. 2019. "A study of zooplankton in shivnath river at madku dweep district mungeli (C.G.)", *International Journal of Development Research*, 09, (03), 26092-26097.

INTRODUCTION

Zooplankton are microscopic animals that act as primary and secondary links in the food chain of all aquatic eco-systems. They feed on phytoplankton which directly provide food source for larval vertebrates and invertebrates as well as related to the growth of juvenile and larger fish. They are also important component in the transfer of energy from primary producers of phytoplankton to higher trophic levels such as fish.

- The present study has been undertaken to determine the Zooplankton diversity and abundance in relation to physical parameters in the study sites with aim of contributing to the knowledge of zooplankton diversity in shivnath river water bodies [1].
- Regarding the habitual zooplankton are cosmopolitan fauna and inhabit all freshwater bodies of the world [2].

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MATERIALS AND METHODS

The study area Shivnath river at Madku dweep distt. Mungeli (SRMDM) was visited at monthly interval during the one year period (December 2016 to December 2017). The water sample containing Zooplankton were collected at the surface of study sites at four stations namely Location -1 to Location-4 and sample was collected between 9 A.M. to 11 A.M.

For the collection of planktons glass bottles are preferred. Glass bottles are tightly sealed.

The bottles are soaked with 10% HCL for 24 hours and then thoroughly clean and rinse with distilled water. Sampling will do on monthly interval. Water sample will be collected from different locations with the help of ruddiness sampler. Samples will be fixed in the field and are later analyzed in the laboratory. Four location sample of one ml. for each replicate were examined under a compound microscope of various magnifications using a Sedgwick-Rafter counting cell.

Total Zooplankton species check list and distribution by location with seasonal period (Dec-2016 to Dec 2017)

Total zooplankton = Mean value

| Location | Groups with Species | Winter | Summer | Rainy |
|----------------------|--------------------------|--------|--------|-------|
| I | PROTOZOA (15) | 131 | 158 | 65 |
| | Arcella-sp. | | | |
| | Centropyxix-sp. | | | |
| | Coleps-sp. | | | |
| II | Colpidium-sp. | 123 | 148 | 69 |
| | Verticella-sp. | | | |
| | Filinia-sp. | | | |
| | Keratella-sp. | | | |
| III | Monostyla-sp. | 119 | 140 | 70 |
| | Gastropus-sp. | | | |
| | Oxytricha-sp. | | | |
| | ActnoPhyrus-sp. | | | |
| IV | Harringia-sp. | 120 | 142 | 74 |
| | Volvox-sp. | | | |
| | Tifflugia-sp. | | | |
| | Epistylis-sp. | | | |
| I | ROTIFERA (18) | 132 | 150 | 80 |
| | Brachionus angularis | | | |
| | Brachionus angulosum | | | |
| | Brachionus calyciflorus | | | |
| II | Brachionus caudatus | 127 | 143 | 73 |
| | Brachionus falcatus | | | |
| | Brachionus forficula | | | |
| | Brachionus quadridentata | | | |
| III | Brachionus vireus | 130 | 140 | 74 |
| | Asplanchna-sp. | | | |
| | Cephalotella-sp. | | | |
| | Colurella-sp. | | | |
| IV | Conochilus-sp. | 131 | 140 | 74 |
| | Mytilina-sp. | | | |
| | Rotaria-sp. | | | |
| | Scaridium-sp. | | | |
| I | Trichocerea-sp. | 14 | 22 | 17 |
| | Trichotria-sp. | | | |
| | Triplocheros limnias | | | |
| | Alona-sp. | | | |
| | Alonella-sp. | | | |
| | Bosmina-sp. | | | |
| | Ceriodaphnia-sp. | | | |
| | Chydorus-sp. | | | |
| | Conochiloides-sp. | | | |
| | Daphnia-sp. | | | |
| | Diaphanosoma-sp. | | | |
| | Diaphanosoma-sarsi | | | |
| | Moina-sp. | | | |
| | Moinamacrocopa-sp. | | | |
| Sita-sp. | | | | |
| Leydgia-sp. | | | | |
| Macrothrix-sp. | | | | |
| Simocephalus-p. | | | | |
| Streblocerus-sp. | | | | |
| Sida crystalline-sp. | | | | |
| Pleuroxusaduncus | | | | |
| Diaphanosomaexcisum | | | | |
| I | COPEPODA (05) | 64 | 23 | 66 |
| | Cyclopoid | | | |
| | Copepod | | | |
| | Cyclops-sp. | | | |
| II | Diaptomus-sp. | 61 | 21 | 60 |
| | Mesocyclops-sp. | | | |
| | Nauplius larvae | | | |
| | | | | |

Individual /A = A.C/L

Where A = average number of individual per ml.
C = Volume of concentrated sample in ml.
L = Volume of filtered water in liter.

