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***Platypontonia ngae* sp. nov., a new symbiotic shrimp (Decapoda: Palaemonidae) living inside a boring gastrochaenid bivalve mollusk from the Philippines**

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Abstract

A new symbiotic palaemonid shrimp *Platypontonia ngae* sp. nov., is described based on a male-female pair found inside the mantle cavity of a gastrochaenid bivalve mollusk collected on a coral slope on the island Panglao, Philippines. The new species constitutes the third member of the genus *Platypontonia* Bruce, 1968. The new species is described, figured and compared with its congeners.

Key words: Malacostraca, Caridea, symbiosis, Mollusca, Gastrochaenidae, Philippines

Introduction

During the Panglao Marine Biodiversity Project (PANGLAO 2004), to document the fauna and measure species richness of an ecologically complex coastal site in the Central Philippines (Bouchet *et al.* 2009), a male-female pair of symbiotic palaemonid shrimp was collected from a boring bivalve mollusk of the family Gastrochaenidae. This is the second record of a symbiotic shrimp associated with a gastrochaenid bivalve mollusk. Fransen & Van der Meij (2010) recorded a juvenile specimen of the bivalve symbiont shrimp genus *Anchistus* Borradaile, 1898, in the endolithic gastrochaenid *Spengleria mytiloides* (Lamarck, 1818). The present shrimp species belongs to the genus *Platypontonia* Bruce, 1968 with two species presently known (De Grave & Fransen 2011). However, it does not fit the descriptions of these species: *P. brevirostris* (Miers, 1884), and *P. hyotis* Hipeau-Jacquotte, 1971. The new species is herein fully described, figured and compared with its congeners.

Materials and methods

Specimens were studied with a dissecting stereomicroscope (Zeiss DiscoveryV8, Zeiss, Oberkochen, Germany) and a compound microscope (Olympus BX53, Olympus, Tokyo, Japan) both provided with a drawing tube. Drawings were scanned (Canon Canoscan 9000F, Canon, Tokyo, Japan) with a resolution of 600 dpi and subsequently mounted into plates using Adobe Photoshop software (Adobe Systems, San Jose, CA, U.S.A.). Post-orbital carapace length (pocl) was measured from the posterior margin of the orbit to the posterior dorsal margin of the carapace. The material is deposited in the collection of Naturalis Biodiversity Center, Leiden, The Netherlands.

Taxonomy

Family Palaemonidae Rafinesque, 1815

***Platypontonia* Bruce, 1968**

***Platypontonia ngae* sp. nov.**

(Figs. 1–6)

Type material. *Holotype*: ovigerous female, pochl. 3.4 mm, RMNH.CRUS.D.58061, Panglao Marine Biodiversity Project, stn. R40, Philippines, Pamilacan Island, 9°29.2'N 123°55.1'E, 12 June 2004, depth 8–33 m, damaged coral slope, in endolithic gastrochaenid bivalve, collected by Stefano Schiaparelli. *Allotype*: male, pochl. 2.7 mm, RMNH.CRUS.D.58062, same data as holotype.

