

A CHECK LIST OF AXIIDAE
(DECAPODA, CRUSTACEA, THALASSINIDEA, ANOMALA),
WITH REMARKS AND IN ADDITION DESCRIPTIONS OF
ONE NEW SUBFAMILY, ELEVEN NEW GENERA AND TWO NEW SPECIES

(Text-figures 25, Tables 4)

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INTRODUCTION

Though the Axiidae are becoming better known presently, identification may still be difficult. In the present paper some clarification is made by reviewing the family, and by establishing a new taxon. As new species are being discovered, the distinctions given by Borradaile's (1903: 534) and de Man's (1925c) taxa become narrower, and the difficulties of relating them to the older description increase.

A more fundamental problem concerns the systematic importance of the shape of the 4th thoracic sternite, which is not sexually dimorphic in this group. It is connected to the structure of endophragmal system and its muscles, as well as those of the 1st and 2nd pleopods which are most probably based on hermaphroditic characteristics. These facts are used in this paper as diagnostic features to settle their definition of such genera as *Spongiaxius* gen. nov., *Bouvieraxius* gen. nov., *Ambiaxius* gen. nov., *Calocaris* Bell, 1853, *Calastacus* Faxon, 1893, and *Calaxiopsis* gen. nov.

Brief morphological diagnosis with some remarks are given for each genus after having examined the type and its related specimens mainly preserved in the Muséum national d'Histoire naturelle, Paris, and one new subfamily, 11 new and 13 previously known genera, 108 species including 2 new species and 11 synonyms are listed.

Throughout, the following abbreviations are used: ABD, abdomen; CL, Carapace length; coll., collected by; CR, carapace; fms, fathoms; juv., juvenile; ovig., ovigerous; m, meter; Mxp, maxilliped(s); mm, millimeter; P, pereopod(s); Pl, pleopod(s); TL, total length measured from rostral apex to telson. The repositories of material are also abbreviated as follows: USC, Allan Hancock Foundation, University of Southern California, Los Angeles; BM, British Museum (Natural History), London; IRB, Institut Royal des Sciences naturelles de Belgique, Brusessels;

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MP, Muséum national d'Histoire naturelle, Paris; SMF, Forschungsinstitut Senckenberg, Frankfurt am Main; USNM, National Museum of Natural History in Washington, D. C.; Instituut voor Taxonomische Zoologie, Zoologisch Museum in Amsterdam; ZMB, Zoologisches Museum, Berlin; ZSM, Zoologische Staatssammlung, Munich.

We are deeply grateful to the following museums for allowing us to borrow specimens for comparative study: University of Southern California, Los Angeles (J. Garth; J. Haig); British Museum (Natural History), London (R.W. Ingle; P.F. Clark), Forschungsinstitut Senckenberg, Frankfurt am Main (M. Türkay); Zoologische Staatssammlung, Munich (L. Tiefenbacher); National Museum of Natural History in Washington D.C. (R.B. Manning; A.B. Williams).

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LIST OF TAXA INCLUDED

I. Subfamily *Coralaxiinae* subfam. nov.

- 1) Genus *Coralaxius* Kensley and Gore, 1981
nodulosus (Meinert, 1877); *abelei* Kensley and Gore, 1981.

II. Subfamily *Axiinae* Huxley, 1879

- 1) Genus *Anophthalmaxius* de Man, 1905.
eccoptodactylus de Man, 1905.
- 2) Genus *Eiconaxius* Bate, 1888 (= *Iconaxiopsis* Alcock, 1901)
acutifrons Bate, 1888; *kermadeci* Bate, 1888; *parvus* Bate, 1888; *farreae* Ortmann, 1891; *cristagalli* (Faxon, 1893); *carribaeus* (Faxon, 1896) (= *Eiconaxius communis* Bouvier, 1905); *laccadivensis* (Alcock and Anderson, 1894); *andamanensis* (Alcock, 1901); *agassizi* Bouvier, 1905; *borradailei* Bouvier, 1905; *antillensis* Bouvier, 1905; *rotundifrons* Bouvier, 1905; *spinigera* (MacGilchrist, 1905); *asper* Rathbun, 1906; *weberi* de Man, 1907; *indica* de Man, 1907; *consobrinus* de Man, 1907; *kermadecensis* (Chilton, 1911); *sibogae* de Man, 1925; *carinatus* Bouvier, 1925; *singularis* Zarenkov, 1981.
- 3) Genus *Strahlaxius* gen. nov.
plectorrhynchus (Strahl, 1862); *waroona* (Poore and Griffin, 1979)
- 4) Genus *Axius* Leach, 1815
stirhynchus Leach, 1815 (= *Axiopsis mediterranea*)

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- Caroli, 1921); *serratus* Stimpson, 1852; *australiensis* de Man, 1925.
- 5) Genus *Neaxius* Borradaile, 1903
glyptocercus (von Martens, 1868); *acanthus* (A. Milne Edwards, 1878)(= *Eiconaxius taliliensis* Borradaile, 1900; *Axius acanthus* var. *mauritanus* Bouvier, 1914); *vivesi* (Bouvier, 1895).
 - 6) Genus *Neaxiopsis* gen. nov.
gundlachi (von Martens, 1872); *euryrhynchus* de Man, 1905; *orientalis* de Man 1925.
 - 7) Genus *Dorphanaxius* gen. nov.
appendiculis (Poore and Griffin, 1979)
 - 8) Genus *Paraxius* Bate, 1888
altus Bate, 1888
 - 9) Genus *Scyptoleptus* Gerstaecker, 1856 (= *Evaxius* Kingsley, 1882)
serripes Gerstaecker, 1856 (= *Evaxius tricarinatus* Kingsley, 1882)
 - 10) Genus *Parascyptoleptus* gen. nov.
tridens (Rathbun, 1906)
 - 11) Genus *Spongiaxius* gen. nov.
odontorhynchus (de Man, 1905); *novaezealandiae* (Borradaile, 1916); *?pitatucensis* (de Man, 1925); *brucei* (Sakai, 1986);
 - 12) Genus *Bouvieraxius* gen. nov.
longipes (Bouvier, 1905); *rudis* (Rathbun, 1906).
 - 13) Genus *Eutrichocheles* Wood Mason, 1875 (= *Paraxiopsis* de Man, 1905)
modestus (Herbst, 1794) (= *Axius biserratus* von Martens, 1868); *brocki* (de Man, 1887); *defensus* (Rathbun, 1901); *bisquamosa* (de Man, 1905); *johnstoni* (Edmondson, 1925)
 - 14) Genus *Ambiaxius* gen. nov.
alcocki (McArdle, 1901); *aberrans* (Bouvier, 1905)
 - 15) Genus *Calocaris* Bell, 1853
macandreae Bell, 1853; *investigatoris* (Anderson, 1896); *barnardi* Stebbing, 1914; *templemani* Squires, 1965; *granulosa* Grebenjuk, 1975.
 - 16) Genus *Calastacus* Faxon, 1893
stilirostris Faxon, 1893; *laevis* Saint Laurent, 1972
 - 17) Genus *Calaxiopsis* gen. nov.
felix (Alcock and Anderson, 1899); *serrata* sp. nov.

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- 18) Genus *Oxyrhynchaxius* Parisi, 1917
japonicus Parisi, 1917
- 19) Genus *Acanthaxius* gen. nov.
spinulicaudus (Rathbun, 1902); *spinosissimus* (Rathbun, 1906); *miyazakiensis* (Yokoya, 1933); *polyacanthus* (Miyake and Sakai, 1967); *amakusana* (Miyake and Sakai, 1967); *hirsutimanus* (Boesch and Smalley, 1972); *caespitosa* (Squires 1979); *pilocheirus* (Sakai, 1987).
- 20) Genus *Allaxius* gen. nov.
princeps Boas, 1880; *clypeatus* (de Man, 1888); *aethiopica* (Nobili, 1904); *picteti* (Zehntner, 1894); *spinimanus* (de Man, 1905); *sculptimanus* (Ward, 1942).
- 21) Genus *Axiopsis* Borradaile, 1903
serratifrons A. Milne Edwards, 1873 (= *Axius spinipes* de Man, 1888; *Axius affinis* de Man, 1888); *consobrina* de Man, 1905; *irregularis* Edmondson, 1930; *baronai* Squires, 1976.
- 22) Genus *Calocarides* Wollebaeck, 1908
?armatus (Smith, 1880); *longispinis* (McArdle, 1901); *quinqueseriatus* (Rathbun, 1902) (= *Calastacus rostriserratus* Andrade & Baez, 1977); *coronatus* (Trybon, 1904) (= *Euconaxius crassipes* Trybon, 1904; *Axius laevis* Bouvier, 1915); *?tenuicornis* (de Man, 1905); *?habereri* (Balss, 1913); *soyoi* (Yokoya, 1933); *werribee* (Poore and Griffin, 1979)
- 23) Genus *Calaxius* gen. nov.
inaequalis (Rathbun, 1901); *pailoloensis* (Rathbun, 1906); *euophthalmus* (de Man, 1905); *sibogae* (de Man, 1925); *mimasensis* (Sakai, 1967); *jenneri* (Williams, 1974); *oxypleurus* (Williams, 1974); *acutirostris* sp. nov.
- 24) Genus *Axiorygma* Kensley and Simmons, 1988
nethertoni Kensley and Simmons, 1988

SYSTEMATIC ACCOUNTS

Family Axiidae Huxley, 1879

Axiidae Huxley, 1879:785; Bate, 1888:36; Ortmann, 1891:46; Stebbing, 1893:187; Ortmann, 1899:1141; Alcock, 1901:186; Borradaile, 1903; Borradaile, 1907:476 (key); Selbie, 1914:88; Pesta, 1918:190; Schmitt, 1921:110; Rathbun, 1929:25; Makarov, 1938:48; Bouvier, 1940:93; Edmondson, 1946:256; Barnard, 1950:489; Balss, 1957:1579; Saint Laurent, 1979:1395, Saint Laurent, 1988:59.

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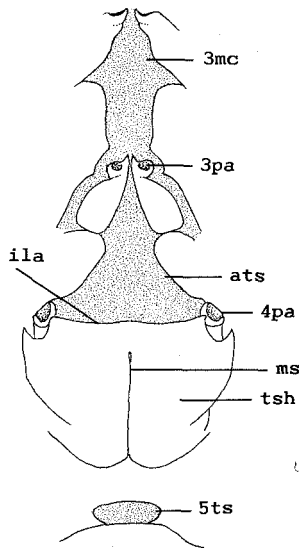


Fig. 1. Explanations on the structure of the 4th thoracic sternite: atr, Anterior thoracic region; 4pa, Intermediate line of articulations; mc, median carina on 3rd thoracic sternite; ms, median slit; tsh, Thoracic shield on 4th thoracic sternite; 3pa, posterior articulation on 3rd thoracic sternite; 4pa, posterior articulation on 4th thoracic sternite; 5ts, 5th thoracic sternite.

Definition.-Carapace more or less cylindrical, and without linea thalassinica; cervical groove defined partly or to a whole length. Rostrum developed in good size or short. Antennal acicle spiniform, long or reduced, not forming a scale. P/1-2 chelate. Basis and ischium of P/1-5 fusing.

The 4th thoracic sternite forming a single shield, or divided into two-parts, thoracic shield and anterior thoracic region, strongly bent posteriorly. 5th thoracic sternite free from the 4th thoracic sternite (Fig. 1).

Type genus: *Axius* Leach, 1815

Remarks.-In Axiidae the 4th thoracic sternite is broadly furrowed with a median slit, which is invaginated into an interior median septum. The interior median septum is fore and aft divided into two parts by the interior hook of the middle hole; the posterior part is elevated to form a higher septum where a pair of much developed remoter coxal muscle is attached, and the anterior is not so much elevated as the posterior, used also as an attachment to a pair of weak promoter and remoter coxal muscles.

This structure of the 4th thoracic sternite is similar to that of *Upogebia pusilla*, but different from that of an astacid group; in *Austropotamobius torrentium* the 4th thoracic sternite is separated from the 5th one, however the thoracic sternum is devoid of a median slit (Klein, 1988).

In the family Axiidae the exterior surface of the 4th thoracic sternite presents three major types, that is, *Coralaxius*-, *Econaxius*-, and *Axius*-types as follows.

1. *Coralaxius*-type. The 4th thoracic sternite is a single unit, which is separated from the 3rd one by a suture. The sternite is

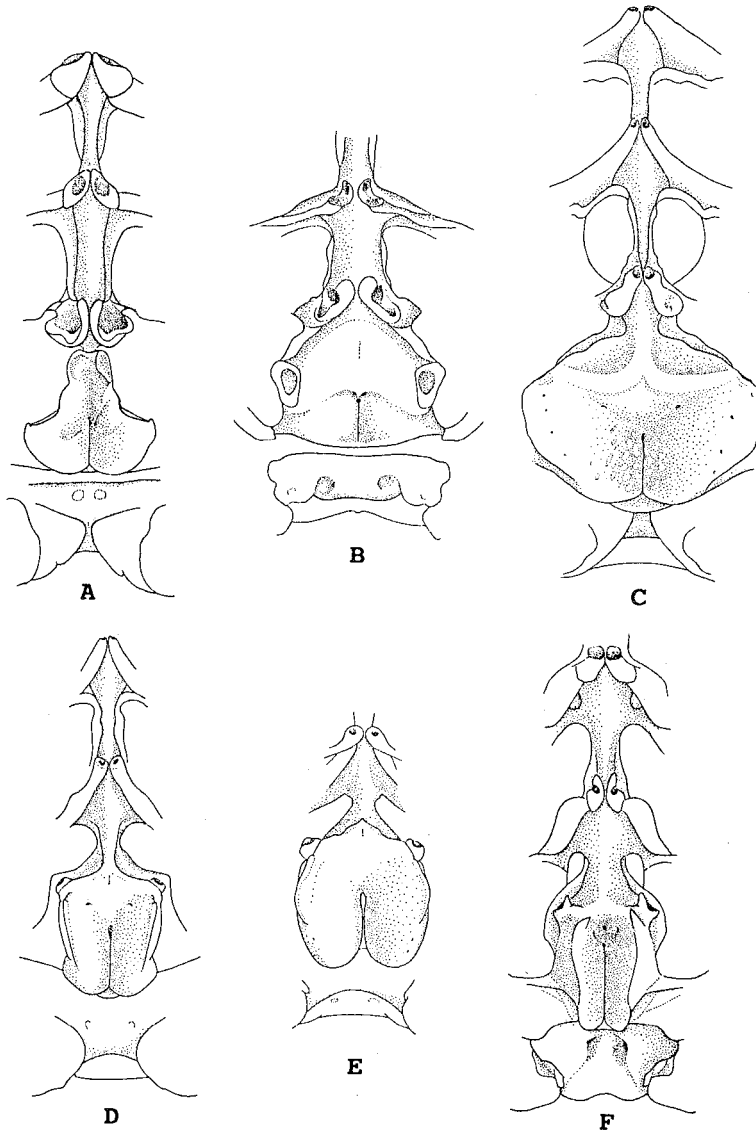


Fig. 2. 4th thoracic sternites of A. *Calaxius abelei*, ♀, BM P-13; B. *Eiconaxius agassizi*, ♂, MP 173; C. *Strahlaxius plectrorhynchus*, ♂, MP 678; D. *Axius stirhynchus*, ♀, MP 149; E. *Axius serratus*, ♀, BM 1898.5.7.832; F. *Neaxius acanthus*, ♂, MP 865.

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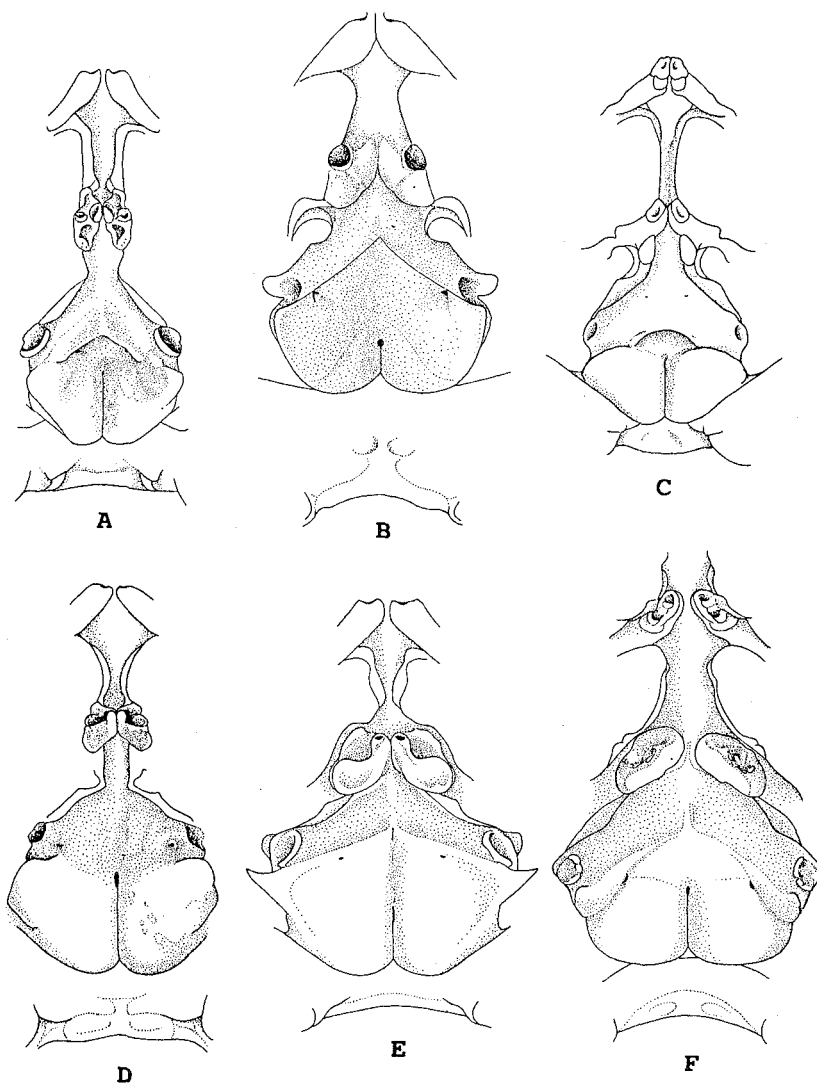


Fig. 3. 4th thoracic sternites of A. *Dorphinaxius appendiculis*, ♀, USNM 92800; B. *Paraxius altus*, ♂, MP 996; C. *Scyptoleptus serripes*, ♀, MP 914; D. *Parascyptoleptus tridens*, 1 ovig. ♀, USNM 59-17; E. *Spongiaxius novaezealandiae*, ♂, MP 940; F. *Spongiaxius brucei*, ♂, MP 897.

This set is actually 2 sets

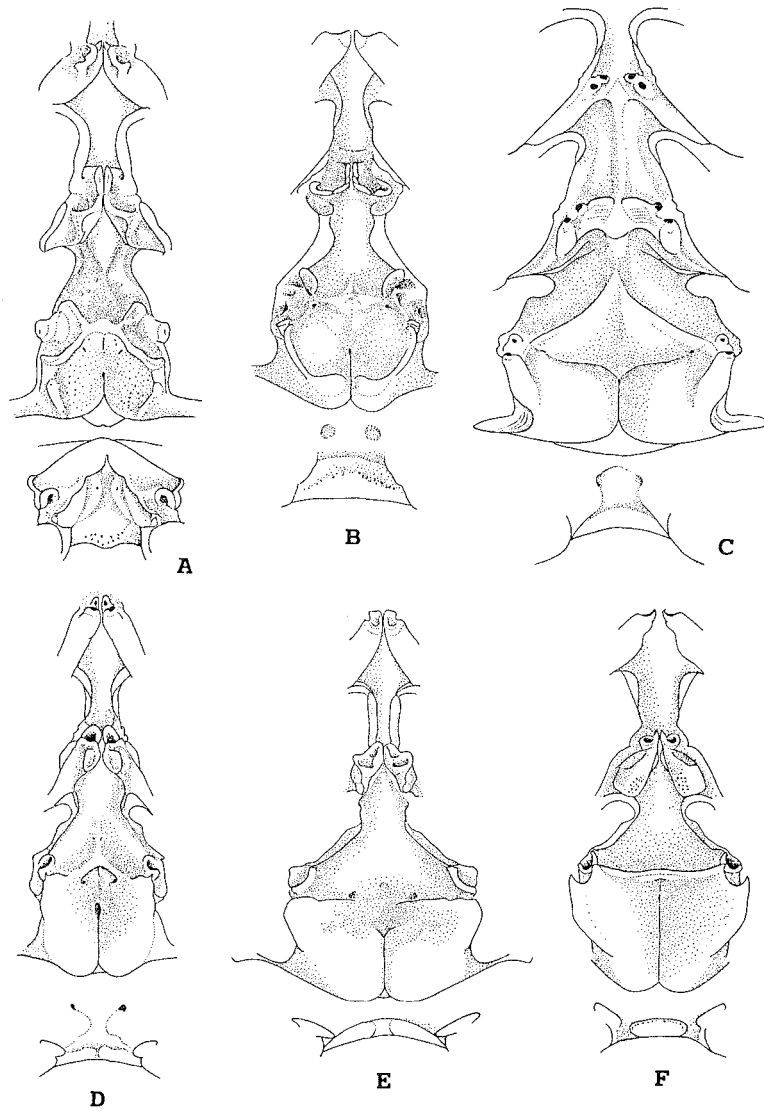


Fig. 4. 4th thoracic sternites of A. *Bouvieraxius rudis*, ♀, MP 445; B. *Eutrichocheles brocki*, ovig. ♀, MP 885; C. *Calocaris macandreae*, ♀, MP 162; D. *Acanthaxius miyazakiensis*, ♂, MP 871; E. *Allaxius princeps*, ♀, MP 1140, F. *Axiopsis serratifrons*, ♂, MP 691.

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pear-shaped, and concave in its whole length (Fig. 2A).

2. *Eiconaxius*-type. The 4th thoracic sternite is largely furrowed on surface, fusing with the 3rd thoracic sternite without a suture (Fig. 2B).

3. *Axius*-type. The 3rd and 4th thoracic sternites are fused. The 4th one consists of two regions, the posterior thoracic shield and the anterior thoracic region, both of which are usually divided by a transverse, intermediate line of articulation (Fig. 2C-F; 3-4). In *Calocaris macandreae*, *Spongiaxius novezealandiae*, *Spongiaxius brucei*, *Paraxius altus* as well as *Eiconaxius agassizi* the 4th anterior thoracic region bears a short anterior neck, while in *Axius stirhynchus*, *Axius serratus*, *Eiconaxius acanthus*, *Eiconaxius vivesi*, *Neaxiopsis gundlachi*, *Strahlaxius plectrorhynchus*, *Bouvieraxius rudis*, *Eutrichocheles brocki*, *Allaxius princeps*, *Allaxius ethiopica*, *Scytoleptus serripes*, *Parascytoleptus tridens*, *Acanthoaxius miyazakiensis*, *Dorphanaxius appendiculis*, and *Axiopsis serratifrons* the 4th thoracic sternite has an elongated neck.

The genus *Enoplometopus* A. Milne Edwards, 1862 was occasionally included in the family Axiidae (Balss, 1957; Holthuis, 1983). Balss 1957:1580 said that "*Enoplometopus* A. Milne Edwards, 1862, früher zu den Homaridae gestellt, aber zu den Axiidae gehörend, da Stylamblys an den Plp/3-5 vorhanden". This feature, however, is observed only in juvenile specimens (Holthuis, 1946), and in adult males the appendix interna and appendix masculina are found only on the 2nd pleopods. However, it is uncertain whether these protrusions are really homologous with the appendix interna and masculina of Axiids and carids, their specific form and orientation being quite different from the structures of the mentioned groups. *Enoplometopus* is clearly different from the family Axiidae by the antennal acicle being in blade-form, the basis and ischium of the pereopods articulating freely with each other, and the 4th and 5th thoracic sternites being fused to each other (De Saint Laurent, 1988:59).

The genus *Meticonaxius* de Man, 1905 (synonym: *Metaxius* Bouvier, 1905) was once included in Axiidae (de Man, 1925c; 53; Barnard, 1950:499; Balss, 1957:1579), however treated at present as a member of Callianassidae (Bouvier, 1925:469; de Man, 1928:18). *Marcuxiaxius lemoscastroi* Carvalho and Rodrigues 1973 was described as a new genus of Axiidae, however it belongs to the genus *Meticonaxius*.

KEY TO THE SUBFAMILIES OF THE FAMILY AXIIDAE

1. No epipods on P/1-4. P/2 chela rounded. Maxilliped 3 exopod consisting of two segments and flagellum, distal segment and flagellum combined bent with acute angle from proximal segment. Coralaxiinae
- . Epipods present on P/1-4. P/2 chela elongate. Maxilliped 3 exopod of proximal segment and flagellum stretching out without bending. Axiinae

Subfamily Coralaxiinae nov. subfam.

26 5/1
Definition.-Antennal acicle small, flattened, distally trispinose. Mxp/2 exopod of two segments, distal segment deflected downward. Mxp/3 exopod of two segments and jointed flagellum, distal segment and flagellum combined deflected downward. P/2 chela rounded. P/3-5 biunguiculate. P/1-5 lack of epipods. P/4 thoracic sternite small, pear-shaped, furrowed, and separated from P/3 by suture.

Type genus.-*Coralaxius* Kensley and Gore, 1981.

27 5/1
Remarks.-This subfamily contains only one genus *Coralaxius*, which is very much different from Axiinae in the shape of the rostrum, the antennal acicle, the exopod of the 2nd and 3rd maxillipeds, the rounded chela of the 2nd pereiopods, the biunguiculate dactyls of the 3rd to 5th pereiopods, the 4th and 5th thoracic sternites, the peculiar forms of the 1st and 2nd male pleopods, and no epipods on the 1st to 5th pereiopods.

C. abelei is closely related to a fossil species from Priesen, E. Germany, *Schlueteria tetracheles* Frisch and Kafka, 1887 in the form of the chelipeds, the rounded chela of the 2nd pereiopods.

Genus *Coralaxius* Kensley and Gore, 1981

Coralaxius Kensley and Gore, 1981:1278.

Definition.-Rostrum short, situated at lower level from and discontinuous with gastric region. Eystalks thick; cornea pigmented. P/1 unequal. Pl/1 of males faced each other, consisting of two segments; proximal segment long, and distal one rounded with reduced stylamblys, that of females of proximal segment and flagellum. Pl/2 of males with broad bilobed appendix masculina and rod-shaped appendix interna. Pl/3-5 similar, and with appendix interna. Uropod exopod with inconspicuous transverse suture.

Remarks.-The oldest nominal species belonging to *Coralaxius* is *nodulosus* (Meinert, 1877:212) from off Nymindagab, Denmark, at the west coast of Jutland, North Sea. The type specimen was reviewed by Poulsen (1940:208, text-fig 2), but further specimens have not been recorded.

In 1981 Kensley and Gore reported the second species, *abelei*, from Florida, and described it under the new generic name, *Coralaxius*.

Type species.-*Coralaxius abelei* Kensley and Gore, 1981 [by monotypy].

Species included.-*Axius nodulosus* Meinert, 1877; *Coralaxius abelei* Kensley and Gore, 1981.

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Coralaxius nodulosus (Meinert, 1877)

Axius nodulosus Meinert, 1877:212; Stephensen, 1910:276, text-figs 1-4; de Man, 1925c:18; Balss, 1926:26; Poulsen, 1940:208, text-fig 2.

"*Axiopsis nodulosus*", -Borradaile, 1903:539.

Type locality.-Off Nymindegab, North Sea.

Distribution.-West coast of Jutland, North Sea.

Coralaxius abelei Kensley and Gore, 1981.

Coralaxius abelei Kensley and Gore, 1981:1278, text-figs 1-6, 2 tables.

Material examined.-1♀, TL 12, CL 3.5, USNM 251443, SW of Alligator Light, Florida, 90ft (27.36m), Aug. 22, 1963, A.W. and J. Starch, and W. Davis coll.; 2♂♂, TL 13.5, CL 4.5: TL 12, CL 3.5, 2♀♀, TL 14.5, CL 5: TL 9, CL 3, BM P-13 49, W. India.

Diagnosis.-The 4th thoracic shield is a small, simple pear-shape with a pair of small lateral articular concavities; the ventral surface is furrowed on a whole, strongly decreased in the posterior half. The border between the 4th and the 3rd abdominal segments is clearly marked by a suture (Fig. 2A).

Type locality.-Off Key Largo, Florida, 76m deep.

Distribution.-Off Key Largo, Florida, 76m deep; Belize, Caribbean Sea.

Subfamily Axiinae Huxley, 1879

Definition.-Rostrum developed in good size or short. Cervical groove defined to its whole length or only on its dorsal part. The 4th thoracic sternite fusing with the 3rd one without suture, consisting of a single concavity or of two parts, thoracic shield and anterior thoracic region.

Eyestalks rounded or subglobose, and long or short. Antennal acicle spiniform or reduced. Mxp/3 exopod consisting of proximal segment and multiarticulate flagellum, directed straightly. P/1-2 chelate. P/3-4 simple, and P/5 simple or subchelate. Pl/1 of males present or not, and that of females usually of proximal segment and jointed flagellum. Pl/2 of males bifurcate, and with appendix interna and appendix masculina. Pl/3-5 of males or Pl/2-5 of females usually with appendix interna (except *Bouvieraxius*).

Type genus.-*Axius* Leach, 1815

Genera included.-*Anophthlmaxius* de Man, 1905; *Eiconaxius* Bate, 1888; *Strahlaxius* gen. nov.; *Axius* Leach, 1815; *Neaxius* Borradaile, 1903; *Neaxiopsis* gen. nov.; *Dorphanaxius* gen. nov.; *Paraxius* Bate, 1888; *Scytoleptus* Gerstaecker, 1856;

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Parascytoleptus gen. nov.; *Spongiaxius* gen. nov. *Bouvieraxius* gen. nov.; *Eutrichocheles* Wood Mason, 1875; *Ambiaxius* gen. nov.; *Calocaris* Bell, 1853; *Calastacus* Faxon, 1893; *Calaxiopsis* gen. nov.; *Oxyrhynchaxius* Parisi, 1917; *Acanthaxius* gen. nov.; *Allaxius* gen. nov.; *Axiopsis* Borradaile, 1903; *Calocarides* Wollebaek, 1908; *Calaxius* gen. nov.; *Axiorygma* Kensley and Simmons, 1988.

