



A new species of the pontoniine shrimp genus *Harpilius* Dana, 1852, *H. spinifer* (Crustacea: Decapoda: Palaemonidae), from New Caledonia

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Abstract: A new species of the small pontoniine shrimp genus, *Harpilius* Dana, 1852, is described and illustrated on the basis of a single specimen from New Caledonia. The new species, a pocilloporid coral associate, is readily distinguished from the three other species of the genus by the presence of well developed supraorbital spines.

Resumé : Une nouvelle espèce de crevette pontoniine du genre *Harpilius* Dana, 1852, *H. spinifer* (Crustacea : Decapoda : Palaemonidae), de Nouvelle-Calédonie. Une nouvelle espèce du petit genre de crevettes pontoniinae, *Harpilius* Dana, 1852, est décrite et illustrée en se basant sur un seul spécimen provenant de Nouvelle Calédonie. La nouvelle espèce, associée au corail *Pocillopora*, se distingue aisément des trois autres espèces du genre par la présence d'épines supraorbitaires bien développées.

Keywords: *Harpilius spinifer* • New species • Crustacea • Decapoda • Pontoniinae • New Caledonia • *Pocillopora* associate

Introduction

Pontoniine shrimps are now well known as “commensals” of scleractinian corals of the Indo-West Pacific and Eastern Pacific regions. So far very few similar associations have been reported from the Atlantic-Mediterranean region, *Veleroniopsis kimallynae* Gore being the only reported instance (Gore, 1981). These associations have been reviewed by Bruce (1998). Of the pontoniine shrimps now known to associate with corals of the genus *Pocillopora*, the first to be noted was illustrated without a name by

Savigny (1809) and described shortly after by Audouin (1826) as *Palaemon Beaupresii* (now *Harpiliopsis beaupresii*) from material collected from the Red Sea during Napoleon’s Egyptian Expedition. In 1852, Dana described *Palaemonella orientalis* (now *Vir orientalis*) from the Sulu Sea, collected during the United States Exploring Expedition, 1838-42. In 1860, Stimpson described *Harpilius depressus* (now *Harpiliopsis depressa*) from Hawaii and in 1890, Ortmann described *Anchistia spinigera* (now *Harpiliopsis spinigera*) from Samoa. From Ternate, Indonesia, *Periclimenes amygone* (now *Kemponia amygone*) and *Harpilius consobrinus* were described by De Man (1902). In the 20th century several further species have been added to the list, including *Fennera chacei*

Holthuis, 1951, first described from Eastern Pacific (Mexico to Colombia) and now known throughout most of the Indo-West Pacific region. Bruce (1969) described two further species, *Periclimenes madreporae* and *P. mahei*. Holthuis (1981) described *Periclimenes bayeri* (now *Harpilius bayeri*) collected in 1950 from the Marshall Islands. Most recently, *Yemenicaris trullata* has been described by Bruce (1997) from the Yemen and is still known only from the type material. Most of the other species have proven to be common and widely distributed wherever *Pocillopora* may be found. Many of the records of these species may be found in the ecological literature as the associates of *Pocillopora* have been a popular subject amongst coral reef projects. Initiated by Patton (1966), these studies (Patton, 1974; Abele, 1975; Austin et al., 1980; Kropp & Birkeland, 1981; Black & Prince, 1983) have made *Pocillopora* one of the most thoroughly studied tropical coral reef micro-habitats. Twelve species of pontonine shrimp are now considered to be primarily associates of *Pocillopora* corals. Other species, such as *Periclimenella petithouarsii* (Audouin) and *P. spiniferus* (De Man) may also be commonly found in *Pocillopora* colonies but are of frequent occurrence in other habitats. *Pocillopora* corals may also be occasional paratenic hosts for some *Coralliocaris* species. It is interesting that further new species can still be added to this list of associates. Although collected nearly 30 years ago, from New Caledonia, the discovery of a new species of *Harpilius* indicates that the fauna associated with these corals may still not be fully known. Thirteen species of pontonine shrimp have now been reported as *Pocillopora* associates.

The holotype specimen is deposited in the collections of the Muséum national d'Histoire naturelle, Paris.

Abbreviations used: CL, postorbital carapace length; ORSTOM, Office de la Recherche et Technique d'Outremer (now l'Institut de Recherche pour le Développement); MNHN, Muséum National d'Histoire Naturelle, Paris.

Systematics

Crustacea Decapoda

Family PALAEMONIDAE Rafinesque, 1815

Subfamily Pontoninae Kingsley, 1878

Genus *Harpilius* Dana, 1852

Harpilius Dana, 1852

Harpilius Dana, 1852a: 17. – Dana, 1852b: 576-577. – Borradaile, 1898: 386. – Borradaile, 1917: 380. – Nobili, 1906: 63. – Tattersall, 1921: 379-380. – Kemp, 1922: 226-229. – Bruce, 2004: 4-5.

