

PENELITIAN LAUT DI INDONESIA

MARINE RESEARCH IN INDONESIA

No. 6

On some species of Eumedoninae from Indo-Malayan region

by

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Editor

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Published by

**LEMBAGA PENELITIAN LAUT
DJAKARTA, INDONESIA**

**COUNCIL FOR SCIENCES OF INDONESIA (M. I. P. I.)
MINISTRY OF NATIONAL RESEARCH**

1963

PRINTED BY ARCHIPEL BOGOR

ON SOME SPECIES OF EUMEDONINAE FROM INDO-MALAYAN REGION

by

RAOUL SERENE ¹⁾ and KASIJAN ROMIMOHTARTO ²⁾

INTRODUCTION.

In their paper, EUMEDONINAE DU VIETNAM (Crustacea), R. Serene, T.V. Duc and N.V. Luom (1958) give an account on the genera and species of the subfamily *Eumedoninae*. But unfortunately some species are not sufficiently studied, especially those not collected and examined by the authors and only worked out by the reference of other publications.

The present note is intended to suffice, if not all, the insufficiency in the above mentioned paper.

The species studied in this note include:

Proechinoecus sculptus Ward 1934.

Ceratocarcinus longimanus Adams & White 1848.

Zebrida adamsi White 1847.

Rhabdonotus pictus A. Milne Edwards 1878.

Proechinoecus sculptus has been recorded only from Christmas Island as the type locality. *Ceratocarcinus longimanus* is a little known species and the material from the Institute of Marine Research, Djakarta, Indonesia is the first male specimen recorded at this day. *Zebrida adamsi* is recorded from different regions of the Indo-Pacific and *Rhabdonotus pictus* has never been recorded since the original description by the author (1878) and never been referred to the subfamily.

The first male pleopods of those species have not yet been published. We therefore describe and illustrate them in this note. The description and illustration will be based upon the pressed pleopods prepared in polyvinyl lactophenol and drawn with PROJECTINA, a magnifying and drawing apparatus.

As the bristling of the pleopods may be present on all surfaces and their transparency may cause erroneous drawing upon the attachment of the bristles, careful drawings are attempted with regard to both (upper and under) sides of the pressed materials.

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Our gratitudes should be given to :

Director of the Institute of Marine Research, Djakarta, Indonesia.

Director of the National Museum in Singapore.

Head of the Department of Zoology in Singapore University and

Head of the Department of Zoology in Chulalongkorn University, Bangkok, Thailand

for their valuable assistance in lending us the materials studied.

***Proechinoecus sculptus* Ward 1934.**

1934 — *Proechinoecus sculptus*, Ward, p. 7, pl. 1, fig. 5, 5a

1950 — *Eumedonus sculptus*, Buitendijk, P. 74.

M a t e r i a l.—Sing. 159—1 male of 5.3 mm length; 5.75 mm breadth
1 female of 5.75 mm length; 6.45 mm breadth
Singapore Museum, identified by Ward, Christmas Island (Indian Ocean)
Dr. Tweedie leg.

H i s t o r y. — Ward (1934) describes the species as numerous specimens found underneath the test of the echinoid, *Colobocentrotus striatus* (Linn.). The type male measuring 4 mm across the carapace and the type female is 6.5 mm.

Buitendijk (1950) includes the species in the genus *Eumedonus*, but we prefer to adopt the taxonomic position put by Serene, Duc and Luom (1957, pp. 138, 139) who maintain *Proechinoecus* and *Echinoecus* as distinct genera from *Eumedonus*.

O b s e r v a t i o n. — Our observation on the specimens confirm the remark of Buitendijk (1950) that the chelipeds are unequal in both male and female. Thus it corrects the description of the genus by Ward, who states: "The anterior legs are short and sub-equal"

The close kinship with *Echinoecus pentagonus* (A. Milne Edwards, 1879) is reinforced by the similarity in the pattern of the coloration, particularly clear on the male; both species are marked by the presence of a broad arcuate white band covering the anterior part of the dorsal surface of the carapace, which is brown. It covers both anterolateral and frontal regions. Two broad longitudinal stripes present, one on each epibranchial region, which reach the posterior border. However the profile of the carapace

is a little different in the two genera; on *Proechinoecus* the rostrum is less prominent, shorter and broader and not so triangular; the eyes, as pointed out in the key of Serene, Duc and Luom (1958, p. 138), are more dorsal than that of *Echinoecus*. Comparison by photographs between *Echinoecus pentagonus* of Serene, Duc and Luom (Pl. IV A) and *Proechinoecus sculptus* in this note (Pl. I A, B) is so remarkable. The sexual dimorphism of *P. sculptus* emphasized by Ward (1934) is undisputable, but it exists also with more or less developed in *E. pentagonus*. The difference is particularly remarkable between the females. On the male (and female) of *E. pentagonus*, the surface of the carapace is pitted in similar manner with that of the male of *P. sculptus*, but the pits are more minute (fig. 3 in Serene, Duc and Luom 1958). Those observations show a possible inclusion of the two genera *Proechinoecus* and *Echinoecus* in one, but confirm those two forms as generally different from *Eumedonus*.

