



## The sand shrimp genus *Philocheras* (Caridea: Crangonidae) from the continental margin of Western Australia including the description of a new species and a key to Australian species\*

JOANNE TAYLOR

Museum Victoria, GPO Box 666, Melbourne, Vic. 3001, Australia. E-mail: jtaylor@museum.vic.gov.au

\* In: De Grave, S. & Fransen, C.H.J.M. (2010) Contributions to shrimp taxonomy. *Zootaxa*, 2372, 1–414.

### Abstract

Eight species of *Philocheras* (Crustacea: Caridea: Crangonidae) are reported from the Northwest Shelf of Western Australia. One species is new to science *Philocheras anthonyi* sp. nov. Five species are reported for the first time from Australian waters, *P. angustirostris* (De Man, 1918), *P. incisus* (Kemp, 1916), *P. japonicus* (Doflein, 1902), *P. modestus* (De Man, 1918) and *P. plebs* (Kemp, 1916). A range extension within Australia is reported for *Philocheras lowisi* (Kemp, 1916) and *P. planoculminus* Bruce, 1994. These records expand the number of *Philocheras* species previously recorded from Australian waters from ten to 16. A revised key and illustrated guide to the species from Australia is provided.

**Key words:** Crustacea, Decapoda, Caridea, Crangonidae, sand shrimp, *Philocheras*, new species, key, Western Australia, Australia, taxonomy

### Introduction

The crangonid shrimp genus *Philocheras* comprises 53 species in temperate to tropical regions around the world (Komai 2008). These small, often cryptic sand shrimp inhabit mud or sand in shallow to bathyal waters. Over two-thirds of the species occur in the Indo-West Pacific region with endemism evident in southern Australia and New Zealand (Yaldwyn 1960, 1971; Poore 2004; Komai 2008). Ten species are recorded from Australian waters; *P. brucei* Komai, 2004, *P. flindersi* (Fulton & Grant, 1902), *P. intermedius* (Bate, 1863), *P. lowisi* (Kemp, 1916), *P. obliquus* (Fulton & Grant, 1902), *P. pilosus* (Kemp, 1916), *P. planoculminus* Bruce, 1994, *P. poorei* Komai, 2008, *P. triangulus* Komai, 2006 and *P. victoriensis* (Fulton & Grant, 1902) (Davie 2002; Poore 2004; Komai 2004, 2006, 2008).

To date, no *Philocheras* species collected from Western Australian waters have been identified to species. CSIRO Division of Fisheries Research reported on the decapods collected on the Northwest Shelf in 1983 (cruise SO2-1983) (Ward & Rainer 1988). They reported that the fifth most abundant taxon was *Philocheras* spp. although they did not attempt to determine the species. This material was subsequently lodged in the Northern Territory Museum and Art Gallery (NTM). Recent sampling cruises off the continental margin of Western Australia on board FRV *Southern Surveyor* in 2005 and 2007 were mounted by CSIRO Marine and Atmospheric Research (CMAR) and Museum Victoria, (project entitled “Mapping benthic ecosystems on the deep continental shelf and slope in Australia’s South West Region”). A report on the decapods from voyage SS10-2005 revealed the decapod crustacean fauna to be highly diverse (Poore *et al.* 2008) and two unidentified species of *Philocheras* were listed, one of which has since been redetermined as belonging to the genus *Parapontophilus* (referred to as *Philocheras* sp. MoV 5439 in the report). This contribution is based on those two collections and on those taken during a second phase of the CMAR-MV project along the northern Western Australian continental margin (cruise SS05-2007). Examination of *Philocheras* specimens collected

during these cruises lodged in NMV and NTM has revealed five species of *Philocheras* previously unrecorded from Australian waters and range extensions for two others. One new species, *Philocheras anthonyi* sp. nov. is described.

Abbreviations are: NT, Northern Territory; Qld, Queensland; SA, South Australia; Vic, Victoria; WA, Western Australia which are all Australian states. WAM, Western Australian Museum, Perth; NMV, Museum Victoria, Melbourne; NTM, Northern Territory Museum and Art Gallery, Darwin, where material is lodged; sp. MoV refers to the unique Museum Victoria number allocated to new or undetermined taxa (and is not the same as sp. nov. which refers to a new species); pocl refers to the postorbital carapace length. Previously published and original illustrations were scanned and digitally ‘inked’ using Adobe Illustrator following Coleman’s methods (Coleman 2003).

## Systematics

### Crangonidae Haworth, 1825

#### *Philocheras* Stebbing, 1900

*Philocheras* Stebbing, 1900: 48. — Chace, 1984: 38.

**Type species.** Selected by Holthuis, 1955: 138: *Crangon nanus* Krøyer, 1842 (= *Pontophilus bispinosus* Hailstone, 1835: 271).

**Diagnosis.** Rostrum without teeth in basal half of length, carapace without postorbital longitudinal suture; eye with well developed cornea, pigmented; antennal scale with well developed blade; pereopod 1 without trace of exopod; pereopod 2 chelate, usually overreaching merus of anteriorly extended pereopod 1.

