

A new crangonid shrimp, *Pontocheras arafuræ* gen. et sp.n., from the Arafura Sea

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Accepted 14 April 1987

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Bruce, A. J. 1988. A new crangonid shrimp, *Pontocheras arafuræ* gen. et sp.n., from the Arafura Sea.—*Zool. Scr.* 17: 213–221.

A new genus of crangonid shrimp from the Arafura Sea is described and illustrated. *Pontocheras arafuræ* sp.n. occurs in shallow silty waters off northern Australia. The new genus is closely related to the genus *Pontocaris* Bate, 1888, but it is remarkable in the modifications of the dactyls of the fifth pereopods, a mechanism attaching the branchiostogite to the thoracic sternites and the presence of a probable stridulating mechanism on the carpus of the third pereopod.

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Introduction

The caridean shrimp family Crangonidae has been little studied in Australian waters, particularly in the tropical areas, and few species have been recorded.

Recent collections made from the catches of local prawn trawlers have provided several specimens of a small crangonid that could not be satisfactorily placed in any of the known genera and a new genus is now described for its reception.

The drawings have been prepared with a camera lucida. The following abbreviations have been employed: *NTM* Northern Territory Museum; *CL* carapace length, from tip of rostrum to posterior margin of carapace in dorsal midline; *TL* total body length, from tip of rostrum to tip of telson.

Systematics

Family Crangonidae

Pontocheras gen.n.

Generic description

Small, robustly built, strongly calcified crangonid shrimps, with small acute rostrum with 1 pair of small lateral teeth; carapace with short postorbital suture, 1st lateral carina with 9 teeth or tubercles; thoracic sternites broad, unarmed; abdominal sternites with strong median teeth; telson without spines; eye with well developed cornea; antennule with blunt stylocerite; antennal scale well developed; 2nd maxilliped with epipod and podobranch, 3rd maxilliped with well developed arthrobranch; 1st pereopod with feebly developed exopod; 2nd pereopods chelate; 3rd pereopods slender; 5th pereopods with dactyl with distoventral expansion, not slender, tapering; 5 pleurobranches, C-shaped, with ventral apices directed anteriorly.

Type species. *Pontocheras arafuræ* sp.n.

Etymology. Derived from the crangonid generic names *Pontophilus* Leach, 1817 and *Philocheras* Stebbing, 1900.

Systematic position

Pontocheras is most closely related to *Pontocaris* Bate, 1888, as recently redefined by Chace (1984). It may be distinguished from *Pontocaris* by its lack of an apically cleft rostrum but in the rest of its general morphology shows the closest resemblance to *Pontocaris*. Closer comparison shows a number of specialized features that appear sufficient to warrant its separation at generic level. The thoracic sternites in *Pontocheras* are relatively broad and without any armament in the midline. *Pontocaris* species show a strong median tooth on the twelfth thoracic sternite [*P. lacazei* (Gourret) (Fig. 7E) and *P. cataphracta* (Olivi)] or a spine with median carinae on the thirteenth and fourteenth somites, as in *P. sibogae* (De Man). Some species of the related genus *Parapontocaris* Alcock also show a very well developed median tooth between the bases of the third pereopods, e.g. *P. levigata* Chace. Also, in *Pontocheras* ventrolateral extensions of the posterior thoracic sternites attach to the broadened ventral border of the branchiostegite, a mechanism that is quite lacking in the species of *Pontocaris* examined. The fifth pereopods are also unique. In most crangonid genera the dactyls of these appendages are slender, tapering and subcylindrical or feebly subspatulate. In *Pontocheras* the dactyl is robust and distally expanded, with rounded lamellar expansion of unknown function.

A possible stridulating mechanism (Figs. 6EF) on the medial aspect of the carpo-meral joint of the third pereopod is described in *Pontocheras*, but the presence or absence of this relatively inconspicuous feature may have been overlooked in earlier species descriptions.

Pontocheras arafuræ sp.n. (Figs. 1–7)

Type material. (i) Ovig. ♀, holotype, Arafura Sea, 11°04.5'S, 132°04.5'E, 15–22 m, Stn. CP/92, F. V. *Aqua-Sam*, 10–11 August 1986,