KEY TO THE GENERA OF THE SUBFAMILY AXIINAE

1. Eystalks quadrate. Mandible with serrated cutting edge. *Anophthalmaxius*
- Eystalks subglobose, long or short. Mandible with smooth cutting edge 2
2. P/3 dactylus rounded, and armed with spines on its ventral margin. 4th thoracic sternite of a single, concave shield without anterior thoracic region; median slit defined in posterior part. Rostrum conspicuous, and concave on surface. Cervical groove inconspicuous. Antennal acicle strong. *Eiconaxius*
- ? - P/3 dactylus sickle-formed. 4th thoracic sternum consisting of thoracic shield with median slit, and anterior thoracic region. 3
3. P/3 propodus broadened, and without transverse rows of setae and spines. Pl/2-5 broadened. 4
- P/3 propodus elongate, and with transverse rows of setae and spines. Pl/2-5 narrow. 4 ?
4. 4th thoracic shield broaden, and shallowly furrowed along median slit. Rostrum slightly longer than broad, armed with 4-6 strong blunt teeth. Pl/1 of males consisting of a single, curved article. *Strahlaxius* nov.
- 4th thoracic shield narrow, and deeply concave along its whole length. 5
5. Rostrum triangular. Pl/1 of males uniramous, and two-segmented. Pl/2 of males with appendix interna and appendix masculina. Pleura 3-5 with tuft of pubescence. Transverse suture of uropod exopod not present or inconspicuous. Pleurobranchs present on P/2-4. *Axius*
- Rostrum bifurcate, or rounded at tip. Uropod exopod without transverse suture. Pl/1 of males destitute. Pl/2 of males with appendix interna, but without appendix masculina. 6
6. Rostrum bifurcate. Anterolateral margin of carapace armed. Telson with two strong smooth transverse ridges. Pleura 3-5 with tufts of dense setae. Pleurobranchs on P/2-4 present. *Neaxius*
- Rostrum forming a rounded margin with teeth. Anterolateral margin of carapace unarmed. Telson without transverse ridges. Pleura 3-5 without tufts of dense setae. No pleurobranchs present. *Neaxiopsis* nov.
7. Gastric region remarkably elevated from base of rostrum. Rostrum small in size. P/1 unequal. 8
- Gastric region slightly convex, or at the same level with

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rostrum. Rostrum developed in good size.

not always

present in Scytoleptus

- 11
- 8. Cervical groove defined almost to a whole length. Antennal acicle comma-shaped. Pl/2 of males with appendix interna and appendix masculina. *Dorphia*^h *axius* nov.
- Cervical groove defined only on its dorsal part. Antennal acicle reduced. Pl/2 of males with appendix interna, but without appendix masculina (unknown in *Parascytoleptus*) 9
- 9. Eyestalks rudimentary; cornea unpigmented. Penultimate segment of antennal peduncle reaching to end of antennular peduncle. Uropod exopod with transverse suture. No pleurobranches on P/2-4. *Paraxius*
- Eyestalks small; cornea pigmented. Penultimate segment of antennal peduncle extending beyond antennular peduncle. Uropod exopod without suture. Pleurobranches on P/2-4. 10
- 10. Telson and uropod largely incurved. 4th thoracic shield anteriorly with a deep crescent-formed concavity. *Scytoleptus*
- Telson and uropod not incurved. 4th thoracic sternum without anterior crescent-formed concavity, however anterior thoracic region concave as a whole. *Parascytoleptus* nov.
- 11. Both P/3 and P/5 coxae of female with genital pore. Pl/1-2 of males different from Pl/3-5 in shape; Pl/1 of males simple, or frequently taking a spatulate form. 12
- Either P/3 or P/5 coxa with genital pore. Pl/1 of males absent, and that of female present; Pl/2-5 of both males and females homologous in shape. 18
- 12. Eyestalks subglobose; cornea pigmented or not. 13
- Eyestalks rounded, attached to carapace; cornea unpigmented. Pl/3-5 with appendix interna. 15
- 13. Cornea faded away. P/2 chela thickly pubescent. Appendix interna on Pl/3-5. P/1 palm with broadened ventral surface. P/3-4 coxae with knobs. Uropod exopod with or without transverse suture. *Spongi*^s *axius* nov.
- Cornea pigmented. P/2 chela without pubescent. Uropod exopod with suture. 14.
- 14. Antennal acicle elongate. Anterolateral margin of carapace unarmed. No appendix interna on Pl/3-5. 5th thoracic sternite forming thoracic shield. *Bouvier* *axius* nov.
- Antennal acicle bifurcate. Anterolateral tooth of carapace present. Appendix interna on Pl/3-5. 5th thoracic sternite simple. *Eutrichocheles*
- 15. Rostrum styliform. P/1 much unequal in shape and size. Pl/2 of males with boot-shaped appendix masculina proximally attached with appendix interna. Uropod exopod with transverse suture. *Ambiaxius*

not true for Spongi

no

no male or female : all individuals alike

not opposed to styliform

equal in Calocaris

no male

- . Rostrum elongated. P/1 unequal in shape. 16
- 16. Anterolateral tooth of carapace present. Pleurobranches on P1/2-4 present. Calocaris
- . Anterolateral margin of carapace unarmed. No pleurobranches. 17
- 17. P1/2 endopod of males with two-segmented appendix masculina and small appendix interna. Uropod exopod without transverse suture. Calastacus
- . P1/2 endopod of males with two-segmented appendix masculina proximally attached by small appendix interna. Uropod exopod with transverse suture. Calaxiopsis
- 18. Rostrum discontinuous to gastric region. 19
- . Rostrum intermediate continuous to gastric region. 21
- 19. Rostrum styliform, and eyestalks cylindrical. Anterolateral tooth of carapace present. Carapace covered with scale-like tubercles. Oxyrhynchaxius
- . Rostrum triangular, and eyestalks subglobose. Anterolateral margin of carapace unarmed. ? 20
- 20. Eyestalks thick, and with double corneae P/1 chela obliquely positioned; carpus obliquely connected with palm; palm and dactylus armed with distinct teeth on dorsal margins. Posterior margin of telson rounded. Acanthaxius
- . Eyestalks subglobose. P/1 chelae vertically positioned; palm with some flat swellings on surface, and unarmed on dorsal margin. Telson subsquare with strong posteromedian tooth. Allaxius
- 21. Eyestalks subglobose. Telson with posteromedian tooth. 22
- . Eyestalks elongate. Telson with or without posteromedian tooth. 23
- 22. Rostrum broadly triangular. Gastric region forming a spinous horse-shoe shaped prominence. Axiopsis
- . Rostrum narrowly triangular. Gastric region not forming a horse-shoe shaped prominence. Calocarides
- 23. P/1 palm with interspaced teeth on dorsal margin. Telson rounded on posterior margin, and without posteromedian tooth. Calaxius
- . P/1 palm unarmed on dorsal margin. Telson truncate on posterior margin, and with posteromedian tooth. Axiorygma

Genus **Anophthalmaxius** de Man, 1905

Anophthalmaxius de Man, 1905:593; 1925c:60.

Definition.-Rostrum conspicuous, triangular, and with pointed apex; margins continuous with gastric region. Anterolateral

broken in only specimen known

Check list of Axiidae

margin of carapace unarmed. Gastric region situated at the same level with rostrum. Cervical groove noticeable only on dorsal part, not extending to its anterolateral part. Pleura smooth, and unarmed on margins. Telson oblong, and without posteromedian tooth.

Eyestalks forming a flat quadr^urate plate; cornea unpigmented. Antennal acicle simple and prominent. Mandible with serrated cutting edge.

P/1 equal; dorsal margin of chela unarmed. P/2-4 with pleurobranches.

Pl/1 of male absent. Pl/2-5 bifurcate, and narrow; Pl/2 with appendix interna, but without appendix masculina. Uropod exopod without transverse suture.

Remarks.-The type species, *eccoptodactylus*, from Aru Is, Arafura Sea, 1788m deep.

Type species.-*Anophthalmaxius eccoptodactylus* de Man, 1905 [by monotypy].

Anophthalmaxius eccoptodactylus de Man, 1905

Anophthalmaxius eccoptodactylus de Man, 1905:594; de Man, 1925c:61, pl. 5 figs 11-11d, pl. 6 figs 11e-n.
Anophthalmaxius enoptodactylus, -Balss, 1925:210 (miss-spelling).

Material examined.-1♂, ZMA. (examined by M. Sait Laurent)

Remarks.-This species is characteristic in that the mandible is serrated on the cutting edge of the molar process, and the eyestalks are quadrate as in callianassid species. However the antennal acicle is distinct.

Type locality.-Aru Is., Arafura Sea, 1788m deep.

Distribution.-Arafura Sea, 1788m.

Genus **Eiconaxius** Bate, 1888

Eiconaxius Bate, 1888:40.

Iconaxiopsis Alcock, 1901:193 (Type species: *laccadivensis*); Balss 1925:210.

Iconaxius Alcock, 1901:193 (Miss-spelling).

Iconaxiopsis s. str., -Borradaile, 1903:537.

Eiconaxius s. str., -Borradaile, 1903:537; de Man, 1925c:14.

Definition.-Rostrum widely triangular, dorsally furrowed, and with more or less acute or rounded apex; margins armed or unarmed, extending backward to gastric region. Gastric region convex. Cervical groove inconspicuous. Pleura and terga entire. Telson oblong, denticulate on lateral margins, and with posteromedian tooth. Eyestalks short; cornea pigmented or not. Antennal acicle conspicuously developed.

P/1 subequal or unequal; palm with or without dorsodistal

tooth. P/3 dactylus short, oval, and armed with spinous row on ventral margin.

Pl/1 of males absent, and of females two-segmented. Pl/2 of males bifurcate with appendix internal and appendix masculina. P/3-5 of males and P/2-5 of females bifurcate with appendix interna. Uropod exopod without transverse suture.

Remarks.-*Iconaxiopsis* Alcock, 1901 was synonymized with *Eiconaxius* by de Man (1925c:8).

In the genus *Eiconaxius* 22 species are known; *acutifrons*, *kermadeci*, *parvus*, *weberi*, *indica*, *consobrinus*, and *sibogae* from the Indonesian waters; *laccadivensis*, and *andamanensis* from Indian Ocean; *kermadeci*, and *kermadecensis* from South Seas; *asper*, and *singularis* from central Pacific; *farreae* from Japan; *crisagalli* from Panama, west coast of America; *caribaeus*, *agassizi*, *borradailei*, *antillensis*, *rotundifrons*, *spinigera*, and *carinatus* from West Indies, and the Gulf of Mexico.

of *Eiconaxius*

Type species.-*Eiconaxius acutifrons* Bate, 1888 [through *Borradaile*, 1903].

Species included.-*Eiconaxius acutifrons* Bate, 1888; *Eiconaxius kermadeci* Bate, 1888; *Eiconaxius parvus* Bate, 1888; *Eiconaxius farreae* Ortmann, 1891; *Eiconaxius crista-galli* Faxon, 1893; *Eiconaxius caribaeus* Faxon, 1896 (= *Eiconaxius communis* Bouvier, 1905); *Iconaxiopsis laccadivensis* Alcock and Anderson, 1894; *Iconaxiopsis andamanensis* Alcock, 1901; *Eiconaxius agassizi* Bouvier, 1905; *Eiconaxius borradailei* Bouvier, 1905; *Eiconaxius crista-galli* var. *antillensis* Bouvier, 1905; *Eiconaxius rotundifrons* Bouvier, 1905; *Iconaxiopsis spinigera* MacGilchrist, 1905; *Eiconaxius asper* Rathbun, 1906; *Iconaxius weberi* de Man, 1907; *Iconaxius crista-galli* var. *indica* de Man, 1907; *Iconaxius (Iconaxiopsis?) consobrinus* de Man, 1907; *Iconaxiopsis kermadecensis* Chilton, 1911; *Axius (Eiconaxius) sibogae* de Man, 1925c; *Axius (Eiconaxius) caribaeus* var. *carinatus* Bouvier, 1925; *Axius (Eiconaxius) singularis* Zarenkov, 1981.

was

***Eiconaxius acutifrons* Bate, 1888**

Eiconaxius acutifrons Bate, 1888:40, text-fig. 4, pl. 5 figs 2d-g.

Axius acutifrons, -Faxon, 1895:103, pl. 28 fig. 2.

Axius (Eiconaxius) acutifrons, -Borradaile, 1903:538; de Man, 1925c:15,37, pl. 3 figs 5-5e.

Iconaxius acutifrons, -Balss, 1925:209.

to be checked?

Type locality and habitats.-Off Banda, South of Great Kei Is., Indonesia, volcanic mud.

Distribution.-Banda Sea; Great Kei Is.; Bay of Panama? 595-1000m.

lectotype selected (on fig. 5) is from which locality?

***Eiconaxius kermadeci* Bate, 1888**

Fig. 5

Check list of Axiidae

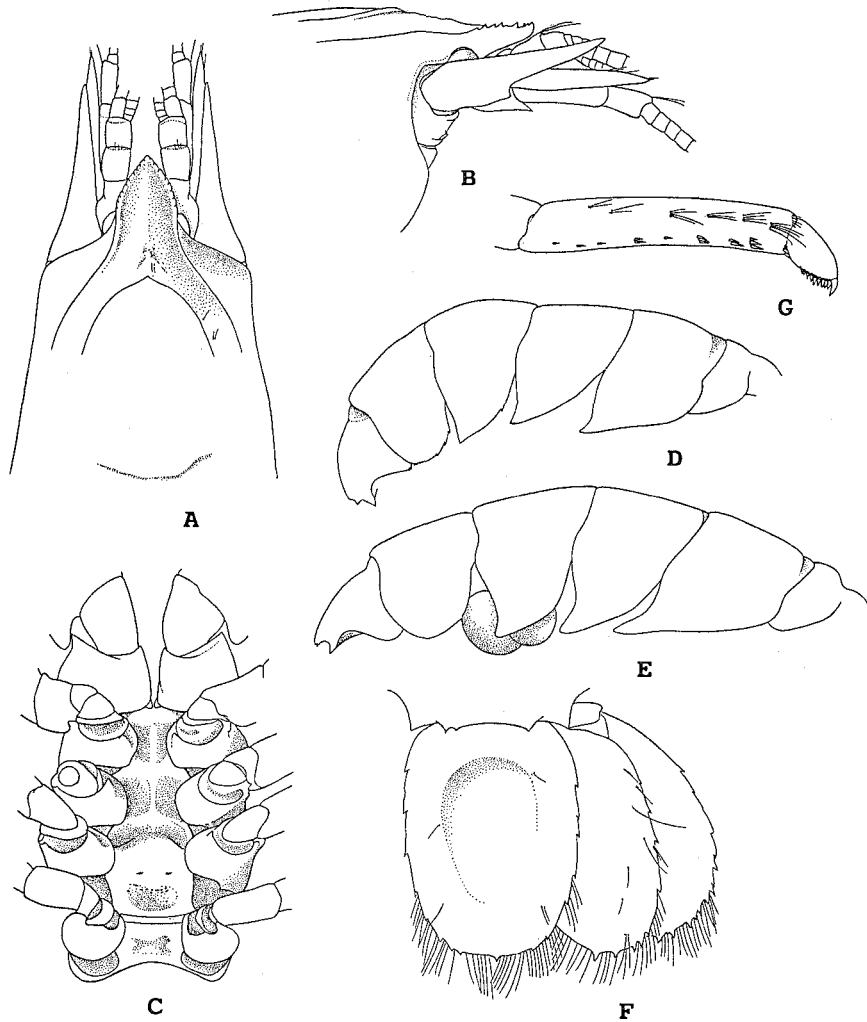


Fig. 5. *Eiconaxius kermadeci* Bate, 1888: A. anterior part of carapace in dorsal aspect; B. same in lateral aspect; C. thoracic sternites; D. abdominal somites in lateral aspect; E. same in females; F. tail-fan. A, B, C, D, and F for ♂ lectotype, and E for ovig. ♀ paralectotype, BM 1888.43, types.

Eiconaxius kermadeci Bate, 1888:43, pl. 5 figs 3-31; Balss, 1925:210.

Axius (Eiconaxius) kermadeci, -Borradaile, 1903:538; de Man, 1925c:16, 42, pl.3 figs 7-7f.

Iconaxius kermadeci, -Balss, 1925:210.

Material examined.-1♂, TL 21, lectotype: 2 ovig. ♀♀, TL 18, 23, paralectotypes, BM 1888.43.

Remarks.-The male lectotype and the female paralectotype^s are designated. The male lectotype is illustrated on the anterior part of carapace, the thoracic sternites, the abdomen, the tail-fan, and the propodus and dactylus of the 3rd pereopods (Fig. 5). The thoracic sternites are broadly exposed.

The gill-formula is defined as follows,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	-	1	1	1	1	-	-
Arthropodes	-	-	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	1	1	1	-

Type locality.-Off Kermadec Is., 600fms (1080m) deep, hard ground.

Distribution.-Kermadec Is. 1080-1100m.

Eiconaxius parvus Bate, 1888

Eiconaxius parvus Bate, 1888:44, pl. 5 figs 4-5.

Axius (Eiconaxius) parvus, -Borradaile, 1903:538; de Man, 1925c:16, 42, pl. 3 figs 7-7f.

Iconaxius parvus, -Balss, 1925:210.

Material examined.-1♀, TL 14, lectotype, BM.

Remarks.-Bate (1888:44) observed seven ovigerous specimens, however one of them examined here is to be designated as the lectotype.

Type locality.-Off Kermadec Is., 952m deep, hard ground.

Distribution.-Kermadec Is.; Great Kei Is. 520-950m

Eiconaxius farreae Ortmann, 1891

Eiconaxius farreae Ortmann, 1891:49.

"?Axius (*Iconaxiopsis*) *farreae*", -Borradaile, 1903:537.

Axius (Eiconaxius) farreae, -Balss, 1914:88; de Man, 1925a:125, text-figs 3-3d.; de Man, 1925c:16; Yokoya, 1933:52.

Iconaxiopsis farreae, -Balss, 1925:209, 211.

Axius farreae, -Sakai, 1987:304.

Type locality.-Sagami Bay, Japan, 182-364m deep.

Distribution.-Tokyo Bay to Goto I., Japan. 77-600m.

Eiconaxius cristagalli (Faxon, 1893)

Axius crista-galli Faxon, 1893:193; Faxon, 1895:104, pl. 28 figs 1-1h..

"?Axius (*Eiconaxius*) *crista-galli*", -Borradaile, 1903:538.

Check list of Axiidae

Iconaxius cristagalli, -Balss, 1925:210.

Axius (Eiconaxius) crista-galli, -de Man, 1925c:14.

Type locality.—South of Panama, West coast of America, 465fms (837m) deep.

Distribution.—Panama, 465fms (837m).

Eiconaxius carribaeus (Faxon, 1896)

Fig. 6

Iconaxius carribaeus Faxon, 1896:155, pl. 1 figs 1-4.; Balss, 1925:209.

Axius (Eiconaxius) carribaeus, Bouvier, 1925:461, pl. 7 fig. 6; de Man, 1925c:16.

Iconaxius carribaeus, -Balss, 1925:209.

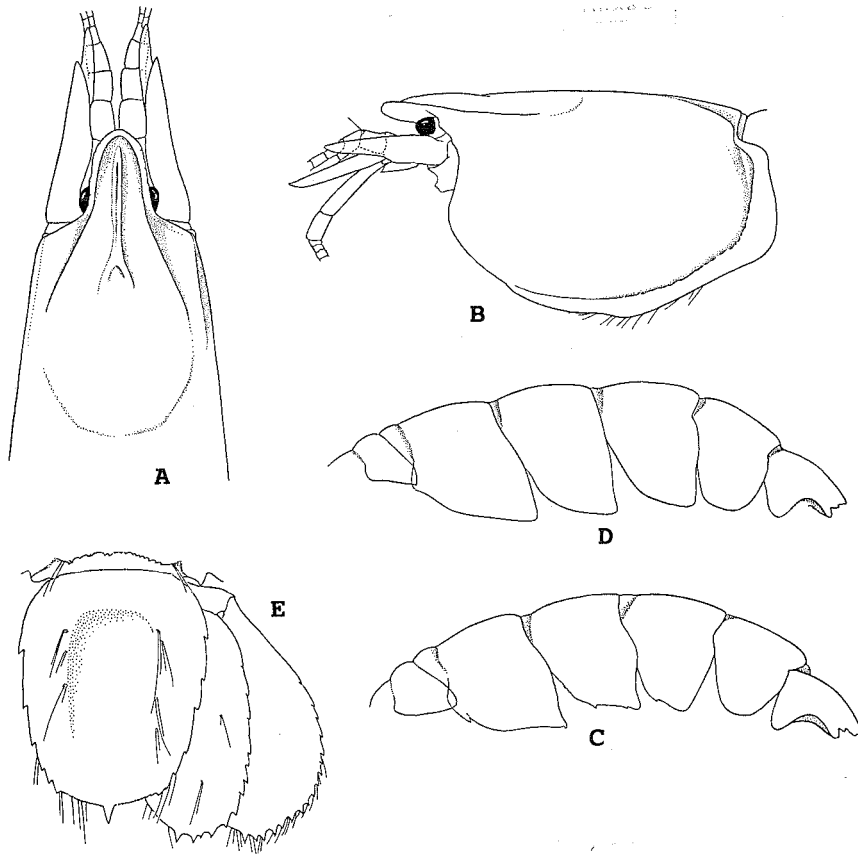


Fig. 6. *Eiconaxius rotundifrons* Bouvier, 1905: A. anterior part of carapace in dorsal aspect; B. carapace in lateral aspect; C. abdominal somites of male in lateral aspect; D. same of female; E. tail-fan. A, B, C, and E in ♂, and D in ♀, MP 183.

Naturalists 3.

Eiconaxius communis Bouvier, 1905:803
Iconaxius communis, - Balss, 1925:210.
Axius (*Eiconaxius*) *communis*. -de Man, 1925c:17

Material examined.-1♀, TL 13, CL 4.5, MP 177, Barbados, 140 (= 227m) brasses, "Blake", No 299; 1♀, TL 11.5, CL 4, MP 178, Guadelope, 150 brasses (= 244m), "Blake", No 16; 1 ovig. ♀, TL 15, CL 5, MP 179, Barbados, 123 brasses (= 199m), "Blake", No 297; 2♂♂, TL 12, CL 4.5: TL 11.5, CL 4, MP 180, Guadelope, 155 brasses (not 150)(= 251m), "Blake", No 166; 1♂, TL 13, CL 4.5: 1♀, TL 16, CL 6, MP 181, Milligan Key, 124 brasses (= 201m), "Blake", No 259; 1♀, TL TL 19, CL 7, MP, transferred from Comp. Zool. Comp. Mus., Havana, 290 fms (= 431m), "Atlantis" Sta 2999, March 17, 1938 coll.

Remarks.-*communis* Bouvier, 1904 from West Indies and Gulf of Mexico was treated by Bouvier (1925:461) as a synonym of the present species.

Type locality.-Caribbean Sea, 434m deep; commensal in sponges of the genus *Farrea*, Hexactinellidae)

Distribution.-West Indies and Gulf of Mexico, 88-237fms (158-426m) deep.

***Eiconaxius laccadivensis* (Alcock and Anderson, 1894)**

Eiconaxius kermadeci var. *laccadivensis* Alcock and Anderson, 1894:162.

Iconaxiopsis laccadivensis, -Alcock, 1901:195; Alcock and MacGilchrist, 1905:, pl 71, fig 3; Balss, 1925:209, 211.

Axius (*Iconaxiopsis*) *laccadivensis*, -Borradaile, 1903:537.
Axius (*Eiconaxius*) *laccadivensis*, -de Man, 1925c:16.

Type locality.-Arabian Sea near Laccadives and Travancore, 360fms (648m), 430fms (774m), 705fms (1269m) deep.

Distribution.-Arabian Sea, 648-1269m.

***Eiconaxius andamanensis* (Alcock, 1901)**

Iconaxiopsis andamanensis Alcock, 1901:196, pl. 2 fig. 1; Alcock and McArdle, 1901:, pl 55, fig 2; Balss, 1925:209.

Axius (*Iconaxiopsis*) *andamanensis*, -Borradaile, 1903:537.
Axius (*Eiconaxius*) *andamanensis*, -de Man, 1925c:16.

Type locality.-Bay of Bengal, off west coast of the Andamans, 238-290fms (428-522m) deep.

Distribution.-Andaman Sea, 428-530m.

***Eiconaxius agassizi* Bouvier, 1905**

Eiconaxius Agassizi Bouvier, 1905:803.
Iconaxius Agassizi, -Balss, 1925:209.

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Axius (*Eiconaxius*) *agassizi*, -Bouvier, 1925:458, text-fig. 22,
pl. 7 fig. 5, pl. 9, fig. 2.

Axius (*Eiconaxius*) *Agassizii*, -de Man, 1925c:17.

Material examined.-1♂, TL 23, CL 7.5, MP 173, Martinique, 502
brasses (= 813m), "Blake", No 95; 1♂, TL 14, CL 5.5: 1+, TL 18,
CL 6, MP 174, Barbados, 399 brasses (= 646m), "Blake", No 288.

Diagnosis. (4)th thoracic sternum largely concave as a whole,
however much depressed in posterior part along the median slit;
the intermediate line of articulation hardly defined (Fig. 2B).

Remarks.-The shape of the 4th thoracic shield is much
different from the other axiid genera, because the (4)th thoracic
shield is concave as a whole, and has no intermediate line of
articulation to separate the posterior shield from the anterior
region.

Type locality.-West Indies to Gulf of Mexico.

Distribution.-West Indies to Gulf of Mexico, 291-860fms
(523-1548m).

Eiconaxius borradailei Bouvier, 1905

Eiconaxius Borradailei Bouvier, 1905:803.

Iconaxius Borradailei, -Balss, 1925:209.

Axius (*Eiconaxius*) *borradailei*, -Bouvier, 1925:465, pl. 7 figs
7-8, pl. 9 fig. 4.

Axius (*Eiconaxius*) *Borradailei*, -de Man, 1925c:17.

Material examined.-1♀, TL 9.5, CL 4, MP 175, Barbados, 106
brasses (172m), "Blake", No 277; 2♀♀, TL 15, CL 4.5: TL 12.5,
CL 3.5, MP 176, Grenada, 150 brasses (243m), "Blake", No 166.

Type locality.-West Indies to Gulf and Mexico.

Distribution.-West Indies to Gulf of Mexico, 172-243m.

Eiconaxius antillensis Bouvier, 1905

Eiconaxius crista-galli var. *antillensis* Bouvier, 1905:803.

Iconaxius cristagalli var. *antillensis*, -Balss, 1925:210.

Axius (*Eiconaxius*) *crista-galli* var. *antillensis*, Bouvier,
1925:456, pl. 8 fig. 3, pl. 9 fig. 1; de Man, 1925c:33.

Type locality.-Antilles and Gulf of Mexico.

Distribution.-Antilles to Gulf of Mexico, 288-298fms
(518-536m).

Eiconaxius rotundifrons Bouvier, 1905

Eiconaxius rotundifrons Bouvier, 1905:803.

Iconaxius rotundifrons, -Balss, 1925:210.

Axius (*Eiconaxius*) *caribbaeus rotundifrons*, -Bouvier, 1925:463.

h fig 5

Naturalists 3.

text-figs 23-23, pl. 10 figs 3, 4..
Axius (Eiconaxius) rotundifrons, -de Man, 1925c:17.

Material examined.-1♂, TL 17, CL 5.5: 1♀, TL 18, CL 6.5, MP 183, Ste. Lucie, 154 brasses (= 249m), "Blake", No 216; 1♂, TL 16, CL 6, MP 184, Barbados, 288 brasses (= 407m), "Blake", No 281; 1♂, TL 13, CL 5: 1♀, TL 16, CL 5, MP 185, Cariacou, 163 brasses (= 264m), "Blake", No 241: 1 ovig. ♀, TL 20, CL 7, MP 186, Ste Lucie, 164 brasses (= 266m), "Blake", No 218.

Remarks.-The carapace, the abdomen, and the tail-fan is illustrated (Fig. 6).

Type locality.-West Indies to Gulf of Mexico.

Distribution.-West Indies to Gulf of Mexico, 154-837fms (277-2506m).

***Eiconaxius spinigera* (MacGilchrist, 1905)**

Iconaxiopsis spinigera MacGilchrist, 1905:240; Alcock, Annandale, and McGilchrist, 1907:, pl 78, fig 1; Balss, 1925:209.

Axius (Eiconaxius) spiniger, -de Man, 1925c:15.

Type locality.-Bay of Bengal, 1755m deep.

Distribution.-Bay of Bengal, 1755m.

***Eiconaxius asper* Rathbun, 1906**

Eiconaxius asper Rathbun, 1906:895, text-fig 52.

Iconaxius asper, -Balss, 1925:209.

Axius (Eiconaxius) asper, -de Man, 1925c:14.

Type locality.-Vicinity of Kauai Is., Hawaii, 418-528fms (752-950m) deep.

Distribution.-Hawaii, 752-950m.

***Eiconaxius weberi* (de Man, 1907)**

Iconaxius Weberi de Man, 1907:127; Balss, 1925:210.

Axius (Eiconaxius) Weberi, -de Man, 1925c:17, 44, pl. 3 figs 8-8a, pl. 4 figs 8b-o.

Type locality.-Off south-east and south-west coasts of Great Kei Is, 595, 984m deep.

Distribution.-Great Kei Is. and Malay Archipelago, 595-984m.

***Eiconaxius indica* (de Man, 1907)**

Iconaxius crista-galli var. *indica* de Man, 1907:128.

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Iconaxius cristagalli var. *indica*, -Balss, 1925:210.
Axius (*Eiconaxius*) *crista-galli* var. *indica*, -de Man, 1925c:15,
31, pl. 2 figs 3-3b.

Type locality.-Off south-east coast of Great Kei Is., 934m deep.

Distribution.-Great Kei Is., and Malay Archipelago, 934-980m.

***Eiconaxius consobrinus* (de Man, 1907)**

Iconaxius (*Iconaxiopsis*?) *consobrinus* de Man, 1907:129
Iconaxiopsis consobrina, -Balss, 1925:209, 211, text-fig. 15.
Axius (*Eiconaxius*) *consobrinus*, -de Man, 1925c:16, 40, pl. 3
figs 6-6d.

Type locality.-Off E. Timor, 1224m deep.

Distribution.-Timor and Malay Archipelagos, 1224m.

Eiconaxius kermadecensis (Chilton, 1911)

not Eiconaxius
could be
Dorphanaxius

Iconaxiopsis kermadecensis Chilton, 1911:550, text-figs 1-2;
Balss, 1925:211.

Axius (*Eiconaxius*) *kermadecensis*, -de Man, 1925c:15.

Type locality.-Kermadec Is., littoral. "rock pools"

***Eiconaxius sibogae* de Man, 1925**

Axius (*Eiconaxius*) *Sibogae* de Man, 1925b:218; de Man, 1925c:15,
34, pl. 2 figs 4-41.

Type locality.-Sulu Sea, stony bottom, 522m deep.

Distribution.-Sulu Sea, 522m.

***Eiconaxius carinatus* Bouvier, 1925**

Axius (*Eiconaxius*) *caribbaeus* var. *carinatus* Bouvier, 1925:465,
pl. 9 fig. 3.

Material examined.-1♀, TL 17, CL 6, MP 182, Montana, 298
brasses (= 483m), "Blake", No 154.

Type locality.-Caribbean Sea, 88-298fms (158-536m).

Distribution.-Caribbean Sea, 158-536m.

***Eiconaxius singularis* (Zarenkov, 1981)**

Axius (*Eiconaxius*) *singularis* Zarenkov, 1981:83. text-fig d.

Type locality.-Around submarine mountains Marcus-Necker near

Hawaii, 100-1350m.

Distribution.-Only known from the above mentioned type locality.

Genus *Strahlaxius* gen. nov.

Definition.-Rostrum triangular, margins denticulate, extending posteriorly to gastric region. Anterolateral margin unarmed. Gastric region convex. Cervical groove distinct, but unarmed.

4th thoracic sternite broadened; intermediate line of articulation thickly carinate.

Abd Pileura 3-5 laterally without tuft of setae. Telson not sculptured on surface, and with posteromedian tooth.

Eyestalks subglobose; cornea pigmented. Antennal acicle simple, and distinct.

P/1 unequal. P/3 propodus setose, and without transverse rows of setae and spines. No pleurobranchs.

Pl/1 of males consisting of an uniramous rod of 3 segments, and of females of proximal segment and segmented flagellum. Pl/2 of males with appendix interna, but without appendix masculina. Pl/3-5 of males and Pl/2-5 of females with appendix interna. Uropod exopod without transverse suture.

broad

not a good character

Remarks.-This genus is closely related to *Neaxiopsis*, because both of them are provided without the pleurobranchs on the 2nd to the 4th pereopods, however differ with one another; in *Strahlaxius* the rostrum is triangular; the 2nd maxillipeds with a rudimentary arthrobranch without branches; the 4th thoracic shield is broadened; the intermediate line of articulation thickly carinate, however in *Neaxiopsis* the rostrum is broadly rounded; the 2nd maxilliped with an arthrobranch, and the 4th thoracic shield is narrow and deeply concave, anteriorly extending to narrow anterior thoracic region. So far as the genus *Strahlaxius* is concerned, two species, *plectorrhynchus* from western Pacific, and probably *waroona* from southern Australia, are known at present.

Type species.-*Axius plectorrhynchus* Strahl, 1862.

Species included.-*Axius plectorrhynchus* Strahl, 1862; *Axius waroona* Poore and Griffin, 1979.

Strahlaxius plectorrhynchus (Strahl, 1862)

Axius plectorrhynchus Strahl, 1862:1060, text-fig 2-4, 11; Strahl, 1862a:387; Miers, 1884:282; de Man, 1888:463, pl 19, fig 5.

Axius plectorrhynchus, -Zehntner, 1894:195.

Axius (Neaxius) plectorrhynchus, -Borradaile, 1903:537; Hale, 1927a:309.

Axius (Neaxius) plectorrhynchus, -McNeil, 1926:304; de Man, 1925c:13; Poore and Griffin, 1979:238, text-fig. 9; Sakai, 1987:96.

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Nec.

Axius plectrorhynchus, -Fulton and Grant, 1902:60, pl 5, figs 7-8 (= *waroona*, after Poore and Griffin, 1979).

Axius plectrorhynchus, -Hale, 1927:84, text-fig 81 (= *waroona*, after Poore and Griffin, 1979).

Material examined.-3♂♂, TL 37mm, CL 12: TL 42, CL 13: TL 42, CL 12, 1♀, TL 51, CL 13.5, 2 ovig. ♀♀, TL 44, CL 13: CL 48, CL 13.5, MP 678, Goeland, New Caledonia, 8m, March 23. 82., Menon coll.; 1♂, TL 30, CL 10, 1♀♀, TL 33, CL 10: TL 28, CL 8.5, MP 707, Heron I. Queensland, Australia, Sept. 6. 80., Boea & Hensby coll.; /1 juv. TL 11, CL 3.5, MP 708, Heron I. Oct. 21. 80., Boear & Hensby coll.; 1♂, TL 42, CL 13, MP 709, Heron Is., Sept. 76., D. Fisk coll.; 1 juv. TL 17, CL 5.5, MP 710, Heron I. Jan.12.79., N. Bruce coll.; 1 ovig. ♀, TL 47, CL 13, IRB 22060, South Pacific, Aug. 21. 59., M. Theodor coll.; 1♀, TL 24, CL 8, MP, W. Samberbaba Bay, Tapen Is. Dutch New Guinea, Feb. 14. 56., coll.

waroona

Diagnosis.-4th thoracic shield broad, concave around the median slit, and not provided with lateral teeth; the cup of articulation characteristically located on the inner surface of the lateral angle; the intermediate line of articulation broadly carinate, directing to the median convexity of the anterior thoracic region; 4th anterior thoracic region laterally concave, and the anterior neck defined in a short triangular shape (Fig. 2C).

