

**A NEW PARASITIC COPEPOD, *CALIGUS KRISHNAI*, FROM THE
MACKEREL TUNA *EUTHYNNUS AFFINIS AFFINIS* (CANTOR)***

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SEVERAL species of the genus *Caligus* parasitic on South Indian fishes have been described by Pillai (Pillai, 1961 ; 1963 and 1964). The species described in this paper was identified as *Caligus kuroshio* Shiino by Pillai (1963). The present author considers this as a new species. Figures are omitted as Pillai (1963) has given detailed illustrations.

***Caligus krishnai* sp. nov.**

Caligus kuroshio Pillai, 1963, p. 80, fig. 9.

Material: 229 female and 28 male specimens were collected by the author from the gills of the mackerel tuna *Euthynnus affinis affinis* (Cantor) from Calicut, South India. All the fishes examined were found to be infested.

The ground colour of the fresh specimen was creamy white becoming translucent in the anterior part of the body. The genital segment of the female was white and opaque. The egg-strings which were also white in colour were about one and a half times as long as the abdomen and consisted of a single row of disc-shaped eggs.

The holotype female (CMFRI No. 92) and allotype male (CMFRI No. 93) have been deposited in the museum of the Central Marine Fisheries Research Institute, Mandapam Camp, South India.

Holotype: Female. The carapace is as long as broad with evenly rounded sides. The cephalic region is longer than the thoracic area. Eyes are situated near the centre of this region. Transverse groove is slightly arched with a median ridge bifurcating anteriorly. The two halves of the longitudinal grooves are divergent in the beginning to converge towards the free ends. Median lobe of the carapace is broader than long with curved sides. Fourth thoracic segment is a little less than 1/3 as wide as the carapace. The genital segment is swollen and roughly triangular, narrow in front and broad behind. At its anterior end it is as broad as it is long and is produced into short, blunt lateral lobes. Abdomen is nearly three and a half times as long as broad and almost of the same length as the genital segment. It is slightly constricted at the anterior end and has the maximum width in the middle region. The egg-strings have the same breadth as the abdomen and are nearly equal in length to the cephalothorax.

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TABLE I

Measurements of Caligus krishnai sp. nov. in millimetres

	Female					Male				
	I	II	III	IV	V	I	II	III	IV	V
Total length (excl. caudal rami) ..	4.165	4.114	3.434	3.808	3.893	4.027	3.621	3.060	2.907	2.856
Carapace : Length ..	1.615	1.479	1.275	1.360	1.326	1.955	1.751	1.462	1.462	1.360
Breadth ..	1.360	1.496	1.258	1.309	1.360	1.836	1.615	1.411	1.343	1.326
Genital segment : Length ..	1.207	1.190	1.045	1.054	1.139	0.850	0.833	0.731	0.629	0.629
Breadth ..	1.105	1.071	1.071	0.986	1.122	0.527	0.493	0.510	0.425	0.408
Abdomen : Length ..	1.071	1.139	0.935	1.037	1.054	0.901	0.967	0.663	0.646	0.612
Breadth ..	0.357	0.323	0.296	0.374	0.340	0.340	0.289	0.255	0.238	0.221
Caudal ramus : Length ..	0.119	0.119	0.119	0.119	0.119	0.187	0.187	0.136	0.136	0.153
Breadth ..	0.085	0.085	0.085	0.085	0.085	0.136	0.119	0.102	0.102	0.102
Fourth segment : Length ..	0.255	0.204	0.170	0.204	0.204	0.187	0.187	0.136	0.136	0.136
Breadth ..	0.459	0.425	0.391	0.425	0.442	0.501	0.442	0.374	0.357	0.340

