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***Phycomenes zostericola* gen. nov, sp. nov., a new pontoniine shrimp (Crustacea: Decapoda: Palaemonidae) from Moreton Bay, Queensland**

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ABSTRACT

A new genus and species of Australian pontoniine shrimp, *Phycomenes zostericola*, is described and illustrated. The genus is closely related to *Periclimes* Costa, and distinguishable by the presence of a triangular median process on the fourth thoracic sternite. The new species appears common in sea grass habitats along eastern and northern Australia. □ *Crustacea, Decapoda, Pontoniinae, Phycomenes, new genus, new species, Australia, sea grass.*

The study of the pontoniine shrimp fauna of Moreton Bay, south east Queensland, commenced with the investigation of coral symbionts at Myora, South Stradbroke Island, by Patton (1966), who reported the presence of five species. The fauna now comprises 23 species, most of which are from the northern half. None have been previously reported from the southern half of Moreton Bay.

In December 2005 and February, 2006, the Centre for Aquatic Processes and Pollution, Griffith University, carried out a faunistic survey as part of a project to study the importance of edge effects in seagrass landscapes at the mouth of Loder's Creek, an outflow into the Gold Coast Broadwater, in south eastern Queensland, under the direction of Dr Rod Connolly. Numbers of a small pontoniine shrimp were collected and some provided for taxonomic study. Although very *Periclimes*-like, they could not be identified with any known species of that genus. Further examination indicated that they could not be satisfactorily placed in of the described genera and a new genus is now designated for their inclusion. A number of similar shrimps from other localities outside Australia are currently

under going study and are likely to be also referred to this genus.

The type material is deposited in the collections of the Queensland Museum (QM), Muséum National d'Histoire naturelle, Paris (MNHN); Northern Territory Museum, Darwin, (NTM); Nationaal Natuurhistorisch Museum-Naturalis, Leiden, (RMNH); National Museum of Natural History, Washington (USNM). Other abbreviations used are: CL, postorbital carapace length.

SYSTEMATICS

Sub-phylum Crustacea

Order Decapoda Latreille, 1802

Family Palaemonidae Rafinesque, 1815

Sub-family Pontoniinae Kingsley, 1878

***Phycomenes* gen. nov.**

Diagnosis. Small sized pontoniine shrimps of slender subcylindrical body shape. Carapace smooth, glabrous, with rostrum well developed, dorsally and ventrally dentate, lateral carinae feebly developed, ventral carina obsolete, epigastric spine present, hepatic and antennal spines present, hepatic spine fixed, supraorbital spines absent, orbit poorly developed, without

postorbital groove, inferior orbital angle strongly produced, rounded, with feeble ventral flange, anterolateral, angle of branchiostegite not produced; abdomen normally developed, smooth, glabrous, third segment not posterodorsally produced, non-carinate, pleura rounded, fourth and fifth not acutely produced posteriorly, sixth segment not elongate, normal, with distolateral angle produced, antenna with stylocerite acute, statocyst normal; flagella well developed; antennal basicerite with ventrolateral tooth, scaphocerite well developed, with strong distolateral tooth not exceeding distal lamella; ophthalmic somite with small subacute *béc ocellaire* and median pigment spot; eye well developed, stalk subcylindrical, cornea globular, well pigmented, with conspicuous accessory pigment spot, stalk without proximolateral articular process; epistome unarmed, with small submedian hemispherical bosses, without anteromedian process; mandible without palp, molar and incisor processes normal; maxillula with feebly bilobed palp; maxilla normal, with simple palp, basal endite bilobed, coxal endite convex, obsolescent, first maxilliped with simple non-setose palp, basal and coxal endites feebly separate, broad, exopod with slender flag-

ellum, caridean lobe elongate, epipod small, rounded; second maxilliped with normal endopod, exopod slender, epipod suboval, without podobranch; third maxilliped slender, ischiomerus feebly separated from basis, exopod slender, coxa with elongate lateral plate, without arthrobranch, maxillipedal exopods generally with four plumose terminal setae; second to third thoracic sternites not elongate, unarmed, fourth with acute transverse median process; with five pleurobranches; first pereopods short, slender, chela with fingers simple, cutting edges entire, coxa with small setose distoventral process; second pereopods feebly developed, slender, subequal and similar; chela slender, fingers subequal to palm length, without molar process and fossa; cutting edges unarmed, slightly gaping proximally, merus without distoventral tooth, ambulatory pereopods slender, dactyls slender, biunguiculate, without basal process, merus and ischium distinct; uropod with protopodite bluntly produced; exopod with small distolateral tooth, with small mobile spine; telson with two pairs of small dorsal spines, three pairs of posterior spines.

Type species: *Phycomenes zostericola* sp. nov., by present designation and monotypy.

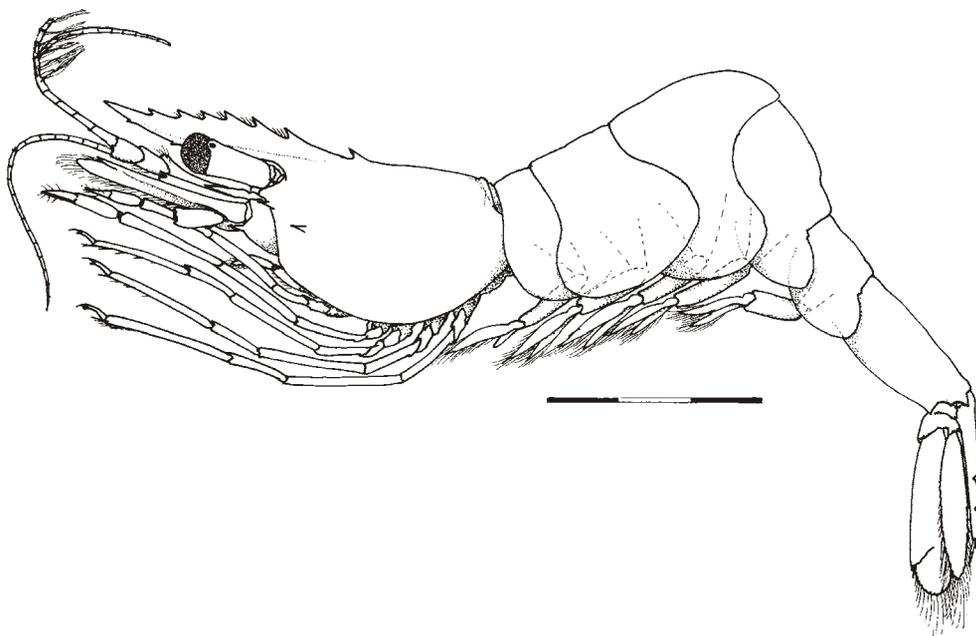


FIG. 1. *Phycomenes zostericola* gen. nov., sp. nov., holotype, post-ovigerous female, Loder's Creek, Qld (QM-W28406). Scale bar in millimetres.

