

Three species of *Acanthaxius* Sakai & de Saint Laurent, 1989, including two new to science, from the Solomon Islands and New Caledonia (Crustacea, Thalassinidea, Axiidae)

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Abstract

Material recently collected from the Solomon Islands include three species of *Acanthaxius* Sakai & de Saint Laurent, 1989, two of which are new to science: *A. clevai* **n. sp.** and *A. gadaletae* **n. sp.** and a specimen of *A. polyacantha* Miyake & Sakai, 1967. Two specimens from New Caledonia are assigned to *A. gadaletae* **n. sp.** The new taxa are readily differentiated from *A. polyacantha* by their longer rostrum and the glabrous postcervical region of carapace. *A. clevai* **n. sp.** is characterized by a slender rostrum longer than the eyestalks, with two lateral and a suborbital spine, the gastric region with a median, submedian and lateral carina, setose pereopods 1 with three and two upper spines on the propodal palm and dactylus respectively, the telson longer than broad with three teeth and one spinule on the lateral border. *A. gadaletae* **n. sp.** is similar to *A. clevai* **n. sp.** but differs by the gastric region with two submedian carinae, the pereopod 1 with four upper spines both on the propodal palm and the dactylus, the maxilliped 3 basis with a large lower distal spine (absent in *A. clevai* **n. sp.**) and the abdominal pleura 3–5 with an anterior spinule (absent in *A. clevai* **n. sp.**).

Résumé

Trois espèces d'*Acanthaxius* Sakai & de Saint Laurent, 1989, dont deux nouvelles, des Iles Salomon et de Nouvelle Calédonie (Crustacea, Thalassinidea, Axiidae).

Du matériel récemment récolté des Iles Salomon a permis d'identifier trois espèces d'*Acanthaxius* dont deux sont nouvelles : *A. clevai* **n. sp.**, *A. gadaletae* **n. sp.** et un spécimen d'*A. polyacantha* Miyake & Sakai, 1967. Deux spécimens de Nouvelle Calédonie sont placés dans *A. gadaletae* **n. sp.** Les deux nouveaux taxa se distinguent aisément d'*A. polyacantha* par leur rostre plus long et la région postcervicale de la carapace inerme. *A. clevai* **n. sp.** se distingue par un rostre long et grêle avec deux épines latérales et une suborbitale, la région gastrique avec une carène médiane, une submédiane et une latérale, un péréiopode 1 pourvu de nombreuses soies et de trois et deux épines dorsales respectivement sur le paume et le dactyle, un telson plus long que large muni

de trois dents et d'une spinule au bord latéral. *A. gadaletae* n. sp., très proche d'*A. clevai* n. sp., diffère par la présence de deux carènes submédianes dans la région gastrique, le péréiopode 1 avec quatre épines dorsales au paume comme au dactyle, le maxillipède 3 avec une forte épine ventrale au basis (absente chez *A. clevai* n. sp.) et les pleurons abdominaux 3–5 pourvus d'une spinule antérieure (absente chez *A. clevai* n. sp.).

Key words: Crustacea, Thalassinidea, Axiidae, *Acanthaxius*, Solomon Islands, New Caledonia, new species

Introduction

Among material recently collected from the Solomon Islands were specimens of two hitherto undescribed species of *Acanthaxius* Sakai & de Saint Laurent, 1989, *A. clevai* n. sp., *A. gadaletae* n. sp., and one specimen of *A. polyacantha* Miyake & Sakai, 1967. The holotype and only known specimen of the latter species is from the East China Sea. Two additional specimens from New Caledonia are assigned to *A. gadaletae* n. sp. The material studied is deposited in the Muséum national d'Histoire naturelle, Paris (MNHN). The measurements given in the descriptions are: carapace length (cl.) measured from the tip of the rostrum to the posterior border of the carapace, and total length (tl.) measured from the tip of the rostrum to the posterior border of the telson. The anterior part of the carapace, the telson and uropods are figured in dorsal view and appendages in lateral view.

