

Redescription of *Hippolyte australiensis* (STIMPSON, 1860) (Crustacea, Decapoda, Caridea)

by Cédric D'UDEKEM D'ACCOZ

Abstract

The South Australian shrimp *Hippolyte australiensis* (STIMPSON, 1860), previously considered a junior synonym of the Indian Ocean species, *Hippolyte ventricosa* H. MILNE EDWARDS, 1837, is elevated to full species rank. It is redescribed in detail on the basis of fresh Tasmanian specimens and of the syntypes of *Caradina cincinnuli* BATE, 1863, a junior synonym of *Hippolyte australiensis*.

Key words : *Hippolyte australiensis*, *Hippolyte ventricosa*, Crustacea, Decapoda, Caridea, Hippolytidae, Indo-Pacific, Australia, taxonomy.

Résumé

La crevette sud-australienne *Hippolyte australiensis* (STIMPSON, 1860), qui était précédemment considérée comme un synonyme plus récent de l'espèce de l'Océan Indien *Hippolyte ventricosa* H. MILNE EDWARDS, 1837, s'avère en être bien distincte. L'espèce est redécrite en détails d'après des spécimens de Tasmanie récemment récoltés et d'après les syntypes de *Caradina cincinnuli* (BATE, 1863), un synonyme plus récent de *Hippolyte australiensis*.

Mots clés : *Hippolyte australiensis*, *Hippolyte ventricosa*, Crustacea, Decapoda, Caridea, Hippolytidae, Indo-Pacifique, Australie, taxonomie.

Introduction

The systematics of the Indo-Pacific genus *Hippolyte* LEACH, 1814 is poorly understood (D'UDEKEM D'ACCOZ, 1996). Many species are only known by their short and often inadequate original descriptions. Several distinct species have previously been lumped together under the name *Hippolyte ventricosa* H. MILNE EDWARDS, 1837, considered the commonest and most widespread Indo-Pacific species of the genus by HOLTHUIS (1947) and CHACE (1997).

In a previous paper (D'UDEKEM D'ACCOZ, 1999), the 'true' *Hippolyte ventricosa* was redescribed on the basis of syntypic material. In the present work, the poorly known related species *H. australiensis* (STIMPSON, 1860) is similarly treated.

Systematics

Hippolyte australiensis (STIMPSON, 1860) (Figs. 1-5)

Virbius australiensis STIMPSON, 1860: 35 (type locality: "In portu Jacksoniensi Australiae").

Caradina cincinnuli BATE, 1863: 500, pl. 40 fig. 3 (type locality: Gulf St Vincent).

Caradina cincinnuli; HASSWELL, 1882: 183.

Virbius australiensis; HASSWELL, 1882: 186.

Hippolyte australiensis; KEMP, 1914: 98, pl. 2 fig. 6.

Hippolyte australiensis; HALE, 1927: 50, ? in part, possibly not fig. 42.

Hippolyte australiensis; HALE, 1928: 91, at least in part, fig. 19 (syntype of *Caradina cincinnuli*).

Hippolyte ventricosa; HOLTHUIS, 1947: 16, 55 in part, not fig. 7-9 (possibly an undescribed species).

Hippolyte australiensis; D'UDEKEM D'ACCOZ, 1996: 112.

Hippolyte ventricosa; CHACE, 1997: 49 (in part), not page 66.

Hippolyte australiensis; EDGAR, 1997: 192, unnumbered colour photograph.

Hippolyte australiensis; DEBELIUS, 1999: 132, left colour photograph.

Material examined

Australia, Gulf St Vincent: 2 females previously identified as *Caradina cincinnuli*, Natural History Museum, London, registration number 1868.81, label indicating "Pres. Mr. G.J. ANGUS" and "Described by Spence BATE: Proc. Zool. Soc., Nov. 1863" [these specimens are obviously syntypes of *Caradina cincinnuli*] — Tasmania, Maria Island, Return Point, 42°38'S – 148°01'E, 2 m depth, from algal washing, Graham EDGAR coll., 01/VI/2000: 47 specimens (38 deposited in the collection of the Institut Royal des Sciences Naturelles de Belgique / Koninklijk Belgisch Instituut voor Natuurwetenschappen, 3 specimens deposited in the Nationaal Natuurhistorisch Museum, Leiden (RMNHD 48679), 2 specimens deposited in the South Australian Museum (SAM C 6005), 2 specimens deposited in the Queensland Museum (QM W 25691), 2 specimens deposited in the Northern Territory Museum (NTM CR 13161)).

