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Abundance of benthic macro-invertebrate diversity of littoral zone of Bilawali Talab, Indore M.P. India

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ABSTRACT

The littoral region is an important interface between land and pelagic zone of water body. Bilawali lake, Indore is a shallow topical lake whose shoreline has dense population of Benthic invertebrate communities. The invertebrates are represented by Oligochaetes - *Dero dorsalis*, *Stylaria fossularis*, *Branchiodrillus semperi*, Molluscs- *Lymnaea acuminata*, *Bellamya bengalensis*, *Digoniostoma pulchella*, *Melanoides tuberculatus*, *Thiara scabra*, *Gyrallus* sp. *Pisidium clakeanum* and arthropods – *Chironomus* sp. *Chaoboros* sp. Etc. It is suggested that rich diversity of Benthic fauna of this lake is due to availability of food material and favorable environmental conditions and shoreline vegetation. Seasonal fluctuation in animal biomass is related to the physico-chemical factors and organic pollution.

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Introduction

Benthic macro invertebrates are best indicators for Bio-assessment. The abiotic environment of the water body directly affect in the distribution, population density and diversity of the macro benthic community. Benthic fauna are especially of great significance for fisheries that they themselves act as food of bottom feeder fishes (Sharma, 2002).

The littoral region is an important interface between land and pelagic zone of water body. It is occupied by rooted plants, micro and macro-invertebrates and demersal fish species. The studies on benthic communities of shallow tropical lakes reported by several authors (Shrivastava, 1996, 1957; Krishnamurthy, 1966; Michael 1968; Mandal & Moitra, 1975; Pahwa, 1979 Oommachan & Belsare, 1985; Malhotra et.al. 1990; Jaiswal & Singh, 1994; Sharma et.al 2007) reported energy content of macro-invertebrates and their seasonal changes in Indian sub-tropical lake water body, which explains rich biodiversity of the region.

Macrozoobenthic organisms play an important role in the energy cycle of fresh-water bodies. Their value as indicator organisms of water quality and occurrence with relation to the semimetal particle size were highlighted in several reports. Good (1953), Kajak (1963), Brinkhurst (1969), Oakland (1963), Cairns & Dickson (1971), Edmondson (1971).

Methods & methods

After survey of Bilawali Talab for the benthic biodiversity and nature bottom, there four sampling stations are selected for the study in shore line of lake. Monthly sampling were made from Jan 2013 to April 2013. a rod net was used in collecting samples and sieving them for isolation. the bigger animal species picked by hand where the smaller forms were isolated by sugar isolation method and studied them under low power (X 50) microscope. They were preserved by narcotizing them by methanol and chloral hydrate and later 70% alcohol. The benthic

organisms were identified with help of standard books and keys. Counts were expanded to standard units of numbers per square meter by a conversion factor, which was taken from the area sampled by the grab. The conversion factor is the ratio of 1 m² to the surface area sampled by the grab. Counts were multiplied by the conversion factor to estimate the number per square meter present in diversity.

Result and discussion

Macroinvertebrates diversity recorded in 'Bilawali Talab' during Jan 2013 - April 2013.

CRUSTACEA

(i) *Macrobrachium* spp.

EPHEMEROPTERA

(i) *Rhithrogena* spp.

(ii) *Baetis* spp.

(iii) *Ephemerella* spp.

(iv) *Caenis* spp.

(v) *Stenonema* spp.

DIPTERA

(i) *Chironomus* spp.

(ii) *Chaoboros* sp

MOLLUSCA

(Gastropoda)

(i) *Bellamya bengalensis*

(ii) *Thiara scabra*

(iii) *Thiara tuberculata*

(iv) *Thiara lineate*

(v) *Digoniostoma pulchella*

(vi) *Lymnaea acuminata*

(vii) *Gyrallus* spp.

