

## PLANKTONIC OSTRACODS OF THE NORTHERN INDIAN OCEAN

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### ABSTRACT

Thirty-two species of ostracods were identified from 712 samples collected from northern Indian Ocean. Two of them belong to Cypridinidae and the rest to Halocyprididae. Most of the species are common to those of the Atlantic and Pacific Oceans. *Paraconchoecia decipiens* and *Orthoconchoecia striola* alone could be considered as typical Indo-Pacific species. In general, Arabian Sea sustained a rich ostracod fauna.

*Euconchoecia aculeata* was the dominant species in the northern Indian Ocean. In the Arabian Sea *Cypridina dentata* was the most abundant species confined largely in the neritic areas and off the west coast of India. Most of the widely distributed species could tolerate a salinity range of 32-37 ‰. Statistical analysis of the data using students 't' test indicated that 5 species showed seasonal variations and four species gave significant 't' values for day and night variations.

### INTRODUCTION

Planktonic ostracods constitute an appreciable part of marine zooplankton, especially of tropical and subtropical oceans. This group from the Indian Ocean has not been studied in detail although extensive studies have been made on them from other oceans, particularly Atlantic. Muller's report (1906) based on the 'Valdivia' material was the first study on planktonic ostracods from the Indian Ocean. Cannon (1940) gave a list of planktonic ostracods collected during John Murray Expedition. Later Leveau (1969), George (1969, 1971, 1976 and 1977), George, Purushan and Madhupratap (1975) and James (1972 and 1973) reported on this group. Poulsen's studies (1962, 1965, 1969 and 1973) on the Dana material are very exhaustive but the expedition covered limited areas of the Indian Ocean, namely, off Sumatra and very few stations were covered in the central and western Indian Ocean.

This study concerns mainly with the distribution of each species in the northern Indian Ocean, especially in the Bay of Bengal which is the least explored as far planktonic ostracods are concerned. The physico-chemical factors involved in the incidence of different species and seasonal and diurnal variations in more common species were also studied in detail.

### MATERIAL AND METHODS

The zooplankton samples collected during the IIOE (1960-65) form the basis of this study. Most of the samples were collected from the upper zone using an Indian Ocean Standard Net (Currie, 1963). All the details pertaining to these collections are given in IOBC Handbook (1969). Ostracods from 712 samples collected from the

northern Indian Ocean, north of 10°S were considered for the present study. The classification and terminology of Skogsberg (1920) and Poulsen (1973) were followed. The density at each station is compared on the basis of catch per unit standard haul (IOBC, 1969). The temperature and salinity ranges have been used from the published data (IOBC, 1971).

The data for the ten common species were subjected to statistical analyses using students 't' test for studying seasonal and diurnal variations. Since the northern Indian Ocean is influenced by southwest and northeast monsoons during the different parts of the year, the stations were also grouped accordingly from 16th April to 15th October and 16th October to 15th April denoting the two seasons respectively. The abundance figures were converted to their log values for the purpose of analyses. The formula used for comparison of the means of the two seasons as well as day and night is

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

where  $n_1$  and  $n_2$  are number of observations,  $x_1$  and  $x_2$  are the means and S is the combined S. D. calculated by the formula

$$S^2 = \frac{\Sigma(x_1 - \bar{x}_1)^2 + \Sigma(x_2 - \bar{x}_2)^2}{(n_1 + n_2 - 2)}$$

The degrees of freedom of this 't' is  $n_1 + n_2 - 2$ . The values of mean, combined standard deviation, the 't' values and their respective degrees of freedom are given in the Tables I-III. Since the environmental conditions for Arabian Sea and Bay of Bengal are different, their values are treated separately. Only ten of the more common species were thus studied. The other species did not provide enough representative samples for worthwhile application of statistical methods.

Table I. Comparison of 10 common species during SW and NE monsoon periods in the Arabian Sea.

Species	SW monsoon average	NE monsoon average	Combined S. D.	t	d. f.
<i>S. porrecta</i>	1.7445	1.5914	0.6037	1.5948	157
<i>O. atlantica</i>	1.4416	1.2704	0.5039	1.8896	122
<i>M. rotundata</i>	1.4390	1.2458	0.5644	0.4332	185
<i>M. curta</i>	1.4356	1.3539	0.5340	0.6626	78
<i>C. giesbrechti</i>	1.5107	1.3448	0.5570	1.9025	163
<i>P. decipiens</i>	1.2987	1.0625	0.4825	2.7986 <sup>b</sup>	129
<i>P. procera</i>	1.8733	1.5851	0.5229	3.9221 <sup>c</sup>	199
<i>H. brevirostris</i>	1.2159	0.9643	0.4781	1.8776	98
<i>E. aculeata</i>	1.9985	2.0163	0.7346	0.1594	181
<i>C. dentata</i>	2.3391	2.8805	1.0004	3.8261 <sup>c</sup>	200

a = significant at 5% level    b = significant at 1% level    c = significant at 0.1% level

Table II. Comparison of 10 common species during SW and NE monsoon periods in the Bay of Bengal.

Species	SW monsoon average	NE monsoon average	Combined S. D.	t	d. f
<i>S. porrecta</i>	1.6025	1.4842	0.4595	1.4533	132
<i>O. atlantica</i>	1.2199	1.1177	0.5468	1.1419	87
<i>M. rotundata</i>	1.7376	1.5927	0.4354	1.9581	139
<i>M. curta</i>	1.6464	1.5037	0.4707	0.7798	32
<i>C. giesbrechti</i>	1.7328	1.4843	0.5095	3.0268	154
<i>P. decipiens</i>	1.1630	1.1640	0.4423	0.0065	32
<i>P. procera</i>	1.6446	1.6807	0.4549	0.4313	116
<i>H. brevirostris</i>	1.1654	0.9335	0.5244	1.8522	78
<i>E. aculeata</i>	2.1160	2.3563	0.6551	2.3722 <sup>a</sup>	173
<i>C. dentata</i>	—	—	—	—	—

a = significant at 5% level.