Description

No distinct morphological sexual dimorphism. Ratio lateral length (measured from antennal spine to posteriormost lateral part of carapace) / height of carapace = 1.9-2.3. Rostrum 5.9-7.2 times as long as high, straight, long, about as long as

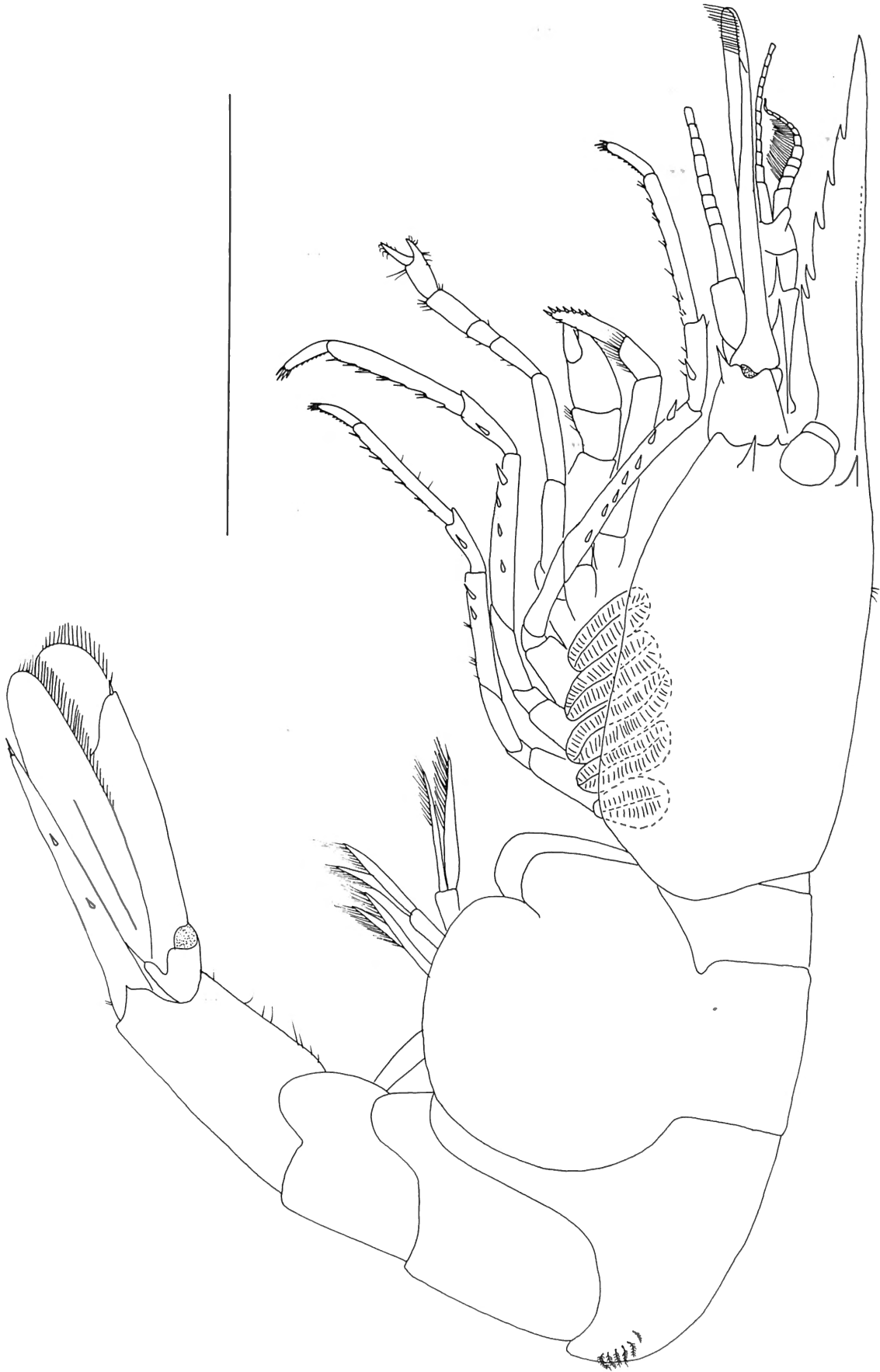


Fig. 1. *Hippolyte australiensis* (STIMPSON), Gulf St Vincent, female (syntype of *Caradina cincinnuli* BATE). Shrimp in lateral view. Scale bar : 5.0 mm.

