A new species of *Philocheras* (Crustacea, Decapoda, Caridea, Crangonidae) from southwestern Australia

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ABSTRACT
A new species of crangonid shrimp, *Philocheras poorei* n. sp., is described and illustrated on the basis of two specimens collected from Albany, southwestern Australia, at littoral depths. Morphologically, the new species appears closest to *P. acutirostratus* (Yaldwyn, 1960) and *P. pilosoides* (Stephensen, 1927), both known from New Zealand, but is readily distinguished by the different disposition of the teeth on the carapace and the unarmed ventral margin of the merus of the first pereopod. It is the tenth species of the genus known from Australia, and the fifth possibly representing an endemic element to southern Australia. A key to the species of the genus known from Australia and a checklist of the species from the world are provided.

KEY WORDS
Crustacea,
Decapoda,
Caridea,
Crangonidae,
Philocheras,
southwestern Australia,
new species.

RÉSUMÉ
Une nouvelle espèce de Philocheras *(Crustacea, Decapoda, Crangonidae) du sud-ouest de l'Australie.*
Une nouvelle espèce de crevette Crangonidae, *Philocheras poorei* n. sp., est décrite et illustrée d'après deux spécimens récoltés à Albany, sud-ouest de l'Australie, à des profondeurs littorales. Morphologiquement, la nouvelle espèce est proche de *P. acutirostratus* (Yaldwyn, 1960) et *P. pilosoides* (Stephensen, 1927), toutes deux connues de Nouvelle-Zélande, mais s'en distingue par la position différente des dents sur la carapace et la marge ventrale du merus du premier péréiopode inerme. Il s'agit de la dixième espèce du genre connue d'Australie et de la cinquième possiblement endémique du sud de l'Australie. Une clé des espèces australiennes du genre et une liste mondiale des espèces sont incluses.

MOTS CLÉS
Crustacea,
Decapoda,
Caridea,
Crangonidae,
Philocheras,
sud-ouest de l'Australie,
espèce nouvelle.

INTRODUCTION

Species of the crangonid shrimp genus, *Philocheras* Stebbing, 1900, inhabit sand or mud substrates of shallow to bathyal waters in temperate to tropical regions in the world. Most of the earlier described species had been referred to *Pontophilus* Leach, 1817 until Chace (1984) resurrected *Philocheras* as a valid genus. Christoffersen (1988) confirmed the validity of *Philocheras* with a cladistic approach. *Philocheras* is the most diverse genus in the family, including 53 described species presently considered valid (see checklist in this paper). Highest species richness is found in the Indo-Pacific region (38 of 53 species are known from the region), and particularly, southern Australia and New Zealand appear to have a number of endemic species (e.g., Yaldwyn 1960, 1971; Poore 2004). Species of the genus are generally small, and cryptic in habitat as they usually dig into substrates (pers. obs.). Benthic samples made by dredge or trawls often contain specimens of these small shrimps, but their identification is not so easy because the taxonomy of the genus is still fragmentary. Discovery of new species is continuing at a relatively long pace (De Grave 2000, Kim & Hayashi 2000, Komai 2002, 2004, 2006; Komai & Chan 2007).

During a study of material of the Crangonidae housed in the collection of the Muséum national d'Histoire naturelle, Paris, an undescribed species of *Philocheras*, represented by two specimens from shallow subtidal waters of Albany, southwestern Australia, were found. This paper serves to describe a new species based on these specimens. Morphological similarity suggests that the new species is closely related to *P. acutirostratus* (Yaldwyn, 1960) and *P. pilosoides* (Stephensen, 1927), both known from New Zealand. Differences among the three species are discussed in detail. An emended key to species of the genus known from Australia is presented. Furthermore, a world-wide checklist of *Philocheras* species presently considered as valid is also given in order to briefly summarize current taxonomic information on the genus, because there have been no comprehensive taxonomic works on the genus.

MATERIALS AND METHODS

The type material remains deposited in the Muséum national d'Histoire naturelle, Paris (MNHN). The abbreviation cl refers to the postorbital carapace length. For detailed observation of the surface structure on the integument, the specimens (including removed appendages) were stained with a solution of methylene blue. The key to species is restricted to species reported from Australia. It is suspected that many more species of the genus await discovery in the area, but the key may provide some idea on the identification of specimens. In the checklist, important references including information on morphology or figures useful for species recognition are cited.

For comparison, the following specimen was examined:

Philocheras acutirostratus (Yaldwyn, 1960): RV *Tangeroa*, stn TAN0413/72, Tasman Sea, 37°27.63'S, 177°12.52'E, 464-473 m, 12.XI.2004, 1 ♀ cl 6.1 mm (National Institute of Water & Atmospheric Research, Wellington, registration number 13697).

SYSTEMATICS

Family CRANGONIDAE Haworth, 1825
Genus *Philocheras* Stebbing, 1900

Philocheras poorei n. sp.
(Figs 1-3)

TYPE MATERIAL. — Princes Royal Harbor, Albany, Southwest Australia, subtidal, 15.I.1988, coll. R. Manning, 1 ovig. ♀ holotype cl 6.0 mm (MNHN-Na 16370); 1 ♀ paratype cl 5.4 mm (MNHN-Na 16371).

