

RESEARCH ARTICLE

Comparative study of macrozoobenthos of Kunghada Bandh lake and Chamorshi lake, tah. Chamorshi, Dist. Gadchiroli, (India)

Tijare RV* and Kunghadkar GE

Department of Zoology, Govt. Institute of Science, Nagpur. R. T. Road, Civil Lines, Nagpur-440001, M. S., India. Email: rvtijare@rediffmail.com

Manuscript details:

Received: 13.10.2015
Revised : 26.11.2015
Accepted: 06.12.2015
Published : 30.12.2015

Editor: Dr. Arvind Chavhan

Cite this article as:

Tijare RV and Kunghadkar GE (2015) Comparative study of macrozoobenthos of Kunghada Bandh lake and Chamorshi lake, tah. Chamorshi, Dist. Gadchiroli, (India). *International J. of Life Sciences*, 3(4): 360-366.

Copyright: © 2015 | Author(s),

This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

ABSTRACT

The present study deals with the qualitative and quantitative comparison between macrozoobenthos of Kunghad Bandh lake (20.22°N - 80.01°E) and Chamorshi Lake (19.55°N - 79.52°E). The collection and analysis of macrozoobenthos were done once in a month during two years i.e. February 2012 to January 2014. Total 19 species of macrozoobenthos were observed in Kunghada Bandh lake and 18 species in Chamorshi Lake belonging from phylum Annelida, Arthropoda and Mollusca. It is concluded that both the Lakes are rich in diversity of macrozoobenthos. Kunghad Bandh lake is shows slightly more diversity and quantity of macrozoobenthos as compare to Chamorshi Lake, due to good quality of water.

Key words: Macrozoobenthos, Chamorshi Lake, Kunghada Bandh, Gadchiroli.

INTRODUCTION

Most of the benthic fauna are the important indicators of water quality which indicates the past and current environmental and ecological status of an aquatic ecosystem (Hynes, 1960; 1962). A macro benthic invertebrate including both adult and larval forms varies according to their sizes (Cummins, 1975). They also act as an agent for the biomonitoring and proved to be very useful bio-indicators (Hofman, 1978). Many workers like Aston, 1973; Osborne *et al.*, 1976; Jonason and Lindegard, 1979; Clare and Edwards, 1983; Tijare and Kunghadkar, 2015 are carried out the work on the studies of benthic fauna in relation to the water quality. Most of the benthic organisms are devoid of backbone and inhabit the bottom substratum by spending almost their entire life to complete their life cycle (Rosenberg and Resh, 1922).

MATERIALS AND METHODS

Kunghad Bandh and Chamorshi Lake are situated at 20.22°N - 80.01°E and 19.55°N - 79.52°E respectively. Benthic organisms were collected from all five stations in the plastic bucket (white transparent of 5 liter capacity) by using Ekman's dredge and Van-Vin grab. Both the dredge is of medium size i.e. 6" X 6" X 6". The samples were collected monthly for the period of two years (February 2012 to January 2014) and categorized them according to their seasons e.g. 15th February to 15th May-Summer, 15th June to 15th September-Monsoon and 15th October to 15th January-Winter. Samples were collected during 10 am to 12 pm. and analyzed in the same day to avoid any error. The macrozoobenthos were snapped by using "Nikon Camera-Coolpix L29". The identifications or qualitative study were done by using various prescribed keys of Naidu and Shrivastava (1979), Tonapi (1980), Needam (1962) and Thorp (2009). For quantitative analysis, the segregated benthic organisms are counted species wise with naked eye or under binocular microscope. Their density are counted individuals (N) per M² and calculated by using the formula- $N/M^2 = n/A \times 10^4$