(viii) *Pisidium Clarkana*

(ix) *Melanoide tuberculatus*

BIVALVIA

- (i) *Lamellidens spp.*
- (ii) *Corbiculla striatella*
- (iii) *Viviparabenglensis*
- (iv) *Melarioids tuberculatus*
- (v) *Lymnea articulate*
- (vi) *Lymnea acuminata*
- (vii) *Digoniostoma pulcheta*

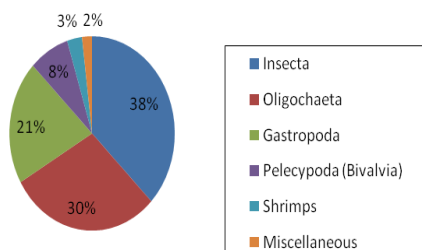
WORMS

- (i) *Dero digitata*
- (ii) *Dero dorsalis*
- (iii) *Brachiodrilus semoen*
- (iv) *Tubifex tubifex*
- (v) *Stylaria fossularis*
- (vi) *Hirudenic*
- (vii) *Glossophonia*
- (viii) *Nais communis*

Table 01. Average quantitative percentage composition of bottom fauna of Bilawali Talab' during Jan,2013-April 2013 Four Station (Per Cm² of sediment).

Macro Invertebrates (Bottom Fauna)	Jan	Feb	March	April	Remakes
Insecta	36.5	37.5	38.0	39.0	I
Oligochaeta	32.0	28.5	29.0	30.5	II
Gastropoda	18.5	20.0	21.5	22.0	III
Pelecypoda (Bivalve)	6.5	8.0	7.0	7.5	IV
Shrimps	5.0	3.5	3.2	Nil	V
Miscellaneous	1.5	2.5	0.8	0.5	VI

Fig.13: Average quantitative Percentage Composition of Bottom fauna of Bilawali Talab during (Jan.2013-Apr.2013) four Stations (per Cm² of sediment)

**January**

In January Oligochaetes were 34.9%, Leeches, Gastropodas (Pelecypoda) and shrimps were 1.8%, 15.8%, 20.5% and 2.6% respectively. Insects larvae were constitute about 42.3% which showed a major share.

February

In February 2013, a marked decrease in the population density of oligochaetes (32.5%) and a sudden fall in insect density (32.9%). There was an abrupt and large increase in population of gastropods (24.8%). A marked increase in pelecypods population (4.8%) but slight decrease in population of Shrimps (2.4%) and Leeches (1.5%) were found.

March

In 2013, there was a further decline in oligochaetes population (31.3%) and also fall incidence in insect population (30.5%). The gastropods (28.6%), Pelecypoda (5.8%) groups were in increasing order in comparison to previous month. Shrimps (1.2%), Leeches (0.7%) showed slightly decreasing trend.

April

In 2013, Oligochaetes (52.7%) were the largest contributor the total collected benthic community and constituted more than half portion of total benthic fauna. The next group was the gastropods (30.4%). Insects registered their presence only 9.2% slmmps were completely absent in the collection. Leeches were only 1.5%.

There is difficulty in studying benthic macroinvertebrate diversity due to their heterogenous distribution in littoral water in relation to their requirements for feeding, growth and reproduction. They cope up with these changes with their adaptive mechanisms, return or die Oommachan and Belsare (1985). Another major problem encounters in effective analysis of these organisms is the difficulty of sampling them quantitatively because of substrate heterogeneity which leads to a patchy and nonrandom distribution. Due to greater number of different microhabitats in littoral region of Bilawali Talab, they are abundant in hot as well as cold climates. Their abundance at station III of the lake is due to organic matter of domestic sewage effluent and run-off water from agricultural fields. During cold season the diversity of oligochaete populations and their abundance, even though shore birds and demersal fishe (sharma and Belsare ,2012) , which feed on them, are abundant, probably indicate interacting mechanism permitting coexistence in the habitat. The population of these worms is regulated by selective breeding and adaptive regulatory mechanism (Sharma et al.2007).

Macrobenthic fauna of Indian lakes tried to relate their population to organic matter (Verma et.al. 1984), physico-chemical conditions (Malhotra et.al. 1990) or seasonal variation in energy content of benthic macro invertebrates (Jaiswal & Singh, 1994),

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