Infraorder Thalassinidea Latreille, 1831

Family Axiidae Huxley, 1879

Genus *Acanthaxius* Sakai & de Saint Laurent, 1989

Remarks

The genus *Acanthaxius* was created by Sakai & de Saint Laurent (1989) for eight species with *Axiopsis* (*Axiopsis*) *pilocheira* Sakai, 1987 as type species. Later, Sakai (1994) increased, with *A. polycheates*, the number of species to nine. Kensley (1996) considered that “the definition of this genus contains some uncertainties”, redefined it and limited the number of species to five: *A. miyazakiensis* (Yokoya, 1933) from Japan, *A. amakusana* (Miyake & Sakai, 1967) and *A. polyacantha* (Miyake & Sakai, 1967) from the East China Sea, *A. pilocheira* (Sakai, 1987) from Japan, *A. polychaetes* Sakai, 1994 from the Great Barrier Reef, Australia, and added *A. kirmilleri* Kensley, 1996 from off Anguilla. Two other species were established in 1998: *A. formosa* Kensley & Chan and *A. grandis* Kensley & Chan, both from Taiwan.

Ngoc-Ho (2005), describing a specimen of *Axius spinosissimus* Rathbun, 1906 from

French Polynesia, agreed with Kensley (1996) that although this species was placed in *Acanthaxius* by Sakai & de Saint Laurent (1989), it did not fit the generic definition and should logically be assigned to a new genus. Nevertheless, as it comprised only three specimens including the holotype, all damaged, it seemed undesirable to establish a monotypic taxon on a material in such poor condition. The species was provisionally retained in *Acanthaxius* (Ngoc-Ho, 2005).

According to Kensley (1996), the advanced characters of the genus are the relatively slender and dentate rostrum, with its basal pair of spines in a supraorbital position; the form of the pereopod 1 chela, and especially that of the small pereopod 1, with slender dentate fingers being 1.5–2.0 times longer than the propodal palm; the presence of spines on the upper margins of the dactylus and propodus of the pereopod 1 chela; the absence of pleurobranchs; and the presence of epipods on pereopods 1–4.

The new species studied agree well with this scheme except for the fingers of the pereopod 1 in *A. gadaletae* **n. sp.** being only about 1.2–1.3 longer than the palm. It can also be noted that all known *Acanthaxius* species have a slender and incurved tip of the antennal article 2, as pointed out by Sakai & de Saint Laurent (1989), which could be considered as diagnostic.

***Acanthaxius clevai* n. sp.**

(Figs 1, 2, 3A–C)

Type material

Holotype: Solomon Islands, Vella Gulf, *Alis*, Salomon 2, St. 2260, 399–427 m, Ph. Bouchet, A. Warren & S. Samadi coll., Nov. 2004 : male, cl. 23 mm, tl. 62 mm (MNHN Th 1491).

Paratypes: same data as holotype: 2 males, cl. 22 mm, tl. 59 mm (figured), cl. 28.5 mm, tl. 72.5 mm, 1 ovigerous female, cl. 21 mm, tl. 57.5 mm (MNHN Th 1492).

Diagnosis

Rostrum about 2.5 times as long as broad at base, reaching half length of last article of antennular peduncle; lateral border with two spines and large basal suborbital spine. Gastric region with carinae weakly defined, bearing large spines; median carina with spine and spinule anterior to tubercle, two or three tubercles posterior to it, lateral carina with anterior spine, submedian carina with four spines. Postcervical carapace glabrous, postcervical carina absent. Abdominal pleura 2–5 ventrally rounded. Telson slightly longer than wide, with two pairs of dorsal spines; lateral borders bearing three teeth and one spinule, two mobile posterolateral spines and median spine on convex posterior border.

Antenna with lower distal spine on article 1 and 3. Maxilliped 3 with lower distal spine on coxa, basis unarmed, two lower spines on ischium, three lower spines on merus, small lower distal spine on carpus.

Pereopods 1 unequal in males, subequal in females, densely setose; propodus and dactylus with three or four and two upper spines respectively. Uropod exopod and endopod ovoid, exopod with six or seven spinules on lateral external border, three or four spines on lateral external carina; endopod with three spines on lateral external border, four large spines on median carina.

Description

Carapace (Figs 1, 2A) with pointed rostrum reaching far beyond eyes to half length of last article of antennular peduncle; lateral border with two spines and large suborbital spine. Carinae weakly defined bearing large spines; median carina starting beyond rostral base with spine and spinule anterior to tubercle, two or three tubercles posterior to it; lateral carina with anterior spine; submedian carina with four spines, several round tubercles between carinae. Cervical groove well defined, postcervical carapace glabrous, postcervical carina absent. Abdominal pleuron 1 ventrally narrowed, pleuron 2 broad, pleura 3–5 ventrally rounded, pleura 6 with tiny denticle on anterior border. Telson (Fig. 2D) slightly longer than broad with lateral border having three teeth and one spinule, two mobile posterolateral spines and median spine on convex posterior border; two pairs of spines and faint longitudinal median groove on dorsal surface.

