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New species and new records of Caridea (Hippolytidae: Pasiphaeidae) from New Zealand*

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Abstract

New species and new records of caridean shrimps are recorded from New Zealand. The hippolytid genera *Leontocaris* and *Merhippolyte*, and pasiphaeid genus *Alainopasiphaea* are reported for the first time from New Zealand waters, exemplified by three species of *Leontocaris*, *Merhippolyte chacei* and *Alainopasiphaea australis*, respectively. The three species of *Leontocaris*, *M. chacei* and *A. australis* were each previously known only from southern Australia. A new species of *Lebbeus*, the second to be recorded from New Zealand, is described. *Lysmata vittata* is recorded for the first time from New Zealand.

Key words: Crustacea, Decapoda, Caridea, *Lebbeus*, *Leontocaris*, *Lysmata*, *Merhippolyte*, *Alainopasiphaea*, New Zealand

Introduction

Deep and shallow water marine surveys conducted around New Zealand over the past decade by the National Institute of Water and Atmospheric Research (NIWA) have resulted in discovery numerous new distributional records and the discovery of new species of decapod Crustacea (e.g., Webber 2004; Bruce 2005; McLay 2007, 2009; Ahyong 2007, 2008, 2009). The caridean shrimp genera *Leontocaris*, *Merhippolyte* and *Alainopasiphaea* are herein reported from New Zealand for the first time, a new species of *Lebbeus* is described, and first records of *Lysmata vittata* from the region are documented.

Materials and Methods

Total carapace length (tcl) is measured along the carapace midline from the tip of the rostrum to the posterior margin of the carapace. Carapace length (cl) is measured from the posterior margin of the orbit to the posterior margin of the carapace. Specimens examined are deposited in the NIWA Invertebrate Collection (NIWA) and NIWA Biosecurity Collection (NIWA (MITS)), both at Wellington, New Zealand, and Museum Victoria, Melbourne (NMV).

Taxonomic Account

Hippolytidae Bate, 1888

***Lebbeus cristatus* sp. nov.**
(Figs. 1–3A)

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Material examined. HOLOTYPE: NIWA 33142, damaged female (tcl 12.7 mm, cl 9.0 mm), 36°54.76'S, 167°32.10'E, Challenger Plateau, New Zealand, 1231–1226 m, epibenthic sled, with sponges and scleractinian coral (*Fungiacyathus fragilis* Sars), TAN0707/50, 30.V.2007.

Diagnosis. Rostrum straight, directed anteroventrally, overreaching eye but not reaching distal margin of antennular peduncle article 1; dorsal margin with 2 sharp teeth on rostrum proper and 2 postorbital teeth, posteriormost tooth arising at anterior quarter of carapace; with 2 ventral distal teeth. Antennal scale 3 times as long as wide; distolateral tooth almost reaching to distal margin of blade. Postrostral median ridge distinct, slender, extending slightly beyond posterior three-fourths of carapace. U-shaped notch ventral to base of supraorbital spine. Abdominal somite 2 with shallow transverse dorsal groove, posteriorly forming low ridge; pleura 1–4 broadly rounded, unarmed; pleuron 5 with posterolateral spine. Telson with 4 pairs of articulated dorsolateral spines; posterior margin convex, with 2 pairs of articulated posterolateral spines and 7 mesial spinules. Antennular peduncle reaching to distal 0.8 of scaphocerite; article 1 with 3 distolateral spines; stylocerite reaching to base of article 2. Pereopods 1–3 with strap-like epipod.

Description of holotype. Body robust, glabrous. Rostrum straight (Fig. 1C), 0.4 times cl, directed anteroventrally, reaching beyond midlength but not to distal margin of antennular peduncle article 1, laterally compressed, tapering to acute apex; dorsal margin with 4 sharp, widely spaced teeth (2 widely spaced teeth on rostrum proper; 2 postorbital); posteriormost tooth arising from anterior quarter of carapace; ventral margin with 2 equal teeth distally; lateral carina weak, extending from base of supraorbital spine to proximal half of rostrum. Postrostral median ridge (Fig. 1A, B) pronounced, slender, extending slightly beyond posterior three-fourths of cl.; general dorsal profile broadly convex. Supraorbital spine strong; U-shaped notch ventral to base of supraorbital spine (Fig. 1C). Anterolateral margin between supraorbital notch and suborbital lobe convex. Suborbital lobe narrowly, slender, apex rounded (Fig. 1D). Antennal spine slender, not overreaching suborbital lobe, without carina. Pterygostomial spine small, slender, not reaching midlength of antennal spine (Fig. 1C). Anterolateral margin between antennal spine and pterygostomial spine convex.

Abdomen rounded dorsally; somite 2 with shallow transverse dorsal groove, posteriorly forming low ridge; somite 3 posterodorsal margin produced; pleura 1–4 broadly rounded, unarmed; pleuron 5 with posterolateral spine (Fig. 1A). Abdominal somite 6 length 1.4 times that of somite 5, 2.0 times height; with blunt posteroventral angle and strong, triangular posterolateral tooth.

Telson (Fig. 1G) length 2.9 times anterior width, 5.8 times posterior width, 1.6 times length of somite 6; margins parallel in anterior third, and tapering posteriorly to convex posterior margin; with 4 pairs of dorsolateral spines; with 2 pairs of posterolateral spines (inner longer), 7 setose mesial spinules and several fine setae.

Thoracic and abdominal sternites unarmed.

Eye subglobular, cornea wider than stalk; ocellus absent; maximum corneal diameter 0.2 times cl (Fig. 1A, D).

Antennular peduncle (Fig. 1D) reaching to distal 0.8 of antennal scale. Article 1 longer than articles 2 and 3 combined; reaching almost to midlength of antennal scale; with 3 distolateral dorsal spines and 1 subdistal ventrolateral spine (Fig. 1E); stylocerite sharp, reaching base of article 2. Article 2 about half as long as article 1; 2.2 times longer than wide; with stout distolateral spine. Article 3 about half as long as article 2; with conical distodorsal spine. Lateral flagellum with thickened aesthetasc-bearing portion 0.4 cl.

Antennal scaphocerite (Fig. 1F) 0.6 times cl, 3.0 times as long as wide; lateral margin faintly concave; distolateral tooth directed anteriorly, almost reaching to broadly rounded distal margin of blade. Basicerite with slender ventrolateral spine. Ultimate peduncle article length 4 times width.

