

## TWO NEW AXIOIDS (DECAPODA: THALASSINIDEA) FROM NEW CALEDONIA

Feng-Jiau Lin

(FJL) Institute of Marine Biology, National Taiwan Ocean University, 2 Pei-Ning Road,  
Keelung 202, Taiwan, R.O.C. (F-JLin@yahoo.com.tw)

### ABSTRACT

Two new species of Axioidea were found amongst the deep-sea material recently collected from New Caledonia. *Meticonaxius dentatus* sp. nov. is unique among members of the genus by the presence of the teeth on the rostrum and the merus of the large cheliped. *Oxyrhynchaxius tricarinatus* sp. nov. is the third species known in the genus and is unique in bearing three dorsal ridges on the abdomen.

### INTRODUCTION

Only six species of axioid shrimps have so far been reported from New Caledonia (Sakai and de Saint Laurent, 1989; Poore, 1997). In the course of sorting abundant thalassinidean material recently collected from New Caledonia and now in the Muséum national d'Histoire naturelle, Paris, two new species belonging to the rare genera *Meticonaxius* de Man, 1905, and *Oxyrhynchaxius* Parisi, 1917, were discovered. *Oxyrhynchaxius* has not been found previously in New Caledonia. The present report describes these two new species. The specimens are deposited at the Muséum national d'Histoire naturelle, Paris (MNHN). Carapace length (cl.) and total length (tl.) are measured dorsally from the orbital margin to the posterior margin of the carapace and the telson, respectively. The term "setal rows" refers to special setal arrangements as defined in Kensley and Heard (1991). BATHUS (a Greek meaning deep) and HALIPRO (HALIPRO from the French HALIEUTIQUE (fisheries sciences), and PROFOND (deep) are the names of French expeditions.

### SYSTEMATIC ACCOUNT

Family Micheleidae Sakai, 1992  
Genus *Meticonaxius* de Man, 1905  
*Meticonaxius dentatus* sp. nov.  
(Figs. 1-2)

Material Examined.—Holotype: New Caledonia, BATHUS 1, stn CP 701, 20°57.5'S, 165°35.9'E, 302-335 m, 18 Mar 1993, female, cl. 14.9 mm, tl. 51.7 mm (MNHN-Th1464).

Paratypes: New Caledonia, BATHUS 2, stn DW 758, 22°18.37'S, 166°10.51'E, 337-386 m, 16 May 1993, 1 carapace with pereopods I and II, cl. 8.5 mm (MNHN-Th1466); BATHUS 4, stn DW 882, 22°02.4'S, 165°56.4'E, 250-350 m, 1 Aug 1994, 1 carapace with pereopod I, cl. 8.2 mm (MNHN-Th1465).

Description.—Rostrum (Fig. 1B, C) triangular acute, longer than eye, at least one side armed with 1-3 teeth; median carina posteriorly bifurcated.

Carapace (Fig. 1A, B) smooth, anterolateral carapace with 3-4 subvertical setal rows below lateral rostral carina. Abdominal somite I with horizontal setal row dorsolaterally, abdominal somites III-V bearing dense setae, abdominal

somite VI with 2 sublongitudinal and 2 short setal rows. Telson (Fig. 1D) longer than wide, unarmed; posterior margin slightly convex, lateral margin constricted in distal three-fifths.

Eye reduced and without pigment, shorter than rostrum. Antennular peduncle extending to about distal one-third of antennal peduncle article IV. Antennal acicle well-developed or rudimentary.

Mandible (Fig. 2G) with incisor process anteriorly smooth, cutting edge with 1 proximal tooth; palp with 3 articles, article III subequal in length to articles I and II together. Maxillule (Fig. 2F) with endopod as 2 slender articles; basal endite bearing spiniform setae on mesiodistal margin. Maxilla (Fig. 2E) with bilobed basal and coxal endites, all densely setose on mesial margins; coxal endite unequally bilobed, proximal lobe broader than distal lobe; basal endite also unequally bilobed, distal lobe slightly broader than proximal lobe; endopod tapering, reaching beyond exopod; scaphognathite with 1 long posteriorly directed seta.

Maxilliped I (Fig. 2D) with elongated suboval basal edite, coxal endite shorter than basal endite; endopod slender, shorter than basal endite; exopod elongate, digitiform distally; proximal epipod lobe twice as long as distal lobe. Maxilliped II (Fig. 2C) endopod with elongated merus; carpus short; propodus broad; dactylus subcircular, fringed with 10 stout setae; epipod with vestigial podobranch. Maxilliped III (Fig. 2A, B) basis with distoventral spine; ischium with crista dentata consisted of 18 denticles; merus slender, with subdistoventral spine; carpus slender, about as long as merus; propodus slender, slightly shorter than carpus; dactylus digitiform, shorter than propodus; epipod with well-developed podobranch.