Antenna peduncle (Fig. 2E) with lower spine on article 1 and 3, acicle acute, arcuate, slightly overreaching middle of peduncular article 4. Maxilliped 3 (Fig. 2F) with lower distal spine on coxa, basis unarmed, two lower spines on ischium, three lower spines on merus larger distally, small lower distal spine on carpus. Other mouth appendages similar to those figured for *Acanthaxius pilocheira* (see Sakai, 1987: 298, fig. 2) except for the maxilla with no posterior seta on the scaphognathite.

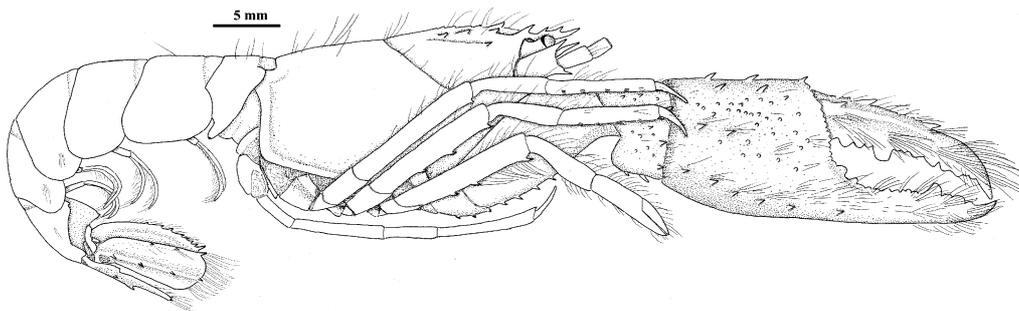


FIGURE 1. *Acanthaxius clevai* n. sp., holotype, male (MNHN Th 1491). Lateral view. Scale line: 5 mm.

Pereopods 1 asymmetrical, strongly setose. Large pereopod 1 (Fig. 2B) stout compared to body (Fig. 1), ischium with two lower spines; merus with two upper distal spines, four lower spines, three or four spines on anterolateral surface; carpus with two or three upper spines, two lower spines; lateral surface with three or four spines near distal border and five or six others together with several tubercles posteriorly; propodus with

three upper spines, row of six or seven submarginal spines on lower lateral surface, lateral surface of palm with several spines, acute denticles or round tubercles; fixed finger subequal in length to propodal palm, with slightly curved tip, cutting edge bearing rounded teeth with two larger ones, one proximal the other near distal third; dactylus as long as fixed finger, with more curved tip, two upper spines; cutting edge with round teeth and a larger one near proximal third.

Small pereopod 1 (Fig. 2C) similar to large pereopod 1 except for propodus with row of six to nine submarginal spines on lower lateral surface; lateral surface of palm with five or six spines and few tubercles; fixed finger about 1.5 lengths of propodal palm, with slightly curved tip, cutting edge bearing small acute teeth; dactylus as long as fixed finger, with more curved tip, two upper spines, cutting edge, as in fixed finger, with small acute teeth.

Pereopod 2, pereopod 3 (Fig. 1) similar to those of *A. gadaletae* **n. sp.** (Fig. 3H, I) merus with three lower spines or spinules; pereopod 3 propodus bearing rows of corneous setae and a large one on lower distal border. Pereopod 4 (Fig. 1) similar to pereopod 3 except for having single lower distal spinule on merus. Pereopod 5 with long and slender dactylus.

Gill formula as given by Sakai & de Saint Laurent for the genus (1989).

Pleopod 1 absent in male, present in female (Fig. 3B) as a single slender ramus, faintly biarticulated. Male pleopod 2 (Fig. 3A) with *appendix masculina* and *appendix interna*

Male pleopod 3–5 and female pleopod 2–5 (Fig. 3C) with *appendix interna*.

Uropod (Fig. 2D) exopod with six or seven spines on lateral border, mobile spine at angle of suture, eight to ten spinules along suture, three or four spinules on external carina; endopod with three spines on lateral border, four spines on median carina including distal marginal spine.

The ovigerous female MNHN Th 1492 bears eggs of 0.30–0.35 mm in diameter.

Etymology

The species is dedicated to Régis Cléva for his contribution to this work and several others on Crustacea in the Muséum National d'Histoire Naturelle.

