



## EFFECT OF FERTILIZER USE ON THE DISTRIBUTION AND ABUNDANCE OF MACROZOOBENTHOS IN ANCHAR LAKE, KASHMIR

### Zoology

**Zahoor Ahmad  
Khanday\***

P.G. Department of Zoology, University of Kashmir. \*Corresponding Author

**Zakir Hussain  
Khanday**

Department Of Life Science, Singhania University, Rajasthan.

### ABSTRACT

The distribution and abundance of macrozoobenthic invertebrates in relation to the fertilizer use was investigated for a period of one year. Based on the fertilizer use in the floating gardens and agricultural fields in catchment area of the lake, the effect of fertilizers on the distribution and abundance of macrozoobenthos was carried out and the result of the fertilizer affected sites were compared with the unaffected sites of the lake. The study revealed a higher abundance of oligochaetes and insects at fertilizer affected sites than at unaffected sites whereas the mollusks were lower at fertilizer affected sites and higher at unaffected sites of the lake.

### KEYWORDS

Fertilizers, Benthos, Occurrence, Effect, Anchar Lake.

### INTRODUCTION

With the titanic population explosion the pressure on agriculture land has increased tremendously and with the result productivity and the total production in agriculture is of primary concern now. In the process of increasing productivity, more and more of synthetic chemicals like fertilizers are used to increase the production and the quality of agricultural products. However, indiscriminate use of fertilizer has affected man and his environment drastically. These fertilizers after heavy rains and runoff make their way towards the water bodies. The inland water bodies both lotic and lentic serve as an ultimate sinks for these fertilizers leading to total ecological imbalance. These agrochemicals not only upset physicochemical equilibrium but also modify the biotic communities, the species composition and bio diversity in water. Under these conditions, the susceptible species often vanish and the tolerant tend to flourish and dominate causing entire food chains and food webs to be disturbed.

Anchar Lake is a shallow basined valley lake with fluitile origin (altitude 1584m a.s.l) is situated 14 kms to the north west of Srinagar city. The lake is in a state of stress & its ecological condition has undergone drastic changes. A number of studies have been undertaken on the various features of lake but the effect of fertilizers use on the structure and composition of zoo benthos has received little attention. It is with this aim that the present studies on the effect of fertilizers used in the agriculture/horticulture fields (in the close vicinity of the lake) on the structure and composition of zoobenthic macro invertebrates was carried out and the results of the affected sites were compared with non-affected sites in the lake which probably gives us an idea of the extent of the effect of fertilizers on the lake fauna.

### STUDY SITES:

Three study sites were chosen in the present study. Site I was located near paddy fields and site II in the open clean waters virtually free from macrophytes in the central part of the lake. Site III was chosen near SKIMS (a tertiary care hospital) complex which receives effluents from the complex and also flanked by floating vegetable gardens from sides where fertilizers are used. The location of these sites is shown in the map (Fig. 1).

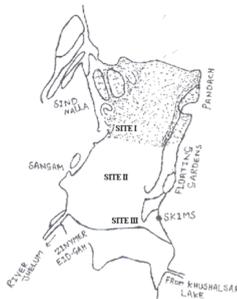


FIG. 1: MAP OF ANCHAR LAKE SHOWING STUDY SITES.

### MATERIALS AND METHODS

For studying macrobenthos-invertebrate fauna, the collection of the bottom samples were made with the help of Ekmans's dredge having an area of 15.5 cm<sup>2</sup>. The samples were sieved through 0.5 mm mesh. The organism 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 (1957), Edmondson (1989), Pennek (1978), APHA (1989), Engbolm and Lingdell (1999). The density was calculated in terms of individuals/m<sup>2</sup>.

### RESULTS AND DISCUSSION

From the physicochemical parameters of water it was found that site III was the most polluted among the three sites. Site I was the next polluted site where as site II was the least polluted site. A total of 24 species of macrozooinvertebrates were recorded of which 12 belonged to Annelida, 8 to Arthropoda and 4 to mollusca. Quantitatively the most dominant class was oligochaeta followed by insecta & mollusca during the investigation.

Table 1 : Percentage contribution of macrozoobenthos groups in Anchar lake

Groups	% age
Annelida	68
Arthropoda	29
Mollusca	3

The present study revealed a higher abundance of annelids at fertilizers affected sites than at unaffected sites. The abundance and density of annelids was higher at site III and lower at site II. Goodnight and Whitney (1960) suggested that the higher concentration of oligochaetes can be attributed to increased amount of high domestic & agricultural pollution of the habitat. Singh A.K (1996) stated that oligochaetes mostly *Tubifex* and *Chironomus* are indicative of tropic pollution.

Arthropoda had higher density and abundance at fertilizer affected sites. The abundance of this group was higher at site III & least at site II. Insecta was the most dominant group and its percentage contribution was second after the oligochaetes. The number & density of pollution tolerant species was maximum which were represented by *chironomus spp.*, *chaoborus spp.* and *tendipes tenants*. Chironomids are invariably the inhabitants of polluted waters with low oxygen content and high organic nutrients. Similar results have been obtained by Bay et al. 1966 Kaushik et al (1991).

Mollusks were higher at site II and lower at site III. Cooker (1954) and Pahwa (1979) also found predominance of mollusks in cleaner waters.

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