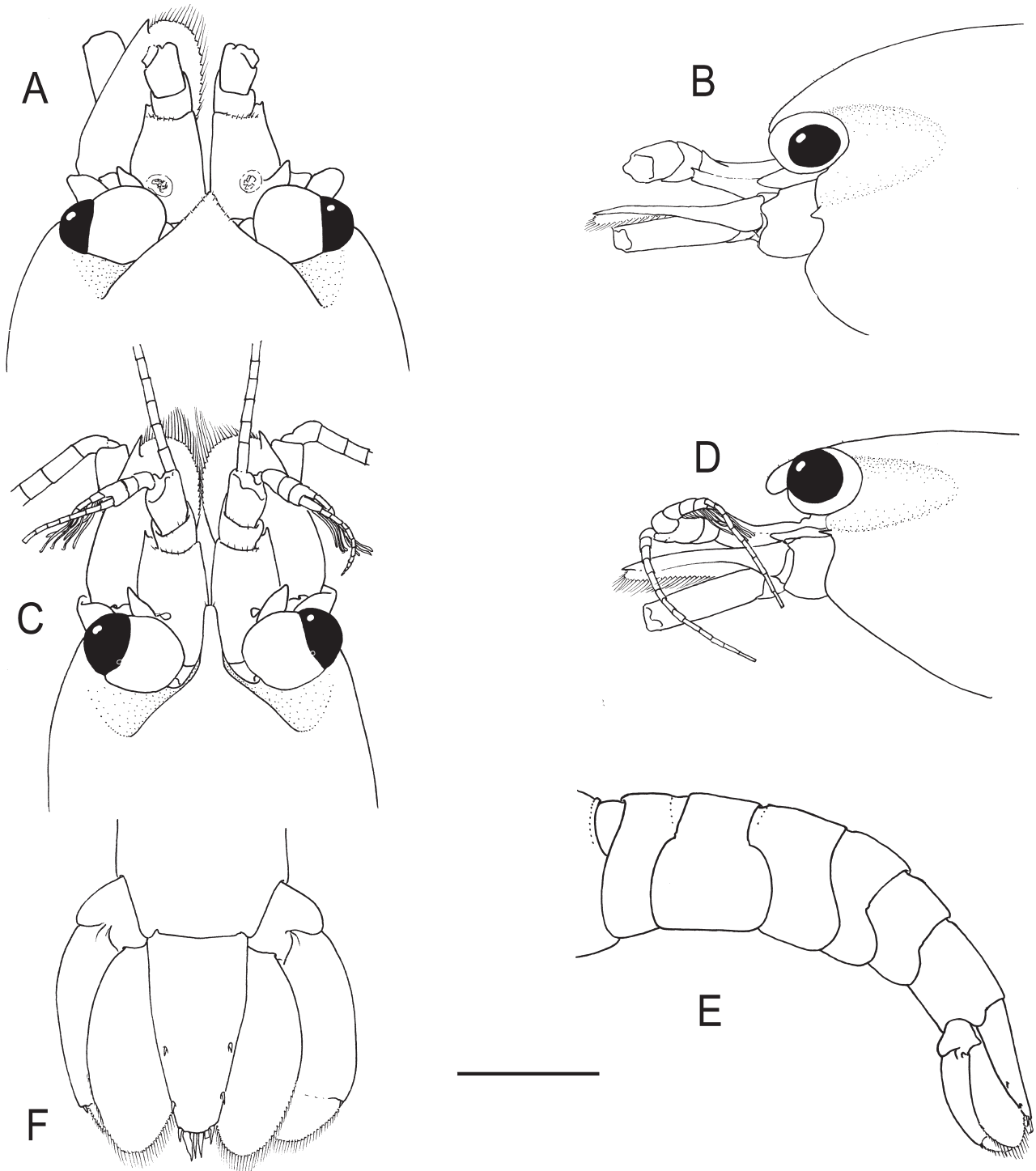


FIGURE 1. *Platypontonia ngae* sp. nov.: A, B, ovigerous female holotype, RMNH.CRUS.D.58061; C–F, male allotype, RMNH.CRUS.D.58062. A, C, Anterior appendages, dorsal view; B, D, idem, lateral view; E, abdomen, lateral view; F, tail fan, dorsal view. Scale A–D, F = 1 mm; E = 1.5 mm.