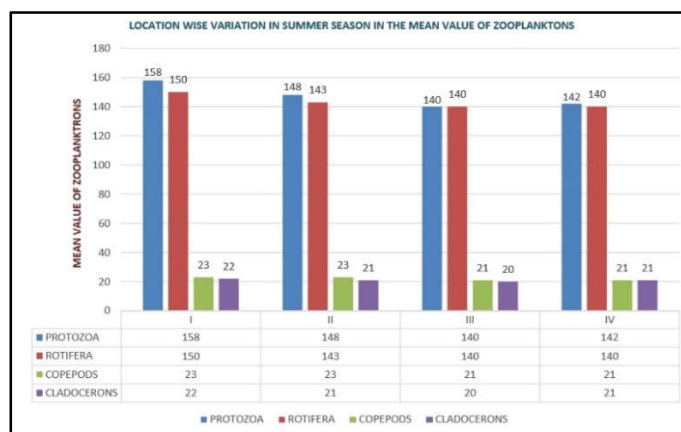
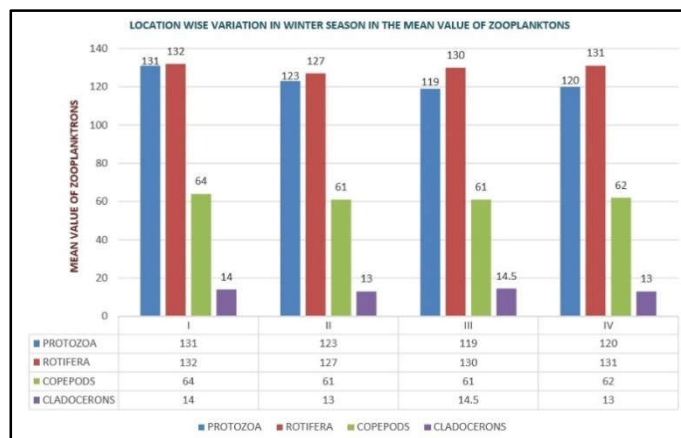
Zooplankton Population density = Total number individuals of the species / Total number of sampling unit studies. Zooplankton were identified and enumerated at the lowest and highest level according to the slandered taxonomic references [3]&[4].

Data Analysis

The degree of corrections between two variables can be ascertained by the quantitative value of coefficient of correction which can be found out by calculation. Karl Pearson has given formula for measuring correction coefficient (y).[5]