ETYMOLOGY. — This species is named in honour of Dr Garry C. B. Poore of Museum Victoria, an eminent crustacean systematist, particularly in recognition of his major contributions to the knowledge of decapod crustaceans in southern Australia.

DISTRIBUTION. — Known only from the type locality, Princess Royal Harbor, Albany, Southwest Australia, at subtidal depths.

DESCRIPTION OF HOLOTYPE (FEMALE)

Body (Figs 1; 2A, D) stout, somewhat depressed dorsoventrally.

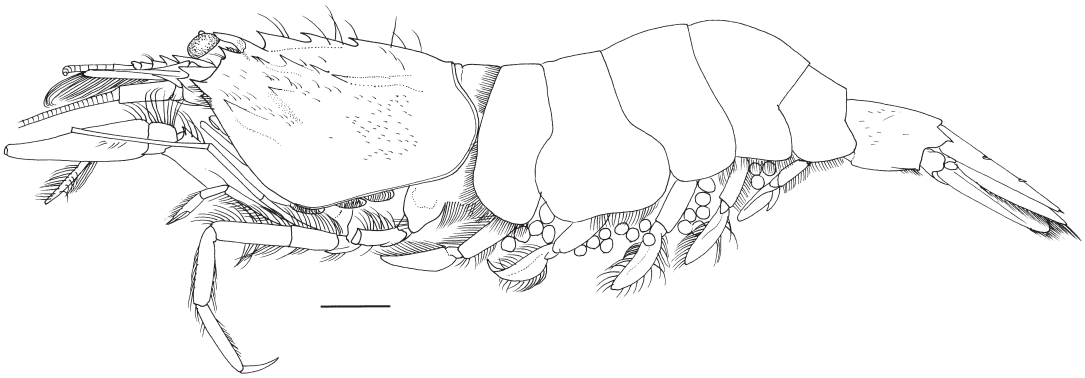

FIG. 1. — *Philocheras poorei* n. sp., holotype, ovigerous ♀ (cl 6.0 mm) (MNHN-Na 16370), entire animal in lateral view. Scale bar: 2 mm.

Rostrum (Fig. 2A, B) triangular with blunt apex in dorsal view, 0.15 of carapace length, directed forward, reaching to midpoint of eye-stalk, depressed dorsoventrally; dorsal surface shallowly concave; lateral margins without row of short setae proximally; ventral margin carinate medially. Carapace (Fig. 2A-C) approximately as long as broad; surface with sparse short and scattered long setae, but without dense pubescence; faint transverse furrow posterior to rostral base; dorsal midline sharply carinate, bearing 3 relatively large, sharp middorsal teeth increasing in size anteriorly; first tooth (epigastric tooth) arising 0.08 of carapace length, third tooth arising 0.53 of carapace length, second tooth at midway between first and second teeth; longitudinal row of 5 small teeth posterior to base of antennal tooth, posteriormost tooth situated at midlength of carapace (first tooth smallest, other 4 teeth subequal in size); hepatic tooth arising at nearly same level of epigastric tooth; branchial carina not evident; 1 additional tooth present anteroventral to hepatic tooth; orbital margin concave, with conspicuous cleft; antennal tooth small, acute, not buttressed (Fig. 2C); branchiostegal tooth moderately large, nearly reaching dorsodistal margin of antennal basicerite, without support of carina; small pterygostomial tooth present.

Thoracic sternum widened posteriorly, deeply concave, without armature on surface; no prominent anterior projection or spur on third somite.

Small arthrobranch above base of third maxilliped; pleurobranch present on each fourth through eighth thoracic somites, ventral apices all directed posteriorly.

Pleon (Figs 1; 2D) not sculptured. First and second somites each with few moderately long setae, third to fifth somites naked, sixth somite with sparse short setae and scattered longer setae. All somites devoid of conspicuous middorsal carina, though trace discernable on third somite. Posterodorsal margins of second and fifth somites without conspicuous notch, that of third somite broadly concave, that of fourth somite broadly convex. Pleura of first to fifth somites rounded. Sixth somite 2.10 times longer than fifth somite and 1.40 times longer than high, without dorsal carina; posterodorsal margin shallowly notched medially; posterolateral process terminating in acute tooth; posteroventral angle subacutely pointed; ventral surface slightly convex, without prominent rows of setae. Telson (Fig. 2D) moderately narrow, 1.60 times longer than sixth somite, terminating in small acute tooth (Fig. 2E); dorsal surface with shallow median sulcus in anterior 0.70, lateral margin without conspicuous anterior convexity; each dorsolateral ridge with 2 relatively large spines (anterior spine arising at 0.35 length of telson, posterior spine at about 0.60); posteromedian tooth flanked by 1 pair of small spines and 2 pairs of long setulose spiniform setae (Fig. 2E).

First to fifth pleonal sternites without median teeth.

Cornea (Fig. 2A, B) small (maximum width 0.14 of carapace length), well-pigmented, distinctly faceted; eye-stalk fully exposed in dorsal view, slightly constricted at middle, with small dorsal tubercle.