Remarks

The genus *Harpilius* Dana, 1852, was reduced to the status of a subgenus of *Periclimenes* Costa by Holthuis (1951), to include those species of *Periclimenes* with simple ambulatory dactyls. It was later placed in the synonymy of *Periclimenes* by subsequent authors, remaining in this situation up to the publication of Holthuis (1993). Bruce (2004) reinstated the genus *Harpilius* Dana and restricted it to three species only: *H. lutescens* Dana, the type species of the genus, *H. consobrinus* De Man, 1902 and *H. bayeri* (Holthuis, 1981). A full definition of the genus was also provided. This only requires slight modification to accommodate *H. spinifer*: — supraorbital spines present or absent. The genus now includes four species.

Harpilius spinifer sp. nov.

(Figs 1-5)

Material

Holotype, ovigerous E, Ilôt Maitre, New Caledonia, 4 m, 11 October 1977, coll. ORSTOM, MNHN Na16339.

Diagnosis

A *Harpilius* species with well developed supraorbital spines, second pereopod carpus with strong distoventral spine medially.

Description

A moderately robust shrimp (Fig. 1), strongly calcified, of subcylindrical body form. Almost complete: rostrum damaged, lacking chela of left first pereopod.

Rostrum (Fig. 2A) well developed, slender, straight, horizontal, about 1.16 of CL, well exceeding antennular peduncle, dorsal carina well developed with 7 acute teeth, first tooth pre-orbital, first to fifth teeth well developed, sixth smaller, seventh minute, preterminal, lateral carinae feebly developed, ventral carina distinct, convex, with three small acute teeth, interdental spaces with short plumose setae.

Carapace (Fig. 2A,B) smooth, glabrous, without epigastric spine, supraorbital spines well developed, orbital region depressed from supraorbital spine to antennal spine, antennal spine strongly developed, robust, acute, marginal, exceeding inferior orbital angle, posteriorly subcarinate, inferior orbital angle (Fig. 5A) broad, acutely produced in dorsal and lateral views, hepatic spine well developed, smaller than antennal spine, on slightly lower level, anterolateral branchiostegite bluntly angular.

Abdomen without special features; sixth segment (Fig. 2C) about 0.38 of CL, 1.6 times length of fifth segment, compressed, posterolateral angle well developed, acute,

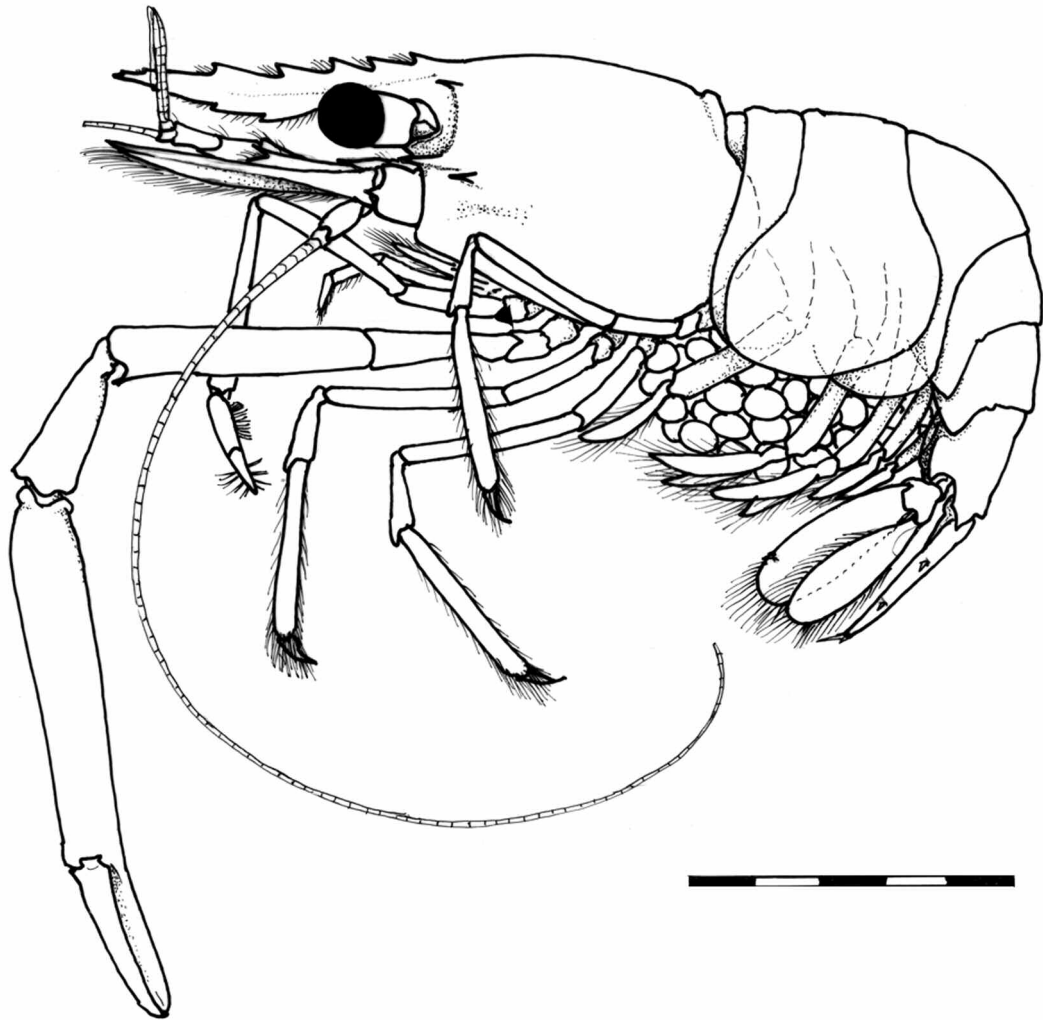


Figure 1. *Harpilius spinifer* sp. nov., holotype female, MNHN Na16339. Scale bar in millimeters.