First male pleopod. — (Fig. 1 A). The study on the first male pleopods of *Proechinoecus sculptus* shows that those pleopods are slightly different in form from the other genera studied in this note. It

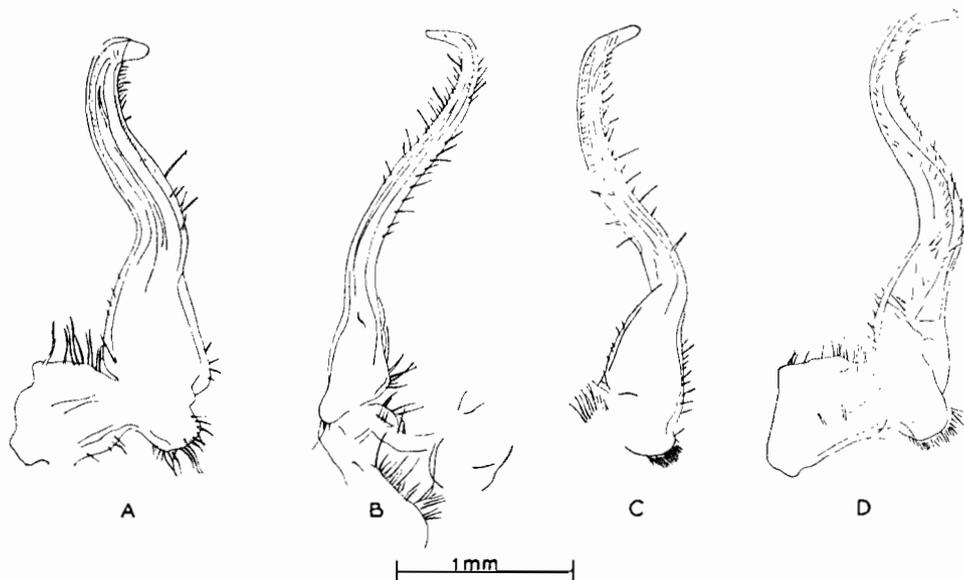


Figure 1. First male pleopods of *Eumedoninae*.

- A. Left male pleopod of *Proechinoecus sculptus* Ward.
- B. Right male pleopod of *Ceratocarcinus longimanus* Adams and White.
- C. Right male pleopod of *Rhabdonotus pictus* A. Milne Edwards.
- D. Left male pleopod of *Zebrida adamsi* White.

is comparatively shorter and thicker. The tip is much bent outward. Bristles are present in separate series on the outer surface, at the distal, middle and basal portion (near the basal lobe). On the inner surface four short bristles are visible at the proximal half and completely absent at the distal half.

Bristling of the distal portion. — (Fig. 2 A, B). At close observation, the distal portion of the pleopod appears to be coarsely textured (not represented in the figure). Two series of hairs present in pair on the outer surface. The inner serie begins fully halfway up and the outer one comes after three bristles upward. Both series are continued to

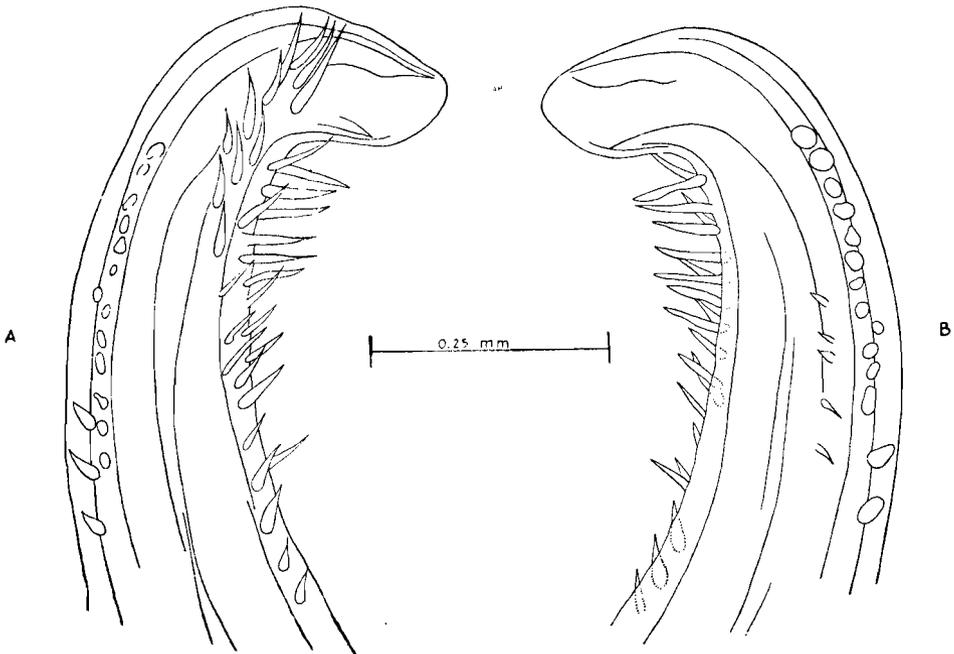


Figure 2. Distal portion of the left first male pleopod of *Proechinoecus sculptus* Ward.

