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BENTHIC INVERTEBRATE DIVERSITY OF DAL LAKE, KASHMIR

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ABSTRACT
Studies on the composition of macro-zoobenthtos were carried out for a period of one year from January 2008 to December 2009 A total of 24 species of benthic invertebrates were recorded during the study. Oligochaetes especially Tubifex and Chironomids were predominant at the highly polluted sites whereas mollusks predominated at less polluted sites. The least diversity of benthic species attributed to the high pollution level is discussed.

Key words: Benthic, Dal lake, Diversity, Invertebrates,

I INTRODUCTION

The valley of Kashmir is rich in aquatic habitats especially lakes (Dal, Wular, Anchar, Tarsar. Marsar). Many studies have been carried out on the benthic fauna of these lakes. Such studies are important because the diversity of benthic fauna gives an indication of the trophic status of a Water body. ln the present scenario when the pollution has become a grave problem for the lakes of Kashmir such studies become much more important. Therefore, in the present study an attempt was made to explore the benthic invertebrate diversity of Dal Lake.

II STUDY SITES

Three study sites were selected in the world famous Dal Lake for the present study. These sites were the (i) Site I near- Ashai Bagh (ii) Site ll- Bod dal, central deepest portion (iii) Site Ill- near Telbal Nallah

Site I: The site is surrounded by residential houses and floating gardens. The domestic sewage and fertilizers used in the floating gardens are the main sources of pollution at this site.

Site II: This site is the deep water central portion with natural springs and exhibits least levels of pollution.

Site Ill: This site is near the entrance of Telbal Nallah in the Dal and the agricultural run off and domestic wastes from Telbal Nallah pollute this site. However, it is not as polluted as Site I.

III METHODS

For studying macrobenthos-invertebrate fauna, the collection of the bottom sediment sample were made with the help of **Ekman's dredge** having an area of 15.5 cm2. The samples were sieved through 0.5mm mesh. The

organisms were sorted out manually using forceps and preserved in 4% formalin for soft bodied animals while 70% ethanol for hard bodied or shell type organisms. The samples were taken to the laboratory for detailed examination. Identification of the various taxa was done with the help of standard taxonomic works of Needham [1], Edmondson [2], Pennak [3], APHA [4], Engbolm and Lingdell [5].

IV OBSERVATIONS

From the physico-chemical parameters of water it was found that the site l was most polluted of the three sites. Site Ill was the next polluted site whereas the site II was the least polluted site. A total of 24 of macro-zoobenthic species (table 1) were recorded from the three sites of Dal Lake from January 2008 to December 2008. These belonged to three phyla. The maximum representation was from Annelida which contributed 12 species (2 classes and 6 families), Out of the 12 species of Annelida 11 were contributed by class Oligochaeta. Althropods contributed 7 species belonging to 2 classes and 7 families whereas the phylum mollusca contributed 5 species (2 classes and 4 families) to the total diversity. Chironomids and tubifex were the dominant organisms at site I and III. While as the mollusks dominated at site II.

Table 1:

ORGANISM	Site 1	Site 2	Site 3
Phyllum Annelida			
Class Oligochaeta Family Aelosomattidae 1.*Aelosoma sp.*	+	+	+
Family Enchytraridae 2. *Lumbricillus sp.*	+	+	+
Family Lumbriculidae 3. *Lumbriculus sp.*	+	+	+
Family Naididae 4. *Chaetogaster sp.*	+	-	+
5.Naidium sp.	+	+	+
6. Nais sp.	+	-	-
7. *Pristina sp.*	+	+	+
8. *Stylaria sp.*	+	+	+
Family Tubificidae 9. *Branchiura sowerbyii*	+	+	+
10. *Limnodrilus hoffimeister*	+	-	-
11. *Tubifex tubifex*	+	-	+
Class Hirudinidaea Family Hirudinidae 12. *Hirudo sp.*	+	+	+
Phyllum Arthropoda			
Class Crustacea Family Gammaridae 13. *Gammarus*	+	+	+
Class Insecta Family Aeshmidae			

14. *Anax*	+	+	+
Family Chironimidae 15. *Chironomous*	+	-	+
Family Corydalidae 16. *Corydalus sp.*	-	+	-
Family Ephimeridae 17. *Ephemerella sp.*	+	+	+
Family Hydrophilidae 18. *Hydrophilus sp.*	-	+	+
Family Tamipodinae 19. *Pentaneuura*	-	+	+
Phyllum Mollusca			
Class Gastropoda Family Amminicolidae 20. *Amnicola limosa*	-	+	-
Family Lymnaeidae 21. *Lymnea auricularia*	+	+	+
Family Planorbidae 22. *Gyraulus parvus*	-	+	-
Class Pelecypoda Family Sphaicidae 23. *Musculium sp.*	-	+	+
24. *Pisidium sp.*	-	+	+

V DISCUSSION

A total of 24 species of zoo-benthos belonging to three phyla, 6 classes and 17 families were recorded from the Dal lake. The least diversity of 17 species at the site I can be attributed to the high pollution levels of this site because this site is exposed to of Oligochaeta at the Site I and Ill can also be attributed to their high pollution levels. Goodnight and Whitney [6] suggested that the high concentration of progressively increased amount of domestic discharge and urban runoff. Singh and Ahmad [7] also found least diversity at polluted sites in their study on river Ganga. The high concentration Oligochaetas can be attributed to the high organic or industrial pollution of the habitat.

Dipteran larvae were mainly seen at site l and III. This could be associated with muddy bottoms and their low number at siteli could be due to sandy bottoms. These observations are in confirmation with the findings of Paoletli et al. [8]. David and Ray [9] stated that Oligochaetas (mostly Tubifex) and bloodworm (Chironomous sp.) are indicative of trophic condition in all enviromments where anaerobic saprobic activity is intense and associated these forms with sewage fungi complex which denotes highly polluted conditions devoid of oxygen.

The study also showed that the Site II with low levels of pollution was dominated by mollusks. Cooker [10] and Pahwa [11] also found predominance of mollusks in clean waters.

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