Etymology. From *phycus*, (Latin), sea-weed, a reference to the habitat of this shrimp, and *-menes*, from part of *Periclimenes*, a pontoniine generic name first used by Costa, 1844. Gender masculine.

Systematic Position. In its general morphology *Phycomenes* appears most closely related to the species of *Periclimenes* Costa, 1844, that are generally referred to as the *Periclimenes obscurus* species group, presently including about 12 species (Bruce 1987). *Phycomenes* differs from all these in the presence of a distinct acute transverse median process on the fourth thoracic sternite. Such a character is absent from the majority of pontoniine genera and is known only in the genera *Eupontonia* Bruce, *Exoclimenella* Bruce, *Harpilius* Dana, *Kemponia* Bruce, *Palaemonella* Dana, *Periclimenella* Bruce, *Philarius* Holthuis, and *Vir* Holthuis. This process is also present in a number of palaemonine genera and can be considered as a plesiomorphic character. The species of these genera all have well developed second pereopods with relatively large chelae and also the ambulatory dactyls in all these genera are simple. In contrast, *Phycomenes* has remarkably poorly developed second pereopods and ambulatory dactyls that are distinctly biunguiculate.

Most of the mouthparts of *P. amethysteus* (Risso, 1816), the type species of the genus *Periclimenes* Costa, 1844, have been illustrated by Holthuis (1952, fig. 4). Those of *Phycocaris* gen. nov. show a close resemblance. The principal difference is that the epipod of the first maxilliped is small, simple and rounded in *Phycocaris* and larger, and distinctly bilobed in *P. amethysteus*. The maxillipedal flagella are also provided with numerous long plumose setae (about 12–15) in *P. amethysteus* (see Holthuis, 1952, fig. 4ef) in contrast to *Phycomenes*, in which only four terminal plumose setae are present.

With the removal of *Harpilius* Dana and *Kemponia* Bruce (Bruce 2004) from the genus *Periclimenes* Costa, the definition of the genus given by Bruce (1994), which states the fourth thoracic sternite may possess or lack a median process, is no longer correct. *Periclimenes amethysteus*, the type species, does not have a well developed acute median process on the fourth thoracic sternite, but has a distinct ven-

tral rostral carina and well developed second pereopods with robust chelae. *Periclimenes* s. str. should be restricted to species without a well developed median fourth sternal process. Of the species remaining in *Periclimenes* s. str. none are known to have such a process, although the morphology of this sternite for some species presently included has yet to be reported.

Phycomenes also shares several features with the species of the *Periclimenes aesopius* species group, particularly the small ventral flange of the inferior orbital angle, a feature otherwise so far only reported in this group. The general form of the well developed rostrum, devoid of a ventral carina, and the ambulatory pereopods are also particularly similar, but *aesopius* group species all have well developed second pereopod chelae.

It may be noted that Menon (1939) described the larval stages of *Periclimenes indicus* Kemp, 1922, a closely related species with which the present species had been earlier confused. He remarked that, in comparison with some other species of the genus, 'some of the differences which the present species exhibit ... seem large enough to render its position within the genus somewhat doubtful.'

Phycomenes zostericola sp. nov.

(Figs 1–7)

Periclimenes indicus (in part) – Bruce, 1977: 226–228, figs 32–33.

? *Periclimenes* (*P.*) nr *obscurus* – Wadley, 1978: 19, fig. 9k; Young & Wadley, 1979: 86, tab.2.

Periclimenes indicus – Bruce & Coombes, 1995: 131; Bruce & Coombes, 1997: 313–314; Davie, 2002: 328.

Material Examined. HOLOTYPE: QM-W28406, ♀, Loder's Creek, Labrador, Qld, 11.2007, J. Haig. PARATYPES: QM-W28270, 4 ovig. ♀, RMNH-D51761, ♂, ovig. ♀; MNHN-Na16606 ♂, ovig. ♀; NTM-Cr015502, 2 ovig. ♀; USNM-1102691, 2 ovig. ♀, same data as for holotype.

OTHER MATERIAL: NTM-Cr009238, 25 spms (10 ovig. ♀), Costen's Point, Port Hacking, NSW, from *Posidonia* beds, 13.07.1976, V. Wadley. NTM-Cr009239, 39 spms (28 ovig. ♀), Costen's Point, Port Hacking, NSW, from *Posidonia* beds, 13.07.1976, V. Wadley. QM, 3 ♂, 10 ovig. ♀, AJB #3425, mouth of Loder's Creek, Broadwater, Gold Coast, in sea-grass, hand net, 1–1.5m, 15–18.12.2005, H. Moller. RMNH, 3 ♀ (2 ovig.), Myora, North Stradbroke Is., Qld, shallow