- A. Superior surface (the surface opposite the inner wall of the abdomen).
 B. Interior surface (the surface opposite the sternum).

the tip of the pleopod on the superior surface as a cluster of more or less eleven hairs. These hairs are absent on the inferior surface of the same part. The bristles are slender, moderately long with acute tips. The outer surface of the pleopod is devoid of hairs. A row of unevenly shaped granules visible on both, superior and inferior surface near the outline of

the inner surface. Below the base of this row there are three thick, short and sharp spines. Five short hairs present in the middle on the inferior surface. The cluster of hairs present in this genus also found on the pleopods of the other genera in this note. Therefore it may be secured as a certain taxonomic characteristic of the subfamily, if not, of the higher categories of the eumedonid crab. But a sufficient material must be studied before putting this remark into serious account.

***Ceratocarcinus longimanus* Adams and White 1848.**

1848 — Adams and White, p. 34, pl. VI, fig. 6.

1895 — Alcock, p. 288.

1934 — Gordon, p. 69, text fig. 33a.

1958 — Serene, Duc and Luom, p. 184, fig. 6, A — H, and pl. IV B (Literature).

H i s t o r y. — The species is known only by four specimens which are all females. Those are from Kalimantan Utara (North Borneo) (Adams and White, 1848), Malacca Straits (Alcock, 1895), Banda Sea (Gordon, 1934) and Nhatrang, South China Sea (Serene, Duc and Luom, 1958).

M a t e r i a l. — C 636a ♂; 6.45 mm breadth; 5.4 mm length. The specimen was collected by hand at low tide at south west coast of Nusalenga Island, eastern Indonesian waters, in October 23, 1961.

O b s e r v a t i o n. — The specimen agrees considerably with the descriptions and figures of Adams and White (1848), Alcock (1895), Gordon (1934) and Serene, Duc and Luom (1958). Therefore there is no doubt about its identity. But referring to Adams and White (1848, pl. 4, fig. 6) we observe that the pattern of coloration of the dorsal surface of the carapace shown by those authors is different from our specimen. Their colored figure shows, on a reddish brown background, five light yellow transverse stripes (one anterior and four posterior to the line joining the two lateral teeth) and a large transversely oval spot on the gastric region of the same color. The present specimen shows, on a brown background, a broad dusty white line covering all the borders of the carapace (except the tips of the lateral frontal teeth), and three transverse stripes of the same color (Plate I C). But such a difference has a little importance, since in the actual situation of our knowledges on the species of the genus, the coloration pattern alone does not give any specific differentiation. Serene, Duc and Luom (1958, p. 170) indicate that in the genus *Harrovia* some species possess similar transverse stripes (see Jones and Sankarankutty, 1960, fig 1 for *Harrovia albolineata*).

It is possible that there is some correlation between the extension of those stripes (but not the number) and the size of the specimen within those genera. The illustration of the first male pleopod of our specimen may give more facilities for further study on *C. longimanus* Adams & White, which requires some complimentary observations, especially in relation with its differentiation with *C. dilatatus* A. Milne Edwards which possesses similar coloration pattern and is very close to the species.

First male pleopod. — (Fig. 3 A, B). Slender, a little longer, with longish tip bending outward. Hairs present along the distal half of the outer surface and the inner surface. The distal portion armed with three