Gill-form of *plectorhynchus* shown as follows,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	r	1	1	1	1	①	-
Arthrobranchs	-	-	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

? absent

(r=rudiment)

Type locality.-Luzon.

Distribution.-Luzon; Amboina; New Caledonia; Dutch New Guinea; Port Moller, Melanesia; Australia (Queensland, South Australia, and Western Australia), 13m, reef and coral.

Strahlaxius waroona (Poore and Griffin, 1979)

Axius plectrorhynchus, -Fulton and Grant, 1902:60, pl. 5 figs 7-8; Hale, 1927:84, text-fig. 81.

Axius (*Neaxius*) *waroona* Poore and Griffin, 1979:240, text-fig. 10.

Remarks.-As this species is seemingly similar to *plectorhynchus*, it is included in this genus.

Type locality.-North side of Cape Naturaliste, Western

Naturalists 3.

Australia, mud tube under intertidal stones.

Distribution.-Queensland; Victoria; Tasmania; South Australia; and Western Australia.

Genus *Axius* Leach, 1815

Axius Leach, 1815:343; Leach 1816: (no number of page); Bell, 1853:227; Norman, 1868:177; Boas 1880:76; Borradaile, 1903:536; de Man, 1925c:8; Rathbun, 1929:25; Poore and Griffin 1979:235; Zariquiey-Alvarez, 1968:223.

Axia H. Milne Edwards, 1837:310.

Axius s. str. Borradaile, 1903:537.

Definition.-Rostrum triangular, margins armed, extending to gastric region. Anterolateral margin of carapace unarmed. Gastric region slightly convex. Cervical groove present on a whole length. P/4 thoracic shield deeply furrowed; intermediate line of articulation remarkable, connected to a narrow anterior thoracic region.

Abdominal pleura 3-5 laterally with tuft of soft setae, and truncate or rounded on margin. Telson oblong, and with posteromedian tooth.

Eyestalks subglobose; cornea pigmented. Antennal acicle prominent. P/1 unequal, and vertically positioned. P/3 propodus broadened, and without rows of lateral spines. P/5 subchelate. P/2-4 with pleurobranchs.

Pl/1 of males simple, two-segmented; distal segment short, and that of females also two-segmented, consisting of basal segment and multiarticulate flagellum. Pl/2-5 bifurcate in broad leaves, and with tufts of soft setae; Pl/2 of males with appendix masculina and appendix interna. Uropod exopod with an inconspicuous transverse suture.

Remarks.-*Axius* is different from *Neaxius*, *Neaxiopsis*, and *Strahlaxius*; in *Axius* the 2nd pleopods of males have an appendix interna and an appendix masculina, and the uropod exopod possesses an inconspicuous transverse suture or non, while in *Neaxius*, *Neaxiopsis*, and *Strahlaxius*, the 2nd pleopods of males is provided only with appendix interna, and without appendix masculina, and the uropod exopod without a transverse suture.

The systematic confusion has been caused by the ill-observation that *A. stirhynchus* has no suture on uropod exopod (Borradaile, 1903:536, de Man, 1925c:1). The present author (K. Sakai) examined the type specimens (BM 261a, 261b), and confirmed that there is an inconspicuous suture on uropod exopod.

In the genus *Axius* three species are included; *stirhynchus* from Sidmout, England to Mediterranean, *serratus* from eastern coast of America, and Australia (de Man, 1925).

Type species.-*Axius stirhynchus* Leach, 1815 [by monotypy].

Species included.-*Axius stirhynchus* Leach, 1815; *Axius serratus* Stimpson, 1852; *Axiopsis (Axiopsis) australiensis* de Man, 1925.

Check list of Axiidae

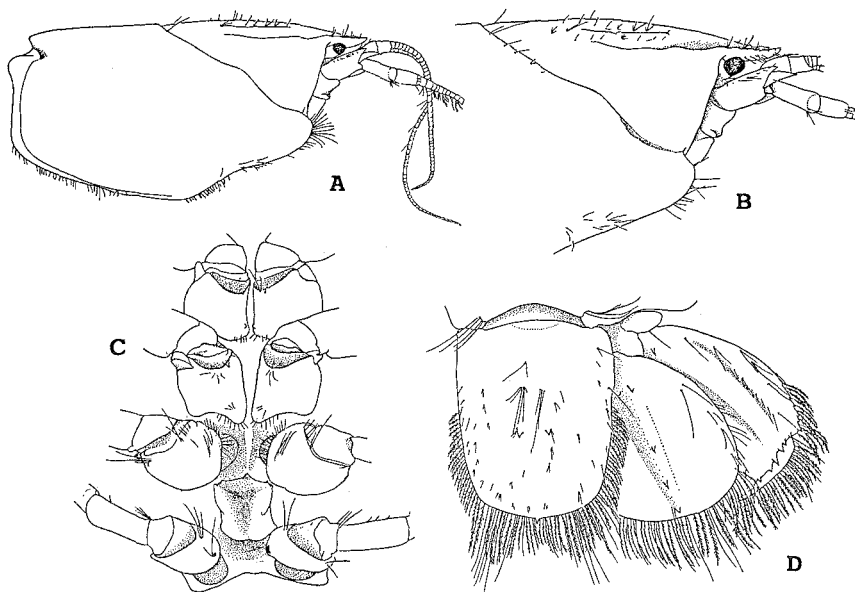


Fig. 7. *Axius stirhynchus* Leach, 1815: A. carapace in lateral aspect; B. anterior part of carapace in lateral aspect; C. thoracic sternites; D. tail-fan. ♂, MP 593.

Axius stirhynchus Leach, 1815

Fig. 7

Axius stirhynchus Leach, 1815:343; Leach, 1816:, pl 33; H. Milne Edwards, 1837:311; Bell, 1853:228, text-fig. 1.

Axius stirhynchus, -White, 1847:70; Lovett, 1885:16; Selbie, 1914:89, pl. 14 figs 1-4; Caroli, 1921a:254; Bouvier, 1940:93, text-fig 65; Ceidigh, 1962:163; Zariquiey-Alvarez, 1946:103; -1968:223, fig 88.

Axius (Axius) stirhynchus, -Borradaile, 1903:537; de Man, n, 1925c:11; Bouvier, 1940: 93, text-fig. 65; Ceidigh, 1962:163; Zariquiey-Alvarez, 1968:223, text-fig. 88a.

Axiopsis mediterranea Caroli, 1921a:254, text-figs 1-2, pl. 9 figs 14, pl. 10 figs 5-16.

Axiopsis (Axiopsis) mediterranea, -de Man, 1925c:70.

Material examined.-

Material from south coast of England. -1♀, BM 261a, type, dried specimen, Sidmouth, Devonshire; 1♀, BM 216b, type, dried specimen, Devonshire, figured by Leach (1815b); 1♂, BM 50.89, dried specimen, Weymouth, Dorset; 1♀, BM 84.15, dried specimen, Jersey.

Material from coasts of France. -2♀♀, TL 57mm, CL 18; TL 52, CL 16, 1♂, only abdomen, 2 ovig. ♀♀, only abdomens, MP 149; 1 ovig. ♀, TL ca. 76, damaged on carapace, MP 150, from St. Vaast-

la Hougue, Bouvier det., 1895 coll.; 1♀, TL 42, CL 12, MP 228, 1911, de S. Joseph coll.; 1♂, TL 75, CL 22, MP 382; 1♀, only carapace, CL 9, MP 606, June 31. 68., Y. Gruet coll.; 1♂, TL 67, CL 19, MP 607, Dec. 2. 67., Y. Gruet coll.; 1♂, TL 31, CL 10, MP 608, Dec. 13. 66., Y. Gruet coll.; 2♀♀, TL 45, CL 14.5; TL 49, CL 16.5, MP 609, La Beruerie en Retz, May 2. 69., Y. Gruet coll.; 1♂, TL 36, CL 12, MP 610, Dec. 2. 67., Y. Gruet coll.; 1♂, TL 31, CL 9.5, MP 611, St. Michel (North West) Bas, Apr. 24. 67., Y. Gruet coll.; 1♂, TL 27, CL 9, MP 624, Aug. 8. 67., Y. Gruet coll.; 1♀, TL 42, CL 13.5, March 29. 67., Y. Gruet coll.;

Diagnosis.-Carapace, thoracic sternites, and tail-fan illustrated (Fig. 7). Pl/1 of males present as a uniramous two-segmented palp, although its distal segment short, and that of females as usual consisting of a basal segment and a slender, inconspicuously segmented flagellum.

(4th) thoracic shield deeply concave; anterior margin carinate, and convergent forwards at middle; anterior thoracic region narrow with its narrow anterior neck. 3rd and 2nd thoracic median carinae sigmoid (Fig. 2D).

2nd to 4th pereopods with small pleurobranch respectively. Gill formula shown as follows,

	Maxillipes			Pereopods				5
	1	2	3	1	2	3	4	
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	1	1	1	1	1	1	-
Arthrobranchs	-	1	2	2	2	2	2	r
Pleurobranchs	-	-	-	-	1	1	1	-

(r=rudimentary)

Remarks.-The species name *stirhynchus* Leach, 1815 was emended under the plenary powers of *stirynchus* (Official List of Generic Names in Zoology, opinion 712, no. 1609).

mediterranea Caroli, 1921 is treated as a synonym of *Axius stirhynchus* by Bouvier (1940:95).

A. stirhynchus is defined as a type species of the genus *Axius* on condition that the uropod exopod has no suture (Borradaile, 1903:536), however an inconspicuous suture on the uropod exopod is present as shown by Bouvier (1940:,text-fig. 65).

Type locality.-Sidmouth.

Distribution.-Ireland, England, coasts of France. Mediterranean, Gulf of Naples.

***Axius serratus* Stimpson, 1852**

Axius serratus Stimpson, 1852:222; Smith, 1879:55, pl 10, fig 4; Smith, 1881:435; Stimpson, 1852:222; Rathbun, 1929:25, text-fig. 32.

Axius (Paraxius) serratus, -Borradaile, 1903:538.

Axius (Axius) serratus, -de Man, 1925c:11.

Check list of Axiidae

Material examined.-1♀, TL 31mm, CL 31, BM 1898.5.7.832.

Diagnosis.-4th thoracic shield rounded in shape, and deeply concave on ventral surface; anterior margin carinate, and elevated; anterior thoracic region elongated with narrow anterior neck. 3rd and 2nd thoracic median carinae sigmoid (Fig. 2E).

Remarks.-This species is different from *A. stirhynchus* in that the uropod exopod has no transverse suture.

Type locality.-Massachusetts Bay, inhabiting the laminarian and coralline Zone.

Distribution.-Bay of Fundy to Long Island Sound, east coast of North America, 10-55 fms.

Axius australiensis (de Man, 1925)

Axiopsis (*Axiopsis*) *australiensis* de Man, 1925a:127, text-fig. 4-4j; de Man, 1925c:69; Poore and Griffin, 1979:226, text-fig. 2.

Type locality.-Port Jackson, Sydney, Australia.

Distribution.-Central New South Wales and central Victoria, intertidal.

Genus *Neaxius* Borradaile, 1903

Neaxius s. str. Borradaile, 1903:537; de Man 1925c:3.

Definition.-Rostrum bifurcate at tip, margins armed, continuous to gastric region. Anterolateral margin of carapace armed with teeth. Gastric region convex. Cervical groove conspicuous almost to a whole length, and armed with lateral teeth. Abdominal pleura 3-5 laterally with tuft of setose. Telson usually broader than long, and with transverse sculptures. *low wall*

Eyestalks subglobose; cornea pigmented. Antennal acicle elongate, armed with marginal teeth.

P/1 unequal. P/3 propodus broadened, setose, and without vertical rows of spines.

Pl/1 of males absent, and of females of a single leaf without articulated flagellum. Pl/2-5 broad, and setose. Pl/2 of males with appendix interna, but without appendix masculina. Pl/3-5 of males and Pl/2-5 of females with appendix interna. Pl/2-5 with pleurobranchs. Uropod exopod without transverse suture.

Remarks. In the genus *Neaxius* three species are known; *glyptocercus* from Cape York, northern Australia, *acanthus* from Indo-west Pacific, and *vivesi* from Lower California.

Type species.-*Axia acanthus* A. Milne Edwards, 1878 [by Borradaile, 1903].

Species included.-*Axius glyptocercus* von Martens, 1868; *Axia*

strongly unequal in ♂
subequal in ♀

not Axius
probably new genus
same as
venibae

acanthus A. Milne Edwards, 1878 (= *Eiconaxius taliliensis* Borradaile, 1900; *Axius acanthus* var. *mauritanus* Bouvier, 1914): *Eiconaxius vivesi* Bouvier, 1895.

***Neaxius glyptocercus* (von Martens, 1868)**

Axius glyptocercus von Martens, 1868:613; Haswell, 1882:165.
? *Axius* (*Neaxius*) *glyptocercus*, -Borradaile, 1903:537.
Axius (*Neaxius*) *glyptocercus*, -de Man, 1925:50, text-fig. 1; de Man, 1925c:13; Poore and Griffin, 1979:236, text-fig. 8.

Type locality.-Cape York, Australia.

Distribution.-Cape York; Northern Territory; Queensland.

***Neaxius acanthus* (A. Milne Edwards, 1878)**

Axia acanthus A. Milne Edwards, 1878:110.
Eiconaxius acanthus. -De Man, 1896:491; de Man, 1898, pl. 34 fig. 57.
Axius (*Neaxius*) *acanthus*, -Borradaile, 1903:537; de Man, 1925c:14; Holthuis, 1953:51; Poore and Griffin, 1979:235, text-fig. 7; Sakai, 1987:304.

Eiconaxius taliliensis Borradaile, 1900:420 (Type locality: Talili Bay, New Britain), text-figs 15a-15c.

Axius acanthus var. *mauritanus* Bouvier, 1914:704 (Type locality: Mauritius); Bouvier, 1915:19, text-fig. 7; Fourmanoir, 1955:31, text-fig. 4.
Axius (*Neaxius*) *acanthus* var. *mauritanus*, -Bouvier, 1915:19, text-fig. 7; de Man, 1925c:14.

Material examined.-1♂, broken, CL 27mm, ABD 53, MP 190, New Caledonia, M. Edwards 1903 det.; 1♀, TL 72 mm, MP 812, dried specimen, type, New Caledonia; 1 ovig. ♀, rostrum defected, TL 69 (excluding rostrum), CL 10 (excluding rostrum), MP 191, Chaland, Mauricius, "le Chaland", 1912, M. Carié coll.; 1♂, TL 58, CL 20, 2 ovig. ♀♀, TL 67, CL 20: TL 62, CL 20.5, MP 192, Port Louis, Mauritius, Jan. 1913, M. Carilé coll.; 1♀, TL 84, CL 27, MP 451, Grande Glorieuse, Glorieuse Is., Madagascar, 20m, Jan. 30. 71, A. Crosnier coll.; 1♀, TL 65, CL 20, MP 452, Nosy Iranja, Madagascar, A. Crosnier coll.; 1♂, TL 53, CL 18, MP 453, Nossi-Bé, Madagascar, 20m, A. Crosnier coll.; 1♂, TL 77, CL 28, 1♀, TL 92, CL 29.5, MP 454, Nosy Iranja, Madagascar, A. Crosnier coll.; 2♂♂, TL 66, CL 23.5: TL 77, CL 24, 1♀, TL 73, CL 24, MP 455, Nossi-Bé, Madagascar, A. Crosnier coll.; 1♂, TL 51, CL 16, TL 457, Tuléar, Madagascar, B. Thomassin coll.; 1♂, TL 35, CL 12, MP 459, Tuléar, Madagascar, B. Thomassin coll.; 1 juv., TL 18, CL 6, MP 460, Tuléar, B. Thomassin coll.; 3 juvs TL 7-10, MP 461, Tuléar, B. Thomassin coll.; 5♂♂, TL 55-69, 7♀♀, TL 74-86, 1 ovig. ♀, MP 511, New Caledonia, Balansa coll.; 1♂, TL 78, CL 24, MP 780, Mombasa; 1 ovig. ♀, TL 59, CL 22, MP 780, Laven Reef, Mombasa; 6♂♂, TL 54-63, 3♀♀, TL 54-75, MP 865, Ishigaki, Japan, 1977, K. Sakai coll.

Check list of Axiidae

Diagnosis.-4th thoracic shield elongate, deeply furrowed, and armed with a pair of strong lateral teeth; the anterior margin thickly elevated. Anterior thoracic region medially carinate, and continued to the anterior neck. 3rd and 2nd thoracic median carinae sigmoid (Fig. 2F). 4th posterior thoracic shield in *acanthus* similar to those in *vivesi* and *gundlachi*. This species characteristically with an pleurobranch on 5th pereiopods. Branchial formula shown as follow,

	Maxillipeds				Pereiopods				
	1	2	3		1	2	3	4	5
Epipods	1	1	1	1	1	1	1	1	-
Podobranchs	-	-	1	1	1	1	1	1	-
Arthrobranchs	-	1	2	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	1	1	1	1

Remarks.-*taliliensis* was synonymized by Borradaile (1903:537) with the present species, and var. *mauritiis*, was also synonymized by Poore and Griffin (1979: 235).

Type locality.-New Caledonia.

Distribution.-Saipan, Marianas Is.; West Celebes; New Britain; New Caledonia; Murray Is., Torres Strait; Port Louis, Mauritius.

Neaxius vivesi (Bouvier, 1895)

Eiconaxius Vivesi Bouvier, 1895:7.

Axius (Neaxius) Vivesi, -De Man, 1925:56, text-fig. 2; de Man, 1925c:14.

Material examined.-2♂♂, TL 110, CL 36; TL 81, CL 28, MP 193, syntype, Lower California, 1894, L. Digue coll.; 1♂, TL 92, CL 28, MP 194, type, Lower California, L. Digue coll.; 1♀, TL 88, CL 28, MP 510, Ile San Jose, Gulf of California, L. Digue leg., 1897.

Diagnosis.-This species has pleurobranchs on the 2nd to 5th pereiopods as shown in the following formula,

	Maxillipeds				Pereiopods				
	1	2	3		1	2	3	4	5
Epipods	1	1	1	1	1	1	1	1	-
Podobranchs	-	1	1	1	1	1	1	1	-
Arthrobranchs	-	1	2	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	1	1	1	1	1

Type locality.-Lower California.

Distribution.-Lower California.

Genus *Neaxiopsis* gen. nov. *with modification*

Definition.-Rostrum forming broad rounded margin, lateral margins extending posteriorly to gastric region. Anterolateral margin unarmed. Gastric region convex. Cervical groove distinct, and without teeth.

P/4 thoracic sternite narrow, deeply furrowed, and with a pair of strong thorns; intermediate line of articulation convex. Pleura 3-5 laterally without tufts of setae. Telson broader than long, or about as long as broad, and with posteromedian tooth.

Eyestalks subglobose; cornea pigmented. Antennal acicle simple, and distinct. Mxp/3 with an arthrobranch.

P/1 unequal. P/3 propodus without transverse rows of setae and spines. No pleurobranchs.

Pl/1 of males absent. Pl/2 of males with appendix interna, but without appendix masculina. Pl/3-5 of males and Pl/2-5 of females with appendix interna. Uropod exopod without transverse suture.

Remarks.-This genus is closely related with *Neaxius* in such external characters as the shapes of the tail-fan, and the gastric region, however it differs; in *Neaxiopsis* the anterolateral margin of the carapace is unarmed; the cervical groove is also unarmed; the 2nd to 5th abdominal pleura laterally without tufts of pubescence; and no pleurobranchs, while in *Neaxius* the anterolateral margin is armed with numerous teeth; the cervical groove is laterally provided with many teeth; the 2nd to 5th pleurobranchs are present.

In *Neaxiopsis* there are three species; *gundlachi* from Cuba, West Indies, *euryrhynchus* from ?Japan and Celebes, and *orientalis* from New Britain.

Type species.-*Callianidea gundlachi* von Martens, 1872.

Species included.-*Callianidea Gundlachi* von Martens, 1872; *Axius (Neaxius?) euryrhynchus* de Man, 1905; *Axius (Neaxius) Gundlachi* var. *orientalis* de Man, 1925.

Neaxiopsis gundlachi (von Martens, 1872) *might be identical*

Callianidea Gundlachi von Martens, 1872:132, pl. 5 figs 15, 15b, 15c.

"?*Axius (Neaxius) Gundlachi*", -Borradaile, 1903:537.

Axius gundlachi, -Rathbun, 1919:327.

Axius (Neaxius) Gundlachi, -de Man, 1925a:120, text-fig. 1; 1925c:12, 31.

Material examined.-1♀, ZMB 4572, holotype. Cuba, Gundlach coll.; 1♂, TL 84, CL 30, USNM 42958, Schottegat, Island of Curacao, shallow waters, Apr. 20. 05, J. Boeke coll.

Diagnosis.-4th thoracic sternite narrow, deeply furrowed, and armed with a pair of strong thorns; intermediate line of articulation clearly convex. Abdominal pleura 3-5 laterally

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without tufts of setae.

No pleurobranchs as in the following gill-formula,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	-	1	1	1	1	r	-
Arthropods	-	1	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

Type locality.-Cuba.

Distribution.-Cuba; Curacao.

Neaxiopsis euryrhynchus (de Man, 1905)

Axius (*Neaxius*?) *euryrhynchus* de Man, 1905:590.

Axius (*Neaxius*) *euryrhynchus*, -de Man, 1925c:12, 25, pl. 1, fig. 2-2e, pl.2 fig. 2f-2k; ?Miyake, 1982:90, pl. 30 fig. 5.

Remarks.-Recently Miyake (1982) reported this species from Japan, however it is uncertain whether it belongs *euryrhynchus*. His female specimen, measuring 69 mm in total length, is much larger than de Man's type specimen of female from Celebes, which is young, measuring only 11 mm (de Man, 1925c:26),

Type locality.-Celebes, 36m deep.

Disribution.-Celebes; ?Tanabe, Japan.

Neaxiopsis orientalis de Man, 1925

Axius (*Neaxius*) *Gundlachi* var. *orientalis* de Man, 1925a:122, text-figs 2-2b; de Man, 1925c:12, 31.

Type locality.-Matupi, New Britain, Bismarck Archipelago.

Distribution.-Only known from the type-locality.

Genus Dorphinaxius gen. nov.

Definition.-Rostrum short, trilobed; margins extending backward to gastric region. Anterolateral margin unarmed. Gastric region conspicuously elevated from the level of rostrum, and with median and submedian carinae. Cervical groove present to a whole length. Abdominal pleura smooth on surface, and truncate or rounded on margins. 4th thoracic shield medially with transverse concavity. Telson oblong, rounded on posterior margin, and without posteromedian spine.

Eyestalks small; cornea pigmented. Antennal acicle comma-shaped, directed anteriorly.

P/1 unequal; palm of both chelipeds much longer than dactylus. Pleurobranchs present on P/2-4.

Pl/1 of males absent, and of females of proximal segment and

segmented flagellum. P1/2-5 sexually demorphic; those in males narrow, leaf-like, while in females slender. P1/2 of males with appendix interna and appendix masculina. P/3-5 of males and P/2-5 of females with appendix interna. Uropod exopod with transverse suture.

Type species.-*Axiopsis (Paraxiopsis) appendiculis* Poore and Griffin, 1979.

Remarks.-This new genus is similar to *Scytoleptus*, because the gastric region is remarkably elevated from the level of the rostrum; the 1st to the 3rd pereopods with a broad foliaceous epipod respectively; the 2nd to 5th pleopods are sexually dimorphic in shape, that is, the 2nd to 5th pleopods of females are narrower than those of males; and the 2nd to 4th pereopods with pleurobranch. However, in *Dorphinaxius* the cervical groove is recognized to a whole length; the 2nd to 4th pereopods lack the pleurobranch respectively, however, in *Scytoleptus* the cervical groove is defined only on dorsal part, and the 2nd to the 4th pereopods possess a pleurobranch.

***Dorphinaxius appendiculis* (Poore and Griffin, 1979)**

Axiopsis (Paraxiopsis) appendiculis Poore and Griffin, 1979:224, text-fig 1.

Material examined.-2♂♂, TL 40, CL 13.5: TL 29, CL 11, 1♀, TL 21, CL 8, USNM 92800.

Diagnosis.-P/1-4 epipods forming a rounded leaf. Pleurobranches not present. 4th thoracic shield provided with a pair of rounded lateral angles, and deeply concave along the median slit; transverse concavity present with a pair of pits at the level of articulation. 4th anterior thoracic region triangular, and its anterior neck distinct. 3rd median thoracic carina decreasing forwards (Fig. 3A). Gill-formula shown as follows,

*Small
ovis*

	Maxillipeds			Pereopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	-	1	1	1	1	-	-
Arthrobranchs	-	-	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

Type locality and habitats.-Shell Harbour, New South Wales, Australia, upper stones between tide mark.

Distribution.-New South Wales, intertidal-5m.

Genus *Paraxius* Bate, 1888

Paraxius Bate, 1888:37.

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Paraxius s. str. Borradaile, 1903:538; Balss, 1957:1579; de Man, 1925c:18.

Definition.-Rostrum small, margins armed, not extending backward to gastric region. Anterolateral margin of carapace unarmed. Gastric region much convex, and without dorsal carina. Cervical groove defined only on dorsal part.

Abdominal pleura smooth on surface, and rounded on margins. Telson oblong, and serrated on lateral margins; posterior margin rounded, and without posteromedian spine.

Eye-stalks reduced; cornea retired. Antennal acicle rudimentary. P/1 unequal; palm of larger cheliped with dorsodistal spine. No pleurobranchs.

Pl/1 of males with a two-segmented rod; distal segment shorter than proximal. Pl/2 of males with appendix interna, but without appendix masculina. Pl/2-5 with appendix interna. Uropod exopod with transverse suture.

♀ unknown

Type species.-*Paraxius altus* Bate, 1888 [by monotypy].

Paraxius altus Bate, 1888

Fig. 8

Paraxius altus Bate, 1888:37, pl. 5 figs 1d-z; Balss, 1925:210. *Axius (Paraxius) altus*, -Borradaile, 1903:538; de Man, 1925c:18.

Material examined.-1♂, BM 18 88 22, holotype; 1♂, TL 15.5, CL 5.5, MP 996, Philippines, Musorstom II, St. 38, 1980.

Diagnosis.-Anterior part of carapace, abdominal somites, tail-fan, and 1st pleopod of male are shown (Fig. 8). 4th thoracic shield broadly concave, and provided with a pair of rounded lateral angles; intermediate line of articulation is slender; anterior thoracic region broadly triangular, and concave at its both sides (Fig. 3B). Pleopod 2 of males with appendix interna, but without appendix masculina.

No pleurobranchs shown as in the following gill-formula.

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	-	1	1	1	1	-	-
Arthrobranchs	-	-	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

Remarks.-Gurney's gill-formula of *Paraxius* (1942:149) is much different from the above-cited one as shown in followings.

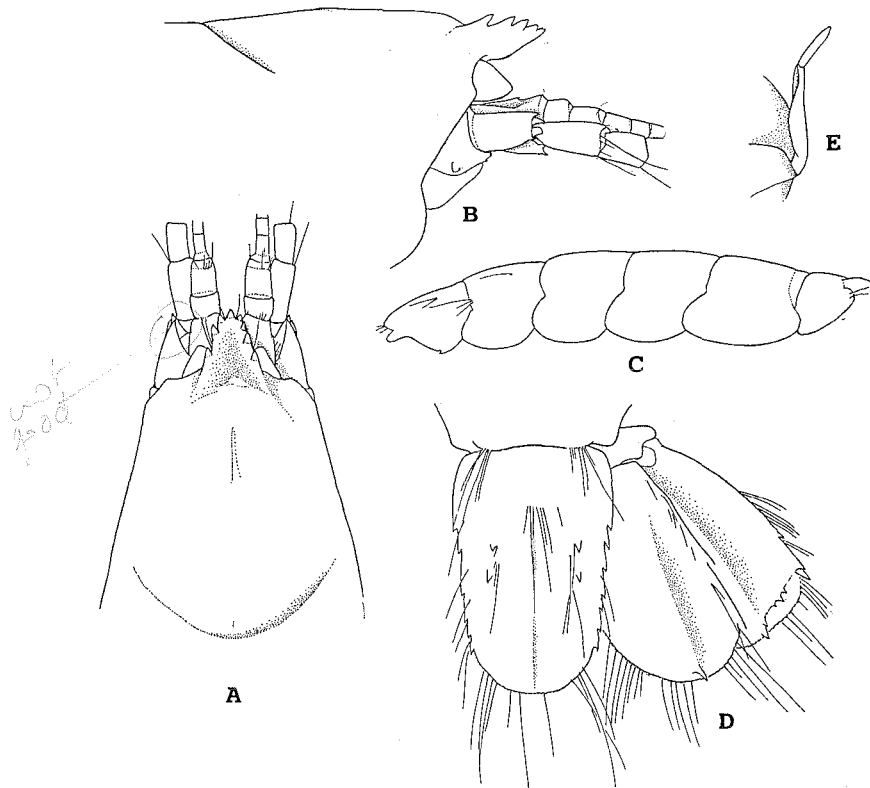


Fig. 8. *Paraxius altus* Bate, 1888: A. anterior part of carapace in dorsal aspect; B. same in lateral aspect; C. abdominal somites in lateral aspect; D. tail-fan; E. 1st pleopod. ♂, BM 1888.22, holotype.

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	-	r	r	r	r	-	-	-
Podobranchs	-	1	1	1	1	-	-	-
Arthrobranchs	-	2	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

(Gurney, 1942:149)

Type locality.-North of Papua, New Guinea, 1958m, blue mud.

Distribution.-N. Papua, New Guinea; Philippine, 1926(= 1070fms)-1958m.

Genus *Scytoleptus* Gerstaecker, 1856

Scytoleptus Gerstaecker, 1856:155; Borradaile, 1903:539; de Man, 1925c:40; Barnard, 1950:499; Poore and Griffin, 1979:243.
Evaxius Kingsley, 1882:26.

Check list of Axiidae

Definition.-Rostrum small, short, pointed at tip; margins unarmed, shortly extending to a pair of teeth on gastric region. Anterolateral margin of carapace unarmed. Gastric region extremely elevated from the level of rostrum, and with median and submedian carinae. Cervical groove defined except in its anterolateral part. Abdominal pleura 3-5 with a small tuft of setae. Telson arched on surface, oval, and reduced in its breadth posteriorly; posterior margin with or without posteromedian spine.

Eyestalks subglobose; cornea pigmented. Antennal acicle short. P/1 unequal; palm much shorter than fingers, and unarmed on dorsal margin. P/3 propodus with transverse rows of spines. Pleurobranchs on P/2-P4.

P1/1 of males bears a slender leaf, and that of females consisting of a proximal segment and a segmented flagellum; P1/2 of males with appendix interna, but without appendix masculina. P1/3-5 of males with broadened protopods, and broad with appendix interna, and P1/2-5 of females with narrow protopods, and slender with appendix interna. Uropods arched on surface; exopod without transverse suture.

Remarks.-*Evaxius* Kingsley was synonymized with *Scytoleptus* by de Man (1925c:49).

In *Scytoleptus* the 1st pleopod of males has a uniramous article as in *Axius* and *Neaxiopsis*.

Type species.-*Scytoleptus serripes* Gerstaecker, 1856 [by monotypy].

***Scytoleptus serripes* Gerstaecker, 1856**

Fig. 9

Scytoleptus serripes Gerstaecker, 1856:158, pl. 6 figs 1-4; Strahl, 1861:1055; Strahl, 1862:383; Hilgendorf, 1878:827; Borradaile, 1903:540; Lenz, 1905:379; Bouvier, 1914:702; Bouvier, 1915:198, text-figs 8, 9; de Man 1925c:49, pl. 4 figs 9-9h; Barnard, 1950:499; Fourmanoir, 1955:30; Poore and Griffin, 1979:243, text-fig. 11; Kensley, 1981:30.

Evaxius tricarinatus Kingsley, 1882:130 (Type locality: Zanzibar), pl 1, fig 1; Borradaile, 1903:540.