Distribution

Only known from the type locality

Remarks

By its long and slender rostrum bearing two lateral spines and a suborbital spine, its carapace with median, submedian and lateral carina, the postcervical region glabrous, the ventrally rounded abdominal pleura 2–6, this species shows similarities to *Acanthaxius pilocheira* (see Sakai, 1987: 296, figs 1–2) from Kumano-nada, Japan. It differs by having fewer spines on the chelipeds, especially on the upper border of the propodus and dactylus, the telson longer than broad with more spines on lateral borders.

A. clevai n. sp. is more similar to *A. gadaletae* n. sp. described below and the two are compared under the latter species.

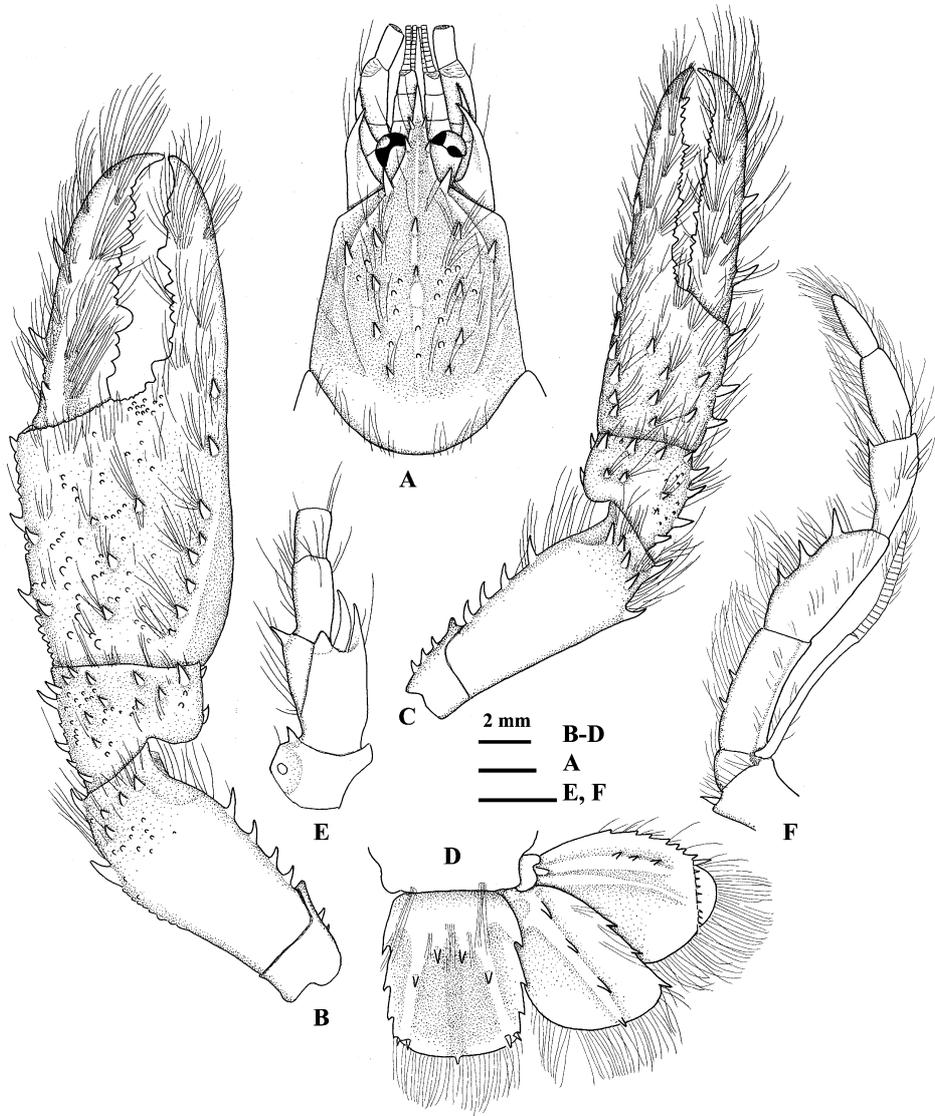


FIGURE 2. *Acanthaxius clevai* n. sp. A, D, holotype, male (MNHN Th 1491).; B, C, E, F, male paratype (MNHN Th 1492).. A, anterior part of carapace; B, large pereopod 1; C, small pereopod 1; D, telson and uropods; E, antenna; F, maxilliped 3. Scale line: 2 mm.

***Acanthaxius gadaletae* n. sp.**

(Fig. 3D–I)

Type material

Holotype: Solomon Islands, *Alis*, Salomon 1, St. 1831, 135–325 m, Ph. Bouchet, B.