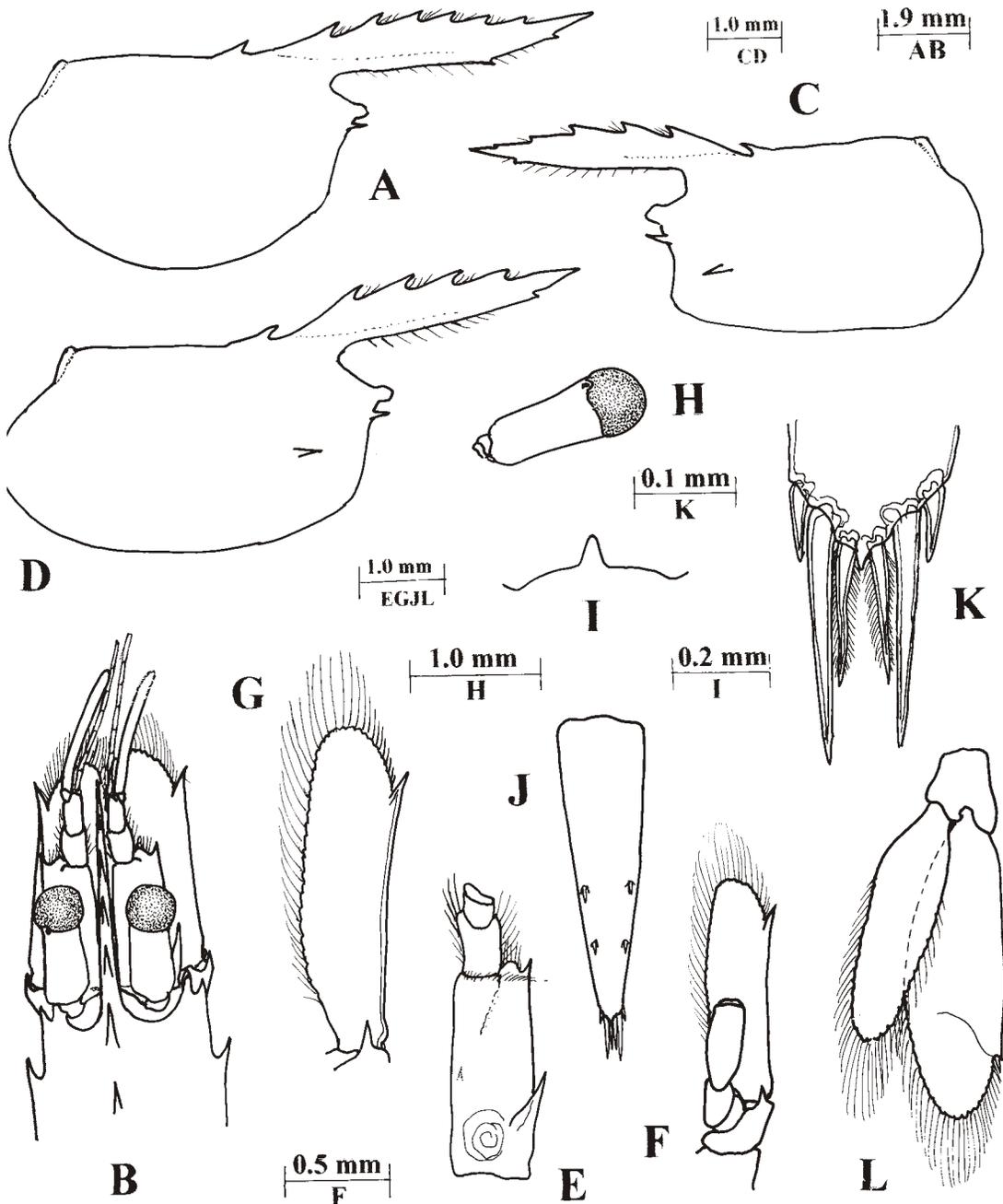


FIG. 2. *Phycomenes zostericola* gen. nov., sp. nov., paratype, S, Loder's Creek, SE Qld (QM-W28270). A, carapace and rostrum. B, anterior carapace and appendages, dorsal. C, carapace and rostrum. D, same. E, antennule. F, antenna, ventral. G, scaphocerite. H, eye. I, fourth thoracic sternite. J, telson. K, same, posterior spines. L, uropod. A, B=ovigerous female; E-L= males.

sublittoral, 31.01.1968, A.J. Bruce. QM W28352, 1 spec., bopyridized, Loder's Creek, Labrador, Qld, 1.0 m, Sept. 2007, J. Haig. QM-W28478, 4 ♂, 14 ♀ (13 ovig.), Myora, North Stradbroke Is., Qld, shallow sublittoral, 31.01.1968, A.J. Bruce. QM-W28479, 2 ovig. ♀, Peel Island, Moreton Bay, Qld, shallow sublittoral, in *Sargassum*, 23.09.1968, A.J. Bruce. QM-W24039, 2 specs, Fisherman Island, nr mouth of Brisbane R., Moreton Bay, 27°22'S, 153°10'E, 0.2–0.5 m, sand/mud flat, pools, symbiotic with seagrass, *Zostera capricorni*, 2–4.06.1998, netted, P. Davie, J.W. Short. QM-W17139, 5 spms, Fishermen Is., 27°23'S, 153°10'E, 2 m, seagrass, 23 .07. 1990, trawled, Queensland Fisheries Service. QM-W18190, 10 spms, Starcke R. mouth, 14°47.1'S, 145°01'E, 1m, *Zostera* seagrass, 12.11.1992, netted, P. Davie, J.W. Short. QM-W25489, 52 spms, Dunwich, North Stradbroke Is., Moreton Bay, 27°30'S, 153°24'E, near anemone, *Stichodactyla haddoni*, 10.09.2000, W.K. Patton. NTM-Cr006496, 11 spms (9 ovig. ♀), stn CP/13/2, Coral Bay, Port Essington, Arnhem Land, NT, from *Sargassum* washings, 0.5 m, 20 .07. 1981, A.J. Bruce. NTM-Cr001197 1, ♂, 2 ovig. ♀, stn CP/10, Black Point, Port Essington, Arnhem Land, NT, 18.07.1981, 1–2m, A. J. Bruce & J.N.A. Hooper. NTM-Cr008241, 2 ovig. ♀, stn CP/18, Midjari Point, Cobourg Peninsula, Arnhem Land, NT, low water spring tide, 16.10.1981, A.J. Bruce *et al.*; NTM-Cr009285, 2 ovig. ♀, 1 juv., stn CP/58, Caiman Creek, Port Essington, Arnhem Land, NT, <1m, 15.05.1983, N.L. Bruce & A.J. Bruce. QM-W21326, 3 spms, unnamed peninsula SE of Cape Londonderry, Kimberley Coast, 13°45.3'S, 126°48.5E, 1.5 m, marine, fringing reef, symbiotic with macrophyte, *Sargassum*, 28.11.1995, netted, J.W. Short.

Description. Slenderly built shrimps (Fig. 1), of subcylindrical body form.

Rostrum: (Figs 2A–D, 5A) well developed, slender, straight, horizontal, 0.9 of CL (♂), subequal to CL (♀), distally acute, slightly exceeding antennular peduncle, dorsal carina well developed, deepest at about half length, with 4–6 (♂), 5–6 (♀) acute teeth, all pre-orbital, first to third or fourth teeth well developed, distal teeth diminishing, sometimes minute (Fig. 5B), interdental spaces with short plumose setae, lateral carinae obsolescent, ventral carina obsolete, ventral margin straight, with 1–2 (one specimen with 3) well spaced small acute distal teeth, with median row of short plumose setae.

Carapace: (Fig. 2A–C) smooth, glabrous, with non-articulate epigastric spine, at about 0.7 of CL, lacking supraorbital spine, orbit feebly developed, antennal spine well developed, marginal, exceeding inferior orbital angle in female, subequal in male, inferior orbital angle (Fig.

5C–D) broad, bluntly produced in dorsal and lateral views, hepatic spine well developed, subequal to antennal spine, on slightly lower level, at about 0.85 of CL, anterolateral branchiostegite bluntly obtuse.

Abdomen: without special features; third tergite without posterior marginal denticulations, sixth segment about 0.75 of CL, 2.3 times longer than deep, 1.9 times length of fifth segment, compressed, posterolateral angle well developed, acute, posteroventral similar, pleura of first three segments broadly rounded, fourth and fifth posteriorly produced, bluntly rounded.

Telson: (Fig. 2J) about 0.8 of CL, about 3.4 times longer than anterior width, lateral margins sublinear, posteriorly convergent, with two pairs of subequal dorsal spines, about 0.06 of telson length, at 0.56 and 0.73 of telson length, posterior margin (Fig. 2K) about 0.25 of anterior width, angular, with small acute median process, lateral telson spines small, similar to dorsal spines, intermediate spines robust, about 0.15 of telson length, submedian spines slender, subventral, feebly setulose, about 0.45 of intermediate spine length.