Material examined.-1♀, TL 45.5, CL 15, MP 195, St. Marie, Madagascar coll., A. Milne Edwards det., Bouvier 1915:198; 1♀, TL 49, CL 16.5, MP 196, "le Chaland", Mauricius, Oct. 1892, M, Carié, coll.; 1♀, TL 41, CL 15, MP 197, Port Luice, Mauricius, 1913, M. Carié coll.; 1♂, TL 17, CL 7, MP 198, Grande Comore, 1899, Pobeguïn coll., Balss det.; 1♂, TL 38, CL 16, MP 392, Mayotte Is, Comoros, Nov. 26, 64, Voker coll.; 1♀, TL 21.5, CL 9.5: 1 ovig. ♀, CL 18, telson missing, MP 393, Iwatin Is, Kenya, Sept. 7, 71, A.J. Bruce coll.; 3♂♂, TL 48, CL 14.5-TL 26, CL 8.5, MP 394, Jadini, Kenya, 4° 20'S, 39° 34.7'E, 0.5 m, Apr. 16. 72., A.J. Bruce coll.; 5♂♂, TL 41, CL 14.5-TL 16.5, CL 6.5: 1 ovig. ♀, TL 6.6, CL 20, MP 463, Nossi-Bé, Madagascar, Aug. 18.58., A. Crosnier coll.; 5♂♂, TL 44, CL 16.5-TL 21, CL 8: 1♀,

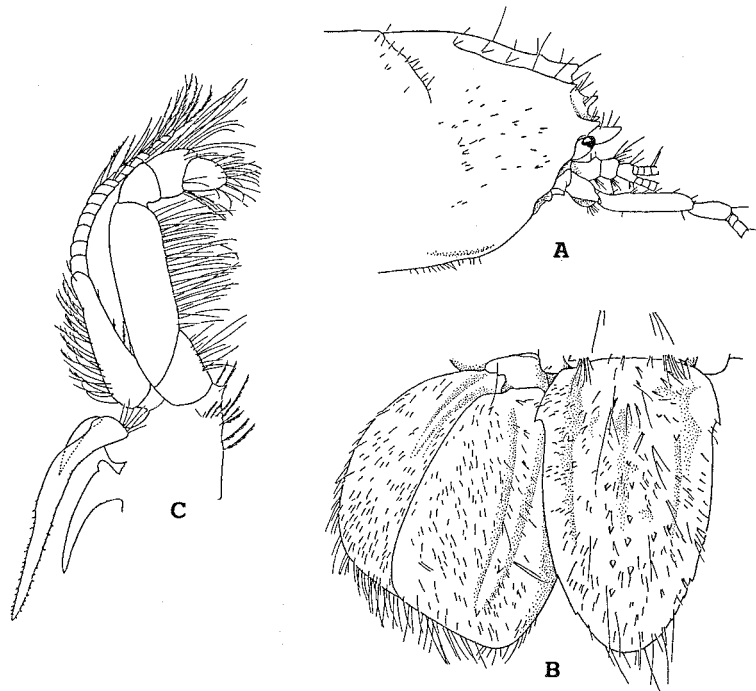


Fig. 9. *Scytoleptus serripes* Gerstaecker, 1856: A anterior part of carapace; B. tail-fan; C. 2nd maxilliped. ovig. ♀, MP 914.

TL 40, CL 13.5, MP 464, Mayotte Is., A. Crosnier coll.; 1♂, TL 43, CL 16, MP 465, Tuléar, Madagascar, Oct. 58., A. Crosnier coll.; 11♂♂, TL 41, CL 15.5-TL 17, CL 6, 2 ovig. ♀♀, TL 51, CL 16.5- TL 54, CL 18, 3♀♀, TL 60, CL 20-TL 17, CL 7, MP 580, Tuléar, P. Galeuon coll.; 8♂♂, TL 51, CL 18.5-TL 17, CL 7.5, 4 ovig. ♀♀, TL 64, CL 20.5-TL 48, CL 17.5, MP 581, Tuléar, P. Galeuon coll.; 1 ovig. ♀, TL 16.5, CL 20.5, MP 582, Tuléar, P. Galeuon coll.; 1♂, TL 19, CL 7.5, MP 583, Tuléar, P. Galeuon coll.; 1♂, TL 36, CL 11, 1 ovig. ♀, TL 57, CL 19, MP 584, Tuléar, P. Galeuon coll.; 2♂♂, TL 23, CL 9- TL 15, CL 6, MP 585, Tuléar, P. Galeuon coll.; 1♂, TL 37, CL 13, 1♀, TL 26, CL 10, MP 586, Tuléar, P. Galenoy coll.; 2♀♀, TL 13, CL 5-TL 19, CL 7, MP 587, Tuléar, P. Galeuon coll.; 2♂♂, TL 16, CL 6.5- TL 14, CL 6, MP 588, Tuléar, P. Galeuon coll.; 1♂, TL 17, CL 6.5, MP 589, Tuléar, P. Galeuon coll.; 1 ovig. ♀, TL 63, CL 18.5, MP 914, Tuléar, B. Thomassin coll.; 1♀, TL 40, CL 14, IRB, Ambatolsalea, Janu. 2, 59. coll.; 1♂, TL 47, CL 16, MP (IG 22044), Nossi-Bé, Oct. 5-6, 59., M. Cherbonner coll.

Diagnosis.-Anterior part of carapace, mxp 2, tail-fan illustrated (Fig. 9). 4th thoracic shield concave along median slit, and with a pair of broadly rounded lateral angles; a deep transverse furrow along intermediate line of articulation present; anterior thoracic region convex as a whole, continuous to its anterior neck (Fig.3C). Gill-formula shown as follows,

Check list of Axiidae

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	r	1	1	1	1	-	-
Arthropods	-	r	2	2	2	2	2	-
Pleurobranchs	-	-	-		1	1	1	-

Remarks.-de Man (1925c:49), Barnard (1950:499) and Poore and Griffin (1979:243) defined *tricarinatus* as a synonym of *serripes*.

Type locality.-Port Natal?, South Africa.

Distribution.-South Africa; Mozambique; Kenya; Mauritius; Indonesia, up to 36m.

Genus *Parascytoleptus* gen. nov.

Definition.-Rostrum small, short, rounded at tip, margins with a pair of denticles, and discontinuous to gastric region. Anterolateral margin of carapace unarmed. Gastric region remarkably convex from the base of rostrum. Cervical groove defined only on dorsal part. Abdominal pleura 3-5 laterally with small tufts of setae, and truncate or rounded on margins. Telson triangular; posterior margin reduced in breadth, armed with a pair of outer lateral spines, but without posteromedian spine.

Eyestalks short, subglobose; cornea pigmented. Antennular peduncles much longer than antennal one. Antennal aciculae reduced. P/1 strongly unequal, palm bare, and without dorsodistal spine. P/3 propodus with transverse rows of spines. Pleurobranchs present on Pl/2-4.

Pl/1 in males unknown; in female simple, narrow, consisting of basal segment and multiarticulate flagellum. Pl/2-5 slender, and with appendix interna. Uropod exopod without transverse suture.

Type species.-*Parascytoleptus tridens* (Rathbun, 1906) [by monotypy].

Remarks.-This genus is very closely related with *Scytoleptus* in the following points; The gastric region is elevated from the base of rostrum; the cervical groove is shortly developed only on the dorsal part; the 4th antennal segment is long; the 1st pereiopods are much unequal; the propodus of the 3rd pereiopod is provided with conspicuous transverse rows of spines; the pleurobranchs are present on the 2nd to 4th pereiopods; the 2nd to 5th pleopods are narrow in females; the telson possesses a pair of posterolateral spines. In addition the epipods on the 1st to 4th pereiopods are rounded as in *Dorphanaxius* and *Scytoleptus*.

However, this genus is different from *Scytoleptus* as in *Parascytoleptus* the rostrum is rounded at apex, and with a pair of proximal denticles, the gastric region is not so steep as in *Scytoleptus*, bearing no sublateral and lateral carina on the

Small P₁ sexually dimorphic

very variable in body

gastric region; the telson is triangular, while in *Scytoleptus* the rostrum is pointed, and unarmed, though continuing to a pair of teeth on the gastric region; and the telson oval.

***Parascytoleptus tridens* (Rathbun, 1906)**

Fig. 10

Paraxius tridens Rathbun, 1906:895, text-fig. 53.
Axius (Paraxius) tridens, de Man, 1925c:127.

Material examined.-1♀, TL 29.0 mm, USNM 30537, syntype 1
ovig. ♀, TL 22 mm, CL 7.5, USNM. Madagascar, 59-17, 22. 6. 1954.

Diagnosis.-Anterior part of carapace, and tail-fan are illustrated (Fig. 10). 2nd to 5th pleopods narrow. 4th thoracic shield deeply concave along the median slit, and with a pair of broadly rounded lateral angles; intermediate carina of

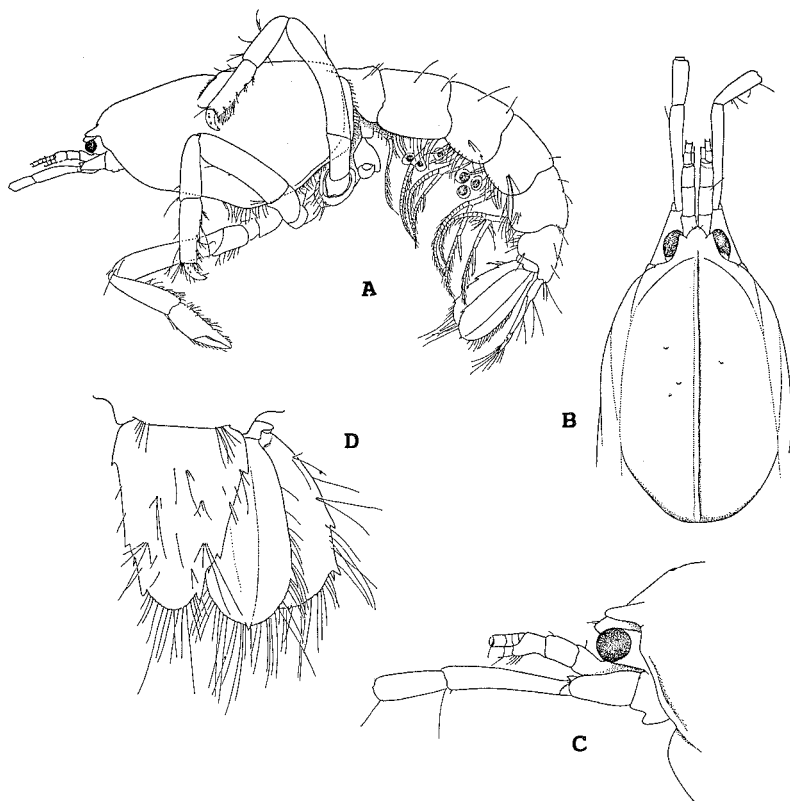


Fig. 10. *Parascytoleptus tridens* (Rathbun, 1906): A. total figure in lateral aspect; B. Anterior part of carapace in dorsal aspect; C. anterior part of carapace in lateral aspect; D. tail-fan. ♀, USNM 30537, holotype.

Check list of Axiidae

articulation obtuse. 4th anterior thoracic region broadly triangular, and its neck narrow (Fig. 3D).

Pleurobranchs on the 2nd to 4th pereopods present, as shown in following gill-formula,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	-	1	1	1	1	-	-
Arthrobranchs	-	⊙?	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	1	1	1	-

Type locality.-French Frigate Shoal, Hawaii, 20-33fms (36-59m).

Distribution.-Hawaii; Madagascar.

Genus *Spongiaxius* gen. nov.

Definition.-Rostrum prominent, furrowed on surface; margins armed with a row of erected spines, extending onto gastric region. Anterolateral margin of carapace unarmed. Gastric region convex, and with serrated median, submedian and lateral carinae. Cervical groove remarkable except its anterolateral part. Abdominal pleura almost smooth on surface, and acute on margins. Telson oblong, and with posteromedian spine.

Eyestalks subglobose; cornea pigmented. Antennal acicle prominent in comma-shape. P/1 unequal in shape; chela with flatten ventral surface. P/2 chela strongly pubescent outside. P/3 propodus with transverse rows of spines. and P/5 subchelate. P/3-4 coxae with knobs. Both P/3 and P/5 coxae with genital pore. Pleurobranchs on P/2-4.

P/1 of males two-segmented, ^{present or not} distal segment takes a spatulate form or a flagellum. Pl/1 of females of proximal segment and multiarticulate flagellum. Pl/2 of male-forms with Appendix masculina and appendix interna present. Pl/2-5 of males and Pl/3-5 with appendix interna. Uropod exopod with short transverse suture, or not. Living usually in sponges.

Type species.-*Axiopsis brucei* (Sakai, 1986)

Species included.-*Axius* (*Neaxius*?) *odontorhynchus* de Man, 1905; *Axius* (*Axius*) *novae-zealandiae* Borradaile, 1916; *Axiopsis* (*Axiopsis*) *pitatucensis* de Man, 1925; *Axiopsis brucei* Sakai, 1986.

other
genus

Remarks.-This genus is related with *Calocaris* in the structure of the 2nd pleopods of males; the 2nd pleopods of males are bifurcate, the endopod consists of 2-segments, the proximal endopod is furnished with a small appendix interna and an appendix masculina as well as an elongated endopod.

no - In some species
are probably protandric ♀

Spongiaxius odontorhynchus (de Man, 1905)

Axius (*Neaxius*?) *odontorhynchus* de Man, 1905:591
Axius (?*Axius*) *odontorhynchus*, -de Man, 1925c:12, 18, pl. 1 figs 1-1m.

Remarks.-This species was well illustrated by de Man (1925c:18, pl 1). Rostrum continuous to gastric region; Telson rounded on posterior margin, and with small posteromedian spine. Eyestalks subglobose; cervical groove distinct to a whole length; P/1 stout, but without any spines; Pl/1 of males absent, but that of females uniramous. Uropod exopod without transverse suture.

Type locality.-Kei Is., 90m.
Distribution.-Kei Is.; Timor. 73-90m.

Spongiaxius novaezealandiae (Borradaile, 1916)

Fig.11

Axius (*Axius*) *novae-zealandiae* Borradaile, 1916:91, text-figs 5a-b; de Man, 1925c:12.
Axius (*Axius*) *novaezealandiae*, -Balss, 1933:87, fig. 1.

Material examined. 1♂, TL 50, 3♀♀, TL 27-78, BM 1917.1.29.106-110, ~~syntype~~ ^{lectotype} St. 96, New Zealand; 1♂, TL 55, MP 940, ~~Paratype~~, New Zealand. ^{paratypes}

Diagnosis.-Carapace, abdominal somites, telson, P/1, Pl/1 of females and Pl/2 of males are illustrated (Fig. 11H-I). 4th thoracic shield is broad, deeply furrowed along median slit, and provided with a pair of sharp lateral spines; intermediate carina of articulation distinct, anteriorly convergent; anterior thoracic region broadly triangular, and concave, and anterior neck scarcely developed. 3rd thoracic sternite narrow, and its posterior part of articulation broadly expanded in both sides, fusing with one another to make a board (Fig. 2E).

Pleurobranchs on 2nd to 4th pereopods are found as follows,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	r	1	1	1	1	-	-
Arthrobranchs	-	-	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	1	1	1	-

(r=rudimentary)

Remarks.-This species is bisexual; the genital pore is found on either the coxa of 3rd/pereiopods or that of 5th pereopods. The uropod exopod has no transverse suture. The external

has
 → openings are sometimes seen in ♀, but no
 ♀ openings in ♂.

Check list of Axiidae

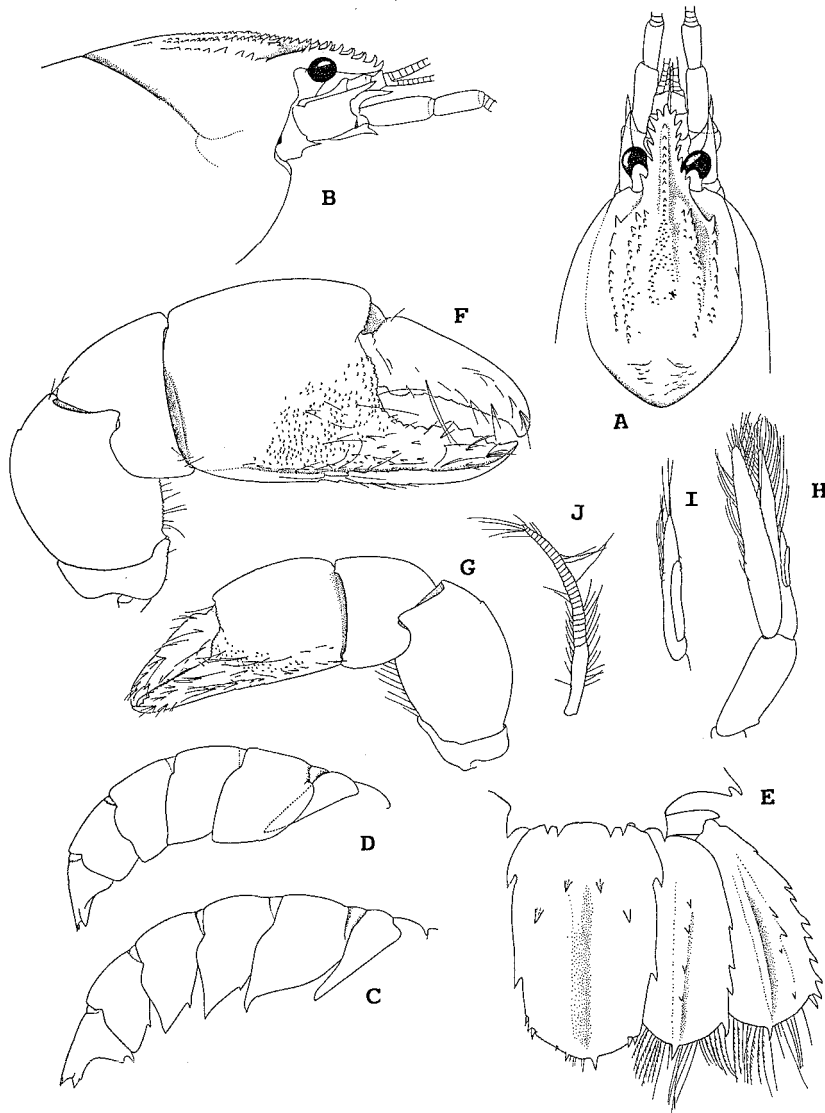


Fig. 11. *Spongiaxius novaezealandiae* (Borradaile, 1916): A. anterior part of carapace in dorsal aspect; B. same in lateral aspect; C. and D. abdominal somites in lateral aspect; E. tail-fan; F. 1st pereopod in larger side; G. same in smaller side; H. 2nd pleopod in male; I. same, enlarged; J. 1st pleopod in ♀. A, B, C, E, F, G, H and I for ♂, and D and J for ♀, BM 1917.1.29.106-111, types.

features including the morphology of the 3rd thoracic sternite show it to be closely related to *brucei*; the 3rd thoracic sternite has a pair of rounded boards of articulation at its posterior part as seen in *brucei*.

Type locality.-East of North Cape, New Zealand, 70m.
Distribution.-New Zealand, 70-720m.

Spongiaxius pitatucensis (de Man, 1925)

Axiopsis (*Axiopsis*) *pitatucensis* de Man, 1925a:133, text-figs 5, 5a-c; de Man, 1925c:69.

Material examined.-1♂, ZMB 1443a.

Diagnosis. Antennal acicle comma-shaped, directed outside dorsodistal tooth of 2nd antennal article; cervical groove remarkable except its anterodistal part; gastric region provided with some teeth. P/1 palm of larger cheliped with a dorsodistal tooth, but without tubercles on surface. Posterior margin of telson rounded, and without posteromedian spine.

Remarks. De Man mentioned that the specimen described is a female, however, re-examination revealed that it is a male.

Type locality.-Pitatuki, Buka Is, Indonesia.

Distribution.-Indonesia.

not a
Spongiaxius
new genus

Spongiaxius brucei (Sakai, 1986)

Axiopsis brucei Sakai, 1986:11, text-figs 1-6.

Material examined.-1♂, TL 59, CL 22, MP 897, North West Shelf, Western Australia, Jan. 30. 1984.

Diagnosis.-4th posterior thoracic shield broad, deeply furrowed along median slit, and provided with a pair of rounded lateral teeth; intermediate line of articulation not carinate; anterior thoracic region broadly triangular, concave at both sides, and its anterior neck scarcely developed. 3rd thoracic carina is broad, and its posterior bases of articulation broadened to make a board (Fig. 3F).

Remarks.-Sakai (1986:11) noticed that the paratype donated to the Muséum national d'Histoire naturelle, Paris is a female measuring 67mm in total length, however, the specimen preserved in Paris is a male of 59. He overlooked the presence of the the pleurobranchs on the 2nd to 4th pereopods, but the amended gill-formula is shown as follows,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	1	1	1	1	1	-	-
Arthrobranchs	-	-	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	1	1	1	-

Check list of Axiidae

Type locality.-North-west Australia, 18° 43.7'S 117° 02.2'E, 454m.

Distribution.-North-west Australia, 454m, commensal in a hexactinellid sponge.

Genus *Bouvieraxius* gen. nov.

Definition.-Rostrum narrowly triangular; margins armed, extending to gastric region. Anterolateral margin of carapace unarmed. Gastric region convex. Cervical groove conspicuous to a whole length. Abdominal pleura smooth on surface, and truncate on margin. Both 4th and 5th thoracic shield present. 4th and 3rd median carinae are sigmoid. Telson oblong, and with posteromedian spine.

Eyestalks subglobose; cornea pigmented. Antennal acicle conspicuous.

P/1 subequal; chela smooth on dorsal and ventral margins, palm denticulate on dorsal margin, and with a conspicuous dorsodistal spine. P/3-4 propodus with transverse rows of spines, and P/5 propodus with teeth at ventrodistal corner. P/3 and P/1 of females with genital pores.

PI/1 of males two-segmented; distal segment slender or lanceolate; Pl/1 of females of proximal segment and multiarticulate flagellum. Pl/2 of males bifurcate; endopod consisting of two segments, proximal segment of which distally attached by a small appendix interna and an elongate appendix masculina. Pl/3-5 without appendix interna. Uropod exopod with transverse suture.

Type species.-*Axius longipes* (Bouvier, 1905).

Species included.-*Axius longipes* Bouvier, 1905; *Axius rudis* Rathbun, 1906.

Remarks.-This genus is related to *Calocaris* because of the existence of pleurobranches on the 2nd to 4th pereopods, and the 2nd pleopods possess the appendix interna and the appendix masculina as well as the two-segmented endopod.

probably protandric ♀

Bouvieraxius longipes (Bouvier, 1905)

Axiopsis longipes Bouvier, 1905:804; Balss, 1925:209; Bouvier 1925:466, text-figs 26, 27, pl. 9 fig 5, pl. 10 fig. 5.
Axiopsis (*Axiopsis*) *longipes*, -de Man, 1925c:70.

Material examined.-1♂, TL 36. USNM 7756.

Diagnosis.-Submedian lines of gastric region with 4 pairs of elongated carinae. Pl/1 showing an oval distal leaf with a short triangular leaf on its anterior margin.

Type locality.-Porto Rico, 300m.

Distribution.-Porto Rico; Barbados.

Bouvieraxius rudis (Rathbun, 1906)

Figs. 12-14

Axius rudis Rathbun, 1906:894, text-fig. 51; Balss, 1925:209.
Axiopsis (Axiopsis) rudis, -de Man, 1925c:70.

Material examined.-1 ovig. ♀, TL 20, USNM 30535, holotype, Molokai Is, Hawaii; 1♀, TL 55, CL 23, MP 445, Madagascar, 15° 21,7'S, 46° 12.6E, 90-130m, Nov. 8, 1972, A. Crosnier coll.; 1♂, TL 28, CL 10, MP 1004, New Caledonia, Musorstom 5, St 0255, 25 15° 40'S, 159° 54'E, Oct. 7, 1986.

identification uncertain

different species

Diagnosis.-Rostrum is narrowly triangular, and with two lateral teeth including one on gastric region. Gastric region with five carinae, median and lateral carinae smooth, and submedian with 3 elongate teeth. P/1 subequal in shape; palm granulate on dorsal margin, and provided with subterminal tooth. P1/1 of males is simply two-segmented (type, USNM 30535, young specimen) or in a lanceolate form, and that of females of proximal segment and segmented flagellum. P1/2 of male with short appendix interna and elongated appendix masculina. 4th and 5th thoracic sternites are developed. Both P/3 and P/5 coxae with genital pore.

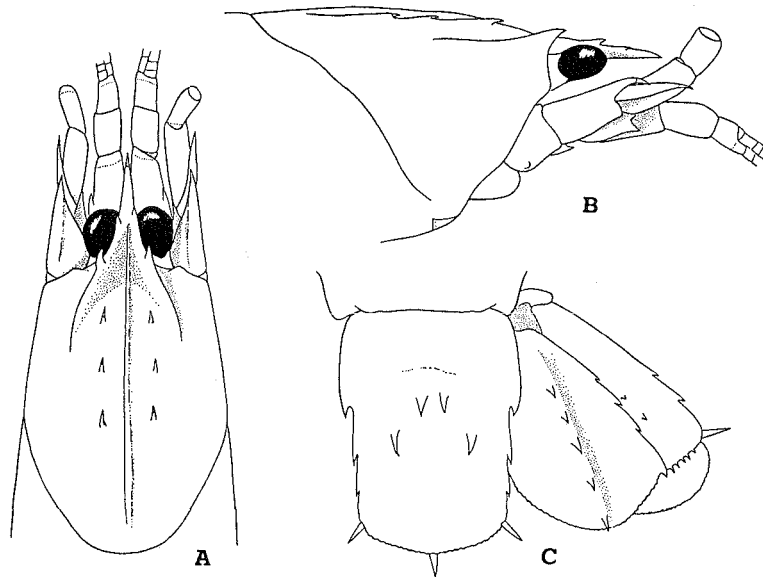


Fig. 12. *Bouvieraxius rudis* (Rathbun, 1906): A. anterior part of carapace in dorsal aspect; B. same in lateral aspect; C. tail-fan. ovig. ♂, USNM 30535, holotype.

Check list of Axiidae

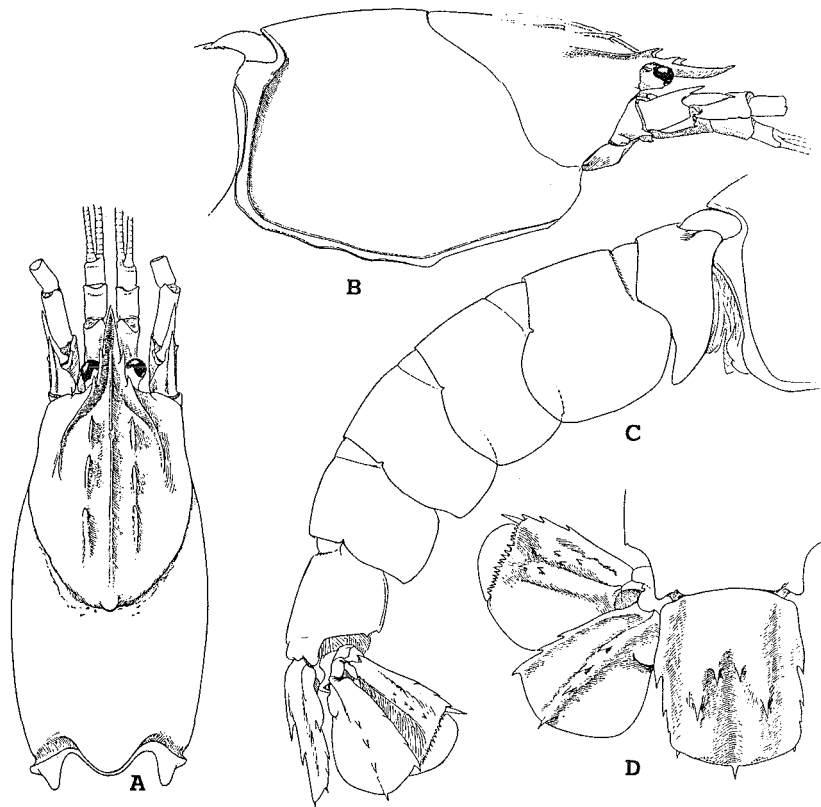


Fig. 13. *Bouvieraxius rudis* (Rathbun, 1906): A. carapace in dorsal aspect; B. same in lateral aspect; C. abdominal somites and tail-fan in lateral aspect; D. Tail-fan, ♀, MP 445.

identification to be checked

Madagascar

Description.—Carapace smooth. Rostrum (Figs. 12A,B; 13A,B) narrowly triangular, and pointed at tip; lateral margin with one tooth, and, just posterior to it, with another tooth on carina continued to lateral carina of gastric region. Gastric region dorsomedially convex, and with median, submedian and lateral armatures; median carina unarmed, reaching anteriorly to proximal half of rostrum, and posteriorly extending to cervical groove; submedian part with three elongated carinae; and lateral carina conspicuous but unarmed, reaching to midway to cervical groove. Cervical groove clearly defined to a whole length. Dorsal part of cardiac region obscurely convex without forming median carina.

Both 4th and 5th thoracic shields (Fig. 4A) present. 5th thoracic sternite highly elevated in posterior part to form a V-shaped concavity together with elevated basal parts of coxae. 4th thoracic shield armed with a pair of lateral teeth, deeply concave to a whole length, and hairy; anterior margin thickly elevated, and convergent to the middle; the median slit reaches to the middle point; anterior thoracic region is triangularly

concave, and its anterior neck is convex. 4th and 3rd median carinae are sigmoid.

Abdominal somites (Fig. 13C) smooth; somites 2-6 subequal, and each connected directly to pleura without transverse convexity. Abdominal pleuron 1 narrow, ventrally produced into triangular angle, declining backward. Pleuron 2 broadened; anterolateral margin convex in obtuse triangle, ventral margin straight, and posterolateral margin roundly convex. Abdominal pleura 3-4 curved rectangularly at posteroventral angle. Pleuron 6 triangular. Telson (Fig. 12C, 13D) oblong in dorsal view, and slightly longer than somite 6; lateral margin with 3 teeth including one at proximal convexity, and with elongate articulating spine at posterior corner; distal margin largely convex, and with a median spine. and dorsal surface with shallow median furrow, and with two pairs of sharp teeth.

Eyestalks subglobose, reaching distally to proximal third of rostrum. Antennular peduncle overreaching rostrum by midway of penultimate segment; basal article unarmed, elongated, more than penultimate and distal articles combined; penultimate article unarmed, and slightly longer than distal one. Antennal peduncle slightly longer than antennular one; distal margin of article 1 armed with 4-5 denticles on its inner half, and with a tooth at its middle; article 2 carinate on dorsal margin, and protruded distally onto sharp dorsal tooth. Article 3 ventrodistally forming a short triangular tooth. Antennal acicle stout, and about twice as long as dorsodistal tooth of article 2; article 4 thick and about twice as long as article 5, reaching slightly beyond rostrum.

Mandible smooth on cutting edge palp 3-segmented. Maxillule 1 with 2-segmented palp, distal segment twisted, and with two long terminal bristles. Maxillule 2 scaphognathite with long posterior bristle. Maxilliped 1 endopod consisting of 2 segments, distal segment slender; exopod distally with eight-segmented palp. Maxilliped 2 exopod of proximal segment and multiarticulate flagellum; carpus, propodus and dactylus subequal in length; dactylus with yellow-transparent bristles on distal margin.

Maxilliped 3 exopod of proximal segment and multiarticulate flagellum, reaching to midway of carpus; coxa with sharp tooth on ventral margin; basis with sharp ventral tooth; ischium 2.5 times as long as broad, and with two strong teeth on inner mesial margin, and with serrated interior ridge with more than 20 teeth; merus about as long as ischium, and with 4 small and 3 larger teeth on inner mesial margin, and small subterminal tooth on outer margin; carpus about two-thirds length of merus, subequal to propodus, and with distal tooth on ventral margin; dactylus slightly shorter than propodus.

