2 hours has made this test a useful tool especially when monospecific immune sera not available.

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DISCONTINUITY IN THE LARVAL DISTRIBUTION OF PHORONIDA AND BRACHIOPODA IN THE INDIAN OCEAN

VIJAYALAKSHMI R. NAIR

Regional Centre, National Institute of Oceanography, Cochin-18

ABSTRACT

Distribution of Phoronid and Brachiopod larvae in Indian Ocean was studied on the basis of the zooplankton samples collected during the International Indian Ocean Expedition. The striking feature is the discontinuous distribution of these larvae. The larvae of Phoronida prefer relatively low salinity waters while the Brachiopod larvae have high tolerance to changes in salinity. The abundance of both Brachiopod larvae and Actinotrocha in the Bay of Bengal suggests the richness of the adults in this region of the Indian Ocean.

PHORONIDA and Brachiopoda have free swimming larval stages in their life-histories and these larvae are familiar constituents of plankton. Both Phoronida and Brachiopoda lead a benthonic existence. Phoronids, so far recorded, are limited to the shallow waters of tropical and temperate zones[1]. Brachiopods are exclusively marine forms and occur in all seas from the intertidal zone to depths of 500 m[1]. Their meroplanktonic larvae serve as links and maintain genetic continuity between populations spatially isolated from one another[2].

There are only a few reports on these larvae from the Indian Ocean and adjacent seas. The earlier records of the Brachiopod larvae are the occurrence of *Lingula* larvae in the Gulf of Aden, South of Red Sea, off the Mysore coast, west coast of Sumatra and of *Pelagodiscus* larvae from the southwestern part of India[3-5]. A number of Actinotrocha are known of which the adult has not been identified[1].

During the International Indian Ocean Expedition from 1960 to 1965, zooplankton samples amounting to 1927 were collected from the Indian Ocean between the Lat. 25° N to 46° S and Long. 20° to 120° E. Most of the samples were taken with an Indian Ocean Standard Net from a depth of 200 m to the surface or in the continental shelf from the bottom to the surface[6]. The data obtained from these zooplankton samples form the basis of the present study.

ACTINOTROCHA

The fully developed larva has an elongated body varying from less than 1 to 5 mm in length[1]. The planktonic existence of the larva extends probably to several weeks. Actinotrocha are represented in 4·1% of the samples. Maximum incidence of the larvae was found to be in the Bay of Bengal, off the coast of Somalia and off the southeast coast of Africa (Fig. 1). A striking feature is the discontinuous distribution of the larvae as they were absent or sparsely represented in the Arabian Sea, Central Indian Ocean and eastern part of the Indian Ocean between the Equator and Lat. 30° S and Long. 68° to 120° E. Their seasonal occurrence and other details are given in Table I. The hydrographical data at the stations, from which high abundance of the larvae was recorded, have a temperature range 13·69°–26·48° C, salinity 32·86–35·46‰, oxygen 0·36–5·40 ml/l and phosphate phosphorus 0·16–1·33 µg at/l. With the exception of three records, they were never found at stations where maximum

salinity was 36‰ or near this value. It is probable that the larvae prefer relatively low salinity waters.

common in the Bay of Bengal, Gulf of Aden and off the southwest coast of India (Fig. 2). These larvae also exhibit a discontinuous distribution,

