

To Dr. M. P. T. S. W.  
NICMAS.

A NEW SPECIES OF *ACARTIA* (COPEPODA, CALANOIDA) FROM  
COCHIN HARBOUR, INDIA, AND ADJACENT AREAS

BY

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During the course of a study of the family Acartiidae of Cochin harbour and its neighbourhood, a species of *Acartia* different from all other known species of *Acartia*, was found. Its characteristics, habitat and seasonal distribution form the theme of this paper.

*Acartia bilobata* n. sp. (figs. 1-14)

*Types*. — The 21 types, all from the harbour of Cochin, South India, are deposited in the Division of Crustacea, Smithsonian Institution, Washington, D.C., U.S.A., with the following catalog numbers: Holotype ♀, 125672; allotype ♂, 125673; paratypes 14 ♀, 3 ♂, 125674. The holotype female was collected at Station I, Aroor on 29 February 1968 in surface water.

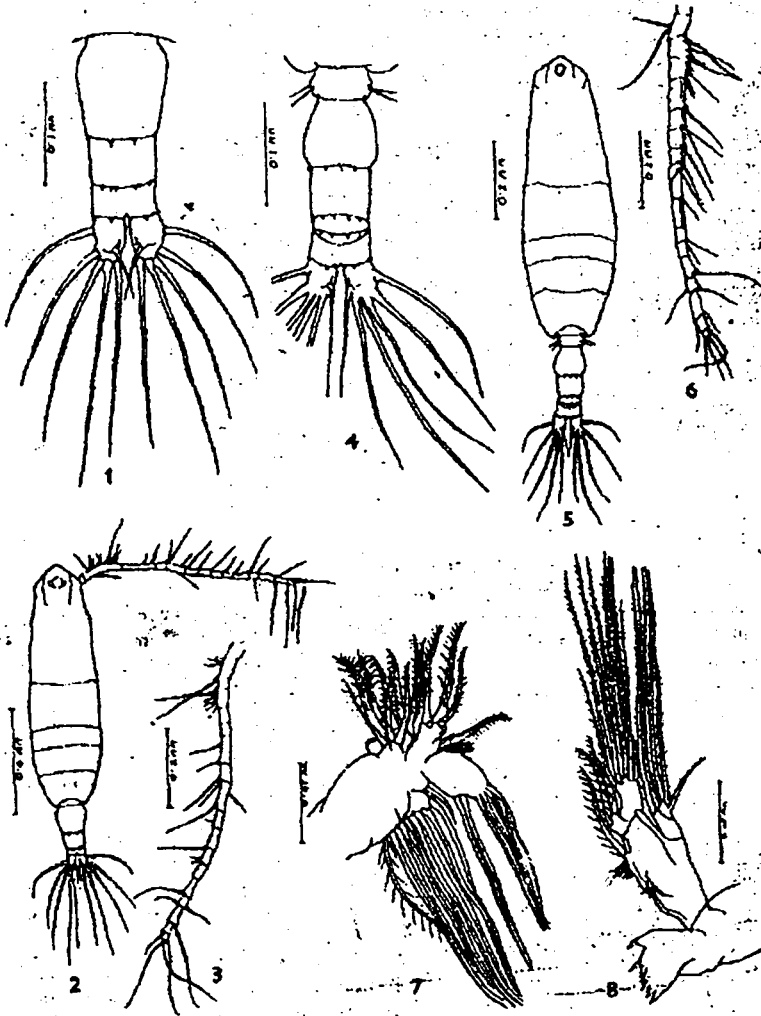
Description

*Female*. — Total length 0.95-1.10 mm (fig. 2). Prosome about 4 times as long as urosome. Head moderately produced; suture between head and first pedigerous segment weak. Posterior corners of fifth pedigerous segment rounded, without spines. Relative lengths of urosome segments and caudal rami (fig. 1) about 8 : 4 : 3 : 4. Dorsal posterior margins of genital and second urosome segments armed with 4 to 6 spinules. Caudal rami slightly less than twice as long as wide; next-to-innermost of 4 major caudal setae the longest.

Antenna 1 (fig. 3) 17-segmented, extending to midlength of genital segment, without spines on proximal segments but knobs on first and second segments on the anterior margin. Antenna 2 (fig. 14) normal for the genus. Mandible (fig. 8) typical for the genus; gnathal lobe with 7 primary and 3 accessory teeth. First and second maxillae and maxilliped (figs. 7, 12, 13) with setal armature as shown in figures.

Legs 1 to 4 as in other Acartiidae, with 3-segmented exopods and 2-segmented endopods. Leg 5 (figs. 10, 11) quite distinctive. First segments fused medially; second segment about twice as long as wide, with short plumose seta inserted at about 0.6 the distance along the lateral margin. Third segment more than twice as long as setae of second segment, with bilobed process on posterior surface at proximal 1/5, giving the impression of an additional suture and bent inward nearly at right angles at about its midlength.

