A SMALL COLLECTION OF THALASSINIDS FROM THE WATERS AROUND TSUSHIMA ISLANDS, JAPAN, INCLUDING A NEW SPECIES OF *CALLIANASSA* (CRUSTACEA, ANOMURA)

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With 4 Text-figures

A scientific expedition was paid by the Tokyo National Science Museum to learn the benthos in the waters around Tsushima Islands, and the following four species of Thalassinidea were found in the collected material.

Section Thalassinidea

Family Axiidae

1. *Axiopsis* (*Axiopsis*) sp. aff. *serratifrons* A. MILNE-EDWARDS, 1873

Family Callianassidae

2. *Callianassa* (*Cheramus*) *spinophthalma* sp. nov.
3. *Callianassa* (*Cheramus*) sp.
4. *Callianassa* (*Trypaea*) *bouvieri* NOBILI, 1904

One of them is considered evidently to be a new species of *Callianassa* (*Cheramus*). A species of *Axiopsis* and another form of *Callianassa* (*Cheramus*) are unfortunately found in a very imperfect state of preservation which will not permit any definite identification. Nevertheless these two forms seem very interesting in the Japanese thalassinid fauna. Thus, the present paper includes the descriptions of the new species and above-mentioned two forms in question.

Acknowledgements: I am very grateful to the Tokyo National Science Museum for the privilege granted me to examine these samples of Thalassinidea.

1. *Axiopsis* (*Axiopsis*) sp. aff. *serratifrons* A. MILNE-EDWARDS, 1873

(Fig. 1)

St. 7, Lat. 33°55.5'N, long. 129°28.2'E; 70 m, coarse shelly sand; July 26, 1968. -One ♀.

As the anterior part of the carapace is almost torn away and the first pereiopods are missing, this specimen is described here only on the third maxillipeds, the abdomen and the tail-fan which are still available.

The pleurae of the abdominal segments are large and broad, without any sutures between them and terga. The pleura of the second segment is the largest, those of the third to fifth bear each a small prominence just on the anterior corner. The pleura of the sixth bears a similar prominence in the middle just before the concavity of the posterior half.

The telson is roughly square in shape. The lateral margins are almost parallel with each other, and bear each two movable spines and one immovable outstretched spine, the tip of the latter within the proximal third. The posterior margin is rounded and with a median spine. The outer surface is provided with two pairs of immovable spines medially and a pair of tufts of three movable spines, respectively near the postero-lateral angle. It is markedly suclate around the posterior part of the median line.

The branchial formula and ramification are as follows.

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Pleurobranchs	—	—	—	—	—	—	—	—
Arthrobranchs	—	1	2	2	2	2	2	—
Podobranchs	—	—	—	—	—	—	—	—
Epipods	1	1	1	1	1	1	1	—
Exopods	1	1	1	—	—	—	—	—

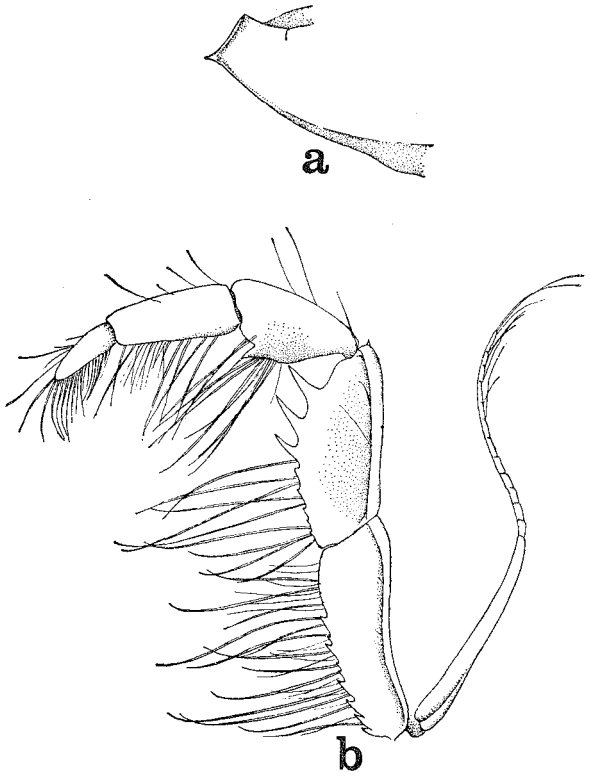
The third maxillipeds (Text-fig. 1b) are pediform. The dactylus is small. The propodus is rod-like, about 1.5 times the dactylus length and as long as the carpus. The lower margin of the carpus bears an anteriorly directed stout spine near the distal angle. The merus is about 1.3 times as long as the carpus, the inner margin is armed in the distal half with three long sharp spines increasing in size distally and is roughly serrate in the proximal half. The ischium is much longer than the merus, and the inner margin is also armed with a row of small triangular teeth.

