

# A NEW SPECIES OF MACANDREWELLA (COPEPODA: CALANOIDA) FROM OFF COCHIN, SOUTH WEST COAST OF INDIA

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## ABSTRACT

*Macandrewella cochinesis* is described and compared with other species of the genus. Examination of the specimens revealed that they cannot be assigned to any of the known species of the genus though they had similarities with *M. joanae* and *M. scotti*.

## INTRODUCTION

During the course of the studies on the copepod family Scolecithricidae from the International Indian Ocean Expedition collections, some specimens of both sexes belonging to the genus *Macandrewella* were observed in a sample taken by "R. V. Conch" from a station at Lat. 10° 10' N, Long. 75° 46' E (IOBC Hand book Vol. I, 1969). They were different from the seven known species of the genus and are hence described as new. Specimens belonging to the same species were later collected from a sample taken by "Blue Fin" at Lat. 09° 48' N, Long. 75° 39' E (N. I. O., 1969-70).

## DESCRIPTION OF SPECIES

### *Macandrewella cochinesis* n. sp.

*Female* (Fig. 1a): Head and the first thoracic segment fused together with a faint line of demarcation laterally. Forehead with a lens-like organ at the base of the rostrum. Fourth and fifth thoracic segments completely separated. Posterolateral corners of the last thoracic segment asymmetrical, each side drawn out into a stout curved spine with a distinct tooth at the base. Spine on the left side longer than the spine on the right side reaching the level of the distal margin of the first urosome segment (Fig. 1b). Rostrum with a bifurcate base and one filament attached to each ramus.

Abdomen four segmented, genital segment asymmetrical in outline in dorsal view and with a ventral backwardly directed protuberance (Fig. 1c). Posterior margin of the second and the

third abdominal segments fringed with fine spines. Fourth abdominal segment shortest. Caudal furca almost as long as wide. Five caudal setae attached to each furcal joint. Middle caudal seta on the left side elongated.

Antennules with 23 separate segments. Antennae, mandibles, maxillae and maxillipeds in general structure almost similar to those of the other species of the genus with the following differences. Chewing blade of each mandible carries 8 teeth; inner tooth long, curved and serrated (Fig. 2c). First basal of the maxilliped with a short row of fine curved spines at its proximal end on either side. Second basal just behind the anterior margin, on either surface carries a long row of fine spines along its entire length. Spines at the centre of this row are short and those at the ends are long (Fig. 2f).

Segmentation of legs 1-4 (Figs. 3a,b,c,d) as in *M. scotti* Sewell, with the following differences. Outer border of exopod 3 of leg 1 even and straight, external spines on the three exopod segments almost subequal. First basal segment of leg 2 with a small spine behind the distal external angle. Exopod segment 2 of leg 2 and 3 with a transverse, crescent-shaped row of spines towards the distal border, segment 3 provided with a group of small spines on the surface towards the middle. Endopod 1 of leg 2 drawn out into a spine at the distal external angle. Endopod 2 of leg 2 with two rows of three spines each. Spines in the outer row almost equal. Spines in the inner row unequal. Endopod segments 1 and 2 of legs 3 and 4 drawn out into spines at their distal external angle, segments 2 and 3 with stout sharp spines on the surface. Spines on the sur-