P/1 (Fig. 14A) subequal. Coxa with two ventral teeth. Basis unarmed. Ischium with 5-6 ventral teeth including large subterminal one. Merus about twice as long as broad; dorsal margin largely convex at its distal part, and with a row of 4 distally declined teeth; ventral margin almost straight, and with 5 interspaced teeth increasing their size distally. Carpus unarmed, about as long as broad, and about half length of merus. Chela in left larger cheliped 2.7 times as long as broad. Palm 1.7 times as long as broad, and 2.5 times as long as carpus;

Check list of Axiidae

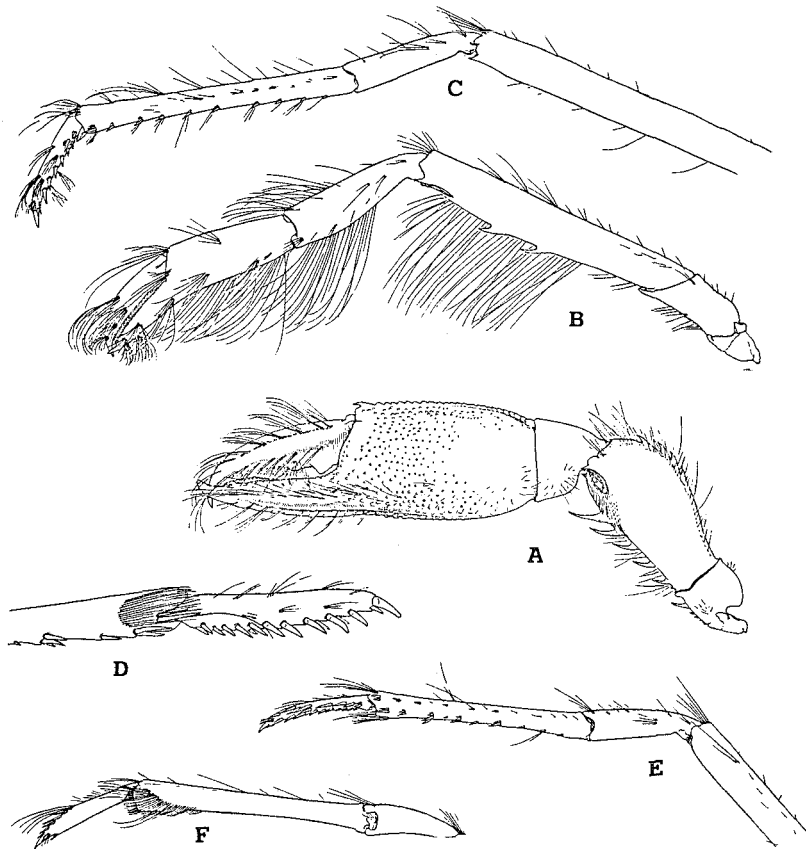


Fig. 14. *Bouvieraxius rudis* (Rathbun, 1906): A. 1st pereopod; B. 2nd pereopod; C. 3rd pereopod; D. Dactylus of 3rd pereopod; E. 4th pereopod; F. 5th pereopod. ♀, MP 445.

dorsal margin granulate, and with distally-directed subterminal tooth; ventral surface also granulate on inner and outer margins; outer surface scattered with granule except in middle part of proximal half, and inner surface also granulate along dorsal margin. Cutting edge of fixed finger proximally granulate, and finely denticulate in its distal third. Dactylus shorter than palm at the level of outer articulation, cutting edge with two triangular teeth in proximal half, distal one of which low in high, and convex with a row of denticles in distal half; dorsal margin also with row of obtuse denticles, outer surface medially with smooth broad carina. In right smaller cheliped arrangements of teeth and setae about same as in larger cheliped, however chela narrower than that in larger one; chela more than 3 times as long as broad, and palm 1.5 times as long as broad.

P/2 (Fig. 14B) coxa with sharp spine on posteromesial margin; basis unarmed; ischium with 7 tubercles on ventral margin; merus

about 6 times as long as broad, and with 3 teeth on ventral margin, including one at ventrodistal angle. Carpus more than half length of merus, and two-thirds length of chela. Fingers less than palm in length.

P/3 (Fig. 14C) coxa with genital pore. Basis, ischium, and merus unarmed. Merus 2.3 times as long as carpus. Propodus twice as long as carpus with 9 rows of transparent, articulating spinules on outer ventral surface. Dactylus (Fig. 14D) with 10 transparent spinules on ventral margin.

P/4 (Fig. 14E) similar in shape, but shorter than P\3. coxa. Basis and ischium unarmed. Merus 2.7 times as long as carpus. Propodus about twice as long as carpus; outer surface furnished with 10 transparent articulating spinules including a distinct one at distal angle. Dactylus sharp, and armed with about 10 transparent, articulating spinules including a sharp distal one.

P/5 (Fig. 14F) simple. coxa, basis and ischium unarmed; coxa with genital pore. Merus 3 times as long as ischium, and 2 times as long as carpus. Propodus 2.2 times as long as carpus, and with 9 rows of spinules on outer ventral margin; surface with tuft of setae at ventrodistal angle. Dorsal margin of dactylus with 3 articulating spines at its distal part, and inner surface diagonally with 3 articulating spinules.

Branchial formula is as follows,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	1	1	1	1	1	-	-
Arthrobranchs	-	1	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	1	1	1	-

Pl/1 of proximal segment and 12 segmented flagellum. Pl/2-5 with slender foliaceous endopod and exopod; endopod without appendix interna and appendix masculina.

Outer margin of uropod exopod (Fig. 12C; 13D) rather straight with 3 teeth including one at posterior angle; dorsal surface with 7 denticles; transverse suture remarkable, and armed with denticles. Outer margin of uropod endopod with 3 teeth including distal one at corner; mid-rib with 3 teeth.

In males. Most features are the same as in females. Pl/1 simple, foliaceous in a lanceolate form; distal half twisted for and aft, separated by a narrow ditch into anterior and posterior parts; anterior part showing a lower triangular flap, and posterior part oval at its distal part. Pl/2 endopod with short appendix interna, and two-segmented, elongate appendix masculina with setae on inner lateral margin. Pl/3-5 without appendix interna.

Type locality.-South coast of Molokai Is., Hawaii, 168-388m.
 Distribution.-Hawaii, 75-420m, Madagascar, and New Caledonia,

?

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Genus *Eutrichocheles* Wood Mason, 1876

Eutrichocheles Wood Mason, 1876:264; Chopra, 1933:277; Balss, 1957:1580.

Paraxiopsis s. str. de Man, 1905:597 (Type species: *brocki* de Man, 1888); de Man, 1925c:71, 101; Gurney, 1942:240.

Definition.-Rostrum triangular, and sharply pointed at tip; margins armed, continuous to gastric region. Anterolateral margin of carapace usually with a spine. Gastric region convex, and almost with five rows of dorsal carinae. Cervical groove noticeable to a whole length. Posterior part of carapace usually with median dorsal carina only in its posterior part. Abdominal pleura laterally without tuft of setae, and rounded or triangular on ventral margins. Telson subsquare, with pair of oblique carinae on surface, and with posteromedian spine.

Eyestalks subglobose; cornea pigmented. Antennal acicle short, and usually bifurcate.

P/1 subequal; palm of larger cheliped usually with dorsodistal spine. No pleurobranchs.

P1/1 of males absent, and of females of basal segment and multiarticulate flagellum. P1/2 of males with appendix interna, but without appendix masculina. P1/3-5 of males and P1/2-5 of females narrow, and with appendix interna. Uropod exopod with transverse suture.

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character of
the genus
is the
lack of
app. interna

Type species.-*Cancer modestus* Herbst, 1796 [by Wood Mason, 1876].

Species included.-*Cancer modestus* Herbst, 1796 (= *Axius biserratus* von Martens, 1868); *Axiopsis* (*Paraxiopsis*) *brocki* de Man, 1888; *Axius defensus* Rathbun, 1901; *Axiopsis* (*Paraxiopsis*) *bisquamosa* de Man, 1905; *Axiopsis* (*Paraxiopsis*) *johnstoni* Edmondson, 1925.

Remarks.-*Paraxiopsis* is thought to be a synonym of *Eutrichocheles*, because those two genera are common in the following characters; the carapace is provided with an anterolateral spine; the antennal acicle is bifurcate; the telson is provided with a pair of oblique carinae with spines on the surface.

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Eutrichocheles modestus (Herbst, 1796)

Cancer modestus Herbst, 1796:173, pl 43, fig 2.

Astacus modestus, - Wood Mason, 1876:246.

Eutrichocheles modestus, -Chopra, 1933:277, text-fig. 1 pl. 6; Balasubrahmanyam and Jacob, 1961:830, 1 text-fig.; Holthuis, 1986:249.

Astacus scaber Fabricius, 1798:407.

Axius biserratus von Martens, 1869:612 (Type locality. Malacca, Indian Ocean.); Nobili, 1903:12.

?*Axiopsis biserratus*, -Borradaile, 1903:538.

Axiopsis (*Paraxiopsis*) *biserrata*, -de Man, 1925a:138, text-figs

6-6b; de Man, 1925c:71.

^a
Remarks.-Holthuis (1986:249) cited many old literature on *modestus*, in which Fabricius' species *scaber* is synonymous with *modestus*. de Man's species, *biserrata*, is also determined to be a synonym of *modestus*, because their features are almost identical, especially on the bifurcate antennal acicle (Saint Laurent, 1979:32).

Lead Gilchrist
Type locality.-Indian Ocean.

Distribution.-Malacca; Porto Novo, S. India, 10 fms (18m).

***Eutrichocheles brocki* (de Man, 1888)**

Axius Brocki de Man, 1888:475, pl. 20 fig. 3

?*Axiopsis Brocki*, -Borradaile, 1903:539.

Axiopsis (Paraxiopsis) Brocki, -de Man, 1925c:71, 101, pl. 8 figs 19-19f.

Axiopsis (Paraxiopsis) brocki, -Poore and Griffin, 1979:228, text-fig 3; Sakai, 1987:304.

Material examined.-1 ovig. ♀, TL 19, CL 6, 1+, TL 19, CL 6, MP 885, Ryukyu Is., K. Sakai coll.

Diagnosis.-Epipods narrow, and podobranchs on Mxp 2 to P\3 not foliated. 4th thoracic shield remarkably concave in its anterior two-thirds, and with a pair of reduced lateral angles; intermediate line of articulation obscurely developed; anterior thoracic region flattened with convex anterior neck; a pair of articulate cups shallow (Fig. 4B).

Gill-formula shown as follows,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	r	r	r	r	r	-	-
Arthrobranchs	-	-	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

(r=rudimentary)

Type locality.-Amboina.

Distribution.-Indonesia; Borneo; Okinawa, Japan. Reef to 83m.

***Eutrichocheles defensus* (Rathbun, 1901)**

Axius defensus Rathbun, 1901:95, text-fig. 17.

?*Axiopsis defensus*, -Borradaile, 1903:539.

Axiopsis (Paraxiopsis) defensus, -de Man, 1925c:71.

Remarks.-This species is to be included in this genus as the antennal acicle is bifurcate.

Check list of Axiidae

Type locality.-Off Boca Prieta, Porto Rico, 15 (= 8.5fms)m.
Distribution.-Porto Rico, 15m.

***Eutrichocheles bisquamosa* (de Man, 1905)**

Fig. 15

Axiopsis (*Paraxiopsis*) *bisquamosa* de Man, 1905:597; de Man, 1925c:72, 109, pl. 8, figs 20-20c, pl. 9 figs 20d-20m; Holthuis, 1953:51.

Material examined.-1♂, ZMA, lectotype.

Remarks.-A small antennal acicle with a small proximal spine is present. The carapace of the male lectotype is illustrated (Fig. 15).

Type locality.-Off Lirung, Salibabu Is., Indonesia, up to 36m.

Distribution.-Indonesia; Saipan, Mariana Is. up to 36m.

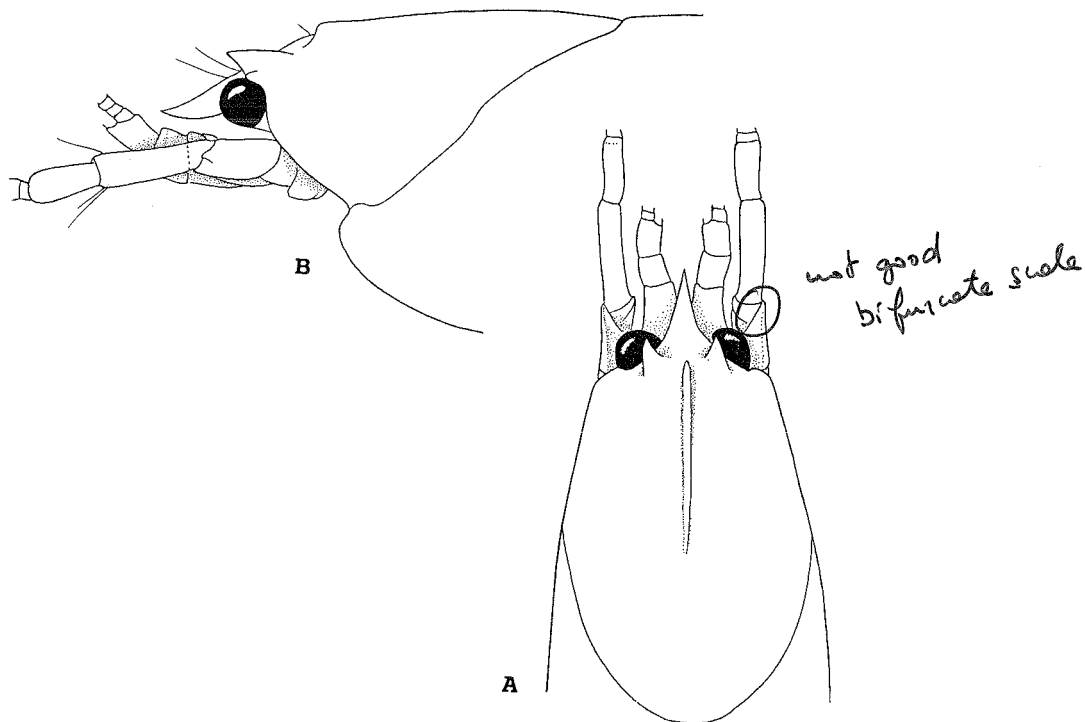


Fig. 15. *Eutrichocheles bisquamosa* (de Man, 1905): A. anterior part of carapace in dorsal aspect; B. same in lateral view. ♂, ZMA, holotype.

Eutrichocheles johnstoni (Edmondson, 1925)

Axiopsis (*Paraxiopsis*) *johnstoni* Edmondson, 1925:20, text-fig. 4, pl. 1A.

Type locality.-John Stone I., Hawaii.

Distribution.-Hawaii.

Genus **Ambiaxius** gen. nov.

Definition. Rostrum styliform, margins armed, extending to gastric region. Anterolateral margin of carapace unarmed. Gastric region convex, and with five carinae. Cervical groove remarkable except in its anterolateral part. Abdominal pleura smooth on surface, and truncate on margins. Telson oblong, obliquely marked by a pair of carinae on surface, and without posteromedian spine.

Eyestalks rounded, fusing with carapace; cornea unpigmented. Antennal acicle prominent; 4th antennal segment long.

P/1 distinctly unequal. P/3 and P/5 coxae with genital pore. All gills devoid of gill-branches. No pleurobranchs.

Pl/1 two-segmented; distal segment lanceolate. Pl/2 with single segment of endopod and a boot-shaped appendix masculina which basally possesses a small appendix interna. Pl/3-5 narrow, and with appendix interna. Uropod exopod with transverse suture.

see without

Type species.-*Calocaris alcocki* McArdle, 1901.

Species included.-*Calocaris alcocki* McArdle, 1900; *Calocaris aberrans* Bouvier 1905.

Remarks.-This genus is similar to *Calastacus* in that the 2nd pleopods do not possess a distal endopod segment, but bear the appendix interna and the appendix masculina. However in *Ambiaxius* the appendix interna is reduced, and attached to the base of a boot-formed appendix masculina, while in *Calastacus* the appendix interna is a small leaf, separated from an elongated appendix masculina.

Ambiaxius alcocki (McArdle, 1900)

Calocaris Alcocki McArdle, 1900:476; Balss, 1925:209.

Calocaris alcocki, - Alcock, 1901:190; Alcock and McArdle, 1900:, pl 50, fig 4; Stebbing, 1915:59; Stebbing, 1917:27, pl. 91.

Calocaris (*Calocaris*) *alcocki*, -Barnard, 1950:502, text-fig 93; Kensley, 1981a:30.

Calocaris (*Calocaris*) *Alcocki*, -Borradaile, 1903:539; de Man, 1925c:116.

Material examined.-1 ♂, CL 13, CABD 27, MP 994, New Caledonia, 20° 48-38.12'S, 166° 53'16'E, 1630-1620m, May 2. 87.

Calocaris
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Check list of Axiidae

Diagnosis. 4th thoracic shield broad, concave, and provided with a pair of rounded lateral projections; a pair of hollows present; intermediate line of articulation obscure; anterior thoracic region broadly triangular with short anterior neck. 3rd median carina sigmoid.

All of gills not foliated, forming simple stick. Branchial formula as follows.

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	r	r	r	r	r	-	-
Arthrobranchs	-	-	2r	2r	2r	2r	2r	-
Pleurobranchs	-	-	-	-	-	-	-	-

To be checked

(r=rudimentary)

Remarks.-The 4th posterior thoracic shield is similar to that of *Calastacus laevis*.

Type locality.-Off Northeast of Sri Lanka, 992m.

Distribution.-Ceylon; Natal; New Caledonia, 800-1630m.

id.

Ambiaxius aberrans (Bouvier, 1905)

Calocaris aberrans Bouvier, 1905:422; Bouvier, 1917:120; Bouvier, 1925:453, text-figs 17-21, pl. 10 figs 6-7; Balss, 1925:209

Calocaris (Calocaris) aberrans, -de Man, 1925c:116.

Type locality.-Saint Lucia, W. Indies, 772m.

- no appendix interne? on pleopods

Genus *Calocaris* Bell, 1853

Calocaris (Calocaris)

Calocaris Bell, 1853:213; Borradaile, 1903:539; Pesta, 1918:191; de Man, 1925c:114, 115; Rathbun, 1929:25; Zariquieg-Alvarez, 1968:225; Saint Laurent, 1972:353.

Calocaris s. str. Borradaile, 1903:539; Balss, 1957:1580.

Definition.-Rostrum narrowly triangular, margins armed, extending posteriorly to gastric region. Anterolateral margin armed with a spine. Gastric region convex. Cervical groove defined entirely. Posterior part of carapace provided with dorsomedian carina. Abdominal pleura smooth on surface. Telson oblong, serrated on lateral margins, and without posteromedian spine.

Eyestalks reduced; cornea unpigmented. Antennal acicle reduced. P/1 unequal in shape; palm of larger cheliped with upper distal spine, and dactylus longer than palm. P/3 propodus elongate. P/3 and P/5 coxae with genital pore. P/2-4 with pleurobranchs.

Pl/1 uniramous, consisting of an elongate basal segment and a foliaceous, bifurcate distal one. Pl/2-5 bifurcate, and

narrow. Uropod exopod with suture. Hermaphrodite.

Remarks.-In *Calocaris* five species are recorded; *macandreae* from eastern Atlantic, and Mediterranean; *barnardi* from South Africa; *investigatoris* from Arabian Sea, Oregon, and California; *granulosus* from Alaska; and *templemani* from New Foundland.

Type species.-*Calocaris macandreae* Bell, 1853 [by monotypy].
 Species included.-*Calocaris macandreae* Bell, 1853; *Calastacus* *investigatoris* Anderson, 1896; *Calocaris* (*Calocaris*) *barnardi* Stebbing, 1914; *Calocaris templemani* Squires, 1965; *Calocaris* (*Calocaris*) *granulosus* Grebenjuk, 1975.

Calocaris macandreae Bell, 1853

Calocaris Macandreae Bell, 1853:233, text-fig. 1; Smith, 1879:55; Carus, 1884:490; Adensamer, 1898:25; Hansen, 1908:41; Stephensen, 1910:277; de Man, 1925a:140, text-fig. 7; Balss, 1925:209. *not*

Calocaris macandreae, - Kirk, 1879:401; Sars, 1884:166, pl. 2; Lovett, 1885:16; Ortmann, 1891:50, pl. 1 fig. 5; Meinert, 1893:220; Alcock and Anderson, 1894:163; Anderson, 1896:97; Adensamer, 1898:621; Aurivillius, 1899:36; Alcock, 1901:189; Lagerberg, 1908:51, pl. 1 fig. 17; Wollebaek, 1909:251, pls 15-17; Björck, 1913:1, text-figs 1-6, 1 pl.; Selbie, 1914:92, pl. 14 figs 5-7; Bouvier, 1917:119, pl. 11 figs 5, 6; Pesta, 1918:191, text-fig. 59; Caroli, 1921:241, text-fig. 2; Caroli, 1921a:264; Runnstorm, 1925:14, pls 1-2; Balss, 1926:26; Rathbun, 1929:25, text-fig. 33; Gustafson, 1934:16; Poulsen, 1940:214, text-fig. 3; Zariquiey-Alvarez, 1946:104, text-fig. 132; Soot-Ryen, 1955:1; Squires, 1965:10; Zariquiey-Alvarez, 1968:225, text-fig. 88b.; Christiansen, 1972:40, text-fig. 46; Atkinson, 1986:356, text-figs 1-2. *not*

Calocaris (*Calocaris*) *Macandreae*, -Borradaile, 1903:539; de Man, 1925c:116 (:- *not*)

Calocaris Mc Andreea, -Bouvier, 1940:96.

Material examined.-2 inds. TL 46, 48, SMF 12846, North Sea, 5° 41.2'N 3° 48.9'E-5° 40.5'N 3° 50'E, 41.5m deep, Aug. 11. 84., F.K. "Senckenberg" coll.; 2 inds. TL 42, 49, SMF 12414, North Sea, 5° 16.2'N 01°W, 98m deep, July 30. 83., F.K. "Senckenberg" coll.; 2 inds. TL 47, 49, SMF 12415, North Sea, 5° 16.2'N 01°W-5° 16.9'N 1° 01'W, 98m, July 30. 83., F.K. "Senckenberg" coll.; 2 inds. TL 39, CL 13.5-CL 37, CL 12.5, MP 153, 43° 40.1'N, 8° 51.4'W, 490m, Aug. 8. 67., "Thalassa" coll.; 1 ind. TL 37, CL 13, 1 carapace, CL 13, MP 154, 43° 35.6'N, 8° 57.2'W, 290m, Aug. 7, 67., "Thalassa" coll.; 1 damaged ind. MP 155, Bay of Gascogne, July 7. 1880, "Travailleur" coll.; 1 ind. TL 22, CL 9, MP 156, S. Marseille, 40° 12'N, 2° 58'W, 555m, July 1881, "Travailleur" coll.; 1 ind. TL 30, CL 8.5, 1 carapace, CL 8.0, MP 157, 42° 42'N, 11° 56'W, 521m, July 18. 1882, "Travailleur" coll.; 1 ind. TL 20, CL 8, MP 158, 42° 54.4'N, 3° 6'W, 560m, July 1881, "Travailleur" coll.; 1 ind. TL 26, CL 7.5, MP 159, 647m, July 1881, "Travailleur" coll.; 1 ind. TL 25, CL

Check list of Axiidae

8, MP 160, 42° 48'N, 11° 57'W, 627m, July 1882, "Travailleur" coll.; 1 ind. TL 44, CL 14.5, 1 ind. without telson, CL 16, MP 161, 43° 35.6'N, 3° 3.8'W, 300-350m, 1970, "Thalassa" coll.; 1 ovig. ♀, TL 44, CL 15.5, 2 damaged inds, MP 162, 43° 30'N, 2° 5'W, 238-500m, 1970, "Thalassa" coll.; 4 inds. TL 30, CL 10.5-TL 33, CL 11, 1 carapace, MP 163, 1970, "Thalassa" coll.; 2 inds. TL 38, CL 13.5-TL 33, CL 12.5, MP 164, 43° 55.8'N, 5° 9'W, 770-800m, 1970, "Thalassa" coll.; 1 ind. TL 38, CL 13, MP 165, 43° 48.3'N, 6° 12.2'W, 392-850m, 1970, "Thalassa" coll.; 1 ind. TL 38, CL 13, MP 166, 1970, "Thalassa" coll.; 1 ind. TL 38, CL 12.5, MP 167, 43° 50.9'N, 6° 10'W, 520-625m, 1970, "Thalassa" coll.; 1 ind. TL 39, CL 13.5, MP 168, 43° 40.3'N, 2° 41'W, 710-1000m, "Thalassa" coll.; 1 ind. TL 20, CL 6.5, MP 169, 43° 36.7'N, 2° 57.8'W, 320-500m, 1970, "Thalassa" coll.; 1 ind. TL 32, CL 11.5, MP 170, 43° 37.8'N, 2° 17'W, 770-1000m, "Thalassa" coll.; 1 ind. TL 19, CL 7, MP 171, 43° 42.6'N, 2° 3.8'W, 480-530m, 1970, "Thalassa" coll.; 2 inds. TL 26, CL 10-TL 27, CL 10, MP 172, E. Marceille, 300m, June 21. 69, H. Zibrowius coll.; 4 ovig. inds. TL 41, CL 14-TL 35, CL 11.5: 1 ind. TL 33, CL 12, MP 225, 16° 48'N, 16° 45'W, 600-700m, Oct. 2. 58. coll.; 8 ovig. ♀♀, TL 35, CL 12.5-TL 41, CL 14.5, MP 226, Dakar, 675m, Aug. 13. 58. coll.; 1 ovig. ♀. TL 31, CL 10.5, MP 326, 41° 19.7'N, 9° 11.6'W, 550m, 1972, "Thalassa" coll.; 1 ind. TL 18, CL 6.5, MP 327, 41° 28.6'N, 9° 15'W, 1972, "Thalassa" coll.; 1 ind. TL 40, CL 14, MP 328, 41° 28.6'N, 9° 15'W, 1972, "Thalassa" coll.; 1 ind. TL 23, CL 8, MP 329, 41° 22.2'N, 9° 11.9'W, 920m, 1972, "Thalassa" coll.; 1 ind. TL 53, CL 16.5, MP 330, 41° 19.7'N, 9° 11.6'W, 550m, 1972, "Thalassa" coll.; 3 inds TL 29, CL 9.5-TL 51, CL 17, MP 331, 41° 19.7'N, 9° 11.6'W, 550m, 1972, "Thalassa" coll.; 2 inds TL 29, CL 10, -TL 32, CL 11, MP 332, 40° 37.1'N, 9° 20.3'W, 435m, "Thalassa" coll.; 1 ind. TL 29, CL 9, MP 333, 40° 33.5'N, 9° 24'W, 1972, "Thalassa" coll.; 1 juv. TL 15, CL 5.5: 1 ovig. ♀, TL 36, CL 12.5, MP 334, 43° 59.4'N, 8° 48.5'W, 850-900m, Oct. 23. 68., "Thalassa" coll.; 3 inds TL 15, CL 4.5-TL 38, CL 12.5, MP 335, Pointe-Noire, 104m, Dec. 6, 66, A. Crosnier coll.; 1 ind. TL 16, CL 5.5, MP 336, 42° 35.8'N, 9° 26.6'W, Oct. 21. 68, Thalassa" coll.; 1 ind. TL ca. 26, CL ca. 8, wanting rostrum, MP 337, 42° 36.7'N, 9° 30.3'W, 540-520m, Oct. 21. 68, "Thalassa" coll.; 1 ind. TL 21, CL 7, MP 338, 44° 4.8'N, 8° 25.5'W, 325m, "Thalassa" coll.; 3 inds. TL 35, CL 12-TL 40, CL 13, MP 340, Mediterranean, 1000m; 3 inds. TL 40, CL 14.5-TL 40, CL 13.5, MP 341, Mediterranean, 1000m; 5 inds. TL 35, CL 12-TL 40, CL 15, MP 342, Mediterranean, 1000m; 3 inds. TL 17, CL 6.5-TL 21, CL 8, 1: carapace, CL 10, MP 343, Marseille, 300m, Dec. 17. 70., H. Zibrowius coll.; 2 inds. TL 22.5, CL 8 - TL 12, CL 5.5, MP 344, 48° 41.4'N, 10° 21.5'W, 860m, Oct. 26. 73., "Thalassa" coll.; 1 ind. without rostrum, TL ca. 34, CL ca. 11, MP 634, Marseille, 360-320m, Nov. 23. 78., H. Zibrowius coll.; 3 inds, TL 25, CL 8.5-TL 35, CL 12, MP 506, Canal of Majorqua, 470-550, June 22. 53. coll.; 1 ind. TL 46, CL 15, MP 724, Mauritania, 587-600m, March 30. 82., "Ernst Haeckel" coll.; 8 inds TL 23.5, CL 9-TL 34, CL 11: 1 ovig. ♀, TL 36, CL 11.5, MP 777, 416m, "Thalassa" coll.; 2 inds TL 54, CL 18: TL 55, CL 18, MP 1046, 26° 22'S, 13° 59'E, 380m, "Bengula II" coll.; 1 ind. TL ca. 28, CR damaged, MP 1046.

Colocaris barwoodi

Naturalists 3.

Diagnosis.-4th thoracic shield unarmed, and broadly concave; intermediate line of articulation distinctly carinate, convergent forwards to median line; anterior thoracic region broadened, and deeply concave at both sides. 3rd thoracic median carina sigmoid (Fig. 4C).

Gill formula defined as follows,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	1	1	1	1	1	-	-
Arthropods	-	1	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	1	1	1	-

Type locality.-Loch Fyne and Mull of Galloway, Scotland, Atlantic Ocean.

Distribution.-Northern Atlantic Ocean; North Sea; Mediterranean; Dakar; Atlantic side of South Africa, 41.5-860m.

Calocaris investigatoris (Anderson, 1896)

Calastacus investigatoris Anderson, 1896:97; Balss, 1925:209; Schmitt, 1921:112, text-fig. 75; Rathbun, 1910:151.

Axius (Eiconaxius) Investigatoris, -Alcock and Anderson, 1896:, pl.25 fig.1.

Calocaris (Calastacus) investigatoris, -Alcock, 1901:191; Borradaile, 1903:539.

Calocaris (Calastacus) Investigatoris, -de Man, 1925c:117.

Type locality.-Off Sind, Arabian Sea, 1733m deep.

Distribution.-Arabian Sea, and also recorded from Alaska; Oregon; and California, 217-947m. The eastern Pacific material has to be checked.

Calocaris barnardi Stebbing, 1914

Calocaris barnardi Stebbing, 1914:9, pl 46; Kensley, 1981a:30.

Calocaris (Calocaris) Barnardi, -de Man, 1925c:116

Calocaris (Calocaris) barnardi, -Barnard, 1950:503, text-figs 93i-k.

Type locality.-Cape Castle, South Africa, 163m deep.

Distribution.-South Africa, 84-180m.

Calocaris templemani Squires, 1965

Calocaris templemani Squires, 1965:2, 6 text-figs, 1 table.

Type locality.-Hermitage Bay, Newfoundland, 260m deep.

Distribution.- New Foundland, 260m. soft mud.

C. ussuriense Smith 1878⁵⁸; Rathbun, 1919.

some in our files

London, other genus

Calocaris granulosa Grebenjuk, 1975

Calocaris (Calocaris) granulosa Grebenjuk, 1975:299, text-figs 1-2.

Nec.:

Calocaris (Calocaris) granulosa, -Sakai, 1987:300.

Remarks.-*granulosa* from Japan turned out to be a different species from Grebenjuk's species, so the manuscript for Japanese species is ready to be published (Sakai, in press).

Type locality.-Bay of Alaska.

Genus **Calastacus** Faxon, 1893

Calocaris (Calastacus)

Calastacus Faxon, 1893:194; Faxon, 1895:105; Schmitt, 1921:112; ~~(de Man, 1925c:116; Saint Laurent, 1972:353.~~
Calastacus s. str., Alcock, 1901:191; ~~Borradaile, 1903:53;~~
Barnard, 1950:502.

Definition.-Rostrum slender, pointed at apex, margins armed, and continuous to gastric region. Anterolateral margin unarmed. Gastric region convex. Cervical groove remarkably only on dorsal region. Abdominal pleura smooth on surface, and truncate on margins. Telson oblong, rounded on posterior margin, and without posteromedian spine. Eyestalks retired, flattened on surface; cornea retired. Antennal acicle prominent.

P/1 unequal. P/3 and P/5 coxae with genital pore. No pleurobranchs.

Pl/1 consisting of a small basal and a spatulate-shaped distal segments. Pl/2 with a single endopod attached with a small appendix interna and a elongate, two-segmented appendix masculina. Uropod exopod with transverse suture.

Type species.-*Calastacus stilirostris* Faxon, 1893 [by monotypy].

Species included.-*Calastacus stilirostris* Faxon, 1893; *Calastacus laevis* Saint Laurent, 1972.

Calastacus stilirostris Faxon, 1893

Calastacus stilirostris Faxon, 1893:194; Faxon, 1895:106, pl. 27 figs 1-1f.

Calocaris (Calastacus) stilirostris, -Borradaile, 1903:539; de Man, 1925c:117.

Calastacus stylirostris, -Balss, 1925:209.

Type locality.-Off Acapulco, 1098m deep.

Distribution.-Off Acapulco; Bay of Panama. 1098-1200m

Calastacus laevis ^{de} Saint Laurent, 1972

Calastacus laevis ^{de} Saint Laurent, 1972:348, text-figs 1-10.

Material examined.-1 ind. TL 45, CL 15, MP 152, holotype.

Diagnosis.-4th posterior thoracic shield concave with a pair of rounded hollows along its anterior margin, and armed with a pair of obtuse lateral angles; intermediate line of articulation weakly carinate with a rounded arch; anterior thoracic region broadly triangular with short anterior neck. Median carina of 3rd thoracic sternite sigmoid.

Posterior arthrobranch of 4th pereopods rudimentary, and not foliated. Gill-formula shown as follows,

	Maxillipeds			Pereopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	r	r	r	r	r	-	-
Arthrobranchs	-	-	r	2	2	2	1+r	-
Pleurobranchs	-	-	-	-	-	-	-	-

(r=rudimentary)

Type locality.-Bay of Biscay, Spain, 950-1000m deep.

Distribution.-Off Spain, 950-1000m.

Genus *Calaxiopsis* gen. nov.

Definition.-Rostrum narrowly elongated, margins armed, continuous to gastric region. Anterolateral margin of carapace unarmed. Gastric region convex, and with five carinae. Cervical groove limited only on dorsal region. Telson oblong, and rounded on posterior margin. Eyestalks rounded, fusing with carapace; cornea unpigmented. P/1 subequal. Both P/3 and P/5 coxae of females with genital pore. P/3 coxa of males with genital pore. No pleurobranchs.