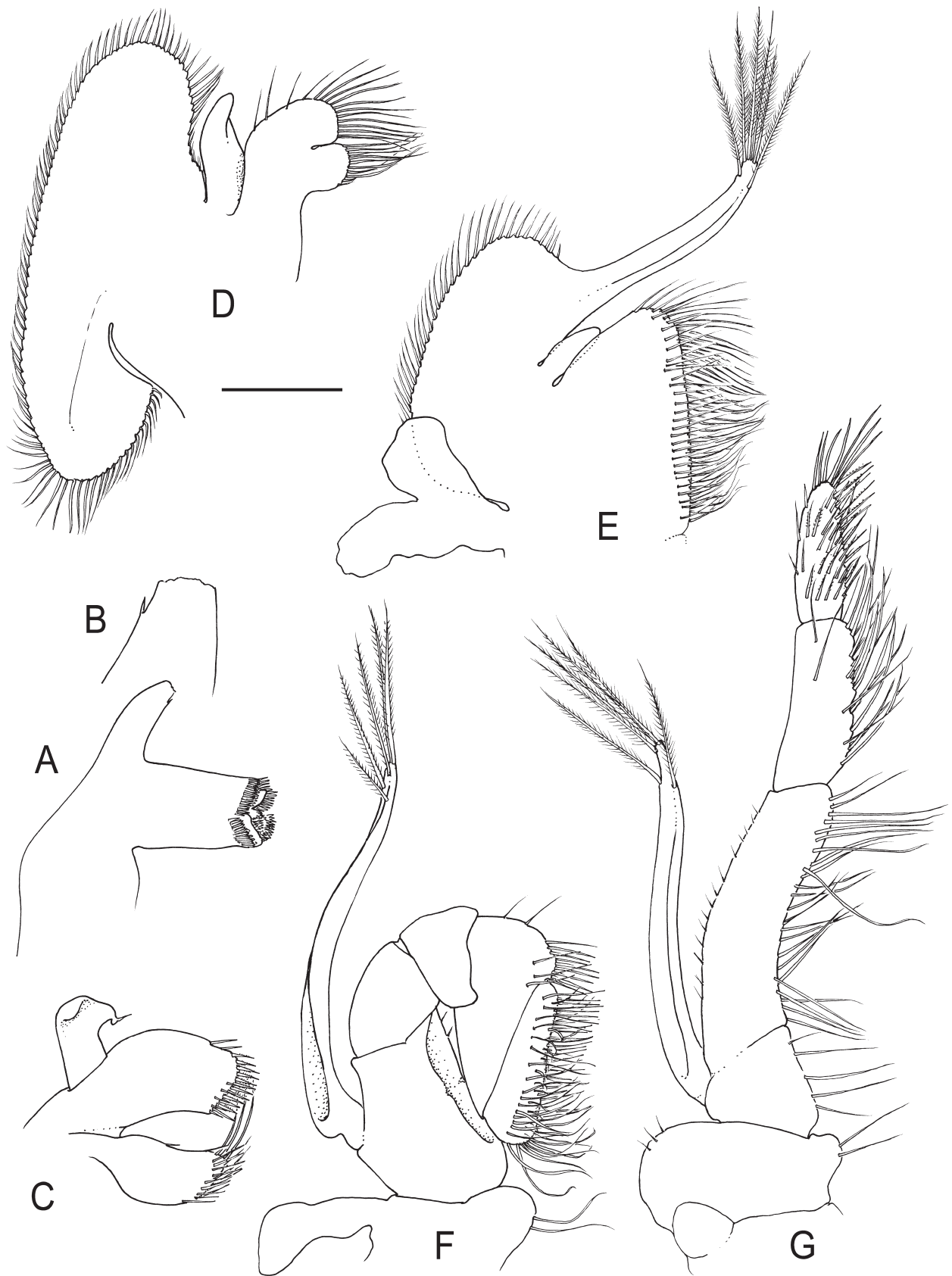


FIGURE 2. *Platypontonia ngae* **sp. nov.**, male allotype, RMNH.CRUS.D.58062: A, right mandible, ventral view; B, idem, detail incisor process, dorsal view; C, right maxillula, ventral view; D, right maxilla, ventral view; E, right first maxilliped, ventral view; F, right second maxilliped, ventral view; G, right third maxilliped, ventral view. Scale A, C–G = 0.5 mm; B = 0.125 mm.

Description. Body depressed; carapace smooth and feebly hirsute (Fig. 1A–D); abdomen glabrous (Fig. 1E). Rostrum very short, extending anteriorly only slightly beyond margin of ophthalmic somite; triangular in shape in ovigerous female holotype (Fig. 1A), more slender in male allotype (Fig. 1C), strongly dorsoventrally flattened, without dorsal or ventral teeth, distally rounded in lateral view. Feeble post-orbital ridges present, with large shallow orbital depression (Fig. 1B, D). Inferior orbital angle feebly produced and blunt. Antennal tooth marginal, short and slender. Hepatic tooth and supra-orbital teeth absent. Anterolateral angle of carapace slightly produced, broadly rounded.

Pleura of first to fifth abdominal somites (Fig. 1E) distally rounded, pleura of sixth somite angular posterolaterally; posteromedial margin slightly produced, rounded.

Telson (Fig. 1E, F) slightly longer than sixth abdominal somite, tapering to small rounded posterior margin; lateral margins feebly convex; dorsal spines short and small, slightly shorter than lateral pair of distal spines. Anterior pair of dorsal spines at 0.5 of telson length, posterior pair at about 0.8 of telson length, pairs situated close to lateral margin. Distal margin with two pairs of spines and one (mesial) pair of stout, plumose setae, intermediate pair longest, about three times as long as lateral spines; posteromedial margin without median tooth.

Eyes (Fig. 1A–D) with cornea hemispherical; ocellus indistinct in male, not visible in female; eyestalk distinctly broader than cornea, about as broad as long.

Basal segment of antennular peduncle (Fig. 1A–D) broad, tapering gradually over distal half, with well-developed distolateral lobe with small acute lateral tooth; stylocerite distally blunt, reaching to about level of middle of basal segment, directed slightly laterally; ventral medial spine absent in both male and female; intermediate segment short and broad, with well-developed anteroventral lobe; distal segment about twice length of intermediate segment, 1.5 times longer than wide; upper antennular flagellar rami fused proximally for first three segments; shorter free ramus of three segments; several groups of aesthetascs on fused part and shorter ramus; longer ramus slightly longer than shorter ramus, with about 10 segments; lower antennular flagella short, slightly longer than longer ramus of upper antennular flagella.

Scaphocerite (Fig. 1A–D) distinctly exceeding antennular peduncle, approximately twice as long as broad, with lateral margin slightly convex; distolateral tooth falling short of distal margin of blade, distal margin anteromesially produced, rounded; protopodite of antenna short and broad, dorsoventrally compressed, with a well-marked tubercle on the distomedial angle; basicerite unarmed; carpocerite subcylindrical, reaching distal margin of antennular peduncle; flagella rather short.