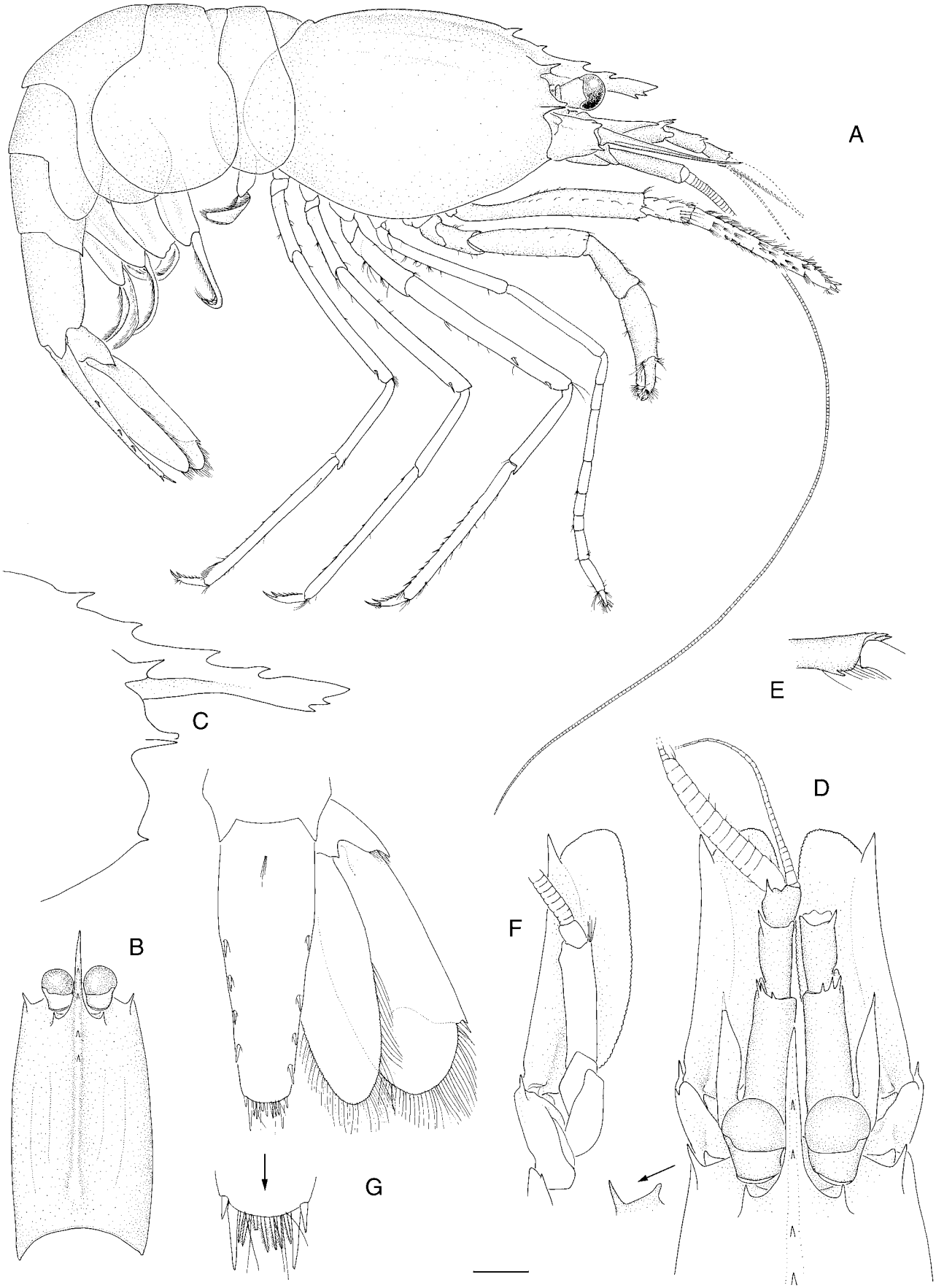

FIGURE 1. *Lebbeus cristatus* sp. nov., female holotype (cl 9.0 mm) (NIWA 33142): A, habitus; B, carapace, dorsal; C, anterior carapace, lateral; D, anterior cephalothorax; E, left antennular article 1, distal end, mesial view; F, right antenna, ventral view; G, telson and right uropod. Scale: A–B = 2.0 mm; C–G = 1.25 mm.

Mouthparts not dissected; mandibular palp 2-articulate.

Maxilliped 3 (Fig. 2A) with 4 articles; exceeding antennal scale by about two-thirds length of ultimate article (= dactylus + propodus). Ultimate article about 3.5 times length of penultimate article (= carpus); with transverse tufts of setae; distodorsally with two rows of 5 or 6 corneous spinules; antepenultimate article (= fused merus, ischium and basis) flattened dorsoventrally, marginally setose; 1 distolateral spine; 1 small distal, articulated, ventrolateral spine. epipod strap-like, distally hooked.

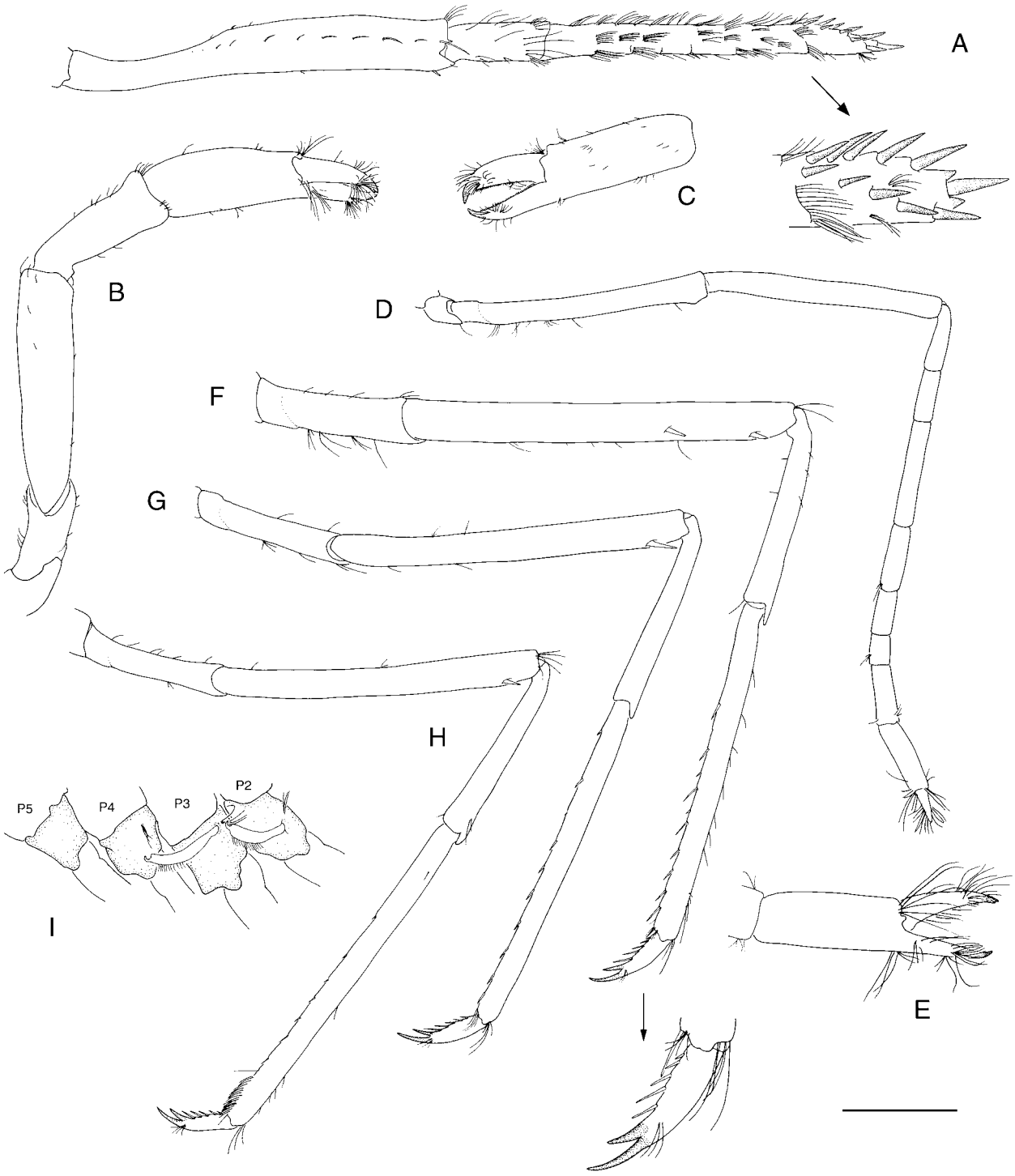

FIGURE 2. *Lebbeus cristatus* sp. nov., female holotype, right appendages (cl 9.0 mm) (NIWA 33142): A, maxilliped 3, lateral view; B, pereopod 1, lateral view; C, right pereopod 1 chela, mesial view; D, right pereopod 2, lateral view; E, right pereopod 2 chela, lateral view; F–H, right pereopods 3–5, lateral view; I, right pereopods 2–5 coxae. Scale: A–D, F–I = 2.0 mm; E = 1.0 mm.

Pereopod 1 (Fig. 2B, C) moderately stout, reaching to about apex of antennal scale. Chela about 1.65 times longer than carpus. Dactylus about 0.6 times as long as palm, strongly curved distally, terminating in 2 parallel corneous claws; occlusal margin entire. Pollex terminating in single corneous claw; occlusal margin entire. Palm subcylindrical. Carpus 2.5 times as long as distal width. Merus subcylindrical, obliquely articulated with ischium; 1.7 times longer than carpus and 4.5 times greatest width; surfaces sparsely setose. Epipod strap-like, distally hooked; setobranch present.

Pereopod 2 slender (Fig. 2D), overreaching antennal scale by half length of chela and carpus combined. Chela small; palm subcylindrical; dactylus 0.7 times as long as palm, with 2 blunt terminal claws. Pollex with 1 terminal claw. Occlusal margins of fingers entire. Carpus 3.9 times longer than chela, 7-articulate, in following ratios from proximal end:
1.0 : 0.8 : 1.6 : 1.0 : 0.7 : 0.5 : 0.9. Merus 0.6 times as long as carpus. Ischium 1.1 times longer than merus. Epipod strap-like, distally hooked; setobranch present.

Pereopods 3–5 long and slender, similar in structure, decreasing slightly in length posteriorly; sparsely setose.

Pereopod 3 (Fig. 2F) overreaching antennal scale by length of propodus; dactylus slender, corneous, bispinous unguis and with single row of 5–7 slender, articulated, corneous spines on flexor margin; propodus 14.3 times longer than high, with 2 rows of flexor spinules; carpus 0.6 times as long as propodus, unarmed; merus 9.6 times longer than deep, with 2 or 3 articulated lateral spines; ischium 0.5 length of merus, unarmed; epipod strap-like, distally hooked; setobranch present.

