

NISTOS OF TWO SPECIES OF *SCYLLARUS*¹

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INTRODUCTION

FOR a number of years the authors have been studying the systematics and distribution of phyllosoma larvae of the Indian Ocean. During the course of these investigations a few nistos of *Scyllarus* were obtained. Scant attention seems to have been paid to the study of this important stage at which there is a change from the pelagic to the demersal phase in the life-history of scyllarids. Although the nistos show a resemblance to the adults, precise identification of these offers many difficulties. It is, however, hoped that by the gradual accumulation of data on the diagnostic characters of nistos belonging to the various species it would be possible ultimately to prepare a key for the identification of the nisto stage of scyllarids.

Seven specimens, six of which belong to one species, collected from the Laccadives and one collected from the Gulf of Mannar off Mandapam form the subject matter of this paper. The specific identification in both these cases is provisional. The authors are grateful to Shri M. J. George for the help rendered in the determination of the species.

DESCRIPTION OF NISTOS

Scyllarus tuberculatus (Bate)*

Six nistos, four from near Bitra on 27-4-1959 and two from near Agatti (Laccadives) on 29-4-1959 were present in the plankton collections made under light. These larvae measure on an average 8.0 mm. from the frontal margin to the end of the telson.

The cephalothorax (Fig. 1A) is sub-cylindrical with a carapace which is slightly broader than long, its broadest portion being almost in the middle. Along the median line on the carapace are two short blunt spines, one near the frontal margin and the other a little behind, and a pair of short ones further posterior on the cervical region. Two pairs of spines occur on each supraorbital region from where a single ridge starts and proceeds laterally along the branchial region to the posterior end, with two intermittent breaks. Short denticles are seen along this ridge. The lateral margins of the carapace are serrulate and pilose with one prominent notch just below the level of the eyes and one or two less distinct ones posteriorly. The posterior margin is concave and shallow with short pile and has a shallow

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* *Scyllarus rugosus* M. Edw. of Holthuis (1946).

median notch. The surface of the carapace is also covered with minute tubercles and scattered hairs. The sternum (Fig. 1B) has the posterior corners of the last segment slightly prolonged and the notch at the anterior extremity of the sternum is shallow. Eyes are in sockets at about two-third the distance from the median line.

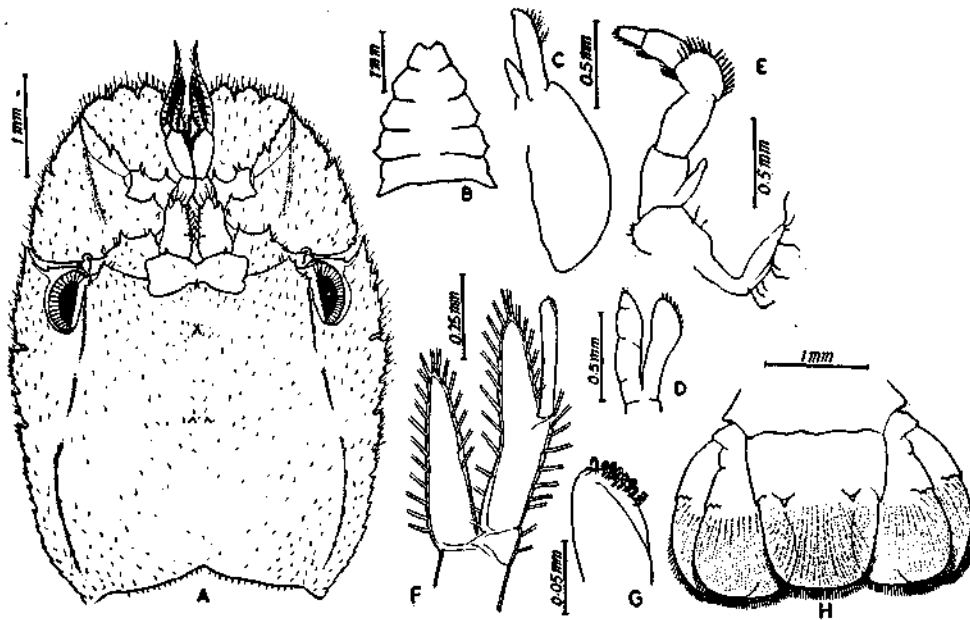


FIG. 1. Nisto of *Scyllarus tuberculatus*. A. Cephalothorax; B. Sternum; C, D and E. First, second and third maxilliped respectively; F. Pleopod of the second abdominal segment showing the appendix interna; G. Tip of the appendix interna enlarged to show the cincinnuli; H. Telson.