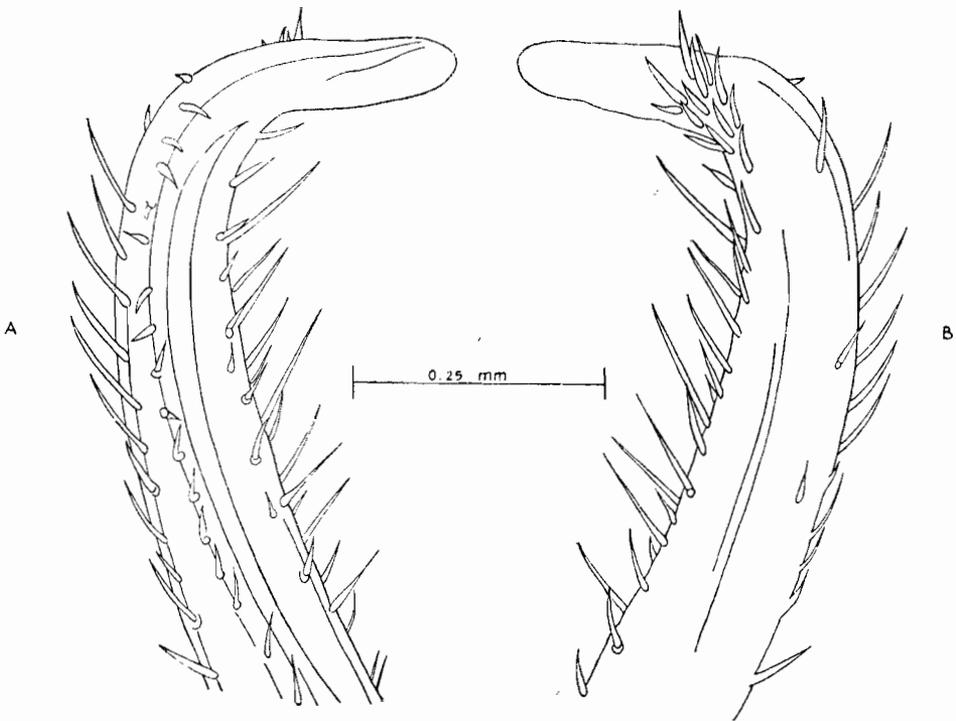


Figure 3. Distal portion of the right first male pleopod of *Ceratocarcinus longimanus* Adams and White.

- A. Inferior surface.
- B. Superior surface.

separate rows of hairs of different sizes. Bristles at the distal portion are arranged as follows: two (or may be three) uneven rows of hairs of different length furnish the outer surface; if it truly consists of three rows, the hairs

in the middle row seem to be the longest. These rows of hairs continue to the base of the bending tip, on the under surface, to form a cluster of uniform hairs. A row of bristles attached on the inner surface. The inferior surface is furnished with a row of short hairs which attaches near to the middle. All the series, except that of the outer surface, ending at or near the base of the tip. As a whole the bristles of the pleopod are long, slender with very acute tips, except that of the shorter ones, which also show acute tips.

Zebrida adamsi White 1847.

- 1847a — White, p. 124.
 1847d — White, p. 121.
 1848 — Adams and White, p. 24, pl. 7, fig. 1.
 1879 — Miers, p. 670 (no record).
 1882 — (*Zebrida longispina*) Haswell, p. 39.
 1893 — Henderson, p. 351.
 1893 — Ortmann, p. 419, pl. 17, fig. 3.
 1895 — Alcock, p. 287.
 1900 — Lanchester, p. 729.
 1906 — Laurie, p. 393.
 1910 — Rathbun, p. 321.
 1922 — Balss, p. 136.
 1926 — Urita, p. 29.
 1930 — Flipse, p. 80, 90.
 1934 — Gordon, p. 63, fig. 32a.
 1938 — Sakai, p. 347 (no record).
 1958 — Serene, Duc and Luom, p. 140, 241 (no record).

History. — The species is recorded from different localities of the Indo-Pacific region (Adams and White, 1848), Australia (Haswell, 1880 or 1882), the coast of India and Ceylon (Henderson, 1893, Alcock, 1895), Japan (Ortmann, 1893, Urita, 1926) and the gulf of Thailand (Rathbun, 1910).

Material. — E 392 ♀; 7.5 mm length; 8 mm breadth; E 391 ♂, 7.5 mm length; 7.7 mm breadth, collected by Mr Hoon Soo Kim, at Ban Pè, Gulf of Thailand, 27-11-1962, during the period of Unesco Training Course on Taxonomy of Marine Animals held in Bangkok. "Those two specimens were collected together in a basket containing sea urchins and fishes caught by beach seine, apart from the sea urchins. It is quite probable that those two specimens have once lived in the test of the sea urchins, *Salmacis bicolor* found together with the fishes and for one and another

reason they come down out of those echinoderms (Note from Mr Hoon Soo Kim).”

Observation. — The species is so well characterized and easy to identify so that it is unnecessary to discuss. (Plate II D, E). But the first male pleopod illustrated and described here will allow to differ the species from *Z. paucidentata* Flipse 1930, the only other species in the genus.

First male pleopod. — The portion from the tip to near-base forms a rather regular S-shape. Two series of fine hairs visible, one on the outer surface and the other on the superior surface near the inner border. The greater part of the inner surface is devoid of hairs.