Figure 1. *Harpilius spinifer* sp. nov., holotype femelle, MNHN Na16339. Echelle en millimètres.

posteroventral angle similar, pleura of first three segments broadly rounded, fourth and fifth (Fig. 2C) bluntly angular.

Telson (Fig. 2H) about 0.6 of CL, about 2.2 times longer than anterior width, lateral margins sublinear, posteriorly convergent, with two pairs of subequal dorsal spines, about 0.07 of telson length, at 0.36 and 0.67 of telson length (Fig. 2J), posterior margin (Fig. 2I) about 0.4 of anterior width, angular, lateral telson spines small, similar to dorsal spines, intermediate spines missing, submedian spines slender, subventral, feebly setulose, about 0.15 of telson length.

Antennule (Fig. 2E) with peduncle slightly shorter than CL, proximal segment about 1.8 times central width, medial margin straight with well developed acute ventromedial tooth at 0.5 of length, distolateral angle not produced, on right (Fig. 5B) broad, with acute distolateral tooth reaching about 0.5 of intermediate segment length,

anterior margin setose, with slender acute tooth medially, on left (Fig. 2F) similar, without medial tooth, lateral margin feebly convex, stylocerite acute, reaching about 0.4 of medial margin length, statocyst normal; intermediate and distal segments short, subequal in length, combined length about 0.6 of proximal segment length, upper flagellum damaged, proximal 12 segments fused, longer ramus damaged.

Antenna (Fig. 2G) with well developed antennal gland tubercle medially, basicerite with acute lateral tooth, car-pocerite subcylindrical, short, about 2.0 times longer than wide, reaching to about 0.33 of scaphocerite length, mero-cerite and ischiocerite normal, short; scaphocerite (Fig. 2G) well developed, well exceeding antennular peduncle and rostral tip, lamella narrow, tapering distally, rounded distally, about 4.6 times longer than proximal width, lateral