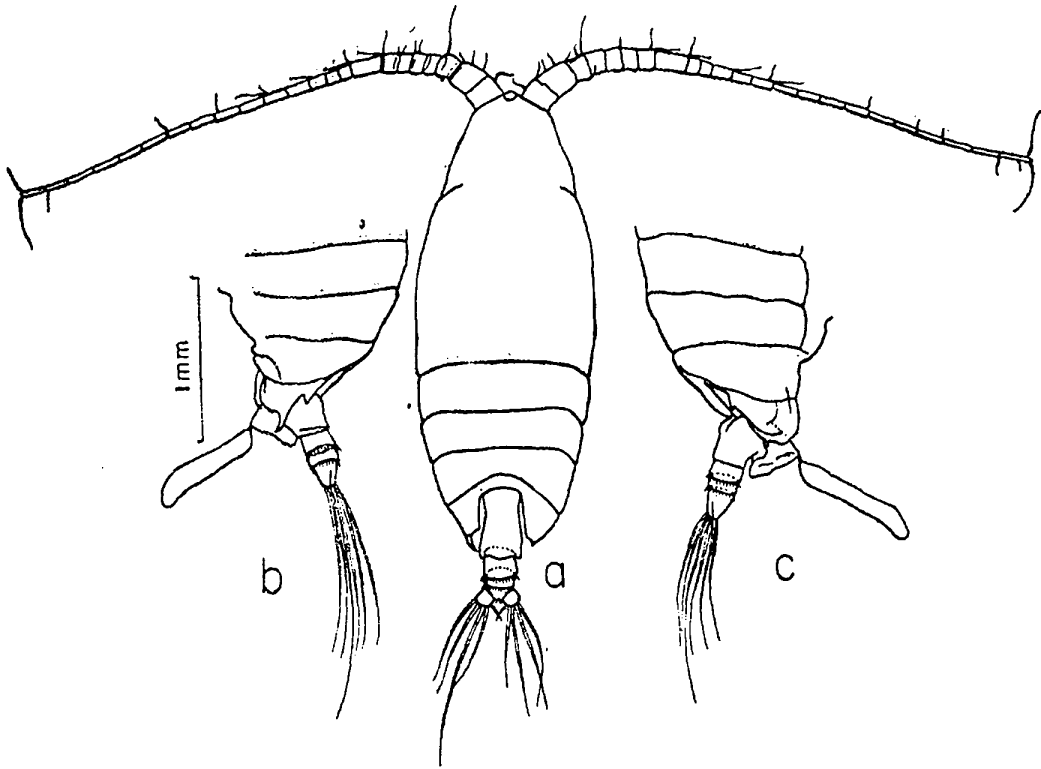


Fig. 1. *Macandrewella cochinensis*. n. sp. Female.

(a) Dorsal view, (b) Lateral view of posterior part from left side, (c) Lateral view of posterior part from right side.

face of segments 2 and 3 of both exopod and endopod of leg 4 arranged in vertical rows. Leg 5 absent.

**Material examined:** Total 25 specimens from the two samples.

**Length range:** 3.0–3.15 mm.

**Male (Fig. 4a):**— Head and first thoracic segment fused together, forehead carries lens-like organ. Posterolateral corners of the last thoracic segment symmetrical, each side with stout curved spines. Abdomen five segmented. Posterior margin of second, third and fourth abdominal segments fringed with fine spines. Four caudal setae on each caudal rami. Antennules with 20 segments on the right side and 21 on the left side. Mouth parts as in female. Legs 1–4 as in female but with reduced armature. Leg 5, in general structure resembles that of the other species in the genus. Right leg with the first basal with an angular expansion towards the proximal one-third; the second basal segment dilated, proximal part of en-

dopod with a curved and blunt distally directed process, a median conical protuberance and a curved tapering distal end; first exopod segment bearing an irregular wing like expansion at the proximal part, a small rounded prominence in the middle and an evenly curved prominent process towards the distal end, second segment with an internally directed club-shaped process almost as long as the entire segment, third segment bent on itself at about the middle with a thin transparent web-like structure connecting the two halves. In left leg second basal longer than first, endopod one-segmented and almost straight, with two triangular expansions and a row of strong teeth distally; exopod two-segmented, tip of second segment with a thin plate-like structure covered with a dense tuft of long cilia and with a thin pointed claw (Fig. 4b.).

