

OBSERVATIONS ON NOCTURNAL SWARMING OF THE PLANKTONIC  
OSTRACOD *CYPRIDINA DENTATA* (MULLER) FOR MATING IN THE  
NORTHERN ARABIAN SEA

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ABSTRACT

Nocturnal swarming of the ostracod, *Cypridina dentata* (Muller), in abundance for mating on the sea surface and the associated bioluminescence observed at ten stations in the northern Arabian Sea during the Oceanographic Expedition on INS DARSHAK from December 1973 to May 1974, are recorded. The occurrence of this species in high numbers contributed to the increase in the total biomass of neuston. Dominance of *C. dentata* over the other major crustacean elements in plankton existing in northern Arabian sea is considered unique.

INTRODUCTION

During the Oceanographic Expedition on INS DARSHAK in the northern Arabian Sea from December, 1973 to May, 1974, 188 neuston stations (99 day and 89 night Stations) were established (Fig. 1). Detailed analysis of the zoological constituents of the neuston samples revealed that there were 82 ostracod positive stations (64 night and 18 day stations) in which the Ostracod, *Cypridina dentata* (Muller) was swarming at the sea surface during the night at ten stations. It was also evident that the swarming was due to planktonic mating, since adult males and egg bearing females occurred in very high numbers and were the main constituents of the neuston, resulting in an increase in the total biomass of the samples at these ten stations. Observations in the experimental aquarium tanks in the ship's laboratory confirmed that

the *Cypridina* were swarming for mating. The neuston samples at the remaining 72 *Cypridina* positive stations (54 night stations and 18 day stations) were constituted of adult males and a few immature females. Further, this species outnumbered the other usually dominant major planktonic constituents like the Copepods and the Amphipods, which feature appears to be unique for that area (*i.e.* northern Arabian Sea) and has not been reported in any other part of the World Oceans. Furthermore, these Ostracods occurred far more abundantly at the sea surface in the night to the extent of creating dense patches of luminescence at the surface. These observations are reported in this paper.

MATERIAL AND METHODS

Neuston samples were collected with a

compact sampler consisting of a rectangular metallic frame (55 cm × 15 cm) with a stream lined float provided with a stabilizing keel and fitted with a conical net of 190 cm. length made of bolting silk bearing 60 meshes to the linear centimetre. Daniel and Jothinayagam (1977) and Daniel, Nagabhushanam and Chakrapani (1977) give details of the neuston net used and the technique followed for estimating the total displacement volume in millilitres. The numbers of organisms in the entire surface sample collected during a five minute haul was analysed for estimating the numbers of organisms in a haul. Continuous observations during the night at the various neuston stations were made to assess the bioluminescence exhibited during the night. Observations on the mating procedure and associated bio-luminescence during the mating period were also made at these ten stations in aquarium tanks in the ship's laboratory.

## OBSERVATIONS

In Fig. 2 the total displacement volumes of the neuston and the numbers of *Cypridina* occurring in a sub-sample of 1 ml and per haul of 5 minutes duration in the 82 *Cypridina* positive stations are presented.

A perusal of Figs. 2 and 3 show that of the 82 *Cypridina* positive stations, the total displacement volume of neuston was ranging from 0.5–5.9 ml at 34 night stations and 16 day stations, 6.0–10.9 ml at 9 night stations and 2 day stations, 11.0–20.0 ml at 9 night stations and above 20 ml at 12 night stations. The 21 stations wherein the total displacement volume was above 11.0 ml were established during the night and excepting at 4 stations (Stn. 09.07, Stn. 11.13, Stn. 29.05 and Stn. 45.08) the occurrence of the ostracod *Cypridina dentata* in very high numbers contributed to the