Bruce, A.J., 1988

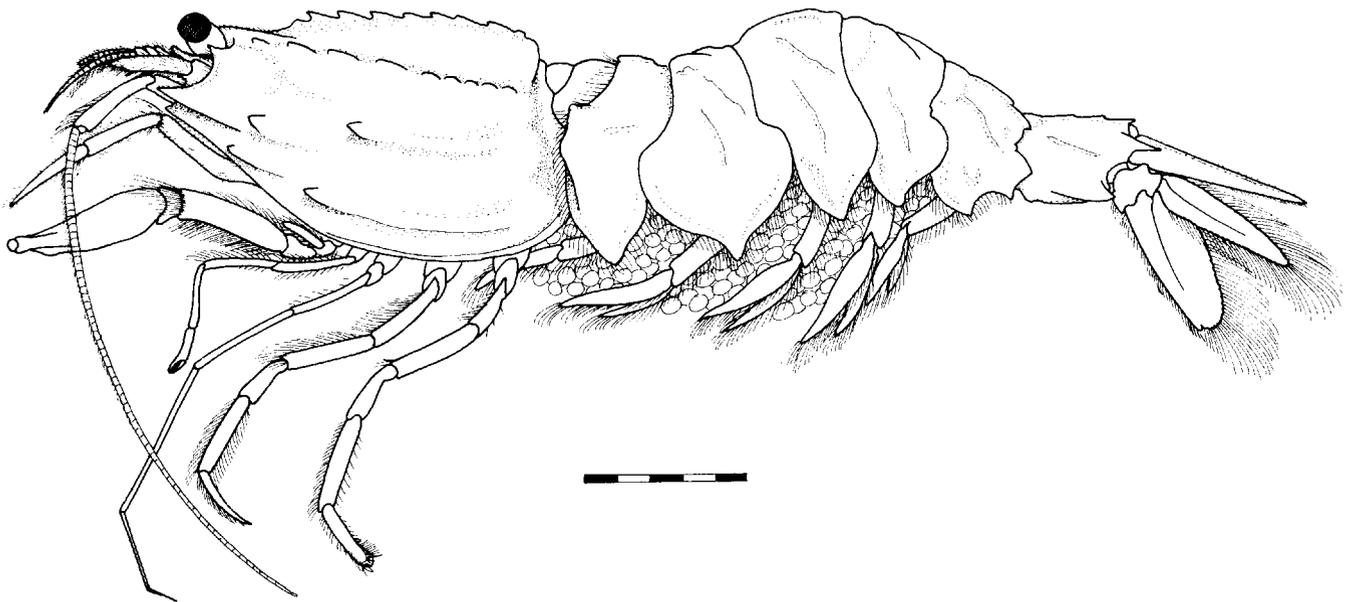


Fig. 1. *Pontocheras arafuræ* sp.n., holotype female, lateral aspect. Scale bar in mm.

coll. C. Johnson, NTM Cr. 004127. (ii) 2 ovig. ♀♀, 1 ♀, 1 soft ♀, paratypes; NTM Cr. 001865; 1 ovig. ♀, paratype, Stn. HL 82-28, NTM Cr. 001863; 1 ovig. ♀, paratype, Stn. HL 82-39, paratype, NTM Cr. 001864; Arafura Sea, 10°58'S, 132°10'E, 27 m, soft mud, 18–20 October 1982, coll. A. J. Bruce. One paratype from the Stn. HL 82-22 is deposited in the collection of the Rijksmuseum van Natuurlijke Historie, Leiden, Catalogue number RMNH 36756.

Description

A medium sized, robustly built, strongly calcified cranonid shrimp (Figs. 1–2).

Rostrum (Fig. 3a–b) narrowly triangular, lateral margins sinuous and setose, ventral carina well developed, convex, setose, very acute in lateral view, reaching to about half length of proximal segment of antennular peduncle, lateral border with small blunt tooth posteriorly.

Carapace with median dorsal ridge bearing anterior and posterior blunt tubercles with 7 intervening teeth, anterior 4 acute, posterior more tuberculate; dorsolateral carina commencing with small postorbital tooth anteriorly and extending to posterior margin of carapace with 8 further teeth, anterior 3 feebly acute, posterior 4 tuberculate; lateral carina with 2 larger acute teeth, interrupted posteriorly to anterior tooth and feebly developed; branchiostegal carina similarly interrupted, with anterior tooth small and blunt, posterior tooth larger, more acute, carina feebly developed posteriorly; marginal carina present, unarmed; orbit (Fig. 7A) with well developed acute lateral tooth, not exceeding level of rostrum, posterior margin with small central lobe, with short orbital fissure laterally; antennal tooth large and acute, projecting well beyond level of rostral apex, to about level of anterior margin of 1st antennular peduncular segment; pterygostomial angle produced, acute, not exceeding antennal tooth, posterior marginal carina strongly reinforced.

Abdomen with feebly developed sculpturing, generally sparsely setose; small submedian carinae with small teeth anteriorly on 1st segment, feeble unarmed median carinae on 3rd and 4th segments; submedian carinae on 5th segment, with feeble submarginal teeth posteriorly and

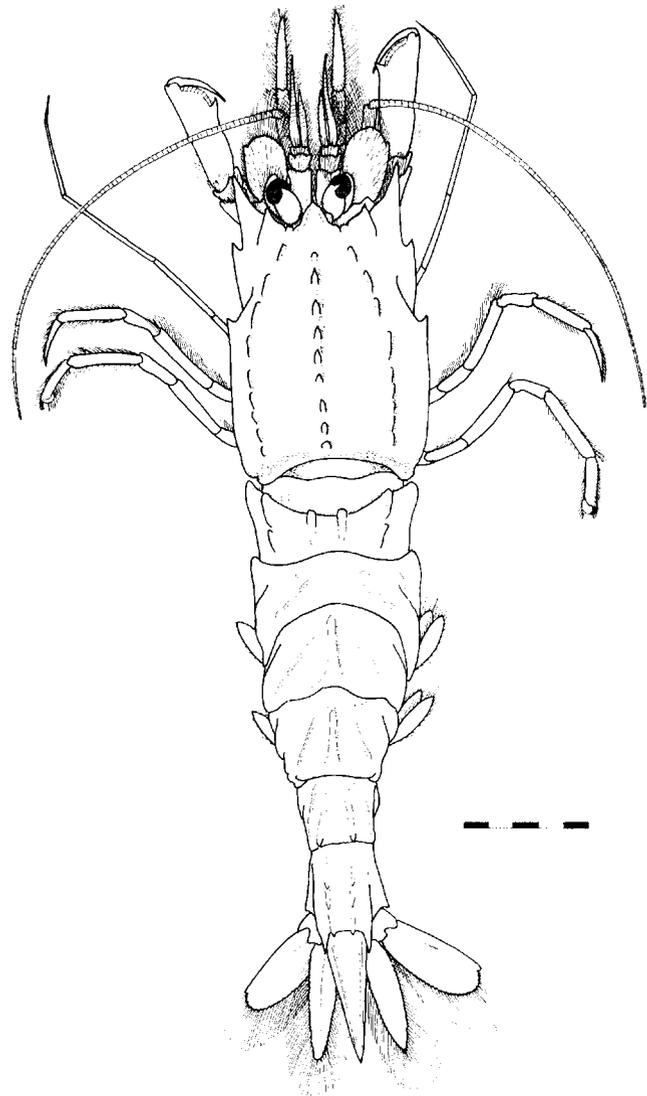


Fig. 2. *Pontocheras arafuræ* sp.n., holotype female, dorsal view. Scale bar in mm.