Antennule: (Fig. 2E) with peduncle about 0.75 of CL, proximal segment about 2.48 times longer than central width, medial margin straight with well developed small acute ventral tooth at 0.5 of length, distolateral angle produced (Fig. 5E), rounded, slightly exceeding acute distolateral tooth, anterior margin setose, with long slender plumose setae, lateral margin straight, stylocerite acute, reaching about 0.5 of medial margin length, statocyst normal; intermediate and distal segments short, subequal in length, combined length about 0.6 of proximal segment length, intermediate segment with numerous plumose setae medially and laterally, upper flagellum with proximal 5–6 segments fused, shorter ramus with 2–3 segments, with about 5 groups of aesthetascs, longer ramus filiform.

Antenna: (Fig. 2F) without antennal gland tubercle medially, basicerite with slender acute ventrolateral tooth, carpocerite subcylindrical, short, about 2.3 times longer than wide, reaching to about 0.45 of scaphocerite length, merocerite and ischiocerite normal, short; scaphocerite (Fig. 2G) well developed, well exceeding antennular peduncle and rostral tip, lamella narrow, broad-

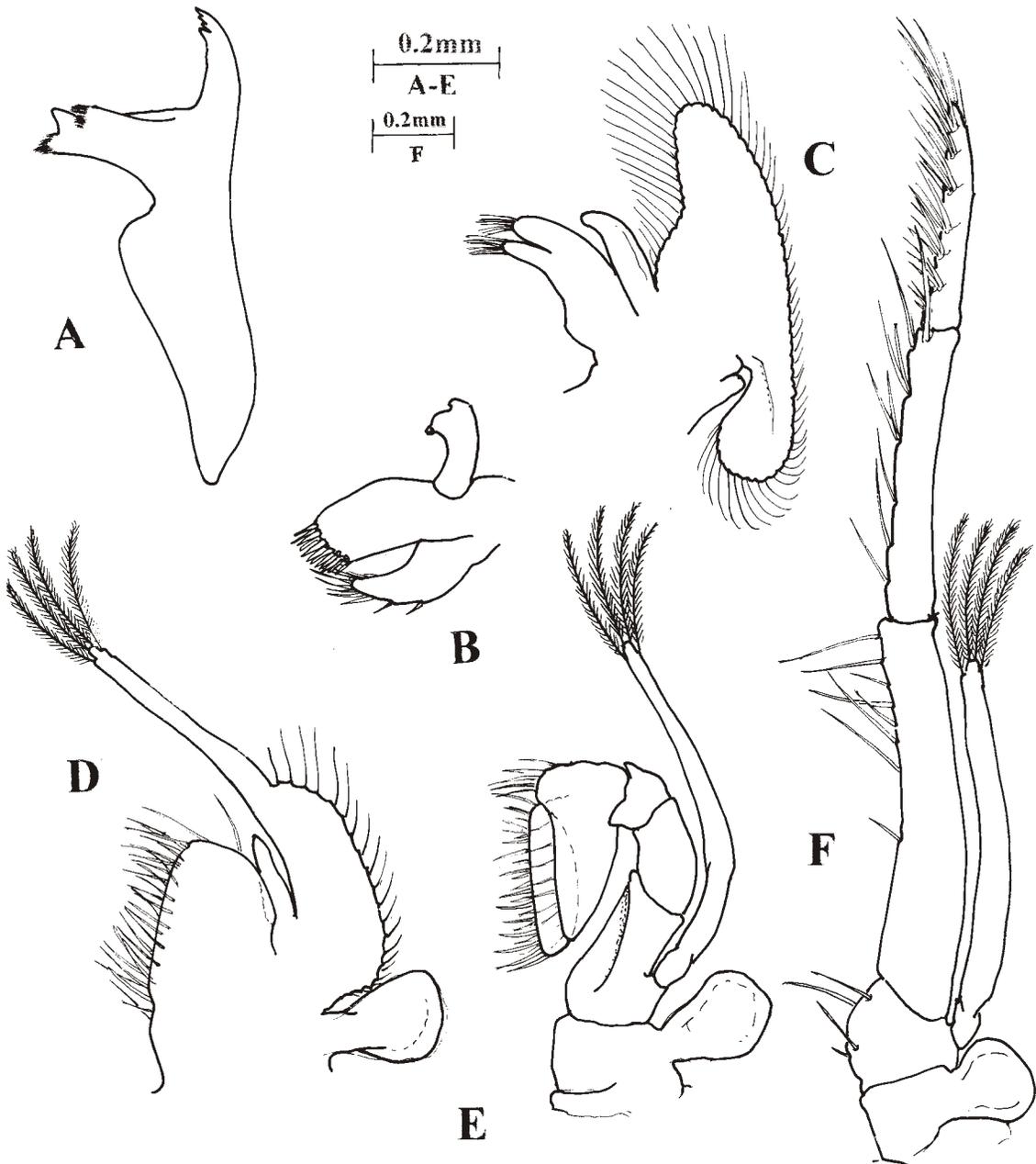


FIG. 3. *Phycomenes zostericola* gen. nov., sp. nov., male, paratype, Loder's Creek, SE Qld (QM-W28270). A, mandible. B, maxillula. C, maxilla. D, first maxilliped. E, second maxilliped. F, third maxilliped. A, B, D-F= male CL 2.0 mm, C= ovigerous female paratype, CL 2.8 mm.

ly rounded distally, about 3.8 times longer than central width, lateral margin feebly concave, with well developed, slender acute tooth distally, about 0.09 of scaphocerite length, at 0.8 of lateral margin length, well short of distal margin of lamella.

Ophthalmic somite: with small subacute *béc ocellaire* and median pigment spot.

Eye (Fig. 2H) about 0.45 of CL, with well pigmented globular cornea, with distinct dorsal accessory pigment spot, diameter about 0.2 of CL, stalk about twice as long as wide, length about 1.7 times corneal diameter, without distodorsal tubercle.

Epistome without anteromedian spine, with small hemispherical bosses laterally.

Mandible: (Fig. 3A) robust, without palp, right molar process stout, subcylindrical, distally oblique with pair of blunt teeth posteriorly, separated by tuft of short setae from anterior pair of blunt teeth, incisor process (Fig. 5H-I) normal, tapering distally, with 3 or 4 small acute teeth distally, medial and lateral teeth larger than inner teeth, medial margin without denticles.

Maxillula: (Fig. 3B) with feebly bilobed palp (Fig. 5J), upper lobe slender, non-setose, lower lobe with small simple terminal setose tubercle, upper lacinia short, broad, distally truncate, with about 12 short stout similar simple spines and numerous spiniform setae, lower lacinia short, tapering, with numerous longer spiniform feebly setulose setae distally, two small spinules ventrally.

Maxilla: (Fig. 3C) with simple flattened non-setose palp, about 4.5 times longer than basal width, basal endite bilobed, lobes short, distal lobe more robust with about 6 simple setae distally, proximal lobe smaller and shorter, with about 4 distal setae, coxal endite obsolete, margin feebly convex, scaphognathite normal, anterior lobe 1.4 times longer than width, medial margin emarginate, posterior lobe small, about 0.66 of length of anterior lobe, 2.4 times longer than basal width.

