International Journal Of Scientific And University Research Publication

ISSN No 2364/2018

Listed & Index with
ISSN Directory. Paris

Multi-Subject Journal

Volum : (3) | Issue : 211 |

INTERNATIONAL JOURNAL OF SCIENTIFIC AND UNIVERSITY RESEARCH PUBLICATION

Research Paper

DIVERSITY OF LIMNOPLANKTONS IN TWO FRESH WATER LAKES OF ETHIOPIA

Dr. B. SAI RAM PATTNAIK || Associate professor
Dept. of Biology
Wolaita Sodo University
Ethiopia

ABSTRACT **Limnology as understood today as study of structural and functional relationships as well as productivity of organisms in inland aquatic ecosystem regulated by the dynamics of aquatic ecosystem regulated by the dynamics of their physical, chemical and biotic communities.*Study of ecosystem regulation is a perennial theme in ecology and from such studies we know that communities are influenced by a variety of physical, chemical and biological factors.An inland lake or pond is a "self conditional institution" or "closed community "enjoying considerable independence of the adjacent land mass. But due to rapid industrial and urban development some of the physiographical features of these fresh water bodies have under gone rapid changes causing much damage to the floral and faunal diversity. Study of Limnoplankton is of paramount importance since these serve as food for many larger organisms forming important link in the food cycle.Studies pertaining to systematic studies are getting low in recent periods. Rather much emphasis is now being given to specialized studies. The extinction of several species in aquatic environment is now an alarming omen in future to come. Present investigation is small attempt to understand the aquatic diversity of two of the rift valley Lakes of Ethiopia.*

KEYWORDS :Eutrophic, Limnology, Phyto- planktons ,

INTRODUCTION

Ethiopia, among all the African countries is quite unique for its geogeographic conditions, rich water resources, extensive green fields, varied animal husbandry and over all, diversity of flora and fauna. The Ethiopian rift valley also known as the AfroArabian rift is one of the greatest East African rift valleys that divides the Ethiopian highlands in to north and south halves. The volcanotectonic basin so created as a result of faulting millions of years ago, later modulated in to beautiful lakes. There are several fresh water lakes found embedded in this basin, among them the most prominent are e.g., the Lake Abaya, Chamo, Koka, Beseka, Ziway, Abijata, Shala and Lake Hawasa.Present study was made on two fresh water lakes i.e., Lake Hawasa and Lake Abaya found in the central Ethiopian Rift Valley separated by a distance of about 100 km. The species composi- tion especially that of limnoplanktons of both of these Lakes were explored in the present investigation.

Area of Investigation

The Hawassa Lake is situated 275 km away from the capital city Addis Ababa of Ethiopia towards the south near the city Hawassa, the capital city of Southern Province (SNNPR) that lies in between 6° 33›- 7° 33› N and 38° 22' - 38° 29' E. The Lake stretches 16km from the north east to south west direction and extends 8 km from north-west to south east direction having an approximate water volume 1.3 billion meter cube (45.9 billion ft3). The maximum depth of the Lake is 21.6m (70.9 feet) with mean depth however is 11m (Elias Dadebo, 2000). The catchment has a total area of 1455 km2 of which 93.6 km2 is the surface area of Lake that may increase up to 99.3 Km2 in the rainy season. The annual net groundwater outflow from Lake Hawassa to adjacent basins is estimated at 58 ×106 m3 (Yemane Gegziabiher, 2004, EFASA-2013).The Lake Abaya on the other hand is one of the biggest lakes in Ethiopia situated near the city Arba Minch that lies in between Lat: 6 º 20' N; Long: 37 º 50' E east of the Guge mountains at an altitude of 1268m above sea level in the same state of SNNPR. Lake Abaya is 60 kilometers long and 20 kilometers wide and has a surface area of 1160 km2. It has a maximum depth of 13 meters and is at an elevation of 1268 meters (Baxter, 2002).

