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Copepod Swarm in the Campbell Bay (Andaman Sea)

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During the 68th cruise of *R V Gaveshani*, an unusual abundance of calanoid copepods of family Pontellidae was observed in the Campbell Bay (lat. 6 30'-6 59'N and long. 93 56'-94 15'E). Swarm density (25974 to 138420/m^3), forming 91.9 to 96.1% of the total copepod population and constituted mainly by 4 species of Pontellidae was recorded. The species in order of abundance were *Pontella spinipes* Giesbrecht, *Pontellopsis regalis* (Dana), *Pontella princeps* Dana and *P. securifer* Brady. The adaptive significance of copepod swarming is briefly given.

Swarming is widespread among the tropical zooplankters. Dense congregations of the cladocerans *Evadne tergestina*[1,2] and *Penilia avirostris*[3], the amphipod *Hyperia sibaginis*[4], the pteropods *Creseis acicula* [5-8] and *Cavolinia uncinata pulsata*[9], the chaetognath *Sagitta enflata* and ostracod *Cypridina dentata*[10] have been recorded from the coastal waters of India. Coincident occurrence of aggregations of the pelagic tunicates[11], pteropod and cladoceran[12] with *Trichodesmium* bloom has also been reported. Devassy *et al.*[13] have described the succession of planktonic organisms following *Trichodesmium* phenomenon. There is no report of copepod swarm caused particularly by members belonging to a single family of copepods. The present paper deals with swarming of species of Pontellidae collected from the Campbell Bay during the 68th cruise of *R V Gaveshani* (29 Jan. 1980).

Materials and Methods

Surface zooplankton were collected between 1400 to 1700 hrs from 3 stations (Fig. 1) using a Neuston net fitted with a calibrated flow meter. The samples were fixed in 5% formaldehyde. Zooplankton biomass was determined by displacement volume method. Depending on the volume of zooplankton sample, an aliquot of 5 to 10% was examined for enumeration of copepod and the species. The number was calculated for the whole sample and computed per m^3.

Results

Zooplankton biomass values varied from 0.64 to 0.98 ml/m^3, the copepod constituting about 85% of the total biomass. The other planktonic taxa encountered in small numbers in the samples were: Hydromedusae, Siphonophora, Polychaeta, Amphipoda, Ostracoda, Chaetognatha, Euphausiacea, Branchiostomata, Gastropoda, Pteropoda, Appendicularia, salps and doliolids. Fish eggs and fish larvae were absent in the collection. The copepod population was dominated by the members of the family Pontellidae (Table 1). Seven pontellid species were observed in the zooplankton samples and copepod swarm was caused mainly by 4 species such as *Pontella spinipes* Giesbrecht, *P. princeps* Dana, *P. securifer* Brady and *Pontellopsis regalis* (Dana). *P. spinipes* was the most dominant species contributing 57.9 to 65.7% of the total counts (Table 1).

Discussion

Copepod swarm density of 25974 to 138420/m^3 was obtained for species of Pontellidae (Table 1). This number is much higher than the maximum number of 473/m^3 obtained in pteropod *C. acicula*[8], 158 to 187/m^3 in Chaetognath *S. enflata*, 654/m^3 in ostracod *C. dentata*[12] and 975/m^3 in cladoceran *E. tergestina*[13]. However, the total biomass values were less compared to the reported biomass values of other zooplankters[5-8,11] which included mostly the gelatinous forms or organisms with calcareous shell. The copepod swarm in the Campbell Bay was caused mainly by 4

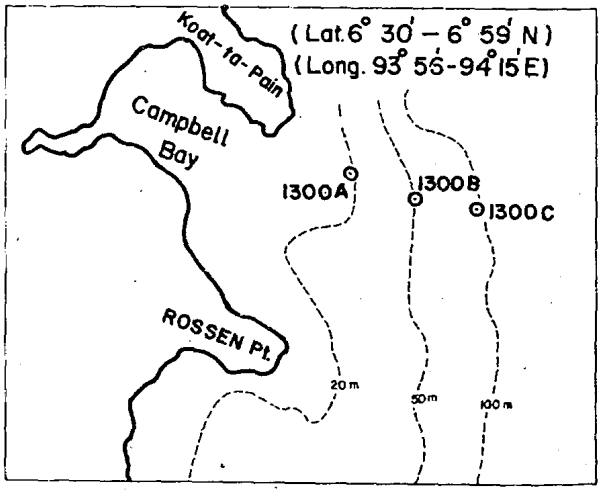

Fig. 1—Location of sampling stations

Table 1—Occurrence of Common Copepod Families and Species of Family Pontellidae at 3 Stations (No./m^3)

	Stations		
	1300 A	1300 B	1300 C
Families			
Pontellidae	25974	70348	138420
Calanidae	806	2354	1024
Paracalanidae	1282	570	178
Eucalanidae	144	710	1098
Euchaetidae	16	86	900
Candaciidae	30	168	742
Metridiidae	—	8	240
Others	104	582	1422
Total	28256	74826	144024
Species of Pontellidae			
Pontella spinipes Giesbrecht	15582	40764	91052
P. princeps Dana	1490	11062	12922
P. securifer Brady	3660	6510	14150
Pontellopsis regalis (Dana)	5092	11238	13648
Pontellina plumata (Dana)	66	338	5080
Labidocera acuta (Dana)	—	212	1036
Calanopia elliptica (Dana)	84	224	532
Total	25974	70348	138420

species. The copepod swarm reported from coral reefs in the Central and North Great Barrier Reef provinces of Australia[14] and in the Caribbean coral reefs[15] was caused by species belonging to different copepod families but during the present investigation, the copepod swarm was constituted by members of the same family (Pontellidae). This is quite an interesting phenomenon, a situation referable to a 'monotone' plankton[10, 16].

Temperature and salinity values did not vary much at the 3 sampling stations. The primary productivity values of the surface waters in the Campbell Bay were very high (Pant, personal communication). Swarming has been stated to be a regular or seasonal phenomenon caused by fluctuations in environmental conditions[8] or the interaction between different environmental factors resulting in population explosion of certain organisms[13]. The adaptive advantages of dense aggregations may also result in swarming of a few forms. The synchronous movement of the copepod swarm with large dorsal and rostral eye lenses in species of genus *Pontella* would be of great help in the location of predators. The copepod swarm sampled during the present studies contained mostly the adult males and females indicating that such congregations would facilitate breeding. The swarming would also help the copepods to cluster in the eddies, thereby reducing their dispersion by currents. The zooplankton aggregations have also been reported to be important for the general economy of the coral reefs[14, 17]. It is probable that combinations of environmental factors and adaptive advantages are responsible for swarming of plankters.

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