#### Key to species of *Philocheras* Stebbing, 1900 known from Australia (modified from Komai 2008)

1. Antennal scale with 1 tooth or serration on lateral margin..... 2
  - Antennal scale unarmed on lateral margin ..... 7
2. Antennal scale with 1 tooth on lateral margin; rostrum with setae extending onto orbital margin..... 4
  - Antennal scale with serration on lateral margin; rostrum without setae..... 3
3. Carapace with median carina and pair of submedian and lateral carinae and 5 spines (1 median, 2 submedian, 3 lateral). ..... *P. japonicus* [WA; Japan and Philippines to 42 m]
  - Carapace with median carina and no spines ..... *P. lowisi* [NT, WA; Andaman Islands, Japan, Hong Kong; sublittoral to 120 m]
4. Rostrum triangular in dorsal view, terminating in acuminate tip; setae on rostrum and orbital margin short ..... *P. triangulus* [NT, 7.3 m]
  - Rostrum broad or narrow, but not triangular in dorsal view; setae on rostrum and orbital margin long..... 5
5. Rostrum broad, terminating in deeply excavate convex tip with lateral horns; carapace without middorsal carina but with 3 middorsal spines; lateral spine on antennal scale positioned well below midpoint..... *P. incisus* [WA; Gulf of Oman to Philippines; Japan; subtidal to 153 m]
  - Rostrum narrow, terminating in convex, concave or truncate tip, with or without lateral horns; carapace with middorsal carina, with or without middorsal spines; lateral spine on antennal scale positioned at midpoint ..... 6
6. Rostrum terminating in convex tip with small lateral horns; carapace with middorsal carina interrupted at midpoint, with 1 middorsal spine ..... *P. angustirostris* [WA; Arabian Sea to Indonesia, 13–83 m]
  - Rostrum terminating in slightly concave or truncate tip without lateral horns; carapace with continuous middorsal carina, without middorsal spine ..... *P. brucei* [Qld, 11 m]
7. Third and fourth abdominal somites with middorsal carina ..... 8
  - Third and fourth abdominal somites rounded dorsally ..... 9
8. Carapace with 3 middorsal teeth including epigastric tooth, middorsal ridge absent ..... *P. victoriensis* [Vic, sublittoral]

- Carapace with 1 middorsal tooth (epigastric tooth); middorsal ridge present as an indistinct discontinuous ridge extending from mid-dorsal tooth to posterior margin..... *P. anthonyi* sp. nov. [WA, 222 m]
- 9. Carapace with 1 or 2 middorsal teeth including epigastric tooth ..... 10
- Carapace with 3 middorsal teeth including epigastric tooth..... 15
- 10. Carapace with longitudinal row of small teeth posterior to orbit.....  
.....*P. intermedius* [Gulf of St Vincent, SA, sublittoral]
- Carapace without longitudinal row of small teeth posterior to orbit ..... 11
- 11. Carapace with 2 middorsal teeth including epigastric tooth [rostrum broad with concave lateral margins, distal margin truncate in dorsal view].....*P. obliquus* [Vic, sublittoral]
- Carapace with 1 middorsal tooth (epigastric tooth)..... 12
- 12. Carapace with postorbital carina .....*P. modestus* [Indonesia; WA, 296–457 m]
- Carapace without postorbital carina ..... 13
- 13. Rostrum broad with distal margin broadly truncate; carapace with 1 tooth posterior to branchiostegal tooth .....  
.....*P. planoculminis* [Flat Top Bank, Timor Sea; WA, 30–49 m]
- Rostrum medium to narrow with distal margin convex (rounded); carapace with 2 teeth posterior to branchiostegal tooth ..... 14
- 14. Rostrum narrow; carapace with pair of carinae extending from below orbital margin to mid-dorsal point .....  
.....*P. flindersi* [Vic, sublittoral]
- Rostrum medium; carapace smooth, without dorsal carinae .....  
.....*P. plebs* [WA; Port Blair, Andaman Islands, 3.6–101 m]
- 15. Carapace with 2 teeth posterior to antennal tooth.... *P. pilosus* [NT; Indian Ocean, New Caledonia; shallow subtidal]
- Carapace with longitudinal row of 5 teeth posterior to antennal tooth.....*P. poorei* [Albany, WA, littoral]

***Philocheras angustirostris* (De Man, 1918)**

(Fig. 3)

*Pontophilus angustirostris* De Man, 1918: 163. — De Man 1920: 279, pl. 22: fig. 67g, k, n, o, pl. 23: fig. 67h–j, l, m.  
*Philocheras angustirostris*. — Chace 1984: 40.

**Material examined.** Australia, WA. Northwest Shelf, between Port Hedland and Dampier, 19°12'S, 118°41'E, 79 m, 04.VI.1983 (stn NWA 15), NMV J46170 (1 specimen, pochl 2.2 mm); 20°01–00'S, 117°17–18'E, 46 m, 02.VI.1983 (stn NWA 5), NMV J40940 (8 specimens, pochl 2.8–3.8 mm); 19°37'S, 118°53'E, 30 m, 03.VI.1983 (stn NWA 14), NMV J40938 (2 specimens, pochl 3.0, 3.2mm); 20°20'S, 115°58–59'E, 42 m, 09.VI.1983 (stn NWA 38), NMV J40945 (1 specimen), NMV J40943 (1 specimen, pochl 3.8mm); 19°05'S, 117°26–46.23'E, 120 m, 12.VI.1983 (stn NWA 52), J58872 (1 specimen. pochl 1.2mm); 19°29.65'S, 118°52.8'E, 37–38 m, 25.X.1983 (stn S02-83 D4), NTM Cr. 16685 (8 specimens, pochl 2.7–3.6 mm); Northwest Shelf, 19°05.4'S, 118°53.7'E, 82 m, 27.IV.1983 (stn S02-83 B4), NTM Cr. 2763 (1 specimen, pochl 4.2mm); 19°45.7'S, 117°51.9'E, 54 m, 20.II.1983 (stn S01/83/B13), NTM Cr. 16680 (1 ovigerous female, pochl 4.0 mm); 19°29'S, 118°52'E, 40 m, 26.IV.1983 (stn NWS-08), NTM Cr. 16563 (1 specimen, pochl 2.9 mm).

**Type locality.** The type series came from Indonesian localities: Batjulmati, Java (reef); Labuhan Badjo, western Flores (to 40 m); between Misool and New Guinea (32 m): and Djedan, Kepulauan Aru (13 m).

**Distribution.** Arabian Sea to Indonesia. Australia; Western Australia; 13–120 m.

**Remarks.** This species resembles *Philocheras brucei* Komai, 2004, known only from the type locality in Queensland because of the narrow setose rostrum and midlateral spine on the antennal scale. *P. angustirostris* is readily distinguished by the interrupted dorsal carina (which is continuous in *P. brucei*).

***Philocheras anthonyi* sp. nov.**

(Figs. 1, 2)

**Type material.** Holotype. Australia, Western Australia, Imperieuse L23 east transect, 17°35.98'S, 118°59.08'E to 17°38.56'S, 119°01.26'E), 222 m, 16.VI.2007 (stn SS05-2007 063), WAM C40390 (male, pochl 10.6 mm); paratypes: same locality, NMV J57302 (2 ov. females, pochl 9.2–9.7 mm).