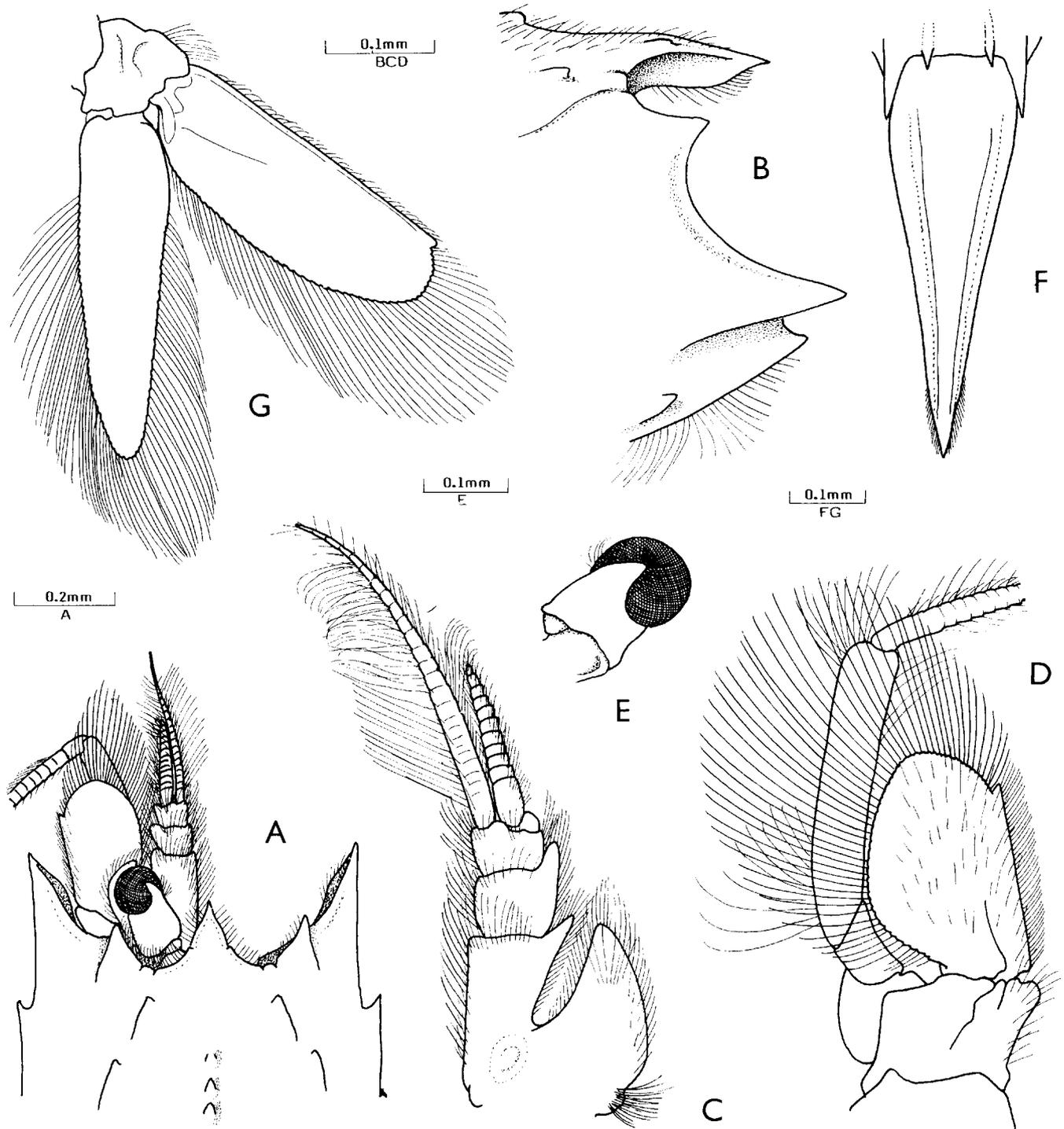


Fig. 3. *Pontocheras arafurae* sp.n., holotype female.—A. Anterior carapace, left eye and antennae, dorsal.—B. Anterior carapace and rostrum, lateral.—C. Antennule.—D. Antenna.—E. Right eye, dorsal.—F. Telson.—G. Uropod.

6th segment with submedian carinae, each with 3 feebly developed teeth on posterior half; 1st segment with feebly developed lateral carina anteriorly, 2nd to 5th segments with feeble oblique posterolateral and lateral carinae extending onto pleura, 6th segment with oblique lateral carina only; pleura of first 4 segments robust, feebly sculptured, bluntly produced ventrally, 5th segment with 2 acute teeth ventrally and blunt tooth posteriorly; 6th segment about 1.5 times length of 5th, about 1.25 times longer than deep, with well developed acute posterolateral tooth and stouter less acute posteroventral tooth. Telson (Fig. 3F) about 1.7 times length of 6th segment,

about 3.6 times longer than anterior width, lateral margins almost straight, convergent, densely setose ventrally; dorsal carinae convergent, unarmed, tip acutely pointed, without spines.

Eyes well developed (Fig. 3E) with small globular, well pigmented, non-tuberculate cornea, diameter subequal to proximal width or length of peduncle.

Antennule (Fig. 3C) short and densely setose; proximal segment of peduncle exceeding rostrum, about as wide as long, extending to about level of tips of antennal teeth, stylocerite well developed, broad, leaf-shaped, tapering distally to blunt tip at level of distal margin of segment,

distolateral angle of segment produced; intermediate and distal segments short and broad, intermediate strongly produced distolaterally; minor flagellum stout, segmentations indistinct proximally, about 12 segments, about 0.6 of peduncle length, outer flagellum about 2.2 times length of inner, densely setose except at tip, segmentations obscure proximally, about 18 segments.