Antennular peduncle (Fig. 2A, B) reaching midlength of antennal scale. First segment longer than distal 2 segments combined, dorsal surface somewhat excavate to accommodate eye-stalk; distolateral angle strongly produced in slender process, overreaching midlength of second segment; ventral surface with sharp median ridge bearing small tooth arising at midlength; stylocerite subrectangular in dorsal view, terminating in acute tooth, distomesial angle rounded, posterolateral angle broadly rounded. Second segment as long as wide, with slightly produced distolateral angle. Third segment as wide as second segment. Lateral flagellum moderately slender, overreaching distal margin of antennal scale by about half length, composed of 10 articles (basal article occupying about 0.25 length). Mesial flagellum slightly shorter than lateral flagellum, composed of about 9 articles (basal article occupying about 0.30 length).

Antenna (Fig. 2A, B, F) with stout basicerite bearing small ventrolateral tooth and conspicuous dorsodistal lobe produced as far as ventrolateral tooth. Carpocerite moderately stout, overreaching midlength of antennal scale. Antennal scale subovate; dorsal surface naked, with weak median ridge proximally; lateral margin nearly straight, distolateral tooth small, falling short of rounded distal lamella. Flagellum not setose (partially broken off).

Mouthparts not dissected. Second maxilliped with endopod composed of 6 segments with basis and ischium fused; epipod subrectangular, podobranch well-developed. Third maxilliped (Fig. 3A) consisting of 4 segments, flattened dorsoventrally, overreaching distal margin of antennal scale (except for distolateral tooth) by 0.80 length of ultimate segment; ultimate segment 1.3 times longer than carpus (= penultimate segment), moderately narrow (5.40 times longer than wide), tapering distally, mesial margin with row of long spines partially obscured by long stiff setae; carpus with short to long setae on dorsal surface and lateral margin, mesial margin with numerous transverse tracts of dense, stiff setae; antepenultimate segment (merus, ischium and basis fused segment) weakly sinuous in dorsal view, setose on margins, setae on dorsolateral distal angle particularly elongate; ventral surface distally with 3 spinules; coxa stout, with rounded lateral lobe; exopod slightly overreaching midlength of antepenultimate segment, tapering distally, bearing well-developed flagellum.

First pereopod (Fig. 3B) stout, overreaching distal margin of antennal scale by half length of palm; palm (Fig. 3C) moderately stout, slightly narrowed distally, 3.30 times longer than wide, mesial surface proximally with cluster of stiff setae forming grooming apparatus; cutting edge strongly oblique, with submarginal row of short setae dorsally and ventrally; pollex fixed, straight, moderately long; dactylus weakly curved, about half length of palm; carpus short, with moderately small ventrodistal tooth on lateral margin and cluster of grooming setae on mesial surface; merus strongly compressed laterally, with moderately large dorsodistal tooth, distolateral margin with 1 blunt tooth, ventral margin faintly sinuous, unarmed; exopod absent. Second pereopod (Fig. 3D, E) not reaching distal margin of carpus of anteriorly extended first pereopod, chelate; dactylus (excluding ungues) 1.08 length of palm, with 2 long ungues distinctly shorter than dactylus; chela 1.30 length of carpus (except for terminal unguis of fingers), with rows of long stiff setae on dorsal and ventral margins; pollex also with long unguis; carpus much shorter than merus, with long setae on each dorsal and ventral margins; merus and ischium with row of long plumose setae on dorsal and ventral margins; ischium slightly shorter than merus. Third pereopod (Fig. 3F) very slender, overreaching distal margin of antennal scale by tip of length of dactylus and propodus; dactylus 0.26 length of propodus, terminating in acute tip; carpus elongate, 1.50 times longer than distal 2 segments combined; merus slightly longer than ischium. Fourth pereopod (Fig. 3G) moderately stout, overreaching distal margin of antennal scale by length of dactylus; dactylus 0.52 length of propodus, slender, weakly curved, slightly flattened dorsoventrally, terminating in thin unguis; ventral surface of dactylus medially ridged;