Pereopod 4 (Fig. 2G) dactylus slender, corneous, bispinous unguis and with single row of 5 or 6 slender, articulated, corneous spines on flexor margin; propodus with 2 rows of flexor spinules; merus with 1 articulated lateral spine distally. Epipod absent; setobranch present.
Pereopod 5 (Fig. 2H) dactylus slender, corneous, bispinous unguis and with single row of 6 slender, articulated, corneous spines on flexor margin; propodus with 2 rows of flexor spinules; merus with 1 articulated lateral spine distally. Epipod absent; setobranch absent.

Uropodal protopod acutely produced posteroventrally; rami subequal in length, extending posteriorly slightly beyond telson apex when folded; endopod length 3 times width; exopod with small articulated spine mesial to smaller distolateral tooth; diaeresis sinuous (Fig. 1G).

Colour in life. (Fig. 3A) Carapace bright red anteriorly; posterior upper quarter and lateral half clear/pale. Abdomen pale, with diffuse, scattered red chromatophores. Antennular and antennal flagella colourless. Maxilliped 3 red. Pereopod 1 red with pale palm. Pereopods 2–5 deep red on proximal half, becoming diffuse to transparent on distal half.

Etymology. Named *cristatus* (Latin) for the long dorsal carina on the carapace.

Remarks. *Lebbeus cristatus* sp. nov. belongs to the group of species within the genus sharing the presence of an epipod on pereopods 1–3, a distinct U-shaped notch below the supraorbital spine; dorsal and ventral rostral spines, and a short rostrum that reaches beyond the eye but not beyond the antennular peduncle article 1 (at least in females). Of these species only two lack an unarmed pleuron on abdominal somite 4 as in *L. cristatus*: *L. antarcticus* (Hale, 1941) from Antarctica and possibly *L. profundus* (Rathbun, 1906) from Hawaii (presence of U- or V-shaped notch below the supraorbital spine not known). The new species can be distinguished from *L. antarcticus* by the longer stylocerite, which reaches to the base of antennular peduncle article 2, rather than to not more than the distal three-fourths of article 1; and a rounded rather than triangular posterior margin of the telson. From *L. profundus*, *L. cristatus* is readily distinguished by the presence of 2 instead of no postorbital spines, and shorter third maxillipeds in which the distal article overreaches the scaphocerite by about two-thirds the distal article length rather than its entire length. In many respects, *L. cristatus* most closely resembles *L. kuboi* Hayashi, 1992 from Japan, particularly in the long postrostral carina on the carapace, robust body form and similar proportions and ornamentation of the antennular peduncle. *Lebbeus cristatus*, however, is readily distinguished from *L. kuboi* by the shorter rostrum (not-reaching versus overreaching the first antennular article), a proportionally wider scaphocerite (3.0 times versus 3.3–3.8 times longer than wide); an unarmed posterolateral margin of pleuron 4; and fewer spines on the meri of pereopods 3–4 (2 or 3 on pereopod 3 and 1 on pereopod 4 versus 5–9 on pereopod 3 and 4–10 on pereopod 4). The

prominence of the dorsal postrostral carina is sexually dimorphic in *L. kuboi*, being slightly shorter and lower in males than mature females (Komai *et al.* 2004). Thus, similar dimorphism can probably be expected when males of *L. cristatus* are found.

Lebbeus cristatus is the second known species of the genus from New Zealand. The only other known *Lebbeus* from the region, *L. wera* Ahyong, 2009 (Fig. 3B), occurs on hydrothermal vents on the southern Kermadec Ridge; it is readily separated from *L. cristatus* by the presence of 5 instead of 2 postorbital spines on the carapace, 4 instead of 6 or 7 pairs of dorsal telson spines, and colouration — more uniform red-orange in *L. wera*, versus red anteriorly and pale posteriorly in *L. cristatus*.

Distribution. Presently known only from the type locality, Challenger Plateau, at 1226–1231 m.

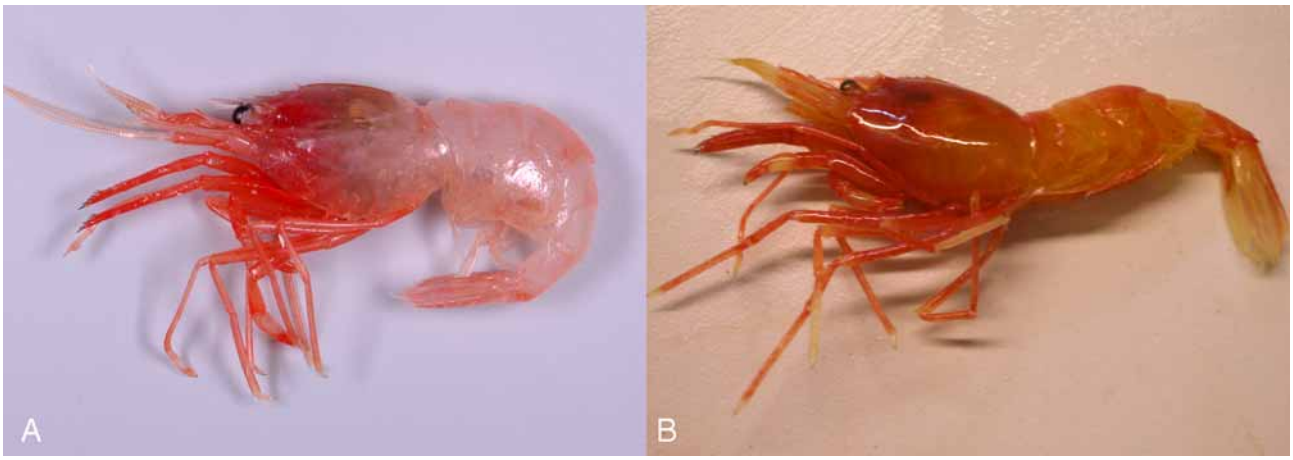

FIGURE 3. A, *Lebbeus cristatus* sp. nov., female holotype (cl 9.0 mm), NIWA 33142 (photo: M. Clark). B, *Lebbeus wera* Ahyong, 2009, female holotype (cl 15.7 mm) NIWA 41274 (photo: R. Stewart and P. Marriott).

Leontocaris alexander Poore 2009
(Fig. 4C)

Leontocaris alexander Poore 2009: 958–964, figs. 2–4 [type locality: Seamount Hill U, Tasmania, Australia, 44°19.6'S, 147°10.8'E,].

Material examined. *Chatham Rise:* NIWA 33119, 1 damaged ov. female (tcl 14.3 mm, cl 6.8 mm), 42°56.80–56.71'S, 174°28.56–27.87'E, 950–971 m, with hydrozoans and anthozoan corals, TAN0705/291, 28.IV.2007.

Remarks. Poore (2009) recently described *L. alexander* from seamounts off south-eastern Tasmania (1050–1300 m) and is here recorded from New Zealand for the first time. It differs from the type description in having a shorter rostrum (1.1 cl. versus 1.7–1.9), though the rostral apex appears to be regenerating after damage. The major pereopod 2 is on the right.

Distribution. South-eastern Tasmania and now from the Chatham Rise, New Zealand; 950–1300 m.

Leontocaris amplectipes Bruce, 1990
(Figs. 4A–B, 5–7)

Leontocaris amplectipes Bruce, 1990a: 121–129, figs. 1–5 [type locality: S of Point Hicks, Victoria, 38°21.90'S, 149°20.00'E, 1000 m]. — Taylor & Poore 1998: 58–59, fig. 1. — Poore 2009: 964–965.
?*Problemacaris spinetum*. — Gordon 1964: 332–336, figs. 1–2 [not *P. spinetum* Stebbing, 1921].

Material examined. *Bay of Plenty:* NIWA 13678, 1 male (tcl 15.4 mm, cl 8.5 mm), Otara Seamount, 36°55.35–55.63'S, 177°20.01–20.10'E, 1534–1513 m, TAN0413/31, sled, with *Chrysogorgia* coral and sponge, 9.XI.2004.

Chatham Rise: NIWA 42668, female (tcl 17.1 mm, cl 10.1 mm), 42°39.27–38.88'S, 177°12.79–12.46'W, 1377–1402 m, TAN0705/211, with mixed corals and sponge, 20.IV.2007.

Hikurangi Trough: NIWA 13677, 1 female (tcl 12.6 mm, cl 6.8 mm), Young Nick's Seamount, 39°26.93–26.98'S, 179°54.37–55.27'E, 2182–2119 m, TAN0413/192, sled, with *Chrysogorgia* and pennatulacean coral, 19.XI.2004.