First maxilliped: (Fig. 3D) with palp short, similar to that of maxilla, non-setose, basal endite well developed, almost fully fused with coxal endite, distal margin rounded, medial border

straight, densely setose with simple slender spiniform setae, coxal endite separated from basal by small notch, feebly convex, sparsely setose, exopod normal, with robust flagellum with 4 plumose terminal setae, caridean lobe well developed, narrow, epipod small, rounded.

Second maxilliped: (Fig. 3E) of normal form, dactylar segment about 3.4 times longer than broad, with serrulate medial spines, longest distally, propodal segment slightly produced anteromedially, with few spiniform setae, carpus, merus and ischiobasis without special features, exopod with robust flagellum with 4 plumose terminal setae, coxa not medially produced, non-setose, epipod small, rounded, without podobranch.

Third maxilliped: (Fig. 3F) reaching to exceed carpoprochite by length of terminal segment, with ischiomerus not fused to basis, combined segment slender, tapering slightly distally, about 6.2 times longer than central width, medial margin sparsely setose, lateral margin non-setose, penultimate segment 0.7 of antepenultimate segment length, subcylindrical, 8.0 times longer than wide, several groups of finely serrulate spiniform setae medially, terminal segment about 0.8 of penultimate segment length, 5.5 times longer than basal width, tapering distally, with long terminal spine, numerous groups of finely serrulate spiniform setae medially; basis medially convex, sparsely setose, exopod with robust flagellum, not reaching distal end of ischiomerus, with four plumose terminal setae, coxa not produced, with semicircular lateral plate, without arthrobranch.

Thoracic sternites: with first narrow, second and third widening, fourth (Fig. 2I) broad with stout median conoidal process, posterior sternites broad, unarmed.

First pereopod: (Fig. 4A) slender, slightly exceeding antennular peduncle, to distolateral scaphocerite spine, chela (Fig. 4B) with palm oval in section, slightly compressed, about 1.7 times as long as deep, with sparse rows of short transverse cleaning proximally, fingers with numerous tufts of setae, about 0.8 of palm length, stout, with simple hooked tips, cutting edges lateral, entire; carpus slender, about 1.45 times chela length, 5.0 times longer than distal width, tapering proximally, with few serrulate cleaning

setae distoventrally; merus subequal to carpal length, about 7.0 times longer than central width, uniform; ischium about 0.7 of chela length; basis and coxa without special features, coxa with small setose distomedial process with several simple setae.

Second pereopods: (Fig. 4C) very poorly developed, only slightly larger than first pereopods, short, subequal and similar, extending to exceed scaphocerite by about half length of fingers, all segments smooth, glabrous, chela (Fig. 4D) small, about 0.4 of CL, 1.35 times length of first pereopod chela, palm about 2.5 times longer than central depth, subcylindrical, oval in section, fingers (Fig. 4E) 0.95 of palm length, sparsely setose; dactyl slender, about 5.7 times longer than proximal depth, dorsal margin feebly convex, with small acute hooked tip, cutting edge distally entire, proximal cutting edge unarmed, slightly gaping, fixed finger similar, unarmed or with single obsolescent denticle at about 0.33 of length, carpus short, about 1.1 times chela length, 7.0 times longer than distal width, tapering slightly proximally, unarmed; merus about 0.9 of carpus length, slender, 7.0 times longer than central depth, ischium about 1.15 of meral length, 8.5 times longer than distal width, tapering proximally, basis and coxa normal, without special features.

Ambulatory pereopods: similar, moderately slender, third (Fig. 4F) extending to distolateral spine of scaphocerite, dactylus (Fig. 4H) about 0.3 of propod length, compressed, slender with well demarcated unguis, unguis slender, curved, about 8.5 times longer than basal width, subequal to length of dorsal margin of corpus, corpus about 3.0 times longer than maximal depth, dorsal margin feebly convex, ventral margin sinuous, with well developed distoventral tooth, about 0.45 of unguis length, 3.5 times longer than basal width; propod (Fig. 4G) about 0.5 of CL, about 14.0 times longer than central depth, uniform, with pair of simple distoventral spines, about 0.33 of dactylar corpus length, with similar pair and single spines at 0.85, 0.74 and 0.55 of length; carpus 0.5 of propod length, 7.0 times longer than distal width, tapering slightly proximally, unarmed; merus subequal to propod length, 10.0 times longer than wide, uniform; ischium about 0.6 of propod length, 8.5 times

longer than distal width, tapering proximally; basis and coxa without special features. Propods of fourth (Fig. 4I) and fifth pereopods (Fig. 4J) slightly longer than third. Fifth pereopod with numerous spinulate setae distoventrally.

Male first pleopod (Fig. 5K): with basipodite 2.5 times longer than wide; exopod about 1.1 times basipodite length; endopod (Fig. 5L) distally expanded, rounded, non-setose, 2.6 times longer than greatest width, with small elongate medial lobe, without cincinnuli

Male second pleopod (Fig. 5M): with basipodite 1.2 times longer than first pleopod, 2.6 times longer than central width; exopod about 1.3 times basipodite length, endopod 1.2 times basipodite length, with appendices (Fig. 5N) at about 0.45 of medial margin length, appendix masculina subcylindrical, about 3.5 times longer than width, 0.3 of endopod length, with 3 slender simple terminal spines, row of 4 similar spines ventrally of diminishing size proximally.

Uropod (Fig. 2L): with protopod distolaterally acute, rami well exceeding telson tip. exopod 3.1 times longer than broad, with lateral margin straight, with small acute distolateral tooth (Fig. 5O) with mobile spine medially, about 3.0 times tooth length, dieresis incomplete, well developed laterally, endopod about 0.85 of exopod length, 3.4 times longer than broad.

Ova: numerous, small, about 50.

Measurements. Holotype female, carapace and rostrum, 5.5 mm; postorbital carapace, 2.4 mm; total body length c.16.0 mm; second pereopod chelae, 0.95 mm. Length of ovum, 0.5 mm.

Coloration. (Fig. 7AB). (From Bruce 1977). Generally transparent but mottled with red-brown, especially along ventral aspect of body, and dorsally over posterior margins of third and fourth abdominal segments, tip of scaphocerite, ventral eyestalk, coxae of pereopods and tips of caudal fan. Scattered small white dots over branchiostegite and pleura. Ovary and ova bright green.

Etymology. From *zoster* (Latin), the generic name of the seagrass habitat of this species, and *-cola* (Latin), a dweller in.

