MORPHOLOGICAL VARIATIONS IN *CALIGUS EUTHYNNUS* KURIAN, 1961 WITH A DISCUSSION ON ITS RELATIONSHIP WITH *C. CORYPHAENAE* STP. & LUTK., 1861

ABSTRACT

Caligus euthynnus Kurian, 1961 is redescribed based on four female specimens collected from the Gulf of Mannar. Variations in certain characters observed in the specimens have been recorded and the relationship of *C. euthynnus* with *C. coryphaenae* discussed.

SHINO (1959) AND PILLAI (1962) synonymised *Caligus aliuncus* Wilson (1905), *Caligus thymni* Dana (1852), *Caligus elongatus* Heegaard (1943) and *Caligus tesserifer* Shiino (1952) with *Caligus coryphaenae* Stp. & Lutk. (1861). Kirtisinghe (1964) synonymised *C. euthynnus* also with *C. coryphaenae*. Pillai (1962) considered *C. euthynnus* distinct and expressed that it might probably be synonymous with *C. coryphaenae* Brian (1906).

After a critical study, Pillai (1962) concluded that there are two groups or forms assignable to *C. coryphaenae*, strikingly similar in most of the important characters, but showing fundamental difference in at least three characters. The first group, represented by *C. coryphaenae* has apically narrowed diverging rami for the sternal fork, straight or slightly outcurved basal hook on the exopod of the third leg and a long apical claw on the fourth leg much longer than the penultimate claw. In the second group represented by *C. euthynnus*, the rami of the sternal fork are apically rounded and parallel, the basal hook on the exopod of the third leg is incurved and the last two claws of the fourth leg subequal in length. In the present description of *C. euthynnus*, certain variations observed are brought out which would serve to link up its close relationship with *C. coryphaenae*.

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Material examined

Four female specimens collected from the Gulf of Mannar, Theckuvadi, Rameswaram Island from the body surface below the second

dorsal fin of *Euthynnus affinis* in November, 1970. They were mounted in glycerine-gelatin and deposited in the Reference Collection Museum of the Central Marine Fisheries Research Institute at Mandapam Camp.

Description

Carapace slightly longer than wide, less than half the total length of body excluding caudal rami; posterior median lobe nearly squarish, more than half the maximum width of carapace and extend slightly behind the posterior margin of lateral lobes (Fig. 1). A minute spine recorded by Kurian (1961) in the outer angle of the median lobe is absent. Free thoracic segment about 2.5 times as wide as long and $\frac{1}{3}$ to $\frac{1}{3.7}$ in the width of carapace. Silas and Ummerkutty (1962) commenting on the dimension of the free thoracic segment in the original description given as twice as wide as long and one-third the width of carapace, remark that in the figure it is shown as 2.5 times as wide as long and wider than one-third the width of carapace. There is a deep notch on the lateral aspects of the posterior half of the free thoracic segment, the posterior margin of which marks the beginning of the genital segment. Genital segment longer than wide and only slightly broader posteriorly than its anterior width. The postero-lateral aspects of the genital segment are in the form of lobular projections, extending prominently beyond the margin of abdomen. Abdomen three-jointed in one specimen and four-jointed in three specimens, slightly shorter than the genital segment, indistinctly demarcated from each other and from the genital segment; the first segment is the longest and the length decreases towards the posterior segments with the last segment recording the shortest length. Anal lamina was found intact in only one specimen; it is slightly longer than wide and immersed postero-laterally in the last abdominal segment which does not project prominently between the anal laminae as a bilobed process as in *C. coryphaenae*. Silas and Ummerkutty (1962) based on the figure of *C. euthynnus* by Kurian record the anal laminae as slightly broader than long. Each lamina with three stout plumose setae and one lateral spine. In the lamina on one side one small seta is present exterior to the spine. It is probable that it might have severed off from the other side. Egg strings equal to or a little more than the total length of the body excluding caudal rami. The antennules are of the normal caligid type with the distal segment less than half the length of the stouter basal. Kurian (1961) recorded length of the terminal segment to be half as long as basal. Silas and Ummerkutty (1962) commenting on this, remark, that in the figure by Kurian it is shown as almost of equal length as basal. This descrepancy is due to the incomplete drawing of the basal portion of the basal segment. Basal segment with a long marginal row of setae. The short submarginal ventral row of setae present in *C. coryphaenae* and *C. euthynnus* of Kurian is quite indistinct in the form of minute knobs. Two of the distal marginal setae very long, reaching beyond the second segment. Second segment with a bunch of apical setae and two apical and one lower very long sparsely plumose setae, much longer than the apical setae of the first segment. Antenna two segmented, basal segment square-shaped and massive with the terminal segment ending in the form of a hook-like claw. Maxillule in the form of a rectangular knob projecting from the position of the middle segment of the maxilla anteriorly. Maxilla three segmented; the first segment adjacent to the mouth cone is triangular shaped and points posteriorly as a prominent process, the middle segment is short and knob-like and the terminal segment long, curved and reaches the base of the second segment of first maxilliped. According to Kurian (1961) maxillule is indistinct in *C. euthynnus* and the maxilla, probably incompletely drawn, in the form of a single segmented conical process. The maxillule is absent in *C. coryphaenae*. Mouth cone long