Victoria, Australia: NMV J191881, holotype, presumed male (tcl 9.7 mm; cl 6.1 mm), S of Point Hicks, Victoria, 38°21.90'S, 149°20.00'E, 1000 m, WHOI epibenthic sled, SLOPE 32, G. Poore *et al.*, 23.VII.1986; NMV J41438, 1 male (tcl 12.2 mm, cl 7.0 mm), 1 female (cl 10.5 mm, cl 6.1 mm), S of Point Hicks, Victoria, 38°21.90'S, 149°20.00'E, 1000 m, WHOI epibenthic sled, SLOPE 32, G. Poore *et al.*, 23.VII.1986; NMV J41439, 1 male (cl 13.2 mm, cl 7.6 mm), 1 female (tcl 9.7 mm, cl 5.6 mm), S of Point Hicks, Victoria, 38°19.60'S, 149°24.30'E, 930 m, rock, rubble, clay, sand, biogenic sediment WHOI epibenthic sled, SLOPE 33, M. Gomon *et al.*, 23.VII.1986.

Tasmania, Australia: NMV J41249, 1 male (cl 7.8 mm), 1 ov. female (tcl 14.8 mm, cl 8.2 mm), "Andys" seamount, 65.1 km SSE of Southeast Cape, Tasmania, 44°10.8'S, 146°59.4'E, 900 m, epibenthic sled, SS01/97/57, T. N. Stranks *et al.*, 29.I.1997; NMV J58066, 1 male (tcl 12.7 mm, cl 7.0 mm), 18 females (11 ovig.) (tcl 7.6–12.6 mm, cl 4.5–7.2 mm), Huon 1000 site, S of Tasmania, 44°04'09"–44°04'51"S, 147°25'24"–147°25'08"E, 810–1020 m, epibenthic sled, SS02/2007/59, T. O'Hara & T. Costa, 7.IV.2007; NMV J58077, 1 male (tcl 13.3 mm, cl 8.1 mm), 11 females (tcl 10.2–13.5 mm, cl 5.9–8.4 mm), Huon 1000 site, S of Tasmania, 44°04'15"–44°04'49"S, 147°04'44"–147°07'55"E, 800–950 m, epibenthic sled, SS02/2007/10, T. O'Hara & T. Costa, 31.III.2007; NMV J41247, 1 male (tcl 9.1 mm, cl 4.9 mm), 3 females (2 ovig.) (cl 8.3–9.9 mm), J1 Seamount, 82.6 km SSE of Southeast Cape, 44°14.4'S, 147°21.6'E, 1200m, epibenthic sled, SS01/97/40, T.N. Stranks *et al.*, 27.I.1997.

Diagnosis. Rostrum well-developed, straight, shorter than cl, apex reaching beyond antennular peduncle; spination 12–20 dorsal (3–6 postorbital), 2–6 ventral; suborbital lobe with rounded apex, reaching beyond apex of antennal spine. Abdominal terga and pleura unarmed. Telson with 3–5 (usually 4) pairs of articulated marginal spines. Antennule stylocerite short, quadrate, with small distolateral spine. Antennal scaphocerite exceeding antennular peduncle; length 2.5–3.0 times central width; distal 0.6 of outer margin with 10–17 slender spines; distal lamella distinctly exceeding distal, lateral spine. Eye with cornea distinctly wider than stalk. Mandibular palp 1-articulate. Major pereopod 2 chela palm inner surface of marginal flange with minute, circular, glabrous tympanum at about propodal midlength. Pereopods 3–4 meri with 4 and 2 or 3 articulated spines respectively. Pereopods 3–5 dactyli about 0.4 propodus length. Uropodal exopod outer margin proximal to articulated spine minutely and sparsely dentate, without row of prominent teeth.

Description of New Zealand material. Carapace (Figs. 4A, B; 5A, 6D) smooth, glabrous. Rostrum well-developed, straight, slightly descending, 0.7–0.9 times cl, apex reaching beyond antennular peduncle; spines well-spaced, slender, inclined anteriorly, 17–20 dorsal (4–6 postorbital), 2 or 3 ventral; lateral carina prominent in proximal third, becoming indistinct in distal two-thirds. Suborbital lobe (Fig. 6D) produced to rounded apex, reaching beyond apex of antennal spine. Antennal spine slender, with distinct carina. Pterygostomial margin rounded, unarmed, at most slightly produced anteriorly. Branchial regions with shallow, arcuate groove.

Abdomen smooth, glabrous; somites 1–5 unarmed dorsally or laterally; pleura rounded (Fig. 5A). Somite 6 twice as long as high; posterolateral angles above uropodal articulation with or without small tooth (absent in smallest specimen; present on both sides in male; absent on one side in largest female). Telson (Fig. 6E) length 3.2–3.4 times width, 1.8–1. 9 times as long as somite 6; 3–5 (usually 4) pairs of articulated marginal spines; posterior margin rounded, with 8 or 9 articulated spines.

Antennule (Fig. 6A, C) shorter than rostrum; article 1 subcylindrical, unarmed, 5.1 times as long as distal width; stylocerite short, quadrate, with small distolateral spine; article 2 about half length of article 1; article 3 slightly longer than half length of article 2. Upper flagellum robust; lower flagellum slender.