Ecology. The Loder's Creek specimens were all collected from sweepings of *Zostera capricorni* Ascherson, 1876, in shallow water, with a salinity of 29–35 ‰. All 18 specimens from Myra

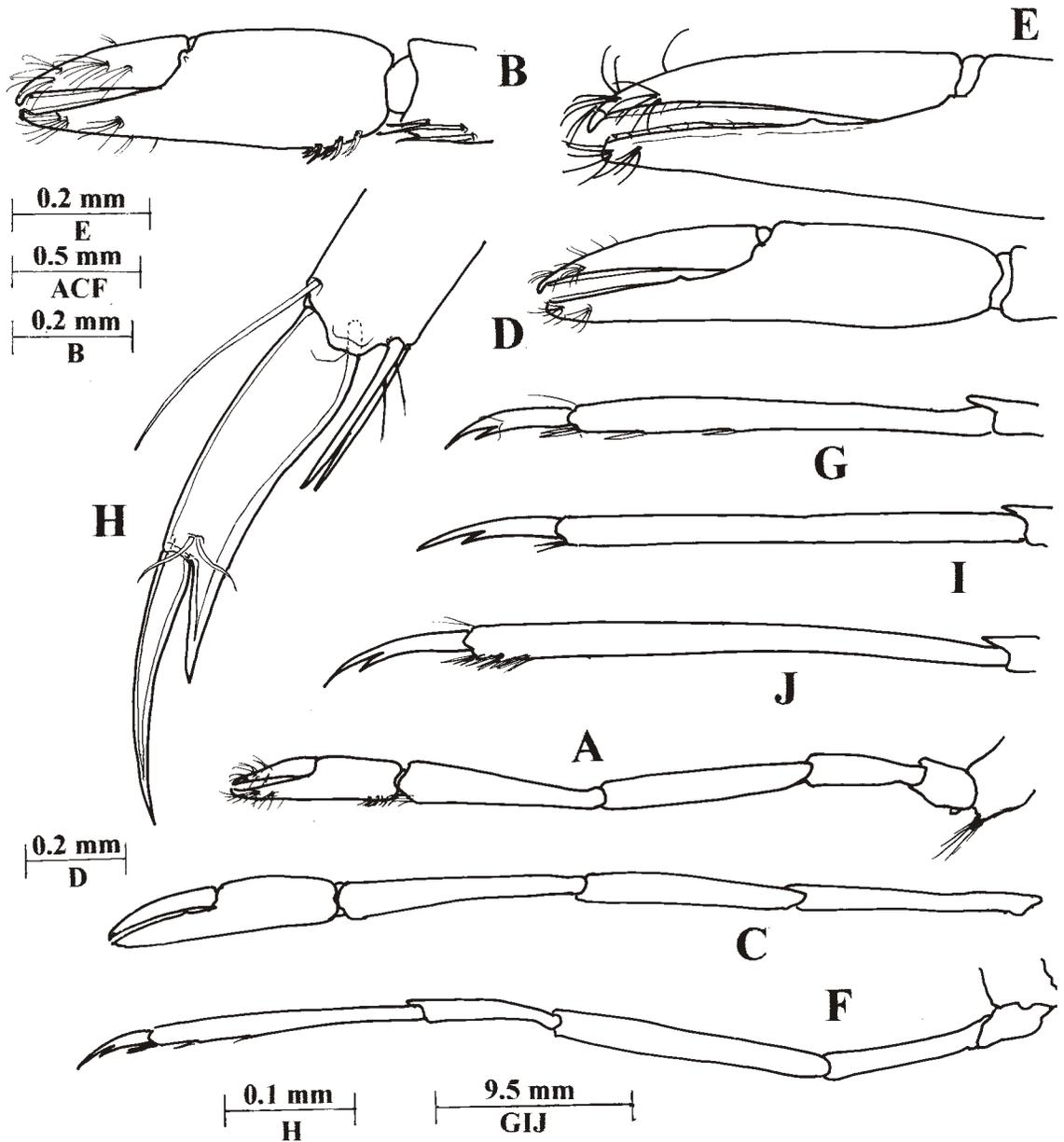


FIG. 4. *Phycomenes zostericola* gen. nov., sp. nov., male, paratype, Loder's Creek, Qld. (QM-W28270). A, first pereiopod. B, same, chela. C, second pereiopod. D, same, chela. E, same, fingers. F, third pereiopod. G, same, propod and dactyl. H, same, distal propod and dactyl. I, fourth pereiopod, propod and dactyl. J, fifth pereiopod, propod and dactyl.