In males Pl/1 lanceolate, and Pl/2 bifurcate; endopod simple, and with elongated appendix masculina attached proximally with reduced appendix interna. Pl/3-5 with appendix interna. In females Pl/1 two-segmented, and Pl/2-5 with appendix interna. Uropod exopod with transverse suture.

Remarks.-This genus is closely related to *Ambiaxius* in the structure of the 1st and 2nd pleopods of males, that is. in *Ambiaxius* the 2nd pleopods of males possess a single endopod and a boot-shaped appendix masculina attached proximally by a reduced appendix interna, and in *Calaxiopsis* a single endopod and an elongated appendix masculina attached proximally by a reduced appendix interna. However these two genera are fundamentally different in the branchial formula; in *Ambiaxius* all podobranchs and arthrobranchs in the 3rd maxillipeds to 4th

Check list of Axiidae

pereiopods are rudimentary due to defect of gill-branches, however in *Calaxiopsis* those except one podobranch on 2nd maxillipeds are provided with gill-branches.

Male-specimens of the genus *Calaxiopsis* have the genital pore only on the coxa of the 5th pereiopods, though the female ones have it in the coxae of the 3rd and 5th pereiopods, however in *Ambiaxius* the male-specimen examined (MP 994) has genital pores in the coxae of the 3rd and 5th pereiopods.

Type species.-*Calaxiopsis serrata* sp. nov.

Species included.-*Calaxiopsis serrata* sp. nov.; *Calastacus felix* Alcock and Anderson, 1899.

Calaxiopsis serrata sp. nov.

Fig. 16

Material examined.-1♂, TL 22, CL 10, MP 1172, holotype, Guinea, Guinea trawling Survey, St. 11, 240-250m, Aug. 11. 1966; 1♀, TL 19, CL 9, paratype, MP 1173, same data as in holotype; 1♂, TL 19, CL 8, paratype, MP 1175, Same Expedition, St. 8, 100m; 1♀, TL 12, CL 4, paratype, MP 1174, Same Expedition, St. 7, 200m;

Diagnosis.-Rostrum narrowly elongated; P/1 subequal, fingers of chelae in larger and smaller chelipeds longer than palm. Abdominal somites 3-5 of males with fore and aft marginal teeth, but those of females only with posterior marginal tooth.

Description of male holotype.-Carapace (Fig. 16A) smooth. Rostrum (Fig. 16A,B,C) narrowly elongated with acute tip; dorsal surface furrowed; lateral margins with 3 pairs of teeth, extending with another pair of teeth onto short, smooth lateral carinae of gastric region. Anterolateral margin of carapace unarmed. Gastric region medially convex, and furnished with median and submedian carinae; median carina anteriorly reaching to proximal part of rostrum, and posteriorly extending in short distance; submedian carinae anteriorly connected with each other to form a circular line across median carina, and posteriorly extending in short distance. Cervical groove defined only on dorsal part. Cardiac region smooth.

Abdominal somites (Fig. 16D) also smooth, and middorsal length of somites 2-6 subequal. Somite 1 shorter, ventrally forming obtuse tooth. Somite 2 largely convex on ventral margin; anterior margin rounded, declining backward to a broad triangle at posteroventral corner. Somite 3-5 with two teeth at fore and aft corner of ventral margin; anterior tooth sharp, directed posteriorly, and posterior one triangular. Somite 6 triangular on ventral margin. Telson (Fig. 16F) oblong, and slightly reducing posteriorly in breadth; posterior margin rounded, and without posteromedian tooth; lateral margin with 3 teeth including one at proximal convexity; dorsal surface with a pair of teeth.

Eyestalks rounded and fused with carapace; cornea unpigmented. Antennular peduncle reaching to rostral tip by

fully ♀

Calaxiopsis is probably a protandrous ♀

2 species mixed

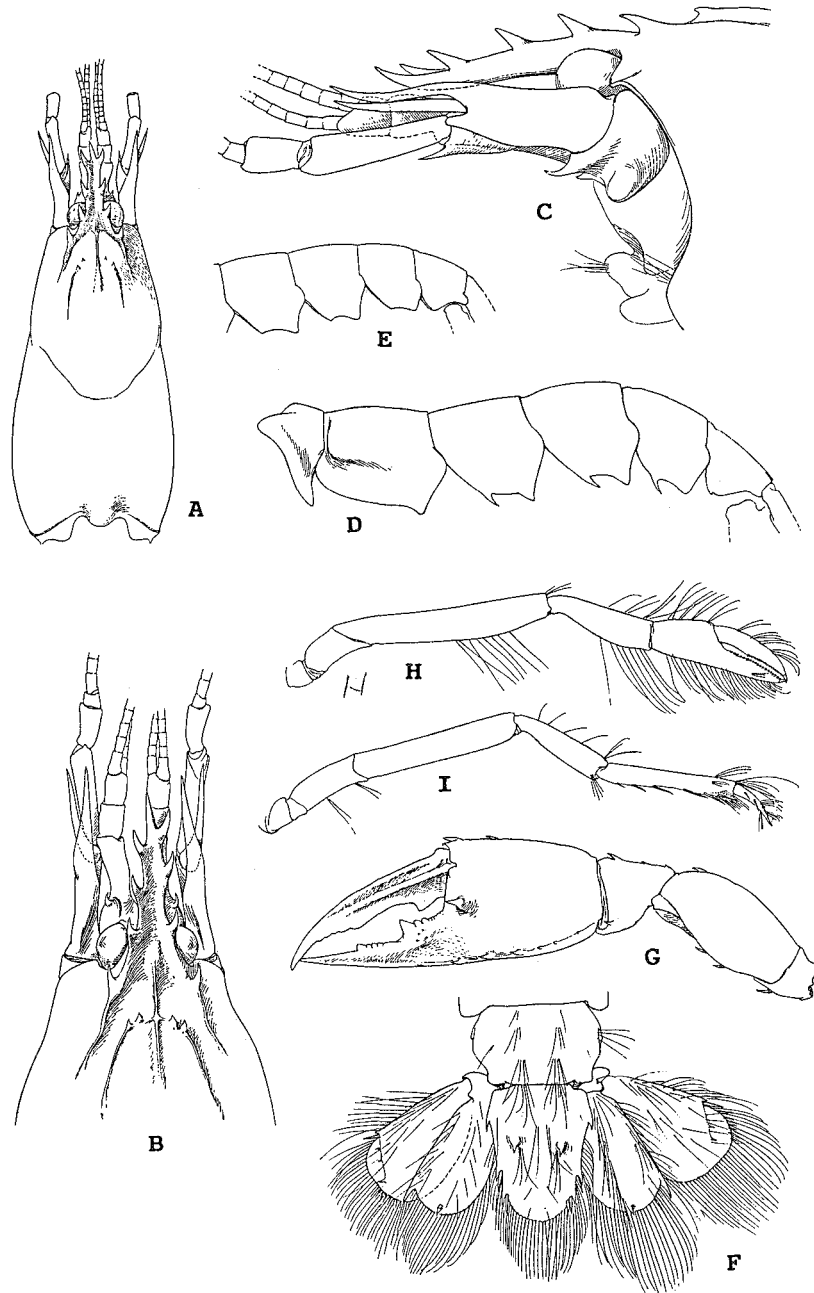


Fig. 16. *Calaxiopsis serrata* sp. nov.: A. carapace in dorsal aspect; B. anterior part of carapace in dorsal aspect; C. same in lateral view; D. and E. abdominal somites in lateral view, F. tail-fan; G. 1st pereopod; H. 2nd pereopod; I. 3rd pereopod. A, B, C, D, F, G, H and I for ♂, and D for ♀, MP 1172.

Check list of Axiidae

distal margin of penultimate article; article 1 twice as long as penultimate and distal articles combined. Antennal peduncle reaches to tip of antennular peduncle by distal third of penultimate article; article 1 with strong ventral tooth; article 2 with elongate dorsodistal tooth, reaching to distal third of penultimate article; antennal acicle directed outward, and about as long as dorsodistal tooth of article 2; article 3 with short ventrodistal tooth; article 4 about 3 times as long as article 5; antennal flagellum about twice as long as antennular ones.

Maxilliped 3 pediform. Coxa and basis each with ventrodistal tooth. Ischium more than twice as long as broad, armed with 2 teeth on incisor margin; inner crest beset with 11 interspaced marginal denticles, terminated by triangular angle. Merus about as long as ischium, armed with 2 sharp teeth at distal part of incisor margin. Carpus broadened distally, about three-fourths length of merus and about as long as propodus. Dactylus about three-fourths length of propodus, and brimmed with dense distally-elongated bristles on incisor margin.

P/1 subequal, larger cheliped in left side (Fig. 16G). Coxa and basis unarmed. Ischium with subterminal tooth on ventral margin. Merus less than twice as long as broad, armed with 2 sharp teeth on ventral margin, and with subterminal tooth on dorsal margin. Carpus about two-thirds length of merus, beset with outerventral tooth, and also with subterminal one on dorsal margin. Chela 2.5 times as long as broad, and fingers setose. Palm slightly longer than broad; outer surface smooth, furnished with sharp subterminal tooth below articulation to dactylus, and also carinate with 5-7 small ridges on outer ventral margin; dorsal margin with a carina to its whole length, provided with distal tooth; and inner surface with a row of 3 teeth in its lower part. Cutting edge of fixed finger is armed with sharp tooth at distal third, and occupied by distinct convexity in proximal third, which is fringed with 4 small rounded teeth and sharp distal tooth on incisor edge; inner surface carinate along cutting edge. Dactylus obviously longer than palm, carinate on dorsal margin and also medially on outer surface; cutting edge slightly convex at the middle, and proximally armed with obtuse triangular tooth. P/1 smaller cheliped in right side. Coxa and basis unarmed. Ischium with 2 teeth on ventral margin. Merus less than twice as long as broad, armed with 3 teeth on ventral margin, and with subterminal one on dorsal margin. Carpus about half length of merus, armed with subterminal tooth on dorsal margin. Chela about 2.5 times as long as broad; dorsal margin carinate, and with subterminal tooth; outer surface with subterminal tooth below articulation to dactylus; ventral margin carinate with tufts of setae; inner surface with tooth around middle of distal margin. Fixed finger with 2 teeth on cutting edge; inner surface carinate along cutting edge. Dactylus 1.6 times as long as palm, and slightly sigmoid on cutting edge; outer surface medially carinate.

P/2 (Fig. 16H) unarmed; carpus about half length of merus, and slightly shorter than chela; and fingers of chela longer than palm. P/3 (Fig. 16I) also unarmed; carpus more than half length of merus, and slightly shorter than propodus; and propodus furnished with five rows of setae and single yellow spine along

Naturalists 3.

ventral margin. P/4 unarmed; carpus two-thirds times as long as merus, and three-fourths times as long as propodus; propodus with 6 row of setae and single yellow spine on ventral margin. P/5 unarmed; coxa with male genital pore; carpus about half length of merus, and two-thirds length of propodus; propodus with pubescent at inner distal part, and ventrodistally armed with blunt tooth; dactylus one third length of propodus.

Branchial formula as follows

	maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	r	1	1	1	1	-	-
Arthrobranchs	-	-	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

(r=rudimentary)

Pl/1 of males present; distal part broadened, twisted from narrow proximal part, and longitudinally divided into two parts, anterior larger part of which forms an elongate triangle, and posterior smaller part a narrow flap.

Pl/2 of males biramous; endopod of a simple elongate segment with elongate appendix masculina proximally fused by small appendix interna.

Pl/3-5 of males with appendix interna.

Outer margin of uropod exopod straight, and with a tooth at posterodistal angle; transverse suture clearly defined, furnished with 2-3 spinules, and with slender spine at outer angle. Outer lateral margin of endopod with distinct distal tooth; midrib smooth.

In the female paratype most of features are the same as in the male holotype, however the following differences exist.

Both P/3 and P/5 coxae with genital pore. Abdominal somites 3-5 (Fig. 16E) only with posterior tooth respectively. Pl/1 of 2-segments, distal segment about two-thirds length of proximal one. Pl/2-5 with appendix interna.

Remarks.-This species is closely related to *Calastacus felix* Alcock and Anderson, 1899 in that the eyestalks are fixed with carapace; and the rostrum reaches to the end of antennular 2nd article, however differs in that in *felix* the rostral prolongations onto the gastric region is furnished with 2 pairs of teeth, and the left cheliped described by Alcock (1899, pl 42) is thickly setose on outer surface, while in *serrata* the rostral prolongation of gastric region with a pair of teeth, and the carpus and palm of the chelipeds are not setose as in *felix*, though the fingers are setose.

Calaxiopsis felix (Alcock and Anderson, 1899)

Calastacus felix Alcock and Anderson, 1899:287; Alcock, 1899:,

Check list of Axiidae

pl 42, fig 3; Balss, 1925:209.
Calocaris (Calastacus) felix, - Alcock, 1901:192; Borradaile, 1903:539; de Man, 1925c:117.

Remarks.-By the illustrations given by Alcock (1899), this species is included in *Calaxius*, because the body and chelipeds are setose, the telson is rather elongated and with a rounded posterior margin.

Type locality.-Arabian Sea, off Cape Comorin, 430 m.
Distributions.-Arabian Sea, Indian Ocean; 430-785m.

Genus *Oxyrhynchaxius* Parisi, 1917

Oxyrhynchaxius Parisi, 1917:17; de Man, 1925c:2.

Definition.-Rostrum styliform, margins denticulate, discontinuous with gastric region. Anterolateral margin of carapace armed with a denticle. Gastric region situated at the same level with rostrum, and with five almost paralleled carinae. Carapace covered with scale-like granules. Cervical groove located to a whole length. Abdominal pleura unarmed on margin. Telson oblong, and with posteromedian tooth. Eyestalks elongated; cornea pigmented. Antennal acicle prominent. P1 subequal; chelae obliquely positioned; surface granulated, and with setae. No pleurobranchs present.

P1/1 of males absent, and of females consisting of proximal segment and jointed flagellum. P1/2 appendix interna and appendix masculina of males unexamined. Uropod exopod with transverse suture.

Type species.-*Oxyrhynchaxius japonicus* Paris, 1917 [by monotypy].

Oxyrhynchaxius japonicus Parisi, 1917

Oxyrhynchaxius japonicus Paris, 1917:18, text-figs 5-6; de Man, 1925c:2; Froggia and Grippa, 1986:260, text-fig. 4.

Material examined.-1♀, TL 69, CL 25.5, MP 428, Hong Kong.

Diagnosis.-Podobranchs on 2nd maxillipeds to 3rd pereopods are very small in shape; podobranchs on 4th pereopods are not foliated. Gill-formula defined as follows,

	Maxillipeds			Pereopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	1	1	1	1	1	r	-
Arthrobranchs	-	1	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

(r = rudimentary)

In the key
cornea one said to be
double, no explanations here!

Naturalists 3.

Type locality.-Enoshima, Sagami Bay, Japan.
Distribution.-Sagami Bay, Japan; Hong Kong.

Genus *Acanthaxius* gen. nov.

Definition.-Rostrum narrowly triangular, and with pointed apex; margins armed with teeth, and discontinuous with gastric region. Anterolateral margin of carapace unarmed. Cervical groove running to a whole length. Gastric region situated at the same level with rostrum, and with five, almost paralleled carinae with denticles. Cardiac region frequently spinous, and also frequently with median dorsal carina. Abdominal pleura truncate or rounded on margins. Telson subsquare or oblong, and almost with posteromedian tooth. Eystalks stout, subglobose; cornea pigmented. Antennal acicle comma-shaped, short or long, directed outside of dorsodistal spine of 2nd antennal segment.

P/1 unequal; chelae obliquely positioned, surface covered with tubercles and setae, and armed with sharp teeth on its dorsal margin. Fingers of small cheliped obviously longer than palm. No pleurobranchs.

Pl/1 of males absent, and that of females consisting of proximal segment and multiarticulate flagellum. Pl/2 of males with appendix interna and appendix masculina. Pl/3-5 of males and Pl/2-5 of females furnished with appendix interna. Uropod endopod with transverse suture.

Remarks.-This genus is characteristic in the following points; the eystalks are stout, with double corneae; the rostrum is narrow; the dorsodistal tooth of antennal segment of antenna incurved, crossing with antennal acicle; the chelipeds are obliquely positioned, and their chelae are almost always provided with teeth on the dorsal margins. In the small cheliped the fingers are obviously longer than the palm.

Type species.-*Axiopsis* (*Axiopsis*) *pilocheira* Sakai, 1987 [by present designation].

wo

Species included.-*Axius spinulicaudus* Rathbun, 1902; *Axius spinosissimus* Rathbun, 1906; *Axius miyazakiensis* Yokoya, 1933; *Axiopsis* (*Axiopsis*) *polyacantha* Miyake and Sakai, 1967; *Calocaris* (*Calastacus*) *amakusana* Miyake and Sakai, 1967; *Calocaris* (*Calastacus*) *hirsutimana* Boesch and Smalley, 1972; *Axiopsis* (*Axiopsis*) *caespitosa* Squires, 1979; *Axiopsis* (*Axiopsis*) *pilocheira* Sakai, 1987.

Acanthaxius spinulicaudus (Rathbun, 1902)

wo
other
genus

Axius spinulicauda Rathbun, 1902:886; Rathbun, 1910:149, text-figs 90a-b.
Axius (*Paraxius*) *spinulicauda*, -Borradaile, 1903:538.
Axiopsis spinulicauda, Schmitt, -1921:111, text-fig. 74.
Axiopsis (*Axiopsis*) *spinulicauda*, -de Man, 1925c:69.
Butler, 1961

Type locality.-Off Bodega Head, California, 62 fms (111m).
Distribution.-California, 111m.

Acanthaxius spinosissimus (Rathbun, 1906)

Woz

Axius spinosissimus Rathbun, 1906:894, text-figs 50a, 50b.
Axiopsis (Axiopsis) spinosissima, -de Man, 1925c:70, 98, pl. 8
figs 18-18g.

Type locality.-South coast of Molokai Is, Hawaii, 23-24 fms
(41-43m).

Distribution.-Hawaii; N. Buton-Strait, Indonesia. 41-94m.

Acanthaxius miyazakiensis (Yokoya, 1933)

Figs 17-19

Axius miyazakiensis Yokoya, 1933:51, text-fig 26.
Axiopsis (Axiopsis) miyazakiensis, -Sakai, 1987:305.

Material examined.-1♀, TL 40mm, CL 14, MP 870, Philippines,
"Coriolis", St. 26, 189m, March 22, 1976; 1♂, TL 42, CL 14, MP
957, Philippines, "Coriolis", St. 3, 170-168m, Nov. 20, 1980;
1♀, TL 37, CL 13, MP 1001, New Caledonia, St. 172, 19° 01.2S,
163° 16.0E, Sept. 11, 1985; 1♂, TL 26, CL 9.5, MP 874,
Philippines, St. 19, March 22, 1976; 1♂, TL 50, CL 19, MP 867,
Philippines, St. 30, 136-177m, Musorstom 1976; 1♀, TL 49, CL 18,
MP 869, Philippines, St. 4, 180m, March 19, 1976; 2♂♂, TL 44, CL
16; TL 47, CL 18, MP 960, Philippines, "Coriolis", 194-196m,
Musorstom 1976; 1♂, TL 46, CL 17, MP 959, Philippines,
"Coriolis", 14° 00'N, 120° 18'E, 193-205m, Musorstom 1976; 1♀,
TL 36, CL 13, MP 963, Philippines, "Coriolis", 14° 01'N, 120°

Several
sp. c. g.
mixed

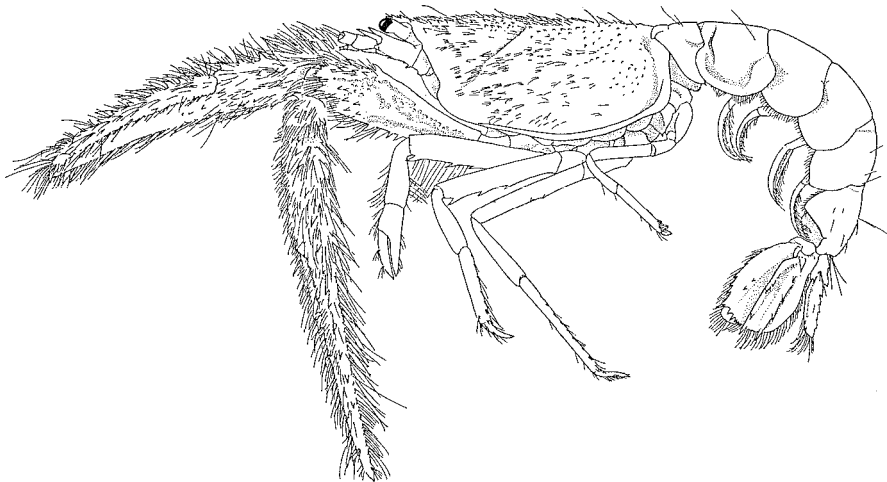


Fig. 17. *Acanthaxius miyazakiensis* Yokoya, 1933 in lateral view.
♂, MP 854.

MAKASSAR STRAIT

- 67 - identification uncertain

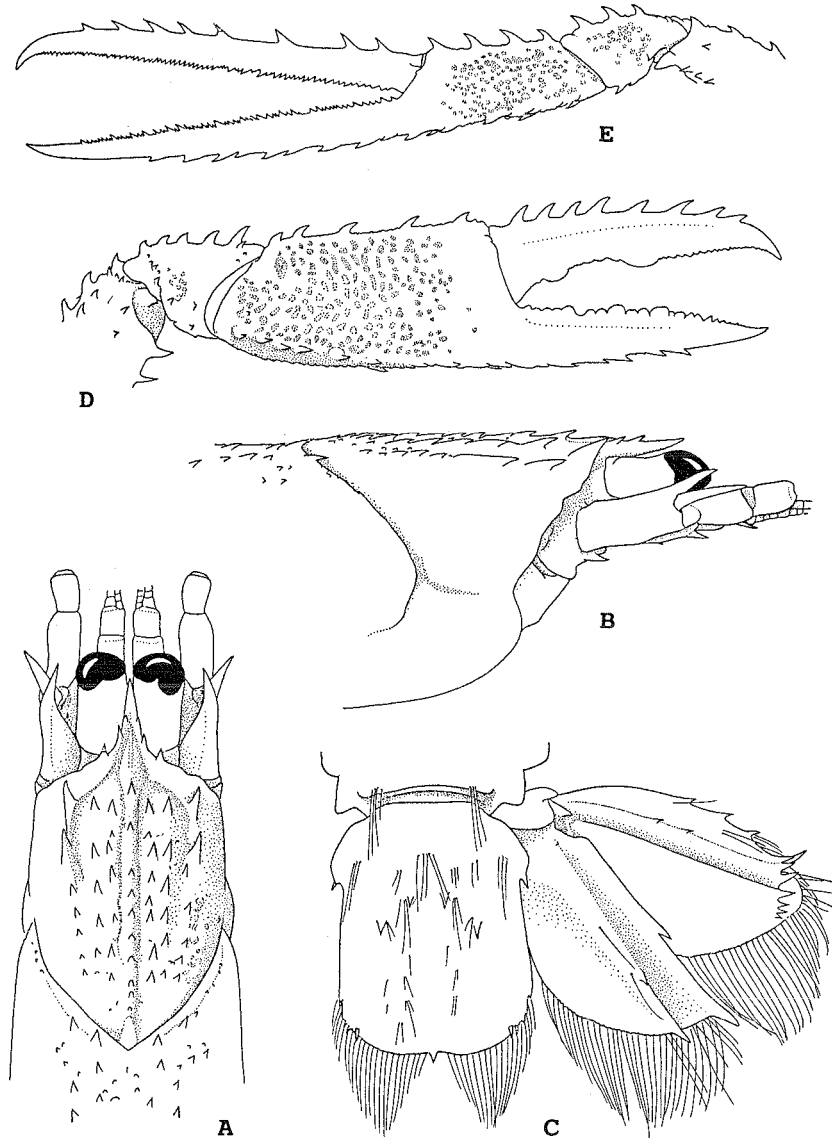


Fig. 18. *Acanthaxius miyazakiensis* Yokoya, 1933: A. anterior part of carapace in dorsal aspect; B. same in lateral aspect; C. tail-fan; D. 1st pereopod in larger side; E. same in smaller side. ♂, MP 960.

Philippines - Identification uncertain

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19'E, 196-204m, Musorstom 1976; 1♂, TL 53, CL 19, 1♀, TL 48, CL 17, MP 871, Philippines, St. 10, 178-205m, March 19, 1976; 1♂, TL 39, CL 14, MP 873, Philippines, St. 31, 187-175m, March 22, 1976; 1♂, TL 57, CL 21, 1 ovig. ♀, TL 57, CL 21, MP 854, "Corindon", Macassar, St. 273, 200-120m, Nov. 7, 1980; 1♂, TL 48, CL 18, MP 958, Philippine, 189-194m, Musorstom 1976; 1♂, TL 48, CL 12, MP, St. 34, 191-188m, Musorstom; 1♀, TL 44, CL 16, MP 872, St. 71, 174-204m, Musorstom 1976; 3♂♂, TL 45, CL 16; TL 45, CL 16; TL 52 (50, rostrum broken), CL 20 (18, rostrum broken), 1♀, MP 962, Philippines, "Coriolis", 14° 00'N, 120° 18'E, 193-200m, June 1, 1985; 1♂, TL 38, CL 14, MP 879, St. 36, 210-187m, Musorstom 1976;

Diagnosis.-Gastric region with median, two submedian, and lateral carinae each with a row of teeth; cardiac region spinous on its anterior part.

Description.-Carapace (Fig. 17; Fig. 18A,B) scattered with tufts of setae. Rostrum acute, narrowly triangular, and with sharply pointed apex: lateral margin with two lateral teeth, proximally extending outward onto anterolateral margin of carapace, and with another tooth. Gastric region with median, two submedian and lateral carinae with a row of teeth defined, running backward prior to cervical groove; median carina reaching anteriorly beyond midlength of rostrum, and provided with 11-13 teeth, 3rd or 4th tooth from anterior 1st tooth furnished posteriorly with median tubercles; two submedian rows furnished each 8-10 teeth, and lateral one with 6-7 teeth, the anterior two teeth distinctly larger than the posterior ones. Cervical groove is clearly defined. Cardiac region spinous on anterior half of dorsal region, and also tubercled on lateral side. 4th thoracic shield deeply concave along median slit, and also triangularly engraved along intermediate line of articulation, and with a pair of sharp lateral teeth; anterior thoracic region triangular, slightly concave on surface and with convex anterior neck (Fig. 4D).

Abdominal somites smooth, and middorsal length of abdominal somites 2-6 subequal. Somite 1 shorter, ventrally produced into an acute small tooth. Somite 2 largely convex on pleural ventral margin, somite 3 evenly convex, smaller than somite 2, somite 4 also convex, deflected on posterolateral margin; somite 6 ventrally triangular. Telson (Fig. 18C) subsquare, slightly longer than broad, and about as long as somite 6; lateral margins nearly paralleled, with two small articulating spines at posterior corner, and proximally convex with small sharp tooth; dorsal surface medially depressed, furnished with two pairs of teeth, and posterior margin with median tooth.

Eyestalks thick, and elongate, reaching short of or over level of rostral tip. Antennular peduncle of 3 articles, basal article failing to reach to tip of eye, articles 2 and 3 short, and subequal in length. Antennal peduncle of 5 articles; article 1 short, with ventrodorsal tooth, and 3-4 teeth on ventromesial margin. Article 2 distolaterally produced into elongate tooth directing inward from middle of the article. Antennal acicula extending forward beyond the distolateral tooth of 2nd article. Article 4 about half length of article 2, and ventrally with a



Fig. 19. *Acanthaxius miyazakiensis* Yokoya, 1933: A. 1st maxilliped in outer aspect; B. same in inner aspect; C. 2nd maxilliped; D. 3rd maxilliped. ♂, MP 871.

Check list of Axiidae

short tooth. Article 5 unarmed, and slightly shorter than article 4. Antennal flagellum about twice length of antennular flagella.

Mandible smooth on cutting edge; palp 3-segmented. Maxilla 1 with 2-segmented palp, distal segment deflected with two terminal bristles. Maxilla 2 scaphognathite with long posterior bristle. Mxp 1 (Fig. 19A,B) endopod 2-segmented; exopod with 2-segmented process. Mxp 2 (Fig. C) propodus broader than long, and dactylus setose, and rounded on distal margin. Mxp 3 (Fig. 19D) coxa with sharp distal teeth on posteromesial margin; basis also with two small teeth on anteromesial margin, and with sharp distal tooth on posteromesial margin; ischium with serrated ridge on inner mesial margin, and with 2 teeth on outer mesial margin; merus slightly longer than ischium, with 4 sharp teeth on outer mesial margin; carpus about three-fourths length of merus, and with distoventral tooth; propodus slightly longer than carpus; dactylus more than half length of propodus.

P/1 unequal, obliquely positioned in chela, and setose. Coxa with two ventral teeth. Basis with one ventral tooth. Ischium with 4-7 ventral teeth, including one on ventrodistal margin. In larger cheliped merus about three times as long as broad, with 9-10 sharp ventral teeth, with 3 distinct dorsal teeth including one on the distal margin, with 3-5 teeth on outerdistal margin, and with more than 10 sharp teeth on outer distal surface. Chela (Fig. 18D) thickly covered with setae on outer surface, and about as long as merus along dorsal margin except dactylus. Carpus oblique on distal margin, with 4-5 teeth on dorsal margin, with 3 teeth on outerverventral margin, with one tooth on innerventral margin, and with 2 teeth on outer surface. Palm furnished with 4 teeth on dorsal margin, with 13 teeth on outerverventral margin except in distal third of fixed finger, with 5 teeth on innerventral margin in proximal half of fixed finger. Dactylus 2.3 times as long as palm at the level of outer articulation, and with 10 interspaced teeth on dorsal margin, and with a row of rounded teeth on cutting edge.

In smaller cheliped (Fig. 18E) merus less than 4 times as long as broad. Carpus oblique on distal margin, with 4 teeth on dorsal margin, with 2-3 teeth on outerverventral margin, one tooth on innerventral margin, and with some teeth and granules on outer surface. Palm 1.3 times as long as carpus at the level of articulation, with 4 sharp teeth on dorsal margin, with 13 sharp teeth on outerverventral margin, and with 3-4 sharp teeth on innerventral margin. Dactylus 2.3 times as long as palm, and with 8 sharp interspaced teeth on dorsal margin; cutting edge finely serrated by distally-declined teeth.

P/2 chelate. Coxa with one anteroinner tooth, with 2 posteroinner teeth. Basis with one tooth on ventral margin. Ischium ventrodistally produced into sharp tooth. Merus with 3 ventral teeth including one on distal margin. Carpus unarmed, and slightly shorter than chela. Fingers of chela slightly longer than palm on cutting edge.

P/3 simple. Coxa with one small anteroinner tooth, and with another innerdistal one. Basis and ischium unarmed. Merus with 3 sharp ventral teeth including one on distal margin. Carpus unarmed, slightly more than half length of merus. Propodus about

Naturalists 3.

as long as carpus; outer surface with 7 transverse rows of 1-2 brown, transparent spines and setae, and in addition with one elongate, spine at ventrodistal angle. Dactylus setose, and about two-fifths length of propodus.

P/4 simple, extending forward beyond the tip of 2nd pereopods, and distinctly longer than P/3; merus, carpus, and propodus narrower and longer than those of P/3. Coxa with 3 anteroventral teeth. Carpus about two thirds length of merus. Propodus about one and half length of carpus; outerventral surface with transverse rows of setae and 1-2 brown, transparent spines. Dactylus setose, and one third length of propodus. P/5 subchelate, reaching forward to the end of distal margin of P/4 carpus.

Branchial-formula as follow:

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	1	1	1	1	1	-	-
Arthrobranchs	-	1	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

Pleopod 1 absent in males.

Pleopods 2-5 foliaceous; endopods with appendix interna and appendix masculina, which are similar in shape.

Outer margin of uropod exopod largely convex, and with 5 teeth including one at the outerposterior angle, and with another longer articulating spine at the same outerposterior angle; distal suture distinct, but narrow, and armed with 7 marginal teeth; distal flap small and rounded on margin.

In females pleopod 1 with proximal segment and segmented flagellum. Pl\2-5 only with appendix interna.

Remarks.-It seems the female type specimen of *miyazakiensis* was lost, and Yokoyas's description and his figures are insufficient for comparison, however the present specimens from Philippine and New Caledonia are identified as *miyazakiensis* because of the following points; the rostrum is furnished with 2-3 teeth on its lateral margin, the gastric region with two submedian rows of teeth, the cardiac region spinous posterior to the cervical groove, and also in the chela of the larger cheliped and the tail-fan. In Yokoya's specimen, however, the teeth on the cardiac region, and also on the lateral ridge of the gastric region are rather small in number, however this difference is to be thought within variation.

Type locality.-East of Southern Miyazaki Pref., Japan, 137m.
Distribution.-Japan, Philippines, and New Caledonia.