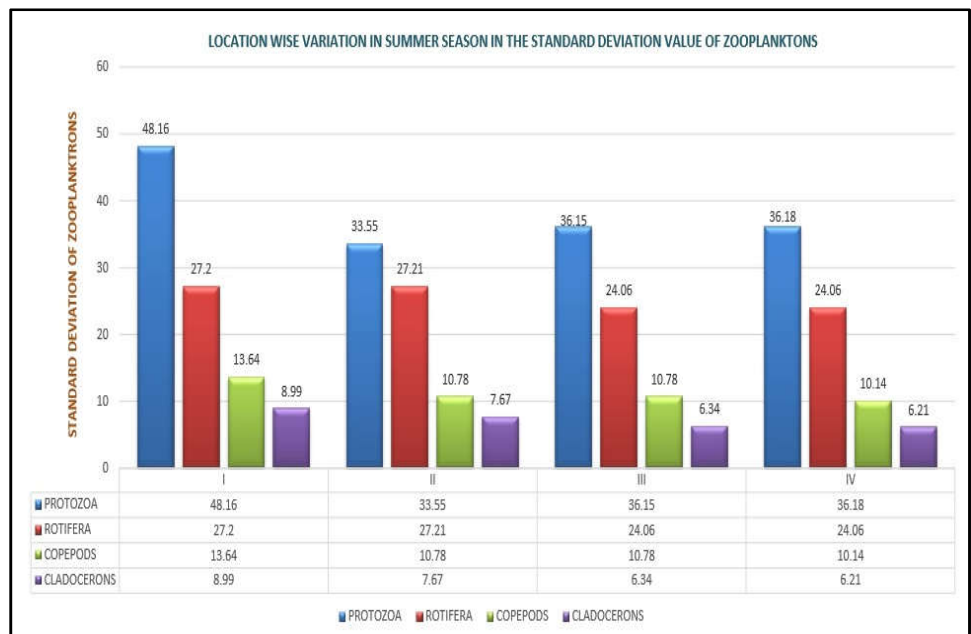
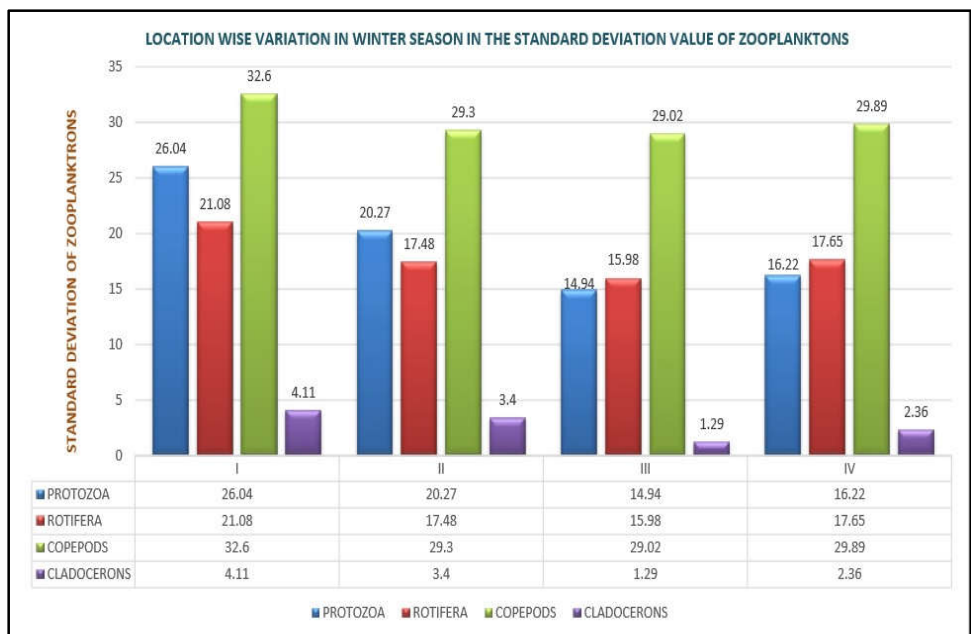
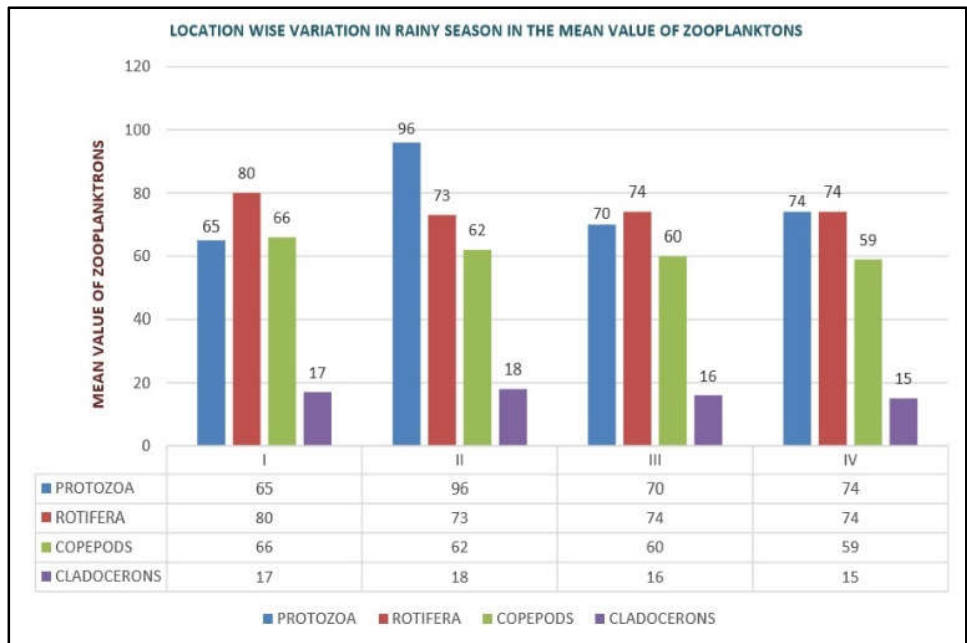
RESULT & DISCUSSION