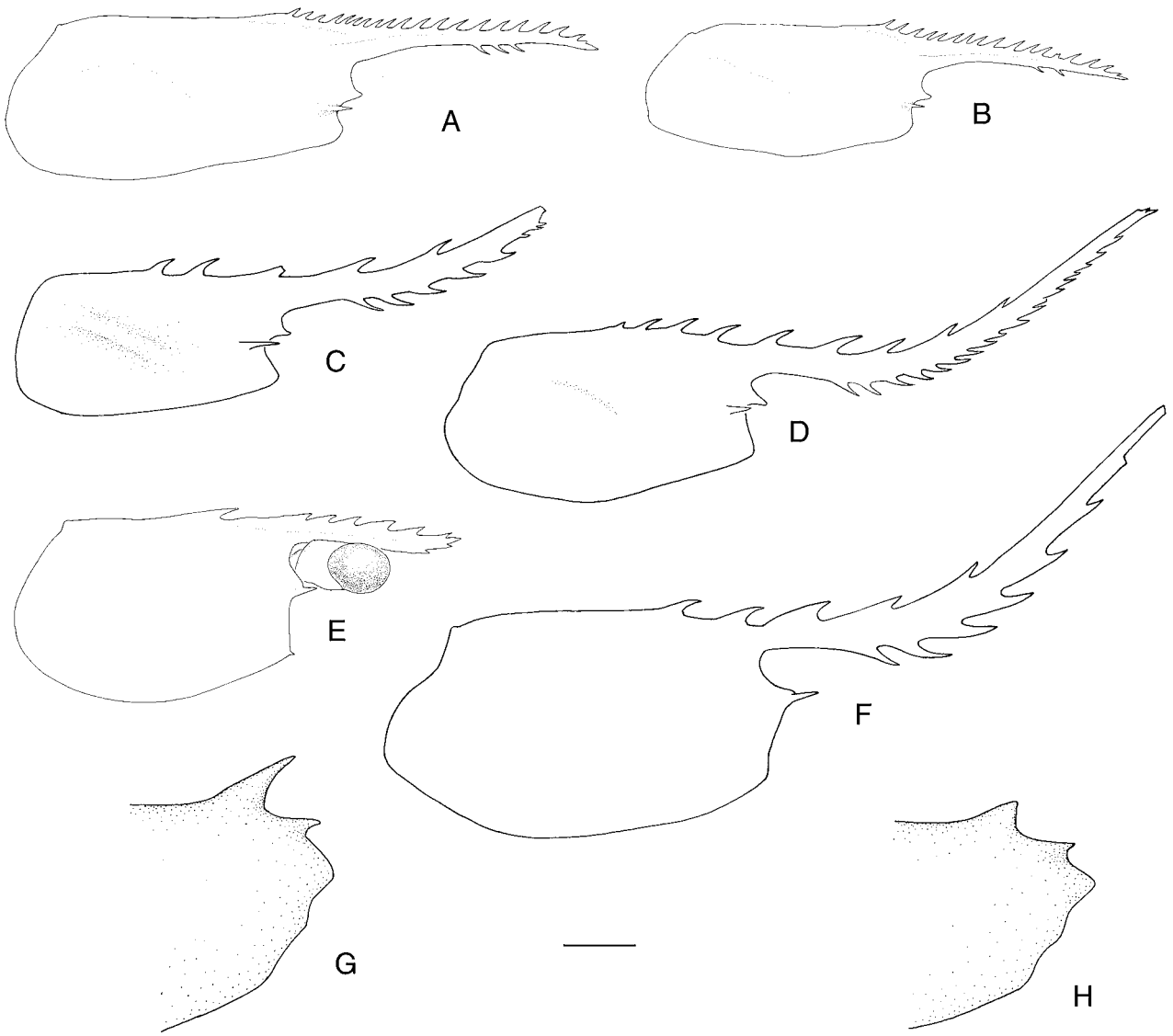

FIGURE 4. A–B, *Leontocaris amplectipes* Bruce, 1990, carapace, male (cl 8.5 mm) (NIWA 13678), female (cl 6.8 mm) (NIWA 13677). C, *Leontocaris alexander* Poore, 2009, carapace, ov. female (cl 6.8 mm) (NIWA 33119). D, *Leontocaris yarramundi* Taylor & Poore, 1998, carapace, male (cl 7.6 mm) (NIWA 29687). E, *Lysmata vittata* (Stimpson, 1860), carapace, sex indet., tcl 5.7 mm (NIWA (MITS) 5523). F, *Merhippolyte chacei* Kensley, Griffin & Tranter, 1987, carapace, ov. female (cl 8.9 mm) (NIWA 33172). G–H, *Alainopasiphaea australis* (Hanamura, 1989), anterior carapace, female (tcl 16.8 mm), female (16.9 mm), both NIWA 33095. Scale: A–D, F–H = 2.0 mm; E = 1.0 mm.

Antenna (Fig. 6A, B) with stout, unarmed basicerite; distal peduncular article subcylindrical, 10–11 times as long as wide, reaching anteriorly to level of distal marginal spine of scaphocerite and apex of antennular peduncle; flagellum 2.4 times cl. Scaphocerite well-developed, exceeding antennular and antennal peduncles; length 3.0 times central width; proximal 0.4 of outer margin gently concave, smooth, unarmed; distal 0.6 of outer margin straight, lined with 12–17 slender, anterolaterally inclined spines; distal lamella rounded, distinctly exceeding distal, lateral spine.

Eye with large, globular, well-pigmented cornea, diameter about 0.2 cl., distinctly wider than stalk; ocellus absent (Fig. 6A).

Epistome unarmed. Thoracic sternum (Fig. 6F) narrow anteriorly, broadening posteriorly; sternite 4 with small rounded median boss; sternites 5 and 6 with prominent, hemispherical median boss; sternite 7 with small rounded boss; sternite 8 smooth.

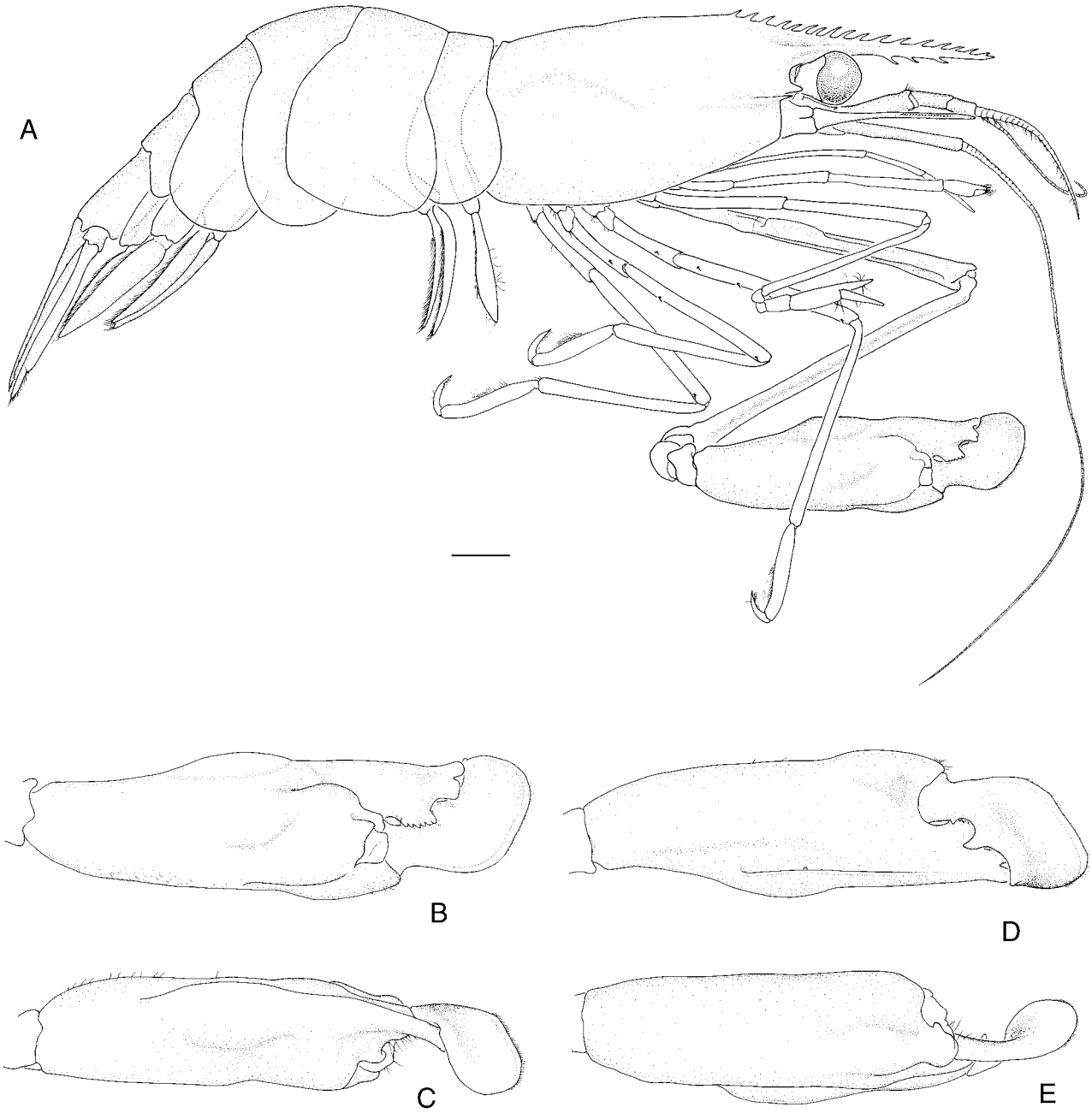

FIGURE 5. *Leontocaris amplectipes* Bruce, 1990, female (cl 10.1 mm) (NIWA 42668): A, habitus; B–D, major pereopod 2 chela. Scale: A = 2.0 mm, B–D = 1.3 mm.

Mandibular palp 1-articulate (Fig. 6G); about 3 times as long as wide; with single apical seta.

Maxilla 1 (Fig. 6H) with slender, feeble, bilobed palp; distal and proximal each with long, slender seta, that of distal lobe plumose, that of proximal lobe simple. Upper lacinia broadened centrally, distally with double row of stout spines and numerous simple setae. Lower lacinia distally pointed, setose.

Maxilla 2 (Fig. 6I) palp short, slender, with single, simple, distal seta; basal endite bilobed, setose, distal lobe slightly wider than proximal lobe; coxal endite short, rounded, sparsely setose. Scaphognathite about 2.5 times as long as wide.

Maxilliped 1 (Fig. 6J) with short, digitiform palp, with sparse marginal setae; basal endite broad, rounded distally, densely setose marginally; exopod with large, broad, caridean lobe; flagellum well developed, exceeding margin of caridean lobe by length similar to that of the palp; epipod large, bilobed.