Antenna (Fig. 3D) with robust basicerite, armed with small lateral tooth, carapocerite well developed, about 5.8 times longer than broad and extending well beyond anterior margin of scaphocerite, flagellum stout, about 1.5 times carapace length, anterior margin densely setose; scaphocerite broad, about 1.6 times longer than wide, lateral margin straight with small distolateral tooth, far outreached by broadly rounded anterior margin of lamella, densely setose.

Mouthparts of usual crangonid type. Mandible (Fig. 4A) with feebly developed corpus, without palp; incisor process absent; molar process (left) slender (Fig. 6A), curved, with 2 strong acute teeth distally, separated by a convex, sharp cutting edge, and 1 small accessory tooth. Maxillula (Fig. 4B) with slender, feebly bilobed palp, lower lobe with 6 stout simple setae; upper lacinia well developed with 8 strong spines distally and numerous setae; lower lacinia reduced, small and rounded, with few slender setae. Maxilla (Fig. 4C) with slender tapering palp with slender setae distally, basal endite simple, small and rounded, with numerous short plumose setae; coxal endite larger, simple, devoid of setae. First maxilliped (Fig. 4D) with elongated, unsegmented palp; basal and coxal endites obsolete, whole of medial margin densely fringed with long finely plumose setae; exopod with robust peduncle, reaching to distal end of palp, caridean lobe narrow, extending whole length of peduncle and densely setose, flagellum short, geniculate, segmentations obscure proximally, with short plumose setae distally; epipod well developed, with anterior lobe much larger than posterior. Second maxilliped (Fig. 4E) with small dactylar segment, medial margin bearing 4 strong spines proximally, separated from several very long slender setae by dense group of about 6 short denticulate spines, penultimate segment elongate, tapering distally, densely provided with many long plumose setae distomedially; basis robust, densely setose medially, exopod as in 1st maxilliped but lacking caridean lobe; coxa medially setose, with well developed bluntly triangular epipod and well developed podobranch. Third maxilliped (Fig. 4F) with well developed endopod, extending well beyond end of antennular flagellum; ischiomerus completely fused to basis, combined segment about 6.4 times longer than width at mid-length, distal half flattened, densely setose medially and laterally, proximal half subcylindrical, sparsely setose; penultimate segment about 4.0 times longer than distal width, subuniform, about 0.4 of length of antepenultimate segment, densely setose; terminal segment about 1.8 times penultimate segment length, slightly tapering and about 7.5 times longer than proximal width, densely setose with scattered slender spines medially, exopod as in 2nd maxilliped; coxa robust, sparsely setose medially, with small robust posteriorly angular lateral plate, with well developed arthrobranch.

First pereopods (Fig. 5A) similar, subchelate, with 3/4 of chela extending beyond scaphocerite, chela (Fig. 5B) with dactyl slender, simple, palm about 3.9 times longer than proximal width, subchelar tooth short and stout, setose; cutting edge convex, entire with short stout setae, medial margin of palm with short setae, lateral margin with short spinules proximally; carpus short and stout, unarmed, except for short spines distolaterally, about 0.2 of chela length; merus unarmed, about 0.6 of chela length, 3.4 times longer than central width, densely setose laterally, proximomedially and with long setae across distodorsal border; ischium obliquely articulated with merus, about 0.43 of merus length densely setose medially; basis short, with short, rigid, setose non-flagellate exopod laterally: coxa robust, normal. Second pereopods (Fig. 5C) feebly developed, reaching about middle of palm of first pereopod; chela (Fig. 5D) with palm slightly tapered proximally, subcylindrical, slightly compressed, about 3.25 times longer than central depth, smooth, with several long setae distodorsally, fingers (Fig. 6B) slender about 0.66 of palm length, dactylus about 5.0 times longer than proximal depth, with 2 short, stout curved spines distally and spiniform setae adjacent (Fig. 6C), cutting edge sharp, entire, over distal half of opposing margin only, fixed finger similar but with single stout distal spine only; carpus slender, unarmed, about 1.1 times chela length, non-setose; merus subequal to chela length, about 6.0 longer than wide, uniform, unarmed, densely setose laterally; ischium about 1.4 times chela length, about 7.2 times longer than proximal width, densely setose medially and laterally; basis and coxa normal, without exopod. Third pereopods (Fig. 5E) very slender, distinctly exceeding ends of maxillipeds; dactylar segment (Fig. 5F) about 11.0 times longer than proximal width, tapering distally, unarmed but with dense group of setae distally partly covered by thin lamellar hood (Fig. 6D); propod unarmed, about 2.4 times length of dactyl, tapering slightly distally, carpus about 1.7 times propod length, uniform; merus about 1.25 times propod length, more robust, about 15.0 times longer than central width; ischium subequal to merus length, slightly more robust, sparsely setose dorsally; ischium, basis and coxa short, without special features. Fourth pereopod robust, extending to about middle of palm of first pereopod; dactyl (Fig. 6G) slender, tapering, subcylindrical, feebly compressed, densely setose along dorsal margin, with small curved unguis distally (Fig. 6G) covered by longer thin lamellar hood; propod about 1.2 times dactyl length, about 5.5 times longer than wide, uniform, unarmed, densely setose dorsally and ventrally; carpus about 0.65 of propod length, 3.0 times longer than distal width, unarmed, non-setose; merus about 1.1 times propod length, about 4.9 times longer than distal width, slightly broadened distally, unarmed, densely setose dorsally and distally; ischium about 1.1 times propod length, about 5.0 times longer than distal width, basis and coxa normal. Fifth pereopod (Fig. 5I) robust, subequal to 4th; dactyl (Fig. 5J) robust, expanding distally, about 4.5 times longer than distal width; unguis slender and curved, about 1.18 of dactyl length, with several slender setae medially and laterally, surrounded by thin lamellar hood (Fig. 6H), distoventral angle broadly expanded as thin lamellar plate