Acanthaxius polyacanthus^a (Miyake and Sakai, 1967)

Axiopsis (*Axiopsis*) *polyacantha* Miyake and Sakai, 1967:303, text-fig. 1, pl. 4A.

Type locality.-East China Sea, 118m.
Distribution.-East China Sea, 118m.

Acanthaxius amakusana (Miyake and Sakai, 1967)

Calocaris (*Calastacus*) *amakusana* Miyake and Sakai, 1967:306, text-fig. 2, pl. 4B.

Axiopsis (*Axiopsis*) *amakusana* - Squires, 1973: 1530
Type locality.-Off Tomioka, Amakusa Is, Kyushu, Japan.
Distribution.-Amakusa Is, Japan.

Acanthaxius hirsutimanus^a (Boesch and Smalley, 1972)

Calocaris (*Calastacus*) *hirsutimana* Boesch and Smalley, 1972:45, text-figs. 1-9.

A. (A.) *h.* Squires, 1973
Type locality.-Off British Guiana, Tropical Atlantic, 50m.
Distribution.-British Guiana; Mississippi. 11-50m.

Acanthaxius caespitosa (Squires, 1979)

Axiopsis (*Axiopsis*) *caespitosa* Squires, 1979:1584, text-figs 1-3, tables 1-2.

Remarks.-This species is designated as the type species of the present new genus.

Type locality.-Off Rio San Juan del Sur, Pacific coast of Colombia, South America.

Distribution.-Pacific coast of Colombia.

Acanthaxius pilocheirus^a (Sakai, 1987)

Axiopsis (*Axiopsis*) *pilocheira* Sakai, 1987:296, text-figs 1-2.

Remarks.-This species is designated as the type species of *Acanthaxius*.

Type locality.-Kumano-nada, Japan, 360m.

Distribution.-Kumano-nada, Japan, 360m.

Genus *Allaxius* gen. nov.

Definition.-Rostrum small, triangular; margins armed with

no
cf p. 66
where
pilocheira
is designated
as type sp.

teeth, shortly extending posteriorly to gastric region. Anterolateral margin of carapace unarmed. Gastric region convex and spinose. Cervical groove obvious except its anterolateral part. Abdominal pleura smooth on surface, and unarmed on margins. Telson subsquare, and with posteromedian tooth.

Eyestalks subglobose; cornea pigmented. Antennal acicle short, and comma-shaped.

P/1 unequal; chela unarmed on dorsal margin. No pleurobranchs. Pl/1 of males absent, and of females consisting of proximal segment and multiarticulate flagellum. Pl/2-5 narrow, and with appendix masculina and appendix interna. Uropod exopod armed with row of teeth on outer lateral margin, and with transverse suture.

Type species.-*Axiopsis aethiopica* (Nobili, 1904) [by present designation].

Species included.-*Axius clypeatus* de Man, 1888; *Axiopsis aethiopica* Nobili, 1904; *Paraxius picteti* Zehntner, 1894; *Axiopsis picteti* var. *spinimana* de Man, 1905; *Axiopsis sculptinana* Ward, 1942.

Remarks.-This genus is remarkable in that the gastric region is convex, and the antennal acicle is short in a comma-form.

Allaxius princeps (Boas, 1880)

Axius princeps Boas, 1880:98, pl. 7 figs 214-217; Balss, 1914:88.

Axiopsis princeps, -Borradaile, 1903:538; Makarov, 1938:48, text-fig. 15.

Axiopsis (*Axiopsis*) *princeps*, -de Man, 1925c:69; Miyake, 1982:90, pl. 30 fig. 4; Sakai, 1987:303.

Material examined.-2♀♀, TL 44, CL 15.5: TL 68, CL 22, MP 1140, Akauma, Sagami Bay, 1977, H. Suzuki coll.

Diagnosis.-Chelipeds with tufts of soft setae. 4th thoracic shield provided with a pair of rounded lateral angles, provided with a median slit extending backward prior to level of intermediate line of articulation, which extinct at middle by median concavity; anterior thoracic region triangular with a short anterior neck, concave on the ventral surface, and kept in the same level to the body axis. Median carina of 3rd thoracic sternit narrow, remarkably descending forwards (Fig. 4E).

Gill-formula shown as follows,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	1	1	1	1	1	-	-
Arthrobranchs	-	1	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

other
genus.
perhaps
Dolichoxius

Check list of Axiidae

Remarks.-*princeps* is tentatively included in *Allaxius* as the antennal acicle is comma-shaped as in the present genus. However, it is doubtful whether it belongs to this genus, because the 1st to 3rd epipods are rounded as in *Scytoleptus*, and the dorsal armature of the gastric region, the unequal chelipeds, and the tail-fan are similar to the species of *Axiopsis*.

Type locality.-Vladivostock.

Distribution.-Japan Sea (Vladivostock; Hokkaido; and Yamagata Pref.), and Sagami Bay, Japan. 300 m.

***Allaxius clypeatus* (de Man, 1888)**

Axius clypeatus de Man, 1888:470, pl. 20 fig. 2.
Axiopsis (*Axiopsis*) *clypeata*, -de Man, 1925c:70

Type locality.-Amboina.

Distribution.-Amboina.

***Allaxius aethiopicus* (Nobili, 1904)**

Axiopsis aethiopica Nobili, 1904:235; Tattersal, 1921:394.
Axiopsis (*Paraxiopsis*) *aethiopica*, -Balss, 1915:1; Nobili, 1906:93, pl. 6 fig. 1; de Man, 1925c:72.

Type locality.-Djibouti and Massawa.

Distribution.-Djibouti; Massawa, Red Sea.

***Allaxius picteti* (Zehntner, 1894)**

Paraxius Picteti Zehntner, 1894:196, pl. 9 fig. 25.
"?*Axiopsis Picteti*", -Borradaile, 1903:539.
Axiopsis (*Axiopsis*) *Picteti*, -de Man, 1925c:70, 92, pl. 7 figs 16-16b.

Type locality.-Amboina.

Distribution.-Indonesia, reef.

***Allaxius spinimanus* (de Man, 1905)**

Axiopsis Picteti var. *spinimana* de Man, 1905:597.
Axiopsis (*Axiopsis*) *Picteti* var. *spinimana*, -de Man, 1925c:70, 96, pl. 7 figs 17-17a.

Type locality.-Off south of Kabaena Is., New Guinea, reef.

Distribution.-New Guinea, reef to 22m.

***Allaxius sculptimana* (Ward, 1942)**

Axiopsis sculptimana Ward, 1942:62.

Type locality.-Chagos, Diego Garcia.
Distribution.-Chagos Is.

princeps is not
included in
Axiops!

Genus *Axiopsis* Borradaile, 1903

Axiopsis Borradaile, 1903:538; Nobili 1906:91; Schmitt, 1921:110; de Man, 1925c:66; Balss, 1957:1579; Poore and Griffin, 1979:224.
Axiopsis s. str. Borradaile, -de Man, 1925c:2, 67; Balss, 1957:1579.

Definition.-Rostrum triangular, pointed at tip; margins armed, extending to gastric region. Anterolateral margin of carapace unarmed. Gastric region with a horseshoe-shape prominence scattered with denticles. Cervical groove running to a whole length. 4th thoracic sternite with distinct intermediate line of articulation. Abdominal pleura smooth on surface, margins truncate or rounded, and frequently with small tooth. Telson subsquare, with posteromedian tooth.

Eyestalks subglobose; cornea pigmented. Antennal acicle prominent (except *A. princeps*).

P/1 unequal, vertically situated; chelae unarmed on dorsal margin. No pleurobranchs.

P1/1 of males absent, and of females consisting of a basal segment and a multiarticulate, blade-shape flagellum. P1\2-5 leaf-like; P1/2 of males with appendix masculina and appendix interna. Uropod exopod with transverse suture.

Type species.-*Axius affinis* de Man, 1888 [by original designation].

Species included.-*Axia serratifrons* A. Milne Edwards, 1873 (= *Axius spinipes* de Man, 1888; *Axius affinis* de Man, 1888); *Axiopsis* (*Axiopsis*) *consobrina* de Man, 1905; *Axiopsis* (*Axiopsis*) *irregularis* Edmondson, 1930; *Axiops* (*Axiops*) *barouai* Squires, 1976

Axiopsis serratifrons (A. Milne-Edwards, 1873)

Axia serratifrons A. Milne Edwards, 1873:263, pl. 13(not 2) figs 6, 6a.

Axius serratifrons, -Rathbun, 1906:895; Edmondson, 1923:27.

Axiopsis serratifrons, -Sendler, 1923:44, pl. 21 fig. 10 (not 9).

"?*Axiopsis serratifrons*", -Borradaile, 1903:538.

Axiopsis (*Axiopsis*) *serratifrons*, - de Man, 1925c:68, 72, pl. 6 figs 12-12i; Holthuis, 1953:51; Kensley and Gore, 1981:1253, text-figs 1-5; not

Axius spinipes de Man, 1888:464 (Type locality: Noordwachter Is., Java Sea), pl. 19 fig. 6; Zehntner, 1894:195.

Axiopsis spinipes, -Borradaile, 1903:538; Borradaile, 1910:262; Nobili, 1906:91.

Axius affinis de Man, 1888:469 (Type locality: Amboina), pl 20, fig 1.

Synonymy of *spinipes* & *affinis* with *serratifrons* must be confirmed

Check list of Axiidae

Axiopsis affinis, -Borradaile, 1903:538; Borradaile, 1904:752; Nobili, 1906:92; Makarov, 1938:47.

Material examined.-4 inds. damaged, MP 144, Obock, 1897, Joussaume coll., Nobili 1905, det. as *Axiopsis affinis*; 4 inds. damaged, MP 145, Obock, 1879, Joussaume coll., Nobili 1905, det. as *Axiopsis spinipes*; 1♀, CL 115, ABD 19, MP 146, Red Sea, 1897, Joussaume coll., Nobili 1905, det. as *Axiopsis spinipes*; 1♂, TL 24, CL 9.5, MP 147, Hawaii; 1♀, TL 41, CL 13, MP 395, Mombasa, 0.5m, under dead coral block, Jan. 1. 71., A. J. Bruce coll.; 1 ovig. ♀, TL 18, CL 5.5, MP 396, 7° 09'S, 56° 08'E, 15fms, Feb. 21. 72., R.V. "Manihine", A.J. Bruce coll.; 1♀, TL 22, CL 7.5, MP 398, 7° 09.3'S, 56° 08'E, 16fms, Feb. 21. 72, R.V. "Manihine", A.J. Bruce coll.; 1 juv. TL 12, CL 4, MP 686, Tuléar, Madagascar, B. Thomassin coll.; 1♀, TL 29, CL 10, MP 687, Tuléar, B. Thomassin coll.; 1♀, TL 27, CL 9.5, MP 688, Tuléar, B. Thomassin coll.; 1 juv. TL 17, CL 5, MP 689, Tuléar, B. Thomassin coll.; 1♀, TL 26, CL 8, MP 690, Aldebra, March 16. 54., "Calypso" coll.; 1♂, CL 22, ABD 46, MP 691, New Caledonia, 1961 coll.; 1♂, TL 37, CL 12.5, Smithsonian Oceanographic Sorting Center Ref. No 152, Iioe, Nov. 16. 64. coll.

Diagnosis.-4th thoracic shield armed with a pair of lateral teeth, and remarkably furrowed with a median slit extending backward to near carinate intermediate line of articulation; anterior thoracic sternite triangular with its anterior neck. 5th thoracic sternite with thick convexity on posterior margin (Fig. 4F).

Gill-formula defined as follows,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	1	1	1	1	1	-	-
Arthrobranchs	-	-	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

Remarks.-de Man's *spinipes* and *affinis* were treated by de Man (1925c:72) as a synonym of *A. serratifrons*.

4th posterior thoracic shield is similar to those of *Oxyrhynchaxius japonicus*, and *Calaxius acutirostris*, however in *O. japonicus* the lateral angles of the thoracic shield are rounded.

Type locality. ~~Hawaii~~.

Distributions.-Hawaii; Gilbert Is.; Palau Is.; Indonesia; Chagos Archipelago; Red Sea; South Africa; Bermuda; Florida.

Upolu, Samoa (specimen seen by de Man, 1925)

Axiopsis consobrina (de Man, 1905)

Axiopsis consobrina de Man, 1905:595; Balss, 1925:209.
Axiopsis (*Axiopsis*) *consobrina*, -de Man, 1925c:80, pl. 6 figs 13-13c; Poore and Griffin, 1979:230, text-fig. 4

probably other species & genera

us Solon-shait, 113 us

Naturalists 3.

Type locality. ~~Sulu Sea, 275m deep~~

Distribution.-Indonesia; Queensland, Australia. 75-275m.

Axiopsis irregularis (Edmondson, 1930)

Axiopsis (Axiopsis) irregularis Edmondson, 1930:10, text-fig. 4,
pl. 1A.; 1946:260

Type locality and habitats.-Pearl and Hermes Reef, Hawaii,
shallow waters.

Distribution.-Hawaii.

Axiopsis baronai Squires, 1978²

Axiopsis (Axiopsis) baronai Squires, 1978²:1885, 4 text-figs, 1
table.

Type locality.-Togorama, Colombia.

Distribution.-Togorawa, Colombia.

Genus **Calocarides** Wolllebaek, 1908

Calocarides s. str. Wolllebaek, 1908:23; de Man, 1925c:71;
Bouvier, 1940:97.

Definition.-Rostrum slender, triangular, and pointed at tip;
margins armed with a row of teeth, extending backward to gastric
region. Anterolateral margin of carapace usually unarmed (except
quinqueseriatus, which it is armed with teeth). Gastric region
convex, and with five carinae. Cervical groove remarkable to a
whole length. Abdominal pleura smooth on surface. Telson
subsquare or oblong, and with posteromedian tooth.

Eyestalks subglobose; cornea pigmented or not. Antennal
acicle prolonged.

P/1 unequal. No pleurobranchs.

P1/1 in males absent, and in females of a proximal segment
and a flagellum. P1/2-5 similar, narrow; P1/2 of males with
appendix masculina and appendix interna. Uropod exopod with
transverse suture.

Remarks.-Wolllebaek (1908:23) referred for his two species,
crassipes and *coronatus*, and defined *Calocarides* on the ground
that the cornea is unpigmented, however it seems more adequate
at this moment to change the definition on the coloration of
cornea as the cornea is pigmented, and to include others species
closely related with this genus.

Type species.-*Euconaxius coronata* Trybom, 1904 [by present
designation].

Species included.-? *Axius armatus* Smith, 1881; *Calastacus
longispinis* McArdle, 1901; *Calastacus quinqueseriatus* Rathbun,
1902 (= *Calastacus rostriserratus* Andrade and Baez, 1977);
Euconaxius coronata Trybom, 1904 (= *Euconaxius crassipes* Trybom,

Check list of Axiidae

1904; *Axius laevis* Bouvier, 1915); (?*Axiopsis tenuicornis* de Man,
1905; ?*Axius habereri* Balss, 1913; *Axius soyoi* Yokoya, 1933;
Axiopsis (*Axiopsis*) *werribee* Poore and Griffin, 1979. ?

?*Calocarides armata* (Smith, 1881)

Axius armatus Smith, 1881:433.
Axius (*Paraxius*) *armatus*, -Borradaile, 1903:538.
Axius (*Axius*) *armatus*, -de Man, 1925c:11.

many characters
of *axiopsis* do not
fit *calocarides*

Material examined.-1♀, USNM 035391, holotype, North Atlantic Ocean, off Martha's Vineyard, R.V. Fish Hawk, 142fms (255m).

Remarks.-This species has a pigmented cornea. In the 1st pereopods the palm of the larger cheliped possesses a subdistal tooth on the dorsal margin, and the dactylus is conspicuously longer than the fixed finger. This species is similar to *werribee* from Victoria, Australia.

Type locality.-South coast of New England, 100-142fms (180-255m).

Distribution.-New England, 180-255m.

Calocarides longispinis (McArdle, 1901)

Calastacus longispinis McArdle, 1901:522; Alcock and McArdle, 1902:, pl. 57 figs 2-2a; MacGilchrist, 1905:239; Balss, 1925:209.

Calocaris (*Calastacus*) *longispinis*, -Borradaile, 1903:539.

Nec.:

Calastacus longispinis (= *C. coronatus*), - Stebbing, 1910:367; Kensley, 1981:30.

Calocaris (*Calastacus*) *longispinis* (= *C. coronatus*), - de Man, 1925c:118; Barnard, 1950:503, text-figs 93d-f.

Remarks.-Stebbing (1910) and Barnard (1950) described *longispinis*, however it is most probable that their specimens are to be defined as *coronatus* by the geographical reason. ?

Type locality.-Arabian Sea, 300fms (549 m) deep.

Distribution.-Arabian Sea; Gulf of Oman.

Calocarides quinqueseriatus (Rathbun, 1902)

Calastacus quinqueseriatus Rathbun, 1902:887; Rathbun, 1910:151, text-fig. 92; Schmitt, 1921:113, text-fig. 76; Balss, 1925:209.

Calocaris (*Calastacus*) *quinqueseriatus*, -Borradaile, 1903:539; de Man, 1925c:118.

? *Calastacus rostriserratus* Andrade and Bez, 1977:65, text-fig. 1.

Material examined.-3♂♂, TL 73, CL 25; TL 76, CL 28; TL 76, CL

Naturalists 3.

26, 2♀♀, TL 76, CL 28: TL 77, CL 28, 1 ovig. ♀, CL 24.5, ABD 44, MP 421, California coast, Arbatross St. 4436, 1904 coll.; 1♂, 1♀, USC 635-1, Oil Island, California, 33° 30'N 118° 10'W, 210-302fms (384-552m), "Velero IV", Feb. 20, 1976.

Diagnosis.-Gill-formula shown as follows,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	1	1	1	1	1	-	-
Arthrobranchs	-	-	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

Remarks.-This species shows a characteristic of *Acanthaxius*, because in *quinqueseriatus* the antennal acicle is crossed with dorsodistal spine of 2nd antennal segment, however it is included in *Calocarides* as the eyestalks are not so thick as in *Acanthaxius*. The cornea are pigmented.

rostriserratus from Hembra (32° 08'S, 71° 50'W), Chile seems to be a synonymo of *C. quinqueseriatus*.

Type locality.-Off San Luis Obispo Bay, South California, 200fms (360m) deep.

Distribution.-Southern California, 160-388fms (228-698m).

***Calocarides coronatus* (Trybom, 1904)**

Figs 20-21

Euconaxius coronata Trybom, 1904:384, pl. 20 figs 1-10, 13-14, pl.21 figs 1-8; de Man, 1925c:71.

Calocarides coronatus, -Wollebaek, 1908:23; Balss, 1926:26; Poulsen, 1940:216; Christiansen, 1955:1; Brattegard, 1966:45, 1 text-fig., 2 tables; Christiansen, 1972:40, text-fig 45.

Axiopsis (*Calocarides*) *coronatus*, -de Man, 1925c:71.

Euconaxius crassipes Trybom, 1904:390, pl. 20 figs 11-12 (Type locality: Kosterfjord, Sweden, 220m).

Calocarides crassipes, -Wollebaek, 1908:23, pls 1-7.

Axiopsis (*Calocarides*) *crassipes*, -de Man, 1925c:71.

Axius laevis Bouvier, 1915:182 (Type locality: West Africa, 698m).

Axius (*Neaxius*) *laevis*, -de Man, 1925c:13.

Material examined.-1♀, TL 41, CL 12.5, MP 339, 41° 34.7N, 9° 18.7'W, 1200m, 1972, "Thalassa" coll.; 2♂♂, TL 54, CL 19: TL 69, CL 23, 1♀, TL 69, CL 22.5, MP 777, Tropical west Africa, "Waeda" coll.; 1♂, TL 73, CL 25, MP 1044, 26° 26'S, 14° 25'E, 300m, 1981, "Benguela IV" coll.; 1♂, TL 72.5, CL 23.5, MP 1045, 26° 26'S, 14° 25'E, 300m, 1981, "Benguela IV" coll.

Check list of Axiidae

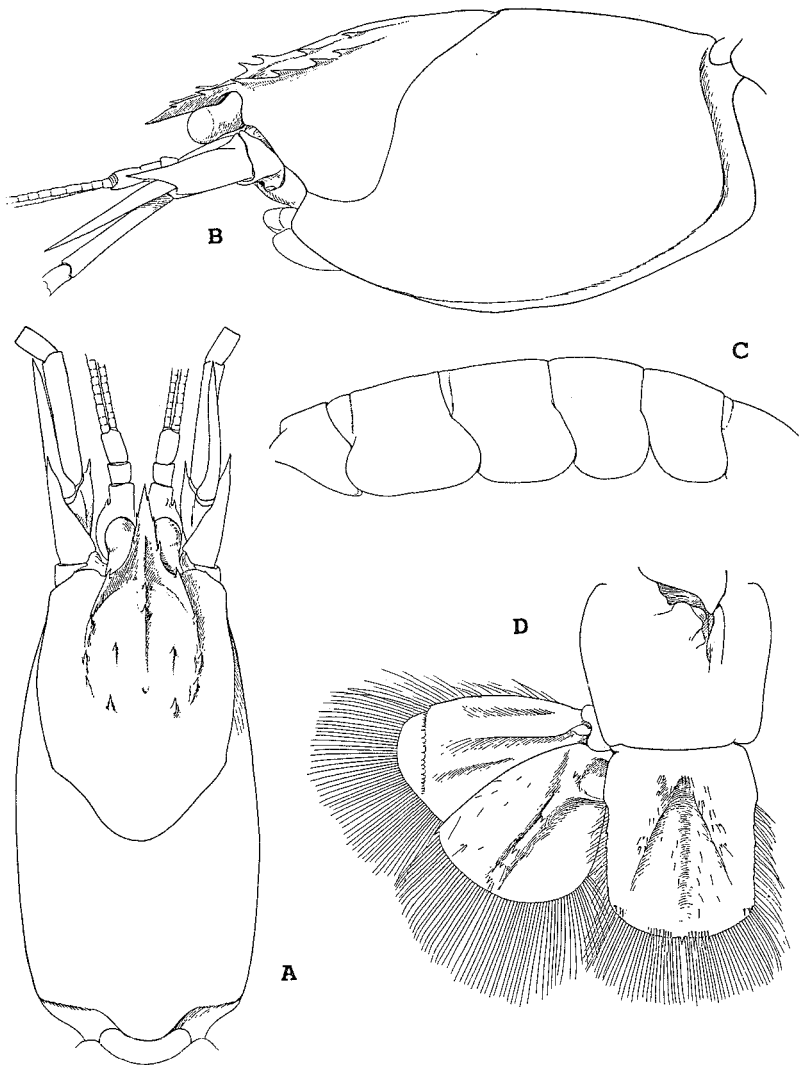


Fig. 20. *Calocarides coronatus* (Trybon, 1904): A. carapace in dorsal aspect; B. same in lateral aspect; C. abdominal somites in lateral aspect; D. tail-fan. ♂, MP 777.

Diagnosis.-Carapace, abdomen and tail-fan are illustrated (Fig. 20). 4th thoracic shield armed with a pair of lateral teeth, and remarkably hollowed with a pair of hollows, and with a median slit reaching to the middle; intermediate line of articulation is weakly carinate, slightly convergent forwards; anterior thoracic region triangular with broad anterior neck. 3rd and 2nd median carinae gently sigmoid.

Gill-formula defined as follows,

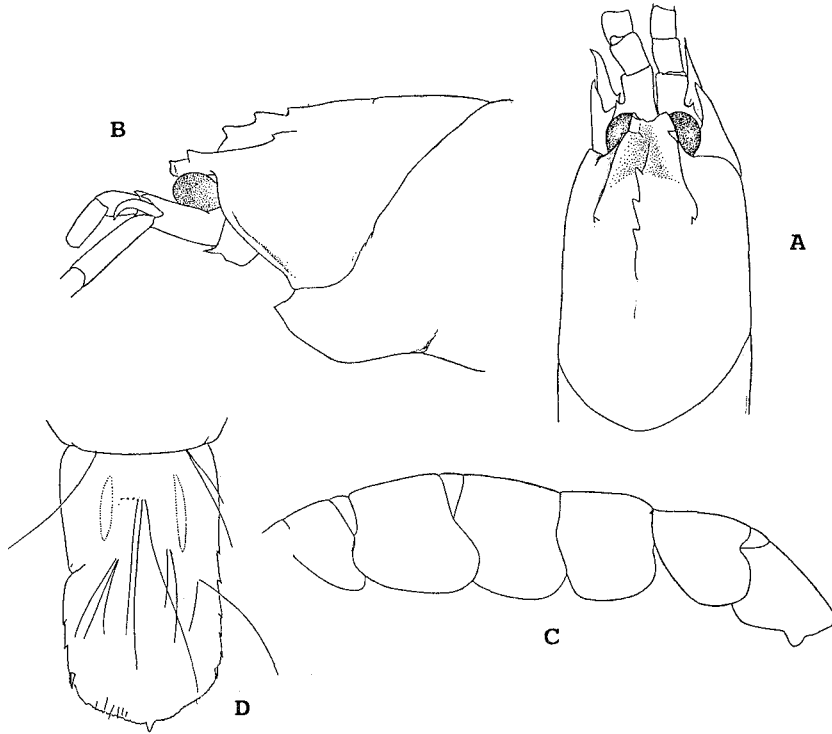


Fig. 21. Type of ~~Calocaris~~ *Calocaris laevis* Bouvier, 1915 (synonym of *Calocaris coronatus*): A. anterior part of carapace in dorsal aspect; B. same in lateral aspect; C. abdominal somites in lateral aspect; D. telson. ♀, MP 148, holotype.

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	1	1	1	1	1	-	-
Arthrobranchs	-	1	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

Remarks.-Trybom's species, *crassipes*, is synonymized by Poulsen (1940:216) with *coronata*.

Bouvier's species, *laevis* (Fig. 21), is also to be included in *coronata*, because Bouvier's type specimen examined is broken at the rostrum, however the dorsal region of carapace, and the abdomen are identical with those of *coronatus*.

McArdle's species, *longispinis*, is much agreed with *coronata* except the rostrum. McArdle said that "in *longispinis* the rostrum is ... about one-fourth the length of the remainder of the carapace (1901:522)", however the specimens examined above

Check list of Axiidae

show that the rostrum is one fifth of the carapace in length, and from this characteristics the specimens are to be identified as *coronatus*. This species is characteristic in that the chela of the chelipeds are spinousus on the dorsal and ventral margins; the fingers of the larger cheliped is shorter than the palm.

The 4th posterior thoracic shield is armed with a pair of lateral teeth, and remarkably concave on surface with a pair of hollows, and with a median slit reaching to the middle; the anterior articulate intermediate carina is weaken in the middle, slightly convergent forwards to the median line. The 4th anterior thoracic region is triangular, and its anterior neck is broad. The 3rd and 2nd median carinae are gently sigmoid.

Type locality.--Skagerrak, North Sea, 500m deep.

Distribution.--Sweden, Norway, and South Atlantic, 220-1200m.

?*Calocarides tenuicornis* (de Man, 1905)

Axiopsis tenuicornis de Man, 1905:596; Balss, 1925:209.

Axiopsis (*Axiopsis*) *tenuicornis*, -de Man, 1925c:69, 84.

Type locality.--7° 46'S 114° 30.5'E, 330 m.

Distribution.--7° 46'S 114° 30.5'E, 330 m; Malay Archipelago, 350m.

Remarks.--This species is tentatively classified into the present genus, *Calocarides*, but it is necessary to check the features of the eyestalks.

?*Calocarides habereri* (Balss, 1913)

Axius habereri Balss, 1913:238; Yokoya, 1933:49..

Axius Habereri, -Balss, 1914:85, text-figs 46-47.

Axiopsis (*Axiopsis*) *Habereri*, -de Man, 1925c:70; Miyake, 1982:89, pl. 30 fig. 3.

Material examined.--1♂, ZSM 68-1, lectotype.

Remarks.--The present authors examined the type specimen preserved in Zoologische Staatssammlung in Munich, and found that the left larger cheliped described by Balss (1914: 86, text-fig 46) is missing. The larger cheliped is not fitted for *Calocarides*, however this species is presumed to be included in the present genus.

Type locality.--Fukuura, Sagami Bay, Japan.

Distribution.--Pacific coast of Japan (Siwoya-zaki, Fukushima Pref.; Sagami Bay), South of Pusan, Korea, Yellow Sea, and Maizuru, Japan Sea; 99-102m.

? | *Calocarides soyoi* (Yokoya, 1933)

Axius soyoi Yokoya, 1933:49, text-fig. 25.

no specimen seen

Type locality.-South of Shiwoya-zaki, Fukushima Pref., Japan, 142 m.

Distribution.-Pacific coast of Japan (Shiwoya-zaki, Fukushima,; Inuboe-zaki; Kii Strait,; Satsuma, Kagoshima Pref.) and Thushima Is.; 120-152m.

Calocarides werribee (Poore and Griffin, 1979)

Axiopsis (Axiopsis) werribee Poore and Griffin, 1979:232, text-figs 5, 6.

not Calocarides h. gen. same as australiensis

Type locality.-Port Phillip Bay, Victoria, Australia; clay sediments, 10-25m deep.

Distribution.-Victoria, Australia, 10-25m.

pleurobranchs on p 2-4
♂ pl 1 present ep. 11/90

Genus **Calaxius** gen. nov.

Definition.-Rostrum slender, triangular; margins armed with teeth, continuous with gastric region. Anterolateral margin of carapace unarmed. Gastric region convex, and with five carina. Cervical groove remarkable almost to a whole length. Posterior part of carapace with a slender median carina. Abdominal pleura triangular or sharply pointed on margin. Telson oblong; posterior margin rounded, and without median tooth. Spine

Eyestalks narrow, elongate; cornea pigmented. Antennal acicle elongate.

P/1 unequal; palm armed with distinct interspaced teeth on dorsal margin; fingers of smaller cheliped longer than palm. P/2-4 with pleurobranchs.

P1/1 of males absent, and of females consisting of proximal segment and flagellum. Pl/2 of males with appendix interna and appendix masculina. Pl/2-5 of females and Pl/3-5 of males with appendix interna. Uropod exopod with transverse suture.

Remarks. This genus is closely related with *Calocarides*, however characterized in that the eyestalks are rather elongate; the dorsal margins of palms in the chelipeds are provided with distinct interspaced teeth; the fingers of the smaller cheliped are much longer than the palm, and the telson without a posteromedian tooth.

Type species.-*Calaxius acutirostris* nov. sp.

Species included.-*Axius inaequalis* Rathbun, 1901; *Axius pailoloensis* Rathbun, 1906; *Calastacus euophthalmus* de Man, 1905; *Calocaris (Calastacus) sibogae* de Man, 1925; *Calocaris (Calastacus) mimasensis* Sakai, 1967; *Calocaris (Calastacus) jenneri* Williams, 1974; *Calocaris (Calastacus) oxypleura* Williams, 1974.

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Calaxius inaequalis (Rathbun, 1901)

Axius inaequalis Rathbun, 1901:96, text-figs 18a, b.
? *Axiopsis inaequalis*, -Borradaile, 1903:539.
Axiopsis (*Axiopsis*) *inaequalis*, -de Man, 1925c:69.

Type locality.-Porto Rico, 161-172fms (289-309m).
Distribution.-Porto Rico, 289-309m.

Calaxius pailoloensis (Rathbun, 1906)

Fig. 22

Axius pailoloensis Rathbun, 1906:893, text-fig. 49.
Axiopsis pailoloensis, -Balss, 1925:209.
Axiopsis (*Axiopsis*) *pailoloensis*, -de Man, 1925c:69, 89, pl. 7
figs 15-15b.

Material examined.-1♂, USNM 30533, holotype.

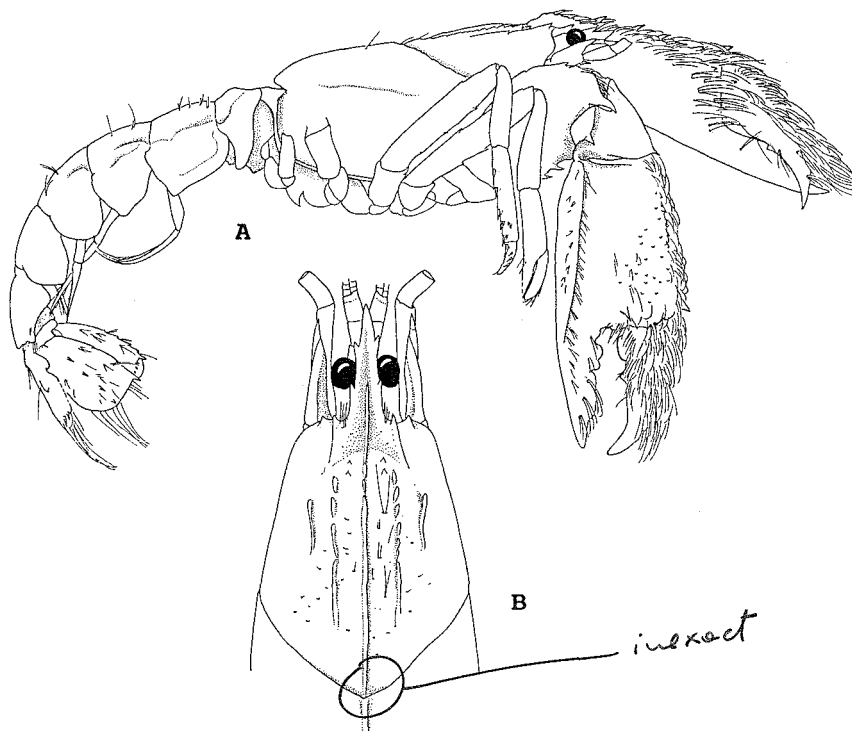


Fig. 22. *Calaxius pailoloensis* (Rathbun, 1906): A. body in lateral aspect; B. anterior part of carapace in dorsal aspect. ♂, USNM 30533, holotype.