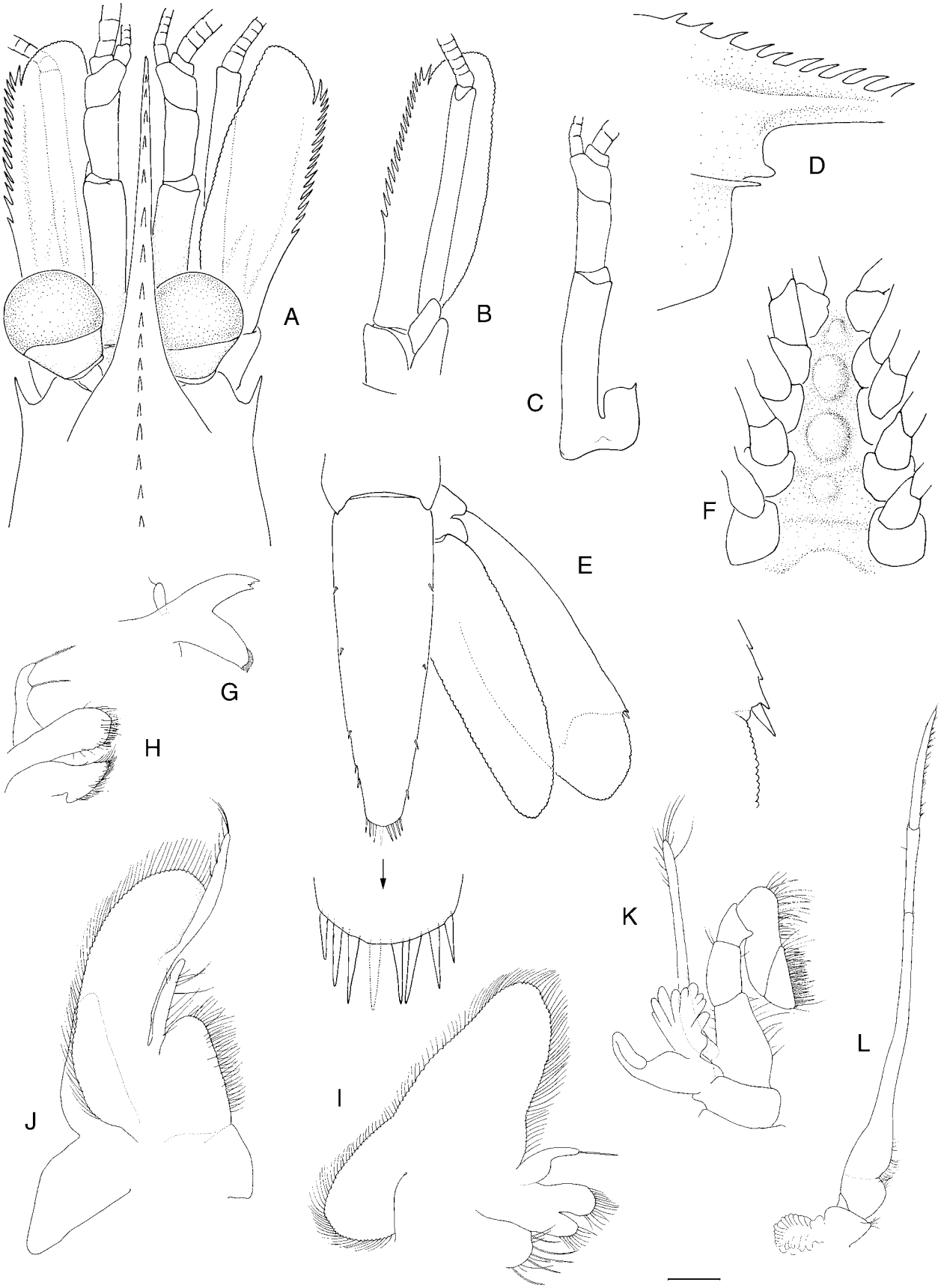

FIGURE 6. *Leontocaris amplectipes* Bruce, 1990, female (cl 10.1 mm) (NIWA 42668): A, anterior cephalothorax; B, right antenna, ventral view; C, right antennular peduncle, dorsal view; D, anterior carapace, right lateral view; E, telson and right uropod; F, thoracic sterna and coxae; G, right mandible; H, right maxilla 1; I, right maxilla 2; J, right maxilliped 1; K, right maxilliped 2; L, right maxilliped 3. Scale: A–F, L = 1.0 mm, G–K = 0.5 mm.

Maxilliped 2 (Fig. 6K) dactylus about twice as long as wide; exopod flagellum well-developed, distinctly exceeding endopod; epipod simple, with podobranch.

Maxilliped 3 (Fig. 6L) slender, extending anteriorly beyond antennular peduncle by half length of distal peduncular article; dactylus finely tapering, mesial margin setose; with small arthrobranch.

Pereopods 1 (Fig. 7A) similar, slender, reaching anteriorly to end of or slightly beyond antennular peduncle. Dactylus half length of palm. Palm height 0.4–0. 5 length. Dactylus and pollex distally setose. Carpus subcylindrical, widest distally, unarmed, length 2.5–2.8 times chela length. Merus subcylindrical, widest distally, unarmed, 0.7–0.9 carpus length. Ischium half length of carpus. Basis without exopod. Coxa without epipod or arthrobranch.

Pereopods 2 strongly unequal and dissimilar. Major pereopod 2 (Fig. 5A–D, 7B) merus exceeding antennal peduncle. Chela palm smooth, glabrous except for sparse setae on proximal extensor margin (ventromesial surface when folded); length about 4 times central width; mesial margin with prominent flange along distal two-thirds; inner surface of flange with minute, circular, glabrous tympanum at about propodal midlength. Pollex occlusal margin with 3 broad teeth; distal 2 blunt, rounded to subquadrate; proximal multidentate, sparsely setose. Dactylus strongly compressed, exceeding pollex almost by length pollex; extensor margin smooth, rounded, finely setose; occlusal margin with short distal tooth and small proximal tooth and large, sharp, triangular tooth. Carpus 4-articulate; proximal article slender, longer than ischiomerus; distal 3 articles short, polygonal, forming 'elbow'. Merus length 0.7 times length of proximal carpal article; flexor margin with longitudinal groove, mesial margin of groove with several granules proximal to midlength; proximal mesial margin with low flange and line of digitiform villi above margin of flexor groove. Ischium 0.4–0.5 merus length.

Minor pereopod 2 (Fig. 7C, D) longer than carapace length; merus reaching anteriorly to end of or beyond antennular peduncle article 1; proximal carpal article overreaching antennular peduncle by half to three-fourths carpal article length. Dactylus and pollex straight, tapering, sparsely setose, about 0.8 palm length; palm length about twice height. Combined length of chela and distal carpal article shorter than proximal carpal article (0.9 in smallest specimen to 0. 7 in largest specimen). Carpus distal article about half length of chela palm and about twice length of second and third articles; proximal article long, slender, about 1.2–1.3 times merus length. Merus as long as ischium, both unarmed.

Pereopods 3–5 slender (Fig. 7E–G); pereopod 3 merus extending anteriorly beyond midlength of antennular peduncle article 1, carpus exceeding antennular peduncle by half to three-fourths carpal article length; dactyli arcuate, unguis spiniform, flexor margin with tuft of setae, extensor margin sparsely setose, length less than half propodus length (0.34–0.44); propodus slightly arcuate, flexor margin concave, medially setose. Pereopod 3 propodus about 0.5 carpus length; carpus 1.1 times merus length (as long as major pereopod 2 merus), with 4 articulated spines; ischium 0.4 times merus length, with 1 articulated spine (absent on one side of cl. 6.8 mm female). Pereopod 4 propodus about 0.5–0.6 carpus length; carpus as long as merus, with 2 or 3 articulated spines; ischium 0.4–0.5 times merus length, with 1 articulated spine. Pereopod 5 propodus 0.6 carpus length; carpus as long as merus, with 1 articulated spine distally; ischium half 0.5 merus length, unarmed.

Appendix masculina (Fig. 7I, H) distally setose; about 5 times as long as wide and 0.6 length of appendix interna.

Uropodal protopod unarmed (Fig. 6E). Endopod as long as, but narrower than exopod, exceeding posterior margin of telson; length 3.3–4.2 times width. Exopod length 3.0–3.3 times width; with 1 articulated spine at margin of diaeresis; lateral margin proximal to diaeresis with 4–6 minute, widely spaced teeth (including tooth adjacent to articulated spine at diaeresis); diaeresis indistinct.

Colour in life. Uniformly reddish orange; rostrum transparent.

Remarks. *Leontocaris amplectipes* is recorded from New Zealand for the first time, extending its known range eastwards across the Tasman Sea. The New Zealand specimens correspond well to Australian material, including the holotype. In *L. amplectipes,* the rostrum extends at least as far as, and usually overreaches, the distal article of the antennular peduncle. Rostral spination is 12–20 dorsal (3–6 postorbital), and 2–6 ventral. Features overlooked in the type description, but present in all specimens examined, including the holotype,

are the presence of minute denticulation on the uropodal exopod margin proximal to the diaeresis, and articulated spines on the meri of pereopods 3–5 and ischia of pereopods 3–4. Pereopod 3 bears 2–4 meral spines and 1 ischial spine (rarely absent on one side). Pereopod 4 bears 2 or 3 meral spines and 1 ischial spine. Pereopod 5 bears one meral spine distally and no ischial spine. As noted by Bruce (1990a), the holotype is a small specimen, probably male, and in poor condition. Thus, *L. amplectipes* is rediagnosed and New Zealand material illustrated and described.