The endopod and exopod of the uropods are nearly as long as the telson. The anterior margin of the exopod is armed with 5–6 distally pointed spines, in addition a distinct movable spine is planted at the distal angle. The reinforcement rib on the upper surface bears 2–3 spines. The anterior margin of the endopod is armed with three spines, the distal one of which extends beyond the distal corner. The median rib bears five interspaced movable spines.

Measurement:

Total length	about 20	mm
Abdomen	12	
Telson	3.2	

Remarks: This imperfect specimen shows a similarity to *Axiopsis* (*Axiopsis*) *serratifrons* (A. MILNE-EDWARDS) as the morphology of the abdomen, tail-fan, and the third maxillipeds of the specimen described above are well coincident with those of the A. MILNE-EDWARDS' species. However, there is a slight difference between this species and the present specimen. In the latter the anterior margin of the carapace just below the linea thalassinica is pointed as shown in Text-fig. 1a, while in the



Text-fig. 1. *Axiopsis* (*Axiopsis*) sp. aff. *serratifrons* A. MILNE-EDWARDS, 1873. (a-b).
a. Anterior margin of carapace just below the linea thalassinica.
b. Third maxilliped of right side, outer surface ×16.

A. MILNE-EDWARDS' species it is simply rounded. Regarding the third maxillipeds the denticulation on the inner margin of the ischium is more prominent in the present specimen than in the A. MILNE-WDWARDS'. The second to fifth pleopods are not so broad in the present specimen as in *A.* (*Axiopsis*) *serratifrons*, they are rather narrow as in *A.* (*Axiopsis*) *habereri* (BALSS, 1913) described by BALSS (1914, fig. 46). Lastly as to the distribution, I rather hesitate to identify the present specimen from Tsushima

Islands where no coral reef is seen as *A.* (*Axiopsis*) *serratifrons* A. MILNE-EDWARDS which is regarded as an inhabitant of the coral reef. For these reasons, the specimen is described here provisionally as a form affined to *A. serratifrons*.

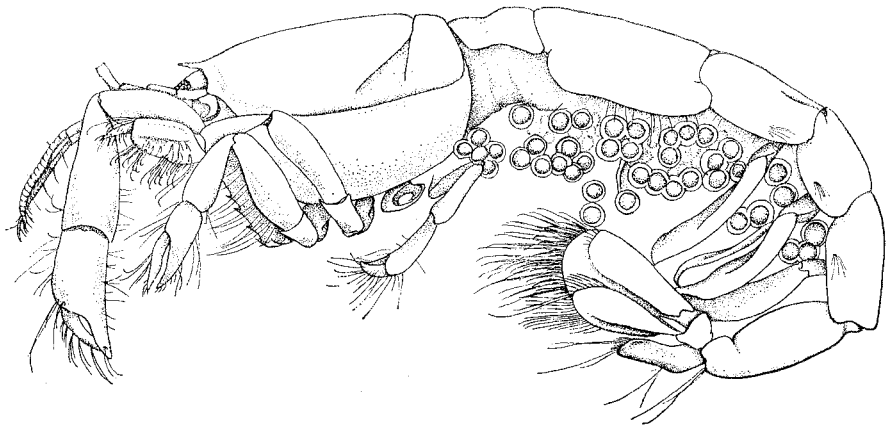
2. *Callianassa* (*Cheramus*) *spinophthalma* sp. nov.