The first antenna is slender and somewhat longer than the second, but are often kept folded and partly hidden below the proximal segment of the peduncle which is stout and provided with long hairs along its inner surface. Both the inner and outer flagella are well developed and provided with numerous long sensory hairs. The outer flagellum is elongated and is about one and a half times the length of the inner. The second antenna is large and flat as in adult scyllarids with the second and fourth segments (often referred to as the proximal and distal squamae respectively) greatly enlarged. The proximal joint has a single oblique ridge on the dorsal surface and three teeth on the outer and one on the inner (frontal) margin. The distal joint has five teeth of which the innermost one is relatively small. The free margins of these segments are serrulate and provided with plumose setae.

Among the oral appendages the first maxilliped (Fig. 1C) possesses a broad epipod, nearly as large as the scaphognathite, a single short endopod and a relatively prominent exopod fringed on the distolateral margin with a few setae. The second maxilliped (Fig. 1D) has an endopod which shows signs of segmentation and an unsegmented exopod. The third maxilliped (Fig. 1E) has a distinctly five segmented endopod with long setae on the carpus and a few short ones on the propodus and the dactylus. A short exopod with a single segmented flagellum as well as an epipod

are present. The dactyls in all the legs are pointed and sharp and the propodi taper towards the distal ends.

The abdominal segments are faintly sulcate transversely. They are somewhat tuberculate and the carina on the third abdominal tergum is much more prominent than the rest. The tergites have a small median notch on the carina and that of the second segment is relatively more prominent showing a bifurcation posteriorly. The four pairs of pleopods are biramous and well developed with long plumose setae. A rod-like appendix interna is present on the endopodites of the pleopods (Fig. 1F) with a cluster of cincinnuli at the anterolateral margin of the tips (Fig. 1G). The telson (Fig. 1H) shows two pairs of spines on the clarified upper surface. Both the uropods and the telson are provided with marginal setae.

A detailed examination of the various characters such as the very prominent nature of the third abdominal tergum and the sixth joint of the third pereopod being not subchelate in the present series strongly suggests that the nistos are of either *Scyllarus tuberculatus* or *S. martensii*. However, since the abdominal segments are tuberculate and without any trace of squamiform sculptures, these nistos are to be considered as those of *S. tuberculatus*.

Scyllarus sordidus (Stimpson)

A single nisto was obtained by direct metamorphosis of a phyllosoma collected from the plankton of the Gulf of Mannar off Mandapam on 19-3-1955. The nisto has a length of 10.0 mm. and is thus slightly longer than that of *S. tuberculatus*. Unfortunately the characters of the last phyllosoma stage could not be recorded.

The cephalothorax is more compressed dorsoventrally. The carapace is distinctly broader than long with almost parallel sides which are serrulate and pilose. The lateral margins are nearly straight while the posterior corners of the carapace are prolonged. The posterior margin is concave and has a deep median notch. The dentitions on the lateral margins are almost the same as in that of *S. tuberculatus* although the second notch is more prominent. There are three prominent spines on the median line of the carapace, the last one being almost in the centre. Two short spines occur on each supraorbital ridge from where two ridges with short denticles on them can be followed to the posterior corners of the carapace (Fig. 2A). The sternum slightly differs from that of *S. tuberculatus* particularly the fifth sternal plate which does not show any prolongation at the corners and the anterior extremity of the sternum has a deep triangular notch (Fig. 2B). The eyes are situated in sockets more or less in the same place as in the nisto of the species described earlier. The first antennae are longer and remain extended beyond the second antennae and also possess long hairs along the inner margin of the basal segment of the peduncle. The proximal segment of the second antenna has a single, prominent, oblique ridge as in the case of *S. tuberculatus*. The five teeth of the distal segment are separated by deeper incisions rendering them more conspicuous than in the other species.

The first maxilliped (Fig. 2C) possesses a long and broad epipod which is slightly bigger than that of the species described above. While the exopod in both these are similar the endopod is bilobed in this species. The second maxilliped (Fig. 2D) has a single endopod showing signs of segmentation and an unsegmented exopod with a few setae on it as in the other species. The third maxilliped (Fig. 2E) has the same basic structure as in the other species of *Scyllarus*.

The carina on the abdomen is most conspicuous in the third segment but not as prominent as in *S. tuberculatus*. These carinae have small median notches and the notch on the second segment is more pronounced in the form of a bifurcation almost