Pereopod I (Fig. 1E) chelate and symmetrical; ischium unarmed; merus with 0-3 ventral teeth, 4-9 subdistodorsal teeth; carpus and palm unarmed; fingers 1.3-1.4 times as long as palm; both fixed finger and dactylus with curved tip, fixed finger bearing 9-10 irregular sized teeth on cutting edge; dactylus unarmed. Pereopod II (Fig. 1F) chelate; ischium, merus, carpus unarmed; cutting edges of chela finely denticulate. Pereopod III (Fig. 1G) propodus about 1.6 times as long as wide, lateral surface with 2 oblique setal rows; dactylus dorsally with 2 spiniform setae. Pereopod IV (Fig. 1H) propodus about 1.6 times as long as wide; dactylus

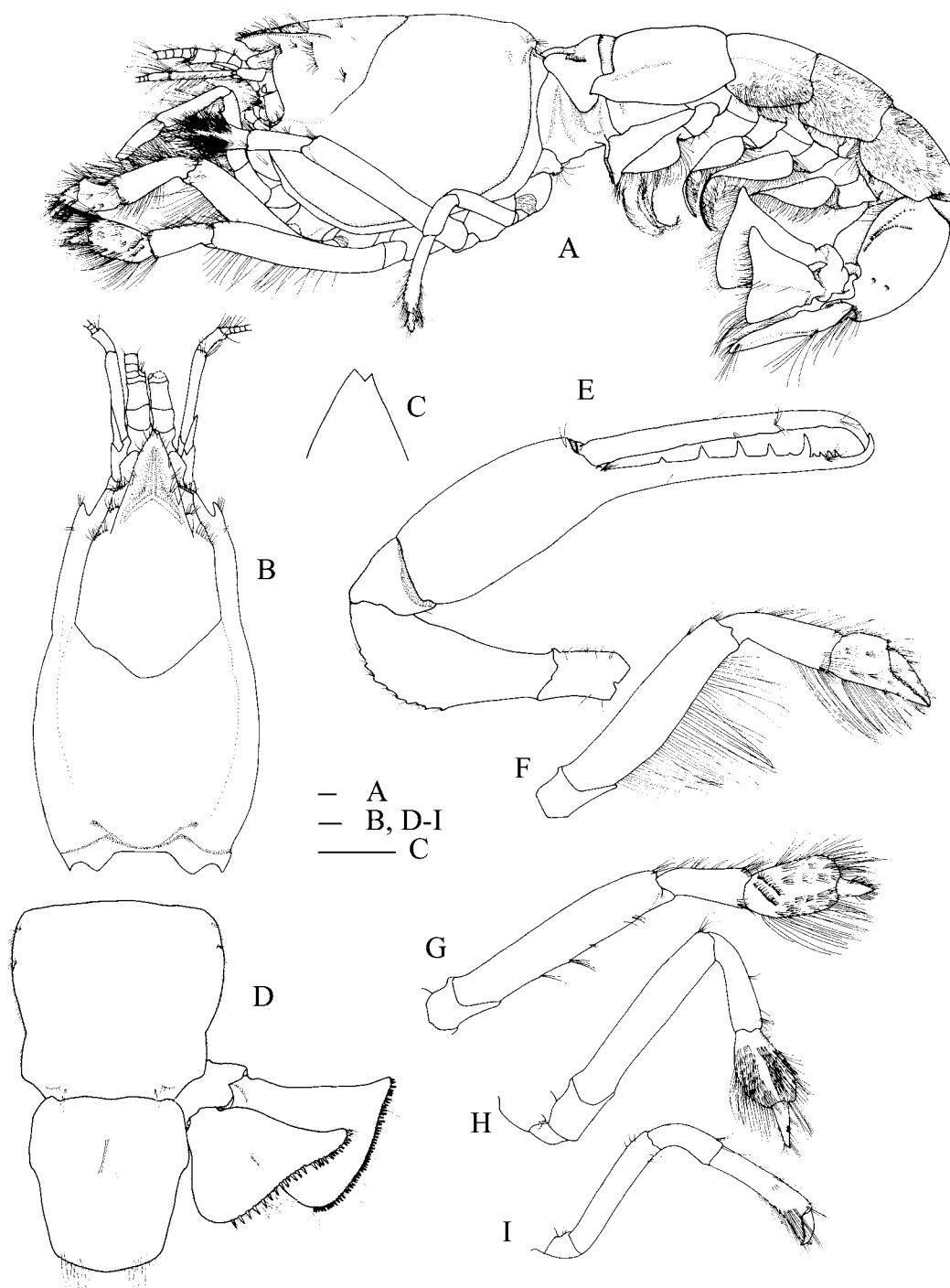


Fig. 1. *Meticonaxius dentatus* sp. nov., holotype, female, cl. 14.9 mm, New Caledonia, MNHN-Th1464. A, lateral view; B, carapace in dorsal view; C, tip of rostrum in dorsal view (setae omitted); D, telson and right uropod in dorsal view; E, right cheliped in lateral view; F, pereopod II in lateral view; G, pereopod III in lateral view; H, pereopod IV in lateral view; I, pereopod V in lateral view. Scale bars: 1 mm.

with 2 spiniform setae subdorsally. Pereiopod V (Fig. 1I) fully chelate.