(Figs. 2–3, 4a–b)

St. 23, Lat. 34° 58'N, long. 129° 26.9'E; 210 m, mud; Aug. 1, 1968. –2 ovig. ♀♀, 3 ♀♀, one larger left cheliped, two right ones, and one smaller right cheliped.

St. 29, Lat. 34° 37.5'N, long. 129° 50.7'E; 110 m, coarse sand and mud; Aug. 4, 1968. -One ovig. ♀.

Types: Holotype: One ovig. ♀. Sp. No. 1 from St. 23 of the Scientific Expedition to the Tsushima Islands Area, Lat. 34° 58'N, Long. 129° 26.9'E, 210 m deep; de-



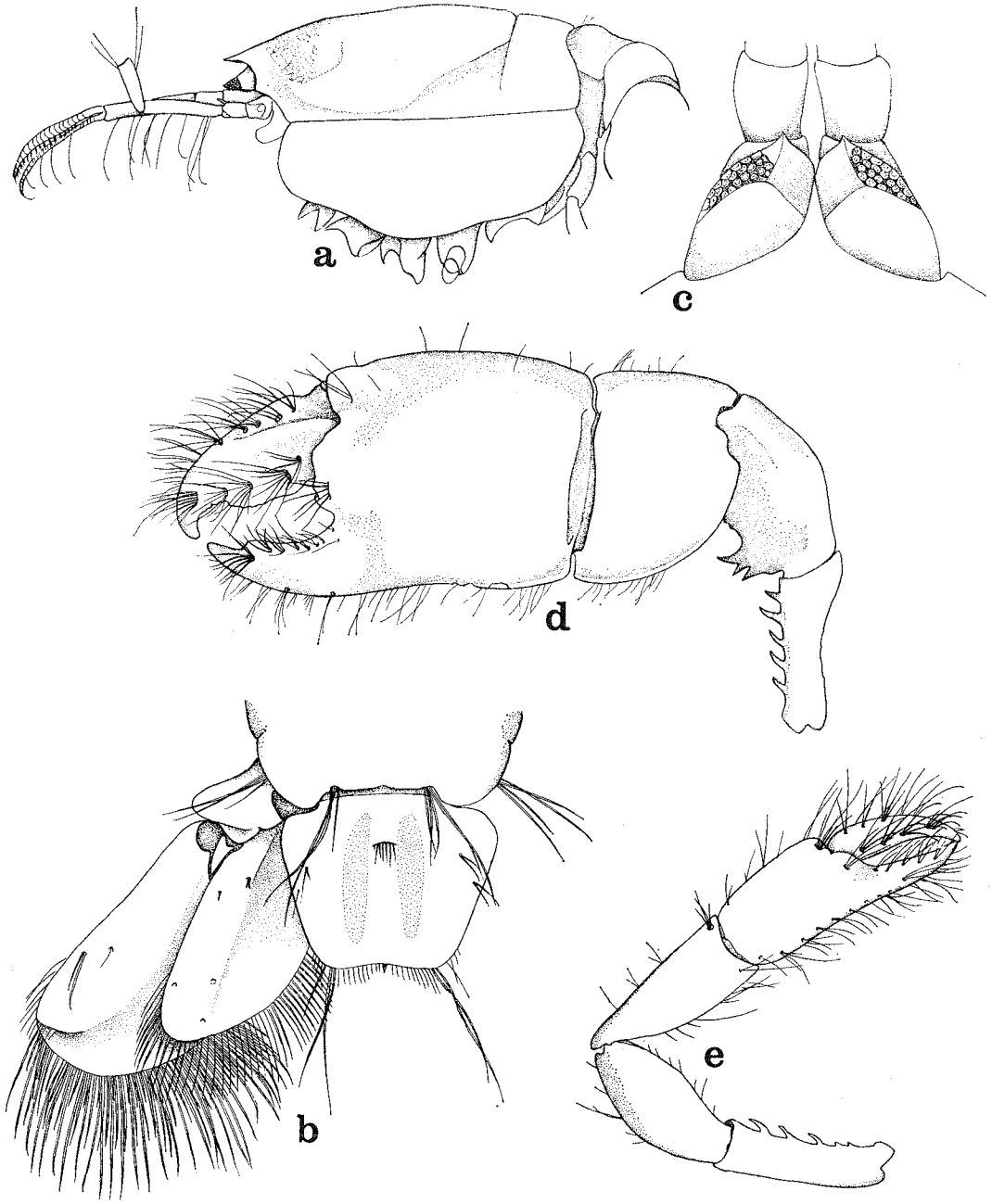
Text-fig. 2. *Callianassa* (*Cheramus*) *spinophthalma* sp. nov., holotype, lateral view, ×8.

posited at the Tokyo National Science Museum. Other specimens form paratypes.