Labrum broad, with rounded, non-setose anterior margin. Paragnaths large rounded lobes separated by deep median fissure.

Mandible of male (Fig. 2A, B) (female not dissected) without palp; incisor process distally broad and very thin, truncate, without terminal teeth, medial margin with small acute tooth subdistally; molar process distally with several blunt teeth and short bristles.

Maxillula (Fig. 2C) with bifid palp, median lobe with small hook-shaped appendage; upper and lower laciniae normally developed, provided with dense brushes of setae medially.

Maxilla (Fig. 2D) with coxal endite not developed; basal endite with two broad distal lobes medially fringed with long setae; palp about as long as basal endite, stout, sub-cylindrical, tapering slightly distally, devoid of setae; scaphognathite normally developed, broad.

Exopods present on all three maxillipeds. First maxilliped (Fig. 2E) with well-developed caridean lobe and exopod, exopod with plumose setae distally; palp short, slender, without setae, not reaching anterior margin of caridean lobe; coxal endite not developed; basal endite well-developed anteriorly to exceed tip of palp, medial border provided with dense brush of long slender setae; bilobed epipod present.

Second maxilliped (Fig. 2F) normally developed; coxal segment medially produced with few long simple setae; epipod rectangular, without podobranch; basal and ischial segments fused, medially excavate to receive propodus and dactylus; exopod long and slender with plumose setae distally; meral and carpal segments without special features; propodal segment medially somewhat produced with row of setae along medial margin; dactylar segment oblong triangular with rows of simple and serrulate setae medially.

Third maxilliped (Fig. 2G) with coxal segment slightly produced medially, with few long slender setae; rounded plate with few simple short setae laterally; arthrobranch reduced; basal segment triangular with few long simple setae medially; exopod reaching beyond anterior border of antepenultimate segment, with long plumose setae distally; antepenultimate segment curved, flattened, about 3 times longer than broad, with long simple setae

medially and short simple setae laterally; penultimate segment $\frac{2}{3}$ length of antepenultimate segment, with rows of long serrulate setae medially; ultimate segment slightly shorter than penultimate segment, with rows of serrulate setae mediodorsally.

First pereiopod (Fig. 3A) short, robust; chela about 4 times longer than deep, subcylindrical, with dense woolly cover of simple setae on palm and fingers; fingers slightly shorter than palm, slender, with tips acute, cutting edges entire; cleaning organ present on carpal-propodal joint; carpus 1.25 times longer than chela, about 4 times as long as distal width, slightly tapering proximally, unarmed; merus slightly longer than carpus, slightly bowed, unarmed; ischium short, about fourth of merus length, unarmed.