Pleopod I slender in female, uniramous. Pleopod II-V biramous, rami broad, with elongated appendix interna.

Uropod (Fig. 1D) with both endopod and exopod widened distally, distolateral corner produced, bearing fringe of plumose setae, spiniform setae on distal margins; endopod slightly wider than long; exopod slightly longer than wide.

Size.—Three specimens ranging from cl. 8.2 to 14.9 mm, holotype of tl. 51.7 mm.

Coloration.—Unknown.

Distribution.—New Caledonia, at depth of 250-386 m.

Etymology.—The name refers to the presence of teeth on the rostrum and the dorsal merus of the large cheliped.

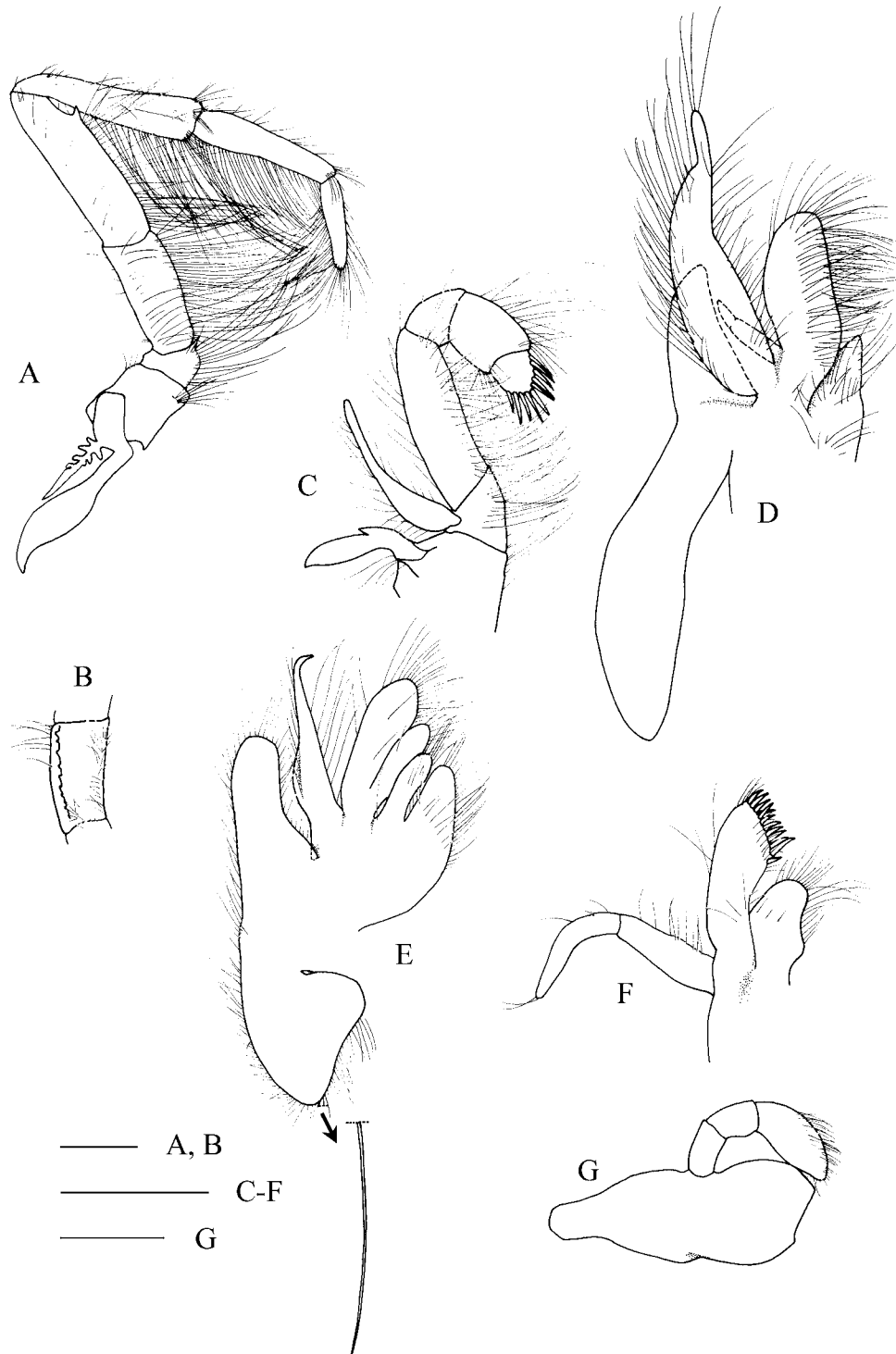


Fig. 2. *Meticonaxius dentatus* sp. nov., paratype, sex undetermined, cl. 8.2 mm, New Caledonia, MNHN-Th1465. A, maxilliped III; B, mesial crest of ischium of maxilliped III; C, maxilliped II; D, maxilliped I; E, maxilla (long seta of scaphognathite broken off); F, maxillule; G, mandible. Scale bars: 1 mm.