**Etymology.** Named for my husband, Anthony David Taylor.

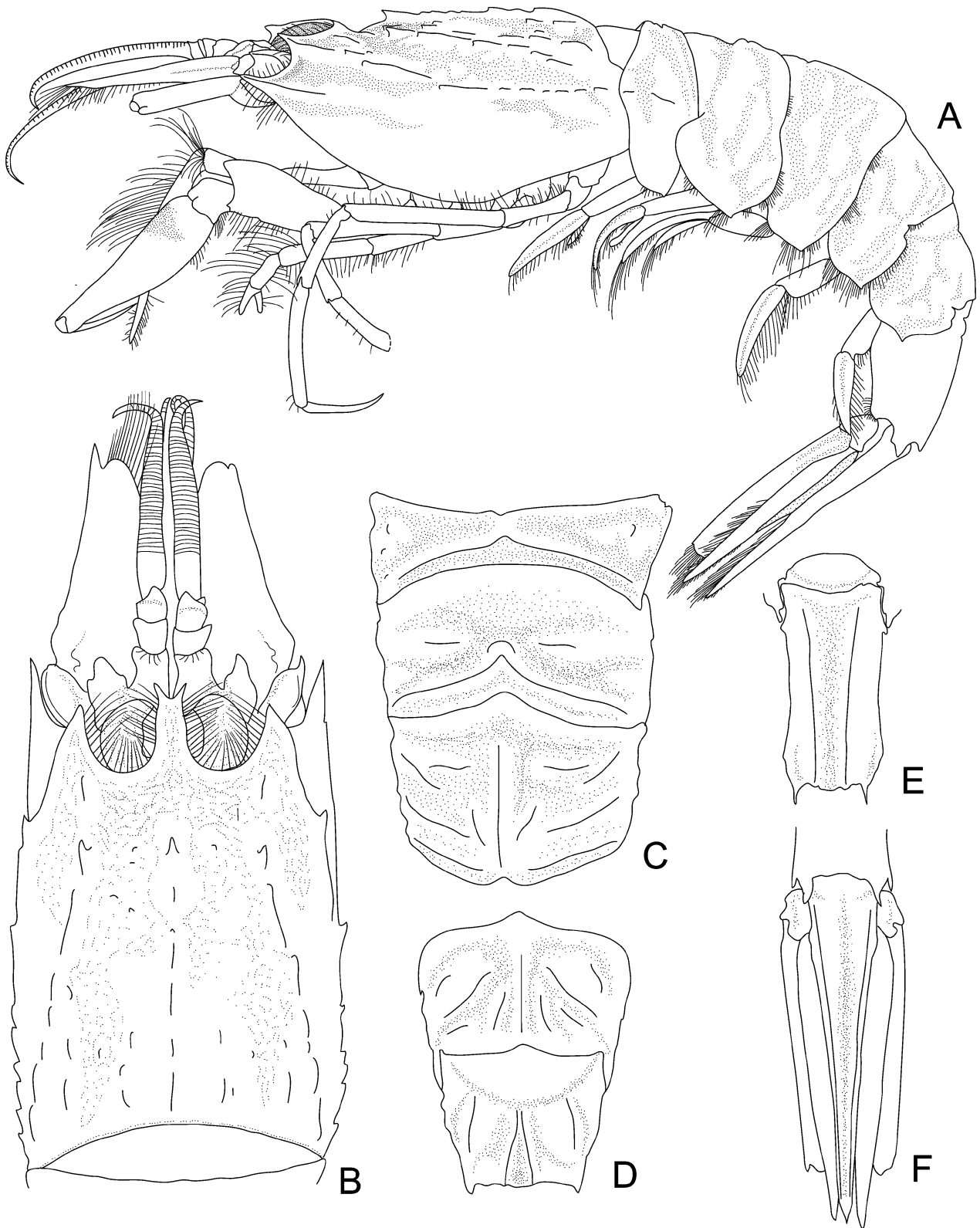
**Description.** Based on holotype male. Body stout (Fig. 1A). Rostrum (Fig. 1B) with distal margin deeply excavate with lateral horns (bifid), 0.18 of carapace length, directed forward, reaching beyond anterior margin of cornea of eyes; dorsal surface (Fig. 1B) deeply concave; lateral margins elevated, without setae, orbital margin without setae. Carapace slightly longer than broad; surface without setae or pubescence; without postorbital longitudinal suture; dorsal midline carinate with an indistinct discontinuous middorsal ridge extending from mid-dorsal spine to posterior margin; first tooth (epigastric tooth) arising 0.15 of carapace length; posterior to antennal tooth is a small tooth positioned in line with epigastric tooth followed by a discontinuous ridge, hepatic tooth arising anteriorly to level of epigastric tooth; branchial carina present; orbital margin concave, without cleft; antennal tooth broad, acute; branchiostegal tooth large, nearly reaching dorsodistal margin of antennal basicerite.

Abdomen (Fig. 1A) widest at first somite, becoming narrow at fifth somite. First somite (Fig. 1C) with distinct transverse carina along posterodorsal margin on tergum, without median carina; lateral longitudinal carina present but indistinct. Second somite (Fig. 1C) with two faint transverse carinae on tergum; posterodorsal margin without median notch. Third somite (Fig. 1C) with distinct median carina; tergum with four carinae, posterodorsal margin with median notch. Fourth somite (Fig. 1D) with median carina, posterodorsal margin with shallow median notch, tergum and pleuron sculptured by transverse carinae. Fifth somite (Fig. 1D) with median carina bifurcate posteriorly; tergum with transverse carina laterally. Sixth somite (Fig. 1E) 1.4 times longer than fifth somite, with two submedian carinae; posterolateral process rounded; posterventral angle forming subacute tooth. Telson (Fig. 1F) 1.8 times longer than sixth somite, tapering posteriorly and terminating in small triangular projection; dorsal surface with median sulcus, lacking dorsolateral spines; dorsolateral ridges distinct along entire length of telson.