Sampling

Water samples plankton analysis were collected between November, 2013 to March 2014 by dipping a wide plankton net of mesh size of 45 microns just below the surface of water in open condition. For quantitative analysis, of plankton a sub-sample of one ml. was quickly drawn with a wide mouthed pipette resembling that of a stempel pipette and poured into a counting cell similar to that of Sedgwick rafter cell of one ml. capacity and all the organisms of the aliquot were counted. However, when there was a bloom, counting was done only in selected squares in random from which total numbers per liter of water could be calculated. The classification and the identification of planktons were made possible by the available literature.

Plankton fauna

There were large varieties of species related to both phyto as well as zooplankton flora and fauna scattered in both the lakes respectively.

Cyanophyceae (Cyanobacteria)	*Raphidiopsis sp. Psuedoanabaena sp. Planktolyngbya sp. Nostoc sp. Microcystis aeuroginesa Cylindrospermopsis africana C. curvispora Aphanizomenon sp. Anabaenopsis sp. Anabaena circinalis*
Bacillariophyceae (Diatoms)	*Cymbella sp. Fragilaria crotenensis Mellosira variance Navicula cryptocephale N. rostellate Navicula oblonga Nitzschia vernicularis Nitzschia sp.* *Surirella sp. Synedra sp. Thalassiosira sp*

Phytoplanktons

	Chlamydomonas reticula Coelatrum sp. Cosmarium sp. Cyclotella sp. Pediastrum boryanum Pediastrum typicum Pediastrum graccilium Pediastrum duplex Pediastrum simplex

	Pediastrum biwae *Phacotus lenticularis* *Spirogyra sp.(3 types)* *Scenedesmus accuminatus* *S. dimorphus* *S. armatus* *S. quadricauda* *S. acutus* **Chlorophyceae** (Green algae)
Dinophyceae (Dinoflagellates)	*Peridinium sp.*
Cryptophyceae (Cryptophyta)	*Cryptomonas obvata*
Euglenophyceae (Euglinophyta)	*Phacus longicaudar* *Lepocincilis sp.*

Zooplanktons

The lakes were basically dominated by large populations of Rotifers, Copepods, Cladocerans and Dipterans (*Chironomous*) insects. The Cilliophorans especially the *Paramecium* population was also represented by quite a good number of species.

Rotifera

Asplanchna seiboldii Asplanchna brightwelli Brachionus calyciflorus B. caudatus

1. *fulcatus B.bidentata*

1. *quadridentata Cephalodella gibba Filinia longiseta Fillinia sp.Keratella cochlearis*

1. *tropica K. valga Lecane luna L.bula*
2. *papuna Polyarthra sp. Testudinella sp. Rotatoria vulgaris* Volume : 4 | Issue : 5 | May 2015 • ISSN No 2277 - 8179 *Pompholyx sulcataTrichocera elongate*

Copepoda *Thermocyclops consimili Mesocyclops aequatorialis Mesocyclops sp. Phyllodiaptomous Cladocera Diaphanosoma excisum Moina micrura Ceriodaphnia sp.*
Ostracoda *Heterocypris sp Strandesia sp.*
Diptera (*Chironomidae***) :***Chironomous larva*

CONCLUSION

In Lake Abaya, among the phytoplanktons the species belonging to chlorophycea and diatoms were most dominant followed by the other algal populations namely Blue green algae, Spirogyra, Mugotia, Euglena, Planktolyngbya and green algae. The zooplankton population basically composed of Cyclopoid copepods, Celanoid copepods, and rotifers especially species belonging to Moina, Daphnia, Brachionus, Keratella, Diaphonosoma, Chironomidae larvae and Plecoptera were recorded in higher number in Lake Abaya. Where as in case of Lake Hawassa the green algae were dominant compared to other phytoplanktons. The distribution and abundance of zooplanktons was basically depending upon the species composition and population of specific phytoplanktons. The climate and weather in Hawassa was much variable than that of Lake Abaya, the reason why there was greater variation in species composition in Hawassa than Abaya, where a single type of species was observed to be predominant for over a period of time.The Lake bed was dominated with plenty of diatoms and cyanobacterians while the littoral zone was scattered with rich composition of chlorophycean algae. Much of the pelagic fauna was dominated by copepods, cladocerans and rotifers. The species composition of zooplanktons was found to be highly variable in Lake Abaya than to that of Lake Hawasa. It may be due to long stretch of Lake Abaya or non contamination of domestic as well as industrial wastes. The high population of crocodiles and fishes also might have contributed in such direction.