**Material examined:** Total 31 specimens from the two samples.

**Length range:** 2.9–2.95 mm.

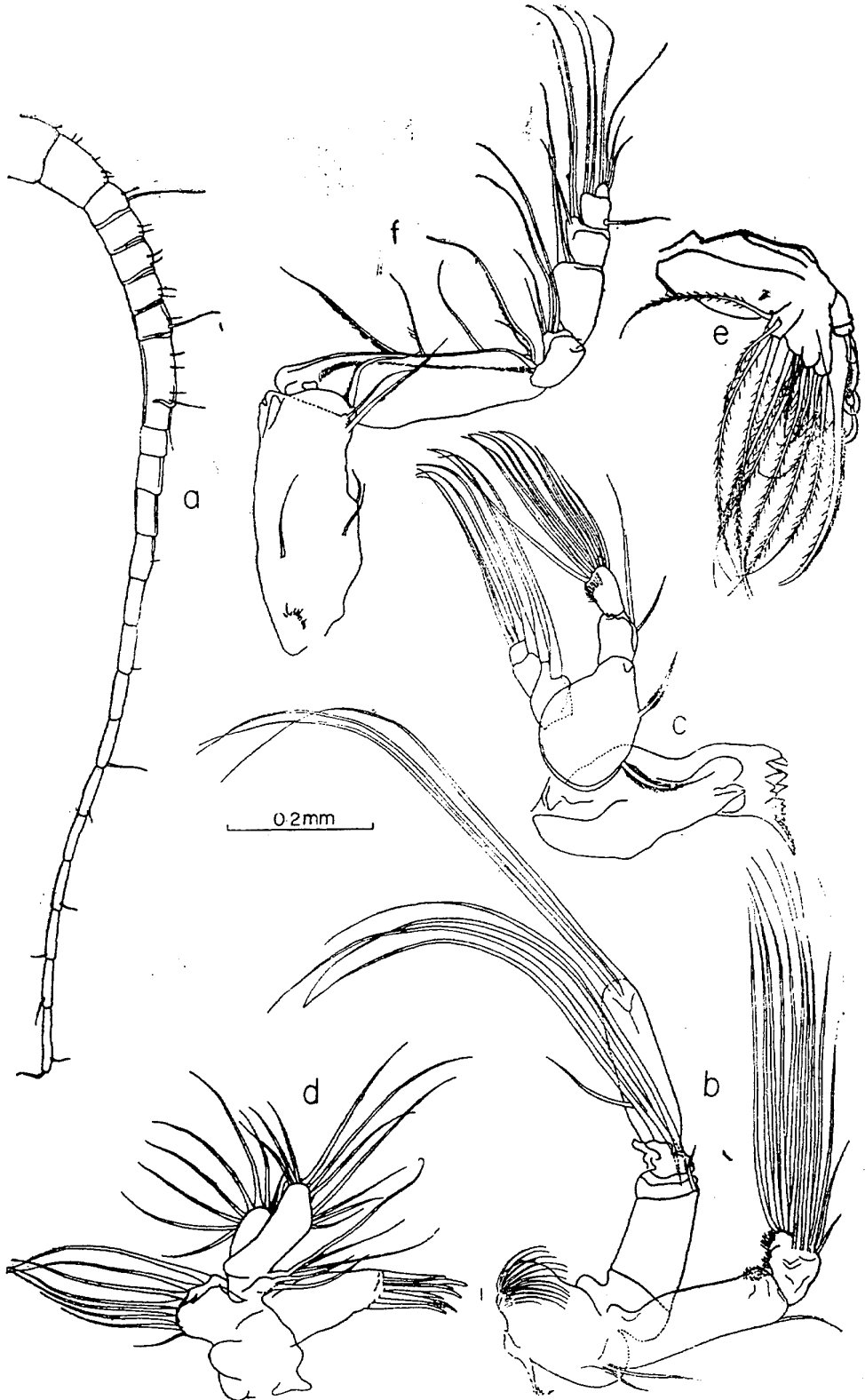


Fig. 2. *Macandrewella cochinensis* n. sp. female.  
 (a) Antennule, (Magnification double that of the other appendages), (b) Antenna, (c) Mandible,  
 (d) 1st maxilla, (e) 2nd maxilla, (f) Maxilliped.



Fig. 3. *Macandrewella cochiniensis*, n. sp. female.  
(a) — (d) legs 1 — 4.