First to fifth pleonal sternites each with blunt median tubercle.

Antennular peduncle (Fig. 1B) just falling short of midlength of antennal scale. First segment longer than distal 2 segments combined, dorsal surface somewhat excavate to accommodate eye-stalk; distolateral angle produced, reaching anterior margin of first segment. Second segment about as long as wide, with slightly produced distolateral angle. Third segment narrower than second segment. Lateral flagellum overreaching distal margin of antennal scale by about one third, composed of approximately 35 articles (basal article occupying about 0.3 length). Antennal scale with distolateral tooth extending beyond rounded distal lamella. Mouthparts not dissected.

First pereopod (Fig. 2A, B) stout, overreaching distal margin of antennal scale by half length of palm; palm 3.0 times longer than wide; cutting edge oblique, with submarginal row of short setae dorsally and ventrally; pollex basally articulated, straight; dactylus curved; carpus short, with small ventrodorsal tooth on lateral margin and cluster of grooming setae on mesial surface; merus large dorsodistal margin rounded, distolateral margin with 1 blunt tooth, ventral margin sparsely setose; exopod absent. Second pereopod (Fig. 2C) reaching distal margin of carpus of anteriorly extended first pereopod, chelate; dactylus 1.8 length of palm, without unguis; chela 0.78 length of carpus, with rows of long stiff setae on dorsal and ventral margins; pollex without unguis; carpus half length of merus, with long setae on each dorsal and ventral margins; merus and ischium with row of long setae on dorsal and ventral margins; ischium slightly shorter than merus. Third pereopod (Fig. 2D) very slender, dactylus 0.38 length of propodus, terminating in acute tip; carpus elongate, 1.69 times longer than distal two segments combined; merus slightly longer than ischium. Fourth pereopod (Fig. 2E) moderately stout; dactylus 0.72 length of propodus, slender, curved; ventral surface of dactylus smooth; propodus with stiff setae marginally; carpus 0.60 length of propodus; merus and ischium with long setae on dorsal and ventral surfaces, merus about 1.25 times longer than ischium and about 7.8 times longer than high. Fifth pereopod (Fig. 2E) dactylus 0.72 length of propodus, slender, slightly curved; ventral surface of dactylus smooth; propodus with stiff few setae marginally; carpus 0.60 length of propodus; merus and ischium with sparse setae on dorsal and ventral surfaces, merus about twice length of ischium and about 9.4 times longer than high.



**FIGURE 1.** *Philocheras anthonyi* sp. nov., holotype male, 10.6 mm, WAM C40390, Northwestern Australia: A, entire animal in lateral view (pereopod 3 missing); B, carapace and rostrum, dorsal view; C, pleonal somites 1-3, dorsal view; D, pleonal somites 4-5, dorsal view; E, pleonal somite 6, dorsal view; F, telson and uropods, dorsal view.



**FIGURE 2.** *Philocheras anthonyi* sp. nov., holotype male, 10.6 mm, WAM C40390, Northwestern Australia: A, subchela of left first pereopod, mesial view; B, subchela of left first pereopod, lateral view; C, left second pereopod, lateral view; D, left third pereopod, lateral view; E, right fourth pereopod, lateral view; F, left fifth pereopod, lateral view; G, left first pleopod (some setae omitted); H, left second pleopod (some setae omitted); I, left third pleopod (some setae omitted).

Pleopods with stout protopods. Endopod of first pleopod (Fig. 2G) about 0.4 length of exopod, tapering distally; endopods of second (Fig. 2H) and third pleopods (Fig. 2I) 0.6-0.7 length of exopods, with appendix internae. Appendix masculina on second pleopod distinctly longer than appendix interna but not reaching tip of endopod, armed with several long setae on subtruncate distal margin.

Endopod of uropod (Fig. 1F) moderately narrow, longer than exopod, overreaching tip of telson, tapering distally; exopod falling short of tip of telson, lateral margin nearly straight, terminating in small tooth.

**Colour in life.** First pereopod has distinctive red 'spotty' pigmentation on the dorsal surface and part of lateral and mesial surface of posterior end of propodus.

**Distribution.** Australia. Western Australia (17°35'59"S, 118°59'05"E to 17°38'34"S, 119°01'16"E), 222 m.

**Remarks.** This new species shares a bifid rostrum with *P. angustirostris* and *P. incisus* but is easily distinguished from them by the smooth lateral margin of the antennal scale which lacks a tooth or serration. It can also be distinguished by the presence of a middorsal carina on abdominal somites 3-6 and by the number and arrangement of dorsal spines on the carapace. The red pigmentation on the first pereopod of freshly collected material makes it quite distinctive from other *Philocheras* collected off Western Australia.

### ***Philocheras incisus* (Kemp, 1916)**

(Fig. 3)

*Pontophilus incisus* Kemp, 1916: 357, pl. 8, fig. 1. — De Man, 1920: 278, pl. 22, fig. 66, 66a. — Calman, 1939: 220. —

Fujino & Miyake, 1970: 287, fig. 18.

*Philocheras incisus*. — Chace, 1984: 40.

*Philocheras* sp. MoV 5422. — Poore *et al.*, 2008: 81.