Diagnosis: Rostrum spiniform. Cervical groove at posterior fifth. Eye-stalks form a spine on top. First pereiopods unequal, lower margin of ischium with a row of slender curved spines; merus of larger leg with an acute proximal tooth, lower margin with one or two spines. Small species, less than 20.0 mm in total length.

Description: The rostrum (Text-fig. 3a, c) is narrow and sharply pointed; the tip reaches the level of about the end of the eye-stalks, keeping aloof from the orbital margin. The linea thalassinica is remarkable, and the cervical groove is situated at the posterior fifth of the carapace length including the rostrum.

The relative lengths of the first to sixth segments of the abdomen and the telson are about 1, 2, 1.3, 1.1, 1.5, 1.8 and 1 respectively. The pleura of the second is broad and truncate; those of the third and fifth are rather truncate than rounded,



Text-fig. 3. *Callianassa* (*Cheramus*) *spinophthalma* sp. nov.
a. Carapace, lateral view, ×10. b. Tail-fan, ×13. c. Eye-stalks, ×35. d. Larger first pereiopod, ×8. e. Smaller first pereiopod, ×10.

though in the fourth it is very slightly rounded. A tuft of hair is present on the pleura of the third to fifth segments; just posterior to the middle in the third segment, about in the middle in the fourth and just anterior to the middle in the fifth. The pleura of the sixth segment is little pronounced. This segment shows a slight constriction on the lateral margin at the posterior fourth forming a distinct postero-lateral lobe on each side, which bears a tuft of long hairs in the middle (Fig. 3b). Thus, the posterior margin of the segment is rather concave as a whole, with a straight edge between both postero-lateral lobes. The telson (Text-fig. 3b) is somewhat trapezoid in outline, with the greatest breadth near its base; the posterior margin is slightly concave near the middle and provided there with a small triangular median spine. On the dorsal surface there is a median transverse line implanted with a row of hairs at the anterior third. The postero-lateral corners of the telson are rounded and furnished with some long hairs on each side.