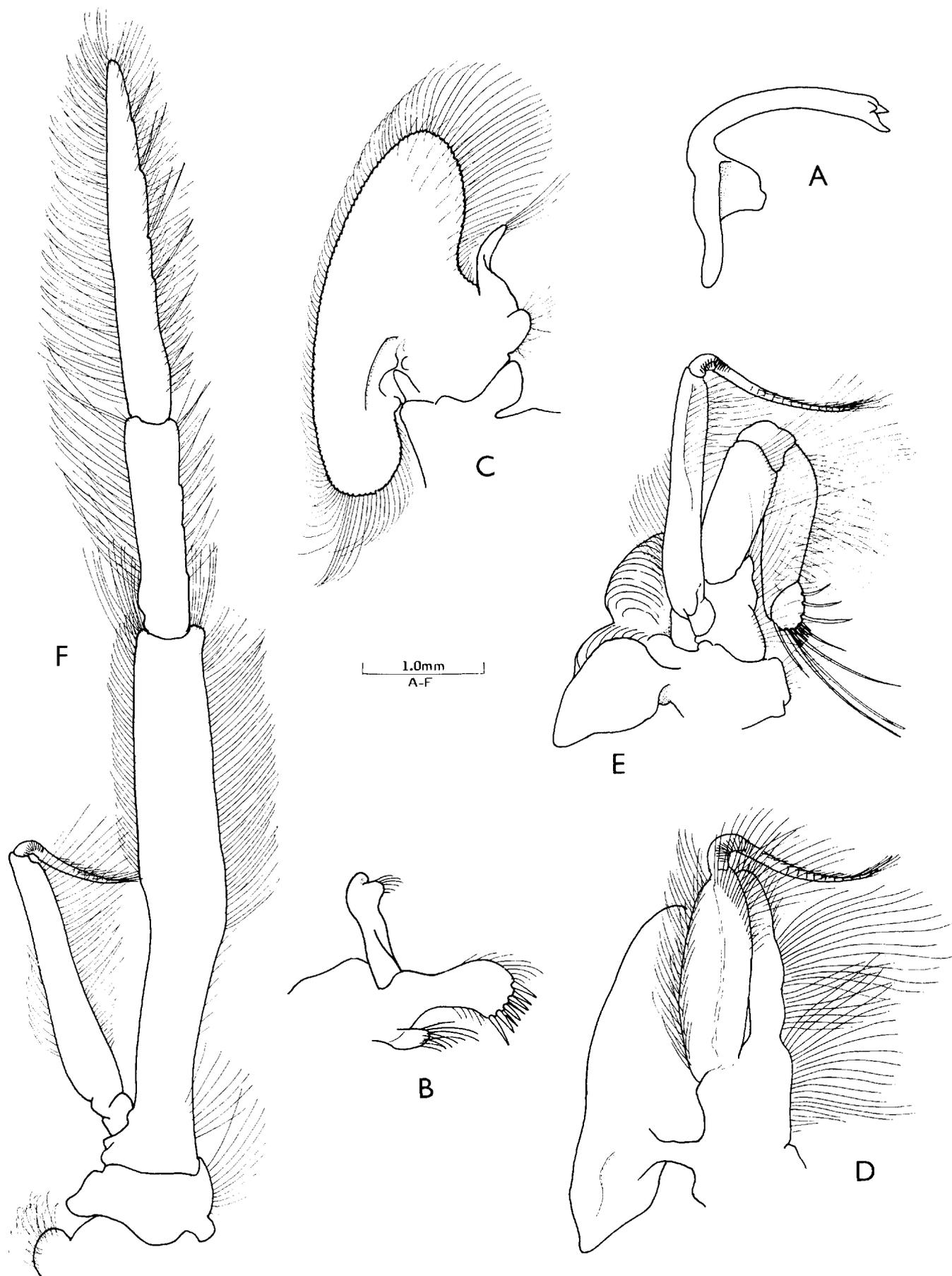


Fig. 4. *Pontocheras arafurae* sp.n., holotype female.—A. Right mandible.—B. Maxillula.—C. Maxilla.—D. First maxilliped.—E. Second maxilliped.—F. Third maxilliped.