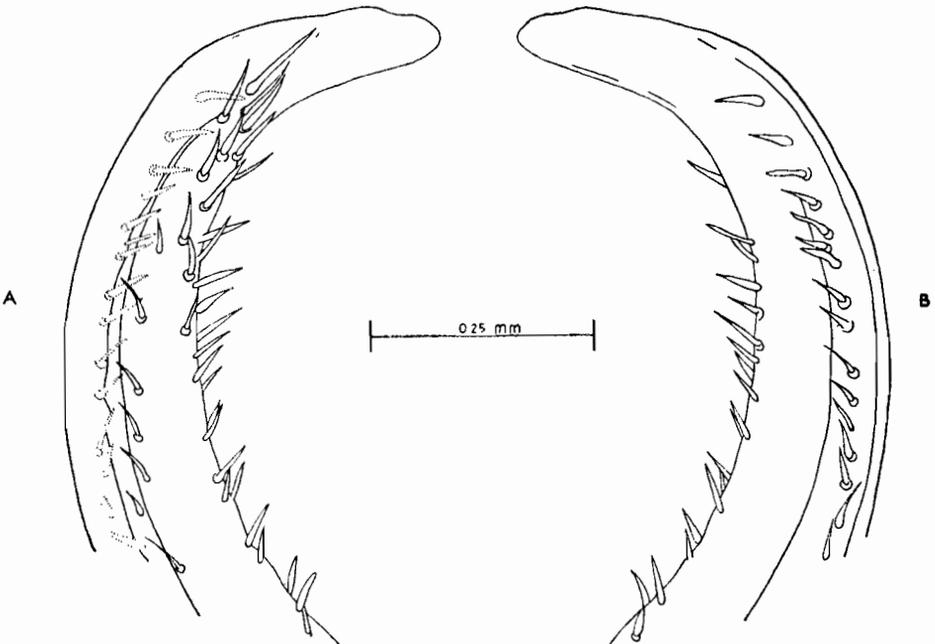


Figure 4. Distal portion of the left first male pleopod of *Zebrida adamsi*. White.

- A. Superior surface.
- B. Interior surface.

Close observation on the distal portion of the pleopod shows that there are not only two but three series of hairs visible. The third one is on the inferior surface which is vaguely visible from the superior surface (fig. 4 A, B).

The first serie consists of two uneven rows ending in a cluster at the basal part of the bending tip.

Rhabdonotus pictus A. Milne Edwards 1878.

1878 — A. Milne Edwards, p. 6, pl. 2, figs. 2, 2a.

1888 — De Man, p. 325.

H i s t o r y. — A. Milne Edwards (1878) describes the genus *Rhabdonotus* for *R. pictus*, a species collected by M.R. Germain on the coast of Cochinchina (Vietnam); he gives a good description with color plate. But neither the type (8 x 8.5) nor the other specimens exist in the National Museum of Natural History in Paris. It may be considered as lost. De Man (1888) refers an ovigerous female (11.5 x 10.66) collected from a comatulid in Amboina to the species and no other specimen recorded within this period.

In August 1962 one of us (R. Serene) found some specimens identified as *Eumedonus* sp. B by Dr. Johnson, the collector, in the collection of the Department of Zoology in Singapore University. These specimens are nothing but *Rhabdonotus pictus*, the species which has been searched by him on field, including the type locality, as a brachyuran of the fauna of Vietnam since long time, but without success. Dr. Johnson who has allowed to lend the specimens for study has given a precision that the species is so common on certain biota near Singapore, where it lives associated with certain comatulid.

A letter of Mr. Sankarankutty from Madras arrived to us in September 1962 requesting some advice for the identification of an eumedonid crab. He enclosed to the letter the description of the specimen with some drawings. This specimen belongs also to *Rhabdonotus pictus* or related species.

M a t e r i a l. — Singapore University

| | | | | |
|-------|----------|----------|----------|------------|
| 198 ♂ | : 6.6 mm | breadth; | 6.8 mm | length; |
| 199 ♂ | : 6.6 mm | | ; 6.8 mm | |
| 200 ♀ | : 6.6 mm | | ; 6.8 mm | |
| 201 ♀ | : 5.2 mm | | ; 5.7 mm | ovigerous |
| 202 ♂ | : 6.6 mm | | ; 7 mm | |
| 203 ♀ | : 7 mm | | ; 7.8 mm | ovigerous. |

D e s c r i p t i o n. — (Sing. ♂ 6.6 mm x 6.8 mm; Pl. II E, F, G. Fig. 5 A, B). The carapace is more or less oval and nearly as long as broad, convex in either directions, without any indication of regions. The surface

is perfectly smooth, polished and glabrous. The front is prominent and lammellate, divided into four lobes lying at the same plane. The margin is granulated. The inner frontal lobes are much broader than the outer ones and separated by a deep median cleft; its inner end is more prominent than its outer one and its margin is oblique and slightly convex. The outer frontal lobes are conical, much smaller and separated from the inner lobes by deep concavities. These lobes do not project to the extent of the inner lobes. The outer margins are oblique and form partly the supra-orbital borders. The outer angle of the orbit is not distinct as a tooth and lies at a lower level. A minute fissure present on the supra-orbital border towards the outer angle. The anterolateral border forms a continuous smooth arch with the posterolateral border. The edge is fairly sharp and without tooth. The posterior border of the carapace is slightly convex.

The antennules fold obliquely. The antennae are short with the basal antennal joints broad and closing the orbital hiatus. The flagellum consists of few joints. The third maxillipeds are broad with the ischium longer and broader than the merus. The anterolateral angle of the merus is rounded.