Remarks.—Although only the holotype is in good condition (except for lack of the left large cheliped), the new species differs from all the eight known species of the genus in the rostrum and the large cheliped merus bearing teeth (or a tooth), the fifth pereiopod being fully chelate and the absence of setal rows on abdominal somites II-V. The genus *Meticonaxius* has

been reported from New Caldeonia and adjacent areas before, with *M. noumea* Poore, 1997, from New Caledonia and *M. soela* Sakai, 1992, from the Coral Sea. Table 1 lists differences amongst the nine species of *Meticonaxius* so far known. The new species is like *M. spicatus* Poore, 1997, from the Caribbean, in having the fingers on the large chela distinctly

Table 1. Distinguishing characters among the species of the genus *Metriconaxius*. <sup>a</sup> From Kensley & Heard, 1991; <sup>b</sup> from Poore, 1997; <sup>c</sup> from Sakai, 1992; <sup>d</sup> from Coelno, 1987. — no data.

|                           | <i>M. dentatus</i> sp. nov.         | <i>M. longispina</i> <sup>a</sup> | <i>M. monodor</i> <sup>a</sup> | <i>M. noumea</i> <sup>b</sup> | <i>M. socla</i> <sup>c</sup> | <i>M. bouvieri</i> <sup>b</sup> | <i>M. capricorn</i> <sup>d</sup> | <i>M. microlops</i> <sup>a</sup> | <i>M. spicatus</i> <sup>b</sup> |
|---------------------------|-------------------------------------|-----------------------------------|--------------------------------|-------------------------------|------------------------------|---------------------------------|----------------------------------|----------------------------------|---------------------------------|
| <b>Rostrum</b>            |                                     |                                   |                                |                               |                              |                                 |                                  |                                  |                                 |
| lateral margin            | at least one side bearing 1-3 teeth | unarmed                           | unarmed                        | unarmed                       | unarmed                      | unarmed                         | unarmed                          | unarmed                          | unarmed                         |
| apex v.s. eyestalk        | acute longer                        | round longer                      | acute longer                   | acute equal                   | acute longer                 | acute longer                    | acute longer                     | round longer                     | acute shorter                   |
| <b>Maxilliped III</b>     |                                     |                                   |                                |                               |                              |                                 |                                  |                                  |                                 |
| merus ventral spine       | 1                                   | 1                                 | 1                              | 0                             | 1                            | 0                               | 1                                | 0                                | 1                               |
| <b>Large cheliped</b>     |                                     |                                   |                                |                               |                              |                                 |                                  |                                  |                                 |
| fixed finger cutting edge | 9-10 irregular sized teeth          | 1 large tooth at distal 2/5       | 1 large tooth at at midlength  | 1 large tooth at midlength    | 1 large tooth at midlength   | 1 large tooth at midlength      | 1 large tooth at distal 1/3      | 1 large tooth at midlength       | 8 irregular sized teeth         |
| <b>merus</b>              |                                     |                                   |                                |                               |                              |                                 |                                  |                                  |                                 |
| dorsal teeth              | 4-9                                 | absent                            | absent                         | absent                        | absent                       | absent                          | absent                           | absent                           | absent                          |
| ventral spines            | 0-3                                 | absent                            | 1                              | 1                             | absent                       | 2-3                             | 1                                | 1                                | absent                          |
| palm length/width         | 1.9-2.0                             | 1.9                               | 1.8                            | 2.0                           | 1.9                          | 1.8                             | 1.8                              | 1.7                              | 2.0                             |
| dactylus/palm             | 1.4-1.5                             | 0.9                               | 1.0                            | 0.8                           | 0.9                          | 1.0                             | 1.1                              | 0.8                              | 1.5                             |
| <b>Pereiopod II</b>       |                                     |                                   |                                |                               |                              |                                 |                                  |                                  |                                 |
| palm length/width         | 0.9                                 | 1.1                               | 0.7                            | 0.9                           | 0.8                          | 0.9                             | 0.7                              | —                                | 1.0                             |
| dactylus/palm             | 1.6                                 | 1.3                               | 1.9                            | 1.4                           | 1.8                          | 1.5                             | 1.7                              | —                                | 1.4                             |
| <b>Pereiopod III</b>      |                                     |                                   |                                |                               |                              |                                 |                                  |                                  |                                 |
| dactylus/propodus         | 1.6                                 | 1.5                               | 1.3                            | 1.4                           | 0.8                          | 1.0                             | 1.0                              | —                                | 1.8                             |
| <b>Pereiopod IV</b>       |                                     |                                   |                                |                               |                              |                                 |                                  |                                  |                                 |
| dactylus/propodus         | 1.5                                 | —                                 | 1.8                            | 1.4                           | 1.5                          | 1.5                             | —                                | —                                | 2.0                             |
| <b>Distribution</b>       | New Caledonia                       | South Africa                      | Indonesia                      | New Caledonia                 | Coral Sea                    | Caribbean Sea                   | Brazil                           | Caribbean Sea                    | Caribbean Sea                   |

longer than the palm and the cutting edges of the fixed finger serrated with many large and small teeth.