View of Kunghada Bandh



View of Chamorshi Lake

RESULTS AND DISCUSSION

Total 19 species were observed in Kunghada Bandh lake and 18 species in Chamorshi Lake of macrozoobenthos belonging to the Phylum from Annelida, Arthropoda and Mollusca. Out of 19 species of macrozoobenthos in Kunghada Bandh, 3 were of annelids:- i) *Limnodrillus hoffmeistry* of Family-Tubificidae and ii) *Lumbricus variegatus* of Family- Lumbricidae, Order-Haplotaxida and Class-Oligochaeta were observed during the collection of benthic organisms. iii) *Hirudinaria granulosa* of Family-Hirudinidae, Order-Hirudinida, and Class-Hirudinea. 9 species of Arthropods- i) *Hydracarina sp.* of Order-Trombidiformes, Class- Arachnida, ii) *Gelasimus sp.* of Family- Ocypodidae, Class- Arachnida, iii) *Dragonfly nymph* of Sub-order- Anisoptera, and iv) *Damselfly nymph* of Sub-order- Zygoptera, Order- Odonata, v) *Culex larve* and vi) *Anopheles larve* of Family Culicidae, vii) *Tabanus sp.* of Family- Tabanidae, Order- Diptera, viii) *Nepa cinerea* and ix) *Ranatra elongata* of Family-Nepidae, Order- Hemiptera, Class- Insecta and 7 were molluscans- i) *Vivipara bengalensis* of Family- Viviparidae, Order- Archtaenioglossa, ii) *Melanoides striatella* of Family- Tharidae, iii) *Fanus ater* of Family- Pachychilidae, Order-Sorbeoconcha, iv) *Lymnea luteola* of Family-Lymnaeidae, Order- Hygrophila, Class-Gastropoda, v) *Lamellidens marginalis*, vi) *Lamellidens correatus* and vii) *Parreysia corrugata* of Family- Unionidae, Order- Uniondia, Class- Bivalvia. While out of 18 species in Chamorshi Lake, 3 were annelids:- i) *Limnodrillus hoffmeistry* of Family-Tubificidae and ii) *Nais communis* of Family- Naididae, Order-Haplotaxida and Class-Oligochaeta were observed during the collection of benthic organisms. iii) *Hirudinaria granulosa* of Family-Hirudinidae, Order-Hirudinida, Class-Hirudinea, 10 species were arthropods:- i) *Hydracarina sp.* of Order-Trombidiformes, Class- Arachnida, ii) *Gelasimus sp.* of Family- Ocypodidae, Class- Arachnida, iii) *Dragonfly nymph* of Sub-order- Anisoptera, and iv) *Damselfly nymph* of Sub-order- Zygoptera, Order- Odonata, v) *Chironomous larve* of Family-

Table 1 : Kunghada Bandh - Analysis of macrozoobenthos (N/M²) observed during February 2012 to January 2014 (Average of two years)

Class,Order	Genus &	SUMMER (N/M ²)				MONSOON (N/M ²)				WINTER (N/M ²)			
Family	species	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Class-Oligochaeta	---	377.78	311.11	155.56	44.44	111.11	266.67	244.44	377.78	355.56	400	311.11	244.44
Family-Tubificidae	<i>Limnodrillus hoffemeistry</i>	222.22	155.56	88.89	0	44.44	155.56	133.33	200	177.78	222.22	177.78	133.33
Family-Lumbricidae	<i>Lumbricus variegatus</i>	155.56	155.56	66.67	44.44	66.67	111.11	111.11	177.78	177.78	177.78	133.33	111.11
Class-Hirudinea	<i>Hirudinaria granulosa</i>	88.89	66.67	22.22	0	22.22	66.67	111.11	133.33	88.89	133.33	88.89	111.11
Class-Arachnida	<i>Hydracarina</i> sp.	88.89	66.67	22.22	0	44.44	88.89	111.11	111.11	133.33	155.56	111.11	111.11
Class-Crustacea	<i>Gelasimus</i> sp.	44.44	22.22	0	0	44.44	88.89	111.11	66.67	88.89	44.44	66.67	44.44
Class-Insecta	---	444.44	266.67	177.78	22.22	244.44	333.33	711.11	666.67	533.33	555.56	400	511.11
Order-Odonata	---	155.56	88.89	22.22	0	111.11	133.33	222.22	244.44	200	222.22	133.33	155.56
Suborder-Anisoptera	<i>Dragonfly nymphs</i>	66.67	44.44	0	0	44.44	88.89	111.11	133.33	88.89	133.33	88.89	66.67
Sub.order-Zygoptera	<i>Damselfly nymphs</i>	88.89	44.44	22.22	0	66.67	44.44	111.11	111.11	111.11	88.89	44.44	88.89
Ord-Diptera	---	177.78	44.44	88.89	0	66.67	200	288.89	266.67	288.89	288.89	244.44	244.44
Fam-Culicidae	<i>Culex</i> larvae	66.67	22.22	44.44	0	22.22	44.44	111.11	88.89	111.11	111.11	88.89	44.44
Fam-Culicidae	<i>Anopheles</i> larvae	44.44	0	0	0	44.44	88.89	66.67	111.11	88.89	44.44	66.67	88.89
Fam-Tabanidae	<i>Tabanus</i> sp.	66.67	22.22	44.44	0	0	66.67	111.11	66.67	88.89	133.33	88.89	111.11

Table:1: Continued...