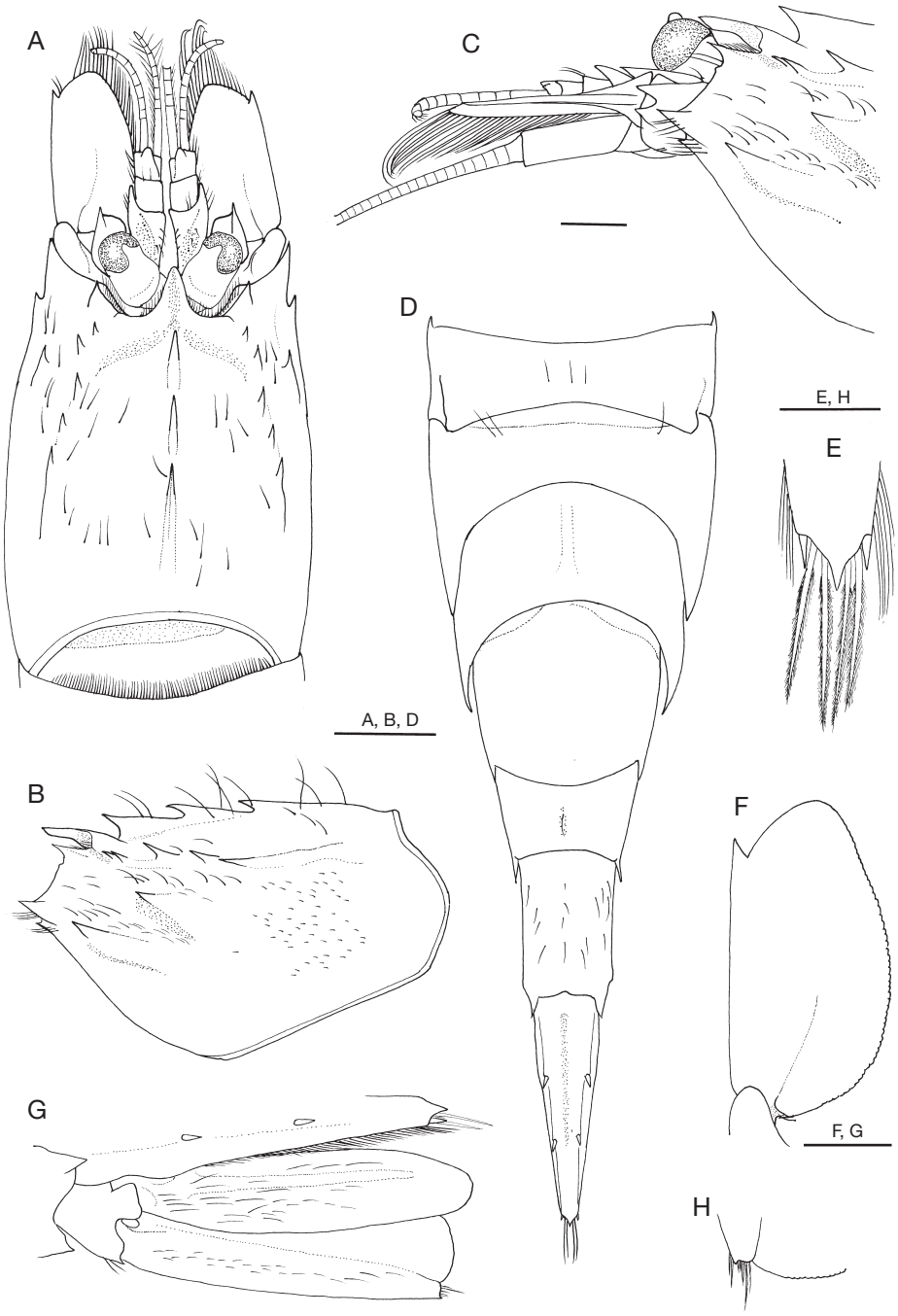

FIG. 2. — *Philocheras poorei* n. sp., holotype, ovigerous ♀ (cl 6.0 mm) (MNHN-Na 16370): **A**, carapace and cephalic appendages, dorsal view; **B**, carapace, lateral view; **C**, anterior part of carapace and cephalic appendages, lateral view; **D**, pleon and telson, dorsal view; **E**, posterior part of telson, dorsal view; **F**, left antennal scale, dorsal view (setae omitted); **G**, left uropod, dorsal view (setae partially omitted); **H**, posterolateral part of exopod of uropod, dorsal view (setae partially omitted). Scale bars: A, B, D, 2 mm; C, F, G, 1 mm; E, H, 0.5 mm.

propodus noticeably compressed laterally, with sharply edged dorsal margin and concave lateral face, and with stiff setae marginally; carpus 0.92 length of propodus, weakly compressed laterally, with row of numerous stiff setae on dorsal and ventral margins; merus and ischium with long setae on dorsal and ventral surfaces, merus about 1.30 times longer than ischium and about 3.7 times longer than high. Fifth pereopod missing.

Pleopods (Fig. 1) each with relatively slender protopods. Endopod of first pleopod (Fig. 3H) elongate, spatulate, slightly shorter than exopod. Second to fifth pleopods becoming shorter posteriorly; each endopod well-developed, 0.70-0.80 length of each exopod, lacking appendix interna (Fig. 3I).

Protopod of uropod (Fig. 2G) stout; posterolateral projection blunt. Endopod of uropod (Fig. 2G) moderately narrow, slightly longer than exopod, overreaching tip of telson, tapering distally; exopod (Fig. 2G) falling short of tip of telson, lateral margin nearly straight, terminating in minute tooth partially obscured by tuft of short setae; posterior margin roundly truncate; very short diaeresis evident.

Notes on paratype

The paratype seems to be in a stage just after molt, and thus it is somewhat damaged. Nevertheless, the disposition of the teeth on the carapace and non-sculptured pleon agree well with those of the holotype.

Coloration in life

Not recorded.