The chelipeds are well developed, subequal, glabrous and smooth to the naked eye but granulated microscopically. All the joints are nearly cylindrical. The merus projects far out of the border of the carapace. The inner angle of the carpus is not prominent; the propodus is stout, subcylindrical, with its upper border longer than the dactylus. The fingers are toothed and pointed; the dactylus closing inside the tip of the fixed finger.

The legs reduce in size backward. The joints are smooth and glabrous. The dactylus is nearly as long as the propodus.

The abdomen of the male consists of seven separate segments.

The dorsal surface of the carapace is painted by several transverse arched lines with their convexities facing forward.

Sexual dimorphism. — The presence of sexual dimorphism in this species is shown by some differences in form between male and female specimens studied. Observation on the female of 7 mm breadth and 7.8 mm length, ovigerous, shows that the chelipeds are relatively smaller in size and subequal. The posterior border of the carapace is broader. The abdomen also consists of seven separate segments. The supraorbital border looks more straight.

Discussion. — Our specimens agree generally with the description and figures of A. Milne Edwards (1878), the remarks of De Man (1888) and the observation and figures inclosed in the letter by Mr. Sankarankutty. A. Milne Edwards (1878) writes: "Les antennes externes sont petites; leur

article basilaire n'atteint pas le front, leur tige mobile est grêle et courte. Il résulte de cette disposition que l'orbite est incomplètement fermée en dedans, contrairement à ce qu'il existe chez les Trapeziens". Our specimens as described by Mr. Sankarankutty show that the basal antennal joint reaches the front and the orbit is closed.

A. Milne Edwards (1878) writes: "L'abdomen du mâle est composé de 7 articles libres". This is in agreement with our specimens.

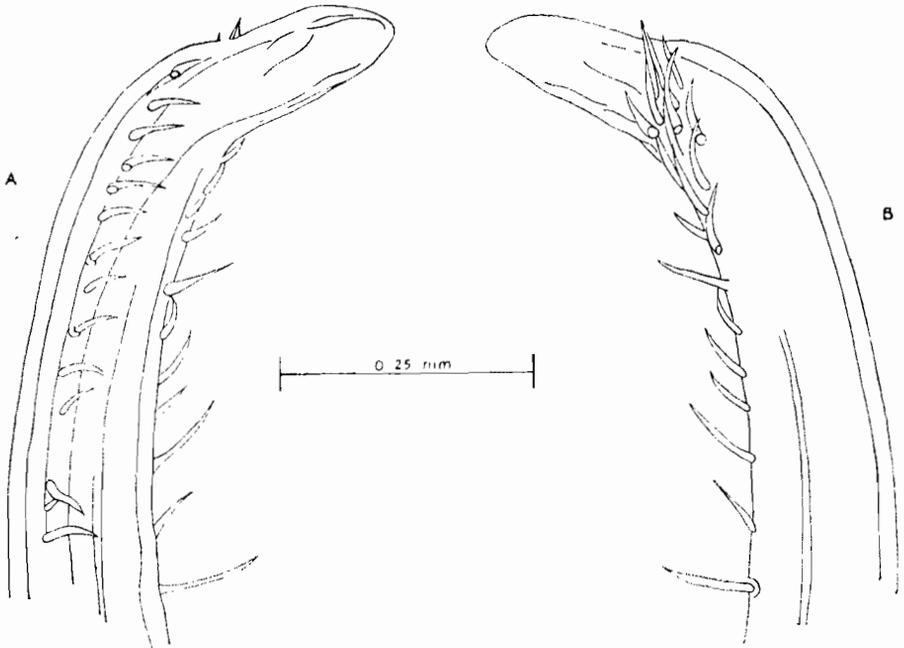


Figure 5. Distal portion of the first male pleopod of *Rhabdonotus pictus* A. Milne Edwards.

- A. Inferior surface.
- B. Superior surface

He also writes: "Des bandes rougeâtre et espacées dont la convexité est tournée en avant la parcourent (la carapace) d'un bord à l'autre". De Man (1888) indicates that his specimen (female 11.5 x 10.66) shows a different pattern of colored lines. He specifies further that on the inferior surface, parallel to the lateral border, there are also one transverse red line on each abdominal segment and some red lines on the legs.

Mr. Sankarankutty indicates (in his letter) on his specimens (two females): "Carapace in fresh condition is slightly brownish in color with transverse lines of red color. In between the orbits, there is a short narrow line which is immediately followed by a long transverse line curving posteriorly. This is followed by three or four shorter transverse lines equally spaced and parallel to each other. In the gastro-cardiac region of carapace is an oval or circular ring; in posterior part of carapace are a number of irregularly disposed lines. Propodus of cheliped on the outer side has two longitudinal lines".

These differences give us little importance. The first male pleopod will give more valuable specific characteristics for further observations. The present specimens like those collected by A. Milne Edwards (1878) and by De Man (1888) are host of a comatulid; the specimens recorded by Mr. Sankarankutty are host of *Virgularia* (Coelenterata), collected from the pearl bank off Tuticorin, 25 m. depth.