Male. — Total length 0.9 to 0.95 mm (fig. 5). Prosome shape as in female, about 3 times as long as urosome. Relative lengths of urosome segments and caudal rami (fig. 4) about 4.8 : 7 : 3 : 5 : 5. Lateral margins of first urosome

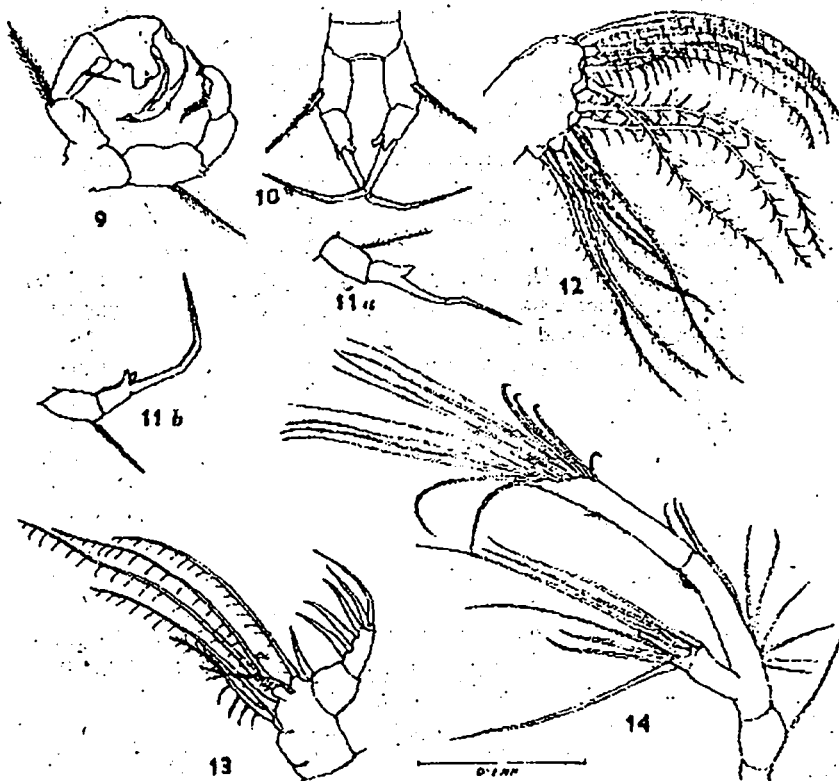


Figs. 1-8. *Atarsia bilobata* n. sp. 1, female, urosome, dorsal view; 2, female, dorsal view; 3, female, first antenna, left side; 4, male, urosome, dorsal view; 5, male, dorsal view; 6, male, first antenna, right side; 7, female, first maxilla; 8, female, mandible. 1-3, holotype; 4-6, allotype.

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segment bilobed, with a pair of setae emerging on either side between the lobes. Dorsal posterior margins of second, third and fourth urosome segments armed with 2 to 5 spines. Posterior margin of anal segment without spines, but produced into a pair of minute knobs. Caudal rami slightly longer than wide.



Figs. 9-14. *Acartia bilobata* n. sp., paratypes. 9, male, fifth leg, posterior view; 10, female, fifth leg, posterior view; 11a, female, right fifth leg, edge view; 11b, female, right fifth leg, antero-lateral view; 12, female, second maxilla; 13, female, maxilliped; 14, female, second antenna.

Antenna 1 (fig. 6) extending to posterior margin of prosome. Right first antenna 17-segmented; segment 10 with serrate anterior margin; geniculation between segments 13 and 14;

Remaining appendages, from antenna 2 to leg 4, as in female.

Right leg 5 (fig. 9) with strong spine on second segment; inner lobe of third segment bilobed, fourth segment narrower and longer. Left leg 5 with rather broad first segment bearing lateral setae at about midlength; second segment narrow; third segment with a leaf-like process and 2 median spines at about mid-

length, one longer and the other short and stout, apex with spine and short curved process.

Relationships. — *A. bilobata* is referable to Steuer's subgenus *Acanthacartia*, where it differs most obviously from the other species of the subgenus in the structure of the female fifth leg. It shows some similarities to *A. chilkaensis* Sewell, *A. levequei* Grice, *A. plumosa* T. Scott, *A. southwelli* Sewell, and *A. spinata* Esterly. Brief comparisons with these species follow.

*A. chilkaensis* has longer caudal rami in both sexes. The female fifth leg has the third segment bent as in *A. bilobata*, but shorter and without the bilobed process. The inner process on the third segment of the male right fifth leg is not bilobed (cf. Sewell, 1919, pl. 9 figs. 4, 5).

*A. levequei* has 2 sets of small spines on the posterior margin of the fifth pedigerous segment, and lacks spines on the urosome segments in both sexes (cf. Grice, 1964, figs. 22, 29, 30, 33). The third segment of the female fifth leg lacks the bilobed process, and the inner process on the third segment of the male right fifth leg is angular, but not bilobed.