Remarks

Philocheras poorei n. sp. appears closest to *P. acutirostratus* (Yaldwyn, 1960) and *P. pilosoides* (Stephensen, 1927), both known from New Zealand, sharing with those species a triangular rostrum, the possession of three middorsal teeth on the carapace and a postorbital row of five teeth on either side, the dorsally smooth first to sixth pleonal somites and the unarmed lateral margin of the antennal scale (Stephensen 1927; Yaldwyn 1960). No other species of *Philocheras* have such a suite of characters. The new species is readily distinguished from the latter two species by the absence of a ventral tooth on the merus of the first pereopod. The disposition of lateral teeth on the carapace is also different between *P. poorei* n. sp. and the other two species. In the new species, there is only one tooth posterior to the branchiostegal tooth, instead of two or three in *P. acutirostratus* and *P. pilosoides*. The third middorsal tooth on the carapace arises more anteriorly in *P. poorei* n. sp. than in the other two species (0.53-0.55 of the carapace length versus about 0.70). *Philocheras pilosus* (Kemp, 1916), known from the eastern Indian Ocean and northern part of Australia, also shows considerable similarity to the new species particularly in the shape of the rostrum, general disposition of the teeth on the carapace and the non-sculptured pleon, but the former species differs from the new species in having only two teeth posterior to the antennal tooth on the carapace and the more posteriorly positioned third middorsal tooth on the carapace.

The structure of the fourth pereopod seems to suggest that the new species is an active burrower, although observation of living specimens has not been made. The compressed propodus with a concave lateral face and the presence of a marginal fringe of stiff setae particularly on the carpus enable the animal to effectively dig into substrates.

From Australia, the following nine *Philocheras* species have been heretofore recorded: *P. brucei* Komai, 2004, *P. flindersi* (Fulton & Grant, 1902), *P. intermedius* (Bate, 1863), *P. lowisi* (Kemp, 1916), *P. obliquus* (Fulton & Grant, 1902), *P. pilosus*, *P. planoculminus* Bruce, 1994, *P. triangulus* Komai, 2006 and *P. victoriensis* (Fulton & Grant, 1902) (Davie 2002; Poore 2004; Komai 2004, 2006). Of the nine listed above, four species, i.e. *P. flindersi*, *P. intermedius*, *P. obliquus*, and *P. victoriensis*, appear restricted to southern Australia. The present new species is the tenth from Australia, and the fifth to be recorded from southern part of the continent. There is little doubt that future study of museum collections or field investigations will eventually discover more unknown forms of this small, cryptic animal group.