## RESULTS

Thirty-two species were identified in the samples. They are listed below in taxonomic order.

## Family Cypridinidae

- Cypridina acuminata* (Muller)
- C. dentata* (Muller)

## Family Halocyprididae

- Archiconchoecia ventricosa* (Muller)
- A. striata* (Muller)
- Euconchoecia chierchiai* (Muller)
- E. aculeata* (T. Scott)
- Bathyconchoecia deevyae* (Kornicker)
- B. angeli* (George)
- Halocypris globosa* (Claus)
- H. brevirostris* (Dana)
- Paraconchoecia oblonga* (Claus)
- P. echinata* (Muller)
- P. elegans* (Sars)
- P. discophora* (Muller)
- P. procera* (Muller)
- P. decipiens* (Muller)

## Family Halocyprididae (Contd.)

- Conchoecetta acuminata* (Claus)
- C. giesbrechti* (Muller)
- Microconchoecia curta* (Lubbock)
- Metaconchoecia rotundata* (Muller)
- M. kyrtophora* (Muller)
- Orthoconchoecia striola* (Muller)
- O. bispinosa* (Claus)
- O. atlantica* (Lubbock)
- Platyconchoecia prosadena* (Muller)
- Spinoecia porrecta* (Claus)
- S. parthenodu* (Muller)
- Conchoecia magna* (Claus)
- Pseudoconchoecia concentrica* (Muller)
- Conchoecissa imbricata* (Brady)
- Alacia alata* (Muller)
- Conchoecilla daphnoides* (Claus)

Among the 32 species belonging to 18 genera *Euconchoecia aculeata* was the most dominant species in the northern Indian Ocean. However, for the Arabian Sea alone, *Cypridina dentata* was the most abundant species. *C. dentata* was found mainly in the neritic waters and off the west coast of India. It was less common beyond the edge of the continental shelf. *E. aculeata* was encountered both in neritic and oceanic waters whereas all the other species occurred mostly in the oceanic waters. The species fall into different categories depending on the patterns of distribution.

Table III. Comparison of 10 common species during day and night.

Species	Day average	Night average	Combined SD SP	<i>t</i>	d.f.
<i>S. porrecta</i>	1.5321	1.7255	0.5395	3.0505 <sup>b</sup>	291
<i>O. atlantica</i>	1.2630	1.2830	0.5332	0.2736	211
<i>M. rotundata</i>	1.4867	1.5647	0.4861	1.0584	315
<i>M. curta</i>	1.3878	1.5243	0.4332	1.6646	112
<i>C. giesbrechti</i>	0.5141	1.2880	0.5881	9.7591 <sup>c</sup>	258
<i>P. decipiens</i>	1.0821	1.2880	0.4724	2.7976 <sup>b</sup>	163
<i>P. procera</i>	1.5725	1.7242	0.5767	2.3815 <sup>a</sup>	327
<i>E. aculeata</i>	2.0922	2.1297	0.7089	0.4954	353
<i>C. dentata</i>	2.7055	2.5430	1.0393	1.0972	197
<i>H. brevirostris</i>	1.1339	1.1448	0.4915	0.1485	178

<sup>a</sup> = significant at 5% level    <sup>b</sup> = significant at 1% level    <sup>c</sup> = significant at 0.1% level

#### Widely distributed species (Figs. 1-3)

*Euconchoecia aculeata*: This species was recorded from the Indian, Atlantic and Pacific Oceans (Muller, 1906, Hartmann, 1959 and Poulsen, 1969). It was found to be the most widely distributed and the most abundant halocyprid ostracod in the northern Indian Ocean. Its wide range of tolerance for salinity seems to promote its distribution. The maximum number of 11,000/haul were observed in a station located at 13°03'N and 50°00'N, where temperature and salinity ranges were 16.3 to 25.3°C and 35.5 to 36‰ respectively. Statistical analysis did not show any significant diurnal variations. Seasonal variations were significant (at 5% level) only in Bay of Bengal, more abundant during NE monsoon period. Possible ranges in temperature was 10.2-30.5°C and that of salinity 31.1-37.4‰.

*Metaconchoecia rotundata*: Previously reported from Atlantic and Pacific Oceans by Muller (1890), Skogsberg (1920), Poulsen (1973) and from Indian Ocean by George (1969). It was present in the entire Arabian Sea, Red Sea and in the Bay of Bengal. This species was recorded throughout the year and could thrive well in the comparatively low saline waters of the Bay of the Bengal. Statistical analysis failed to show any significant seasonal or diurnal variations. Possible ranges in temperature and salinity were 10.1-30.5°C and 31.1-37.4‰ respectively.

*Paraconchoecia procera*: Earlier records were from Atlantic, Indian and Pacific Oceans (Muller, 1906; Deevey, 1968; Poulsen, 1973). This species was distributed throughout the northern Indian Ocean. Its occurrence was noticed throughout the year. Statistical analysis of the data showed significant diurnal variations (significant at 5% level). This species also exhibited marked seasonal variation (significant at 0.1% level) in the Arabian Sea, being more abundant during SW monsoon. The species could tolerate wide ranges in temperature and salinity as the ranges being 10.2-30.5°C and 31.1-37.4‰ respectively.

*Conchoecetta giesbrechti*: Muller (1906) and Poulsen (1973) observed the species from the Atlantic, Indian and Pacific Oceans. The species was more abundant in the Bay of Bengal than in the Arabian Sea. Seasonal variation was significant at 1% level in the Bay of Bengal being more abundant during SW monsoon period. Diurnal variations were far more pronounced (significant at 0.1% level). They occurred in a wide range of salinity (32-37‰) and temperature (11.5-30.4°C).