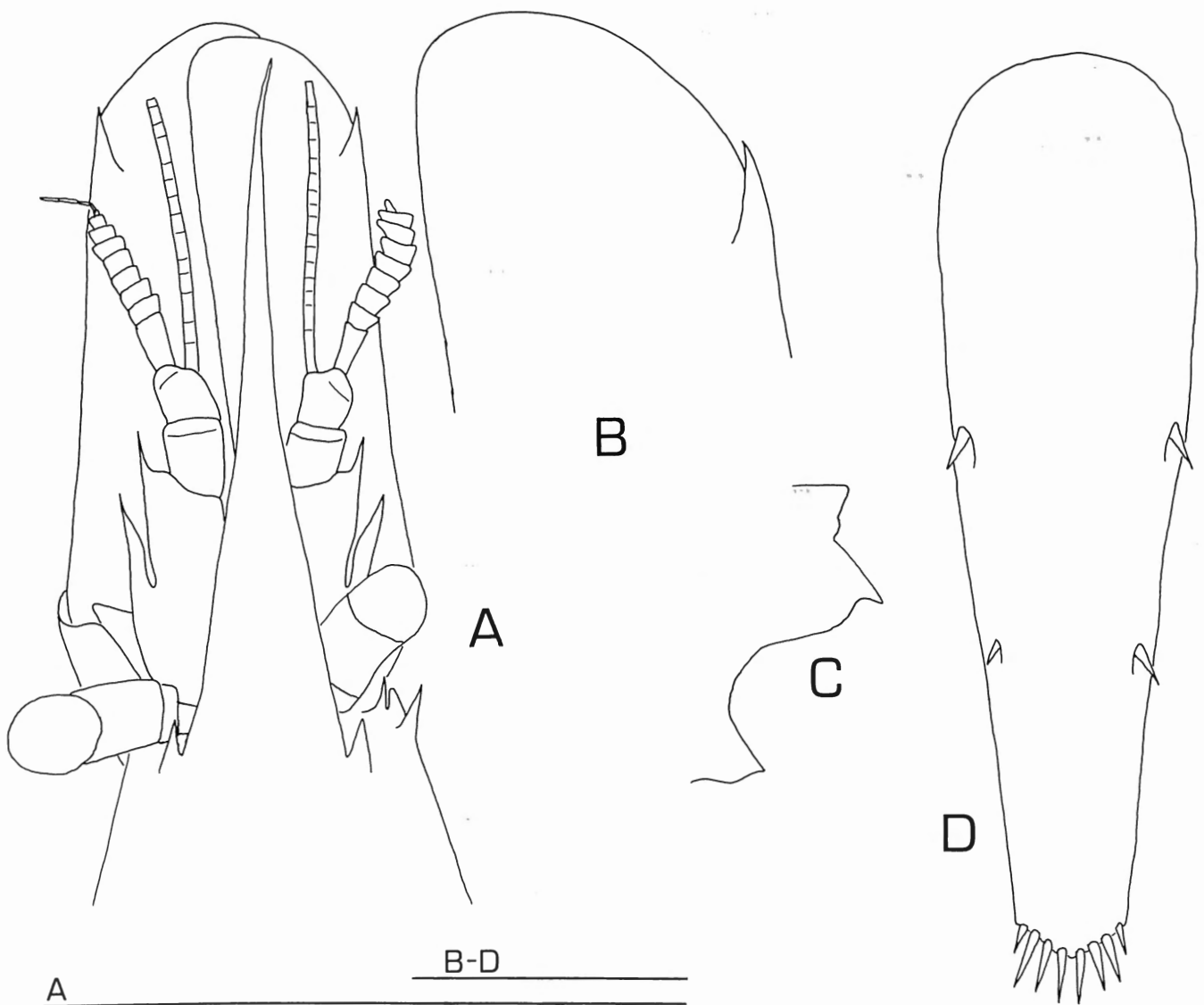


Fig. 2. *Hippolyte australiensis* (STIMPSON), Gulf St Vincent, female (syntype of *Caradina cincinnuli* BATE). A, anterior part of body in dorsal view; B, tip of right scaphocerite; C, tip of 6th pleonite in lateral view; D, telson. Scale bars : A, 5.0 mm; B-D, 1.0 mm.

carapace; distinctly overreaching antennular peduncle; almost reaching apex of scaphocerite. Rostrum with proximal part depressed (only slightly convex when seen in cross section), this depressed dorsal border is limited on each side by a long and very sharp lateral carina; no dorsal teeth; 2-5 (sometimes 1) ventral teeth on the distal 0.6 of the rostrum in the material examined. STIMPSON (1860), BATE (1863), KEMP (1914) and HALE (1928) record specimens with 6 ventral teeth. Antennal tooth distinctly overreaching inferior orbital angle. Hepatic spine reaching or overreaching anterior edge of carapace. Pterygostomian angle moderately protruding.

Third pleonite moderately curved in lateral view. Ratio dorsal length / height of the sixth pleonite = 1.9-2.0. Distal border of telson with 8 strong spines; outer spines are the smallest; no intermediate spinules. First pair of dorsolateral spines on proximal 0.4 of telson and second pair on 0.6.

Unpigmented part of the eyestalk longer than broad and longer than cornea. Cornea overreaching stylocerite apex. Antennular peduncle reaching 0.5 of scaphocerite. First segment of antennular peduncle with 1 distolateral tooth; inner ventral tooth on 0.7 of first segment of antennular peduncle (distolateral tooth not considered); stylocerite medium-sized, reaching 0.77 (distolateral tooth included), or 0.86 (distal tooth excluded) of first segment of antennular peduncle in dissected specimen. Second segment of antennular peduncle about 0.9 times as long as broad in dorsal view, approximately 1.3 times as long as third segment in dorsal view. Outer antennular flagellum shorter than inner. Scaphocerite 3.6 times as long as wide in South-Australian specimens, 3.0-3.1 times as long as wide in the much smaller Tasmanian specimens; distolateral spine of scaphocerite not reaching tip of blade; distolateral spine and blade separated by a distinct notch.