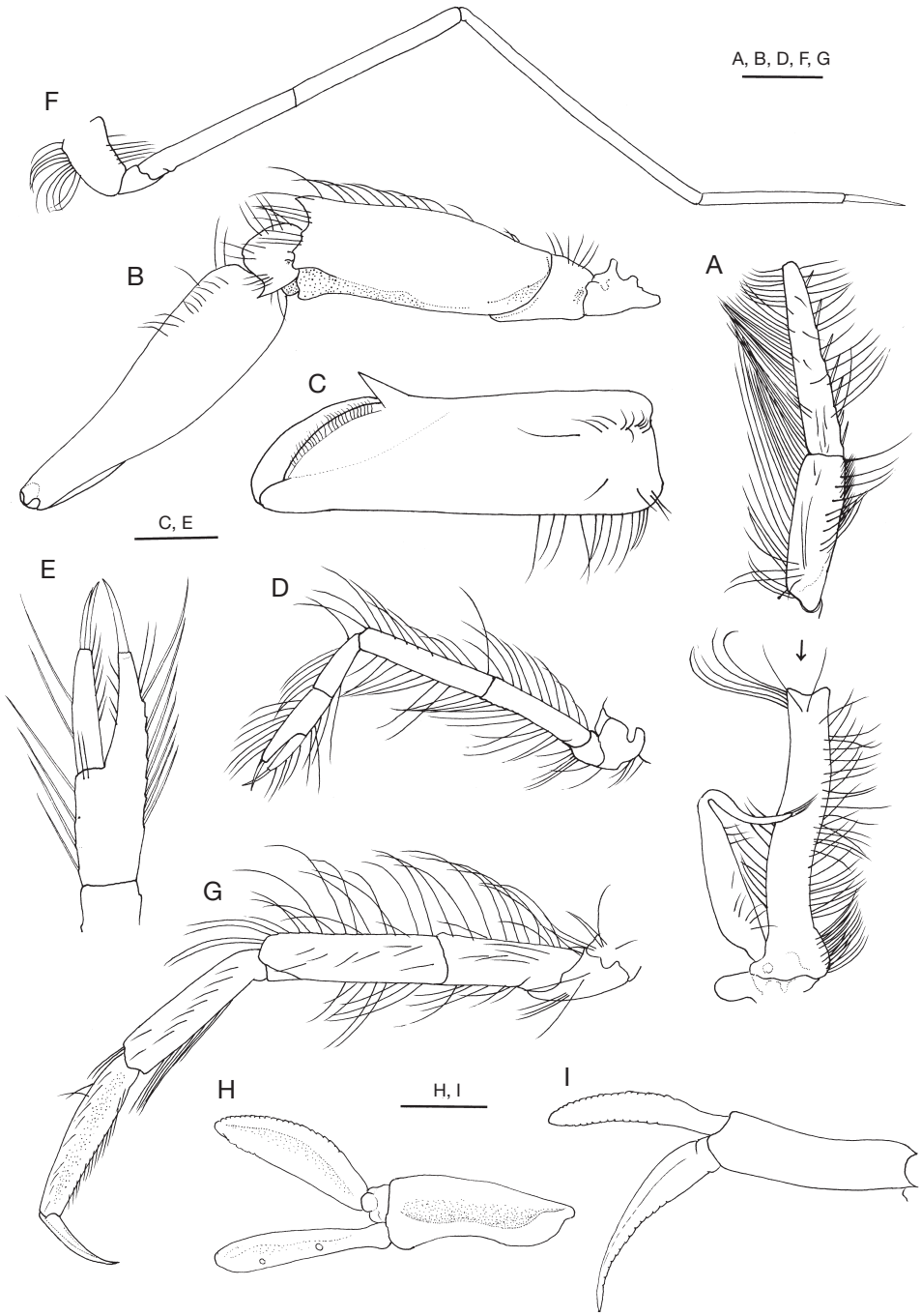

FIG. 3. — *Philocheras poorei* n. sp., holotype, ovigerous ♀ (cl 6.0 mm) (MNHN-Na 16370): **A**, left third maxilliped, dorsal view; **B**, left first pereopod, lateral view; **C**, subchela of left first pereopod, dorsal view; **D**, left second pereopod, lateral view; **E**, chela of left second pereopod, lateral view; **F**, right third pereopod, lateral view; **G**, left fourth pereopod, lateral view; **H**, left first pleopod, ventral view (setae omitted); **I**, left second pleopod, dorsal view (setae omitted). Scale bars: A-D, F-I, 1 mm; E, 0.5 mm.

KEY TO SPECIES OF *PHILOCHERAS* STEBBING, 1900 KNOWN FROM AUSTRALIA

1. Antennal scale with 1 tooth or serration on lateral margin 2
— Antennal scale unarmed on lateral margin 4

2. Antennal scale with 1 tooth on lateral margin 3
— Antennal scale with serration on lateral margin ..... *P. lowisi*
[Andaman Islands, Japan, Hong Kong and Northern Territory, sublittoral to 30 m]

3. Rostrum triangular in dorsal view, terminating in acuminate tip; third pleonal somite with trance of middorsal carina ..... *P. triangulus*
[Northern Territory, 7.3 m]
— Rostrum narrow, but not triangular in dorsal view, terminating in slightly concave or truncate tip; third pleonal somite with distinct middorsal carina ..... *P. brucei*
[Queensland, 11 m]

4. Third and fourth abdominal somites with middorsal carina [carapace with 3 middorsal teeth including epigastric tooth, longitudinal row of 5 teeth posterior to orbit and short row of 4 small teeth posterior to branchiostegal tooth] ..... *P. victoriensis*
[Victoria, sublittoral]
— Third and fourth abdominal somites rounded dorsally 5

5. Carapace with 1 or 2 middorsal teeth including epigastric tooth 6
— Carapace with 3 middorsal teeth including epigastric tooth 9

6. Carapace with longitudinal row of small teeth posterior to orbit ..... *P. intermedius*
[Gulf of St Vincent, South Australia, sublittoral]
— Carapace without longitudinal row of small teeth posterior to orbit 7

7. Carapace with 2 middorsal teeth including epigastric tooth [rostrum broad with concave lateral margins, distal margin truncate in dorsal view] ..... *P. obliquus*
[Victoria, sublittoral]
— Carapace with 1 middorsal tooth (epigastric tooth) 8

8. Rostrum narrow with distal margin convex and lateral margins nearly straight, parallel; carapace with 2 teeth posterior to branchiostegal tooth ..... *P. flindersi*
[Victoria, sublittoral]
— Rostrum broad with distal margin broadly truncate and lateral margins concave; carapace with 1 tooth posterior to branchiostegal tooth ..... *P. planoculminus*
[Flat Top Bank, Timor Sea, 30 m]

9. Carapace with 2 teeth posterior to antennal tooth ..... *P. pilosus*
[Indian Ocean, New Caledonia and Northern Territory, shallow subtidal]
— Carapace with longitudinal row of 5 teeth posterior to antennal tooth ... *P. poorei* n. sp.
[Albany, southwestern Australia, littoral]

CHECKLIST OF *PHILOCHERAS* SPECIES KNOWN FROM THE WORLD

INDO-PACIFIC AND SOUTHERN OCEANS (38 SPECIES)

Philocheras acutirostratus (Yaldwyn, 1960). New Zealand and Tasman Sea, 84-720 m (Yaldwyn 1960; Zarenkov 1968). Figure(s): Richardson & Yaldwyn (1958, as *Pontophilus* sp.); Yaldwyn (1960).

Philocheras angustirostris (de Man, 1918). Arabian Sea to Indonesia, 13-83 m (Kemp 1916; de Man 1920; Chace 1984). Figure(s): de Man (1920).

Philocheras australis (Thomson, 1879). New Zealand, 0-36 m (Kemp 1911; de Man 1920; Richardson & Yaldwyn 1958). Figure(s): Kemp (1911); Richardson & Yaldwyn (1958).

Philocheras bidentatus (De Haan, 1849). Japan and Yellow Sea, 158-522 m (Fujino & Miyake 1970). Figure(s): Balss (1914); Fujino & Miyake (1970).