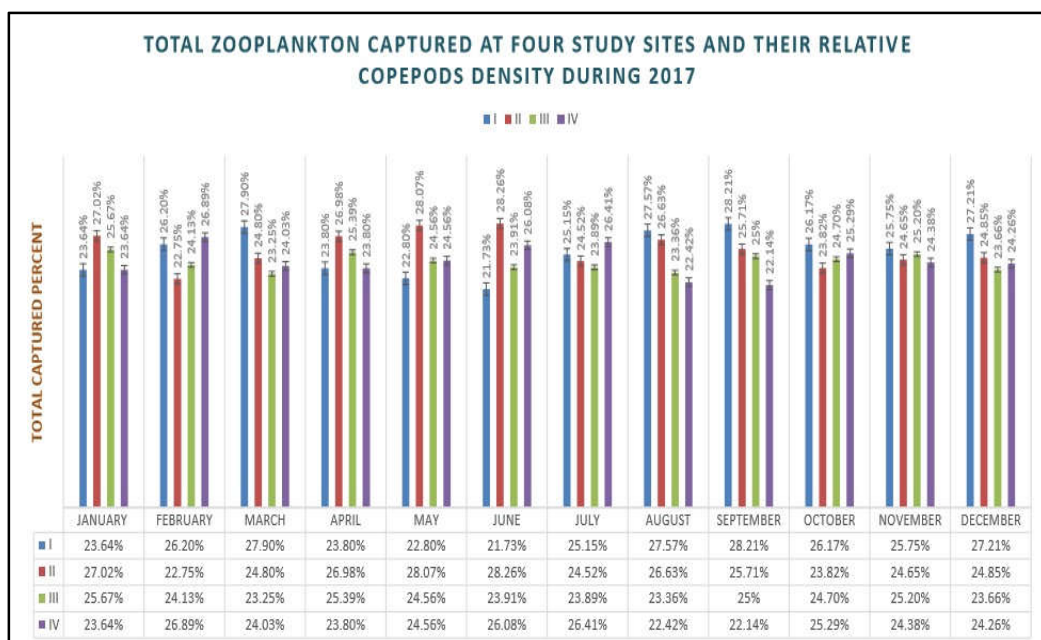
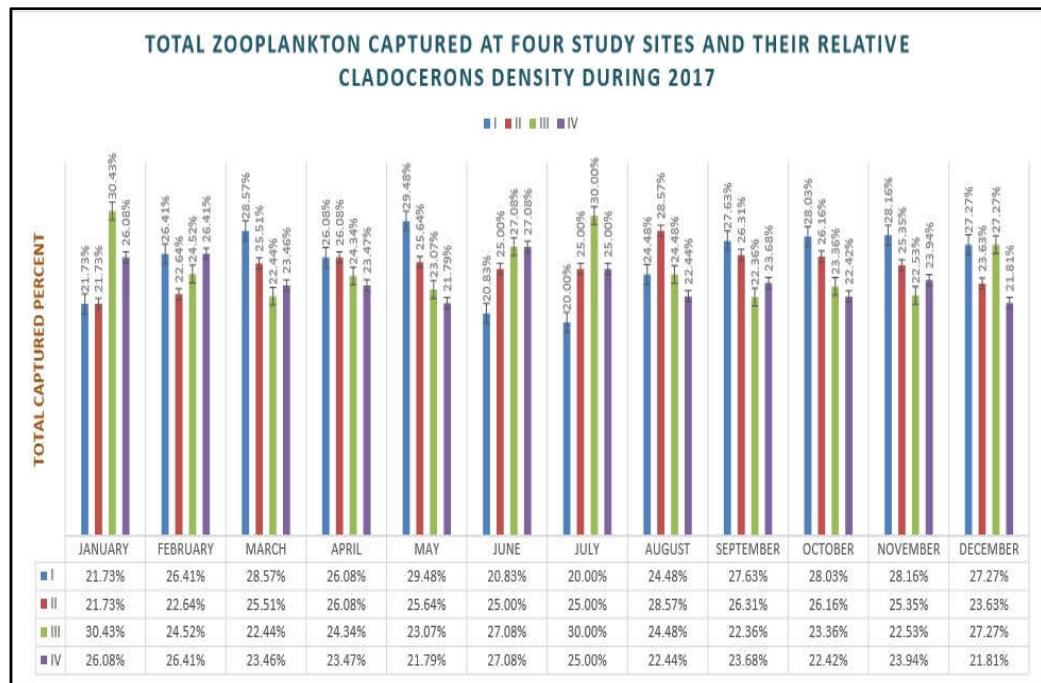
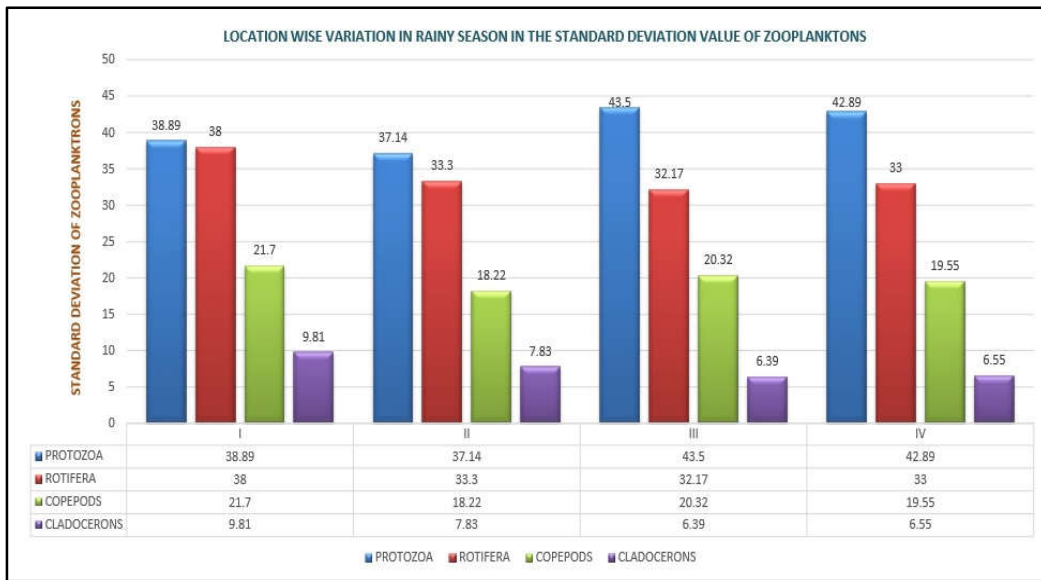
Zooplankton Density: Data of zooplankton species occurred in the study sites are shown in the graphs.