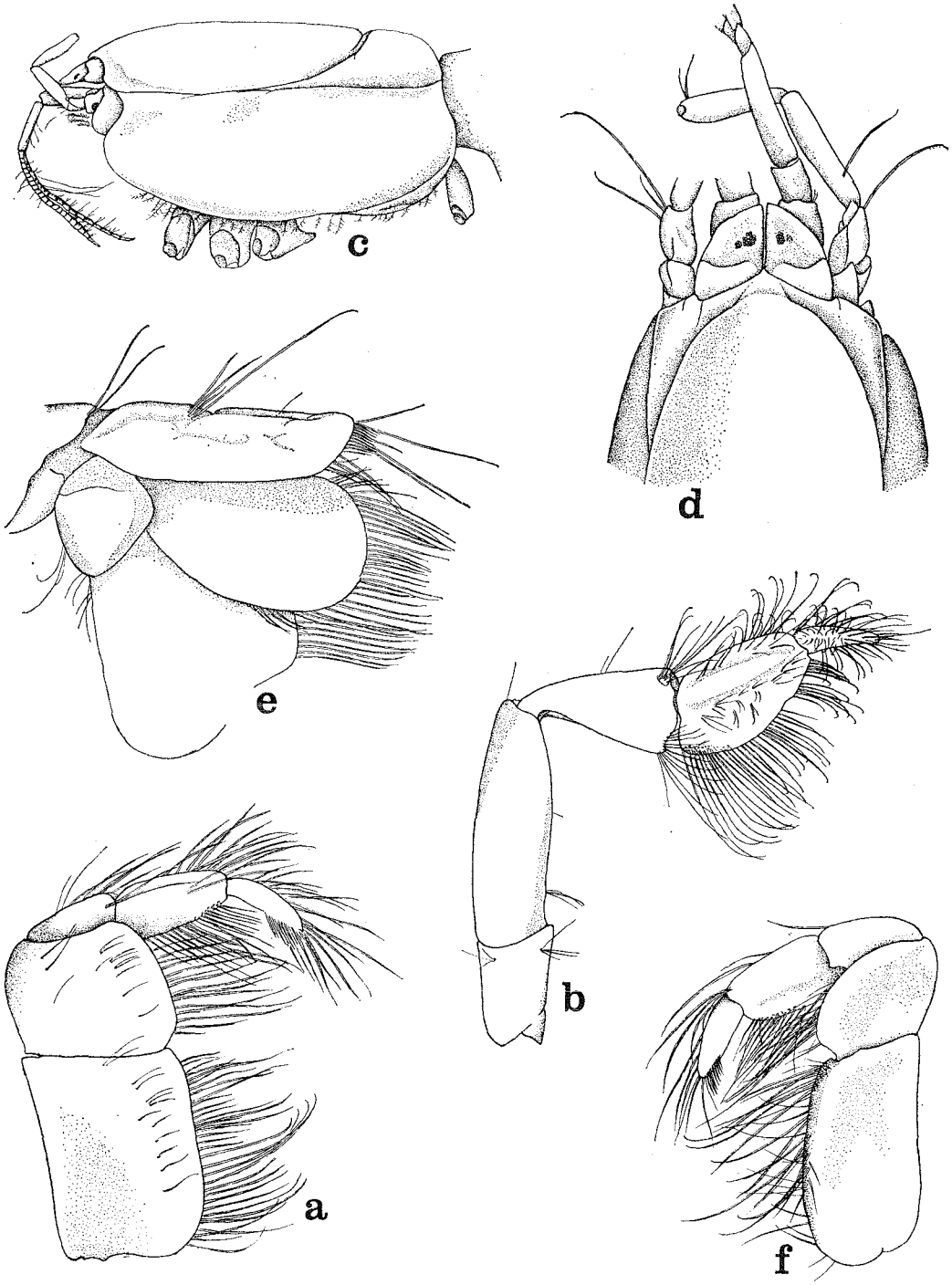
The eyes (Text-fig. 3c) are very peculiar in shape. The top forms a pointed triangular prominence at a short distance from the inner edge, which attains a little beyond the distal end of the basal segment of the antennular peduncle. This prominence is weakly keeled medially to about the middle of the eye, so that the distal half of the eye is divided into the inner and outer parts; the latter is mostly occupied by cornea. The proximal half of the eye, on the other hand, is separated from the distal half by a broad convex border and opaque in texture.

The basal segment of the antennular peduncle is slightly longer than the second; the third segment is about 2.5 times as long as the basal; two flagella are present, respectively longer than the second and third segments together.

The penultimate segment of the antennal peduncle is about 1.5 times as long as the last. The scaphocerite is gradually narrowed distally and extends slightly beyond the basal border of the penultimate segment.

The third maxillipeds (Text-fig. 4a) are rather pediform than operculiform. The length of three distal segments is increased a little in the order of the dactylus, carpus and propodus. All these segments are somewhat narrow. The ischium and merus, on the contrary, form together a broad plate. The merus is much broader than long, the distal margin is concave. The ischium is about 1.3 times as long as broad and 1.7 times as long as the merus on the median line, and has a high serrated crest running diagonally on the inner surface. The teeth on the crest are 23 in Sp. No. 1; the distal tooth lying on the distal margin of the segment is moderately long.

