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MACROINVERTEBRATE FAUNA OF ITHIKKARA RIVER, KERALA, INDIA

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ABSTRACT

Macroinvertebrate fauna was collected from Ithikkara river during the period from December 1995 to November 1996. A total of 28 species belonging to three phyla and six classes were seen. The most abundant group was Arthropoda followd by Mollusca. Crustaceans were predominant among the Arthropods. Insects was abundant in upstream region and Crustaceans and Molluscans were dominant in downstream region. Sand mining is a regular affair of Ithikkara river. Indiscriminate sand mining in Ithikkara river severely reduced the macroinvertebrate fauna which in turn adversely affected the riverine ecosystem.

INTRODUCTION

The river environment is complex and heterogeneous, having many habitat patterns, primarily due to a wide range in the size of substrate particles and configurations on the riverbed. These habitats are characterized by the diversity of aquatic macroinverte-brates. There are considerable differences in the macroinvertebrate distribution between various sections along the course of a river. The general degradation of riverine habitat is an ever-increasing worldwide problem (Benke, 1990; Allen and Flecker, 1993). Macroinvertebrate communities have been the most commonly used tools for making an integrated assessment of ecosystem degradation in rivers (Karr, 1991; Metcalfe, 1991). Considerable information is available on the distribution and other ecological aspects of river macroinvertebrate in the world over is reviewed by Rosillon (1989), Akpan and Ianadu (1994), Khmeleva *et al*. (1994) and Larsen *et al*. (1996). But such studies on Indian river are sparse and limited (Ramanujan, 1984; Synudeensahib, 1992). The objective of the present investigation was to study the species composition and distribution of macroinvertebrate fauna and the effects of sand mining in the river on the macroinvertebrate fauna.

Study area

The state of Kerala (Latitude $8^0$18'N-$12^0$48'N and Longitude $14^0$52'E-$77^0$2'E) is bordered on the east by the Western Ghats protecting it from the dry winds of the eastern plains of the subcontinent and on the west by the Arabian sea. Even though there are 44 rivers in Kerala state, information on the study of macroinvertebrate fauna of these rivers is scanty; hence present investigation is an attempt to study the macroinvertebrate fauna of one of the rivers in Kerala, the Ithikkara river. It originates from Madathurikunnu which lies at a height about 240m amsl (Latitude $8^0$52'N – Longitude $77^0$1'E) and it traverses about 56 km through southern region of Kollam district and finally drains into Paravur back water. It is a comparatively unpolluted river of the state without any major industry in its bank.

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The cottage industries like pottery are located in the bank of the river and many bricks manufacturing units are also seen. In its course it receives a variety of domestic wastes, domestic waste water and agricultural effluents. Sand mining is a regular affair in Ithikkara river. The river water is used for drinking, bathing and fisheries. The main tributaries of the river are Vattamparambu thodu, Kundumon thodu, Vattom thodu, Kulangara thodu and Pallimon Ar.

MATERIALS AND METHODS

Macroinvertebrate fauna was collected from six sampling stations along the master channel of Ithikkara river (Fig.1) once in a month for a period from December 1995 to November 1996. Taking into the account of rainfall pattern of the study area two seasons were recognised, the dry season (December - May) and the wet season (June-November). Collections of macroinvertebrate fauna were made by using a cast net, a hand net made with mosquito curtain cloth and Ekman's dredge. The collected materials were preserved in 4% formalin. Methods described by Tonapi (1980); Fitter and Manuel (1986) and Ward and Whipple (1992) were mainly followed for identification of macro fauna.

RESULTS

Macroinvertebrate fauna of Ithikkara river was composed of 12 species of Insects, one species of Arachnid, 10 species of Crustaceans, four species of Molluscans and one species of Coelenterates. A total of 28 species of macroinvertebrate fauna was collected from Ithikkara river. Station wise account of the macroinvertebrate fauna is presented in Table 1. In upstream region Insecta was the dominant group, but in downstream region Crustacea and Mollusca were the dominant group. *Ranatra elongata* was the common species found entire stretch of the river except station I, and rest of the species of insects were distributed patchy / sporadic along the master channel, most of the species were found frequently or very rarely. Among class Insecta, five species were found in station I, four species in station II, six species in station III, two species each in station IV and V and one species in station VI. Among class Arachnida, one species of water spider Argyroneta aquatica was observed in station I. Crustaceans such as prawns constituted the bulk of population present in the down stream reaches (station V and VI). A crab– *Paratelphusa* sp. was found in station I and *Thalamita crenata* another species of crab was in station VI. Fresh water crustaceans such as Caridina sp. was seen in station I. Observations revealed that one species of prawn in station I, two species in station III, six species in station V and five species in station VI. Crustacean fauna and Mollusca were never observed in station IV. Molluscans such as *Viviparous bengalensis* and *Lamelliden* sp. were found in upstream regions (station II and III) and *Melania tuberculata* and *Villorita cyprinoides* were found in down stream region (station V and VI). Among coelenterata, *Cassiopea* sp. was found in station V and VI.