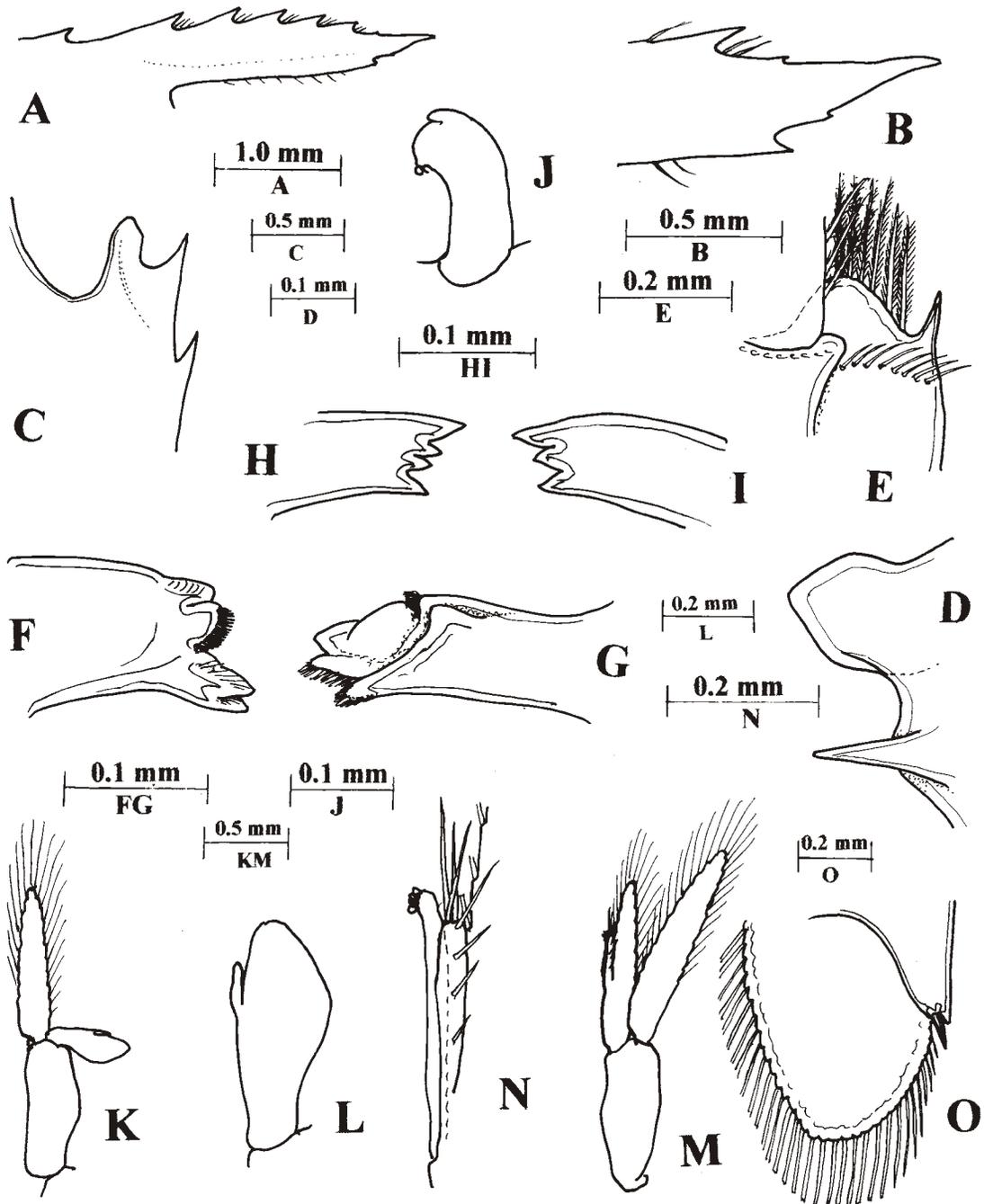


FIG. 5. *Phycomenes zostericola* gen. nov., sp. nov., male, paratype, Loder's Creek, SE Qld (QM-W28270). A, rostrum. B, same, tip. C, right orbital region, dorsal. D, left inferior orbital angle, lateral. E, antennule, proximal segment, distolateral angle. F, right mandible, molar process, dorsal aspect. G, same, ventral aspect. H, same, right incisor process. I, same, left process. J, maxillula, palp. K, first pleopod. L, same, endopod. M, second pleopod. N, same, endopod, appendix interna and appendix masculina. O, uropod, exopod, distolateral angle. A-J, O = ovigerous female. K-M = male.

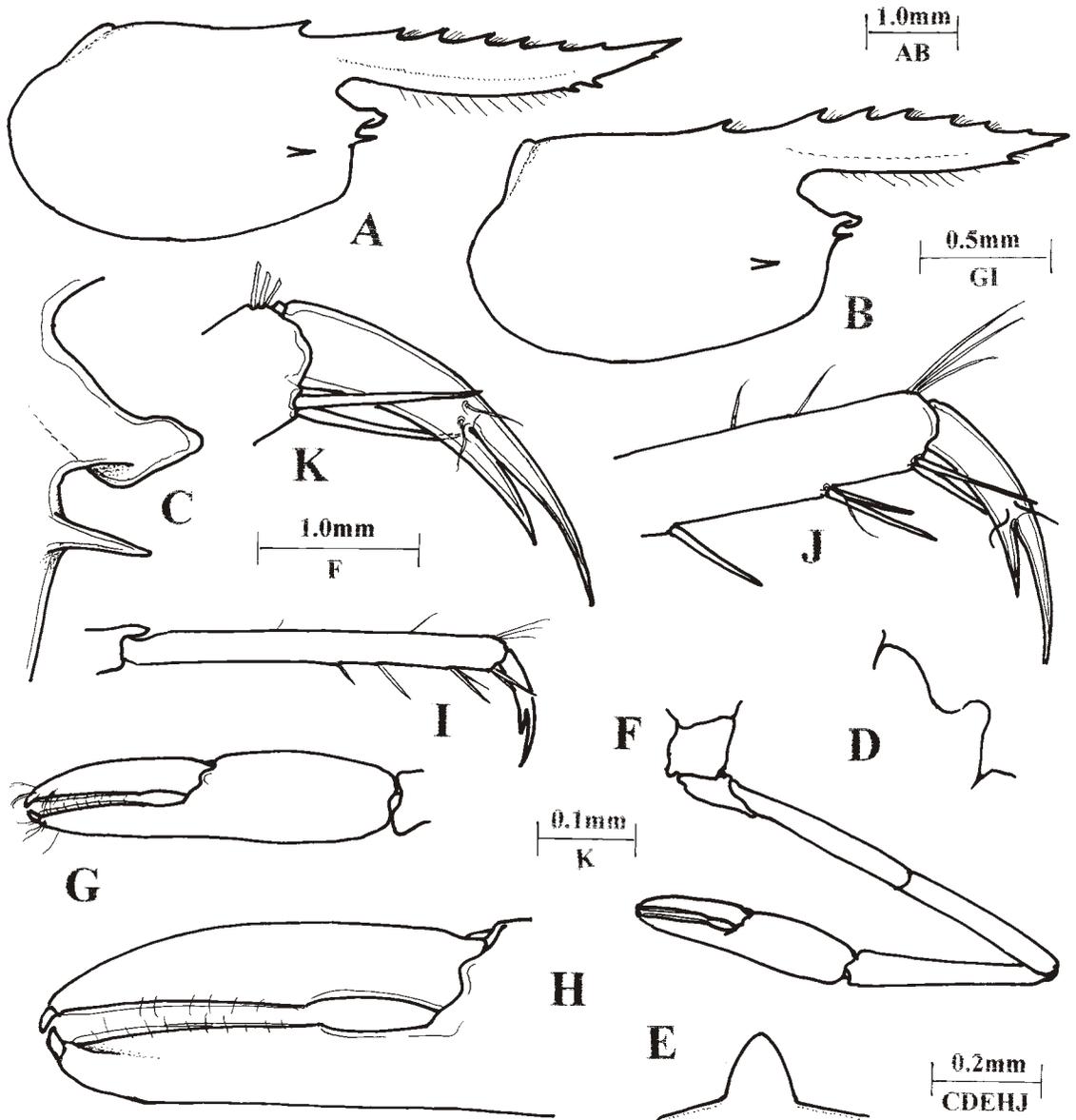


FIG. 6. *Phycomenes zostericola* gen. nov., sp. nov., ovigerous females, Peel Island, Qld (QM-W28479). A, B, carapace and rostrum. C, inferior orbital angle. D, ophthalmic somite profile. E, fourth thoracic sternite. F, second pereiopod. G, same, chela. H, same, fingers. I, third pereiopod, propod and dactyl. J, same, distal propod and dactyl. K, same dactyl.

were collected from a single specimen of the anemone *Macrodactylus doreensis* (Quoy & Gaimard), whereas the 52 specimens collected by Patton in 2000 were associated with another anemone, *Stichodactyla haddoni* (Saville-Kent).

Parasites. The Loders Creek specimen (QM-W28352) has a hemiarthrinid bopyrid, *Diplophryxus* sp. nov. (QM W28355), attached to the ventral abdomen (det. J. Markham, pers. comm.).

Distribution. Reported from New South Wales, Queensland, Northern Territory and northern Western Australia.

Remarks. The Loder's Creek material had all been frozen prior to preservation and specimens are rather macerated and in a fragile state.

Phycomenes zostericola is readily distinguished from *Periclimenes indicus* Kemp, 1915, with which it has been confused, by the absence of a series of robust distolateral spines on the merus of the third maxilliped, which are well developed in the latter species.

