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Occurrence and abundance of *Acetes* shrimps in the Kutubdia channel of Bangladesh coastal water

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Abstract

This investigation was carried out from June '89 to May '90 and focuses on the occurrence and abundance of *Acetes* shrimps in the Kutubdia channel. The shrimps of the genus *Acetes* occurred throghout the year in the area of investigation. *Acetes* showed a bimodal peak in occurrence, one in late monsoon season (August - September) and other in premonsoon season (February - March). But the maximum number of *Acetes* shrimps was recorded in March (462 individuals/haul). The *Acetes* population of this channel was dominated by four species, *Acetes erythraeus* (38.50%), *A. indicus* (32.98%), *A. chinensis* (4.48%) and *A. japonicus* (3.32%).

Key words : *Acetes* shrimps, Kutubdia channel

Introduction

The shrimps of the genus *Acetes* are planktonic (Omori 1975) and which are living mainly in the estuarine and coastal waters of tropical and subtropical regions (Omori 1977). These shrimps often become a major component in the diets of shore fishes, large shrimps and shore birds (Omori 1974, Xiao and Greenwood 1993) and play a significant role in the food web of neritic waters, particularly in mangroves and seagrass beds. During certain part of the year, *Acetes* forms conspicuous aggregations near the shore. Such accumulations have been exploited as human food for many years in Asia and Africa. The annual world catch of *Acetes* is estimated to be about 170,000 tons, or about 15% of the total shrimp catch in the world and about 13.5% of the world crustacean fisheries prduction (Omori 1975). Now-a-days *Acetes* shrimps are used as a food in the hatchery operation and nursery ponds for larval rearing (Kungvankij *et al.* 1986).

In the coastal waters of Bangladesh, *Acetes* is one of the abundant group of macrozooplankton (Zafar and Mahmood 1989, Zafar 1995). But information on *Acetes* is not available except one publication on taxonomic description (Mahmood *et al.* 1978). The present investigation is the first of its kind on temporal distribution of *Acetes* shrimps from the Kutubdia channel in south-eastern coastal water of Bangladesh.

Material and methods

Sampling was made between June '89 and May '90. The area of investigation in the Kutubdia channel is situated at Lat. 21°53'36" N and Long. 91°54'54" E which is laterally fed by tributaries of rivers. On the south-eastern side of the channel, the delta of Mathamuhuri river and adjacent Chakaria mangrove forest. Most of the shoreline on the two sides of the channel is covered by poor mangrove vegetation and natural uloo grass (*Imperata cylindrica* and *Urigrass oryza*), with the adjacent land consisting of coastal salt pans being used for salt extraction during dry season and aquaculture afterwards. This channel is a good spawning and nursery ground for a number of commercially important fish and shrimps (Zafar 1994, Zafar *et al.* 1994 and Zafar 1995).

Four stations were selected for hydrobiological samples. Zooplankton samples were collected during new moon period at every month by a triangular push net made of ordinary nylon cloth having a mesh size of 750 µm. The net, which consisted of a flattened conical bag, measured 2.5 m, and had a mouth of 3.6 m. Samples were collected during the spring tides from shallow waters (depth 1. 2 m) by pushing and dragging the net on the bottom for 15 minutes at a time against tide. Samples were immediately preserved in 5% formalin. Concurrently during the sampling time surface water temperature was recorded by a bucket thermometer. Salinity and dissolved oxygen were recorded following standard procedures and pH was recorded by a digital pH meter. Data on atmospheric temperature and rainfall were obtained from the Meterological Department Kutubdia, Bangladesh. In the laboratory the *Acetes* shrimps were identified from zooplankton samples as following the methods and key characters suggested by Omori (1975), Mahmood *et al.* (1978) and Tirmizi and Ghani (1982). Analysis of variance, correlation and regression are used for data analyses.