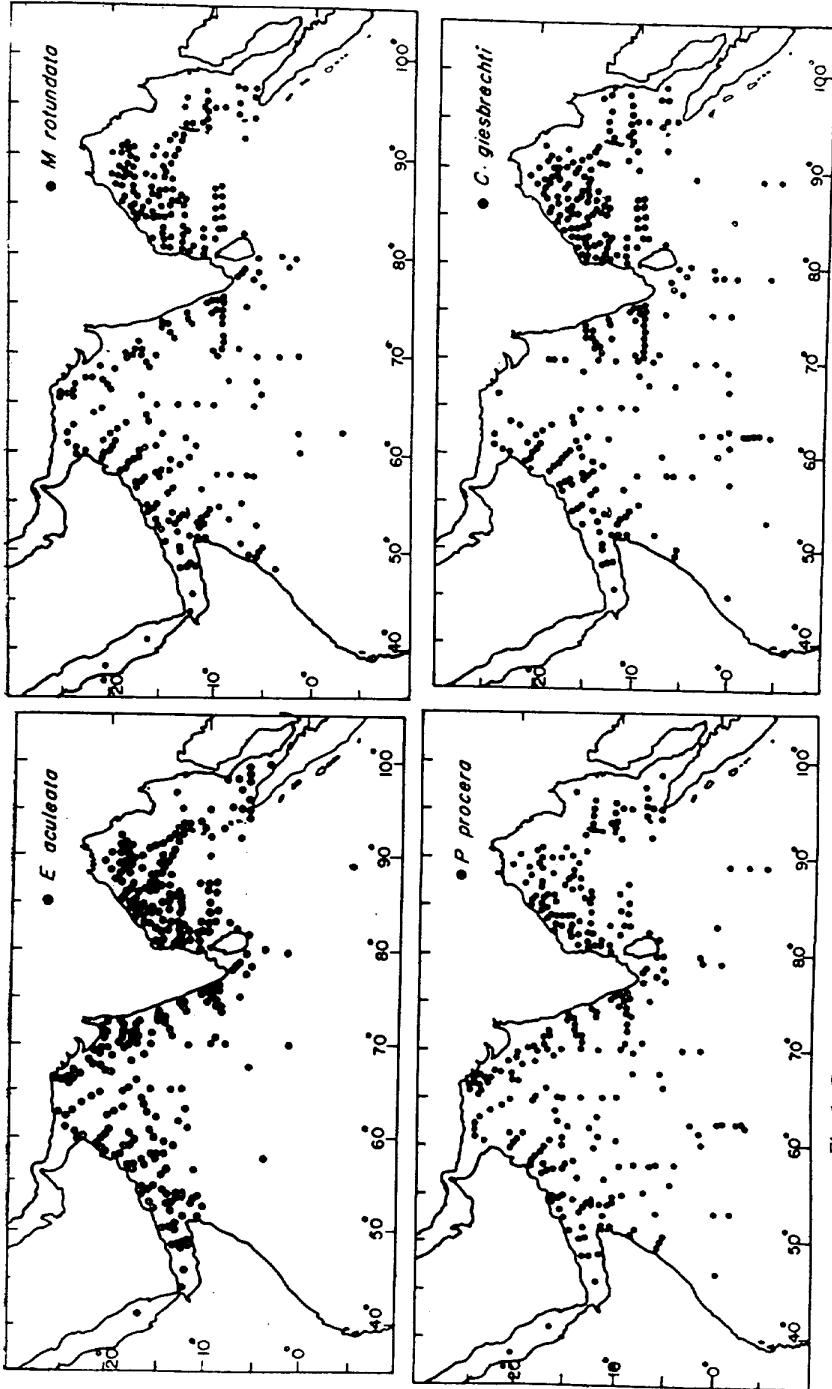


Fig. 1. Geographical distribution of four common species of ostracods in the northern Indian Ocean.