The first pereiopods are very different from each other. The chela of the smaller leg (Text-fig. 3e) is elongate and narrow. The fingers are as long as (Sp. Nos. 1 and 2) or slightly longer than the palm (the largest smaller leg in the present material, found isolated), their cutting edge is smooth. The palm slightly broadens distally. The carpus is about 1.5 times as long as the palm. The merus is much shorter than the carpus, but only slightly shorter than the ischium. The lower margin of the



Text-fig. 4. *Callianassa* (*Cheramus*) *spinophthalma* sp. nov. (a-b).
a. Third maxilliped of left side, ×25. b. Third pereiopod of left side, ×15.
Callianassa (*Cheramus*) sp. (c-f).
c. Carapace, lateral view, ×11. d. Anterior part of carapace, dorsal view, ×20.
e. Tail-fan, lateral view, ×25. f. Third maxilliped of right side, ×30.

merus is inconspicuously protruded at the middle, while the same margin of the ischium is characteristically armed with a series of distally pointed slender spines which are 4, 7 and 5 respectively in Sp. Nos. 1, 2 and the smaller cheliped found isolated.

The larger cheliped (Text-fig. 3d) is very stout. The relative lengths of the dactylus, palm, carpus, merus and the ischium are 1.1, 1.4, 0.8, 1 and 0.9 respectively. In the dactylus, the tip bends down prominently to form a shallow concavity in the distal one-third of the cutting edge; the proximal part of the edge is slightly elevated and somewhat undulate. The outer surface is engraved deep along the upper margin in the proximal two-thirds. The cutting edge of the fixed finger is smooth, but with an abrupt bending near the tip. The palm is much longer than wide. The distal margin of the palm along the articulation with the dactylus forms a broad swelling which is connected with the fixed finger, with a notch with the rounded bottom at the base of the finger. The carpus is as high as the palm. The merus is very characteristic; the upper margin is smooth and smoothly curved, while the lower margin is pronunced in the proximal one-fourth to an acute, distally pointed spine or tooth. This tooth is further armed on the proximal edge with two stout spines in the biggest larger cheliped, but with only a single spine in another bigger larger cheliped; and in the smallest larger cheliped the tooth is quite devoid of any accessory teeth. Distal to this tooth the lower margin of the merus is armed with a row of 7–8 irregular denticles; this denticulation is distinct in the biggest larger cheliped, but inconspicuous in other smaller larger chelipeds.

The two smaller larger chelipeds show some different appearances. The first is the relative length of the segments from dactylus to ischium, which is 1, 1, 0.9, 1.2 and 0.9–1 respectively. The last concerns the distal margin of the palm, which is directly connected with the fixed finger without forming any notch at the base of the finger.

The protopod (Text-fig. 3b) of the uropods broadens distally. The exopod is elongate and about 1.8 times as long as the telson.

Measurement: See Table 1.

Remarks: This new species may safely be included in the subgenus *Cheramus*, though DE MAN (1928, p. 97) made the definition of the subgenus as "Ischium and merus of external maxillipeds, taken together, at least 2 1/2 as long as broad, with an exceptional species, *C.* (*Cheramus*) *praedatrix* DE MAN, in which it is only twice as long as broad".

Affinity to this new species is shown in *C.* (*Cheramus*) *pugnatrix* DE MAN by the form of the third maxillipeds and the first pereiopods (Text-fig. 4b). These two species share the third maxillipeds and the first pereiopods; in the former the merus is largely concave on the distal margin and in the latter the ischium is serrated on the lower margin.

In the existence of the proximal tooth on the lower margin of the merus of the larger cheliped the present new species rather resembles *C.* (*Cheramus*) *pugnatrix*

Table 1. Various Measurements in mm.

Sp. No.	Sex.	Postorbital Carapace	Total Length	1st Pereiopods Left: Tip to Carpus	Left: Merus to Ischium	Right: Tip to Carpus	Right: Merus to Ichium
1	ovig. ♀	4.3	20.0	4.7	3.5 (S)	-	-
2	ovig. ♀	2.9	14.0	3.2	2.5 (S)	-	-
3	♀	4.5	18.0	-	-	-	-
4	♀	3.2	13.0	-	-	-	-
5*	♀	2.8	11.0	-	-	-	-
6	ovig. ♀	4.3	18.0	-	-	-	-
Larger cheliped				10.0	5.9		
Larger cheliped						6.3	4.2
Larger cheliped						4.1	2.7
Smaller cheliped						6.3	4.0

S: Smaller cheliped. *With a bopyrid parasite.