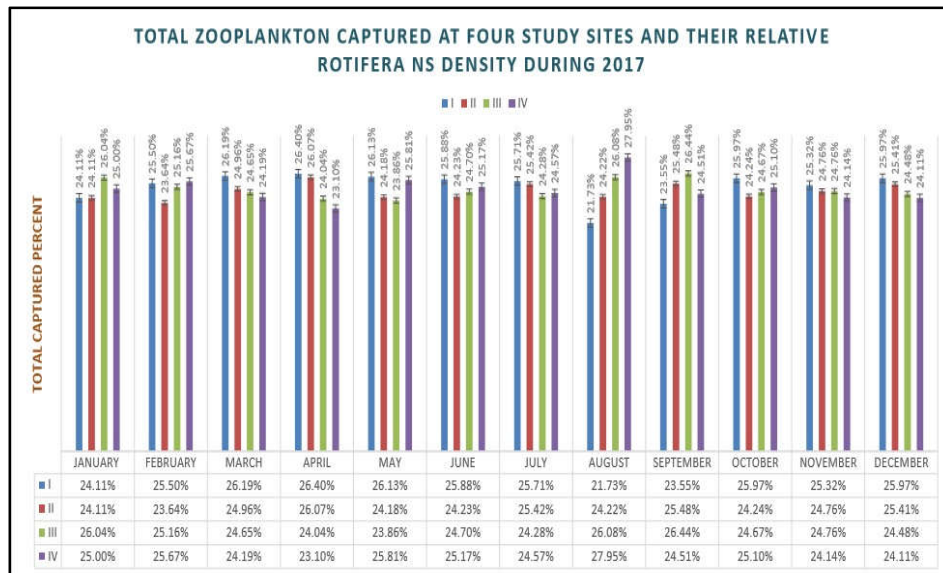
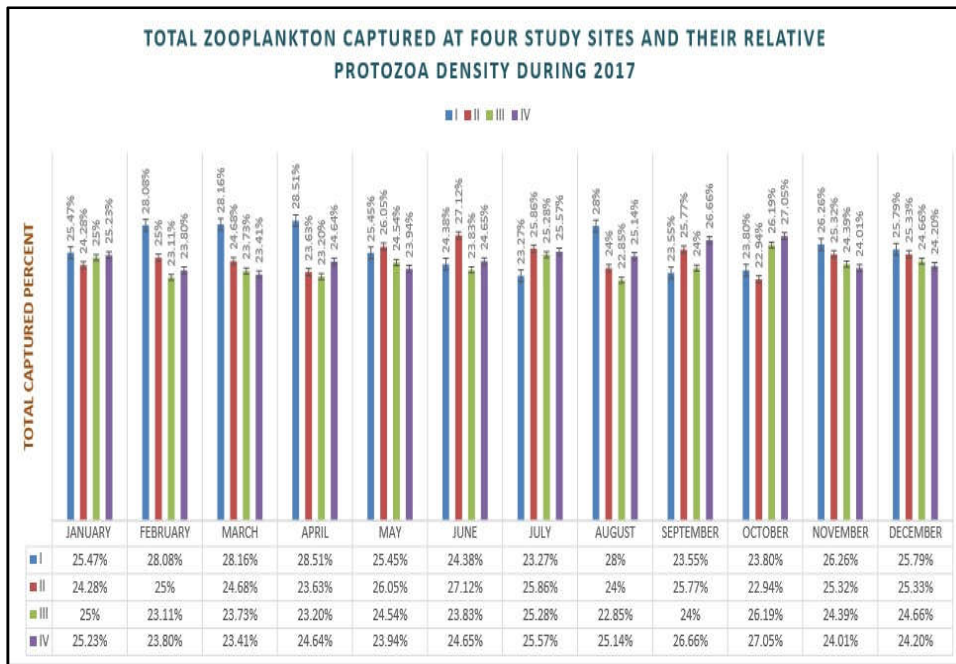