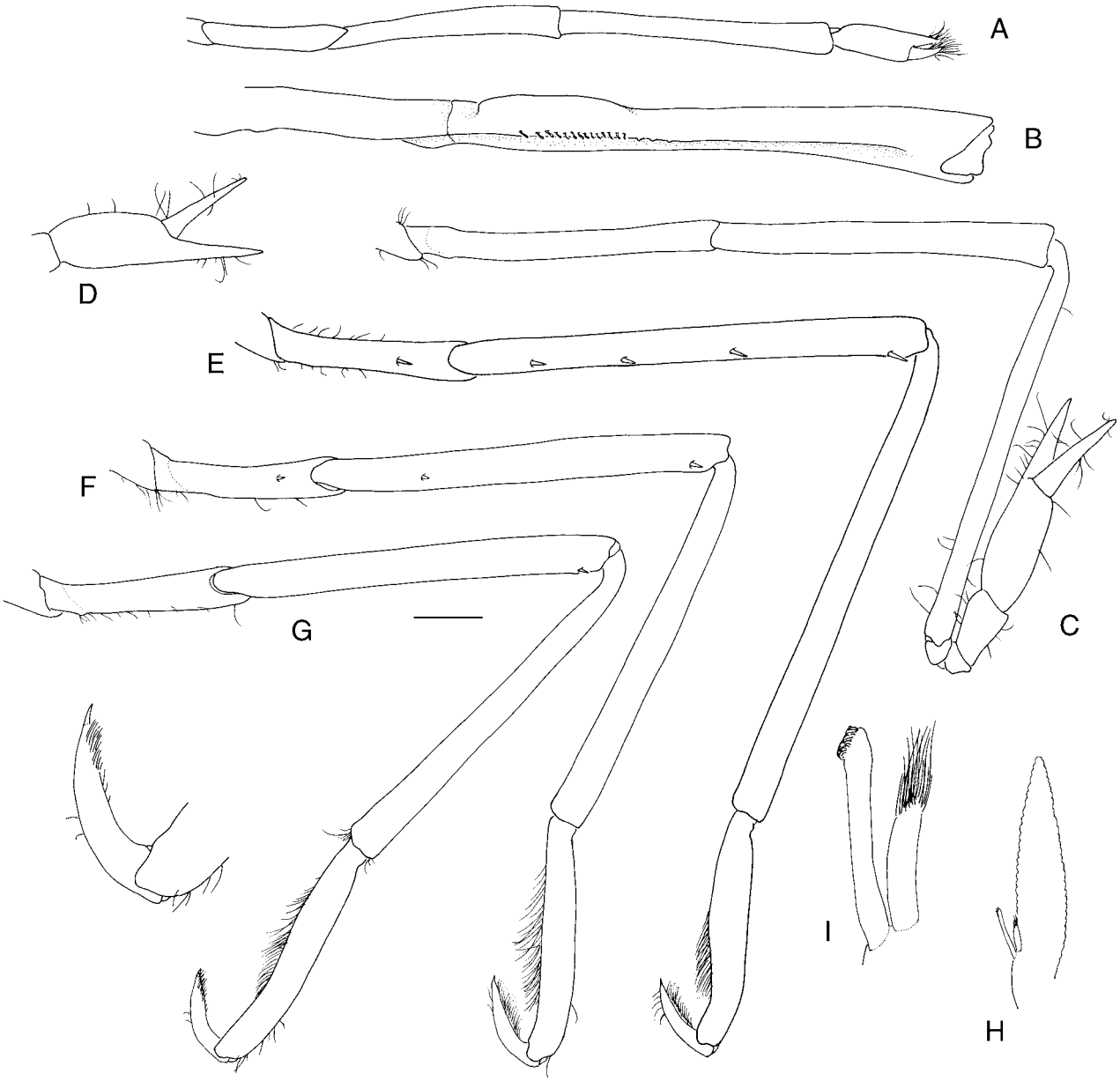

FIGURE 7. *Leontocaris amplectipes* Bruce, 1990: A–J, female (cl. 10.1 mm) (NIWA 42668); H–I, male (cl. 8.5 mm) (NIWA 13678). A, right pereopod 1, lateral view; B, left pereopod 2 ischiomerus, mesial view; C, right pereopod 2, lateral view; D, right pereopod 2 chela; E–G, right pereopods 3–5, lateral view; H, right pleopod 2 endopod; I, right pleopod 2 appendices masculina and interna. Scale: A–H = 1.0 mm; I = 0.25 mm.

Allometric variation is evident in the length:width ratio of the scaphocerite (about 2.5 in the holotype to about 3.0 in the largest specimen), and length of the minor P2 chela (the combined length of the minor pereopod 2 chela and distal carpal article exceeds the length of the proximal carpal article in the smallest specimens, becoming shorter than that article in the largest specimens).

The proportional lengths of the dactyli of pereopods 3–5 become reduced with increasing size such that the pereopod 5 dactylus is 0.44 propodus length in the smallest specimen ranging to 0.38 in the largest specimen. Of the 45 specimens examined, the major pereopod 2 is on the right side in 21 of 37 females, and on the right side in 6 of 8 males.

As observed by Bruce (1990a) the dactyli and propodi of the walking legs of *L. amplectipes* appear to be prehensile, resembling that of some species of Chirostylidae that live on and among the branches of deepwater soft corals; the New Zealand specimens of *L. amlectipes* were collected together with gorgonacean corals.

Gordon (1964) reported the presence of larval *Leontocaris* (as *Problemacaris spinetum* Stebbing, 1921) from waters of the Chatham Rise (40°40'S, 176°36'E; 340 m). Although several 'species' of *Problemacaris* have been tentatively associated with adults on the basis of several co-occurrences (see Fransen 2001), the presence of at least three species of *Leontocaris* on the Chatham Rise, makes identification of the New Zealand larva more difficult. Unlike *Problemacaris spinetum* sensu stricto from South Africa, Gordon's (1964) New Zealand larva has an unarmed rather than spinose outer margin of the uropodal exopod, which corresponds to adult *L. amplectipes*, having a similarly unarmed uropodal exopod; *L. alexander* and *L. yarramundi* both have spinose outer margins on the uropodal exopod. Alternatively, the strong similarity between the New Zealand *Problemacaris* and *P. spinetum* from South Africa, fide Gordon (1964), suggests that the larva might belong to *L. alexander*, which most closely resembles the South African *L. paulsoni* Stebbing, 1905.

Distribution. South-eastern Australia and eastern New Zealand between the Bay of Plenty and the Chatham Rise; 750–2182 m.

Leontocaris yarramundi Taylor & Poore, 1998
(Fig. 4D)

Leontocaris yarramundi Taylor & Poore, 1998: 64–68, figs. 5–7 [type locality: "U" seamount, 82.8 km SSE of Southeast Cape, Tasmania]. — Poore 2009: 965–966.

Material examined. *Chatham Rise:* NIWA 49259, 1 male (tcl 17.2 mm, cl 7.1 mm), Gothic Seamount, 42°43.71'S, 179°53.56'W, 1070–990 m, TAN0104/388, epibenthic sled, with primnoid coral, 21.IV.2001; NIWA 49262, 1 ov. female (cl. 7.4 mm), Zombie Seamount, 42°46.00'S, 179°55.36'W, 970–900 m, TAN0104/337, with mixed corals and sponges, epibenthic sled, 20.IV.2001; NIWA 49260, 2 ov. females (tcl 16.3, cl 7.2–7.4 mm), Diabolical Seamount, 42°47.17'S, 179°59.12'W, 993–900 m, TAN0104/48, with lithistid sponge, epibenthic sled, 16.IV.2001; NIWA 49261, 1 ov. female (cl. 7.6 mm), Zombie Seamount, 42°45.92'S, 179°55.62'W, 1058–990 m, TAN0104/198, with coral and sponge, epibenthic sled, 19 Apr 2001; NIWA 29687, 1 male (tcl. 18.9 mm, cl 7.6 mm), Pyre Seamount, 42°43.06–43.31'S, 179°54.29–54.15'E, 1025–1156 m, TAN0604/102, with mixed corals and sponge, 4.VI.2006; NIWA 29695, 1 ov. female (cl 8.8 mm), Gothic Seamount, 42°43.65–43.84'S, 179°53.94–54.18'E, 1000–1107 m, TAN0604/113, with mixed corals and sponge, 7.VI.2006; NIWA 29670, 1 male (tcl 17.0 mm, cl 7.1 mm), 1 female (tcl 16.0 mm, cl 7.2 mm), 3 ov. females (cl 7.0–8.3 mm), Zombie Seamount, 42°45.76–45.45'S, 179°55.51–55.36'E, 1019–1081 m, TAN0604/09, with mixed corals and sponge, 28.V.2006.