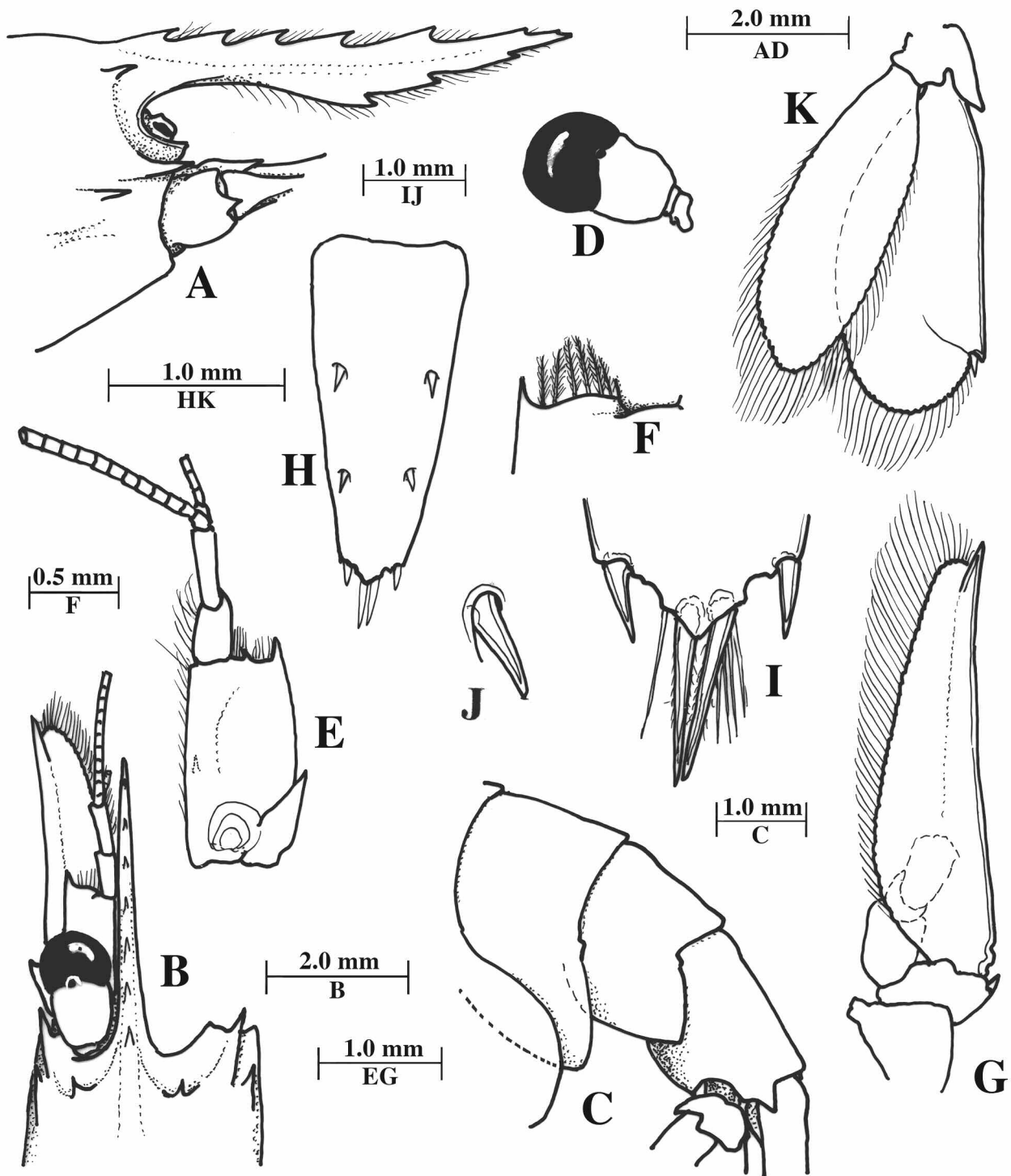


Figure 2. *Harpilius spinifer* sp. nov., holotype female, MNHN Na16339. **A.** Anterior carapace and rostrum, lateral. **B.** Anterior carapace and rostrum with left appendages, dorsal. **C.** Fourth to sixth abdominal segments, lateral. **D.** Right eye, dorsal. **E.** Right antennule. **F.** Left antennule, distolateral angle of proximal segment. **G.** Antenna. **H.** Telson. **I.** Same, posterior dorsal spine. **J.** Same, posterior marginal spines. **K.** Uropod.

Figure 2. *Harpilius spinifer* sp. nov., holotype femelle, MNHN Na16339. **A.** Carapace antérieure et rostre latéral. **B.** Carapace antérieure et rostre avec appendices dorsaux gauches. **C.** Quatrième à sixième segments abdominaux latéraux. **D.** Œil droit, dorsal. **E.** Antennule droite. **F.** Antennule gauche, angle distolatéral du segment proximal. **G.** Antenne. **H.** Telson. **I.** Idem avec épine dorsale postérieure. **J.** Idem avec épines postérieures marginales. **K.** Uropode.