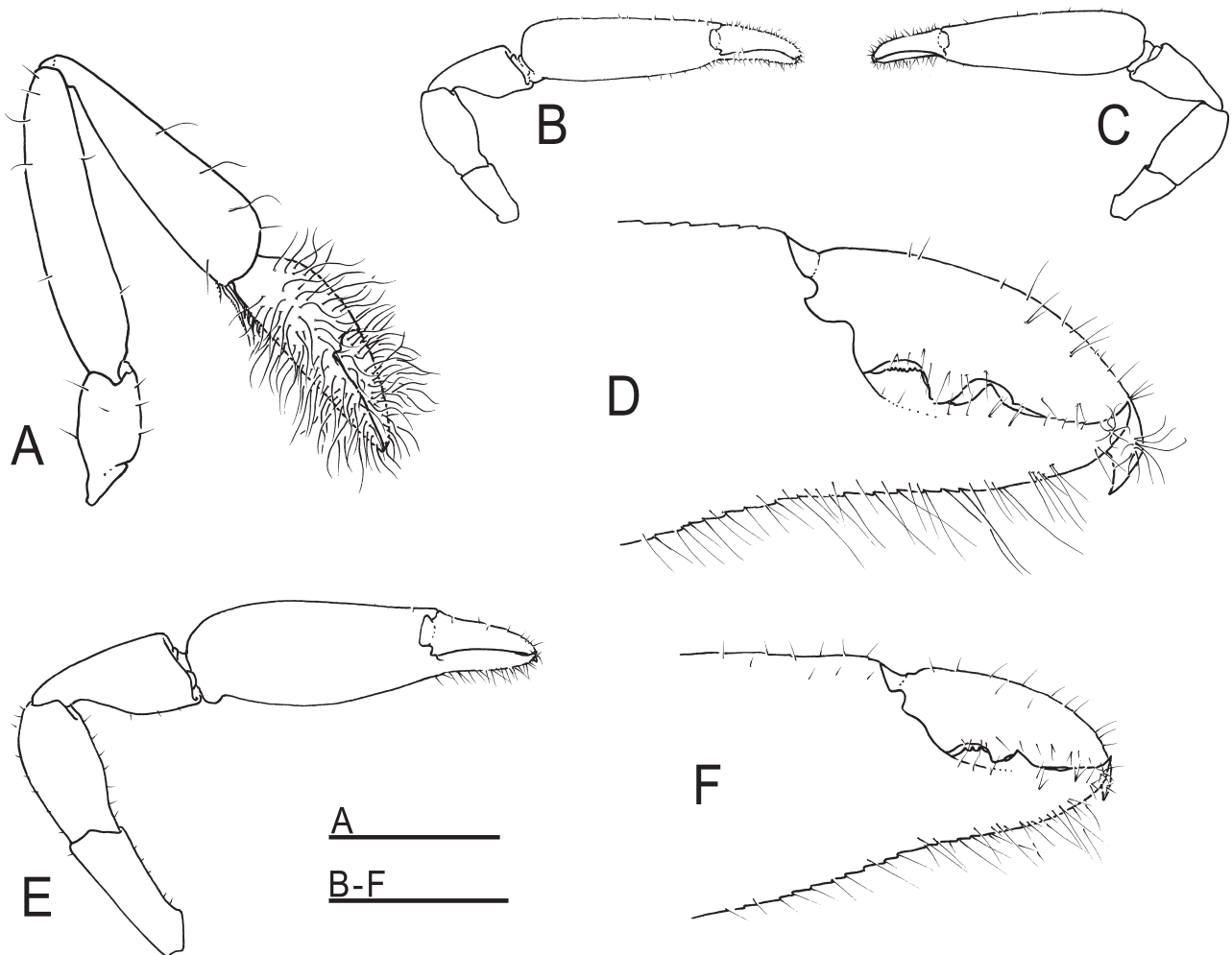


FIGURE 3. *Platypontonia ngae* sp. nov.: A, D, E, male allotype, RMNH.CRUS.D.58062; B–C, F, ovigerous female holotype, RMNH.CRUS.D.58061: A, right first pereiopod, ventral view; B, E, left second pereiopod, dorsal view; C, right second chela, dorsal view; D, F, left second chela, mesial view. Scale A = 1.25 mm; B, C, E = 2 mm; D, F = 0.5 mm.

Left and right second pereiopods (Fig. 3B, C, E) subequal in size and form; palm about as long as postorbital carapace length, slightly compressed, about 2 to 2.5 times as long as fingers, dorsal and ventral margins distally serrated (Fig. 3D, F), ventral margin with row of long simple setae extending on ventral margin of fixed finger; fingers strongly hooked distally; dactylus with large triangular tooth in proximal third and small acute tooth halfway cutting edge; fixed finger with proximal broad serrated tooth and large triangular tooth just before middle of cutting edge; carpus short, about half length of palm, cup shaped, strongly tapering proximally, unarmed; merus broad, slightly longer than carpus, unarmed; ischium $\frac{2}{3}$ length of merus, tapering proximally.

Ambulatory pereiopods similar. Third pereiopod (Fig. 4A) with dactylus (Fig. 4B) short, slightly longer than proximal width, simple, slightly compressed, corpus triangular with flexor margin sinuous; unguis short, strongly curved, with row of scales on dorsal surface; propodus about 6 times length of dactylus, about 5 times longer than wide, with two strong distoventral spines; carpus 0.6 times as long as propodus, 3 times as long as distal width,

slightly tapering proximally, unarmed; merus almost as long as propodus, three times as long as maximal width, unarmed; ischium about as long as carpus, slightly tapering proximally, unarmed. Fourth (Fig. 4C, D) and fifth (Fig. 5A, B) pereopods similar to third.