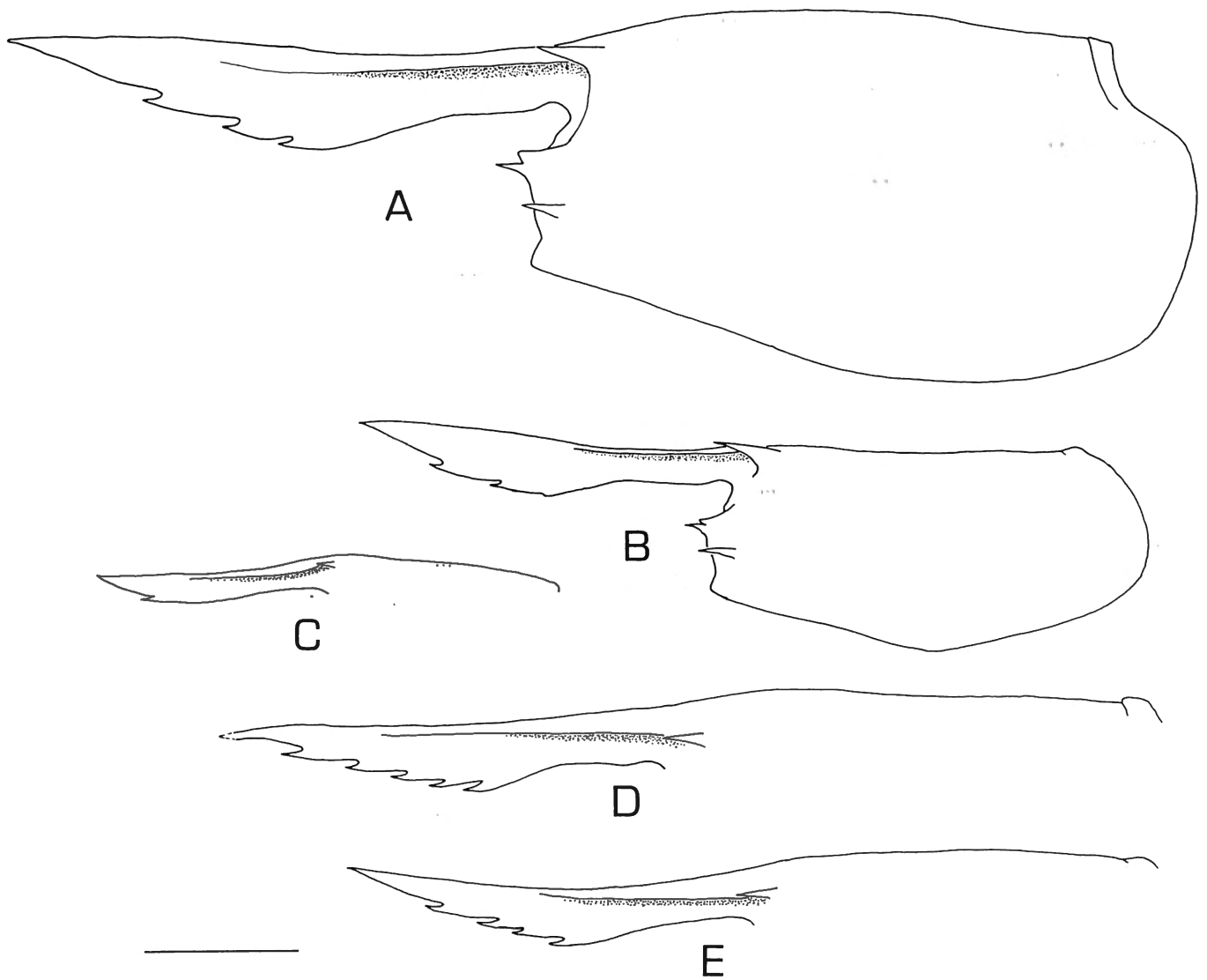


Fig. 3. *Hippolyte australiensis* (STIMPSON), Tasmania. A-B, carapace in lateral view; C-E, dorsal part of carapace in lateral view. A, dissected female; B, dissected male; C-E, female specimens not used for dissection. Scale bar : A-E, 1.0 mm.

Mouthparts with morphology typical for the genus *Hippolyte*. Mandibular incisor process with 3 teeth (3 Tasmanian specimens examined). Second maxilla with upper margin of scaphognathite slightly convex. Epipod of first maxilliped with outer margin slightly notched. Epipod of second maxilliped with outer margin distinctly notched. Third maxilliped very short: when extended forward, it reaches at most 0.2 of the scaphocerite. Ultimate segment of third maxilliped with few rather short apical setae but with 7-9 large conical spines on its apex and the distal third of its inner border; 2.7-3.3 times as long as wide; 1.6-1.7 times as long as penultimate. Exopod of third maxilliped reaching half of antepenultimate segment of endopod.