Dayrat, A. Warren, B. Richer de Forges coll., 5 Oct. 2001: male, cl. 13 mm, tl. 35 mm (MNHN Th 1493) (figured).

Paratypes: Solomon Islands, SW Santa Isabel, *Alis*, Salomon 2, St 2191, 300 m, Ph. Bouchet, A. Warren & S. Samadi coll., Nov. 2004: 1 female, cl. 13 mm, tl. 35 mm (MNHN Th 1494) (figured); Salomon 1, St. 1761, 191–290 m, Ph. Bouchet, B. Dayrat/A. Warren, B. Richer de Forges coll., 27 Sept 2001: 1 male, cl. 12 mm, tl. 32 mm; 2 females, cl. 12 mm & 13 mm, tl. 32 mm & 34.5 mm (MNHN Th 1495).

Other material

New Caledonia: Jumeau West Bank, *Alis*, SMIB 8, St. 177, 320–370 m, 29 Jan. 1993: 1 male, cl. 10 mm, tl. 27 mm (MNHN Th 1496); Loyauté Islands, Lifou, Santal Bay, SE Récif Shelter, St. 1648, 150–200 m, Atelier Lifou coll., 7–19 Nov 2000 : 1 female with broken rostrum, cl. 14.5 mm (without rostrum), tl. 41.5 mm (MNHN Th 1497).

Diagnosis

Rostrum long and slender, reaching to distal border of last article of antennular peduncle lateral border with two spines and large basal suborbital spine. Gastric region with moderately defined carinae bearing small spines; median carina with two or three spinules anterior to tubercle and one spinule posterior to it; lateral carina with anterior spine; two submedian carinae, external with four spines, internal with anterior spine and sometimes with denticles posterior to it. Postcervical region glabrous, postcervical carina absent. Abdominal pleura 3–5 slightly angled posteroventrally, each with minute anterior spinule. Telson slightly longer than wide, with two pairs of dorsal spines, lateral borders bearing three teeth and one spinule, two mobile posterolateral spines and median spine on convex posterior border;

Antenna with lower distal spine on article 1 and 3. Maxilliped 3 with lower distal spine on coxa and basis, two lower spines on ischium, three lower spines on merus, small lower distal spine on carpus.

Pereopods 1 subequal, densely setose; propodus and dactylus each with three or four upper spines. Uropod exopod and endopod ovoid, exopod with six or seven spinules on lateral external border, four or five spines on lateral carina; endopod with three spines on lateral external border, four large spines on median carina.

Description

Carapace (Fig. 3G) with pointed rostrum about 2.8 times as long as broad at base, reaching far beyond eyes to distal border of last article of antennular peduncle; lateral border with two spines and large suborbital spine. Carinae of gastric region moderately defined with small spines; median carina starting beyond rostral base with two or three spinules anterior to tubercle, one spinule posterior to it, lateral carina with anterior spine, two submedian carinae, external with four spines, internal with anterior spinule and

unarmed posterior to it or slightly denticulated. Cervical groove well defined, postcervical region glabrous, postcervical carina absent. Abdominal pleuron 1 ventrally narrowed, pleuron 2 broad, pleura 3–5 slightly angled posteroventrally as in *A. kirmilleri* Kensley (see Kensley, 1996: fig. 1C) with minute spinule on anterior border. Telson (Fig.3F) slightly longer than broad with lateral border having three teeth and one spinule, two mobile posterolateral spines and median spine on convex posterior border; two pairs of spines and faint longitudinal median groove on dorsal surface.

Antenna peduncle (Fig. 3G), as in *A. clevai* **n. sp.** (Fig. 2E) with lower spine on article 1 and 3, acicle acute, arcuate, slightly overreaching middle of peduncular article 4. Maxilliped 3 similar to that of *A. clevai* **n. sp.** (Fig.2F) with lower distal spine on coxa, two lower spines on ischium, three lower spines on merus larger distally, small lower distal spine on carpus, but differing by a large lower distal spine present on basis. Other mouth appendages similar to those figured for *Acanthaxius pilocheira* (see Sakai, 1987: 298, fig. 2) except for the maxilla bearing no posterior seta on the scaphognathite.