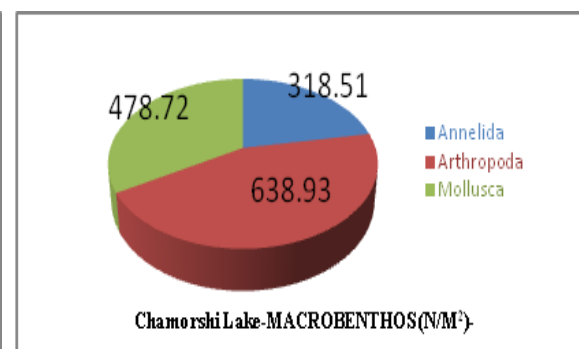
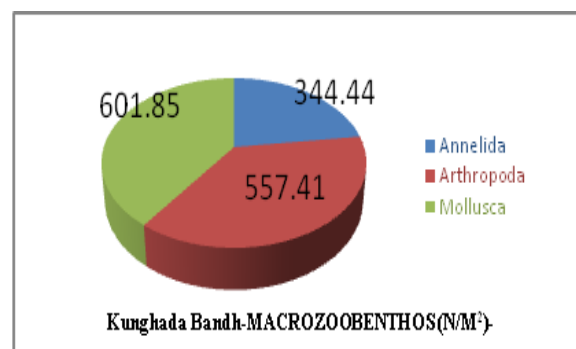
Class,Order	Genus &	SUMMER (N/M ²)				MONSOON (N/M ²)				WINTER (N/M ²)			
Family	species	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Order-Hemiptera	---	111.11	133.33	66.67	22.22	66.67	155.56	200	155.56	44.44	44.44	22.22	111.11
Fam-Nepidae	<i>Nepa</i> sp.	66.67	66.67	44.44	0	44.44	88.89	111.11	66.67	44.44	0	22.22	66.67
Fam-Nepidae	<i>Ranatra eongata</i>	44.44	66.67	22.22	22.22	22.22	66.67	88.89	88.89	0	44.44	0	44.44
Class-Gastropoda	---	488.89	288.89	155.56	44.44	133.33	355.56	444.44	533.33	577.78	466.67	488.89	444.44
Family-Viviparidae	<i>Vivipara bengalensis</i>	200	133.33	66.67	44.44	0	111.11	155.56	177.78	155.56	111.11	133.33	155.56
Family-Thiaridae	<i>Melanoides striatella</i>	88.89	44.44	0	0	44.44	88.89	88.89	133.33	111.11	88.89	133.33	88.89
Family-Lymnaeidae	<i>Lymnea lutiola</i>	111.11	66.67	44.44	0	44.44	66.67	111.11	88.89	133.33	88.89	88.89	111.11
Family-Pachilidae	<i>Fanus ater</i>	88.89	44.44	44.44	0	44.44	88.89	88.89	133.33	177.78	177.78	133.33	88.89
Cla-Bivalvia	---	200	133.33	66.67	0	200	266.67	311.11	377.78	311.11	377.78	288.89	266.67
Family-Unionidae	<i>Lamellidens marginalis</i>	66.67	44.44	22.22	0	44.44	88.89	88.89	133.33	88.89	133.33	88.89	88.89
Family-Unionidae	<i>Lamellidens correatus</i>	88.89	44.44	44.44	0	88.89	88.89	88.89	133.33	155.56	111.11	111.11	88.89
Family-Unionidae	<i>Parreysia corrugata</i>	44.44	44.44	0	0	66.67	88.89	133.33	111.11	66.67	133.33	88.89	88.89
Total Number of species (N/M²)=		1733.3	1155.5	622.22	111.11	800	1622.2	2044.44	2266.6	2088.8	2133.3	1755.5	1733.3

Table 2: Chamorshi Lake - Analysis of macrozoobenthos (N/M²) observed during February 2012 to January 2014 (Average of two years)