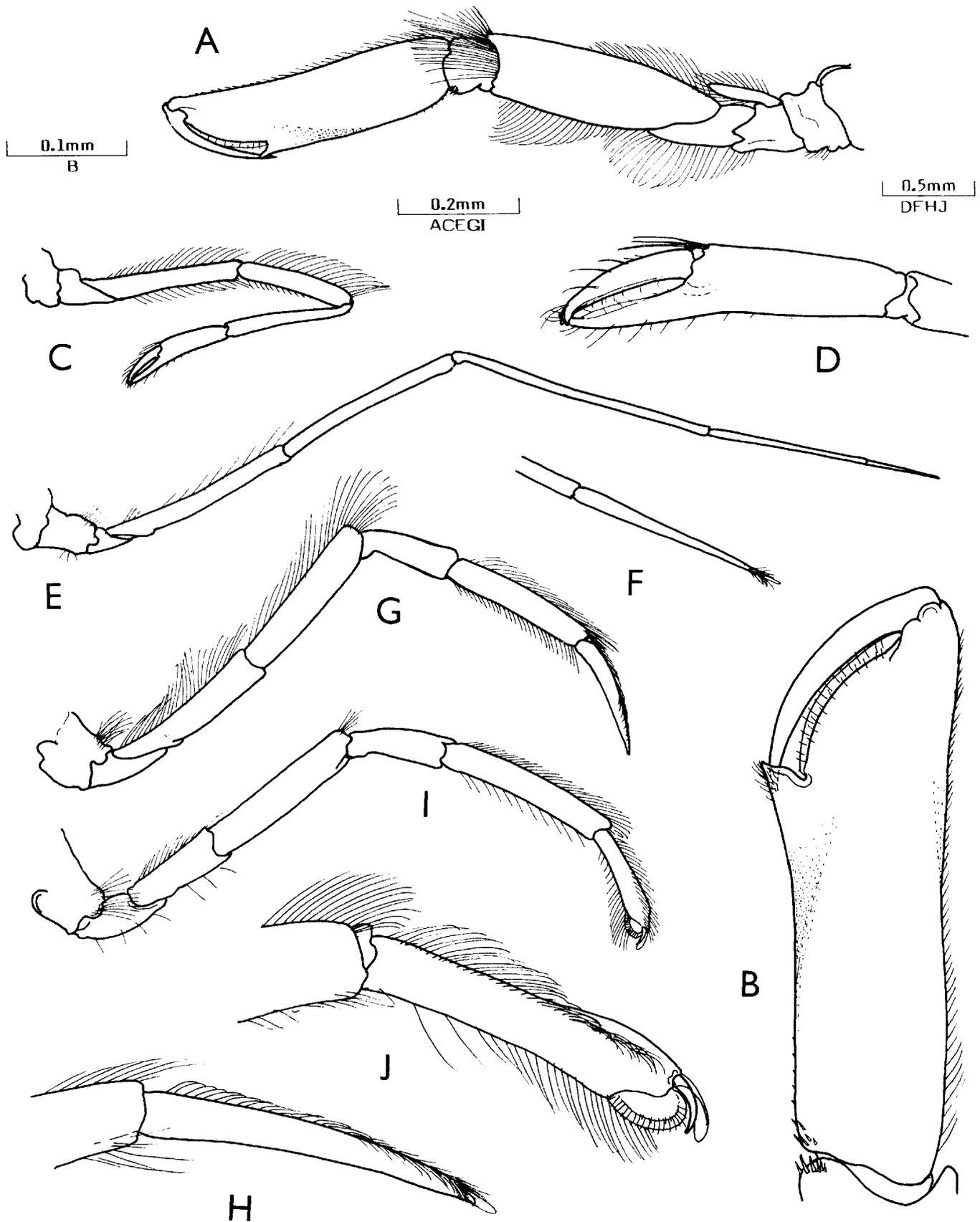


Fig. 5. *Pontocheras arafuræ* sp. n., holotype female.—A. First pereiopod.—B. Same, chela.—C. Second pereiopod.—D. Same, chela.—E. Third pereiopod.—F. Same, dactyl.—G. Fourth pereiopod.—H. Same, dactyl.—I. Fifth pereiopod.—J. Same, dactyl.

(Fig. 6H) with strongly convex outer margin with numerous short, stout rigid setae, dorsal border densely setose, ventral margin with numerous long plumose setae, especially distally; propod about 1.5 times dactyl length, about 6.5 times longer than proximal width, unarmed, densely setose along dorsal margin and more feebly along

ventral border; carpus about 0.8 of dactyl length, about 3.0 times longer than distal width, unarmed, non-setose; merus subequal to propod length, 5.0 times longer than width, uniform, unarmed, with distodorsal setae only; ischium subequal to dactyl length, unarmed, dorsally setose; basis and coxa normal.