Remarks. The New Zealand specimens conform well to the type description and are the first records of the species outside Tasmania. The rostral spination of the New Zealand specimens (9 or 10 dorsal of which 4 are postorbital; 16–20 ventral) is within the expected range of variation for the species (9 dorsal of which 4 are postorbital; 15–18 ventral; Taylor & Poore 1998), as is rostral length (1.22–1.61 cl. versus 1.05–1.46). Of the three males and nine females examined, the major pereopod 2 is on the right in all specimens except for one male and four females. Most specimens were collected together with sponges and mixed corals including primnoids (*Thourella* sp., *Acanthogorgia* sp.) and *Madrepora oculata*.

Distribution. Seamounts off south-eastern Tasmania and now from seamounts on the Chatham Rise, New Zealand; 900–1448 m.

***Lysmata vittata* (Stimpson, 1860)**
(Fig. 4E)

Hippolysmata vittata Stimpson, 1860: 95 [type locality: Hong Kong].
Nauticaris unirecedens Bate, 1888: 608, pl. 10, fig. 1 [type locality: Hong Kong].
Hippolysmata durbanensis Stebbing, 1921: 20, pl. 5 [type locality: Durban, South Africa].
Lysmata vittata. — Bruce 1990b: 601–608, figs. 23–28. — Chace 1997: 78.

Material examined. *Auckland:* NIWA (MITS) 5523, 2 specimens (tcl 5.7–6.0 mm), Viaduct Harbour, 3–4 m, from jetty pile, VIA252-DP, 27.III.2006; NIWA (MITS) 6829, 1 specimen (tcl 5.1mm), Westhaven Marina, 5 m, from jetty pile, WHM252-DP, 28.III.2006.

Manukau Harbour: NIWA (MITS) 13209, 2 specimens, (tcl 7.6–8.3 mm), MNK533-DP, 14.VI.2006.

Kaipara Harbour: NIWA (MITS) 16226, 2 specimens (tcl 9.2 mm; 1 with broken rostrum, cl 4.6mm), Te Whau Point slipway, KPR 435-DP, 28.IX.2006.

Remarks. The present specimens of *L. vittata* from the northwest (Kaipara Harbour and Manukau) and northeast coasts (Auckland) are the first records of the species from New Zealand waters. They are consistent with Chace's (1997) diagnosis of *L. vittata* and agree closely with Bruce's (1990b) redescription of the species based on topotypic material. The rostral spination is 5–7 dorsal (with 1 or 2 postorbital) and 2 or 3 ventral, usually 6 or 7 dorsal (2 postorbital) and 3 ventral. The pereopod 2 carpus is composed of 19–21 articles. Most specimens have two postorbital spines in the dorsal rostral series, and 3 ventral rostral spines. In one small specimen (tcl 5.7 mm; Fig. 4E), however, the spine anterior to the epigastric spine is slightly in advance of, instead of behind, the posterior orbital margin; and the ventral rostral margin bears 2 spines, with an incipient third proximally.

All specimens were collected during port surveys targeting invasive species. It is plausible that *L. vittata* has been introduced via international shipping, though it is more likely that the species has simply been overlooked or mistaken for *L. morelandi* (Yaldwyn, 1971), which also occurs in northern New Zealand. *Lysmata vittata* is common through the Indo-West Pacific, including eastern Australia; northern New Zealand is within its expected natural range.

Distribution. East Africa to the Philippines, Japan, Australia, and now from northern New Zealand; littoral to 54 m (Chace 1997).

***Merhippolyte chacei* Kensley, Griffin & Tranter, 1987**
(Fig. 4F)

Merhippolyte chacei Kensley, Griffin & Tranter, 1987: 309–312, figs. 18, 19 [type locality: E. of Sydney, New South Wales, Australia, 686 m]. — Poore *et al.* 2008: 84.

Material examined. *Bay of Plenty:* NIWA 13674, 1 female (cl 8.2 mm), Tumokemoke Seamount, 37°27.95–27.97'S, 176°57.28–57.05'E, 474–435 m, TAN0413/168, 15.XI.2004.

Challenger Plateau: NIWA 33172, 3 ov. females (cl 8.4–9.5 mm), 38°12.45'S, 168°35.10'E, 512–526 m, TAN0707/84, 3.VI.2007; NIWA 42683, 1 ov. female (cl 9.3 mm), 39°32.61'S, 169°42.87'E, 636–634 m, TAN0707/93, 4.VI.2007.

Remarks. The specimens agree well with the type description and extend the known range of the species from southern Australia to the Challenger Plateau, New Zealand. The rostral spination of the New Zealand specimens (5 or 6 dorsal of which 2 are postorbital; 7 ventral) resembles that of Australian material (4 or 5 dorsal of which 2 are postorbital; 7 ventral) (Kensley *et al.* 1987).

Distribution. Southern Australia (New South Wales, Tasmania, Western Australia) and now from the Challenger Plateau and Bay of Plenty, New Zealand; 435–1000 m.

Pasiphaeidae Dana, 1852

***Alainopasiphaea australis* (Hanamura, 1989)**
(Figs. 4G–H)

Pasiphaea australis Hanamura, 1989: 59–61, figs. 5–7 [type locality: off Maria Island, Tasmania, Australia, 345–350 m]. *Alainopasiphaea australis*.— Hayashi 2004: 369–371, fig. 26.— Poore *et al.* 2008: 89.

Material examined. *Chatham Rise:* NIWA 33041, 1 male (tcl 16.3 mm), 2 females (tcl 17.0–17.4 mm), 42°59.92'S–43°00.43'S, 176°20.90–20.92'W, 648–666 m, TAN0705/155, 16.IV.2007; NIWA 33095, 2 males (tcl 16.5–17.6 mm), 3 females (tcl 15.8–16.9 mm), 42°50.70–50.41'S, 177°13, 44–13.26'W, 785–797 m, TAN0705/221, 21.IV.2007; NIWA 33118, 1 male (tcl 17.1 mm), 43°43.53–43.83'S, 174°27.48–26.92'E, 552 m, TAN0705/287, 27 Apr 2007; NIWA 33037, 1 damaged female, 43°17.44–17.58'S, 175°33.74–34.00'W, 644–640 m, TAN0705/138, 14.IV.2007.

Challenger Plateau: NIWA 33141, 1 female (tcl 12.8 mm), 37°45.36'S, 168°12.88'E, 702–700 m, TAN0707/38, 29 May 2007; NIWA 33175, 4 damaged specimens, 37°52.62'S, 168°18.70'E, 648–652 m, TAN0707/85, 3.VI.2007; NIWA 33201, 14 males (tcl 14.6–18.0 mm), 13 females (tcl 13.4–18.5 mm; 13.7 mm ov.), 39°32.61'S, 169°42.87'E, 636–634 m, TAN0707/93, 4.VI.2007; NIWA 42685, 1 female (tcl 13.1 mm), 39°32.61'S, 169°42.87'E, 636–634 m, TAN0707/93, 4.VI.2007.

Remarks. The present series of *A. australis* represents the first record of the genus and species from New Zealand, agreeing well with published accounts (Hanamura 1989; Hayashi 2004). The rostrum is usually spiniform as reported by Hanamura (1989) for the type material, and occasionally triangular. Poore (2004) and Poore *et al.* (2008) reported *A. australis* from 32–680 m, so the capture depth of the New Zealand specimens (552–797 m) extends the known bathymetric range. The occurrence of *A. australis* from both the west and east coasts suggests that the species has a wide distribution in New Zealand waters.

Distribution. Southern Australia and now from New Zealand waters; 32–797 m.

Discussion

The small collection of Caridea reported herein includes the first confirmed records of *Alainopasiphaea*, *Merhippolyte* and *Leontocaris* from New Zealand waters, exemplified by *Alainopasiphaea australis*, *Merhippolyte chacei* and three species of *Leontocaris*, respectively. The three species of *Leontocaris* also occur on seamounts off southeastern Tasmania, and in the case of *L. amplectipes*, also on the south-eastern Australian slope (Taylor & Poore 1998; Poore 2009). Similarly, *Merhippolyte chacei* and *Alainopasiphaea australis*, were previously known only from southern Australia. Recently, Hanamura (2008) reported the occurrence of *Lysmata morelandi* Yaldwyn, 1971, described from New Zealand, from the south-eastern Australian shelf. *Lysmata vittata*, now confirmed from New Zealand, also occurs in Australia, though it is also wide ranging in the tropical Indo-West Pacific. Thus, results of the present study suggest that, at least in deep water many additional decapods species will probably be found to occur on both sides of the Tasman Sea.

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