Pereopods 1 subequal, strongly setose. Both large and small pereopod 1 (Fig. 3E, 3D) ischium with two lower spines; merus with two upper distal spines, four or five lower spines, three or four spines on anterolateral surface; carpus with three or four upper spines, two lower spines; lateral surface with three or four spines near distal border and four or five spinules posteriorly; propodus with four upper spines, row of six to nine submarginal spines on lower lateral surface, lateral surface of palm with several spines, acute denticles or round tubercles; fixed finger longer than propodal palm in both pereopods 1, with slightly curved tip, cutting edge bearing rounded teeth of various sizes in large pereopod 1, small pointed teeth in small pereopod 1. Dactylus as long as fixed finger, approx. 1.1 times longer than palm in large pereopod 1, 1.2–1.3 times longer than palm in small pereopod 1, with more curved tip, four upper spines; cutting edge, as in fixed finger, with round teeth in large pereopod 1, small pointed teeth in small pereopod 1.

Pereopod 2 (Fig. 3H) merus with three lower spines or spinules; pereopod 3 (Fig. 3I) propodus bearing rows of corneous setae and a large one on lower distal border.

Pleopods as described and figured for *A. clevai* **n. sp.** (Fig. 3A–C).

Uropod (Fig. 3F) exopod with six or seven spines on lateral border, mobile spine at angle of suture, eight to ten spinules along suture, four or five spinules on external carina; endopod with three spines on lateral border, four spines on median carina including distal marginal spine.

Etymology

The species is dedicated to Gabrielle Gadaleta for her contribution to several works on Crustacea in the Muséum National d'Histoire Naturelle.

Distribution

Solomon Islands, New Caledonia.

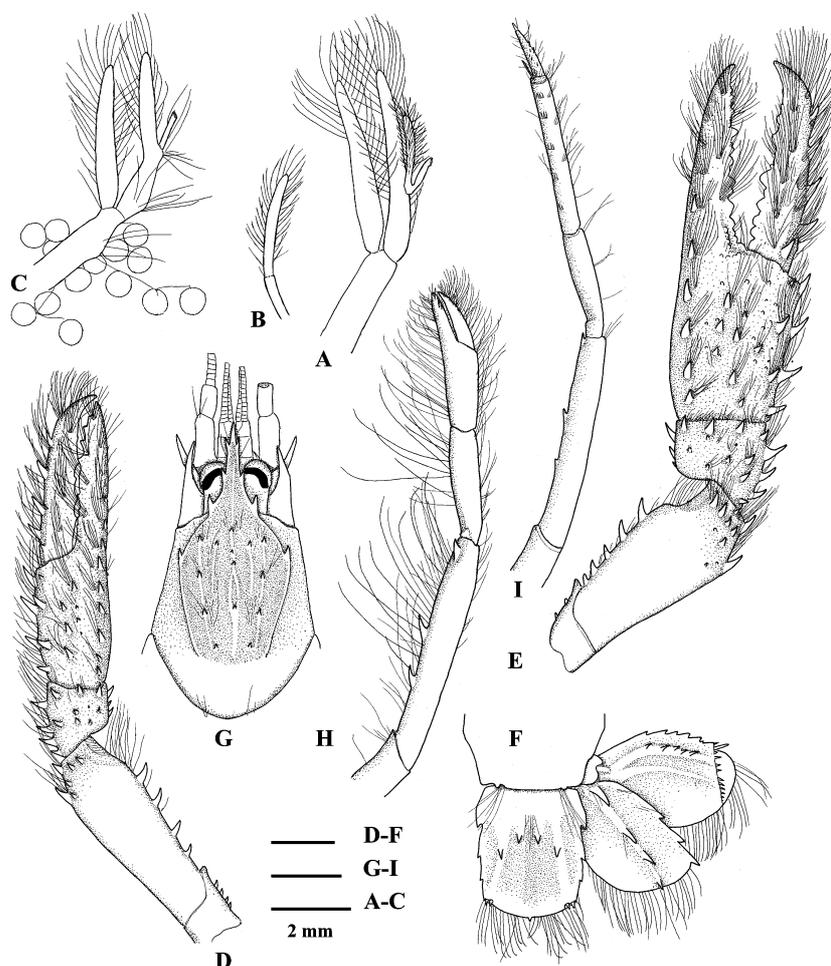


FIGURE 3. *Acanthaxius clevai* n. sp. A, holotype, male (MNHN Th 1491), pleopod 2.; B, C, female paratype (MNHN Th 1492) pleopod 1 and 2 respectively. *Acanthaxius gadaletae* n. sp., D–G, holotype, male (MNHN Th 1493).; H, I, female paratype (MNHN Th 1494). A, male pleopod 2; B, C, female pleopod 1 and 2; D, small pereopod 1; E, large pereopod 1; F, telson and uropod; G, anterior part of carapace; H, I, pereopod 2 and 3. Scale line: 1 mm.