Variations occur in the antennal acicle which is well-developed in the holotype and one paratype (cl. 8.2 mm), but rudimentary in the second paratype (cl. 8.5 mm). Moreover, there is only one tooth on the right side of the rostrum in the holotype while the two paratypes have one pair or two and have three teeth on the lateral margins of the rostrum.

Since the present new species has many unique characters, the diagnosis of the genus *Meticonaxius* given by Kensley and Heard (1991), Sakai (1992) and Poore (1997) must be modified to state: “—rostral margins unarmed or armed, anterolateral carapace with 1-4 setal rows near lateral carina, single setal row on abdominal somite I while abdominal somite VI with 2-4 setal rows—”.

Family Axiidae Huxley, 1879

Genus *Oxyrhynchaxius* Parisi, 1917

*Oxyrhynchaxius tricarinatus* sp. nov.

(Figs. 3-4)

Material Examined.—Holotype: New Caledonia, BATHUS 4, stn CP 899, 20°16.68'S, 163°50.26'E, 500–600 m, 3 Aug 1994, male, cl. 14.9 mm, tl. 42.2 mm (MNHN-Th1467).

Paratypes: New Caledonia, HALIPRO, stn CP 852, 21°44.98'S, 166°36.82'E, 253–266 m, 19 Mar 1994, male, cl. 9.8 mm, tl. 30.2 mm (MNHN-Th1468).

Description.—Rostrum (Fig. 3A, B) styliform, slightly curved ventrally, about one-fourth length of carapace, almost reaching distal margin of antennal peduncle article IV, bearing 13 pairs of denticles.

Carapace (Fig. 3A, B) covered with scale-like tubercles, bearing 5 strong carinae; median carina running from proximal three-fifths of rostrum to posterior margin of carapace, anterior part with 8 round and 10 sharp tubercles, posterior part more or less unarmed; submedian carina bearing 11-12 tubercles; lateral carina armed with 7-8 strong teeth; small antennal spine present. Cervical groove well defined. Abdomen (Fig. 3A) with pleura bearing granules and setae on surfaces; pleura I bearing 2-3 minute ventral spinules; pleura IV and VI bearing 1 minute ventral spinule; pleura V armed with 5 ventral spinules. Tergites I, II and VI (Fig. 3B, C) bearing 1 longitudinal dorsal ridge; tergites III-V bearing 3 strong longitudinal dorsal ridges. Telson (Fig. 3C) longer than wide, armed with 2 pairs of dorsal submedian spines and 2 pairs of lateral spines, posterior margin bearing 1 median spine.

Eye very well-developed, elongate and cylindrical, much longer than rostrum; cornea darkly pigmented, stalk bearing some setae. Antennular peduncle reaching middle of antennal peduncle article IV. Antennal acicle large, about 0.8 length of antennal peduncle article IV.

Mandible (Fig. 4F) palp with article III subequal in length to articles I and II together. Maxillule (Fig. 4E) exopod composed of 2 slender articles, basal endite having numerous setae. Maxilla (Fig. 4D) with both basal and coxal endites bilobed, proximal endite largest, mesial margins densely setose; endopod slender, reaching beyond scaphognathite; latter posteriorly rounded, without whip. Maxilliped I (Fig. 4C) with 2 broad and setose endites, endopod

slender, digitiform; exopod bearing small digitiform distal process; epipod large, bilobed, anterior lobe triangular, posterior lobe rounded distally. Maxilliped II (Fig. 4B) exopod elongate, with flagellum; endopod pediform, with short rounded dactylus fringed with some stout setae; short podobranch on epipod. Maxilliped III (Fig. 4A) pediform, with elongate exopod, terminating in flagellum; ischium bearing 1 ventral spine; merus armed with 5 strong ventral spines; ventral margin of carpus armed with 1 subproximal and 1 subdistal spinules.

Pereiopod I (Fig. 3D; only left cheliped present in holotype, pereiopod I absent in paratype) chelate and densely covered with setae; merus with 1 strong subdistoventral spine, 10 ventral and 8 dorsal spines; carpus covered with teeth, bearing 6 dorsal and 5 ventral spines; propodus with surface sharply tuberculate, bearing 5 dorsal and 11 ventral spines; fingers about 1.6 times as long as palm; fixed finger bearing 2 rows of thick, long setae; dactylus bearing 3 rows of thick, long setae. Pereiopod II (Fig. 3E) chelate, ischium ventral margin bearing subdistal spine; merus armed with 4 ventral spines; carpus unarmed; palm about 1.9 times as long as wide; dactylus about as long as palm, slightly longer than fixed finger. Pereiopod III (Fig. 3F) ischium unarmed; merus bearing 1 distroventral spine; carpus unarmed; propodus slender, unarmed; dactylus elongated, acute. Pereiopod V (Fig. 3G) unarmed.