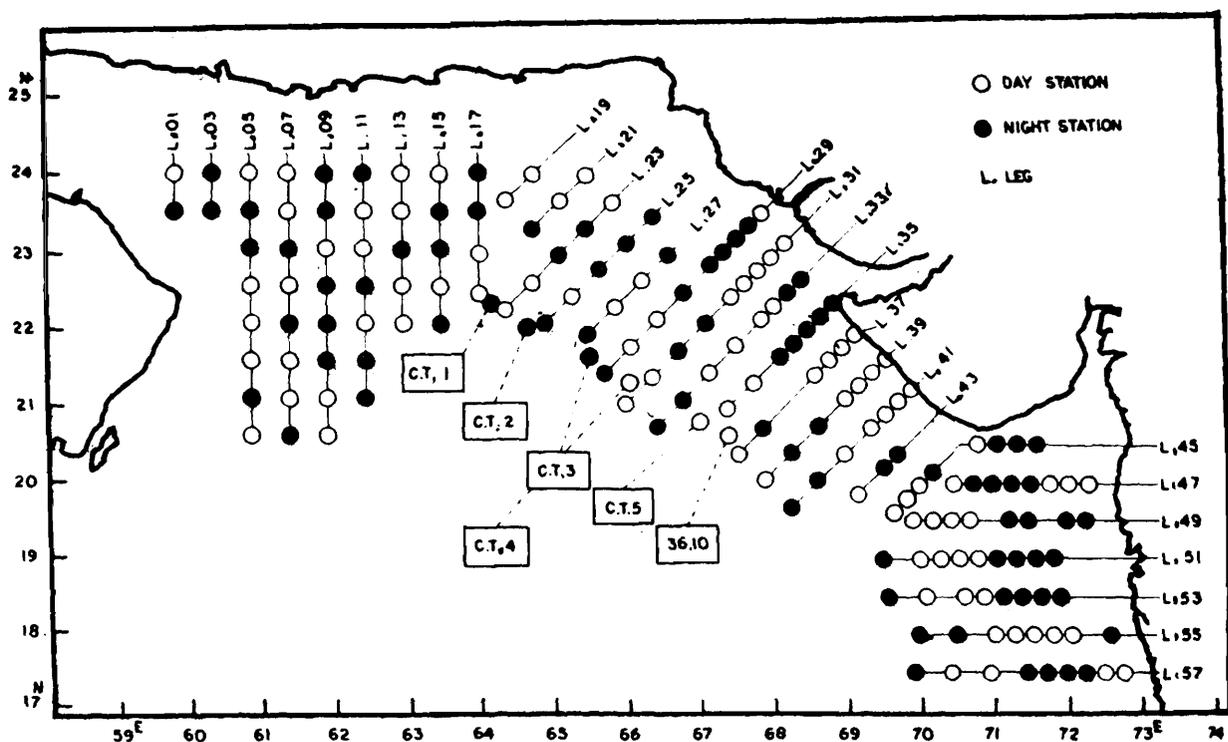


Fig. 1. Neuston stations established during expedition.

TABLE 1. Number of *Cypridina* ♂ and egg bearing ♀ and other zooplanktons occurring per haul of 5 minutes duration for 10 *Cypridina* swarming stations.

Sl. No.	Stn. No.	Total volume	No. of <i>Cypridina</i>		Amphipoda	Copepoda	Mysids	Siphonophora	Chaetognatha	Decapod-larvae	Mollusca	Shrimp-larva	Lucifera	Medusae	Others	Remark
			Males Adult	Females Egg-bearing												
1.	03.03	95.0	10355	10070	2280	570	3800	—	95	95	190	—	—	—	95	—
2.	07.05	31.0	1240	2976	124	93	155	31	—	—	—	—	—	—	31	—
3.	09.09	80.0	12960	11040	400	160	320	—	—	—	—	80	—	—	—	Immature females also present
4.	11.07	36.0	2376	2844	432	144	720	—	—	72	72	—	—	—	180	—
5.	21.05	97.0	21720	12222	485	388	485	—	—	97	194	—	—	—	388	—
6.	25.03	62.0	8308	8432	310	372	1116	—	62	—	62	—	62	—	496	—
7.	27.03	41.0	4551	4674	028	82	492	82	—	—	—	—	—	82	410	Immature females also present
8.	31.07	64.0	11008	9472	121	192	64	64	—	—	—	—	—	—	123	—
9.	35.05	60.0	8760	9840	120	120	60	—	—	300	—	—	—	—	120	Immature females also present
10.	57.13	315.0	56070	66780	315	315	1575	—	—	—	—	—	—	—	—	—

increase in the total biomass of the neuston. At 10 stations—8 deep stations and 2 shallow stations—(Stn. 03-03, Stn. 07.05, Stn. 09.09, Stn. 11.07, Stn. 21-05, Stn. 25-03, Stn. 27-03, 31.07 Stn. 35-05 and Stn. 57.13) *Cypridina dentata* was occurring in very high numbers and constituted mainly of adult males and egg-bearing females (Table 1) indicating that the swarming of this species at the sea-surface during the night was for planktonic mating.

#### *Mating procedure and associated bioluminescence :*

Observations on the mating procedure in the aquarium tanks showed that the male spreads its valves apart, lampers on to the postero-dorsal part of the carapace of the female, clasps the edges of the female valves with the palps of the 1st thoracic legs, unfolds and extends the ends of the paired penis and inserts them into the paired vagina of the female. The female remains passive and the copulation is accomplished in minutes. During this period both male and female exhibited bright luminescence. After the mating the bioluminescence became feeble and finally disappeared.

#### REMARKS

Although the ostracod, *Cypridina dentata* (Muller) has been recorded as a dominant species in the Arabian Sea by George (1967), this species has not so far been known to outnumber the other usually dominant major planktonic constituent *i.e.* the Copepods. This appears to be a unique feature in the northern Arabian Sea during November 1973 to May 1974. Similar observations by Paulinose and Aravindakshan (1977) while studying the zooplankton collections from 200—0 m during the same expedition, lend support to these observations.

Several marine species of Cypridinidae are known to have planktonic mating (Kesling, 1961). Bioluminescence in Cypridinid ostracods has been thoroughly investi-

gated (Harvey, 1952). However, planktonic mating of *Cypridina dentata* and its associated bioluminescence have not been reported so far. This underlines the need for further investigations on this subject.

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