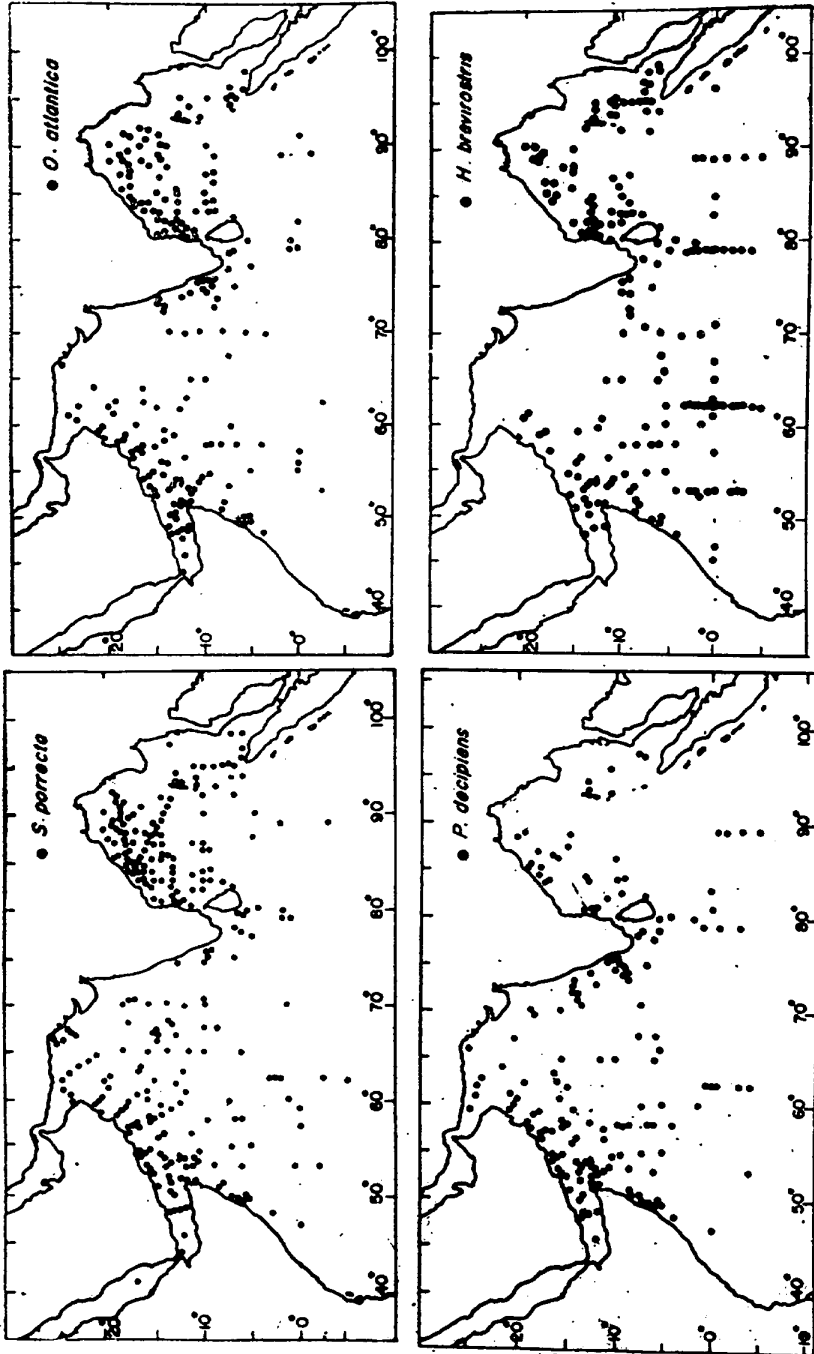


Fig. 2. Geographical distribution of four common species of ostracods in the northern Indian Ocean.

*Spinoecia porrecta*: Earlier records are not reliable as many authors including Muller (1906) considered *S. porrecta* and *S. spirostris* as a single species. Angel (1969) and Deevey (1968) have reported it from the Atlantic and Poulsen (1973) from the Pacific. In the Indian Ocean *S. porrecta* was very common and widely distributed. The abundance of this species seems to have a negative influence on another closely related species *S. spirostris*. Significant (1% level) diurnal variations were observed while there was no seasonal variations. Possible ranges in temperatures and salinity were 10–30°C and 31.1–37‰ respectively.

*Orthoconchoecia atlantica*: This species was reported to be widely distributed in the Atlantic, Indian and Pacific Oceans (Muller, 1906; Poulsen, 1973). *O. atlantica* occurred throughout the year. Its absence off the northwest coast of India is conspicuous. Possible range in temperature was 12.1–30.4°C and that of salinity 31.1–36.7‰.

*Paraconchoecia decipiens*: Earlier records show its occurrence in the tropical parts of Indian and Pacific Oceans (Muller, 1906; Poulsen, 1973). It was distributed throughout the northern Indian Ocean with maximum records off Arabia and Somalia. In the Arabian Sea the species exhibited seasonal variation which was found to be significant at 1% level during the NE monsoon. Diurnal variation was also significant at 1% level. Possible ranges in temperature and salinity were 10.2–30.3°C and 32.2–37.4‰ respectively.

*Halocypris brevisstris*: Reported earlier from all the tropical parts of all the oceans (Poulsen, 1969), they were common in the western Arabian Sea and Bay of Bengal in the equatorial region. Statistical analysis did not show any significant seasonal or diurnal variations. Possible range in temperature was 11.9–30.3°C and that of salinity 32.1–36.1‰.

*Paraconchoecia elegans*: *P. elegans* is widely distributed over all the three oceans. It was encountered throughout the year in the Arabian Sea and Bay of Bengal. However, representation in the Bay of Bengal was rather sporadic. Tolerance limit of temperature ranged between 10.2–30.5°C and that of salinity 33.2–37.4‰.

*Microconchoecia curta*: Reported earlier from all the three oceans (Muller, 1906; Poulsen, 1973). Even though the species was common in the HIOE samples they were absent in the head of the Bay of Bengal, excluding a single record and along the northwest coast of India. Though most of the specimens were collected during the SW monsoon, statistical analysis failed to show any significant seasonal variation. Diurnal variation was also not significant. Possible ranges in temperature and salinity were 11.5–30.5°C and 32–36.9‰ respectively.

*Orthoconchoecia striola*: Reported from the Indian and Pacific Oceans (Muller, 1906; Poulsen, 1973). *O. striola* was a very common species in the Indian Ocean, though it did not attain very high numbers. It was present off Somali and Arabian coast in the equatorial region, east of Andaman Islands and at the mouth of Malacca Strait. Possible range in temperature was 11.5–30.5°C and that of salinity 33.2–36.1‰.

*Spinoecia parthenoda*: Previously recorded from the Atlantic, Indian and Pacific Oceans (Muller, 1906; Poulsen, 1973). Poulsen (1973) considered this species to be rare in the Indian Ocean. However, the present data indicate it to be fairly common. Possible range in temperature was 11.5–28.9°C and that of salinity 32.1–36.4‰.