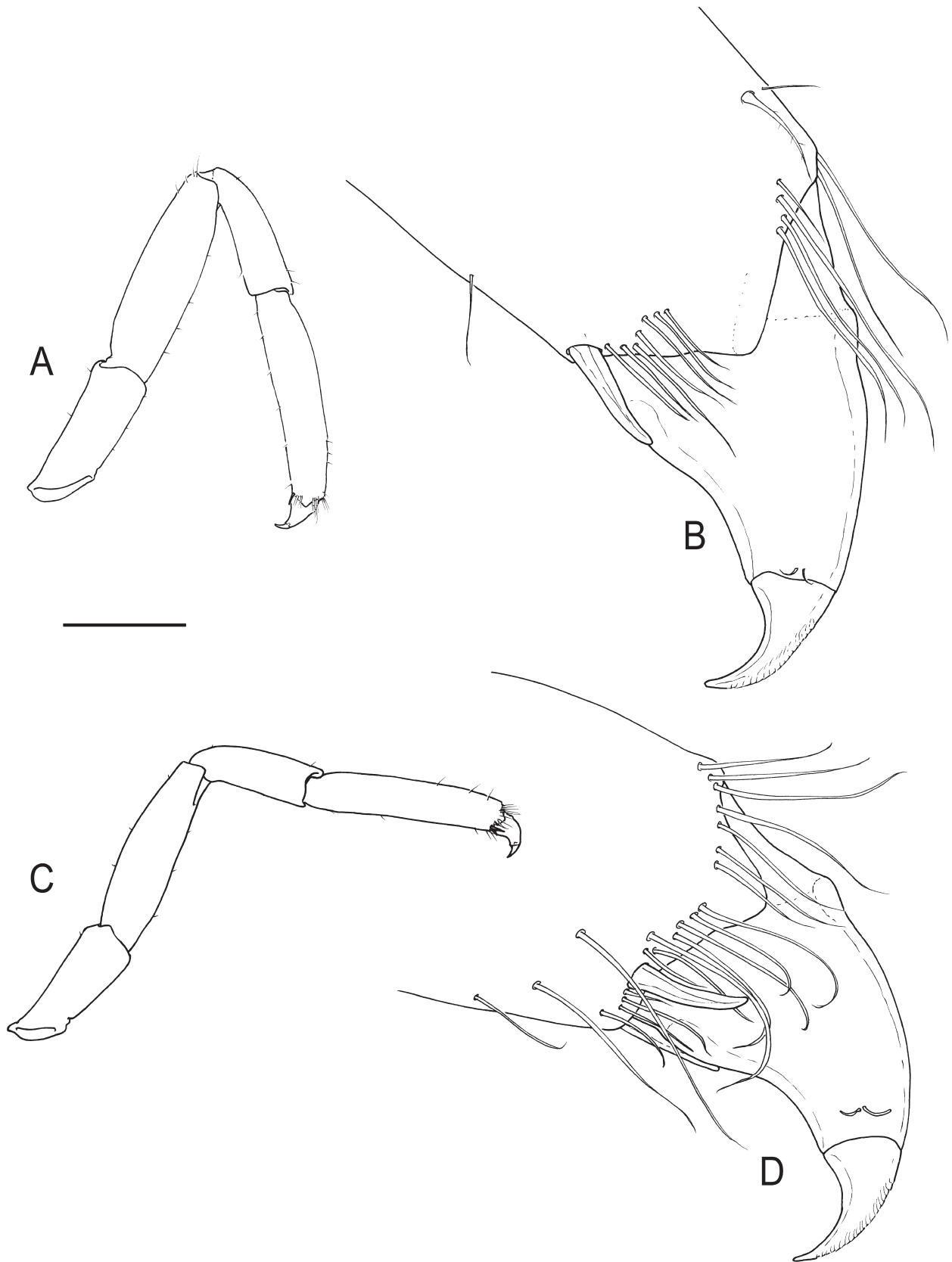


FIGURE 4. *Platypontonia ngae* sp. nov., male allotype, RMNH.CRUS.D.58062: A, right third pereopod; B, idem, dactylus; C, right fourth pereopod; D, idem, dactylus. Scale A, C = 1.25 mm; C, D = 0.125 mm.