Philocheras breviflagella Komai, 2002. Hawaii, subtidal (Komai 2002). Figure(s): Komai (2002).

Philocheras brucei Komai, 2004. Queensland, Australia, 10 m (Komai 2004). Figure(s): Komai (2004).

Philocheras candidus (Kemp, 1916). Andamans, shallow water (Kemp 1916; de Man 1920). Figure(s): Kemp (1916).

Philocheras chiltoni (Kemp, 1911). New Zealand (Kemp 1911; de Man 1920; Richardson & Yaldwyn 1958). Figure(s): Kemp (1911); Richardson & Yaldwyn (1958).

Philocheras dimorphus (Fujino & Miyake, 1971). Japan (Sagami Bay), 75-80 m (Fujino & Miyake 1971). Figure(s): Fujino & Miyake (1971).

Philocheras flindersi (Fulton & Grant, 1902). Southern Australia and Tasmania, 18-127 m (de Man 1920; Davie 2002; Poore 2004). Figure(s): Fulton & Grant (1902); Poore (2004).

Philocheras fujinoi Kim & Hayashi, 2000. South and East China Seas, 80-111 m (Kim & Hayashi 2000). Figure(s): Fujino & Miyake (1970, as *Pontophilus* sp.); Kim & Hayashi (2000).

Philocheras gemmaceus Kim & Hayashi, 2000. Japan, 15-50 m (Kim & Hayashi 2000). Figure(s): Kim & Hayashi (2000).

Philocheras hamiltoni (Yaldwyn, 1971). New Zealand (Yaldwyn 1971). Figure(s): Richardson & Yaldwyn (1958, as *Pontophilus* n. sp.).

Philocheras hendersoni (Kemp, 1915). India, and South Africa, littoral (Kemp 1915, 1916; de Man 1920; Barnard 1950). Figure(s): Kemp (1915); Kensley (1972).

Philocheras incisus (Kemp, 1916). Gulf of Oman to Philippines, Japan, subtidal to 153 m (Kemp 1916; de Man 1920; Fujino & Miyake 1970; Chace 1984). Figure(s): Kemp (1916), Fujino & Miyake (1970); Hayashi (1986).

Philocheras intermedius (Bate, 1863). South Australia (Gulf of St Vincent), shallow water (Bate 1863; Davie 2002; Poore 2004). Figure(s): Bate (1863); Poore (2004).

Philocheras japonicus (Doflein, 1902). Japan, and Philippines (Doflein 1902; de Man 1920; Fujino & Miyake 1970; Chace 1984). Figure(s): Doflein (1902); Fujino & Miyake (1970).

Philocheras kempi (de Man, 1918), Indonesia (Flores Sea), 300-400 m (de Man 1920; Chace 1984). Figure(s): de Man (1920).

Philocheras lowisi (Kemp, 1916). Andaman Sea, Timor Sea, Hong Kong to Japan (Kemp 1916; de Man 1920; Fujino 1978; Bruce 1986, 1994). Figure(s): Kemp (1916); Bruce (1994).

Philocheras magnioculus Komai & Chan, 2007. Bohol Sea, Philippines, 145-163 m (Komai & Chan 2007). Figure(s): Komai & Chan (2007).

Philocheras megalocheir Stebbing, 1900. South Africa, 45-67 m (Stebbing 1900; de Man 1920; Barnard 1950). Figure(s): Stebbing (1900); Barnard (1950); Kensley (1972).

Philocheras modestus (de Man, 1918). Indonesia (Sabah), 296-457 m (de Man 1920; Chace 1984). Figure(s): de Man (1920).

Philocheras obliquus (Fulton & Grant, 1902). Southern Australia and Tasmania, 0-18 m (de Man 1920; Davie 2002; Poore 2004). Figure(s): Fulton & Grant (1902); Poore (2004).

Philocheras parasculptus Burukovsky, 1993. Southwestern Indian Ocean (33°16'N, 43°53'S), 415-460 m (Burukovsky 1993). Figure(s): Burukovsky (1993).

Philocheras parvirostris (Kemp, 1916). Gulf of Manaar to Singapore, littoral (Kemp 1916; de Man 1920; Johnson 1961). Figure(s): Kemp (1916).

Philocheras pilosoides (Stephensen, 1927). Subantarctic islands of New Zealand, littoral (Stephensen 1927; Richardson & Yaldwyn 1958; Yaldwyn 1960). Figure(s): Stephensen (1927); Richardson & Yaldwyn (1958).

Philocheras pilosus (Kemp, 1916). Mozambique, Gulf of Manaar, and northern Australia, littoral (Kemp 1916; Barnard 1950; Kensley 1972; Davie 2002). Figure(s): Kemp (1916); Kensley (1972).

Philocheras planoculminus Bruce, 1994. Timor Sea (Flat Top Bank) (Bruce 1994; Davie 2002). Figure(s): Bruce (1994); Kim & Hayashi (2000).

Philocheras plebs (Kemp, 1916). Andaman Islands, 3.6 m (Kemp 1916). Figure(s): Kemp (1916).

Philocheras poorei n. sp. Albany, southwestern Australia, littoral (this study). Figure(s): this study.