Pleopod I (Fig. 4G) present in males, rudimentary, with cluster of tiny hooks on distomesial margin. Pleopod II (Fig. 4H) of males with appendix masculina originating in proximal one-third of mesial margin of endopod, rod-shaped, with numerous setae; appendix interna articulating at same position as appendix masculina, 1.3 times longer than appendix masculina. Pleopods III-V (Fig. 4I) of males similar to pleopod II, appendix interna originating in proximal one-fourth of mesial margin of endopod.

Uropod (Fig. 3C) exopod with transverse suture and 6-8 lateral spines, dorsal surface with some granules, submedian ridge bearing 4-5 spines, median ridge unarmed; endopod with lateral carinae bearing 3-4 lateral spines, median ridge having 5 spines.

Size.—Only two males known of cl. 9.8-14.9 mm, and tl. 30.2-42.2 mm.

Coloration.—Unknown.

Distribution.—New Caledonia, at depth of 253-600 m.

Etymology.—The name refers to the abdomen bearing three strong dorsal ridges.

Remarks.—Only two species of the rare genus *Oxyrhynchaxius* were previously known, *O. japonicus* Parisi, 1917 and *O. manningi* Lin, Kensley and Chan, 2000. Kensley (1996) suggested that *Acanthaxius caespitosa* (Squires, 1979), *Acanthaxius hirsutimana* (Boesch and Smalley, 1972), and *Acanthaxius spinosissimus* (Rathbun, 1906) may also belong to *Oxyrhynchaxius* in having granular carapace and with males bearing pleopod I. Nevertheless, these three species have shorter eyes (failed to exceed second article of antennal peduncle) and rather broad rostrum that sparsely denticulate (less than 7 pairs of