The two ovigerous female specimens from Peel island (Fig. 6) are referred to *Phycomenes zostericola* with some reservation. The larger specimen, CL 2.7 mm, has the rostrum slightly shorter than the CL, but in the smaller, CL 2.3 mm, it is distinctly longer, about 1.3 times the CL, with a preterminal ventral tooth and two ventral teeth at about 0.66 of the ventral length. Both have an epigastric tooth and six dorsal rostral teeth. The inferior orbital angle is more strongly produced, more acute and less rounded and with a more strongly developed ventral flange. The ophthalmic somite has a small rounded *béc ocellaire*. The median process of the fourth thoracic sternite is broader than in the type specimens. The second pereopod chelae have the distal two thirds of the cutting edges entire with the proximal third slightly concave, forming a small diastema when closed. The third pereopod dactyl has the accessory tooth more than half the length of the unguis and the distoventral spines of the propod well over half, about 0.8, of the dactylar corpus length; propod more robust, about 10 times longer than deep, 3.2 times longer than dactyl length. These differences suggest either that there may be substantial variation in this species or that two taxa may be involved but their existence in such close proximity reduces this possibility.

The recently collected specimens of *Phycomenes zostericola* were found in the course of studies on the Queensland Gold Coast sea-grass fauna. The earlier collections of *P. zostericola* were in one case found in association with an anemone. Anemones are commonly found amongst sea grass meadows. Pontoniine shrimps with biunguiculate ambulatory dactyls are generally found in association with an invertebrate host. It seems possible that the collecting activities disturbed the shrimps from their host associations.

In *Phycomenes zostericola* the exopods of the maxillipeds are well developed but slender and feebly setose, with only 4 terminal plumose setae. This corresponds closely with the larval stages of many pontoniine shrimps, e.g., *Periclimenes brevicarpalis* (Schenkel 1902), described recently by Nagai & Shokita (2003). This should be considered as the plesiomorphic state of this character and is also found in species of the *Periclimenes obscurus* group such as *P. delagoae* Barnard (Bruce 1987). The other pontoniine genera with a well developed median process on the fourth thoracic sternite have well developed broader maxillipedal exopods that are generally provided with numerous long plumose setae distally and along distal medial and lateral margins, e.g. *Kemponia grandis* (Stimpson) (Bruce 1976, fig. 2).

Davie (2002) reports *P. zostericola* (as *Periclimenes indicus*) from 50 m, presumably a typographic error for 0.5 m. All records so far are from shallow waters, the deepest being only 2.0 m.

A collection of numerous carideans from shallow water sea grass beds from southern Western Australia (WAM C38246, from between Favorite Is. and Boullanger Island, 30°17'S, 115°00'E, 1.05.2005, M. Glenn & C. Whisson, box trawl) has been examined. No specimens of *P. zostericola* were found and the collection was dominated by hippolytid shrimps with only three species of palaemonid shrimps: *Leander manningi* Bruce, 2002, *Periclimenes aesopius* (Bate, 1853) and *Kemponia seychellensis* (Borradaile, 1915).

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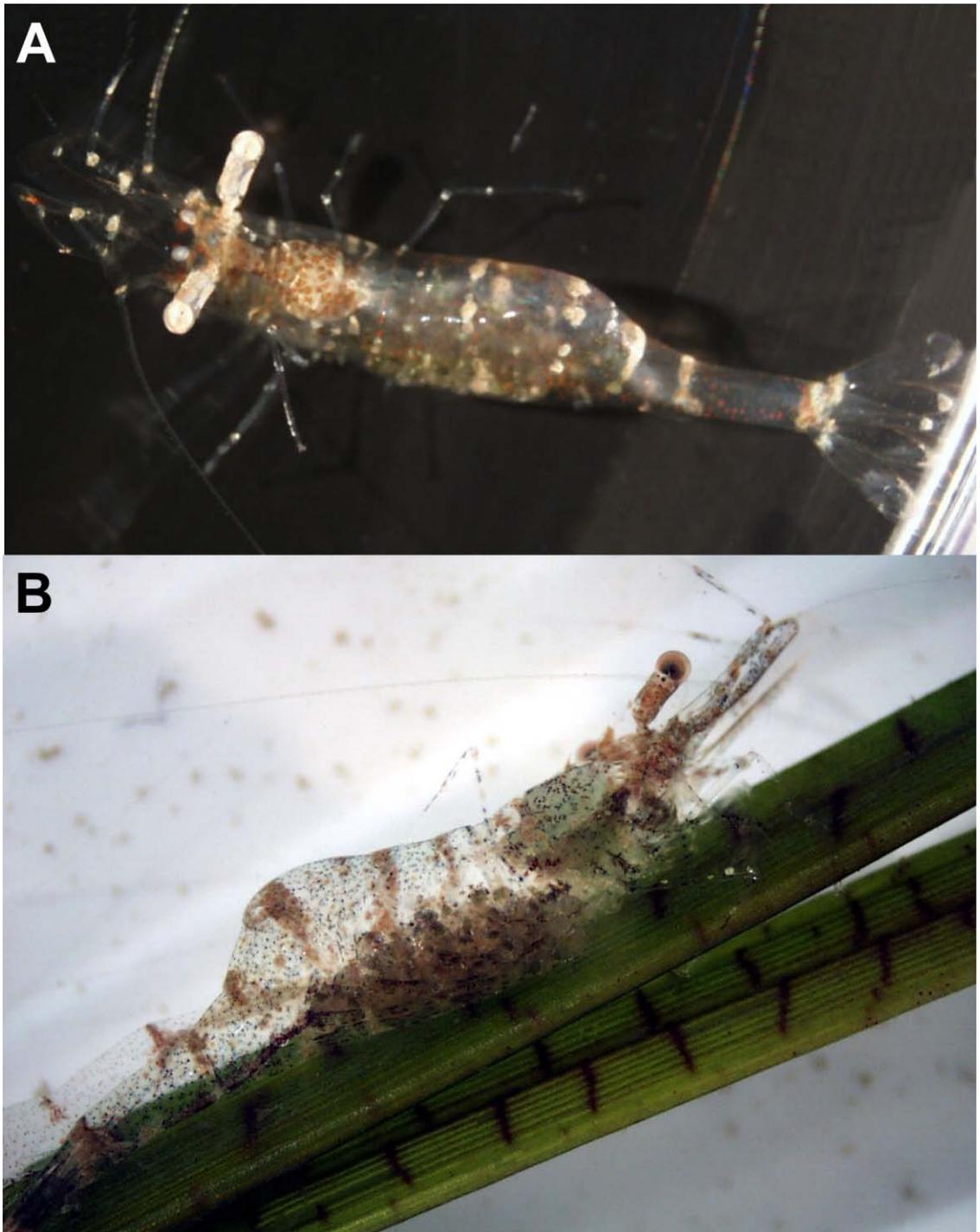


FIG. 7. *Phycomenes zostericola* gen. nov., sp. nov., Loder's Creek, SE Qld. **A**, dorsal aspect. **B**, lateral aspect (photos courtesy Jodie Haig).

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