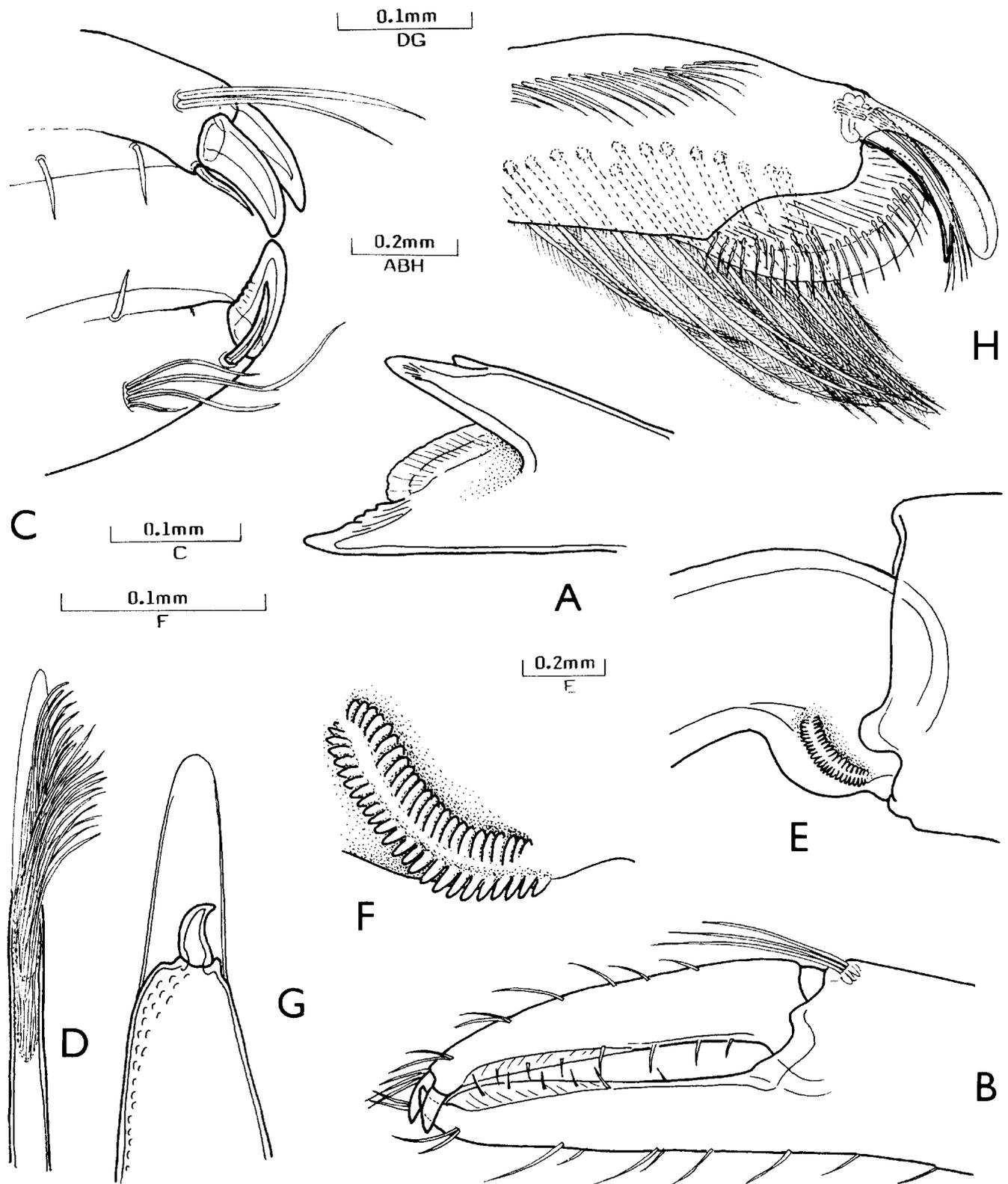


Fig. 6. *Pontocheras arafurae* sp.n., holotype female.—A. Mandible, right molar process.—B. Second pereiopod, fingers.—C. Same, tips of fingers.—D. Third pereiopod, tip of dactylus.—E. Same, carpo-meral joint, medial aspect.—F. Same,? stridulating ridge.—G. Fourth pereiopod, distal dactylus, setae omitted.—H. Fifth pereiopod, distal dactylus.

Branchial formula (Fig. 7C):

	Maxillipeds			Pereiopods				
	I	II	III	P1	P2	P3	P4	P5
Pleurobranch	-	-	-	+	+	+	+	+
Arthrobranch	-	-	+	-	-	-	-	-
Epipod	+	+	-	-	-	-	-	-
Podobranch	-	+	-	-	-	-	-	-
Exopod	+	+	+	-	-	-	-	-

Pleopods with endopods well developed, slender and setose; rami slender; endopods with long, slender appendix interna on 2nd to 5th pleopods.

Uropod (Fig. 3G) with protopodite laterally unarmed; exopod about 2.8 times longer than wide, with lateral border straight, densely setose ventrally, ending in short acute tooth (Fig. 7E); endopod narrower, slightly longer than endopod, about 3.7 times longer than proximal width.