Class,Order	Genus & species	SUMMER (N/M ²)				MONSOON (N/M ²)				WINTER (N/M ²)			
		Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Class-Oligochaeta	---	355.56	244.44	133.33	44.44	155.56	222.22	266.67	377.78	355.56	333.33	222.22	266.67
Family-Tubificidae	<i>Limnodrillus hoffemeistry</i>	200	111.11	111.11	22.22	44.44	88.89	111.11	200	200	155.56	133.33	155.56
Fam-Naididae	<i>Nais communis</i>	155.56	133.33	22.22	22.22	111.11	133.33	155.56	177.78	155.56	177.78	88.89	111.11
Class-Hirudinea	<i>Hirudinaria granulosa</i>	44.44	66.67	22.22	0	44.44	66.67	88.89	133.33	111.11	111.11	88.89	66.67
Class-Arachnida	<i>Hydracarina</i> sp.	111.11	66.67	22.22	0	66.67	177.78	244.44	288.89	244.44	244.44	155.56	155.56
Class-Crustacea	<i>Gelasimus</i> sp.	66.67	44.44	22.22	0	0	88.89	133.33	155.56	155.56	133.33	111.11	88.89
Cla-Insecta		444.44	333.33	200	66.67	311.11	555.56	733.33	755.56	688.89	755.56	555.56	511.11
Order-Odonata	---	111.11	66.67	22.22	0	88.89	155.56	200	222.22	222.22	222.22	133.33	111.11
Suborder-Anisoptera	<i>Dragonfly nymphs</i>	44.44	22.22	22.22	0	44.44	88.89	111.11	133.33	88.89	133.33	88.89	44.44
Suborder-Zygoptera	<i>Damselfly nymphs</i>	66.67	44.44	0	0	44.44	66.67	88.89	88.89	133.33	88.89	44.44	66.67
Order-Diptera	---	222.22	155.56	111.11	22.22	111.11	244.44	355.56	400	422.22	511.11	400	288.89
Fam.-Tendipididae	<i>Chironomous larve</i>	66.67	44.44	22.22	0	44.44	44.44	88.89	88.89	133.33	177.78	133.33	88.89
Fam-Culicidae	<i>Culex larvae</i>	44.44	22.22	0	0	44.44	66.67	133.33	88.89	88.89	133.33	88.89	66.67
Fam-Culicidae	<i>Anopheles larvae</i>	22.22	0	44.44	22.22	0	44.44	88.89	133.33	111.11	66.67	88.89	44.44
Fam-Tabanidae	<i>Tabanus</i> sp.	88.89	88.89	44.44	0	22.22	88.89	44.44	88.89	88.89	133.33	88.89	88.89

Table 2: continued...

Class,Order	Genus & species	SUMMER (N/M ²)				MONSOON (N/M ²)				WINTER (N/M ²)			
Family		Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Order-Hemiptera	---	111.11	111.11	66.67	44.44	111.11	155.56	177.78	133.33	44.44	22.22	22.22	111.11
Fam-Nepidae	<i>Nepa</i> sp.	66.67	44.44	44.44	0	44.44	66.67	111.11	66.67	44.44	0	22.22	44.44
Fam-Nepidae	<i>Ranatra elongata</i>	44.44	66.67	22.22	44.44	66.67	88.89	66.67	66.67	0	22.22	0	66.67
Class-Gastropoda	---	355.56	222.22	44.44	44.44	111.11	333.33	488.89	422.22	511.11	400	400	400
Family-Viviparidae	<i>Vivipara bengalensis</i>	111.11	88.89	0	44.44	0	88.89	177.78	133.33	133.33	88.89	88.89	155.56
Faily-Ampullariidae	<i>Pila globosa</i>	44.44	22.22	0	0	44.44	66.67	88.89	44.44	88.89	88.89	44.44	88.89
Family-Planorbidae	<i>Indoplanorbis exustus</i>	88.89	44.44		0	44.44	88.89	88.89	111.11	133.33	111.11	133.33	66.67
Fam-Tharidae	<i>Melanoides tuberculata</i>	111.11	66.67	44.44	0	22.22	88.89	133.33	133.33	155.56	111.11	133.33	88.89
Class-Bivalvia-	<i>Parreysia corrugata</i>	66.67	22.22	0	0	44.44	88.89	111.11	111.11	66.67	111.11	88.89	44.44
Total no. of species =		1377.7	933.33	444.44	155.56	711.11	1444.4	1800	2000	1977.7	1911.1	1511.1	1444.4