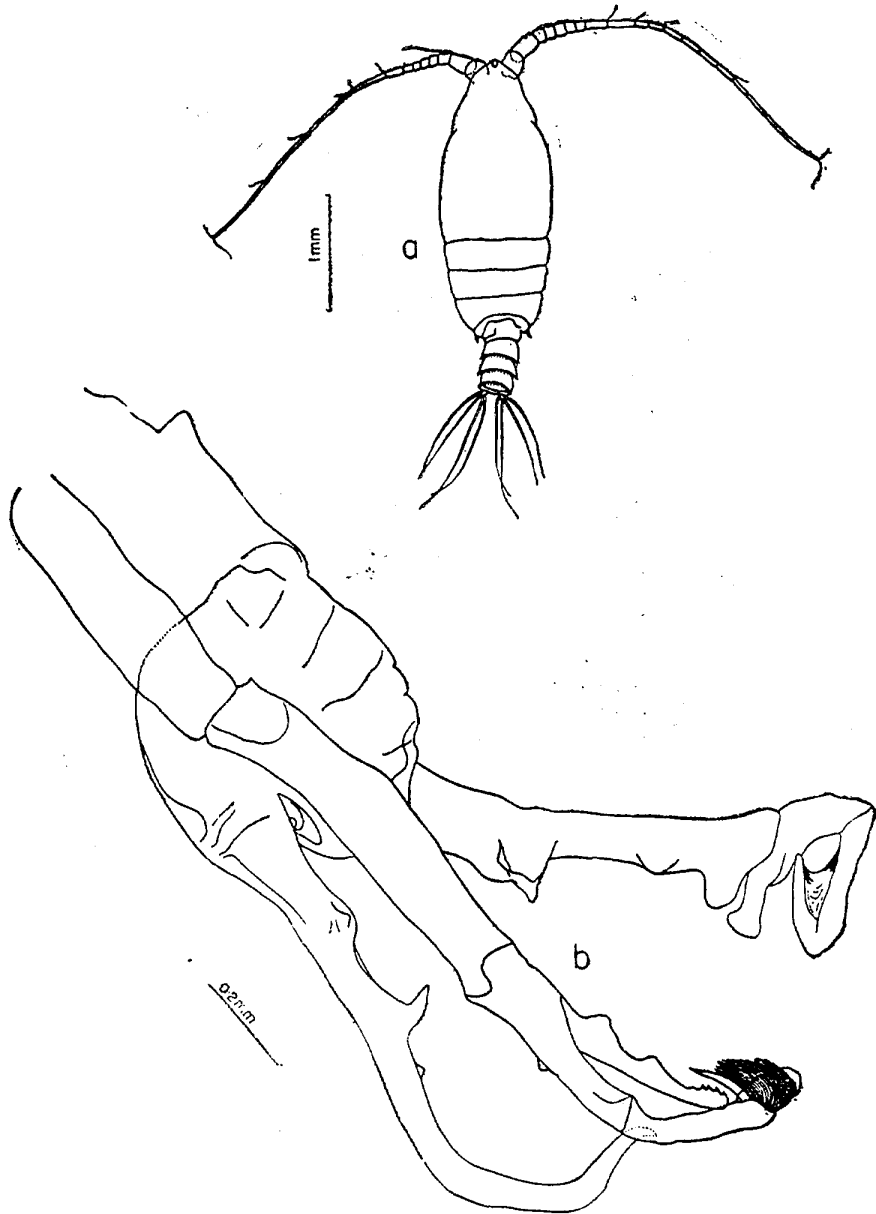


Fig. 4. *Macandrewella cochinensis* n. sp. male.  
(a) Dorsal view (b) Leg. 5.

Table: Comparison of *Macandrewella* species

	<i>M. joanae</i>	<i>M. scotti</i>	<i>M. chelipes</i>	<i>M. Sewelli</i>	<i>M. asymmetrica</i>	<i>M. mera</i>	<i>M. agassizi</i>	<i>M. cochinenis</i>
<b>Female</b>								
Length (mm)	3.6	3.2	3.5	3.5 - 3.7	3.5 - 3.7	3.84	3.0	3 - 3.15
Posterolateral corners of the last thoracic segment	Asymmetrical with the spine extending beyond the middle of the genital segment	Symmetrical	Symmetrical	Symmetrical	Asymmetrical with the spine on the left side bent outwards at an angle of about 45°.	End laterally with short sharp points directed slightly inwards.	Symmetrical	Asymmetrical with the spine on the left side reaching the level of the distal margin of the first urosome segment.
Genital segment	Asymmetrical in dorsal view. Ventral surface produced posteriorly into a small blunt lobe.	Symmetrical in dorsal view.	Symmetrical in dorsal view.	Asymmetrical with a lobe at the right posterior corner overlapping the next abdominal segment.	Asymmetrical with a swollen lateral projection on the right side slightly overlapping the following segment and with a ventral backwardly directed thumblike process projecting from the genital boss.	Asymmetrical with a swelling on the right side a ventral thumblike projection directed towards the genital plate.	Dorsal surface strongly elevated along mid line and armed with a stout spine at the posterior end.	Asymmetrical in dorsal view, prominent backwardly directed on the ventral side.
Spines on the posterior margin of abdominal segments	Present on 1st, 2nd and 3rd segments.	Present on 2nd and 3rd segments	Absent	Absent	Absent	Absent	Absent	Present on 2nd and 3rd segments.
Caudal furca	As long as broad	Short and broad	Wider than long	Wider than long	As broad as long	—	Wider than long	As long as broad