First pereiopod with outer edges of fingers of chela not denticulate; tip of fixed fingers with 3 massive tooth-like spines; tip of dactylus with 4 massive tooth-like spines, one is bicuspid.

Second pereiopod with first segment of carpus 0.9-1.1 times as long as third segment, 0.7 times as long as second and third segments combined; first segment 2.5-3.1 times as long as wide, second segment 1.0-1.3 times as long as wide, third segment 2.1-2.5 times as long as wide (3 second pereiopods measured). Second pereiopod with 3 distal teeth on fixed finger and dactylus; cutting edges not denticulate.

Extended forward, the third pereiopod reaches about 0.8 of scaphocerite; reaching scaphocerite apex in juveniles with a total length less than 10 mm; merus 5.5-8.3 times as long as wide, carpus 3.0-4.9 times as long as wide, propodus 6.3-10.2 times as long as wide (third pereiopod more slender in the large South-Australian specimens than in the smaller Tasmanian shrimps); merus with 2-7 lateral outer spines, carpus with 1 proximal outer spine, propodus with 6-8 pairs of ventral spines of normal length and robustness, dactylus with 10-13 spines. Merus of the fourth pereiopod with 2-6 spines;

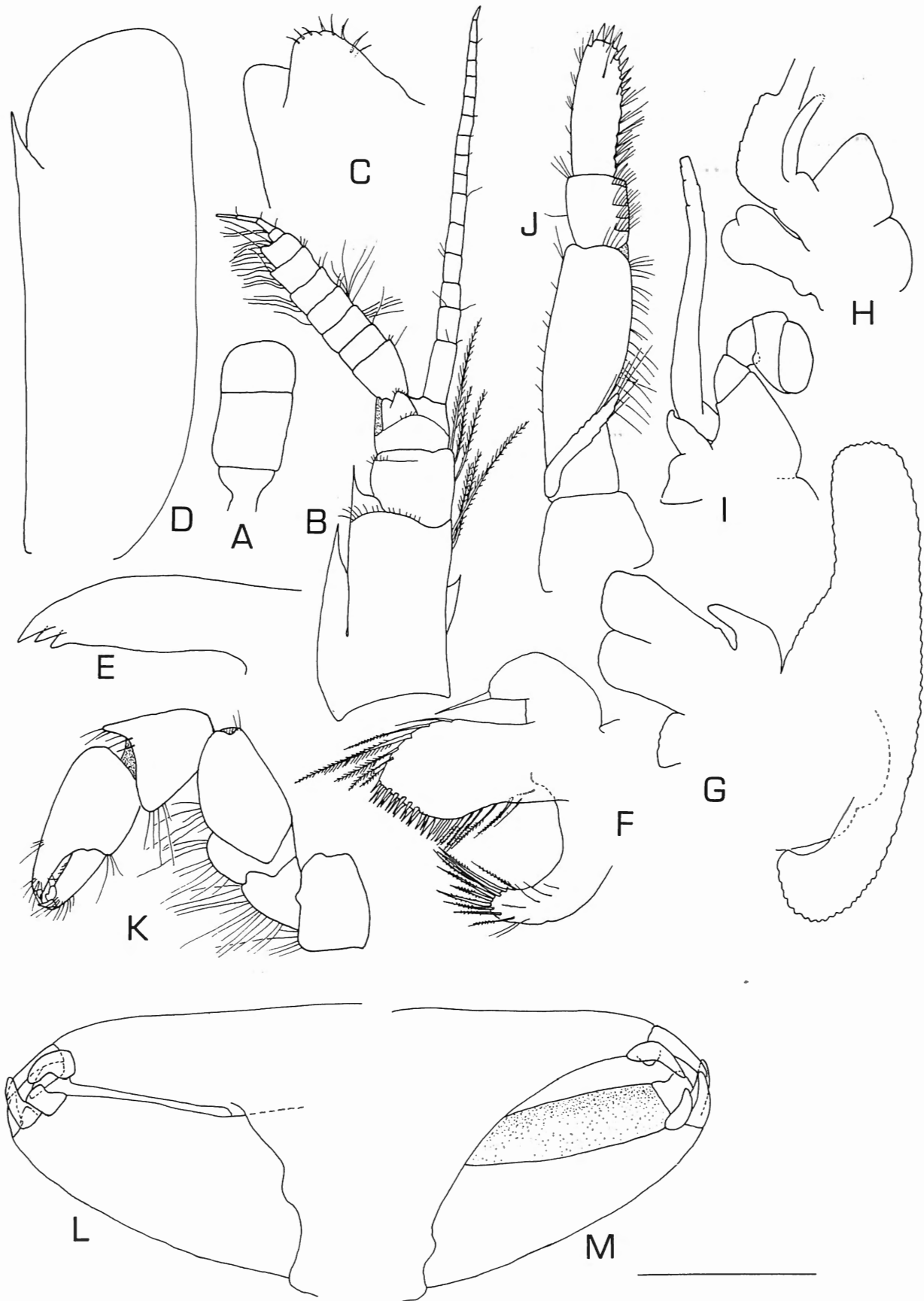


Fig. 4. *Hippolyte australiensis* (STIMPSON), Tasmania. A, H-I, dissected male. B-G, J-L, dissected female. A, left eyestalk in dorsal view; B, left antennula; C, dorsal tip of 3rd segment of left antennular peduncle; D, left scaphocerite; E, incisive process of left mandible; F, left 1st maxilla; G, left 2nd maxilla; H, right 1st maxilliped; I, right 2nd maxilliped; J, left 3rd maxilliped; K, left 1st pereiopod; L, tip of the same in outer view; M, tip of the same in mesial view. Scale bar : A, B, D, J, K, 1.0 mm; F, G, H, I, L, M, 0.50 mm; C, E, 0.25 mm.

merus of the fifth pereopod with 1 (sometimes 2) spines. Dactylus of third to fifth pereopods not especially elongated or broadened; spines all in one row, in ventral and apical positions (none in dorsal or subdorsal positions); 4 apical spines (2 slender spines above 2 robust spines); ventral and apical spines of normal length and width; ultimate spine not fused to dactylus. Dactylus of third to fifth pereopods with ultimate spine distinctly shorter than penultimate spine.

Appendix masculina much shorter than appendix interna, with 5 apical setae (one male dissected).