Results and discussion

Hydrometeorological parameters

Statistical analysis (Kruskal-Wallis one factor ANOVA) shows no significant differences in the four stations among the recorded hydrological parameters. So, only average hydrological parameters are indicated in Table 1.

Occurrence and abundance of Sergestid shrimp, Acetes

The planktonic shrimps of *Acetes* were present in the study area throughout the period of investigation. *Acetes* shrimps showed a bi-modal peak in occurrence of the Kutubdia channel, one in premonsoon season (February - March) and other in late monsoon season (August - September). But the maximum density was recorded in March (462 individuals/haul). The most abundant of *Acetes* shrimps in this channel were *Acetes erythraeus* (38.50%), *A. indicus* (32.98%) (Fig. 1). The *Acetes* shrimps of the Kutubdia channel shows no significant relationship with recorded hydrological parameters. Zafar and Mahmood (1989) reported that *Acetes* shrimps were present throughout the year in the Satkhira estuarine system.

Table 1. Monthly variations of hydrometeorolgical factors in the the kutubdia channel, Bangladesh

Parameters	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
Salinity (%0)	18.00	9.72	10.79	11.00	20.00	25.57	27.53	30.00	29.45	25.00	26.00	25.00
Air Temperature (°c)	32.20	24.50	30.00	27.00	29.00	26.00	19.00	29.00	28.00	29.50	29.00	32.00
Water tenoeratyre (°c)	31.60	24.00	29.00	26.90	27.50	27.00	21.00	27.00	28.50	29.00	28.00	33.00
Dissoved oxhen(ml/l)l	3.51	4.71	6.97	6.99	5.28	4.63	8.35	8.34	5.35	3.82	4.97	5.35
pH	7.50	7.14	8.00	7.10	7.16	8.30	8.40	8.22	7.95	7.14	7.90	7.00
Monthly rainfalll (mm)	562.00	722.00	76.00	465.00	512.00	0.00	0.00	0.00	55.60	195.10	62.00	222.00

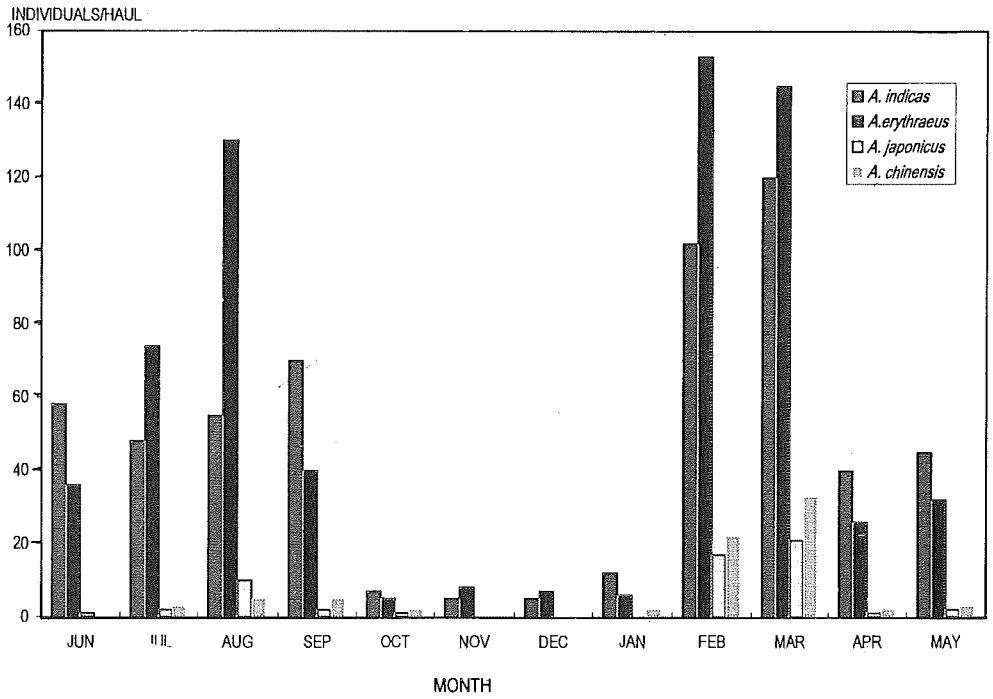


Fig. 1. Abundance of four Acetes shrimps inthe kutubdia channel of Banglsdesh coastal waters.