**Material examined.** Australia, WA, Shark Bay, 25°55.78–55.98'S, 112°40.08–40.86'E, 120 m, 07.XII.2005 (stn SS10-2005 115), NMV J55453 (1 specimen, pocl 3.3 mm); off Ningaloo North, 21°58.68–59.30'S, 113°50.2150.10'E, 106 m, 12.XII.2005 (stn SS10-2005 162), NMV J54487 (1 ov. female, pocl 5.3 mm); off Ningaloo South, 22°04.46–04.70'S, 113°48.83–48.78' E, 101 m, 09.XII.2005 (stn SS10-2005 141), NMV J54500 (1 specimen, pocl 4.5 mm; 1 ov. female, pocl 4.7 mm); Northwest Shelf, 19°04.3'S, 118°47.8'E, 80 m, 27.IV.1983 (stn. S02-83 106), NTM Cr. 16566 (2 ov. females, pocl 4.2, 4.8 mm; 1 ov. female); 19°05.2'S, 118°53.7'E, 82–83 m, 15.II.1983 (stn. S01-83), NTM Cr. 4455 (3 specimens, pocl 3.3–3.7 mm; 1 ov. female, pocl 4.8 mm); 19°59.25'S, 117°3.65'E, 52 m, 22.II.1983 (stn S01-83 B16), NTM Cr. 2782 (1 specimen, pocl 4.7 mm); 19°45.7'S, 117°51.9'E, 54 m, 20.II.1983 (stn S01-83 B13), NTM Cr. 16688 (1 specimen, pocl 3.5 mm); Northwest Shelf (further data unknown), IV.1983 (stn S02-83 092), NTM Cr. 16686 (1 specimen, pocl 4.1 mm); 28.IV.1983 (stn S02-83 138), NTM Cr. 16687 (3 specimens, pocl 3.2–4.0 mm). IV.1983 (stn S02-83 101), NTM Cr. 16689 (1 specimen, pocl 4.1 mm).

**Type locality.** Port Blair, Andaman Islands; 4–22 m.

**Distribution.** Gulf of Oman to Philippines; Japan; Australia, Western Australia. Depth: subtidal to 153m.

**Remarks.** The arrangement of dorsal spines on the carapace together with the broad, bifid rostrum and setose orbital margin distinguish this species from other Australian *Philocheras*.

### ***Philocheras japonicus* (Doflein, 1902)**

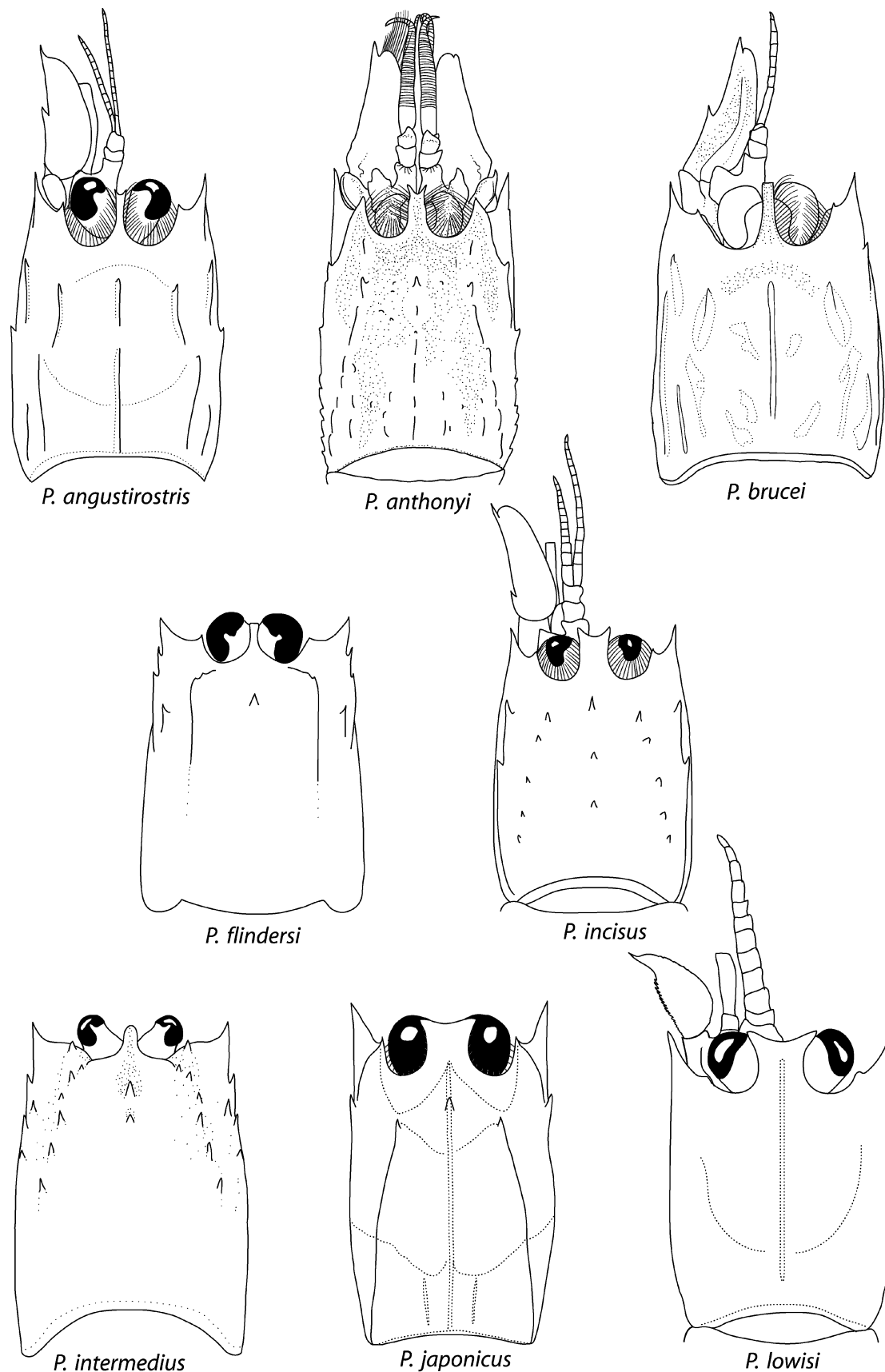
(Fig. 3)

*Pontophilus japonicus* Doflein, 1902: 621, 642, fig. B, pl. 3: fig. 6. — De Man 1920: 286, pl. 23: fig. 69a–c, e, g–i, pl.

24: fig 69d, f, j. — Fujino & Miyake 1970: 290, fig. 19.

*Philocheras japonicus*. — Chace 1984: 40.

**Material examined.** Australia, WA, Northwest Shelf, between Port Hedland and Dampier (19°59.00–59.4'S, 117°51.4–50.4'E), 42 m, 18.II.1983 (stn NWA 1), J40941 (2 specimens).