Position of the genus. — The genus *Rhabdonotus* is considered by A. Milne Edwards as close to the "Trapeziens" (Trapeziidae). De Man (1888), referring to A. Milne Edwards, believes that the genus is close to *Trapezia* and *Cymo* but seems little like a *Pinnotheres* by his vaulted carapace. In the Zoological Record (1883, Crustacea, p. 14) the genus *Rhabdonotus* is included in the family Eriphiidae with the following short description: "Allied to *Trapezia* and *Cymo*; cephalothorax convex, smooth; basilar joint of the external antennae not reaching the front". Balss (1957) maintains the genus in the Xanthidae. In the contrary the two zoologists, who had observed more recently those forms (Mr. Jones and Mr. Sankarankutty) have indicated them as belonging to *Eumedonus* sp. or *Eumedoninae*.

It is evident that certain morphological structures common to the *Eumedoninae* and *Trapeziidae* are related to the adaptation for a symbiotic life on other animals as epizotes. The particular modification of the dactylo-propodal articulation of the ambulatory legs is related to the hooking system on the branches of the host (Coelenterata or Echinodermata).

This adaptation is common to *Trapeziidae* and *Eumedoninae* and also to some other Xanthidae and Oxyrhyncha. Some typical patterns of coloration are also common to *Trapeziidae* and *Eumedoninae*. In some way the position of *Rhabdonotus* is so ambiguous. Another indication of the ambiguous position of this form is shown by our belief that the same form (species) has been described as a portunid crab under the name of *Caphyra archeri* Walker 1887. The identity between the species of Walker with

Rhabdonotus pictus is strengthened by his figure (Walker, 1887, Pl. 9, fig. 4, 5). The aberrant position of *C. archeri* in the genus *Caphyra* is well-known. Stephenson and Campbell (1960, p. 105) and Crosnier (1962, p. 27, foot note) recall that Balss (1934, p. 506, *not seen*) suggests *C. archeri* as belonging not to Portunidae, but to Oxyrhyncha. This is exactly the case with *Rhabdonotus pictus*. The species of Walker, which is never collected after this author, is only recorded from the type locality, Singapore, where *R. pictus* is very common as certain biota, as mentioned by Johnson.

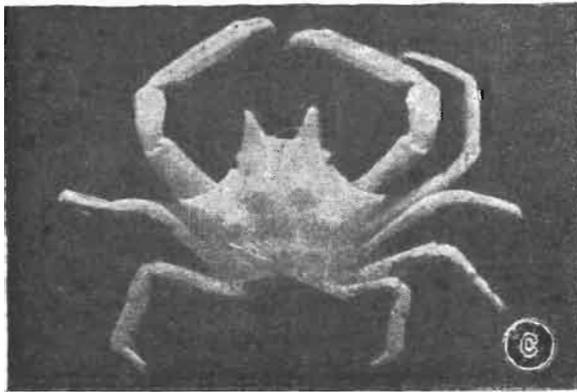
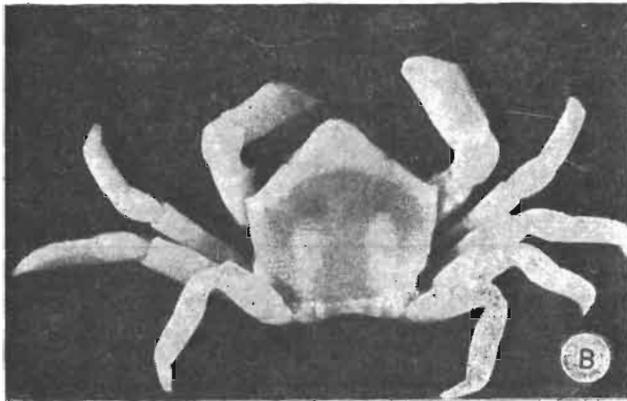
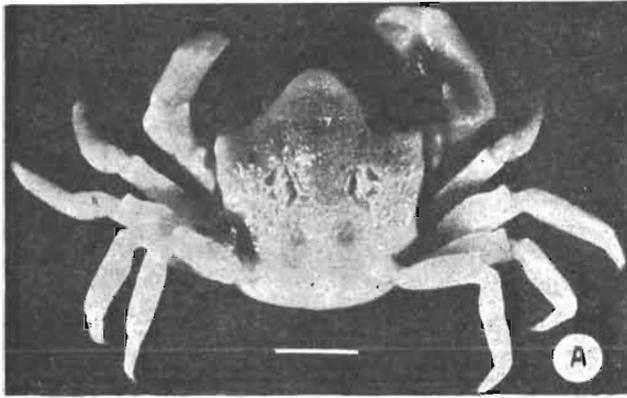
First male pleopod. — The inclusion of this species into Eumedoninae is strengthened by the fact that, as mentioned above, the first male pleopod has more close resemblance with those of the allied genera. The presence of a cluster of bristles on the superior surface at the distal portion in this pleopod may support our opinion.