DISCUSSION

Abiotic factors such as substrate size, heterogeneity, current velocity and relative canopy cover are known to influence the distribution of macroinvertebrates in streams (Cummins and Lauff, 1969; Minshall and Minshall, 1977 and Hawkins *et al*. 1982). In Ithikkara river, the substratum is often sand or mud which support relatively low densities of macroinverte-brates. Humphries *et al.* (1998) made similar observations in Australian low land rivers. Certain groups of macroinvertebrate fauna showed an increasing trend in number from upstream to downstream while certain other groups showed a decreasing trend (Dumnicka, 1996). During the present study insect fauna showed decreasing trend from upstream to downstream but in case of molluscans and prawns, their population and number of species were increased from upstream to downstream.

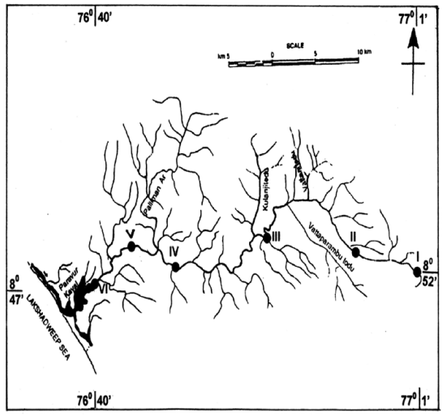

Fig. 1 Ithikkara river indicating study sites

Table 1. Distribution of macroinvertebrate fauna in different stations of Ithikkara river during 1995-1996.

Name of organisms	Sampling locations					
	I	II	III	IV	V	VI
PHYLUM – ARTHROPODA						
Class : Insecta						
1. *Notonecta glauca*	+	+	+	-	-	-
2. *Rhagovelia* sp.	+	+	+	-	-	-
3. *Laccotrephes maculatus*	-	-	+	-	-	-
4. *Ranatra elongata*	-	+	+	+	+	+
5. *Larvae of Psephnus*	-	+	-	-	-	-
6. *Chironomous larvae*	-	-	-	-	+	-
7. *Nymph of Pantala*	-	+	+	-	-	-
8. *Dragon fly nymph* (Cordulegaster sp.)	+	+	+	-	-	-
9. *Damsel fly nymph*	-	+	+	-	-	-
10. *Nymph of Mayfly*	-	-	+	+	-	-
11. *Orectochilus discifer* (Whirlging beetles)	+	-	-	-	-	-
12. *Aphelocherius* sp.	+	-	-	-	-	-
Class : Arachinda						
13. *Argyroneta aquatica* (Water spider)	+	-	-	-	-	-
Class : Crustacea						
14. *Macrobrachium canarae*	+	-	-	-	-	-
15. *M.idella*	-	-	+	-	+	+
16. *M.rosenbergii*	-	-	-	-	+	-
17. *Metapenaeus dobsoni*	-	-	-	-	+	+
18. *Penaeus semisulcatus*	-	-	-	-	+	+
19. *P.monodon*	-	-	-	-	+	+
20. *P.indicus*	-	-	-	-	+	+
21. *Caridina* sp.	+	-	-	-	-	-
22. *Paratelphusa* sp.	+	-	-	-	-	-
23. *Thalamita crenata*	-	-	-	-	-	+
PHYLUM - MOLLUSCA						
Class : Gastropoda						
24. *Melania tuberculata*	-	-	-	-	+	+
25. *Viviparous bengalensis*	-	+	+	-	-	-
Class : Pelecypoda						
26. *Lamelliden* sp.	-	-	+	-	-	+
27. *Villorita cyprinoides*	-	-	-	-	+	+
PHYLUM - COELENTERATA						
Class : Scyphozoa						
28. *Cassiopea* sp.	-	-	-	-	+	+
Total number of species	9	8	11	2	11	11

'+' denotes present, '-' denotes absent.

Although there was a distinct headwater fauna in the Ithikkara river, a sequential downstream change in species composition was observed throughout length of the river with one species being replaced by another. This finding agrees well with the observations of Palmer (1996) in Buffalo river, South Africa.

Macroinvertebrate communicates decreased during wet season, the reduction is attributable to the increased discharge and water turbulence and reduced food availability (Akpan and Ianadu, 1944). Insects and molluscans were found along the entire stretch of the river. Ramanujan (1984) also made a similar observation in Kallar river. In station IV, macroinvertebrate fauna was comparatively very low compared to the other stations because of the anthropogenic disturbance such as intensive sand mining. Rosser and Pearson (1995) found a decline in macroinvertebrate densities with increased disturbance of the sediment surfaces. Molluscans and crustaceans were never observed in station IV,

both of these were usually seen in shallow bottom region, sand mining severely depleted their population. Insects were abundant in station I and III, where pools and large quantity of woody debris were found. Humphries (1998) observed that the highest densities of macroinvertebrates are usually associated with microhabitats such as large woody debris (snags) and macrophytes. Prawns occupy the prime position in station V and VI – the down stream region of the river. In station IV, only two species of insects were observed during the entire period of study. Intensive sand mining severely depleted macroinvertebrate fauna of Ithikkara river. The depletion will drastically affect the entire ecosystem that is in trophic level, food chain and food web pattern, scientific evaluation is necessary before allowing sand mining in a controlled way.

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