Philocheras quadrispinosus (Yaldwyn, 1971). North Auckland, New Zealand, 58 m (Richardson & Yaldwyn 1958; Yaldwyn 1971). Figure(s): Richardson & Yaldwyn (1958, as *Pontophilus* n. sp.).

Philocheras sabsechota (Kemp, 1911). Andaman Islands, littoral (Kemp 1916; Komai 2002). Figure(s): Kemp (1911).

Philocheras triangulus Komai, 2006. Northern Territory, Australia, 7.3 m (Komai 2006). Figure(s): Komai (2006).

Philocheras vanderbilti (Boone, 1935). Indonesia (Lesser Sunda Islands), 256 m (Boone 1935; Chace 1984). Figure(s): Boone (1935).

Philocheras vestigialis (Fujino & Miyake, 1971). Japan (Kagoshima Bay) (Fujino & Miyake 1971). Figure(s): Fujino & Miyake (1971).

Philocheras victoriensis (Fulton & Grant, 1902). Southern Australia and Tasmania, 0-42 m (Fulton & Grant 1902; de Man 1920; Davie 2002; Poore 2004). Figure(s): Fulton & Grant (1902); Poore (2004).

Philocheras wilkinsae De Grave, 2000. Papua New Guinea, 6-12 m (De Grave 2000). Figure(s): De Grave (2000).

Philocheras yaldwyni (Zarenkov, 1968). Southern Ocean south of New Zealand, 334 m (Zarenkov 1968). Figure(s): Zarenkov (1968).

EASTERN ATLANTIC (12 SPECIES)

Philocheras aglyptus (Crosnier, 1972). Congo, littoral (Crosnier 1972). Figure(s): Crosnier (1972).

Philocheras bidens (Holthuis, 1951). Guinea to Angola, 30-100 m (Crosnier & Forest 1973). Figure(s): Holthuis (1951); Crosnier & Forest (1973).

Philocheras bispinosus (Hailstone, 1835). Faeroes to Cape Verde Islands, Mediterranean, 5-360 m (d'Udekem d'Acoz 1999). Figure(s): Kemp (1910); Zariquiey Alvarez (1968); Smaldon (1993). Fransen & Wirtz (1997) synonymized *Pontophilus mbizi* Holthuis, 1952 with *Philocheras bispinosus*. D'Udekm d'Acoz (1999) considered a status of forma of *Philocheras bispinosus* for *Philocheras neglectus* (G. O. Sars, 1883).

Philocheras echinulatus (M. Sars, 1861). Norway to Morocco, Mediterranean, 4-137 m (d'Udekem d'Acoz 1999). Figure(s): Kemp (1910); Zariquiey Alvarez (1968); Smaldon (1993). D'Udekem d'Acoz (1999) suggested a possibility that *Cheraphilus Pattersoni* Kinahan, 1859 was identical to *Philocheras echinulatus*, although no definite conclusion has been drawn out yet.

Philocheras fasciatus (Risso, 1816). British Islands to Canary Islands, Mediterranean, 0-60 m (d'Udekem d'Acoz 1999). Figure(s): Kemp (1910); Smaldon (1993).

Philocheras gaillardi (Crosnier, 1972). Congo (Crosnier 1972). Figure(s): Crosnier (1972).

Philocheras monacanthus (Holthuis, 1961). Portugal, and Mediterranean, 0-23 m (d'Udekem d'Acoz 1999). Figure(s): Holthuis (1961).

Philocheras opici (Crosnier, 1972). Annobon Island, 50 m (Crosnier 1972). Figure(s): Crosnier (1972).

Philocheras prionolepis (Holthuis, 1952). Cape Verde Islands, Congo, 100-225 m (Crosnier & Forest 1973). Figure(s): Holthuis (1952); Crosnier & Forest (1973).

Philocheras sculptus (Bell, 1846) British Islands to South Africa, Mediterranean, 0-230 m (d'Udekem d'Acoz 1999). Figure(s): Kemp (1910); Barnard (1950); Crosnier & Forest (1973); Smaldon (1993).

Philocheras trispinosus (Hailstone, 1835). Norway to Canary Islands, Mediterranean, 0-50 m (d'Udekem d'Acoz 1999). Figure(s): Kemp (1910); Zariquiey Alvarez (1968); Smaldon (1993).

Philocheras wolffi (Holthuis, 1951). French Guinea, 25-50 m (Holthuis 1951). Figure(s): Holthuis (1951).

WESTERN ATLANTIC (ONE SPECIES)

Philocheras gorei (Dardeau, 1980). Georgia to Florida, Gulf of Mexico, Uruguay, 9-194 m (Dardeau & Heard 1983; Christoffersen 1988). Figure(s): Dardeau (1980); Dardeau & Heard (1983).

EASTERN PACIFIC (TWO SPECIES)

Philocheras lapillus Wicksten, 1989. Galapagos Islands, 37-59 m (Wicksten 1989). Figure(s): Wicksten (1989).

Philocheras nikiforovi (Burukovsky, 1990). Sala-y-Gomez Ridge (Burukovsky 1990). Figure(s): Burukovsky (1990).

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