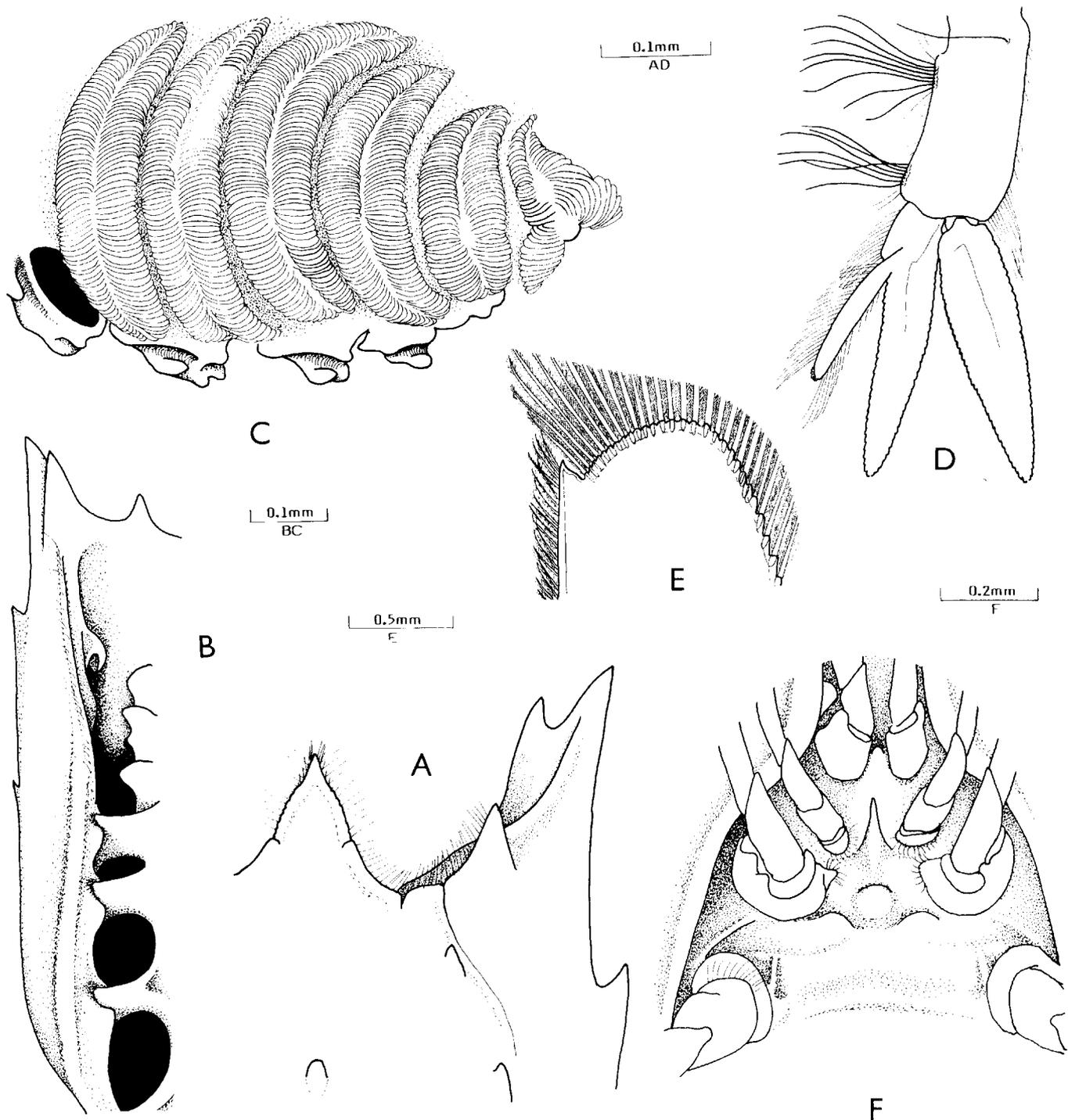


Fig. 7.—A–C. *Pontocheras arafurae* sp.n., holotype female.—A. Orbital region.—B. Branchiae (right) and lateral sternal processes.—C. Ventral branchiostegite and lateral sternal processes.—D. *P. arafurae* sp.n., paratype female, CL 9 mm, distolateral exopod.—E. *Pontocaris lacazei* (Gourret), North West Shelf, Western Australia, CL 9 mm, posterior thoracic sternites.

Ova numerous and small.

Measurements. Total body length holotype female 33.0 mm, carapace length 10.0 mm, length of ova 0.6 mm. Paratypes: HL 82-22, ovig. ♀, TL 30.0, CL 9.0; ovig. ♀, TL 30.5, CL 9.0; ♀, TL 29.5, CL 9.0, soft ♀, TL 35.0, CL 11.0; HL 82-28, ovig. ♀, TL 26.5, CL 8.0; HL 82-29, ovig. ♀, TL 25.0, CL 7.5.

Colouration. Overall opaque chalky white, with median and dorsolateral carapace spines and tubercles orangish, median and oblique ridges orangish, uropods white; bran-

chiostegite and pleura porcelain white; pereopods and pleopods pinkish; ova bright orange.

Etymology. Derived from the locality of capture in the southern Arafura Sea.

Remarks

The specimens present a number of noteworthy features, apparently not noted in other crangonid shrimps.

The long slender third pereopod has a short curved ridge present on the proximomedial aspect of the carpus

(Fig. 6E), immediately distal to the margin of the merus. This ridge has its upper and lower edges decorated by a series of small transverse ridges (Fig. 6F), which suggest that it functions as a stridulating mechanism, although no obvious plectrum is evident.

The ventral and posterior margins of the branchiostegite (Fig. 7B) are thickened and scalloped with small fossae. The thoracic sternites are moderately broad and without median spines, those of the 2nd to 5th segments are expanded laterally to form a small lobe that clips into one of the branchiostegal fossae, while the edge of the branchiostegite is held in a longitudinal groove across the lateral aspect of the sternal process. The medial aspect of the anterior branchiostegite has a reflected lobe that appears to hook round the lateral coxal plate of the 3rd maxilliped. The posterior margin of the branchiostegite also has a reflected lobe that hooks round a ridge on the posterior border of the 5th thoracic sternite. These mechanisms result in the branchiostegite being held rigidly to the posterior thoracic sternites and leave only small apertures lateral to the coxae of the posterior pereopods for the ingress of respiratory water currents.

Discussion

Recent keys to the genera of the family Crangonidae have been provided by Holthuis (1955) and Dardeau & Heard (1983). Subsequently Chace (1986) also provided keys to the Philippine genera of Crangonidae, with revised definitions of the genera, resurrecting *Parapontocaris* Alcock, 1901 and *Philocheras* Stebbing, 1900. Chace's key may be readily augmented to include *Pontocheras* as follows:

- 4. Abdominal sternites with median teeth; first lateral carina with seven or more teeth 4a
- Abdominal sternites unarmed; first lateral carina with 4–5 teeth only *Parapontocaris*
- 4a. Rostrum simple; thoracic sternites unarmed; dactyl of 5th pereopod with distoventral expansion *Pontocheras*

- Rostrum apically cleft; thoracic sternites armed; 5th pereopods with simple dactyl *Pontocaris*

The functions of the distoventral expansion of the dactyl of the 5th pereopod is obscure. The close attachment of the lower branchiostegite to the posterior thoracic sternites may be related to the substrate on which the shrimps live, fine silty mud, and may be a modification that prevents the fouling of the branchiae by small silt particles. The only other crangonid shrimps reported to have expanded dactyls on the posterior pereopods are the species of the genus *Argis* Krøyer (1842), in which they are acute and said to be natatorial, although it seems more probable that they would be fossorial in view of the known habits of most crangonid shrimps.

Acknowledgements

I would like to acknowledge the funds provided by the Australian Heritage Commission that supported the survey of the Port Essington marine fauna during which the holotype specimen was obtained and also the Masters and crews of the F.V. *Aqua-Sam* and the F.V. *Anson* for the facilities provided at sea. I would also like to thank Prof. L. B. Holthuis for the donation of a specimen of *Pontocaris cataphracta*.

References

Chace, F. A. Jr. 1985. The caridean shrimps (Crustacea: Decapoda) of the *Albatross* Philippine Expedition, 1907–1910, Part 3: Families Glyphocrangonidae and Crangonidae.—*Smithson. Contr. Zool.* 397: 1–63.

Dardeau, M. R. & Heard, R. W. Jr. 1983. Crangonid shrimps (Crustacea: Caridea) with a description of a new species of *Pontocaris*.—*Mem. Hourglass Cruises* 6 (2): 1–39.

De Man, J. G. 1920. The Decapoda of the Siboga Expedition. IV: Families Pasiphaeidae, Stylodactylidae, Hoplophoridae, Nematocarcinidae, Thalassocarididae, Pandalidae, Psalidopodidae, Gnathophyllidae, Processidae, Glyphocrangonidae and Crangonidae.—*Siboga Exped. Monogr.* 39a³: 1–318.

Holthuis, L. B. 1955. The Recent genera of caridean and stenopodidean shrimps (Class Crustacea: Order Decapoda: Supersection Natantia) with keys for their determination.—*Zool. Verh., Leiden* 26: 1–157.

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