Remarks

The internal submedian carina of the gastric region of this species varies, being short and unarmed in the holotype (Fig. 3G) and the female paratype MNHN Th 1494, slightly denticulated in other specimens examined but bears two or three spinules in the female from Loyauté Islands (MNHN Th 1497). The number of spines on the pereopod 1 varies especially in specimens from New Caledonia compared with the types. The male of tl. 27 mm (MNHN Th 1496) has fewer upper spines on the pereopod 1 propodus and dactylus, two and two respectively. The large female of tl. 41.5 mm bears more spines (usually one or two additional) on certain articles of the pereopods 1. This specimen has a broken rostrum, the abdominal pleura more rounded ventrally than in the types with no anterior

spinule. Another difference concerns the presence of a posterior seta on the maxilla scaphognathite, absent in the types. Otherwise the two New Caledonian specimens agree with the types in the morphology of the carapace, the pereopods, the telson and uropods. It can be noted that, unlike other *Acanthaxius* species in which the dactylus, that of the smaller pereopod especially, is nearly 1.5–2 times longer than the propodal palm (see Kensley, 1996), in *A. gadaletae* **n. sp.**, the pereopod 1 dactylus is only slightly longer than the palm, 1.2–1.3 times longer in the small pereopod 1, and the New Caledonian specimens also agree with the types on this. They are assigned to the present species with a little doubt concerning the female for the differences mentioned above and the missing rostrum.

A. clevai **n. sp.** and *A. gadaletae* **n. sp.** are very close by having a similarly shaped rostrum and similar glabrous postcervical region of the carapace, pereopods, telson and uropods. The latter species is much smaller (holotype of tl. 35 mm vs. 62 mm in *A. clevai* **n. sp.**), yet does not include juveniles of the former but fully adults with gonopores wide open on the coxae of pereopods. The two species differ by:

1) Gastric region with median, submedian, lateral carinae; carinae hardly defined with large spines in *A. clevai* **n. sp.** (gastric region with two submedian carinae; carinae better defined with small spines in *A. gadaletae* **n. sp.**).

2) Maxilliped 3 with unarmed basis in *A. clevai* **n. sp.** (maxilliped 3 basis with large lower distal spine in *A. gadaletae* **n. sp.**)

3) Pereopod 1 stout compared to body; propodus and dactylus with three and two upper spines respectively in *A. clevai* **n. sp.** (pereopod 1 of moderate size, propodus and dactylus each with four spines in *A. gadaletae* **n. sp.**).

4) Abdominal pleura 3–5 ventrally rounded and unarmed in *A. clevai* **n. sp.** (slightly angled posteriorly with anterior spinule in *A. gadaletae* **n. sp.** as in *A. kirmilleri* Kensley).

Acanthaxius polyacantha Miyake and Sakai, 1967

(Fig. 4)

Acanthaxius polyacantha Miyake and Sakai, 1967: 303, fig. 1.

Material examined

Solomon Islands, *Alis*, Salomon 1, St. 1761, 191–290 m, Ph. Bouchet, B. Dayrat/A. Warren, B. Richer de Forges coll., 27 Sept 2001: 1 female, cl. 9 mm, tl. 24.5 mm (figured) (MNHN Th 1498).

Description

Carapace (Fig 4A) with triangular pointed rostrum slightly shorter than eyestalks, lateral border with two spines and a suborbital spine. Median carina of gastric region extending to cervical groove, with four spines anterior to faint tubercle, six spines posterior to it; lateral carina with large anterior spine and seven smaller posteriorly; two

submedian carinae, each with six or seven spines; lateral sides of carapace and postcervical region bearing numerous spinules. Telson (Fig. 4B) slightly longer than broad with four dorsal spines, lateral border with two spinules, two posterolateral spines and median spine on convex posterior border.