Chironomidae, vi) *Culex larvae* and vii) *Anopheles larvae* of Family Culicidae, viii) *Tabanus sp.* of Family- Tabanidae, Order- Diptera, ix) *Nepa cinerea* and x) *Ranatra elongata* of Family- Nepidae, Order- Hemiptera, Class- Insecta and 5 species were molluscs- i) *Vivipara bengalensis* of Family- Viviparidae and ii) *Pila globosa* of Family- Ampullariidae, Order- Architaenioglossa, iii) *Indoplanorbis exustus* of Family- Planorbidae, Order- Hygrophila, iv) *Melanoides tuberculata* of Family- Tharidae, Order- Sorbeoconcha, Class- Gastropoda, v) *Parreysia corrugata* of Family- Unionidae, Order- Unionida, Class- Bivalvia.

In Chamorshi Lake minimum average total macrozoobenthos (727.78 N/M²) was recorded in summer and maximum average total macrozoobenthos (1711.11 N/M²) in winter as compared to the annual average total macrozoobenthos (1309.26 N/M²). In Kunghada Bandh minimum average total macrozoobenthos (905.56 N/M²) was recorded in summer and maximum average total macrozoobenthos (1927.18 N/M²) in winter as compared to the annual average total macrozoobenthos (1505.56 N/M²). The seasonal fluctuation of macrozoobenthos is occurs might be due to quantity of water and depth of water body is generally decreases in summer while increases in monsoon and winter, as more the quantity of water more will be the organisms.

In Kunghada Bandh, percentage of annelids is 29.91%, while 22.18% in Chamorshi Lake. Percentage of arthropods in Kunghada Bandh is 37.07%, while 44.49% in Chamorshi Lake. In Kunghada Bandh, percentage of molluscs is 40.02%, while 33.33% in Chamorshi Lake.

REFERENCES

Aston R J (1973) Tubificids and water quality: a review. *Envi. pollution* 5: 1-10.

Clare P and Edwards RW (1983) The Macro invertebrate fauna of the drainage channels of the Gwent levels, South wales. *Fresh water Biology*, 13: 202-225.

Cummins KW (1975) Macroinvertebrates: Whitton, B. A. (Ed.) *River Ecology*: Blackwell Scientific publication, Oxford London, pp. 725.

Hoffman W (1978) Analysis of animal microfossils from the Grosser Segebergersee (F. R.G.). *Arch. Hydrobiology*, 82 (1-4): 316-346.

Hynes HBN (1960) The biology of pollute waters. Liverpool, Liverpool University press, 202 pp. in the assessment of water pollution in Swedish lakes. *Zoon* 1: 125-139.

Hynes HBN (1962) The Invertebrate fauna of a Welch mountain stream. *Arch Hydrobiol*, 57: 344-388.

Jonason PM and Lindegard CH (1979) Zoobenthos and contribution to the metabolism of Shallow lakes. *Arch. Hydrobiology. Beih. Ergebn. Limnol.*, 13: 162-180.

Naidu K Vanmala and Shrivastava HN (1979) Some fresh water oligochaetes of Nagpur, India. *Hydrobiologia*, Volume 72, Issue I, Pg: 261-271.

Needam (1962) A guide to study of fresh water biology, Holden day Inc. San Francisco, 5th ed .

Osborne A, Wanielista P and Yousef AA (1976) Benthic fauna species diversity in six central Florida Lakes in summer. *Hydrobiologia*, 48 (2): 125-129.

Rosenberg DM and Resh WH (1992) Freshwater Biomonitoring and Benthic Macro invertebrates. Cahpman & Hall publications, New York, London. p. 488.

Thorp JH and Covich AH (2009) Ecology and classification of North American Fresh water invertebrates. Elsevier Publication, Academic Press, London, UK.

Tonapi GT (1980) Freshwater animal of India: *An ecological approach*, Oxford and IBH Publishing company, New Delhi pp. 341

Tijare RV and Kunghadkar GE. Study of meiozoobenthos present in Kunghada Bandh and Chamorshi Lake, tah. Chamorshi, dist. Gadchiroli, India, *Int. Res. J. of Science & Engineering*, 2015, in Press.