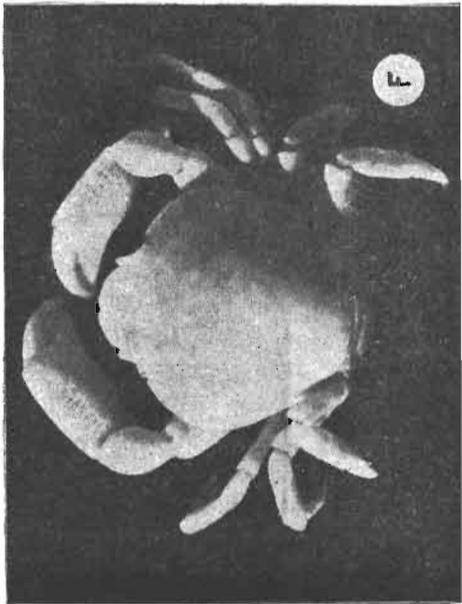
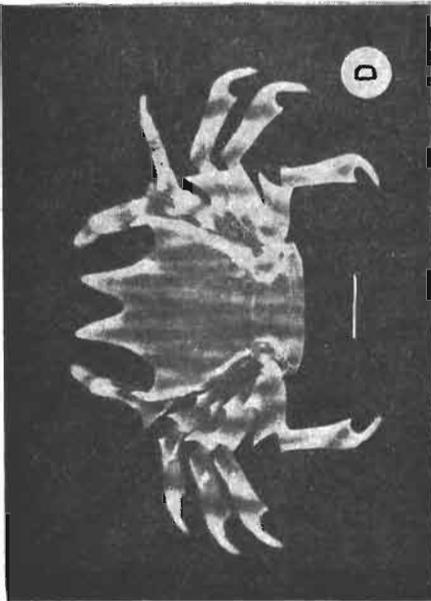
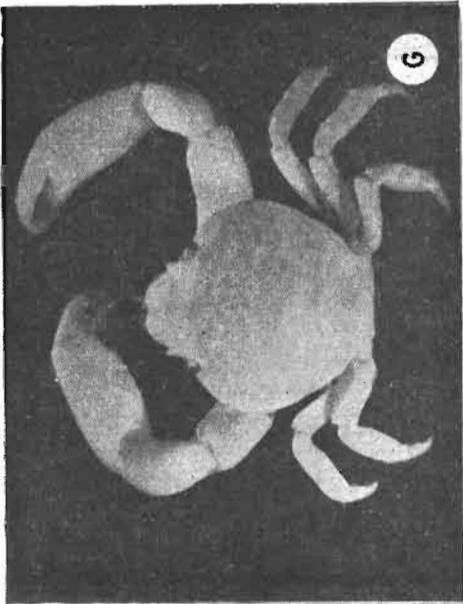
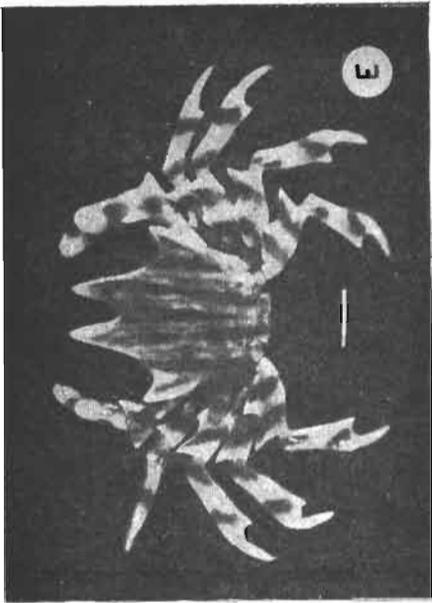
The bristling of the distal of the pleopod is shown by two series of hairs only: one along the outer border which ends in a cluster of hairs on the superior surface at the basal portion of the bending tip, and the other is along the inferior surface.

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EXPLANATION OF PLATE I.

- A. *Proechinoecus sculptus* Ward, 1934. Sing. 159, female of 5.75 mm length; 6.45 mm breadth.
- B. *Proechinoecus sculptus* Ward, 1934. Sing. 159, male of 5.3 mm length; 5.75 mm breadth.
- C. *Ceratocarcinus longimanus* Adams & White, 1848. C 636a, male of 5.4 mm length; 6.45 mm breadth.

EXPLANATION OF PLATE II.

- D. *Zebrida adamsi* White, 1847, E. 392, female of 7.5 mm length; 8 mm breadth.
- E. *Zebrida adamsi* White, 1847. E. 391, male of 7.5 mm length; 7.7 mm breadth.
- F. *Rhabdonotus pictus* A. Milne Edwards, 1878. Sing. 200, female of 6.8 mm length; 6.6 mm breadth.
- G. *Rhabdonotus pictus*. A. Milne Edwards, 1878. Sing. 199, male of 6.8 mm length; 6.6 mm breadth.

NOTE: Sizes in the plates are for 2.5 mm.