*A. plumosa* has small spines on the fifth pedigerous segment and longer caudal rami in the female (cf. T. Scott, 1894, pl. 7 figs. 22, 28-30). The third segment of the female fifth leg has a shelf in its proximal posterior part, and Scott's illustration shows a suture distal to the shelf. Scott refers to the part of the leg distal to this suture as an apical seta. It is possible that Scott misinterpreted this leg, and that the suture is not actually present and the apical seta is the distal part of the third segment beyond the shelf. The male fifth leg of *A. plumosa* is quite different from that of *A. bilobata*; the right leg is much longer than the left; the inner spine on the last segment of the left leg is very long and spinulose.

*A. southwelli* has a much stockier body in the female, and the third segment of the female fifth leg is evenly curved, not bent. The inner lobe of the third segment of the male right fifth leg is evenly rounded (cf. Sewell, 1914, p. 19 figs. 8, 9).

*A. spinata* has dorsal and ventral series of spinules on the fifth pedigerous segment in both sexes, and a row of spinules and a prominent spine on the second segment of antenna 1 of the female (cf. Esterly, 1911, pl. 2 figs. 16, 19, pl. 4 fig. 45). The outer plumose seta on the second segment of the female fifth leg is twice as long as the third segment (cf. Gonzalez & Bowman, 1965, fig. 11b). The male left fifth leg is unusually short, and the inner lobe of the third segment of the male right fifth leg is not bilobed (cf. Esterly, 1911, pl. 3 fig. 24).

The type-locality and hydrography (fig. 15). — Cochin harbour is located at about 09°58'N 76°17'E, in an estuary commonly called the Cochin Backwaters. This estuary has a total area of about 200 square miles. To the north and south it is contiguous with shallow brackish water lagoons. On the western side, between Fort Cochin and Vypeen, it is permanently connected with the Arabian Sea by a narrow channel of about 450 m width, which forms the main entrance into

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Cochin harbour. The inflow of fresh water from several sources, particularly during the monsoon months, is considerable and it is in the lagoons that the mixing of salt and fresh water occurs. The continual discharge of fresh water on one hand and the inward influx of sea water on the other, bring about highly dynamic conditions. The depth of this estuary varies from 10 to 15 m in the area close to the sea.

Generally, the temperature of this estuary is maximal in April ( $32^{\circ}\text{C}$ ) and minimal in September ( $26^{\circ}\text{C}$ ). From June to September, the temperature gradually decreases and from October to May it shows a progressive increase. Seasonal

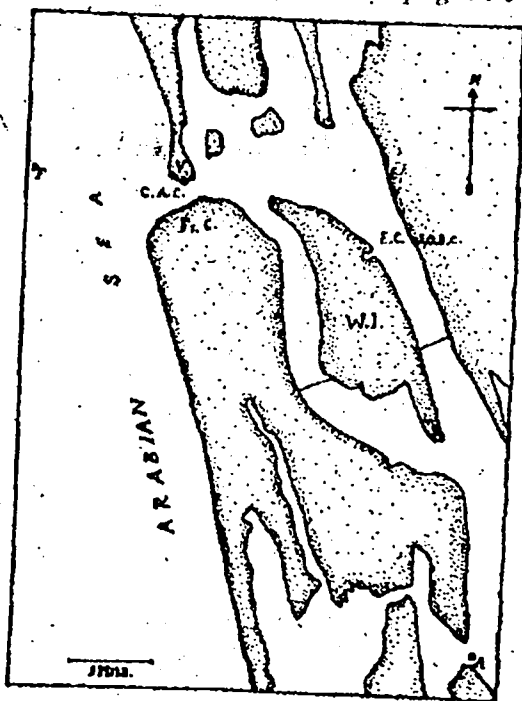


Fig. 15. The type-locality and the stations at which plankton samples were collected. I.O.B.C., Indian Ocean Biological Centre; E., Ernakulam; E.C., Ernakulam Channel; W.I., Willington Island; Ft. C., Fort Cochin; V., Vypeen; C.A.C., Cochin Approach Channel; A, Station I, Aroor; F, Station II, Fairway Buoy.

changes in salinity are well-marked. From October onwards the salinity begins to rise, reaching its maximum in May. In June, with the onset of the monsoon, a sharp fall in salinity occurs. Maximum salinity values range from 28 to  $35\text{‰}$  and minimum from 1.5 to  $14\text{‰}$ .

Seasonal distribution of the species. — In plankton collections taken from Station I at Aroor (fig. 15) *A. bilobata* occurred in considerable numbers from

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late February to May. The number dwindled from May to July and the species was totally absent in July, August and September. It started appearing again in small numbers from late October onwards. From the high percentage frequency of occurrence until May, the total absence from July to September and the reappearance in late October, it is inferred that this species prefers specific ranges of salinity and temperature.

In the plankton collections taken from Station II at Fairway buoy (fig. 15), *A. bilobata* was found to occur in moderate numbers only in June, and was totally absent in other months. It may be due to the fact that the specific ranges of salinity and temperature preferred by this species may not be found in the marine waters of Station II, as frequently as in Station I.