Table (Contd)

	<i>M. joanae</i>	<i>M. scottii</i>	<i>M. chelipes</i>	<i>M. sewelli</i>	<i>M. asymmetrica</i>	<i>M. mera</i>	<i>M. agassizi</i>	<i>M. cochitnensis</i>
Caudal setae	5 on each side, asymmetrical with middle seta on left side elongated.	5 on each side, symmetrical.	4 on each side, symmetrical.	4 on each side, symmetrical.	5 on each side, symmetrical.	Symmetrical	4 on each side, asymmetrical with 2nd inner seta on left side elongated.	5 on each side, asymmetrical with middle seta on left side elongated.
Leg 5	Present	Absent	Absent	Absent	Absent	Absent	Present	Absent
Male								
Length (mm)	3.4	—	Smaller than female	3.25	3.7	Male not recorded.	2.95	2.9 - 2.95
Spines on the posterior margin of abdominal segments	Present on 2nd, 3rd and 4th abdominal segments.	Present on 2nd, 3rd and 4th abdominal segments.	Absent	Absent	Absent	—	Absent	Present on 2nd, 3rd and 4th abdominal segments.
5th leg Right								
Exopod	2 segmented	3 segmented	3 segmented	3 segmented	Similar to that figured by Scott for <i>M. joanae</i> and differ only in small details which can be best seen by comparison of the figures.	—	3 segmented	3 segmented.
Exopod 1	Produced internally into a strong curved claw which exceeds the length of the joint, middle inner margin produced into stout tooth.	Fused with second basal, wing-like projection at proximal end, about the junction of the middle and distal thirds a small rounded lobe, a club-shaped prominence at the distal end.	An angular swelling on the outer margin at the centre, a small knob at the inner distal corner.	Extends beyond the articulation with the second segment as a curved finger-like process.	—	—	A knob at the inner distal corner.	An irregular wing like expansion at the proximal part, small rounded prominence in the middle and an evenly curved prominent process at the distal end.

Table (Contd.)

	<i>M. joanae</i>	<i>M. scotti</i>	<i>M. chelipes</i>	<i>M. sewelli</i>	<i>M. asymmetrica</i>	<i>M. mera</i>	<i>M. agassizi</i>	<i>M. cochinchensis</i>
Exopod 2	Forked at the apex	A strong inwardly directed blunt process at the base equal in length to the whole segment.	A curved process at the base and a small straight process near the centre of the inner margin.	Outer side articulated with the inner side of 1st segment, proximal end enlarged into a trilobed knob which extends behind the articulation.	—	—	A sickle shaped process on the inner margin at the base, projects distally beyond the joint with the third segment.	An internally directed club-shaped process almost as long as the entire segment.
Exopod 3	—	Sickle shaped.	Sickle shaped; a knob on the convex margin, point of sickle overlaps the base of the second segment.	Bent at right angles near its centre with a long process, toothed at the tip on the outer angle of the bent.	—	—	Bent at right angles near its centre and the terminal claw-like part overlaps the sickle-like process at the base of the 2nd segment.	Bent on itself at the middle with a thin transparent web-like structure connecting the two halves.
Endopod	One jointed long curved.	One jointed long curved.	Slender, reaches the distal end of exopod 2.	Extends beyond exopod 2, curved and blunt at the tip, a sharp process on the inner margin near the base and another towards the tip.	—	—	One jointed, a single knob near the centre of the outer margin.	One jointed, a proximal part with a curved and blunt distally directed process, a median conical protuberance and a curved tapering distal end.
<i>Left leg</i>								
Exopod	2 jointed.	2 jointed	3 jointed	2 jointed.	—	—	3 jointed	2 jointed.
Exopo ♂2	Short, dilated, apex furnished with a pad of hairs and a spine.	Terminates in a claw-like process with a tuft of hairs.	Equal in length to exopod 1.	Enlarged at its distal end with an outer setose process.	—	—	Somewhat widened.	A thin plate-like structure at the tip covered with dense tuft of long cilia and with a thin pointed claw.



Table (Contd.)