**FIGURE 3.** Carapace (dorsal view) of *Philocheras* species reported from Australian waters: *P. angustirostris* redrawn from De Man (1918: pl. 22 fig. 67); *P. anthonyi* reproduced from type illustration herein (fig. 1B); *P. brucei* redrawn from Komai (2004: fig. 1); *P. flindersi* redrawn from Poore (2004: fig. 36g); *P. incisus* redrawn from Kemp (1916: pl. 8 fig. 1); *P. intermedius* redrawn from Poore (2004: fig. 36h); *P. japonicus* redrawn from De Man (1918: pl. 23 fig. 69); *P. lowisi* redrawn from Kemp (1916: pl. 8 fig. 2).



**Type locality.** Southern Sagami Nada, Japan.

**Distribution.** Japan and Philippines; Australia, Western Australia; 42–522 m.

**Remarks.** This species shares the minutely dentate lateral margin of the antennal scale and a broad rostrum with *P. lowisi*. It can be readily distinguished by the lack of a lateral spine on the antennal scale (present in *P. lowisi*) and the placement of spines and carina on the carapace.

### ***Philocheras lowisi* (Kemp, 1916)**

(Fig. 3)

*Pontophilus lowisi* Kemp, 1916: 361, pl. 8 fig. 2.

*Philocheras lowisi*. — Bruce 1994: 752, fig. 2.

**Material examined.** Australia, WA, Northwest Shelf, between Port Hedland and Dampier, 19°05'S, 117°26.00–46.23'E, 120 m, 12.VI.1983 (stn NWA 52), J40944 (5 specimens, pochl 1.3–1.8 mm); 19°38–37'S, 118°06–05'E, 49 m, 13.VI.1983 (stn NWA 56), J58874 (3 specimens, pochl 0.8–1.7 mm); 20°01–00'S, 117°17–18'E, 46 m, 02.VI.1983 (stn NWA 5), J58875 (1 specimen, pochl 1.6 mm).

**Other material.** Australia, WA, (stn SO283), NTM Cr16608 (22 specimens).

Type locality. Port Blair, Andaman Islands; 4–20 m.

**Distribution.** Andaman Sea, Hong Kong to Japan; Australia: Timor Sea; Western Australia. Depth: sublittoral to 120m.

**Remark.** See remarks for *P. japonicus*.

### ***Philocheras modestus* (De Man, 1918)**

(Fig. 4)

*Pontophilus modestus* De Man, 1918: 162. — De Man 1920: 274, pl. 22: fig. 65, a–j.

*Philocheras modestus*. — Chace 1984: 41.

**Material examined.** Australia, WA, Northwestern Australia, Mermaid L24 north transect, 17°01.1–01.81'S, 119°35.46–35.00'E, 451 m, 18.VI.2007 (stn SS05-2007 80), NMV J57301 (1 specimen); Mermaid L24 south transect, 17°11.86–12.75'S, 119°33.65–33.46'E, 439 m, 18.VI.2007 (stn. SSO5-2007 78), NMV J57299 (1 specimen); Mermaid L24 east transect, 17°02.83–03.71'S, 119°39.68–41.36'E, 424 m, 18.VI.2007 (stn SS05-2007 77), NMV J57300 (1 specimen).

**Type locality.** West of Kepulauan Ewab, Indonesia; 304 m.

**Distribution.** Indonesia; Australia, Western Australia; 296–457 m.

**Remarks.** The short narrow rostrum, lack of lateral spine on antennal scale and presence of post orbital carina distinguish this species from others recorded from Australia.

### ***Philocheras planoculminus* Bruce, 1994**

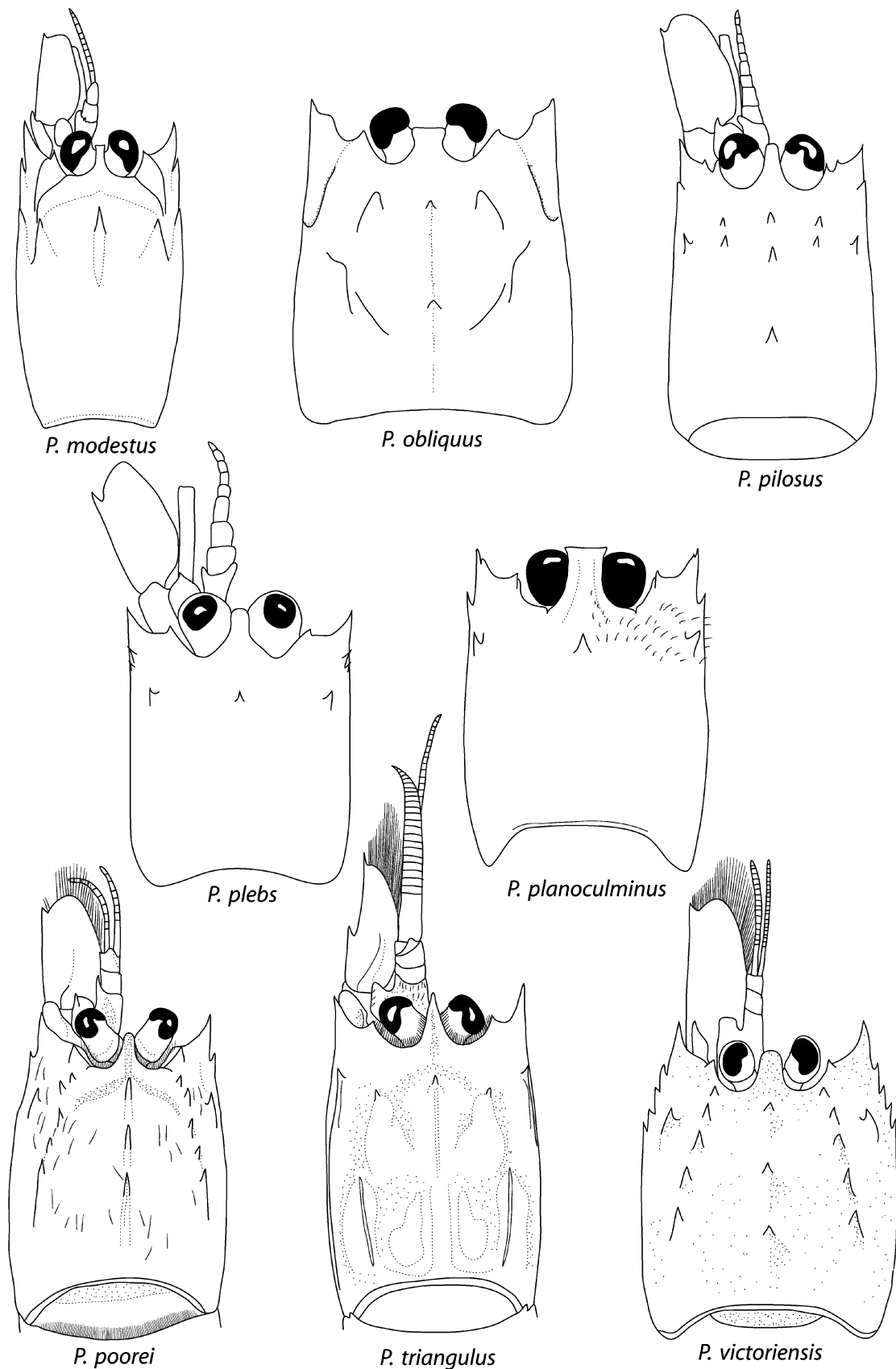
(Fig. 4)