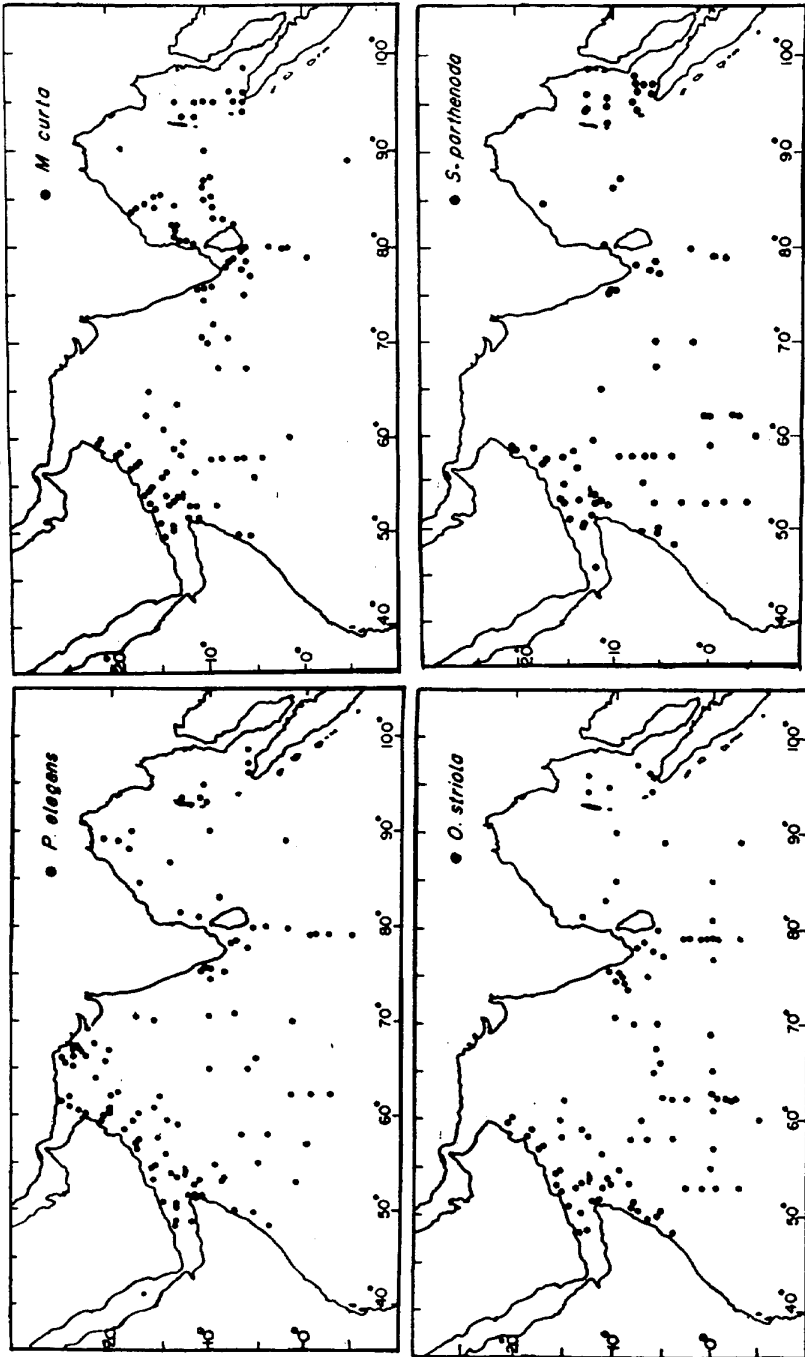


Fig. 3. Geographical distribution of four common species of ostracods in the northern Indian Ocean.



## Equatorial species (Fig. 4)

*Paraconchoecia oblonga*: *P. oblonga* has been previously recorded from Atlantic, Indian and Pacific Oceans (Poulsen, 1973). The species was confined to off Somali coast, south-west of Ceylon and along the equatorial region. Hydrographic data indicate the possible ranges of temperature and salinity to be 11.5–30°C and 34.2–36.4‰ respectively.

*Paraconchoecia echinata*: Previously recorded from Atlantic, Indian and Pacific Oceans (Muller, 1906; Poulsen, 1973). The distribution of *P. echinata* is similar to that of *P. oblonga*, being restricted to the equatorial region of the Indian Ocean. Possible temperature range was 11.5–28.7°C and salinity ranged between 33.9–35.3‰.

*Conchoecilla daphnoides*: Poulsen (1973) reported this species as the most common species of Conchoecinae in all the world oceans. Present investigation showed the occurrence of this species in the equatorial region. In Andaman Sea and mouth of Malacca Strait, it was present in small numbers while stray occurrence were noticed

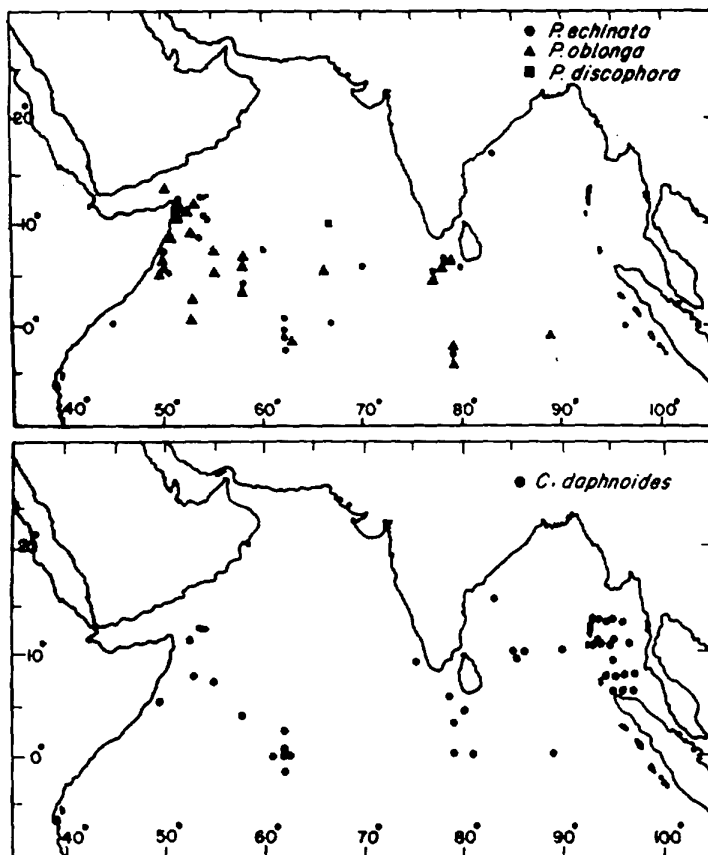


Fig. 4. Distribution of three species of ostracods confined mainly to the equatorial region. Location from where the rare species *P. discophora* recorded is also shown.

in the Arabian Sea and Bay of Bengal. Possible range of temperature was 11.9–29.5°C and that of salinity 32.3–36.0‰.

*Species restricted to Arabian Sea (Fig. 5)*

*Pseudoconchoecia concentrica*: Earlier recorded from Atlantic, Indian and Pacific Oceans (Poulsen, 1973). This species is strictly confined to the Arabian Sea north of 4°N. *P. concentrica* prefers relatively high salinity ranging from 34.8–37.4‰. Temperature range was 10.2–30.3°C.