Some specimens have a few short fascigerous setae.

Colour pattern

"Color viridis" (STIMPSON, 1860). Green marked with brown (HALE, 1928). Green or red (EDGAR, 1997). Colour photographs have been given by EDGAR (1997) and DEBELIUS (1999).

Measurements

The illustrated syntype of *Caradina cincinnuli* is the largest specimen examined. Its total length is 22 mm and its carapace length (measured from the posterior margin of the orbit to the posterior dorsal border of carapace) is 4.5 mm. The largest Tasmanian specimens examined have a total length of about 18 mm. STIMPSON (1860) states that his largest specimen was 1.5 inches long, i.e. 38.1 mm. HALE (1927) indicates that his largest South Australian specimens were 25 mm long.

Types

Although short and incomplete, the original descriptions of *Virbius australiensis* STIMPSON, 1860 and *Caradina cincinnuli* BATE, 1863 agree quite well with the species as described herein. The type material of *Virbius australiensis* STIMPSON, 1860 is assumed to have been lost during the Great Chicago Fire of 1871, as are nearly all STIMPSON's collections (MANNING, 1993). Two specimens from the type series of *Caradina cincinnuli* BATE, 1863 are still extant. One of them is here illustrated (fig. 1-2). The other one has its rostrum broken but is otherwise in good condition.

Ecology

"Inter algas" (STIMPSON, 1860). "Seaweed on exposed reef; 0-15 m depth. The species lives in association with tufted algae" (EDGAR, 1997).

Geographical distribution

Hippolyte australiensis has only been recorded in the Australian temperate waters: New South Wales, South Australia and Western Australia (HALE, 1928), and in Tasmania

(EDGAR, 1997). The type locality of *Virbius australiensis* STIMPSON, 1860 is Port Jackson (= Sydney Harbour), on the southern part of the Eastern Australian coast. The type locality of *Caradina cincinnuli* BATE, 1863 is the Gulf St Vincent, on the Eastern part of the Southern Australian coast.

Remarks

HOLTHUIS (1947) and CHACE (1997) both consider *Hippolyte australiensis* (STIMPSON, 1860) as a junior synonym of *Hippolyte ventricosa* H. MILNE EDWARDS, 1837. However, the South Australian *H. australiensis* examined here differ in many respects from the syntypes of *H. ventricosa*, as described by D'UDEKEM D'ACUZ (1999). The main differences between both species are as follows:

H. ventricosa has 1 or 2 dorsal rostral teeth, while *H. australiensis* has none. In *H. ventricosa*, the proximal dorsal part of the rostrum is strongly convex when seen in cross section, while it is flattened and only slightly convex in *H. australiensis*. In *H. ventricosa*, the rostrum has at most a proximal short and very faint longitudinal mediolateral carina on each side, while in *H. australiensis*, there is a long and extremely sharp longitudinal dorsolateral carina. The tip of the third segment of the antennular peduncle is distinct in both species: present fig. 4C versus fig. 2K of D'UDEKEM D'ACUZ (1999). In *H. ventricosa*, the mandibular incisor process has 6 teeth, while it has only 3 teeth in *H. australiensis*. The third maxilliped reaches 0.4 to 0.6 of the scaphocerite in *H. ventricosa*, versus only 0.2 in *H. australiensis*. The ultimate segment of the third maxilliped is about 3.7 times as long as wide in *H. ventricosa*, but only 2.7-3.3 times as long as wide in *H. australiensis*. In the second pereopod of *H. ventricosa*, the third segment of the carpus is distinctly longer than the first segment, while in *H. australiensis* it is slightly longer or shorter. In *H. ventricosa*, the dactylus of the last three pereopods has 2 terminal teeth (1 slender spine above a robust spine), while there are 4 terminal teeth in *H. australiensis* (2 slender spines above 2 robust spines). In *H. ventricosa*, the appendix masculina has about 11 terminal setae while there are 5 in *H. australiensis*. The variability of this character is however unknown and it should therefore be considered with caution.

All currently known non-Australian *Hippolyte* species exhibit clear-cut differences with *H. australiensis*. On the other hand, the identity of the South-Australian specimen identified and illustrated as *H. australiensis* by HALE (1927) is problematic. Although fairly similar with the material examined, it also exhibits differences. The ventral rostral teeth are unusual, being separated from the rostrum only by a very narrow oblique incision, while they are separated by a large space in the present specimens of *H. australiensis*. Furthermore, the third maxilliped of Hale's specimen reaches the middle of the scaphocerite, while it only reaches 0.2 of the scaphocerite in the present material. The third maxilliped of *H. australiensis* was already described as very short by STIMPSON (1860). These particularities may result from inaccuracies of HALE's drawing or abnormalities of the specimen