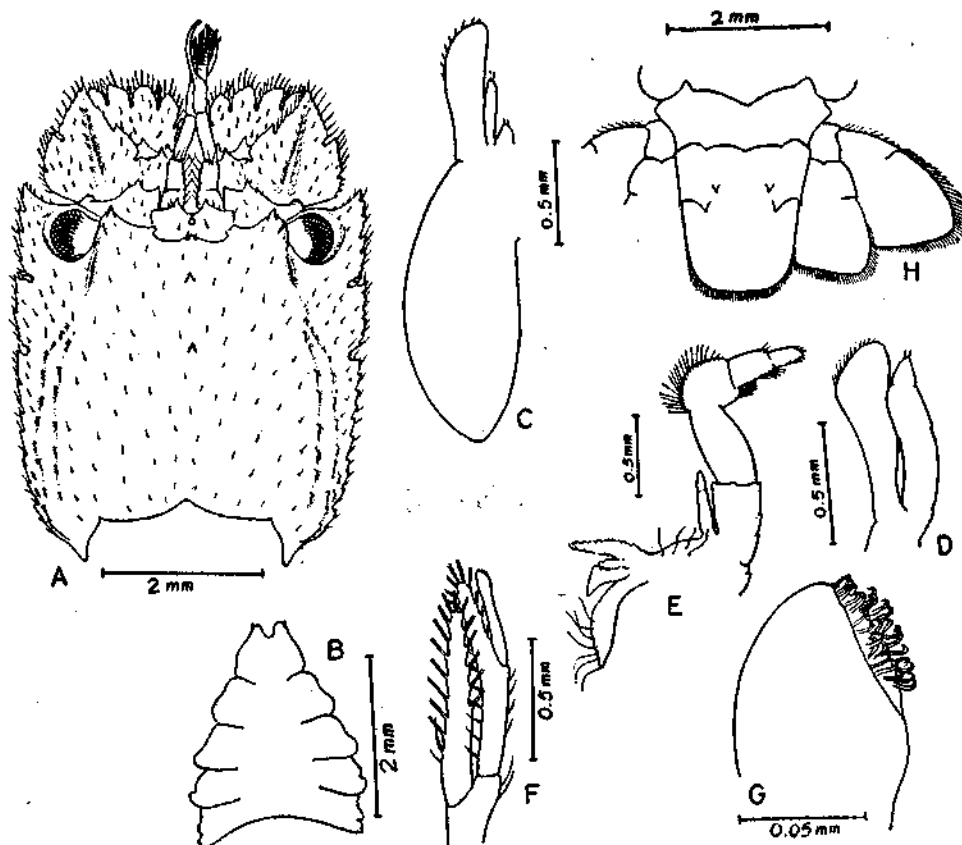


FIG. 2. Nisto of *Scyllarus sordidus*. Key to lettering same as in Fig. 1.

to the middle of the segment. While the median notch of the first four abdominal tergites are deep the posterior margin of the fifth tergite is prolonged into a short spine. The pleopods (Fig. 2F) although similar in structure to that of the nisto of *S. tuberculatus* have narrower exo- and endo-pods while the appendix interna bears identical type of cincinnuli at the tip (Fig. 2G). In addition to the two pairs of spinous processes on the clarified region of the telson there is another pair slightly posteriorly (Fig. 2H) which is again different from the telson of the nisto of *S. tuberculatus*.

Thus, although there is a good deal of similarity between the nistos of *S. tuberculatus* and *S. sordidus*, the differences are clear in their relative size, shape and nature of carapace, the sternal plates, structure of the pleopods, nature of abdominal tergites and the telson. This nisto agrees with most of the characters of *S. sordidus* which is commonly found in the Gulf of Mannar and the newly hatched phyllosoma larva of which has been described by the authors (Prasad and Tampi, 1960). Therefore, it has been provisionally assigned to *S. sordidus*.

Although the nistos resemble in most respects the adult form, their identification is difficult because many of the finer characters on which species determination is based, particularly the sculpturing of the abdominal tergites or the spines and ridges on the carapace, attain their full development only at a later stage. Similarly, as the nisto advances to the adult, changes also seem to take place in characters like the exopods of the maxillipeds which are often considered important distinguishing characters in these lobsters. Unfortunately, the few descriptions of the nisto of scyllarids are difficult to obtain among which are those of Sarato as cited by Bouvier (1917). The nisto of *Scyllarides squamosus* has been figured and described by Miers (1882) as *Pseudibacus pfefferi* from Mauritius. The accounts of Stephensen (1923), Fedele (1926) and Legendre (1936) of *Scyllarus arctus* are too general and Barnard's description (1950) of the nisto of *Scyllarides elizabethae* also does not help in identifying nistos. Alikunhi (1948) alone, as far as our knowledge goes, has mentioned of his obtaining by metamorphosis nistos of *Scyllarus* and *Thenus orientalis* from Indian waters but descriptions are not available. Considering this lack of information on the nisto stages of scyllarids it was thought desirable to give detailed descriptions of the two species. Further data are being collected and it is hoped to prepare a key to the identification of the nistos.

SUMMARY

Six nistos of *S. tuberculatus* obtained in the plankton collections made under light near Bitra and Agatti in the Laccadives have been described. Another single specimen obtained by direct metamorphosis of the phyllosoma larva in the laboratory, of what is presumed to be *S. sordidus*, has also been described in detail.

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