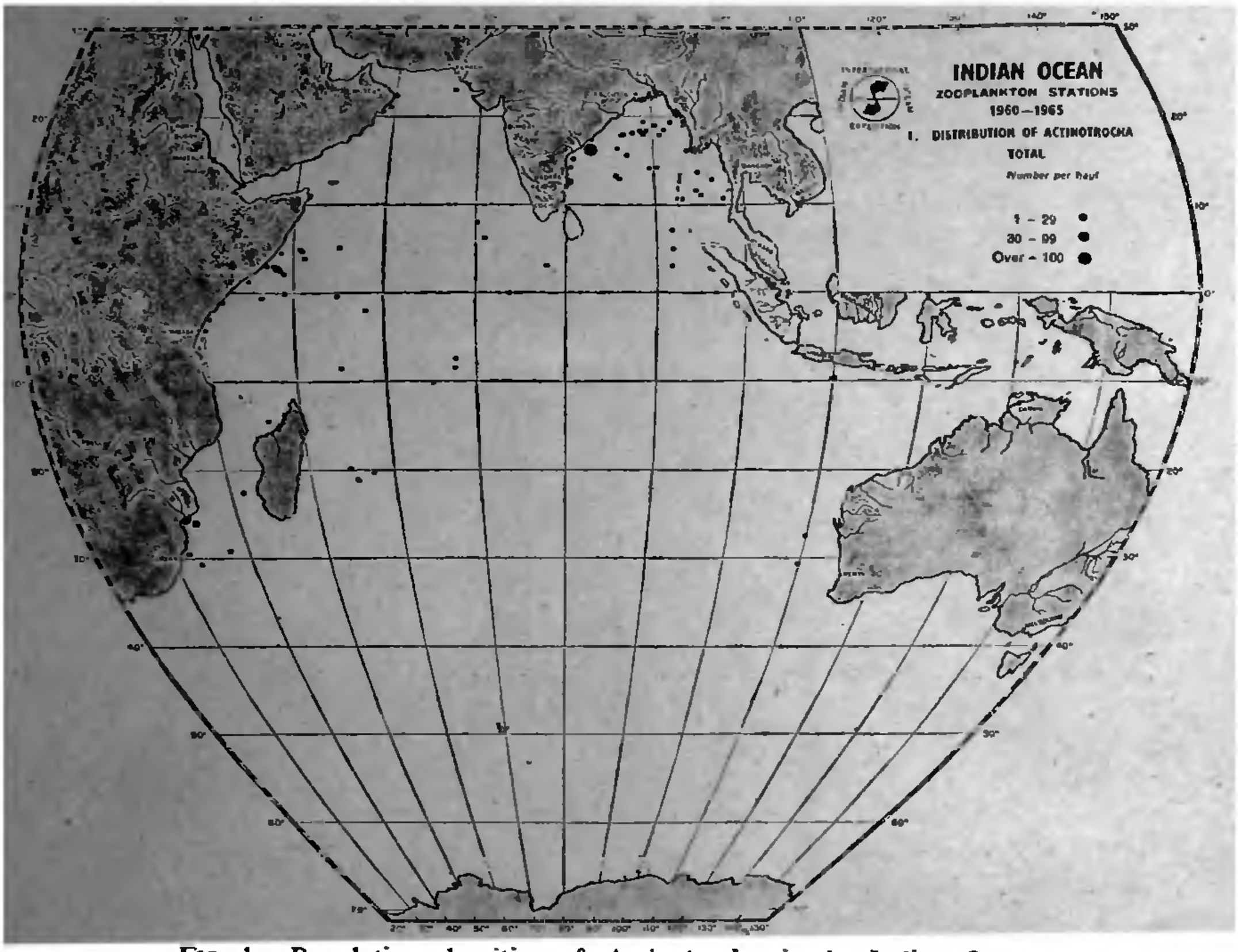

FIG. 1. Population densities of Actinotrocha in the Indian Ocean.

TABLE I

Distribution of Actinotrocha and Brachiopod larvae in the Indian Ocean

Larvae	Total No.	April 16–October 15 (Southwest monsoon period) Average No./haul	October 16–April 15 (Northeast monsoon period) Average No./haul	Day Average No./haul	Night Average No./haul	Maximum abundance	
						Area and density	Month
Actinotrocha	981	10·6	14·0	8·1	23·0	287 (off the Andhra Coast)	January
Brachiopod larvae	292	3·6	7·2	5·6	5·6	43 (Gulf of Aden)	December

BRACHIOPOD LARVAL

The fully developed larva has a bivalved shell, with a diameter ranging from 0·3–1·5 mm[1]. These larvae were found in 2·7% of the zooplankton samples. Brachiopod larvae were more being absent in the northern Arabian Sea and in the Central Indian Ocean. Table I shows important features in their distribution. The maximum number of larvae were found at a station located near the mouth of the Red Sea where hydrographical

conditions for the upper 200 m were : temperature 22·79°–27·10° C. salinity 36·55–39·59‰, oxygen content 1·86–4·55 ml/l and phosphate phosphorus 0·27–6·89 µg at/l. Contrary to the comments made by Hyman[1] that they have a preference to cooler waters. that present data show that the larvae prefer tropical and northern subtropical areas of the Indian Ocean, their southern boundary being Lat. 30° S. Occurrence of Brachiopod larvae in the high saline waters of the Red Sea as well as in low salinity waters of the Bay of Bengal indicates their high tolerance to changes in salinity. Müir-Wood[3] has also recorded a discontinuous distribution in the three genera of adult Brachiopods of the Indian Ocean.