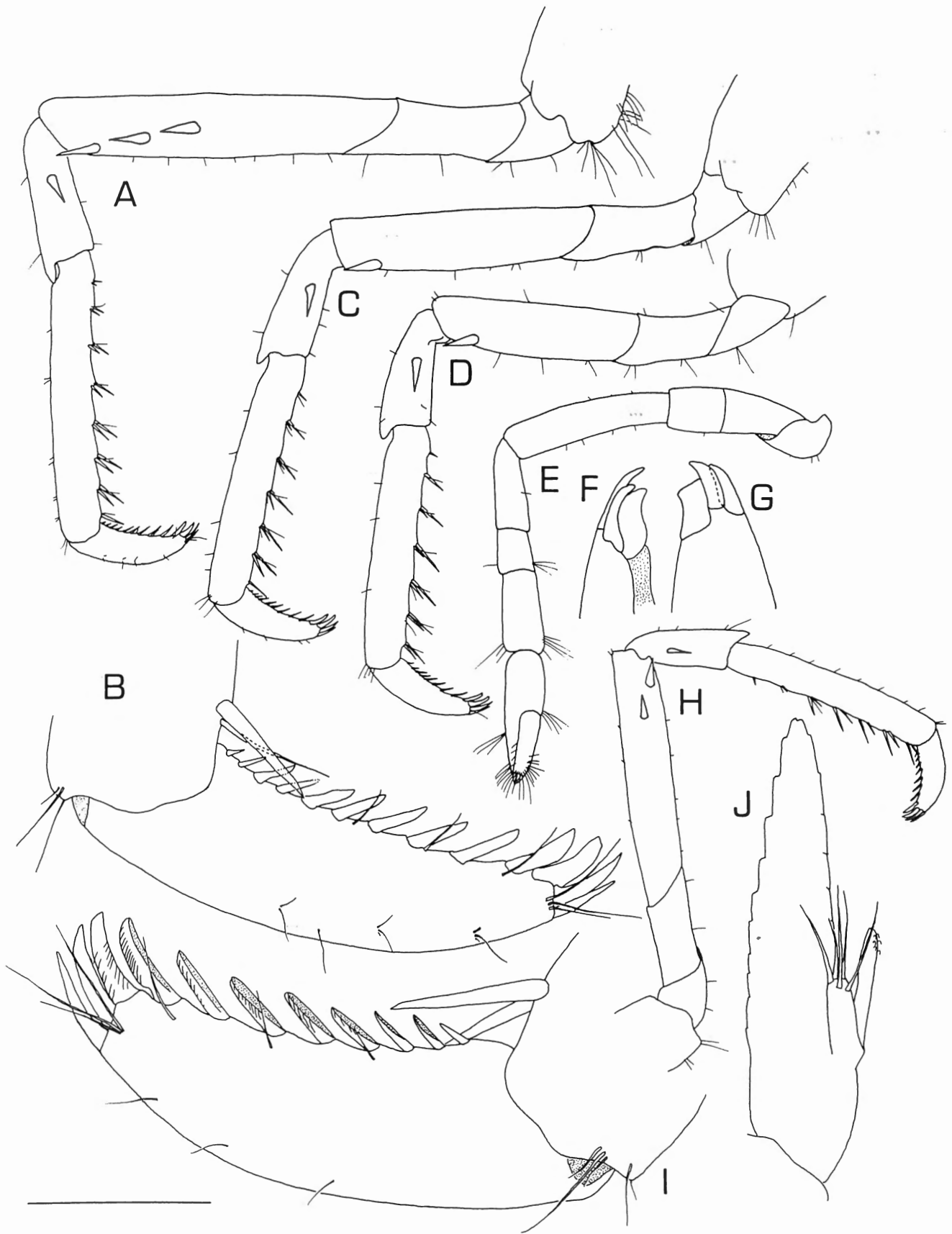


Fig. 5. *Hippolyte australiensis* (STIMPSON), Tasmania. A-E, dissected female; F-G, other female; H-J, dissected male. A, left 3rd pereiopod; B, dactylus of the same; C, left 4th pereiopod; D, left 5th pereiopod; E, left 2nd pereiopod; F, fixed finger tip of right 2nd pereiopod in outer view; G, dactylus tip of right 2nd pereiopod in outer view; H, right 3rd pereiopod (male); I, dactylus of the same; J, endopod of left 2nd pleopod. Scale bar : A, C, D, E, H, 1.0 mm; J, 0.33 mm, I, 0.17 mm; B, F, G, 0.25 mm.

concerned. However, as it may belong to an undescribed species, D'UDEKEM D'ACUZ (1996) treated this specimen as *Hippolyte* sp. A.

Acknowledgments

I am deeply indebted to Dr. Graham EDGAR (University of Tasmania) for collecting the Tasmanian *Hippolyte australiensis* for me, and to Dr. Paul F. CLARK and Ms. Miranda LOWE (The Natural History Museum, London) for the loan of BATE's material of *Hippolyte cincinnuli*.

References

- BATE, C. S., 1863. On some new Australian species of Crustacea. *Proceedings of the Zoological Society of London*, 1863: 498-505 + pls. 40-41.
- CHACE, F. A., 1997. The Caridean Shrimps (Crustacea: Decapoda) of the Albatross Philippine Expedition, 1907-1910, Part 7: Families Atyidae, Eugonatonotidae, Rhynchocinetidae, Bathypalaemonellidae, Processidae, and Hippolytidae. *Smithsonian Contributions to Zoology*, 587: i-v + 1-106.
- DEBELIUS, H., 1999. Crustacea Guide Of The World. IKAN – Unterwasserarchiv, Frankfurt, 321 pp.
- EDGAR, G., 1997. Australian Marine Life. The plants and animals of temperate waters. Reed Books Australia, 544 pp.
- HALE, H. M., 1927. The Crustaceans of South Australia. Handbooks of the Flora and Fauna of South Australia, issued by the British Guild (South Australian Branch) and published by favor of the Honorable the Premier, part 1: 1-201, part 2: 201(bis)-380.
- HALE, H. M., 1928. Some Australian Decapod Crustacea. *Records of the South Australian Museum*, 4: 91-104.
- HASWELL, W. A., 1882. Catalogue of the Australian stalk- and sessile-eyed Crustacea. The Australian Museum, Sydney, i-xxiv + 1-327 + pls. 1-4.
- HOLTHUIS, L. B., 1947. The Hippolytidae and Rhynchocinetidae collected by the Siboga and Snellius Expeditions with Remarks on other species. *Siboga Expeditie Monographie*, 39a(8): 1-100.
- KEMP, S. W., 1914. Notes on Crustacea Decapoda in the Indian Museum V.- Hippolytidae. *Records of the Indian Museum*, 10: 81-129 + pls. 1-7.
- MANNING, R. B., 1993. The scientific contributions of William STIMPSON, an early American naturalist and taxonomist. In: TRUESDALE, F. (Editor), *History of Carcinology*. A. A. BALKEMA, Rotterdam, Brookfield, pp. 109-117.
- STIMPSON, W., 1860. Prodromus descriptionis animalium evertibratorum quae in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro RINGGOLD et Johanne RODGERS Ducibus, observavit et descripsit. *Proceedings of the Academy of natural Sciences, Philadelphia*, 1860: 22-47.
- UDEKEM D'ACUZ, C. d', 1996. The genus *Hippolyte* LEACH, 1814 (Crustacea: Decapoda: Caridea: Hippolytidae) in the East Atlantic Ocean and the Mediterranean Sea, with a checklist of all species in the genus. *Zoologische Verhandelingen, Leiden*, 303: 1-133.
- UDEKEM D'ACUZ, C. d', 1999. Redescription of *Hippolyte ventricosa* H. MILNE EDWARDS, 1837 based on syntypes, with remarks on *Hippolyte orientalis* HELLER, 1862 (Crustacea, Decapoda, Caridea). *Zoosystema*, 21(1): 65-76.

Cédric D'UDEKEM D'ACUZ
Tromsø Museum (Department of Zoology)
University of Tromsø
9037 Tromsø
E-mail : cdudekem@imv.uit.no