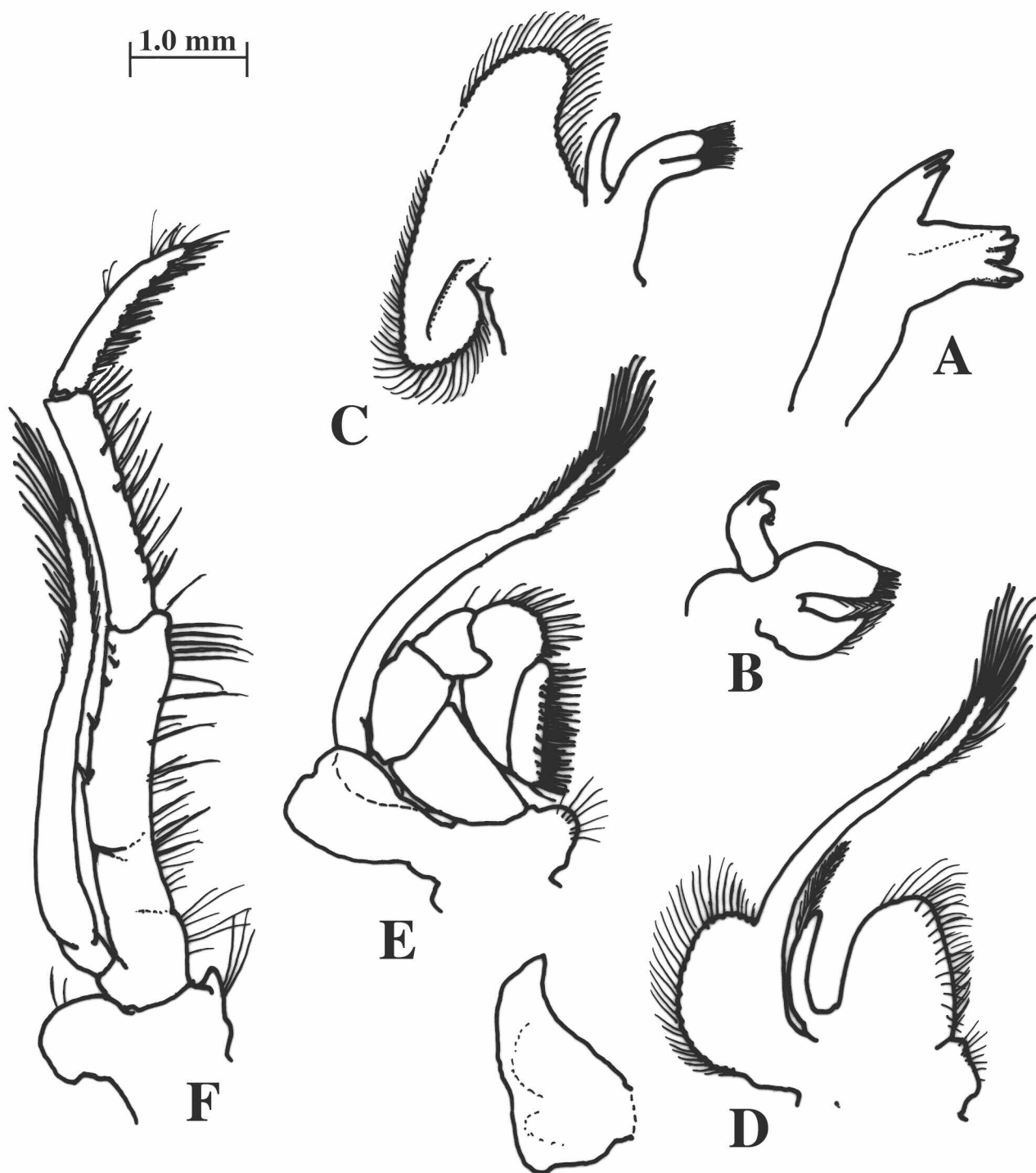


Figure 3. *Harpilius spinifer* sp. nov., holotype female, MNHN Na16339. A. Mandible. B. Maxillula. C. Maxilla. D. First maxilliped., exopod detached. E. Second maxilliped. F. Third maxilliped.

Figure 3. *Harpilius spinifer* sp. nov., holotype femelle, MNHN Na16339. A. Mandibule. B. Maxillule. C. Maxille. D. Premier maxillipède, exopode détaché. E. Second maxillipède. F. Troisième maxillipède.

margin feebly concave, with well developed, slender acute tooth distally, about 0.12 of scaphocerite length, at 0.95 of lateral margin length, well exceeding distal margin of lamella.

Ophthalmic somite without *béc ocellaire* or median pigment spot.

Eye (Fig. 2D) with well pigmented globular cornea, with dorsal accessory pigment spot, diameter about 0.23 of CL, stalk about as wide as long, length about 0.8 of corneal diameter.

Mandible (Fig. 3A) robust, without palp, molar process (Fig. 5D, E) stout, subcylindrical, distally oblique with pair of blunt teeth posteriorly, separated by tuft of short setae from anterior pair of blunt teeth, incisor process (Fig. 5C) short, tapering distally, with three small acute teeth distally, central tooth smaller than medial and lateral teeth.

Maxillula (Fig. 3B) with strongly bilobed palp (Fig. 5F), upper lobe slender, non-setose, lower lobe with small simple terminal setose tubercle, upper lacinia short, broad, distally truncate, with about 9 short stout similar simple spines and numerous spiniform setae, lower lacinia short, tapering, with numerous longer spiniform feebly setulose setae distally, several slender setae ventrally.

Maxilla (Fig. 3C) with simple flattened non-setose palp, about 4.5 times longer than basal width, basal endite bilobed, lobes slender, distal lobe more robust with about 30 simple setae distally, proximal lobe smaller and shorter, with about 20 distal setae, coxal endite obsolete, margin feebly convex, scaphognathite normal, anterior lobe as wide as long, posterior lobe about 0.75 of length of anterior lobe, 1.5 times longer than basal width.

First maxilliped (Fig. 3D) with palp similar to that of maxilla, with single long plumose preterminal seta, basal endite well developed, almost fully fused with coxal endite, distal margin rounded, medial border straight, sparsely setose with simple spiniform setae, coxal endite separated from basal by small notch, subquadrate, sparsely setose, exopod normal, with robust flagellum with numerous plumose terminal setae, caridean lobe well developed, broad, epipod large, triangular.

Second maxilliped (Fig. 3E) of normal form, dactylar segment about 3.4 times longer than broad, with serrulate medial spines, propodal segment slightly produced anteromedially, with few spiniform setae, carpus, merus and ischiobasis without special features, exopod with robust flagellum with numerous plumose terminal setae, coxa medially produced, rounded, sparsely setose, epipod small, quadrate, without podobranch.

Third maxilliped (Fig. 3F) reaching to exceed scaphocerite by length of terminal segment, with ischium and merus incompletely fused to basis laterally (Fig. 5G), incompletely fused to coxa medially, combined segment about 6.0 times longer than central width, medial and

lateral margins subparallel, medial margin sparsely setose, distal half of lateral margin with 5 short spines, size decreasing distally, penultimate segment 0.6 of antepenultimate segment length, subcylindrical, 6.0 times longer than wide, numerous groups of finely serrulate spiniform setae medially, terminal segment about 0.8 of penultimate segment length, 5.5 times longer than basal width, tapering distally, without terminal spine numerous groups of finely serrulate spiniform setae medially, exopod with robust flagellum with numerous plumose terminal setae, coxa produced medially with small acute process, with semicircular lateral plate, without arthrobranch.

Thoracic sternites with first narrow, second and third widening, fourth broad with stout median fingerlike process, posterior sternites narrow, unarmed.