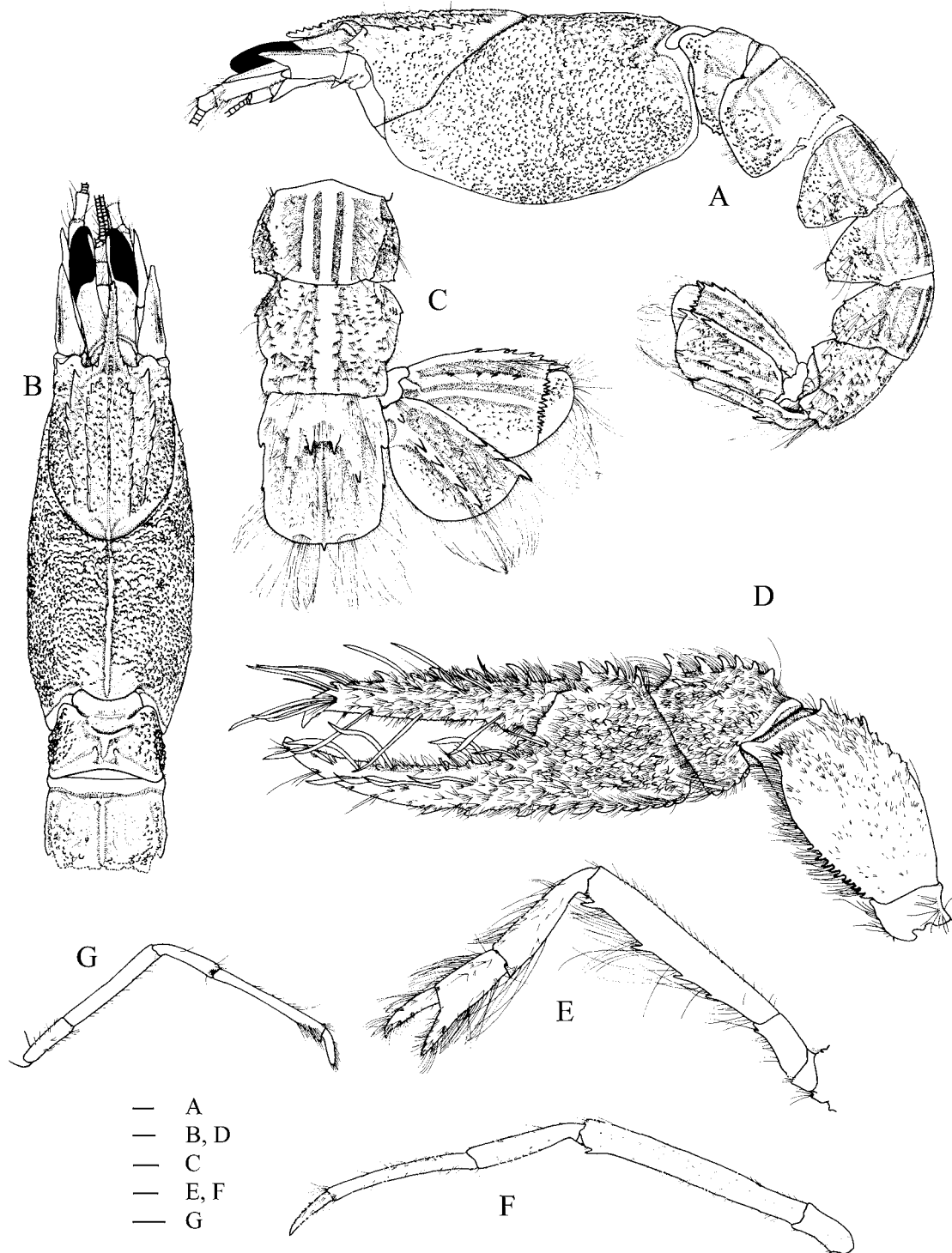


Fig. 3. *Oxyrhynchaxius tricarinatus* sp. nov., A-F, holotype, male, cl. 14.9 mm, New Caledonia, MNHN-Th1467; G, paratype, male, cl. 9.8 mm, New Caledonia, MNHN-Th1468. A, lateral view; B, carapace and anterior two abdominal somites in dorsal view; C, posterior two abdominal somites, telson and right uropod in dorsal view; D, cheliped in lateral view; E, pereopod II in lateral view; F, pereopod III in lateral view; G, pereopod V in lateral view. Scale bars: 1 mm.

teeth). As currently defined (Sakai and de Saint Laurent, 1989; Poore, 1994), *Oxyrhynchaxius* is characterized by having a long eye (at least extending to tip of antennal peduncle) and styliform rostrum with densely denticulate lateral margins (more than 10 teeth on one side). Moreover,

members of *Oxyrhynchaxius* s.s. have the cervical groove unarmed but the cervical groove bears distinct spines in *A. caespitosa* and *A. spinosissimus*. Therefore, the above three species should be excluded from *Oxyrhynchaxius* (also see Ngoc-Ho, 2005).