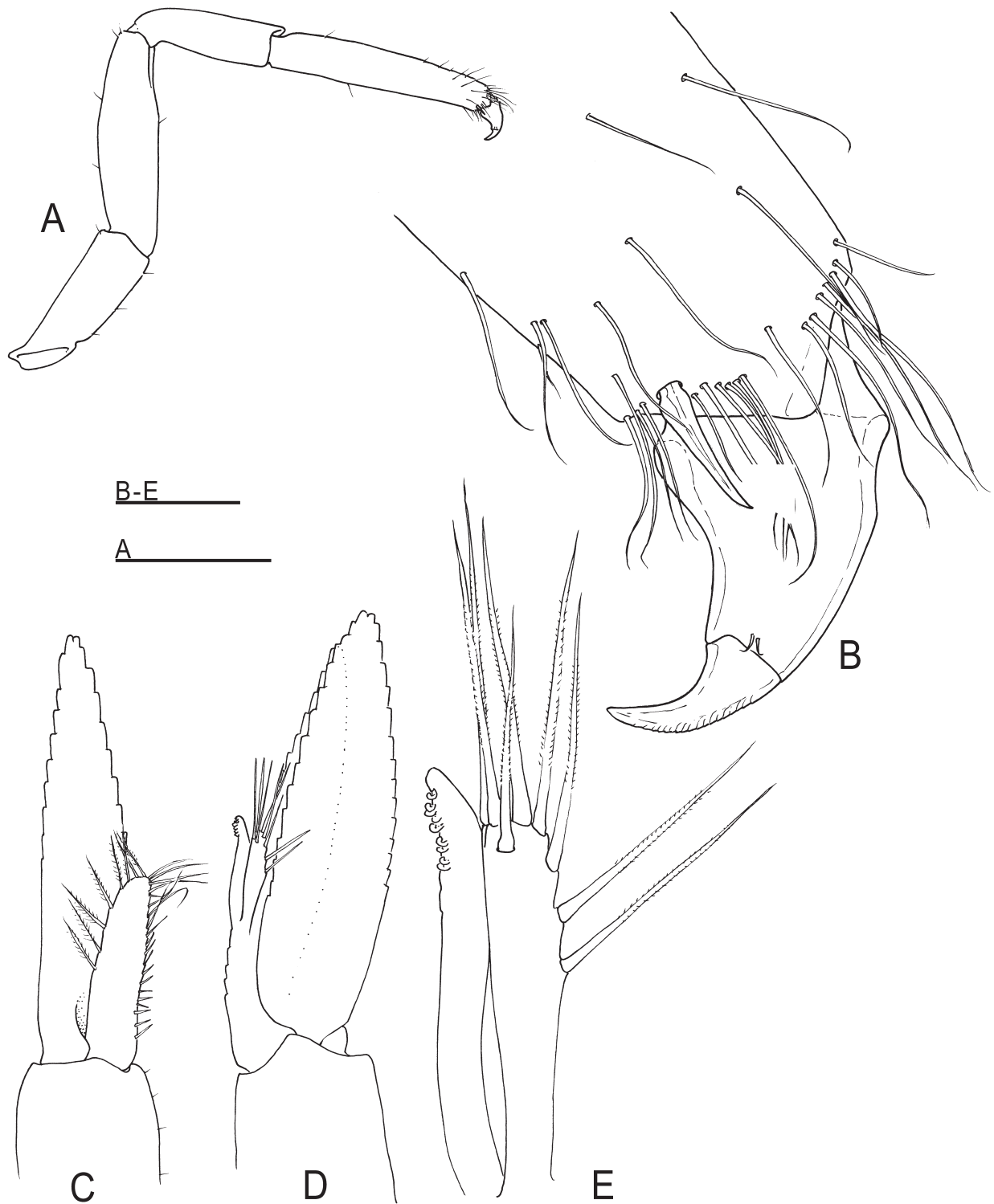


FIGURE 5. *Platypontonia ngae* sp. nov., male allotype, RMNH.CRUS.D.58062: A, right fifth pereiopod; B, idem, dactylus; C, right first pleopod, dorsal view; D, right second pleopod, ventral view; E, idem, appendix masculina and appendix interna. Scale A = 1.25 mm; B, E = 0.125 mm; C, D = 0.5 mm.

Pleopods normally developed. Endopod of first male pleopod (Fig. 5C) about half length of exopod, narrow, not expanded distally, distolateral margin with long plumose setae, medial margin with row of short, stiff, simple setae. Second male pleopod (Fig. 5D) with endopod almost as long as exopod, with well-developed appendix masculina and appendix interna (Fig. 5E), appendix masculina just falling short of appendix interna, with about 8 long serrulate setae in distal half.

Uropods (Fig. 1F) distinctly longer than telson; exopod with convex lateral border, without distolateral tooth, with small distolateral mobile spine; endopod slightly longer than exopod.

Colour (Fig. 6). Entire body and appendages translucent with few reddish chromatophores in anterodorsal part of carapace in female. Eggs purple.