DE MAN, *C.* (*Cheramus*) *joculatrix* DE MAN and *C.* (*Calliactites*) *rotundicaudata* STEBBING, but the former is separable from the latter, as the tooth is not simple in larger specimens, but tends to bear one or two accessory teeth on the lower margin in the former.

The tail-fan of the new species is similar to that of *C.* (*Cheramus*) *pugnatrix* DE MAN, but in the latter the posterior margin of the telson is bilobed more remarkable.

EDMONDSON (1944) showed the variation in the eye-stalks of *C.* (*Cheramus*) *variabilis* EDMONDSON with reference to those of *C.* (*Cheramus*) *indica* DE MAN and *C.* (*Cheramus*) *jousseaumei* NOBILI, in these species the terminal border of the eye-stalk is broadly rounded and furnished with a few spinules. However, in all specimens of the present new species examined the eye-stalk forms a single spine at the top.

3. *Callianassa* (*Ceramus*) sp.

(Fig. 4c–f)

St. 29, Lat. 34° 37.5'N, long. 129° 50.7'E; 110 m, coarse sand and mud; Aug. 4, 1968. -One ♀.

The rostrum (Text-fig. 4d) of this specimen forms an inconspicuous, rather low triangular protrusion which bends down between the left and right eye-stalks. The cervical groove (Text-fig. 4c) is very distinct and situated a little posteriorly to the posterior fourth of the carapace. The transverse groove shows a shallow incision just behind the rostrum.

The segments of the abdomen are to a certain degree contracted one another, although their relative lengths from the first to the sixth segment and the telson are about 1, 1.5, 1, 0.8, 1.1, 1.2 and 1 respectively.

The telson (Text-fig. 4e) is roughly square in outline, slightly longer than broad; the posterior margin is slightly convex and with rounded corners. No marginal denticles are present.

The eyes are of the usual shape and reach anteriorly about the level of the distal end of the first segment of the antennular peduncle. They are opaque in texture in the proximal half, but transparent and depressed medially in the distal half. The cornea lies in the middle of this half.

The second segment of the antennular peduncle is much shorter than the first, while the third is elongate and slightly more than three times as long as the second. The ultimate segment of the antennal peduncle is about 0.8 times as long as the penultimate. The scaphocerite is absent. The antennal flagellum is missing.

The third maxillipeds (Text-fig. 4f) are of the typical form seen in the subgenus *Cheramus*. The dactylus is slender and the propodus broadens a little. The merus and ischium form together a plate nearly three times as long as broad. The distal margin of the merus continues to the inner lateral margin forming a broad smoothly rounded distal-lateral edge. The ischium is nearly twice as long as the merus and insignificantly broadens proximally.

The first and third pereiopods are missing.

The protopod of the uropods is oval. The exopod of the right uropod is torn off and that of the left uropod is heavily damaged. However, it is obvious that both the exopod and endopod are broad oval in form and extend a little beyond the tip of the telson.

Measurement:

	♀
Postorbital carapace	4.2 mm
Total length	15.0

Remarks: This species resembles seemingly the Mediterranean species, *C. (Cheramus) tyrrhena* (PETAGNA, 1792) in the forms of the tail-fan and the third maxillipeds, which are figured by HOLTHUIS and GOTTLIEB (1958). How ever, the comparison of the first to third pereiopods is impossible between this species and the present specimen, and this checks the definite identification of the specimen.

4. *Callianassa (Trypaea) bouvieri* NOBILI, 1904

Callianassa Bouvieri NOBILI, 1904, p. 236
Callianassa (Trypaea) Bouvieri: NOBILI, 1906, pp. 105–107, pl. 6, fig. 3.
Callianassa (Trypaea) bouvier; *de Man*, 1928, pp. 27, 107.

St. 12, Lat. 34°06.2′N, long. 129°11.2′E; 45 m, sand; July 26, 1968. –2 ♀♀.
Measurement:

	♀	♀
Postorbital carapace	3.5 mm	3.5 mm
Total length	16.0	18.0
Left cheliped	—	—
Right cheliped		
Tip to carpus	4.0 (S)	—
Merus to ischium	3.5	

S: the smaller leg.

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