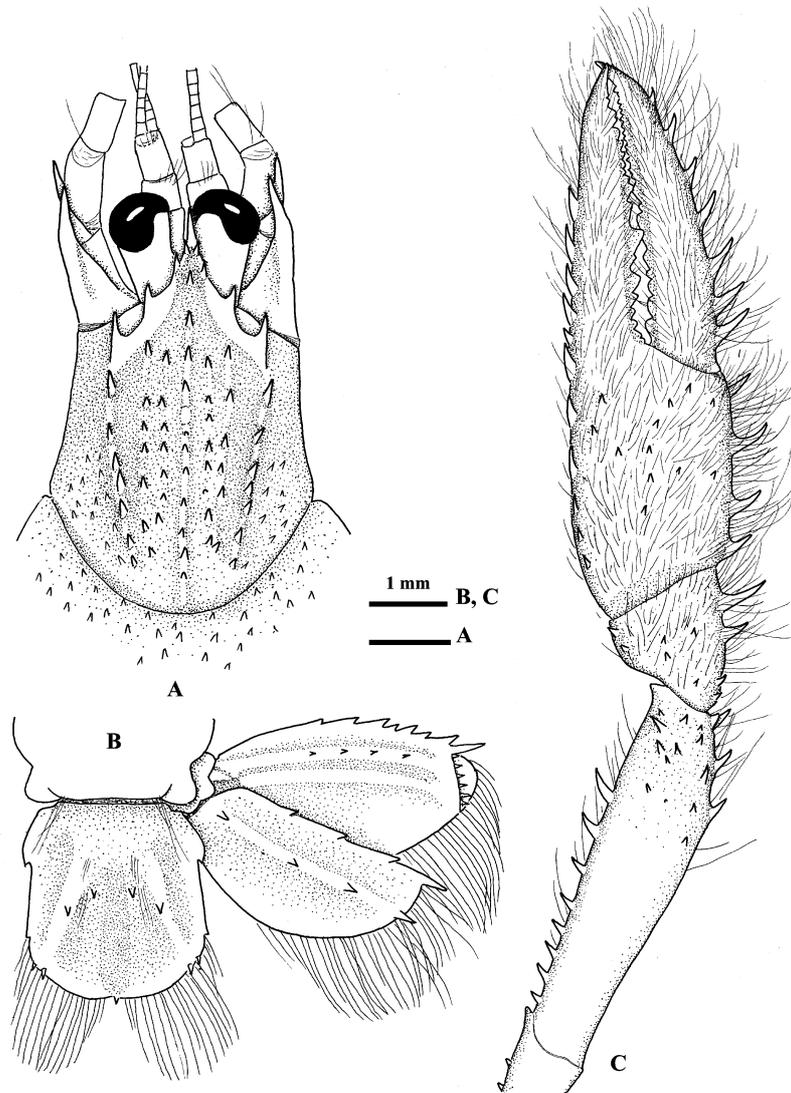


FIGURE 4. *Acanthaxius polyacantha* Miyake and Sakai, female (MNHN Th 1498). A, anterior part of carapace; B, telson and uropods; C, large pereopod 1. Scale line: 1 mm.

Antennal peduncle (Fig. 4A) longer than that of antennule, article 1, 3 and 4 with one, one and two lower spines respectively as figured for the type (Miyake & Sakai, 1967: fig. 1C), acicle slender nearly reaching the distal border of article 4. Maxilliped 3 with lower spine on coxa and basis, two lower spines on ischium, four on merus and one lower distal spinule on carpus.

Pereopods 1 subequal, larger (Fig. 4C) with dactylus about 1.3 times length of propodal palm; smaller pereopod 1 with more slender dactylus nearly 1.8 times as long as palm; similar spinulation for both appendages: ischium with two lower spines; merus with three upper distal spines, eight lower spines, several spines and spinules on anterior lateral surface; carpus with two or three upper spines and two lower spines, propodus with spinules on lateral surface, four upper spines and row of 11–12 lower submarginal spines; cutting edge of fixed finger, as well as dactylus, with small acute teeth, latter with curved tip and seven or eight large upper spines. Pereopod 2, 3 and 4 each with three lower spines on merus, one of them distal. Uropod exopod (Fig.4B) ovoid, bearing seven spines on lateral external border and large distal spine near suture, external carina with four spinules; endopod with four spines on lateral external border and four spines on median carina.

Remarks

The holotype and only known specimen of the species is an ovigerous female from the East China Sea (27°16'N, 125°34.5'E) (off East Taiwan), measuring 15 mm in carapace length and 51 mm in total length. The present specimen from the Solomon Islands is smaller but agrees with the type (Miyake & Sakai, 1967) in the morphology of the rostrum and carapace, the pereopods, the telson and uropods. Some minor differences are found, i.e. fewer upper spines on the merus of both pereopods 1, four dorsal spines on the telson (instead of six in the type) which are probably related to its smaller size and younger age.

Acknowledgements

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