ref_str

1. 1. Bamtstedt, U., Gifford, D. J., Irigoien, , Atkinson, A. and Roman, M. (2000). Feeding. In: Zooplankton Methodology Manual, pp. 323–330, (Har- ris, R.P., Wiebe P.H., Lenz J., Skjoldal H. R. and Huntley M., eds). Academic Press, San Diego. | 2. Brook Lemma (2003). Ecological changes in two Ethiopian lakes caused by contrasting human intervention. Limnologica 33:44-53. | 3. Baxter R.M. (2002). Lake morphology and chemistry In: Ethiopian rift valley lakes (Taylor W.D and Tudorancea C. eds) Backhuys publishers, Leiden. | 4. Carney, H.J. and Elser, J.J. (1990). Strength of zooplankton phytoplankton coupling in relation to lake trophic state. In: Large Lakes: Ecological Structures and Functions, pp. 615–631, (Tizler M.M. and Serruya C. eds). Springer Verlag, New York. | 5. Elias Dadebo (2000). Reproductive biology and feeding habbits of the cat fish Clarias gariepinus Burchel in Lake Hawasssa,Ethiopia.SINET: Ethiopian Journal of Science17:53-69. | 6. Gulati, R.D., Siewertser, K. and Postema, G. (1982). The zooplankton: its community structure, food and feeding, and role in the ecosystem of Lake Vetchen. Hydrobiologia 95:127–163. | 7. Girma Tilahun and Ahalgren, G.(2010): Sea- sonal variations in phytoplankton biomass and primary production in the Ethiopian rift valley lakes Ziway, Hawassa and Chamo-the basis for fish production. Limnologica 40:330-342. | 8.Girum Tamire, Seyoum Mengistou.(2013) Zooplankton community grazing rates in a small crater lake:Lake Kuriftu, Ethiopia. SINET: Ethiop. J. Sci.36 (1)1–8. | 9. Jaco- bus Vijverberg,et al., The composition of fish communities of nine Ethiopian lakes along a north-south gradient: threats and possible solutions: Animal Biology (2012) 10.1163 /157075611 X 618246 | 10. Pattnaik. B.S. R., “Zooplankton community and Trophic nature of Ponds” International Journal of Scientific Research, Vol 3, issue 4; 2014, page: 44-45.| | | 11. Pattnaik. B.S. R., “Species diversity of Lake Hawassa, Ethiopia”, International Journal of Scientific Research, Vol 3, issue 11; 2014, page: 33-35.| | | 12. Proceedings of EFASAVth Annual Conference, Hawassa University, Ethiopia-2013. | 13.Snell, T.W., 1998.Chemical ecology of rotifers, Hydribiolo 387/388:267-276. | 14. Seyoum Mengistou,(2006): Status and Challenges of Aquatic Invertebrate research in Ethiopia: A review; Ethio.J.Biol.Sci,(1):75-115,2006; ISSN:1819 8678. | 15. Welch, P.S., 1952. Limnology (II Edition). Mc. Graw Hill, New York: 538. |

16. 16. Zinabu Gebremariam et al (2002). Long-term changes in chemical features of waters of seven Ethiopian rift valley lakes. Hydrobiolgia 477: 81-9. |

IJSURP Publishing Academy

International Journal Of Scientific And University Research Publication

Multi-Subject Journal

Editor.

International Journal Of Scientific And University Research Publication

+965 99549511

+90 5374545296

+961 03236496

+44 (0)203 197 6676

www.ijsurp.com