First pereopod (Fig. 4A) slender, exceeding scaphocerite by chela and distal 0.2 of carpus, chela (Fig. 4B) with palm oval in section, slightly compressed, about 2.0 times as long as deep, with very numerous transverse rows of cleaning setae along most of ventral palm length, fingers with numerous tufts of setae, about 0.7 of palm length, stout, with simple hooked tips (Fig. 5H), cutting edges lateral, entire, carpus slender, about 2.0 times chela length, 9.0 times longer than distal width, tapering slightly proximally; merus 0.8 of carpal length, 9.0 times longer than central width, uniform; ischium slightly less than chela length; basis and coxa without special features, coxa with setose ventromedial process.

Second pereopods (Fig. 4C) well developed, subequal and similar, major chela about 2.08 times CL, all segments smooth, glabrous, chela (Fig. 4D) palm about 5.5 times longer than central depth, subcylindrical, slightly swollen proximally, oval in section, slightly bowed, fingers (Fig. 4E) 0.5 of palm length, sparsely setose; dactyl slender, about 5.7 times longer than proximal depth, dorsal margin feebly convex, with stout acute hooked tip, cutting edge distally entire, proximal cutting edge with 2 small acute teeth distally, 2 low tubercles proximally, fixed finger similar, dentition more robust, with more marked diastema between distal teeth, carpus short, about 0.47 of palm length, narrow proximally, broadened distally, with bluntly angular dorsal lobe (Fig. 5J, K), small ventrolateral tooth and large acute ventromedial tooth (Fig. 5I); merus (Fig. 4C) about 0.7 of palm length, robust, 6.0 times longer than central depth, with strong acute distoventral tooth (Fig. 5L); ischium 0.6 of meral length, 3.8 times longer than distal width, tapering proximally, basis and coxa normal, without special features. *Minor second pereopod* chela smaller than major, about 0.94 of major chela palm length, fingers with three acute teeth, two proximal tubercles, otherwise similar.

Ambulatory pereopod (Fig. 4I) similar, moderately robust, third exceeding scaphocerite by dactyl, dactylus (Fig. 4H) strongly compressed, with well demarcated