*Philocheras planoculminus* Bruce, 1994: 753, fig. 3.

**Material examined.** Australia, Western Australia, Northwest Shelf, between Port Hedland and Dampier, 19°38–37'S, 118°06–05'E, 49 m, 13.VI.1983 (stn NWA 56), NMV J40946 (4 specimens, pochl 1.0–2.9 mm); 20°01–00'S, 117°17–18'E, 46.0 m, 02.VI.1983 (stn NWA 5), NMV J58873 (3 specimens, pochl 1.3–2.7 mm).

Type locality. Flat Top Bank, Timor Sea; 30 m.

**Distribution.** Flat Top Bank, Timor Sea; North West Shelf, Western Australia; 30–49 m.



**FIGURE 4.** Carapace (dorsal view) of *Philocheras* species reported from Australian waters: *P. modestus* redrawn from De Man (1918: pl. 22 fig. 65); *P. obliquus* redrawn from Poore (2004: fig. 36i); *P. pilosus* redrawn from Kemp (1916: pl. 8 fig. 4); *P. plebs* redrawn from Kemp (1916: pl. 8 fig. 5); *P. planoculminus* redrawn from Bruce (1994: fig 3a); *P. poorei* redrawn from Komai (2008: fig 2a); *P. triangulus* redrawn from Komai (2006: fig 3a); *P. victoriensis* redrawn from Poore (2004: fig 36c).

**Remarks.** This species can be distinguished from other Australian *Philocheras* by the lack of spines or serrations on the lateral margin on the antennal scale and the broad rostrum. The carapace is dorsally smooth, lacking of carinae and bearing a single tooth on the dorsal midline.

***Philocheras plebs* (Kemp, 1916)**

(Fig. 4)

*Pontophilus plebs* Kemp, 1916: 361, pl. 8: fig. 5.

*Philocheras plebs*. — Komai 2008: 395 (list).

**Material examined.** Australia, WA, Northwestern Australia, Kulumburu L29 transect, 13°27.63–28.35'S, 124°01.2–01.43'E, 101 m, 06.VI.2007 (stn SS05-2007 171), NMV J57298 (1 specimen); Northwest Shelf, between Port Hedland and Dampier, 19°12'S, 118°41'E, 79.0 m, 04.VI.1983 (stn NWA 15), NMV J40942 (2 ov. females, pocl 5.0, 5.5 mm); Northwest Shelf, 19°05.4'S, 118°53.7'E, 82 m, 27.IV.1983 (stn SO2-83 B4), NTM Cr. 2767 (4 specimens, pocl 2.5–5.5 mm); 19°04.4'S, 118°47.55'E, 83 m, 27.IV.1983 (stn SO2-83 B6), NTM Cr. 2764 (1 specimen, pocl 2.9 mm); 19°05.2'S, 118°53.7'E, 82–83 m, 15.II.1983 (stn SO1-83), NTM Cr. 16784 (1 specimen, pocl 4.4 mm); 19°05'S, 118°57.8'E, 82 m, 28.IV.1983 (stn SO2-83 124), NTM Cr. 16570 (5 specimens, pocl 5.6–6.6 mm); no further data, IV.1983 (stn SO2-83 101), NTM Cr. 16571 (2 specimens, pocl 6.8, 8.0 mm); IV.1983 (stn SO2-83 092), NTM Cr. 16572 (5 specimens, pocl 3.9–6.1 mm); IV.1983 (stn SO2-83 089), NTM Cr. 16574 (6 specimens, pocl 3.5–6.5 mm). 28.IV.1983 (stn SO2-83 138), NTM Cr. 16575 (3 specimens, pocl 4.0–5.4 mm).

**Distribution.** Port Blair, Andaman Islands. Australia, Western Australia; 3.6–101 m.

**Remarks.** The single spine and lack of carina on the mid-dorsal line of the carapace, and lack of lateral spine on antennal scale distinguish this species from other Australian species.