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Remarks.-Rathbun (1906:893) described the type as female , but it is a male. The figure of *pailoloensis* is given in this text (Fig. 22A-B).

Type locality.-Pailolo Channel, Hawaii, 248-252 (= 138-145fms)m. Distribution.-Hawaii, Indonesia, 70-252m.

Calaxius euophthalmus (de Man, 1905)

Calastacus euophthalma de Man, 1905:598; Balss, 1925:209.
Calocaris (*Calastacus*) *euophthalma*, -de Man, 1925c:118, 122, pl. 10 figs 22-22g.

Type locality.-N. Batjan I., Indonesia, 397m.
Distribution.-Indonesia, Malay Archipelagos; 397-400m.

Calaxius sibogae (de Man, 1925)

Calocaris (*Calastacus*) *sibogae* de Man, 1925c:118, pl. 9 figs 22-22e.

Type locality.-N. Batjan I., Indonesia, 397m.
Distribution.-Indonesia, 397m.

Calaxius mimasensis (Sakai, 1967)

Calastacus (*Calastacus*) *mimasensis* Sakai, 1967:41, pl. 3 fig. 1.

Type locality.-Tosa Bay, Japan.
Distribution.-Tosa Bay, Japan, littoral.

Calaxius jenniferi (Williams, 1974)

Calastacus (*Calastacus*) *jenniferi* Williams, 1974:451, text-figs 1-10.

Axiopsis (*Axiopsis*) *jenniferi*. - Squiers 1979 : 1589
Type locality.-SW Cape Lookout, North Carolina, 100m.
Distribution.-North Carolina, 100m.

Calaxius oxypleura (Williams, 1974)

Calastacus (*Calastacus*) *oxypleura* Williams, 1974:457, text-figs 11-18.

A. (A.) o. Squiers, 1979 : 1590
Type locality.-Strait of Florida, west of Riding Rocks, 365m.
Distribution.-Florida, 365m.

Calaxius acutirostris sp. nov.

Figs 23-25

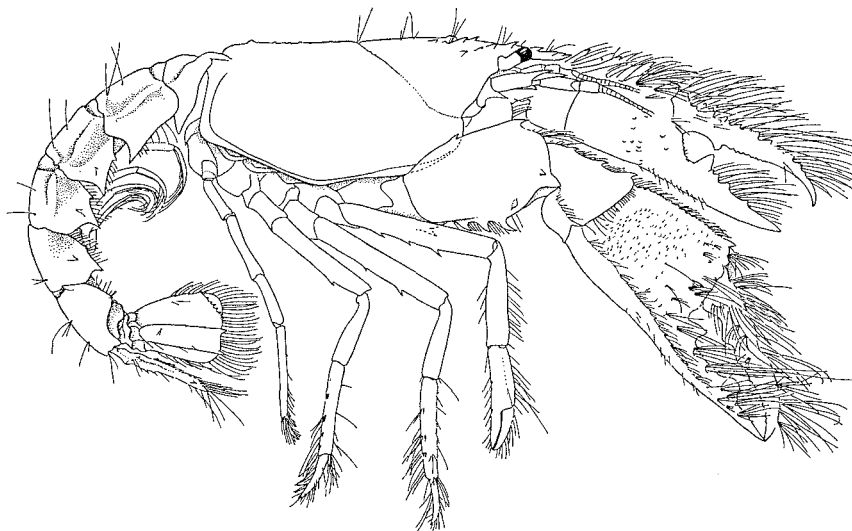


Fig. 23. *Calaxius acutirostris* sp. nov.; body in lateral aspect, ♂, MP 944 *Philippines*

Holotype.-1♂, TL 43, CL 18, MP 447. Madagascar, A. Crosnier coll.

Material examined.-30♂♂, TL 38, CL 16 - TL 27, CL 11, 1♀, TL 32, CL 12, MP 944, Philippines, 12° 06'N, 121° 15'E, "Coriolis", St. CP 120, 219-220m; 1 ovig. ♀, TL 61, CL 26, MP 947, Philippines, 12° 20'N, 121° 42'E, "Coriolis", St. CP 122, 673-675m; 1♂, TL 55, CL broken, Chalutage, east Africa, 15° 19.1'S, 16° 11.8'E, 400m, Nov. 16, 1972, A. Crosnier coll.; 1♂, TL 53, CL 23, MP 1141, Chalutage, east Africa, 22° 17.3'S, 43° 04.3'E, Dec. 21, 1985, "Mascareignes III", St. 6, R. Cleva coll.

at least 2 species mixed

Description of holotype.-The type male specimen from east Africa shown as follows. P/1 chela in larger left cheliped setose on outer surface as a whole; palm with 7 stout teeth above outer ventral carina, with 3 stout teeth and 3 submarginal ones on outer surface; cutting edge of fixed finger with large truncate subproximal tooth followed by small truncate, larger truncate, and 3 other small teeth. P/1 chela in smaller right cheliped also setose on outer surface: palm with 8 teeth above outer ventral carina, with 2 teeth, some tubercles and two submarginal teeth on outer surface. *Madagascar*

Description.-Carapace (Fig. 23) smooth. Rostrum (Fig. 24A,B) elongated, pointed at tip, and with 3-4 sharp teeth on lateral margin, proximally extending onto gastric region. Gastric region with median, submedian, and lateral carinae; median carina reaching anteriorly to distal-third of rostrum, and also extending, though interrupted in its midway, posteriorly to cervical groove as a thick carina, furnished with 1-2 teeth in

The "Description of holotype" and "Description" are relative to distinct taxa (cf fig. 24 & 25)

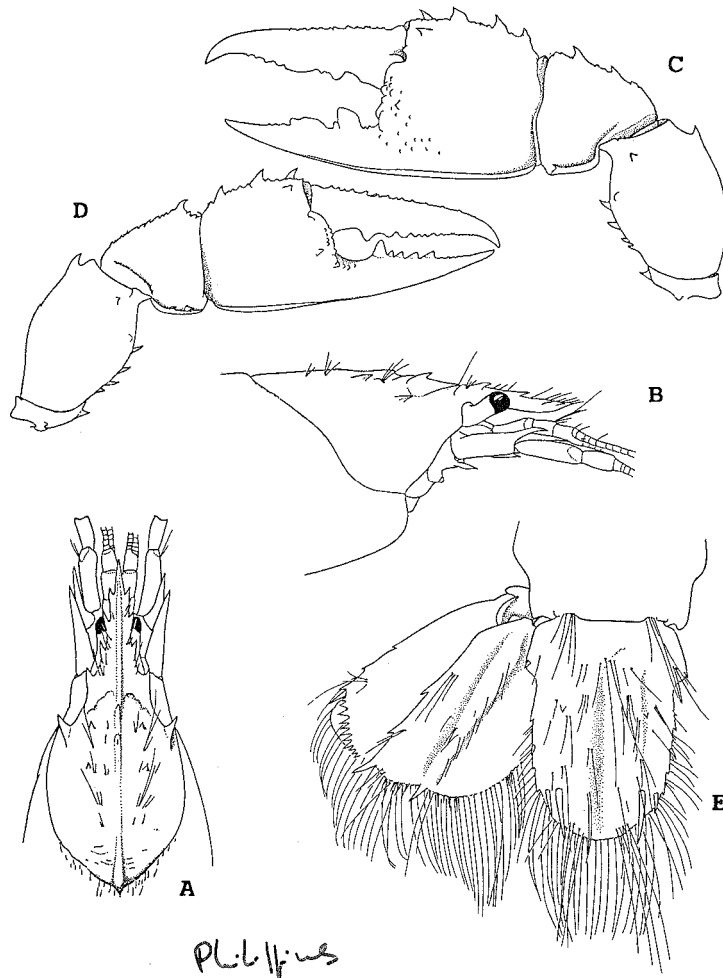


Fig. 24. *Calaxius acutirostris* sp. nov.: A. anterior part of carapace in dorsal aspect; B. same in lateral aspect; C. 1st pereopod in larger side; D. same in smaller side; E. tail-fan. ♂, MP 944.

anterior part, and with median tubercle; submedian line not carinate, but with 2-3 teeth, and lateral carina shortly extending posteriorly, and with 2 teeth. Cervical groove clearly defined to a whole length. Cardiac region dorsally pinched, posteriorly forming median carina.

Abdominal somite smooth; middorsal length of abdominal somite 2-6 subequal, and each with obtuse longitudinal carina between dorsal part and pleuron. Somite 1 shorter, ventrally produced into acute tooth. Somite 2 slightly sinuous on ventral margin, drawn posteroventrally to acuminate tooth. Somites 3-5 ventromedially produced into acuminate tooth respectively; each armed with convex on ventral margin, and furnished with a small

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secondary tooth on its anterior side.

Telson (Fig. 24E) rather setose, and two pairs of teeth on dorsal surface, about 1.8 times as long as broad, and 1.2 times as long as abdominal somite 6; lateral margins paralleled, and with 5-6 small, articulating spines; posterolateral angle with 2 articulating spines; inner spine more conspicuous than outer one; posterior margin rounded, and without median tooth.

Eyestalks narrow, and prolonged; cornea rounded, and pigmented. Antennular peduncle of 3 articles., unarmed, reaching to apex of rostrum; articles 2 and 3 short, and respectively equal in length. Antennal peduncle of 5 articles; article 1 with ventrodistal tooth and with another one on innerdistal angle. Article 2 distolaterally produced forward into elongated tooth. Antennal acicle longer than distolateral tooth of article 2, but fails to reach distal end of article 4. Article 3 with sharp ventrodistal tooth. Article 4 unarmed, reaching to distal end of antennular peduncle. Article 5 also unarmed, and about two-thirds length of article 4.

Mandible smooth on cutting edge, and with 3 segmented palp. Maxillule 1 palp consisting of 2 segments and two distal bristles. Maxillule 2 scaphognathite with long posterior bristle. Maxilliped 1 endopod of two-segments, distal segment narrowed; exopod bearing single distal process with a few long distal setae. Maxilliped 2 propodus broader than long; dactylus reduced in size, and rounded with bristles on distal margin. Maxilliped 3 coxa with strong distal tooth on posteromesial margin, and with 2-3 obtuse teeth on anteromesial margin; basis with sharp distal tooth on posteromesial margin, and with 2-3 small teeth on anteromesial margin; ischium with serrated ridge on inner mesial margin, distally extending beyond its distal margin; merus slightly longer than ischium, and with sharp subterminal tooth on outer mesial margin; carpus unarmed, and slightly shorter than merus and about as long as propodus, and dactylus shorter than propodus.

P/1 of smaller specimens. Chelae (Fig. 24C,D) subequal, thick setae on dorsal margin and on the surface of fingers. Coxa with shape distal tooth on ventral margin. Basis with proximally-broadened tooth on outer distal angle. Ischium with 2-teeth on ventral margin. Merus 1.5 times as long as broad; with 3 stout teeth on ventral margin, and with 2 teeth on dorsal margin, subterminal one of which more distinct than the other at the middle. Carpus symmetrical, about three-fourths length of merus, with 2 sharp teeth on dorsal margin, with 1-2 sharp teeth on ventral margin; thick setae on ventral marginal carina, and on outer distal and inner dorsal margins. In larger cheliped chela 2.3 times as long as broad. Palm about as long as broad, and as long as dactylus, armed with 2 sharp teeth on dorsal margin, with 2 sub-marginal teeth on outer distal margin, and with one small sub-terminal tooth on inner dorsal angle. Cutting edge of fixed finger with stout truncate proximal tooth, two small ones, and triangular one in proximal two-thirds. Dactylus distally incurved, and with two stout teeth in proximal half; outer surface covered with thick setae. In smaller cheliped arrangement of teeth and setae as in larger one; chela about twice as long as broad. Palm longer than broad, and three-fourths length of dactylus. Fingers more slender than those in

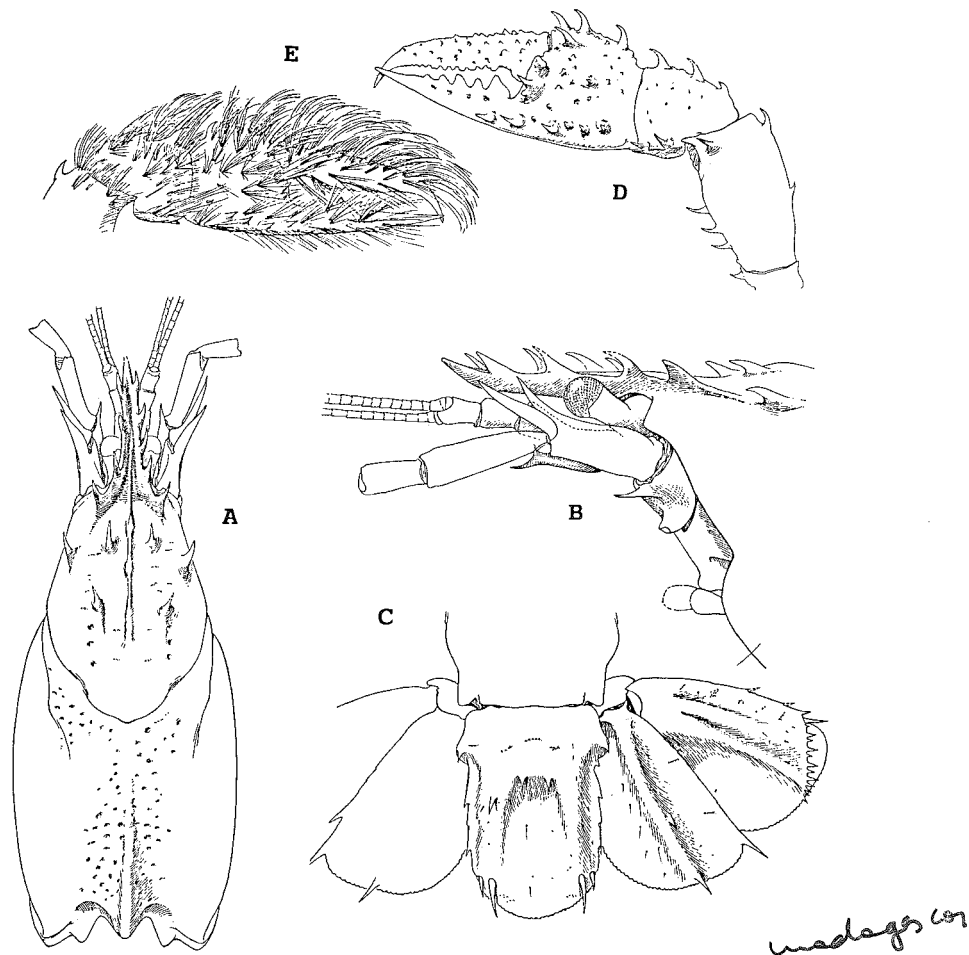


Fig. 25. *Calaxius acutirostris* sp. nov., ♂, MP 447. holotype :
A. carapace in dorsal aspect; B. anterior part of carapace in lateral aspect; C. tail-fan; D. cheliped in larger side, without setae; E. same in smaller side.

larger cheliped. Cutting edge of fixed finger with large sub-proximal tooth followed by 3-5 small teeth. Cutting edge of dactylus with large sub-proximal tooth followed by 6-8 small teeth.

In larger specimens (Fig. 25A-E) the chela of chelipeds are different in characteristics as shown in the description of the cheliped of male holotype.

P/1 of male holotype. The type male specimen from Madagascar shown as follows. P/1 chela in larger left cheliped (Fig. 25D) setose on outer surface as a whole; palm with 7 stout teeth above outer ventral carina, with 3 stout teeth and 3 submarginal

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ones on outer surface; cutting edge of fixed finger with large truncate subproximal tooth followed by small truncate tooth, larger truncate one, and 3 other small teeth. P/1 chela in smaller right cheliped (Fig. 25E) also setose on outer surface: palm with 8 teeth above outer ventral carina, with 2 teeth, some tubercles and two submarginal teeth on outer surface.

P/2 chelate. Coxa with 2-3 teeth on posteromesial process, and with 3-4 teeth on anteromesial margin. Basis and ischium unarmed. Merus with 3 teeth on ventral margin. Carpus unarmed, and slightly more than half length of merus. Chela unarmed, and about as long as carpus, and fingers two-thirds length of palm.

P/3 coxa with 3-4 denticles on anteromesial margin. Basis and ischium unarmed. Merus with one tooth on ventral margin. Carpus, propodus and dactylus unarmed: carpus about half length of merus, and two-thirds length of propodus; propodus with about 6 rows of transverse setae and 4 rows of articulating spines arranged on outer surface; dactylus setose, and about half length of propodus. P/4 coxa with one strong distal and one small proximal tooth on anteromesial margin. Basis and ischium unarmed. Merus with one tooth on ventral margin. Carpus three-fifths length of merus and also three-fifths length of propodus; propodus with 6-8 rows of setae or articulating spines on outer surface. P/5 subchelate, ventrodistal tooth of propodus serrated on incisor margin.

Branchial formula shown as follows,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	-
Podobranchs	-	r	1	1	1	1	-	-
Arthrobranchs	-	r	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	1	1	1	-

(r=rudimentary)

Pl/1 of males absent. Pleopods 2 biramous by narrow endopod and exopod; endopod with slender appendix interna and appendix masculina, both of which slender and almost the same in size. Pl/1 similar to pl/2 in shape, but endopod only with appendix interna.

Outer margin of uropod exopod with 4-5 small teeth, and with long articulating spine on outer posterior angle; distal suture clearly defined, and with 6-8 spines. Outer margin of uropod endopod with 2-4 teeth including distinct one at outer distal angle. median carina with two teeth, distal one located on posterior margin.,

In females pl/1 consisting of proximal segment and multiarticulate flagellum. Pl/2-5 narrow, and only with appendix interna.

Remarks.-The present new species is closely related to *Calaxius euophthalmus* (de Man, 1905) described on the small male type from Batjan, Indonesian waters. In both species the telson is oblong with rounded posterior margin, and with no median

tooth; the rostrum is rather elongated, and, as in smaller specimens from Philippines the carpus, palm and fingers are setose on their margins, though in larger specimens from east Africa the chela setose all over. However, both species are clearly different; in the present species both chelae of the chelipeds show that the merus is armed with 3 distinct tooth on the ventral margin, the carpus is furnished with 2 sharp teeth on dorsal margin, the fingers are distinctly longer than palm, and the eyestlks are elongated, but in *euophthalmus* it is known that the merus of the cheliped is serrated on ventral margin, consisting of 8-9 teeth, the carpus presents only a minute tooth at the distal end of its upper margin, the fingers of the larger cheliped are just as long as the palm, while those of the smaller cheliped a little longer than the palm (de Man, 1925c:124).

Genus *Axiorygma* Kensley and Simmons, 1988

Definition.-Rostrum narrowly triangular, apex pointed; margins armed with teeth, and continuous with gastric region. Anterolateral margin of carapace unarmed. Gastric region convex. Cervical groove running to a whole length. Abdominal pleura 3-5 with small setose band, and rounded on margins. Telson subsquare, and with posteromedian tooth. Eyestalks narrow, and elongate. Antennal acicle elongate.

P/1 unequal; palm of chelipeds unarmed on dorsal margin. No pleurobranchs.

Pl/1 of males absent, and of females possess a single slender segment. Pl/2-5 homologous in shape; Pl/2 of males with appendix interna, but without appendix masculina. Uropod exopod with transverse suture.

Type species.-*Axiorygma nethertoni* Kensley and Simmons, 1988 [by monotypy].

Axiorygma nethertoni Kensley and Simmons, 1988

Axiorygma nethertoni Kensley and Simmons, 1988:658, text-figs 4-7.

Material examined.-1♂, CL 5.8, USNM 211440, holotype.

Remarks.-The present author (K. Sakai) observed the type series of the present species, and the branchial-formula is confirmed as follows,

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	
Podobranchs	-	1	1	1	1	1	-	-
Arthrobranchs	-	-	2	2	2	2	2	-
Pleurobranchs	-	-	-	-	-	-	-	-

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Throughout re-examination, the setobranch on P/5 was not found, in spite of its mention by Kensley and Simmons (1988:662).

Type locality.-Key Largo national Marine Sanctuary, Florida, 30m.

Distribution.-Florida Key, 30m.

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Table 1. Comparisons to the original, de Man's (1925), and the present usages of genera in Axiid species.

Species	Authors	Date	Original Gen.	de Man's Gen. (1925)	Present Gen. (1989)	Available Sp.
1 abejei	Kensley & Gore	1981	Coralaxius	---	Coralaxius	
2 aberrans	Bouvier	1905	Calocarid	Calocarid (Calocarid)	Ambiaxius	
3 acanthus	H.M. Edwards	1878	Axia	Axius (Neaxius)	Neaxius	
4 acutifrons	Bate	1888	Eiconaxius	Axius (Neaxius)	Eiconaxius	
5 acutirostris	sp. nov.	1989	---	---	Calaxius	
6 aethiopica	Nobili	1904	Axiopsis	Axius (Paraxiopsis)	Allaxius	
7 agassizi	Bouvier	1905	Eiconaxius	Axius (Eiconaxius)	Eiconaxius	
8 affinis	de Man	1888	Axius	Axiopsis (Axiopsis)	Axiopsis	serratifrons
9 alcocki	MacArdle	1900	Calocarid	Calocarid (Calocarid)	Ambiaxius	
10 altus	Bate	1888	Paraxius	Axius (Paraxius)	Paraxius	
11 amakusana	Miyake & Sakai	1967	Calocarid (Calastacus)	---	Acanthaxius	
12 andamanensis	Alcock	1901	Iconaxiopsis	Axius (Eiconaxius)	Eiconaxius	
13 antillensis	Bouvier	1905	Eiconaxius	Axius (Eiconaxius)	Eiconaxius	
14 appendiculis	Poore & Griffin	1979	Axiopsis (Paraxiopsis)	---	Dorphanaxius	
15 armatus	Smith	1881	Axius	Axius (Axius)	?Calocarid	
16 asper	Rathbun	1906	Eiconaxius	Axius (Eiconaxius)	Eiconaxius	
17 australiensis	de Man	1925	Axiopsis (Axiopsis)	Axiopsis (Axiopsis)	Axius Gen. nov.	
18 barnardi	Stebbing	1914	Calocarid	Calocarid (Calocarid)	Calocarid	
19 baronai	Squires	1976	Axiopsis (Axiopsis)	---	Axiopsis	
20 biserata	v. Martens	1868	Axius	Axiopsis (Paraxiopsis)	Eutrichocheles	modestus
21 bisquamosa	de Man	1905	Axiopsis (Axiopsis)	Axiopsis (Paraxiopsis)	Eutrichocheles	
22 borradailei	Bouvier	1905	Eiconaxius	Axius (Eiconaxius)	Eiconaxius	
23 brockii	de Man	1888	Axius	Axiopsis (Paraxiopsis)	Eutrichocheles	
24 brucei	Sakai	1987	Axiopsis (Axiopsis)	---	Spongiaxius	
25 caespitosa	Squires	1979	Axiopsis	---	Axiopsis	
26 caribbeus	Faxon	1896	Iconaxius	Axius (Eiconaxius)	Eiconaxius	
27 carinatus	Bouvier	1925	Eiconaxius	Axius (Eiconaxius)	Eiconaxius	
28 clypeatus	de Man	1888	Axius	Axiopsis (Paraxiopsis)	Allaxius	
29 communis	Bouvier	1905	Eiconaxius	Axius (Eiconaxius)	Eiconaxius	caribbeus
30 consobrina	de Man	1905	Axiopsis	Axiopsis (Axiopsis)	Axiopsis	
31 consobrinus	de Man	1907	Iconaxius (Iconaxiopsis)	Axius (Eiconaxius)	Eiconaxius	
32 coronatus	Trybom	1904	Iconaxius	Axiopsis (Calocarides)	Calocarides	
33 crassipes	Trybom	1904	Iconaxius	Axiopsis (Calocarides)	Calocarides	coronatus
34 cristagalli	Faxon	1893	Axius	Axius (Eiconaxius)	Eiconaxius	
35 defensus	Rathbun	1901	Axius	Axiopsis (Paraxiopsis)	Eutrichocheles	

Table 2. Comparisons to the original, de Man's (1925), and the present usages of genera in Axiid species.

Species	Authors	Date	Original Gen.	de Man's Gen. (1925)	Present Gen. (1989)	Available Sp.
36 eccoptyodactylus	de Man	1905	Anophthalmaxius	Anophthalmaxius	Anophthalmaxius	
37 euophthalmus	de Man	1905	Calastacus	Calocaris (Calocaris)	Calaxius	
38 euryrhynchus	de Man	1905	Axius (?Neaxius)	Axius (Neaxius)	Neaxiopsis	
39 farreae	Ortmann	1891	Eiconaxius	Axius (Eiconaxius)	Eiconaxius	
40 felix	Alcock & And.	1899	Calastacus	Calocaris (Calastacus)	Calaxiopsis	
41 gundlachi	v. Martens	1872	Axius	Axius (Neaxius)	Neaxiopsis	
42 glyptocercus	v. Martens	1868	Axius	Axius (Neaxius)	Neaxius	
43 granulosa	Grebenyuk	1975	Calocaris	---	Calocaris	
44 habereri	Balss	1913	Axius	Axiopsis (Axiopsis)	Calocarides ? <i>Dolphinaxius</i>	
45 hirsutimana	Boesch & Smalley	1972	Calocaris (Calastacus)	---	Acanthaxius	
46 inaequalis	Rathbun	1901	Axius	Axiopsis (Axiopsis)	Calaxius	
47 indica	de Man	1907	Iconaxius	Axius (Eiconaxius)	Eiconaxius	
48 investigatoris	Anderson	1896	Calastacus	Calocaris (Calastacus)	Calocaris h. glem.	
49 irregularis	Edmondson	1930	Axiopsis	---	Axiopsis	
50 jeneri	Williams	1974	Calocaris (Calastacus)	---	Calaxius	
51 japonicus	Parisi	1917	Oxyrhynchaxius	Oxyrhynchaxius	Oxyrhynchaxius	
52 johnstoni	Edmondson	1926	Axiopsis (Paraxiopsis)	---	Eutrichocheles	
53 kermadeci	Bate	1888	Eiconaxius	Axius (Eiconaxius)	Eiconaxius	
54 kermadecensis	Chilton	1910	Iconaxiopsis	Axius (Eiconaxius)	Eiconaxius <i>Panacystus</i> <i>lepturus</i>	
55 laccadivensis	Alcocki	1901	Iconaxiopsis	Axius (Eiconaxius)	Eiconaxius	<i>Dolphinaxius</i>
56 laevis	Bouvier	1915	Neaxius	Axius (Neaxius)	Calocarides	coronatus
57 laevis	de Saint Laurent	1972	Calastacus	---	Calastacus	
58 longipes	Bouvier	1905	Axiopsis	Axiopsis (Axiopsis)	Bouvieraxius	
59 longispinis	MacArdle	1901	Calastacus	Calocaris (Calastacus)	Calocarides	
60 macandreae	Bell	1853	Calocaris	Calocaris (Calocaris)	Calocaris	
61 mauritiana <i>Syn.</i>	Bouvier	1914	Neaxius	Axius (Neaxius)	Neaxius	acanthus
62 mediterranea <i>Syn.</i>	Caroli	1921	Axiopsis	---	Axius	stirhynchus
63 mimasensis	Sakai	1967	Calocaris (Calastacus)	---	Calaxius	
64 miyazakiensis	Yokoya	1933	Axius	---	Acanthaxius	
65 modestus	Herbst	1797	Cancer	---	Eutrichocheles	
66 nethertoni	Kensley	1988	Axiorygma	---	Axiorygma	
67 nodulosus	Meinert	1877	Axius	---	Coralaxius	
68 novaezealandiae	Borradaile	1916	Axius (Axius)	Axius (Axius)	Spongiaxius	
69 odontorhynchus	de Man	1905	Axius (Neaxius)	Axius (Axius)	Spongiaxius	
70 orientalis	de Man	1925	Axius (Neaxius)	Axius (Neaxius)	Neaxiopsis	

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Table 3. Comparisons to the original, de Man's (1925), and the present usages of genera in Axiid species.

Species	Authors	Date	Original Gen.	de Man's Gen. (1925)	Present Gen. (1989)	Available Sp.
71 oxypleurus	Williams	1975	Calocaris (Calastacus)	---	Calaxius	
72 pailoloensis	Rathbun	1906	Axius	Axiopsis (Axiopsis)	Calaxius	
73 parvus	Bate	1888	Eiconaxius	Axius (Eiconaxius)	Eiconaxius	
74 picteti	Zehntner	1894	Paraxius	Axiopsis (Axiopsis)	Allaxius	
75 pilocheira	Sakai	1987	Axiopsis	---	Acanthaxius	
76 pitatucensis	de Man	1925	Axiopsis	Axiopsis (Axiopsis)	Spongaxius	g. nov. (MANAXIUS)
77 plectrorhynchus	Strahl	1862	Neaxius	Axius (Neaxius)	Strhalaxius	
78 polyacantha	Miyake & Sakai	1967	Axiopsis (Axiopsis)	---	Acanthaxius	
79 princeps	Boas	1880	Axius	Axiopsis (Axiopsis)	Allaxius	? Do: <u>quinaxius</u>
80 quinqueseriatus	Rathbun	1902	Calastacus	Calocaris (Calastacus)	Calocarides	
81 rostriserratus	Andrade & Baez	1977	Calastacus	---	Calocarides	quinqueseriatus
82 rotundifrons	Bouvier	1905	Eiconaxius	Axius (Eiconaxius)	Eiconaxius	
83 rudis	Rathbun	1906	Axius	Axius (Axius)	Bouvieraxius	
84 sculptimanus	Ward	1942	Axiopsis	---	Allaxius	
85 serratifrons	A.M.Edw.	1873	Axia	Axiopsis (Axiopsis)	Axiopsis	
86 serratus	Stimpson	1852	Axius	Axius (Axius)	Axius	
87 serrata	sp. nov.	1989	Calaxiopsis	---	Calaxiopsis	
88 serringes	Gerstaecker	1856	Scytoleptus	Scytoleptus	Scytoleptus	
89 sibogae	de Man	1925	Axius (Eiconaxius)	Axius (Eiconaxius)	Eiconaxius	
90 sibogae	de Man	1925	Calocaris (Calastacus)	Calocaris (Calastacus)	Calaxius	
91 singularis	Zarenkov	1983	Axius (Eiconaxius)	---	Eiconaxius	?
92 soyoi	Yokoya	1933	Axius	---	Calocarides	.
93 spinigera	MacGilchrist	1905	Eiconaxius	Axius (Eiconaxius)	Eiconaxius	
94 spinimanus	de Man	1905	Axiopsis (Axiopsis)	Axiopsis (Axiopsis)	Allaxius	
95 spinipes	de Man	1888	Axius	Axiopsis (Axiopsis)	Axiopsis	serratifrons
96 spinosissimus	Rathbun	1906	Axius	Axiopsis (Axiopsis)	Acanthaxius	g. nov.
97 spinulicaudus	Rathbun	1902	Axius	Axiopsis (Axiopsis)	Acanthaxius	no
98 stilirostris	Faxon	1893	Calastacus	Calastacus (Calastacus)	Calastacus	
99 stirhynchus	Leach	1815	Axius	Axius (Axius)	Axius	
100 taliliensis	Borradaile	1900	Eiconaxius	---	Neaxius	acanthus
101 templemani	Squires	1965	Calocaris	---	Calocaris	
102 tenuicornis	de Man	1905	Axiopsis	Axiopsis (Axiopsis)	? Calocarides	?
103 tricarinatus	Kingsley	1882	Evaxius	---	Scytoleptus	serringes
104 tridens	Rathbun	1906	Paraxius	Axius (Paraxius)	Parascytoleptus	
105 vivesi	Bouvier	1895	Eiconaxius	Axius (Neaxius)	Neaxius	

Check list of Axiidae

Table 4. Comparisons to the original, de Man's (1925), and the present usages of genera in Axiid species.

Species	Authors	Date	Original Gen.	de Man's Gen. (1925)	Present Gen. (1989)	Available Sp.
106 waroona	Poore & Griffin	1979	Axius (Neaxius)	---	Strahlaxius	
107 weberi	de Man	1907	Iconaxius	Axius (Eiconaxius)	Eiconaxius	
108 werribee	Poore & Griffin	1979	Axiopsis (Axiopsis)	---	Calocarides	<i>gen. nov.</i>

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