	<i>M. joanae</i>	<i>M. scotti</i>	<i>M. chelipes</i>	<i>M. sewelli</i>	<i>M. asymmetrica</i>	<i>M. mera</i>	<i>M. agassizi</i>	<i>M. cochiniensis</i>
Exopod 3	—	—	Short and claw shaped.	—	—	—	With a rounded process and a soft pointed filament on its inner surface, rounded tip covered with hairs.	—
Endopod	One jointed, sickleshaped, as long as exopod, distal half of inner margin serrated.	One jointed, curved and with a row of serrations at the distal end. Shorter than exopod.	One jointed, nearly as long as exopod, dentate on its inner margin.	One jointed, shorter than exopod, laminate and truncate at its tip, with a sharp spine at the centre and a row of coarse teeth distal to the spine.	—	—	One jointed, nearly as long as exopod, almost angular processes on the outer margin, three minute teeth at the tip.	One jointed, shorter than exopod, almost straight, two triangular expansions, a row of strong teeth distally.

*Types*:- Holotype 1 female, allotype 1 male and paratypes 2 females and 2 males are deposited in the reference collection at the Regional Centre of N. I. O. (CSIR), Cochin-18, India, Reg. Nos: I. O. B. C. 0146, 0147, 0148 respectively. In the table the distinctive features of the species in the genus *Macandrewella* are summarised.

### DISCUSSION

Scott (1909) created the genus *Macandrewella* to accommodate the new species *M. joanae* collected by "Siboga" in the Malay Archipelago. Scott also included in the genus the copepod that Giesbrecht (1896) had described from the Red Sea under the name *Scolecithrix chelipes*. There are seven established species of the genus; *M. joanae*, *M. chelipes* (Giesbrecht 1896), *M. scotti* Sewell (1929), *M. sewelli*, *M. asymmetrica*, *M. mera* Farran (1936) and *M. agassizi* Wilson (1950). Female of *M. cochinensis* resembles *M. joanae* in the extreme asymmetry of the posterolateral corners of the last thoracic segment with the spine on the left side reaching the level of the distal margin of the first urosome segment and in the asymmetrical caudal setae with the middle seta on the left side elongated. But the absence of leg 5 is an important character distinguishing it from the latter species. Leg 5 of male in *M. cochinensis* is distinct, in the structure of the different parts, from the other species, though retaining the basic form in the genus. Sewell (1929) while describing females of *M. scotti* refers in the text to the similarity with *M. joanae* in the shape of the posterolateral corners of the thorax, but from figures it has to be assumed that though there are spinous projections they are not comparable to the distinctly asymmetrical spines of *M. Joanae*. Moreover, Sewell makes special mention of the symmetrical caudal setae. They are asymmetrical in *M. cochinensis* as well as in *M. Joanae*. Apart from the variations in the distribution of spines on the maxilliped and legs 1-4, the straight outer border of exopod 3 of leg 1, instead of a notched border in *M. scotti* is a well marked feature of *M. cochinensis*. Thus *M. cochinensis* though possessing certain characters in common with *M. joanae* and *M. scotti* is quite distinct from them and also from the other species in the genus.

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### REFERENCES

- FARRAN, G. P., 1936  
Copepoda. Great Barrier Reef Expedition, 1928-1929. *Sci. Repts.* 5 (3) : 73-142.
- GIESBRECHT, W., 1896  
Über pelagische Copepoden des Rothen Meeres, gesammelt vom Marine stabsarzt Dr. Augustin Kramer *Zool. Jahrb., Abt. Syst.* 9 : 315-328.
- PANIKKAR, N. K. (Ed.), 1969  
Handbook to the International zooplankton Collections, IOBC, I. Station List.
- N. I. O., 1969-70  
National Institute of Oceanography, India, Annual Report 5: 2-8; 33-36.
- SCOTT, A., 1909  
"The Copepoda of the Siboga Expedition". *Siboga-Expedite*. Monograph XXIX Leiden.
- SEWELL, R. B. S., 1929  
The Copepoda of Indian Seas. Calanoida. *Mem. Indian Mus.* 10 : 1-221.
- WILSON, C. B. 1950  
Copepods gathered by the United States Fisheries Steamer "Albatross" from 1887 to 1909, Chiefly in the Pacific Ocean. *Bull. U. S. nat. Mus.* 100 14 (4), 141-441.