**Acknowledgments**

Thanks to the contributions made by staff, students and volunteers in the Marine Invertebrates Department at Museum Victoria. The preliminary identifications of the material lodged at MV were made by Gary Poore, Anna McCallum and Caroline Farrelly. Collection management support was provided by Chris Rowley and David Staples. David Collins prepared the habitus and first pereopod illustrations of *Philocheras anthonyi* sp. nov. Special thanks to Gary Poore for his constructive comments after reading the manuscript draft. Thanks to Alan Williams and Rudy Kloser from CSIRO Marine and Atmospheric Research (CMAR) who were largely responsible for the sampling design of the “Voyages of Discovery” research program which generated a large proportion of the material listed in this report. Thanks to staff at the Northern Territory Museum and Art Gallery, Darwin, my wonderful hosts during my visit to examine their collections. The collection management support provided by Suzanne Horner and Gavin Daly was particularly appreciated as was the loan of NTM material. I wish to acknowledge Sandy Bruce for the preliminary identifications of the NTM material and thank him for his continual encouragement to work on crangonids and for his help obtaining references. My visit to Darwin was approved and funded from the Museum Victoria collection management budget by Dermot Henry. I acknowledge the Commonwealth Department of the Environment and the CSIRO Wealth from Oceans Flagship that provided funds for the laboratory components of the “Voyages of Discovery” program. I am grateful to the reviewers, especially Dr Tomoyuki Komai, whose comments and corrections greatly enhanced the final manuscript. Thanks to my husband Anthony for keeping my daughters Rhiannon and Alannah entertained during my visit to Darwin and during many hours of work on my return.

## Literature cited

- Bate, C.S. (1863) On some new Australian species of Crustacea. *Proceedings of the Zoological Society of London*, 1863, 498–505.
- Bruce, A.J. (1994) Shrimps from flat-top bank, Timor Sea (Crustacea: Decapoda: Caridea). *The Raffles Bulletin of Zoology*, 42, 743–756.
- Calman, W.T. (1939) Crustacea: Caridea. *The John Murray Expedition 1933–34 Scientific Reports*, 6, 183–224.
- Chace, F.A. (1984) The caridean shrimps (Crustacea; Decapoda) of the Albatross Philippine Expedition, 1907–1910, part 2: families Glyphocrangonidae and Crangonidae. *Smithsonian Contributions to Zoology*, 397, 1–63.
- Coleman, C.O. (2003) "Digital inking": how to make perfect line drawings on computers. *Organisms, Diversity and Evolution*, 3, Electronic supplement 1–14.
- Davie, P.J.F. (2002) *Crustacea: Malacostraca: Phyllocarida, Hoplocarida, Eucarida (Part 1)*. CSIRO Publishing, Melbourne, xii, 551 pp.
- Doflein, F. (1902) Ostasiatische Dekapoden. *Abhandlungen der Bayerischen Akademie der Wissenschaften, München*, 21, 613–670, 6 pls.
- Fujino, T. & Miyake, S. (1970) Caridean and stenopodidean shrimps from the East China and the Yellow Seas (Crustacea, Decapoda, Natantia). *Journal of the Faculty of Agriculture, Kyushu University*, 16, 237–312.
- Fulton, S.W. & Grant, F.E. (1902) Some little known Victorian decapod Crustacea with descriptions of new species. No. II. *Proceedings of the Royal Society of Victoria*, 15, 59–68, pls 8–10.
- Hailstone, S. (1835) Descriptions of some species of crustacean animals; with illustrations and remarks by J.O. Westwood. *The Magazine of Natural History and Journal of Zoology, Botany, Mineralogy, Geology and Meteorology*, 8, 261–277.
- Haworth, A.H. (1825) A New Binary Arrangement of the Macrurous Crustacea. *Philosophical Magazine and Journal*, 65, 183, 184.
- Holthuis, L.B. (1955) The recent genera of the caridean and stenopodidean shrimps (Class Crustacea, Order Decapoda, Supersection Natantia) with keys for their determination. *Zoologische Verhandelingen*, 26, 1–153.
- Kemp, S. (1916) Notes on Crustacea Decapoda in the Indian Museum. VI. Indian Crangonidae. *Records of the Indian Museum*, 12, 355–384.
- Komai, T. (2004) A new species of the crangonid genus *Philocheras* Stebbing (Crustacea: Decapoda: Caridea) from northeastern Australia. *Memoirs of the Queensland Museum*, 49, 665–673.
- Komai, T. (2006) *Philocheras triangulus*, a new crangonid shrimp (Crustacea: Decapoda: Caridea) from the Northern Territory, Australia. *The Beagle, Records of the Museums and Art Galleries of the Northern Territory*, 22, 31–37.
- Komai, T. (2008) A new species of *Philocheras* (Crustacea, Decapoda, Caridea, Crangonidae) from southwestern Australia. *Zoosystema*, 30, 387–398.
- Krøyer, H. (1842) De Hidtil bekjendte nordiske Krangon-Arter. *Naturhistorisk Tidsskrift*, 4, 217–276
- Man, J.G. de (1918) Diagnosis of new species of macrurous decapod Crustacea from the Siboga-Expedition. *Zoologische Mededeelingen*, 4, 159–166.
- Man, J.G. de (1920) Pasiphaeidae, Styloactylidae, Hoplophoridae, Nematocarcinidae, Thalassocaridae, Pandalidae, Psalidopodidae, Gnathophyllidae, Processidae, Glyphocrangonidae and Crangonidae. *Siboga Expeditie*, 39a(3), 1–318, pls 1–25.
- Poore, G.C.B. (2004) *Marine decapod Crustacea of southern Australia. A guide to identification (with chapter on Stomatopoda by Shane Ahyong)*. CSIRO Publishing, Melbourne, 574 pp.
- Poore, G.C.B., McCallum, A.W. & Taylor, J. (2008) Decapod Crustacea of the continental margin of southwestern and central Western Australia: preliminary identifications of 524 species from FRV Southern Surveyor voyage SS10-2005. *Museum Victoria Science Reports*, 11, 1–106.
- Stebbing, T.R.R. (1900) South African Crustacea, part 1. *Marine Investigations in South Africa*, 1, 14–66.
- Ward, T.J. & Rainer, S.F. (1988) Decapod crustaceans of the North West Shelf, a tropical continental shelf of north-western Australia. *Australian Journal of Marine and Freshwater Research*, 39, 751–765.
- Yaldwyn, J.C. (1960) Crustacea Decapoda Natantia from the Chatham Rise: a deep water bottom fauna from New Zealand. *Bulletin, New Zealand Department of Scientific and Industrial Research*, 139, 13–53.
- Yaldwyn, J.C. (1971) Preliminary descriptions of a new genus and twelve new species of natant decapod Crustacea from New Zealand. *Records of the Dominion Museum*, 7, 85–94.