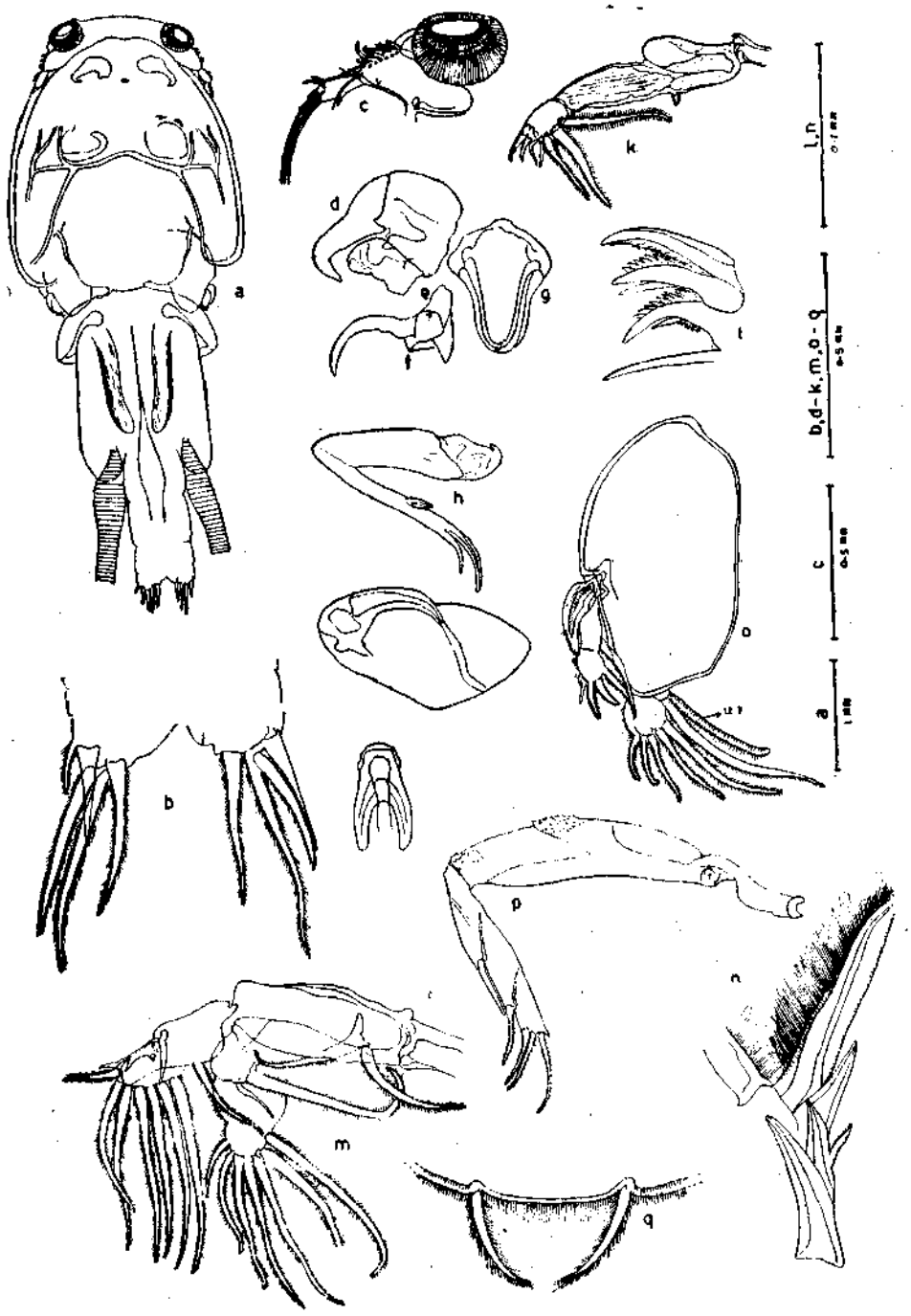

Fig. 1. *Caligus euthynnus* — a. adult female-dorsal view; b. anal lamina ; c. antennule ; d. antenna ; e. maxillule ; f. maxilla ; g. mouth cone with mandible ; h. first maxilliped ; i. second maxilliped ; j. sternal furca ; k. first abdominal leg ; l. terminal claws of first abdominal leg ; m. second abdominal leg ; n. terminal claws of second abdominal leg ; o. third abdominal leg (Lt. P—lateral plate of 4th abdominal sternum) ; p. fourth abdominal leg ; and q. sternal plates of 4th abdominal segment with plumose setae.

and mandible elongate with distal segment produced into 12 or 13 denticulations on the inner side. First maxilliped three segmented as against the two segments reported by Kurian (1961) ; the terminal segment longer and slender with an accuminate spine and two apical claws, the last one bearing more prominent pectinate wings being longer than the other. Second maxilliped with a stouter basal segment that bears a strong curved and pointed terminal claw. Two tubercles in the basal segment found by Kurian are absent in the present specimens. Arms of sternal furca nearly parallel with round or blunt-pointed distal ends that show a slight inclination inwards. The sternal furca of young *C. coryphaenae* is of this pattern, but emerges into a diverging type in the adults. A seta present at the upper end of first segment of first leg in Kurian's material is absent ; a tubercle representing the vestegial endopod of the first leg, present. There is no variation in the second and third legs including the terminal claws on the distal exopod segment except in a reduction of one or two setae in the endopods and exopods. Basal hook of exopod of third leg stout and incurved. Fourth leg four jointed ; first segment slightly longer than the rest, spiny in the upper mid portion and without seta ; second and third joints, each with one seta and the terminal joint with three claws and one small spine, the last claw being only slightly longer than the penultimate. The sternum of fourth abdominal segment at its junction with genital segment, in the form of three plates—one middle and two laterals ; the latter covered with short thick and numerous bristles and the former with long and slender bristles ; at the junction of each lateral plate with the middle one, there is a long plumose seta. Fifth and sixth legs absent in the female.