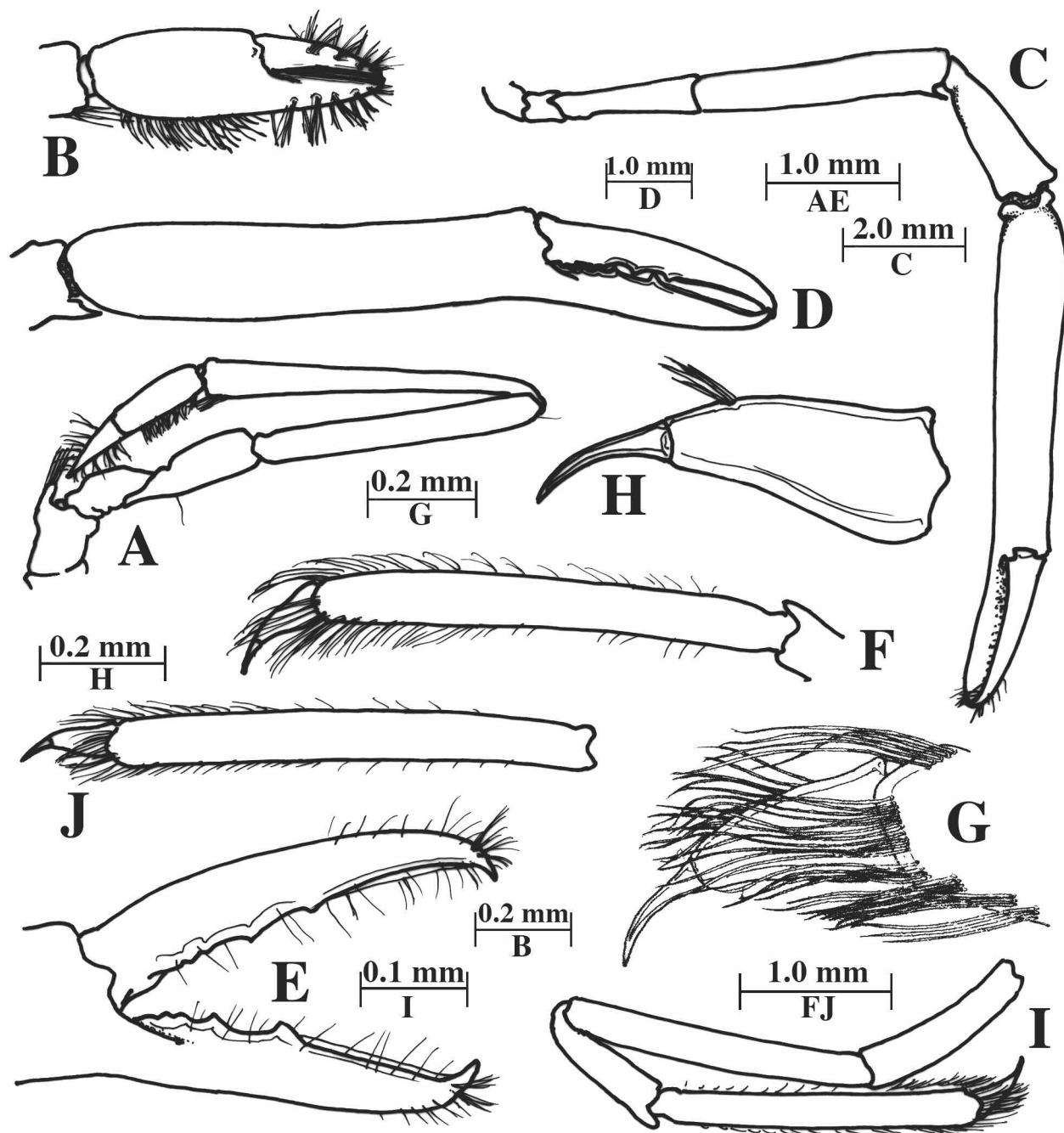


Figure 4. *Harpilius spinifer* sp. nov., holotype female, MNHN Na16339. **A.** First pereiopod. **B.** Same, chela. **C.** Major second pereiopod. **D.** Same, chela. **E.** Same, fingers. **F.** Third pereiopod, propod and dactyl. **G.** Same, distal propod and dactyl. **H.** Same, dactyl. **I.** Fifth pereiopod. **J.** Same propod and dactyl.

Figure 4. *Harpilius spinifer* sp. nov., holotype femelle, MNHN Na16339. **A.** Premier péréiopode. **B.** Idem, pince. **C.** Second péréiopode principal. **D.** Idem, pince. **E.** Idem, doigts. **F.** Troisième péréiopode, propode et dactyle. **G.** Idem, propode et dactyle, partie distale. **H.** Idem, dactyle. **I.** Cinquième péréiopode. **J.** Idem, propode et dactyle.