The first antennae are of the normal caligid pattern with the distal segment shorter than the other. Second antennae end in the typical hook-like claws. The mandible is elongated with the terminal segment produced into denticulations on the inner side. First maxillae are small, unguiform and slightly curved like the second pair, with blunt tips. Terminal claws of the first maxillipeds are unequal and bear broad pectinate wings. Second maxillipeds have stout penultimate segment. They are broadest at the proximal end bearing pointed and curved fingers. This claw reaches nearly the base of the palm and has a spine at about its middle. The long, slender and pointed rami of the sternal furca arch outwards. The first leg bears four terminal spines on the exopod of which the three outer ones are stout, short and slightly curved inwards at the tips. These spines have serrated wings. The innermost spine is the longest and almost double the length of the outermost one. On the inner side of the terminal segment of each of the first legs there are three inwardly directed plumose setae bearing short spines near their bases. The biramous second leg has three segmented rami. The distal segment of the exopod bears two inwardly directed strong spines on the outer margin. The proximal segment of the endopod has four pointed spines. On the second segment there are numerous short curved spines in three rows. Third leg is typical, bearing a basal hook. The endopod and exopod have long plumose setae. Fourth leg is three segmented with the basal segment as long as the rest of the leg. Second segment possesses a strong claw followed by four more on the distal segment which increase in length towards the tip. Each claw is winged and has a semicircular patch of spinules at its base. The caudal rami are short, as long as broad and with four setae. The outermost setae are the shortest and the second from inside the longest, the others being of the same length.

Allotype: Male. Carapace is slightly longer than broad and is a little less than half the length of the entire body with well rounded margins. The general pattern of the grooves on the dorsal surface of the carapace is similar to that of the female. The genital segment is definitely narrower than the carapace and broader than the abdomen. It is half as long as the carapace, nearly half as wide as long and barrel-shaped. The abdomen is two-segmented, as long as and $2/3$ as wide as the preceding segment. It is of uniform width except for the constriction at the line of demarcation of the two segments which are almost equal in length.

The first antennae, mandibles, second maxillae, first maxillipeds and the legs are as in the female. Second antennae have short claws borne on the distal segment. The second segment is elongated and columnar with prominent corrugations. The third one is short, stumpy and bears stout spines. First maxilla is in the form of a sickle-shaped claw. Second maxillipeds are powerful, the palm is inflated and with three low projections on the outer margins. The distal segment is curved, distally pointed and bears a spine at its middle. The sternal fork has long and slender limbs which are less arched than those of the female and are nearly parallel in disposition.

The various measurements of five female and five male specimens are given in Table I.

Remarks: The present species shows marked resemblances to *C. kuroshio* Shiino (Shiino 1959a and Pillai 1963) and *C. bonito* Wilson (Wilson 1905; Yamaguti 1936 and Shiino 1959b and 1960) especially with the former in the details of the structure of the various appendages particularly the second antennae, the first maxillae and the second maxillipeds of the male. But in some important charac-

ters this new species differ from the above species. Thus, in *C. kuroshio*, the genital segment has maximum breadth in the middle and the sides are definitely convex whereas in *C. krishnai* the genital segment is almost triangular, being narrow anteriorly and broad posteriorly. Besides, the abdomen of *C. kuroshio* is a little shorter in comparison with the present specimen. The sternal furca show marked difference. In *C. krishnai* it has long slender rami which are arched and narrow towards the tips while in *C. kuroshio* the rami are nearly parallel to each other and sub-truncate at the distal ends. The prominences on the inner side of the palm of the second maxillipeds are more pronounced in *C. kuroshio* than in *C. krishnai*. *C. bonito* resembles *C. kuroshio* in the above characters and thus differs from *C. krishnai*. Though Pillai (1963) has placed this with *C. kuroshio* the present author feels that there is sufficient justification to separate this from *C. kuroshio* and hence has named it *Caligus krishnai* after Dr. N. Krishna Pillai.

SUMMARY

A new species of parasitic copepod *Caligus krishnai* found to occur on the gills of the mackerel tuna *Euthymus affinis affinis* (Cantor) from Calicut, South India, is described.

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