Discussion

Based on the three important diagnostic characters—shape of sternal furca, basal hook on exopod of the third leg and in the comparative length of the last two claws on fourth leg, which Pillai (1962) used to separate *C. coryphaenae* Stp. & Lutk. and *C. euthynnus* Kurian, the present material is identified as *C. euthynnus* Kurian. It differs from Kurian's material in the absence of a minute spine in the median lobe of carapace, rectangular genital segment, three or four segmented abdomen, anal lamina slightly longer than wide, indistinct submarginal row of setae in the basal segment of the antennule, well developed maxillule and maxilla, three segmented first maxilliped, absence of tubercles in the basal segment of the second maxilliped and reduction of one or two setae in the endopods and exopods of the second and third legs. Of these differences the 3 or 4 jointed abdominal segment and the shape of the genital segment (longer than wide) are characteristic of *C. coryphaenae* and bring in closer the two related species.

TABLE 1. *Body measurements (in mm) of* Caligus euthynnus

Body part		Specimen number I	II	III	IV
Total length (excluding caudal rami)		5.166	4.722	5.000	6.000
Carapace	Length	2.277	2.333	2.444	2.878
	Breadth	2.111	2.055	2.055	2.439
Abdomen	Length	1.055	1.333	1.222	1.463
	Breadth	0.666	0.400	0.555	0.634
Caudal rami	Length	0.611	—	—	—
	Breadth	0.555	—	—	—
Fourth segment	Length	0.277	0.222	0.222	0.365
	Breadth	0.722	0.555	0.555	0.780
Genital segment	Length	1.666	1.333	1.388	1.585
	Breadth	1.277	1.000	1.111	1.317
Length of egg string		5.555	—	5.400	—
No. of abdominal seg.		3	4	4	4

As remarked by Pillai (1962) the extreme similarities with regard to certain characters between the two forms are very remarkable and might be the result of adaptation to the same habitat conditions. Conversely the slight differences might have been induced by the slightly different microhabitat conditions obtained on different hosts as could be naturally expected in a species like *C. coryphaenae* widely distributed from the Atlantic and Pacific Coasts of America through the Pacific and Indian Ocean to the Mediterranean.

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