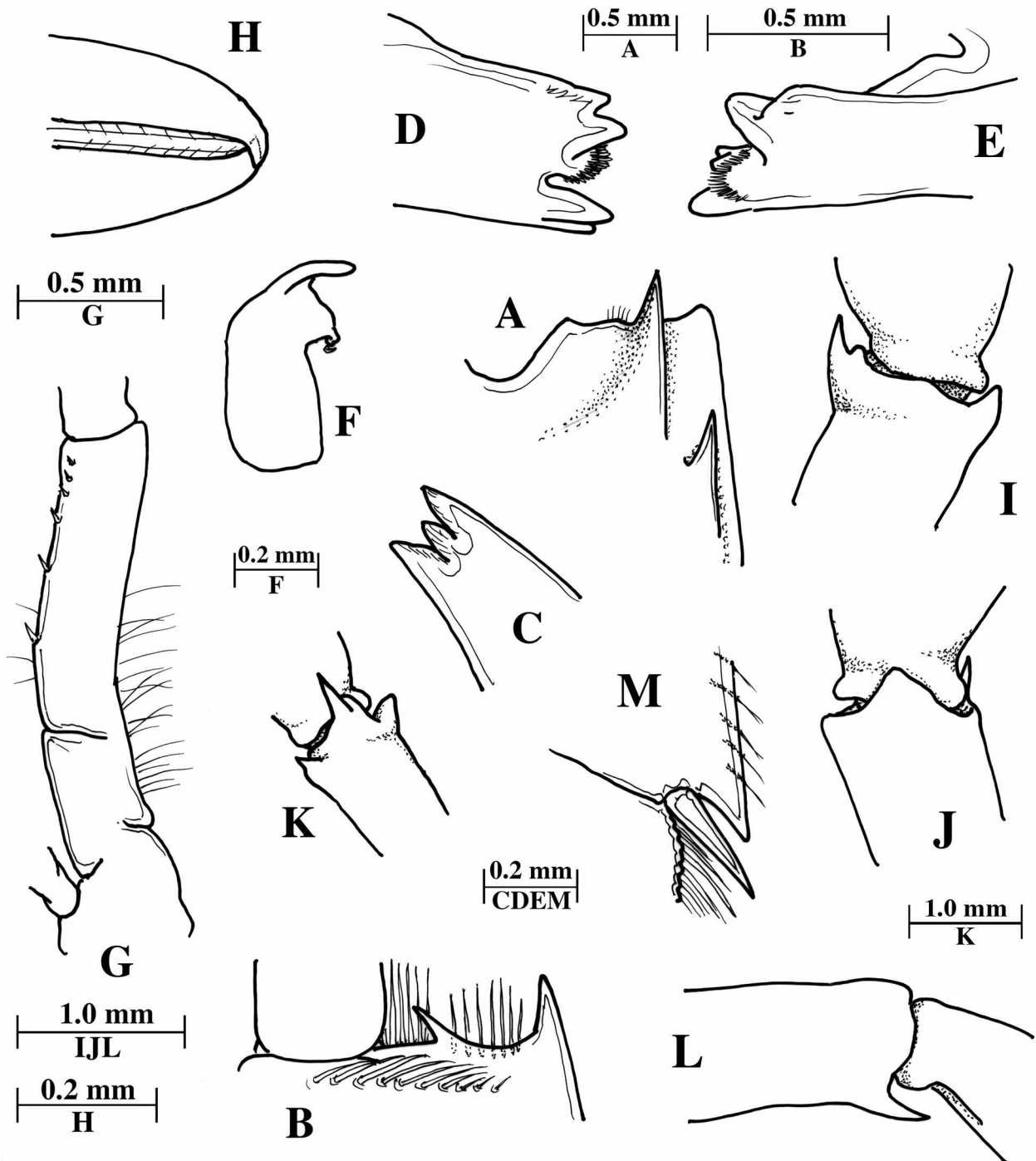


Figure 5. *Harpilius spinifer* sp. nov., holotype female, MNHN Na16339. **A.** Inferior orbital region, dorsal aspect. **B.** Antennule, proximal segment distolateral angle. **C.** Mandible, incisor process. **D.** Same, molar process, dorsal view. **E.** Same, ventral view. **F.** Maxillula, palp. **G.** Third maxilliped, ischiomerale-basis. **H.** First pereiopod chela, finger tips. **I.** Major second pereiopod, distal carpus, dorsal aspect. **J.** Same, lateral. **K.** Idem, ventral. **L.** Same, distal merus, lateral. **M.** Exopod of uropod, distolateral angle.

Figure 5. *Harpilius spinifer* sp. nov., holotype femelle, MNHN Na16339. **A.** Région orbitale inférieure, vue dorsale. **B.** Antennule, segment proximal, angle distolatéral. **C.** Mandibule, incisive. **D.** Idem, molaire, vue dorsale. **E.** Idem, vue ventrale. **F.** Maxillule, palpe. **G.** Troisième maxillipède, base ischiomérale. **H.** Pince du premier péréiopode, extrémité des doigts. **I.** Second péréiopode principal, carpus distal, vue dorsale. **J.** Idem, latéral. **K.** Idem, ventral. **L.** Idem, merus distal, latéral. **M.** Exopode de l'uropode, angle distolatéral.

unguis, slender, curved, about 4.0 times longer than basal width, 0.5 of length of dorsal margin of corpus, corpus about 2.0 times longer than maximal depth, dorsal margin feebly convex, with tuft of short setae at about 0.66 of length, ventral margin sinuous, unarmed; propod (Fig. 4F) about 0.6 of CL, about 9.5 times longer than central depth, uniform, without spines, densely setose distally (Fig. 4G), with long slender simple setae; proximal segments unarmed, sparsely setose, carpus 0.45 of propod length, 3.5 times longer than distal width, tapering slightly proximally, unarmed; merus subequal to propod length, 8.5 times longer than wide, uniform; ischium about 0.55 of propod length, 4.5 times longer than distal width, tapering proximally; basis and coxa without special features. Propod of fifth pereopod (Fig. 4J) slightly more slender than third and fourth propods.

Uropod (Fig. 2K) with protopod distolaterally acute, rami well exceeding telson tip, exopod 2.4 times longer than broad, with lateral margin straight, with well developed acute distolateral tooth (Fig. 5M) with mobile spine medially, about 2.0 times tooth length, diaeresis feebly developed, endopod about 0.9 of exopod length, 3.0 times longer than broad.

Ova numerous, small, about 50.

Measurements (mm)

Postorbital carapace length, 4.2; carapace and rostrum, 9.5; total body length (approx.), 19.5; major second pereopod chela, 8.8; minor second pereopod chela, 8.3; length of ovum, 0.7.

Colour

Unknown.

Etymology

From *spinifer* (Latin), prickly, a reference to the supraorbital spines.

Host

Pocillopora sp. [Scleractinia].

Ecology

The single specimen was preserved in a small tube with a single specimen of *Alpheus lottini* (Guérin), a well known associate of pocilloporid corals, particularly of *Pocillopora* species.

Discussion

Harpilius spinifer sp. nov. is immediately distinguished from the three other species of the genus by the presence of

supraorbital spines and the strongly armed second pereopod carpus. The new species appears more closely related to *H. bayeri* and *H. consobrinus* than to *H. lutescens* on account of the longer, more slender rostrum and the broader dactylar segment of the second maxilliped endopod. Both *H. bayeri* and *H. consobrinus* have the second pereopod carpus unarmed (De Man, 1902; Holthuis, 1981), in which they resemble *H. lutescens* (Kemp, 1922). There appear to be no detailed descriptions of *H. lutescens*, the type species of the genus *Harpilius*. Kemp (1922) notes, in his study of the Red Sea specimen studied by Tattersall, that the rostral midrib "is not continuous with the orbital margin, but curves round the orbit in the form of a sharp carina some distance behind the margin proper". This clearly resembles the condition in *H. spinifer*, in which it extends further, becoming confluent with the antennal spine. This feature is not present in *H. bayeri* and *H. consobrinus* (Holthuis, 1981, fig.3a,i). In *H. spinifer*, there are no clearly postorbital rostral teeth, which are present in the three other species of the genus.

Acknowledgments

Exactly how the specimens came to hand has been lost with the passage of time, but the opportunity to report upon this interesting specimen is none the less appreciated. This study was facilitated by support from the Australian Biological Resources Study.

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