Temporal distribution of four species of Acetes shrimps

Four species of *Acetes* shrimps in the Kutubdia channel varied seasonally but statistically (Kruskal-Wallis one way ANOVA) their abundance showed no significant difference among the four sampling stations . So, only average abundance of *Acetes* shrimps are shown here.

Acetes indicus

This species was most abundant (120 individuals/haul) in March (Fig. 1). Omori (1977) found that *A. indicus* was distributed from the west coast of India through the Andaman sea, Gulf of Sian and the Java sea, to the South China sea. Mahmood *et al* . (1978) stated the presence of *Acetes indicus* in the Karnafuli estuary throughout the year. Bhattacharya (1988) reported that the upper and the lower lethal temperatures were 35^{0}C and 13^{0}C respectively, for *A. indicus* . In the Kutubdia channel temperature varied between 21^{0}C - 31^{0}C and *A. indicus* were found in lower densities during winter months and maximum in February-March months. Bhattacharya (1988) also mentioned that the large numbers of *A. indicus* occurred when salinity varied from 26.50 %0 to 35%0. In the Kutubdia channel this species were recorded within the salinity range of 9.7%0 to 30%0 and large numbers of *A. indicus* occurred when salinity varied from 25%0 -30%0.

Acetes erythraeus

The maximum density of *A. erythraeus* was in February (153 individuals/haul) and minimum in October (5 individuals/haul) (Fig. 1). This

species has the most extensive geographical distribution in the Indo-west Pacific. Its range extends from the coast of South Africa to the South China sea, through the south and west coast of India, the Malay Archipelago and the Java sea. *A. erythraeus* was also recorded near the Mossman, Australia (Omori 1975). This species appeared in the coastal water of south India during January to April (Nataraj 1947). Le Reste (1970) stated that *A. erythraeus* were found in water where the salinity fluctuates seasonally between 1.5%0 and 35%0 . In the present investigation salinity varied between 9.7%0 and 30%0, but higher density was recorded during spring season.

Acetes japonicus

A. japonicus was first recorded from Kutubdia channel during the present investigation. It was recorded throughout the period of investigation except in November - January. Two peak occurrence of *Acetes japonicus* in the studied area, one peak in August (10 individuals/haul) and another in March (21 individuals/haul) Fig. 1. *Acetes japonicus* were recorded from the coasts of India and from the Andaman sea to the southern Japan (Omori 1977).

Acetes chinensis

It was the third dominant species in the *Acetes* population. The maximum abundance of *Acetes chinensis* was recorded in March (33 individuals/haul) (Fig. 1.) Luo and Zhang (1957) reported the spatial distribution of *A. chinensis* in Liaotung Bay and found that spatial variability led to marked differences in the catches at different localities and they also stated that *Acetes chinensis* was euryhaline. However in the present investigation area, *A. chinensis* was found within the salinity range of 9.7 %0 to 30%0.

Conclusions

It appears from this study that usually the *Acetes* shrimps in the Kutubdia channel have a bimodal peak in occurrence, one in premonsoon season (February - March) and other in late monsoon season (August - September). The abundance of four species of *Acetes* in the Kutubdia channel shows no significant correlation with recorded hydrological parameters . But *Acetes indicus* and *A. erythraeus* shows negative relation and *A. chinensis* and *A. japonicus* positively related with salinity. There is no published work on *Acetes* specially ecology, temporal distribution in the coastal waters of Bangladesh. The present account therefore, constitutes the first report on its from in the Kutubdia channel.

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