*Alacia alata*: *A. alata* has been recorded from the tropical zones of all oceans (Poulsen, 1973). However, in the present study, its occurrence was limited in the Persian Gulf, off Arabia, southwest coast of India and west coast of Ceylon. Possible ranges in temperature and salinity were 13.3–30.4°C and 34.8–36.9‰ respectively.

*Cypridina dentata*: Poulsen (1962) reported this species from the southern Bay of Bengal and Malayan Archipelago. In the IIOE material it was found to be the most abundant planktonic ostracod in the Arabian Sea. In the Bay of Bengal it was present only in a few stations. Statistical analysis showed significant (0.1% level) seasonal variations, being more abundant during NE monsoon period. Day and night variations were not significant. Although this species was found to occur at a wide range of salinity (30.1–37.4‰), they were abundant only in areas where salinity values exceeded 34‰. The maximum number of specimens (20,600/haul) was encountered off Cochin (10°29'N and 75°31'E) where temperature and salinity varied from 14.0–28.8°C and 34.9–35.8‰ respectively. Possible range in temperature was 10.1–30.4°C.

*Patchy distribution (Fig. 6)*

*Conchoecia magna*: Reported earlier from all the three oceans (Muller, 1906; Poulsen, 1973). *C. magna* was present along the Somali and Arabian Coasts, mouth of Persian Gulf, Andaman Sea and south-west Bay of Bengal. It was reported to be more abundant in 1000–350 m water column (Poulsen, 1973) and this may account for their restricted occurrence in the upper 200 m of the Indian Ocean. Possible range in temperature was 11.5–30.1°C and that of salinity 32.0–36.4‰.

*Platyconchoecia prosadena*: A rare species reported earlier from the Indian, Atlantic and Pacific Oceans (Muller, 1906; Poulsen, 1973). This species was mostly collected from the Bay of Bengal and from a few stations in the Arabian Sea. Probable range in temperature was 12.1–29.7°C and salinity range was 32.5–36.2‰.

*Metaconchoecia kyrtophora*: *M. kyrtophora* was recorded from Atlantic and Indian Oceans (Muller, 1906) and it is considered to be a rare species. It was recorded mostly in the southern Arabian Sea. Possible range in temperature was 12.2–29°C and salinity 33–36.5‰.

*Euconchoecia chierchiaie*: Distributed over all the oceans (Mullers, 1906; Poulsen, 1969). In the present study the species was recorded mainly off Somali coast and in the Gulf of Aden. In the Bay of Bengal it occurred in the Andaman Sea in large numbers (3056 specimens/haul) and also in the Malacca Strait. Possible ranges in temperature and salinity were 24–29°C and 32.4–33.8‰ respectively.

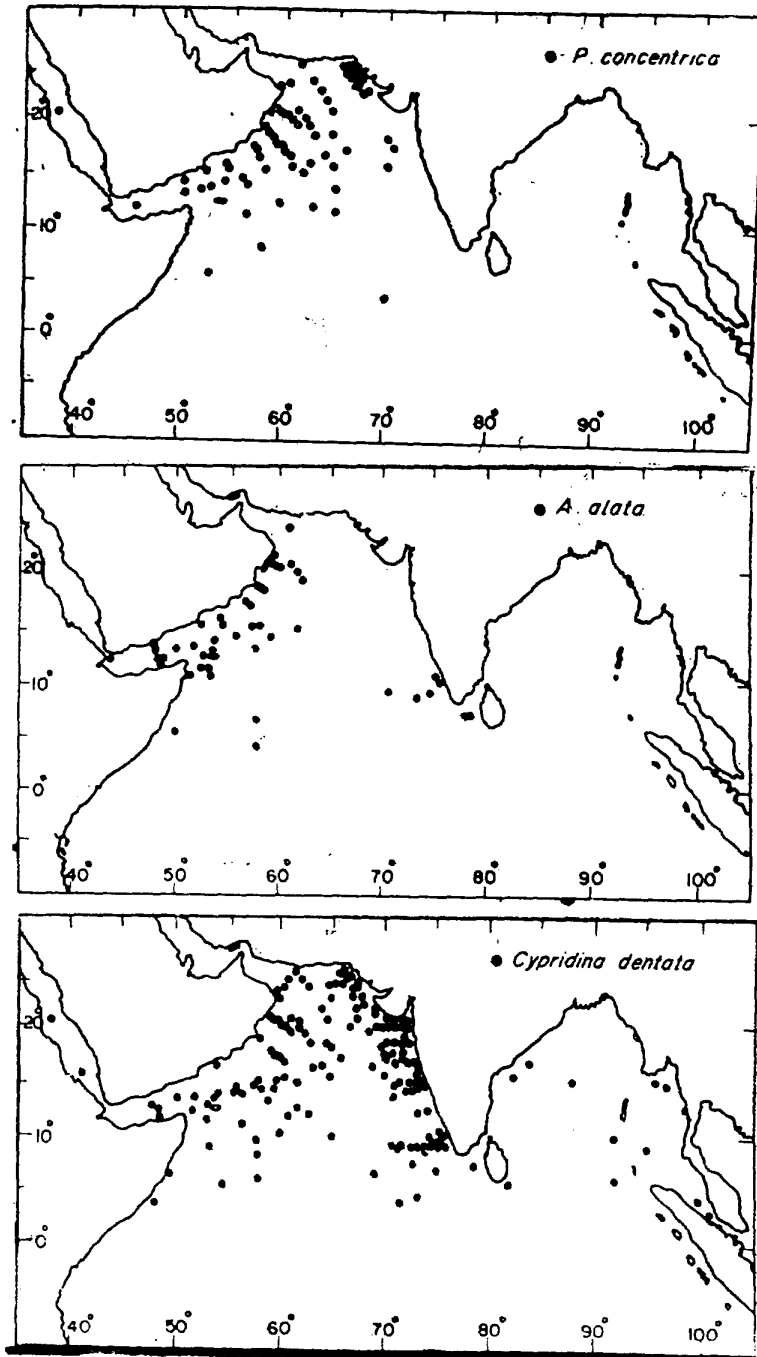


Fig. 5. Geographical distribution of three ostracod species confined mainly to the Arabian Sea.