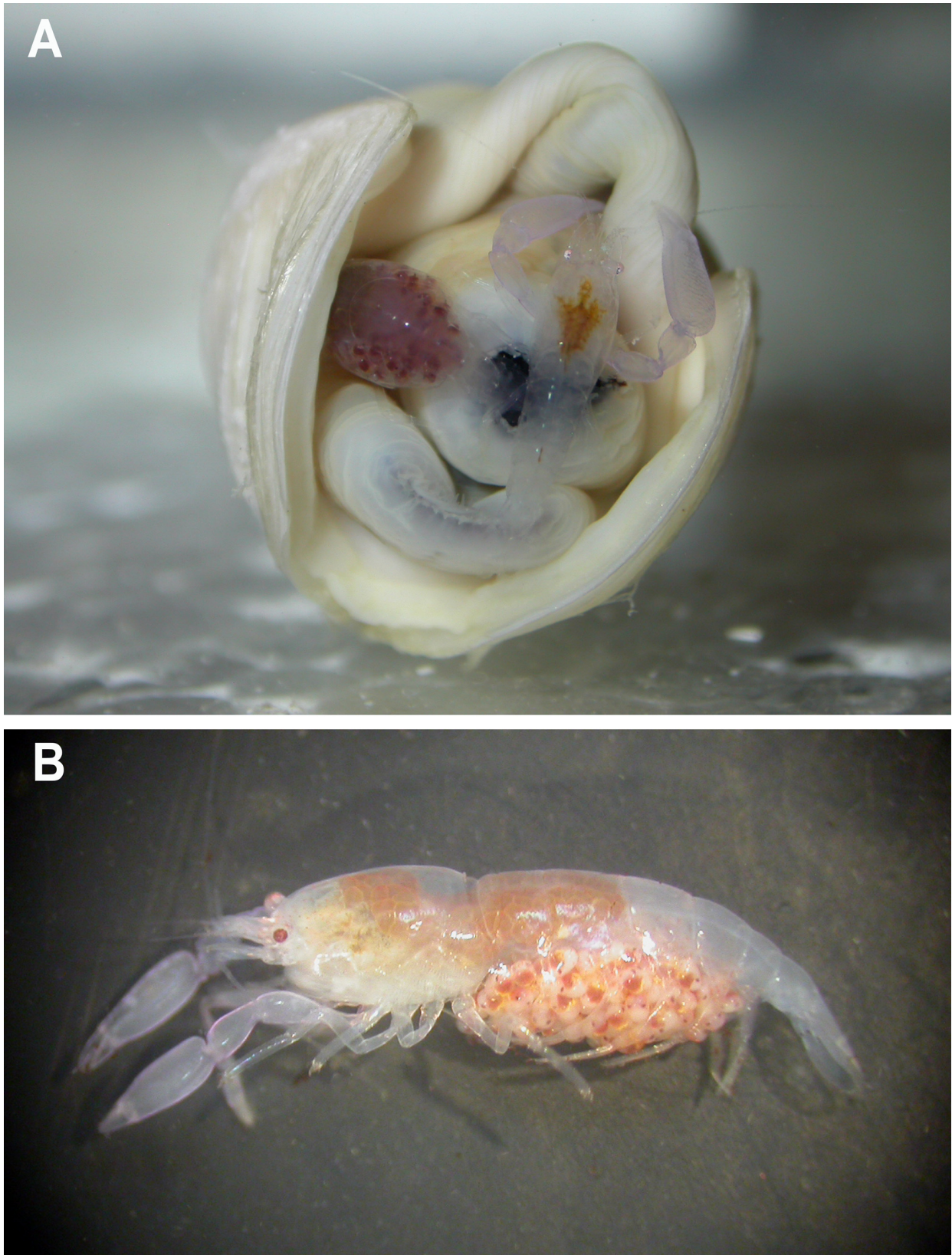


FIGURE 6. *Platypontonia ngae* sp. nov.: A, male-female pair in gastrochaenid bivalve; B, ovigerous female holotype, RMNH. CRUS.D.58061. Photographs by Stefano Schiapparelli.

Host. Endolithic gastrochaenid bivalve mollusk with a shell diameter of about 20 mm.

Etymology. The new species is named after and in memory of the author's colleague and friend, Ngan-Kee Ng, also for her significant contributions to systematics of decapod Crustacea.

Remarks. The new species falls within the diagnosis of the genus as provided by Bruce (1968, 1995), having: 1) a depressed body; 2) reduced rostrum; 3) carapace without hepatic spine; 4) mandible without palp; 5) third maxilliped with fully developed exopod; 6) and simple ambulatory dactyli. It can be distinguished from *Platypontonia brevirostris* and *P. hyotis* by its: 1) small antennal spine (fig. 1B, D) versus well developed antennal spine in the other two species (Bruce 1968: fig. 1A, B; Hipeau-Jacquotte 1971: fig. 1b, f); 2) small dorsal telson spines (fig. 1F) versus the large, basally swollen dorsal spines in the other species (Bruce 1968: fig. 3B–D; Hipeau-Jacquotte 1971: fig. 1d, h); 3) absence of a ventral medial tooth on the basal segment of the antennular peduncle versus the presence of a small tooth there in both congeners; 4) truncate thin mandibular incisor process (Fig. 2A, B) versus the more robust toothed incisor process in the other species (Bruce 1968: fig. 2G; Hipeau-Jacquotte 1971: fig. 3a); 5) woolly setation of the entire chela of the first pereopods (fig. 3A) versus the more stiff setation mostly covering the fingers in *P. hyotis* (Hipeau-Jacquotte 1971: fig. 2d) (first pereopods of *P. brevirostris* have not been described nor figured); 6) short, compact, glabrous ambulatory dactyli (figs. 4, 5A, B) versus the oblong hairy dactyli in the other two species (Bruce 1968: fig. 3G, H; Hipeau-Jacquotte 1971: fig. 2f); and 7) the translucent body (Fig. 6) versus the yellow-red colouration in the other species (Bruce 1968: 295; Suzuki 1971: 9, pl. 3; Fransen 1994: pl. 4B; de Gier *et al.* 2022: fig. 1i).

The incisor processes of the left and right mandibles of the male are very thin and the distal margin is without distinct teeth but looks frayed. The holotype female has not been dissected to observe the mouthparts.

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