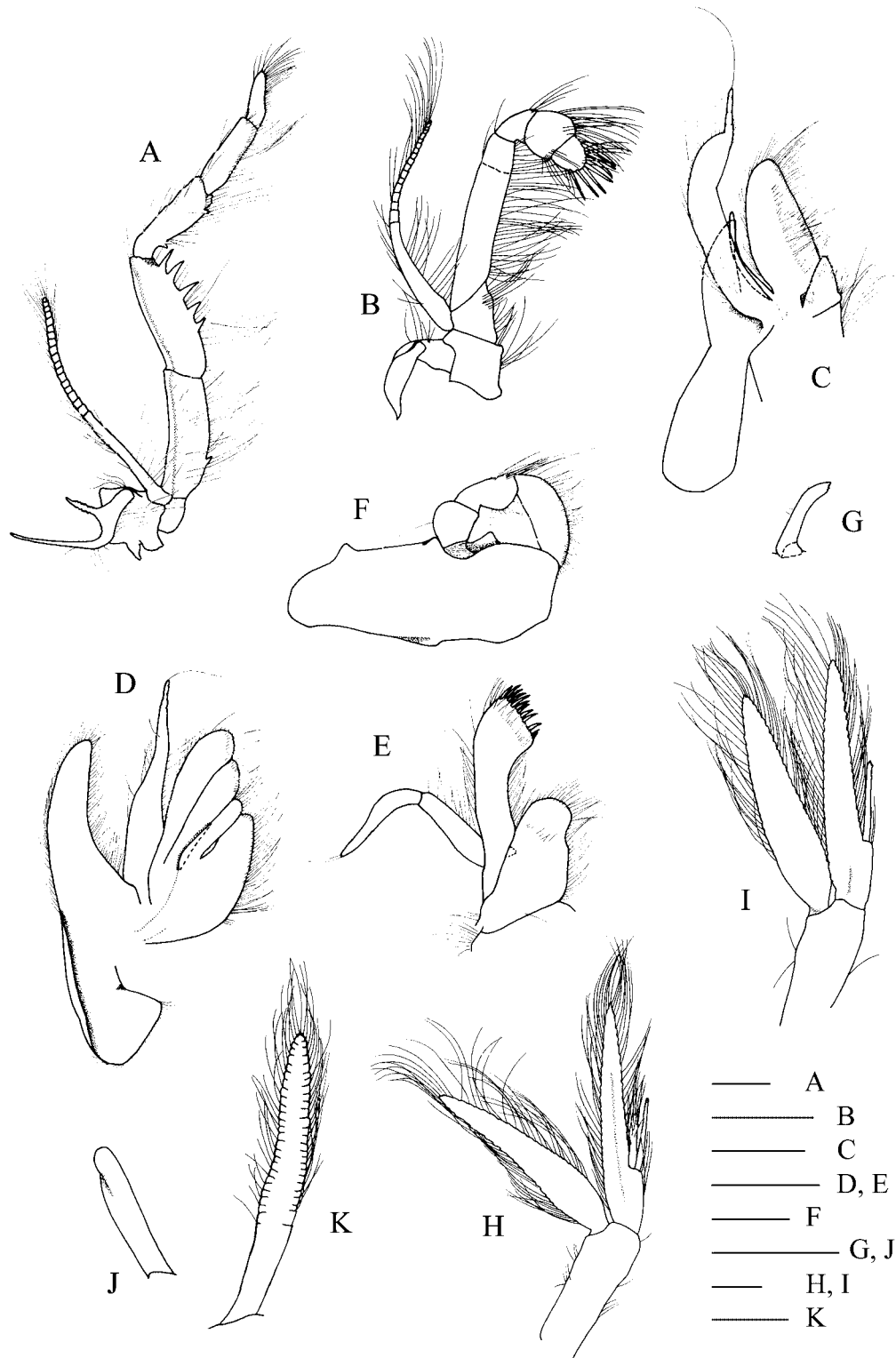


Fig. 4. *Oxyrhynchaxius tricarinatus* sp. nov.: A-I, paratype, male, cl. 9.8 mm, New Caledonia, MNHN-Th1468. *Oxyrhynchaxius japonicus* Parisi, 1917: J, male, cl. 14.1 mm, Taiwan, NTOUA00084; K, female, cl. 19.0 mm, Hong Kong, MNHN-Th428. A, maxilliped III; B, maxilliped II; C, maxilliped I; D, maxilla; E, maxillule; F, mandible; G, pleopod I; H, pleopod II; I, pleopod III; J, pleopod I; K, pleopod I. Scale bars: 1 mm.

Although the holotype of *O. japonicus* was not re-examined, the two present specimens collected from New Caledonia are both males and they have a rudimentary first pleopod as in two Taiwanese males of *O. japonicus* recently

collected (Ke-Zih-Liao fishing port, Kaohsiung County, gill net, about 40 m, 13 May 2000, male, cl. 14.1 mm, NTOUA00084; Tai-Chi fishing port, I-Lan County, commercial trawler, 8 Dec 2004, male, cl. 17.3 mm,

Table 2. Distinguishing characters among the three species of *Oxyrhynchaxius*. <sup>a</sup> Specimens in Lin et al. 2000 re-examined, together with the two recently collected Taiwanese males of *O. japonicus*.

|                           | <i>O. tricarinata</i> sp. nov.           | <i>O. japonicus</i> <sup>a</sup> | <i>O. manningi</i> <sup>a</sup>             |
|---------------------------|--|----------------------------------|---|
| eyestalk length/width     | 5  | 5                                | 2.5   |
| eyestalk/carapace length  | 0.42                                     | 0.40                             | 0.45  |
| rostrum/carapace length   | 0.25                                     | 0.35                             | 0.50  |
| denticles on rostrum      | 13 pairs                                 | 20-26                            | minutely dentate and with 5 spines near tip |
| median carina on carapace | along entire carapace                    | along entire carapace            | end before cervical groove                  |
| abdominal dorsal ridges   | tergites I, II, VI: 1; tergites III-V: 3 | absent                           | tergites I, VI: 0; tergites II-V: 1         |
| plural denticles          | I(2-3), II(0), III-IV(1), V(5), VI(1)    | I-IV(0), V-VI(1)                 | I(1), II(0), III(1), IV(2), V(4), VI(1)     |
| Uropodal exopod           | granular                                 | spinose                          | granular and spinose                        |

NTOUA00586; Fig. 4J). Sakai and de Saint Laurent (1989) incorrectly determined the first pleopod to be absent in males of this genus. Lin et al. (2000) incorrectly assumed that the holotype of *O. japonicus* (first pleopod simple and with rounded apex) was a female.

*Oxyrhynchaxius tricarinatus* can be readily distinguished from the other two species of the genus by the presence of three dorsal carinae on abdominal somites III-V. Other characters that can be used to separate the three species of *Oxyrhynchaxius* are listed in Table 2. On the other hand, the three species known in *Oxyrhynchaxius* all have rows of long thick hairs on the large chelae and these special hairs may be a unique character of this genus.

#### ACKNOWLEDGEMENTS

I wish to express my sincere thanks to the Muséum national d'Histoire naturelle, Paris (MNHN) for providing a short-term research grant that made the present study possible. Special thanks are due to A. Crosnier (MNHN) for his warm hospitality during my stay in Paris and Ngoc-Ho Nguyen (MNHN) for her valuable suggestions and comments. I also thank G. C. B. Poore (Museum of Victoria, Melbourne, Australia) for kindly re-checking the characters of *O. manningi*, T.-Y. Chan (National Taiwan Ocean University) and P. Castro (California State Polytechnic University, Pomona) for reading the manuscript.

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RECEIVED: 7 February 2005.

ACCEPTED: 1 November 2005.