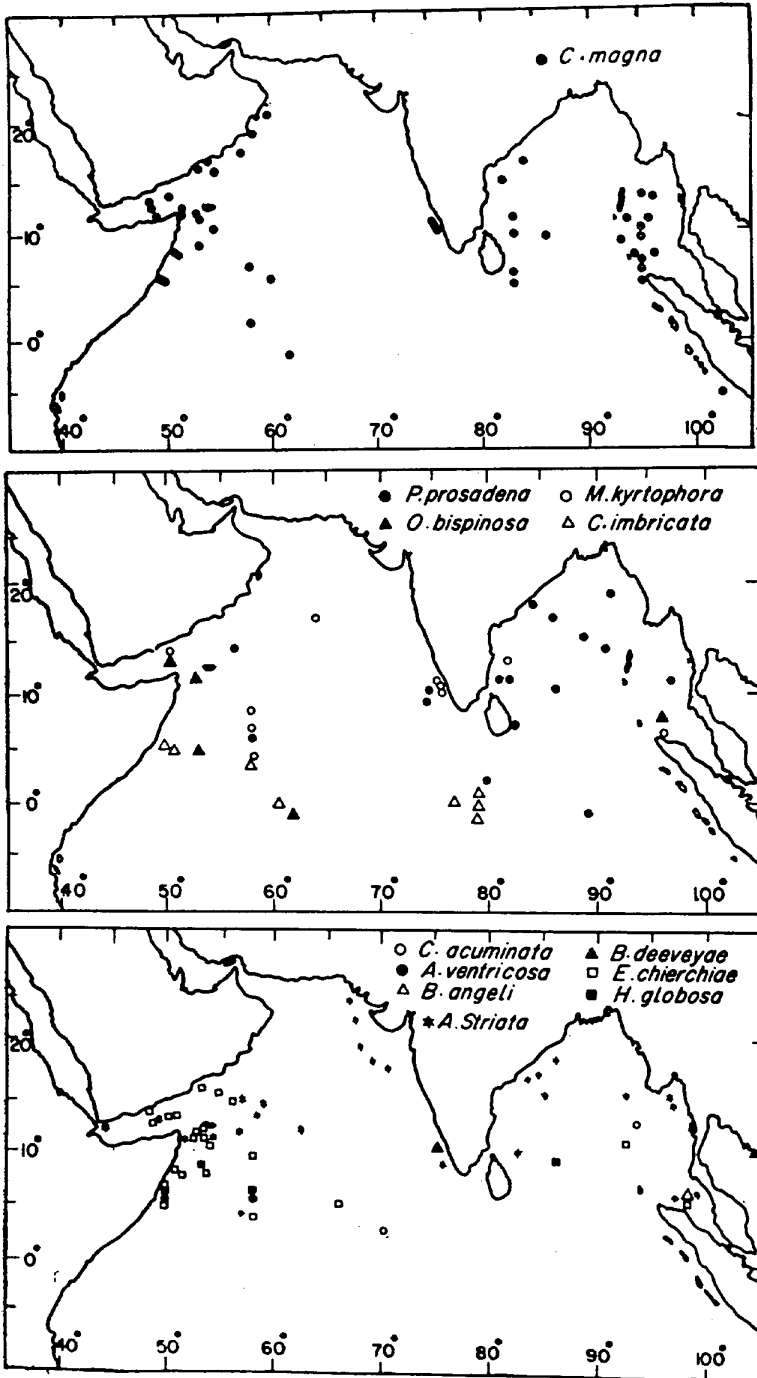


Fig. 6. Distribution of five species of ostracods limited to certain areas. The locations from where the seven rare species recorded are also shown.

*Archiconchoecia striata*: Muller (1906) recorded *A. striata* from the Central Indian Ocean and Leveau (1964) reported the species from the northwest Arabian Sea. In the present collections they were recorded from the Bay of Bengal also. Possible ranges of temperature and salinity were 13.16–30.36°C and 31.59–36.86‰ respectively. Maximum number of 1600/haul was recorded from the Bay of Bengal (14°07'N 97°05'E). The Indian Ocean standard net with its 0.33 mm mesh size is too coarse to retain this species efficiently, hence large catches of these animals may be more a result of net clogging rather than their being uncommon or even absent from other areas.

#### Rare species (Fig. 6)

*Orthoconchoecia bispinosa*: According to the earlier reports (Muller, 1906 and Poulsen, 1973) *O. bispinosa* has a very wide distribution in all the three oceans. Surprisingly the IIOE samples contained only a few representatives. These were collected from the mouth of the Malacca Strait and the Arabian Sea. A comparison of the patterns of distribution of a closely related species, *O. striola* (Fig. 3) with the present species suggest the possibility that this has been replaced by *O. striola*. Possible ranges in temperature was 12.5–30°C and salinity 32.9–36.4‰.

*Conchoecissa imbricata*: Poulsen (1973) reported this as a common species in all the three oceans. But in the IIOE material it was found to be restricted in the equatorial belt. Possible range in temperature was 12.6–28.7°C and salinity 34.3–35.6‰.

*Conchoecetta acuminata*: Previously recorded from all the three oceans (Muller, 1906 and Poulsen, 1973). *C. acuminata* was recorded only from two locations. The ranges of temperature and salinity were 11.9–20°C and 32.3–35.4‰ respectively.

*Archiconchoecia ventricosa*: Reported earlier from the Indian, Atlantic and Pacific Oceans (Muller, 1906 and Poulsen, 1969). It was recorded only from two stations located off Somalia. Salinity and temperature in these stations ranged between 35.1–35.5‰ and 13.9–27.8°C respectively.

*Bathyconchoecia deevyeae*: A single male specimen was obtained from a station located at 10°39'N, 75°22'E. This is the first record of *B. deevyeae* from the Indian Ocean (George, 1971).

*Bathyconchoecia angeli*: *B. angeli* reported as a new species in the Indian Ocean (George, 1977) was collected from a single station located in the Malacca Strait.