Zooplankton Abundance: Investigation was carried out from December-2016 to December-2017. Diversity of zooplankton tends to be the highest in River ($r = +0.988$) and the lowest ($r = -0.746$). The relatively high species number despite of zooplankton supported by river. Shivnath River water body seems to contribute considerably higher total abundance of zooplankton in the other two types of ecosystem. Data analysis highlighted significant difference in zooplankton abundance among the different types of water body.

Zooplankton abundance was derived from the following formula.







The zooplankton abundance was influenced by physical factor of the water bodies. Correlation analysis revealed a strong positive relationship between Location I & II and location III & IV, while there exists a correlation analysis session winter, summer and rainy. Correlation of temperature b/w location I & II is ($r= +0.999$) and location III & IV is ($r= +0.123$). The analysed pH correlation b/w location I & II is ($r= +0.447$) and location III & IV is ($r= +0.102$). In total zooplankton captured at four study sites and there relative Cladoceros density is highest in the month of January 2017 (30.43%) and also lowest is cladocera in month of July 2017 (20.00%).

Conclusion

The qualitative analysis of zooplankton from all four aquatic ecosystem revealed the presence of four taxonomic groups Protozoa, Rotifera, Cladocera, Copepoda from those cladocera are best represented as number of species density and abundance followed by protozoa and rotifera in nauplius. The dominance of zooplankton species is highly variable in different type of water body according to nutrient levels, Predator and other environmental factor which then affects the other biotic components of the ecosystem.

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