Brachiopods tend to live in congregation and the larvae settle near the adults in favourable areas. The power of dispersal of these larvae seem to be limited even when their movement is assisted by wind and currents[3]. The abundance of both Brachiopod larvae and Actinotrocha in the Bay of Bengal indicates the richness of adults in this region of the Indian Ocean. Intensive surveys of both adults and larvae of Brachiopods and Phoronids in the Bay of Bengal may reveal the ecological factors which govern the distribution of these larvae and adults in this region.

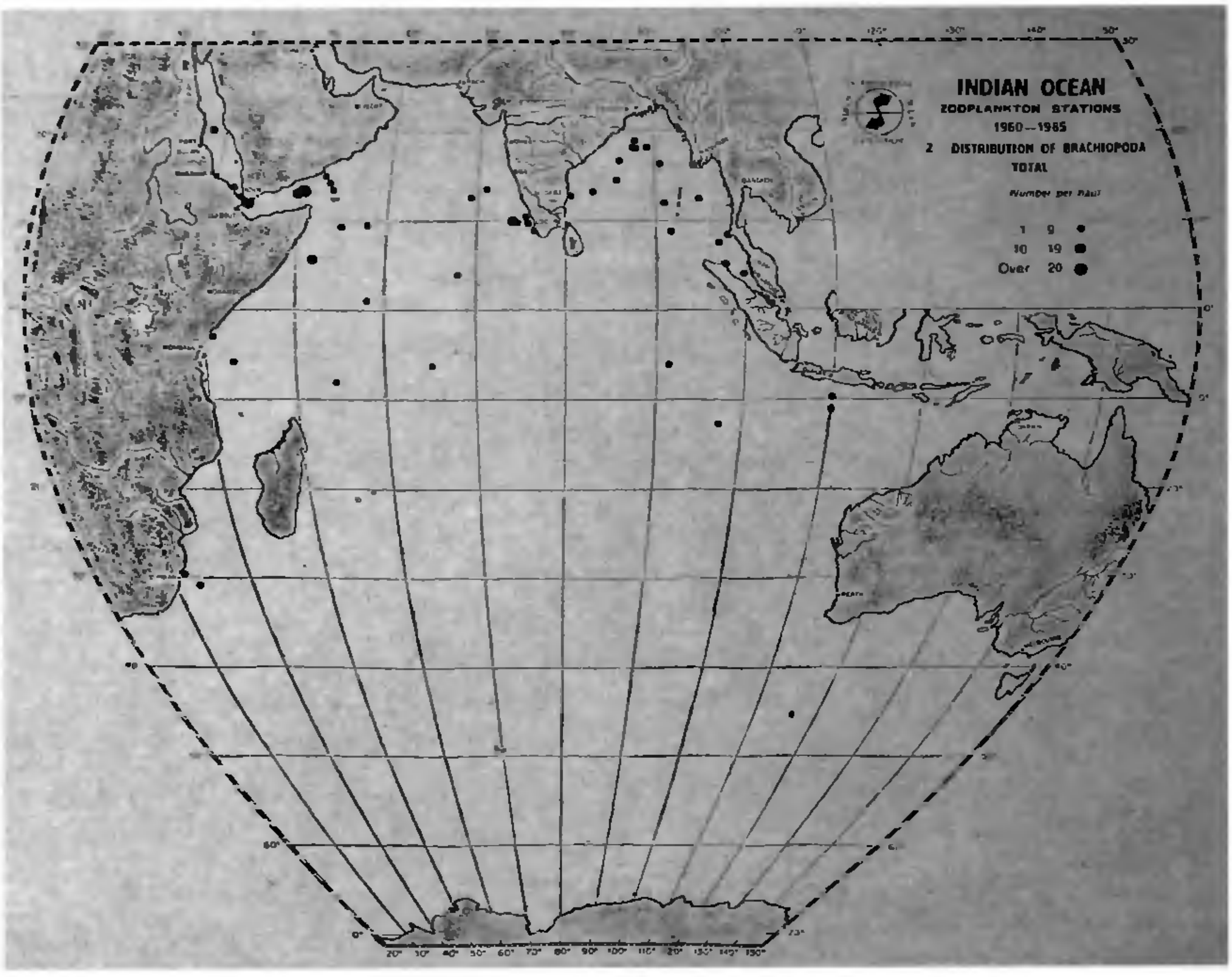

FIG. 2. Population densities of Brachiopod larvae in the Indian Ocean.

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