*Halocypria globosa*: Poulsen (1969) reported this species to be most frequent in the tropical parts of all the oceans. In the IIOE material this species was obtained only from four stations located in the equatorial region where the temperature and salinity ranged between 13.3–29°C and 33.3–35.6‰ respectively.

*Paraconchoecia discophora*: *P. discophora* is reported to be rare and previous records include that of Muller (1906) from Atlantic and Indian Oceans, Deevy (1968) from Atlantic Ocean and Poulsen (1973) from Pacific Ocean. During the present study this species was encountered only at a single station in the southern Arabian Sea (Fig. 4) where the temperature values ranged between 14.6–29.4°C and salinity 34.8–35.9‰.

*Cypridina acuminata*: Reported earlier from the Indonesian Sea (Poulsen, 1962). In the present material *C. acuminata* was obtained from a single station located off

Bombay (20°00'N, 71°45'E). Salinity at the location was 35.6‰. Data on temperature is not available.

#### INTERPRETATION OF STATISTICAL ANALYSES

Statistical analyses showed significant seasonal variations for 5 species. In the Arabian Sea, *Cypridina dentata* was more abundant during NE monsoon period. The other 2 species that showed seasonal variation in the Arabian Sea were *Paraconchoecia procera* and *P. decipiens*, the former being more abundant during SW monsoon period and latter during the NE monsoon period. In the Bay of Bengal significant 't' values were obtained only for 2 species: *Euconchoecia aculeata* being more abundant during NE monsoon and *Conchoecetta giesbrechti* during SW monsoon period. The reported abundance of ostracods during the NE monsoon in the Indian Ocean (George, 1969) could largely be the result of swarming of *Cypridina dentata* in the Arabian Sea and *Euconchoecia aculeata* in the Bay of Bengal.

Significant 't' values for day and night variations were obtained for *Paraconchoecia procera*, *P. decipiens*, *Conchoecetta giesbrechti* and *Spinoecia porrecta*. Because of the limitation of the depth of the present samples to 200 m, it is not possible to draw any definite conclusions on their vertical movements, except for the species which do not migrate to deeper parts or which do appear in the upper zones at night for the sampling to be effective. George (1969) had reported the nocturnal abundance of ostracods in general. These four species could largely be responsible for the larger bulk of ostracods coming up to the surface at night.

#### DISCUSSION

Of the thirtytwo species of planktonic ostracods recorded from the upper 200 m of the Indian Ocean, 12 were widely distributed, 3 were confined mainly to the equatorial region, 3 restricted to the Arabian Sea, 5 limited to specific areas and the remaining 9 were rare. The general pattern of distribution of different species indicate that the areas of their high abundance coincide with the areas of high plankton biomass observed off Arabian coast, north Arabian Sea and off south-west coast of India (Prasad, 1968). Even though *Euconchoecia aculeata* was the dominant species in the surveyed region, in the Arabian Sea *Cypridina dentata* was the most abundant species. *Cypridina* spp. are known to form swarms in the Arabian Sea and high density of *C. dentata* was reported from the Laccadive Seas (Tranter and George, 1972), off Cochin (George, 1977) and off the Maharashtra coast where the species coexisted along with swarms of *Sagitta enflata* (Nair, 1978). Even though *C. dentata* could tolerate a salinity range of 30.8–37.4‰, they were not frequently recorded from the Bay of Bengal and equatorial regions of the Indian Ocean.

Most of the widely distributed species could tolerate a salinity range of 32–37‰. *Orthoconchoecia striola* and *Spinoecia parthenoda* were encountered in areas where salinity values were less than 36‰ and hence these species were found more abundant in equatorial region. *Pseudoconchoecia concentrica* and *Alacia alata* which are strictly confined to the Arabian Sea were mostly seen in high saline waters (34–37‰). Unlike most of the species *Euconchoecia chierchiae* showed a preference to low salinity (32.4–33.7‰).

During the IIOE, 2 samples were taken from the Red Sea. The species encountered in these samples were *Paraconchoecia elegans*, *P. procera*, *Metaconchoecia rotundata*, *Spinoecia porrecta*, *Pseudoconchoecia concentrica*, *Euconchoecia aculeata* and *Cypridina dentata*. The only earlier report on the ostracod fauna of Red Sea is that of Halim (1969) and he emphasized the Indo-Pacific character of the prevailing species. In view of the general aridity prevailing in the area, both salinity and temperature are highest for the Indian Ocean and adjacent areas. Surface salinity ranges between 37–41‰ and the temperature from 17.9–32.0°C. Most of the epiplankton of the Red Sea are dependent on recruitment of individuals for population maintenance from adjacent Gulf of Aden and Arabian Sea (Kimor, 1973). The hot saline waters of the Red Sea may act as a barrier to the successful maintenance of the ostracod species. The few species which are able to withstand this particular environment might have maintained the population due to lack of competition.

Poulsen (1973) had compared halocyprid species of the Indian, Atlantic and Pacific Oceans. Angel (1973) had summarised the occurrence of the ostracod species in all the world oceans and attributed the richness of Atlantic fauna to the disparity of the scientific efforts employed. Comparison of the distribution of the 32 species in the present collection from the Indian Ocean with their distribution in Atlantic and Pacific showed that only *Paraconchoecia decipiens* and *Orthoconchoecia striola* are Indo-Pacific. Species of *Bathyconchoecia* cannot be taken into account, as most of them are reported to occur near the bottom and hence not easily sampled by plankton nets. Angel (1972) in his summary has included *O. striola* as belonging to the three oceans, probably taking into account the single record of *O. striola* by Muller (1906) in the Atlantic Ocean, which could very well be a mistake (Poulsen, 1973). The fact that Skogsberg (1920), Angel (1969), Deevey (1968) and Poulsen (1973) had not reported it from Atlantic, it is considered to be absent in the Atlantic Ocean. The case of *Platyconchoecia prosadena* is also doubtful, since it is a comparatively rare species. Most of the species enjoy a wide distribution and are cosmopolitan in Atlantic, Pacific and Indian Oceans.

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