

# A NEW PALAEMONID SHRIMP FROM THE ZOSTERA-BEDS OF MORETON BAY, QUEENSLAND, AUSTRALIA (DECAPODA: PALAEMONIDAE)

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## ABSTRACT

A new species of palaemonid shrimp, *Periclimenes anacanthus*, is described and illustrated. As a species of the "*Periclimenes grandis* species group", it is most closely related to *P. calmani* Tattersall or *P. ensifrons* (Dana) and *P. grandis* (Stimpson). The species is apparently free-living and associated with *Zostera*-beds in southern Queensland.

KEYWORDS: Crustacea, Decapoda, Palaemonidae, *Periclimenes*, new species, Queensland, Australia.

## INTRODUCTION

Through the kindness of Dr J.G Greenwood, some samples of shrimps collected by epibenthic sledge from sea-grass beds in southern Moreton Bay, Queensland, were made available for study. Amongst these were found a number of specimens of a *Periclimenes*, of the "*P. grandis* group" which could not be identified with any of the so-far described species of this group. This species is now described in detail

## SYSTEMATICS

### *Periclimenes anacanthus* sp. nov.

(Figs 1-5)

**Type material.** HOLOTYPE — ♀ (ovig.), Polka Point, Dunwich North Stradbroke Island, Moreton Bay, Queensland, 27° 29' S 153° 24' E, 0.5-1.0m below LWS, epibenthic sledge, November 1987, coll. J. and J.G. Greenwood, NTM. Cr.006317. ALLOTYPE — ♂, same data as holotype. NTM Cr.006317. PARATYPES — 3♂, 6♀ (5 ovig.), NTM Cr.006317. 1♀, Rijksmuseum van Natuurlijke Historie, Leiden, RMNH, Crust. 37303.

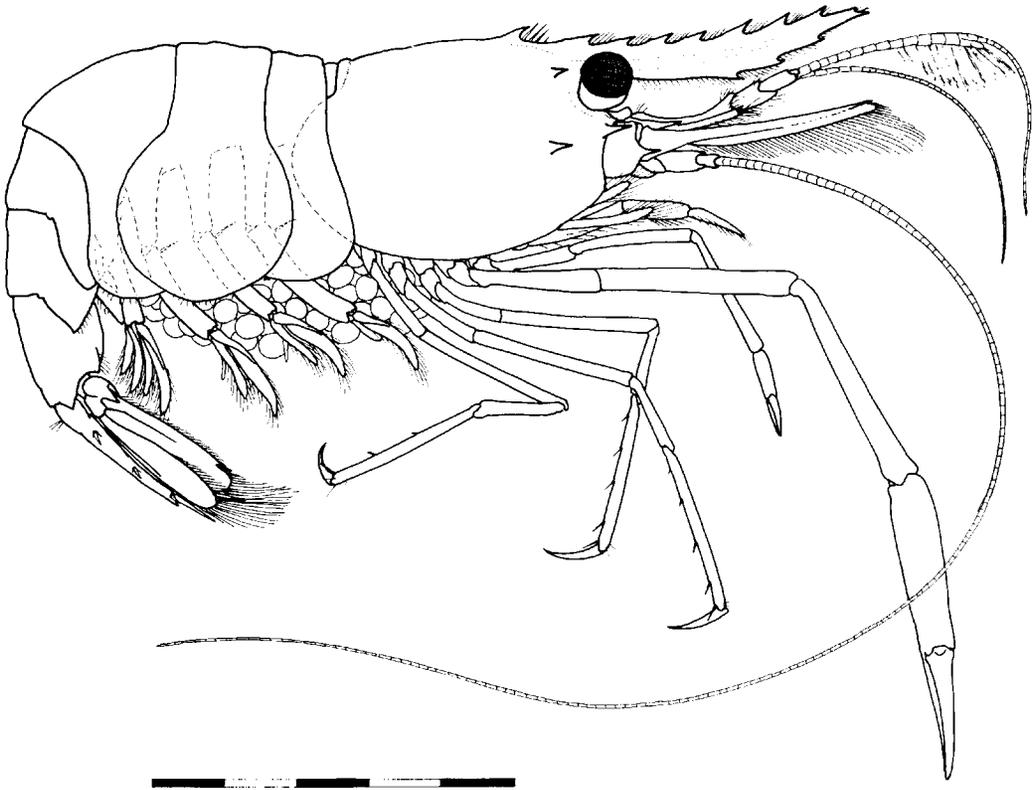
The largest ovigerous female, with the right (?) minor second pereiopod attached has been selected as the holotype, and a male, also with the right (?) minor second pereiopod still attached, as the allotype.

**Description.** A typical medium-sized, (to ca. 24mm), member of the *P. grandis* species group. Carapace smooth, glabrous, with well developed rostrum, about 1.15 of postorbital

carapace length in females, 1.50 in males, distinctly more slender in latter, compressed, slightly upcurved distally, extending well beyond antennular peduncle, to level of distal end of scaphocerite, lateral carinae obsolete, with 8-9 dorsal teeth in females, 7-8 in males, first tooth situated just in front of posterior orbital margin, evenly spaced, 2-3 ventral teeth in both sexes, all on distal half, dorsal interdental spaces with short plumose setae, tip of rostrum with simple dorsolateral setae, ventral margin with median plumose setae proximal to first tooth, double row distally; epigastric tooth present, with spiniform setae anteriorly, supraorbital spine acute, hepatic spine larger than supraorbital, orbit feebly developed, inferior orbital angle small, slightly produced with small medial flange, subacute, antennal spine large, marginal, anterolateral margin of branchiostegite feebly concave, anterolateral angle not produced, blunt.

Abdominal segments smooth, glabrous, with third slightly posterodorsally produced; fifth segment about 0.75 of sixth segment length, sixth compressed, about 1.3 times longer than deep, with posterolateral angle acute, posteroventral angle subacute; pleura of first three segments broadly rounded, enlarged in females, fourth bluntly produced, fifth produced with acute posterior angle. Telson about 1.5 of sixth segment length, 2.5 times longer than anterior width, lateral margins straight, convergent to posterior margin, latter about 0.4 of anterior

Bruce, A.J. 1988



**Fig. 1.** *Periclimenes anacanthus* holotype ♀, Moreton Bay, Queensland. Scale bar in mm.

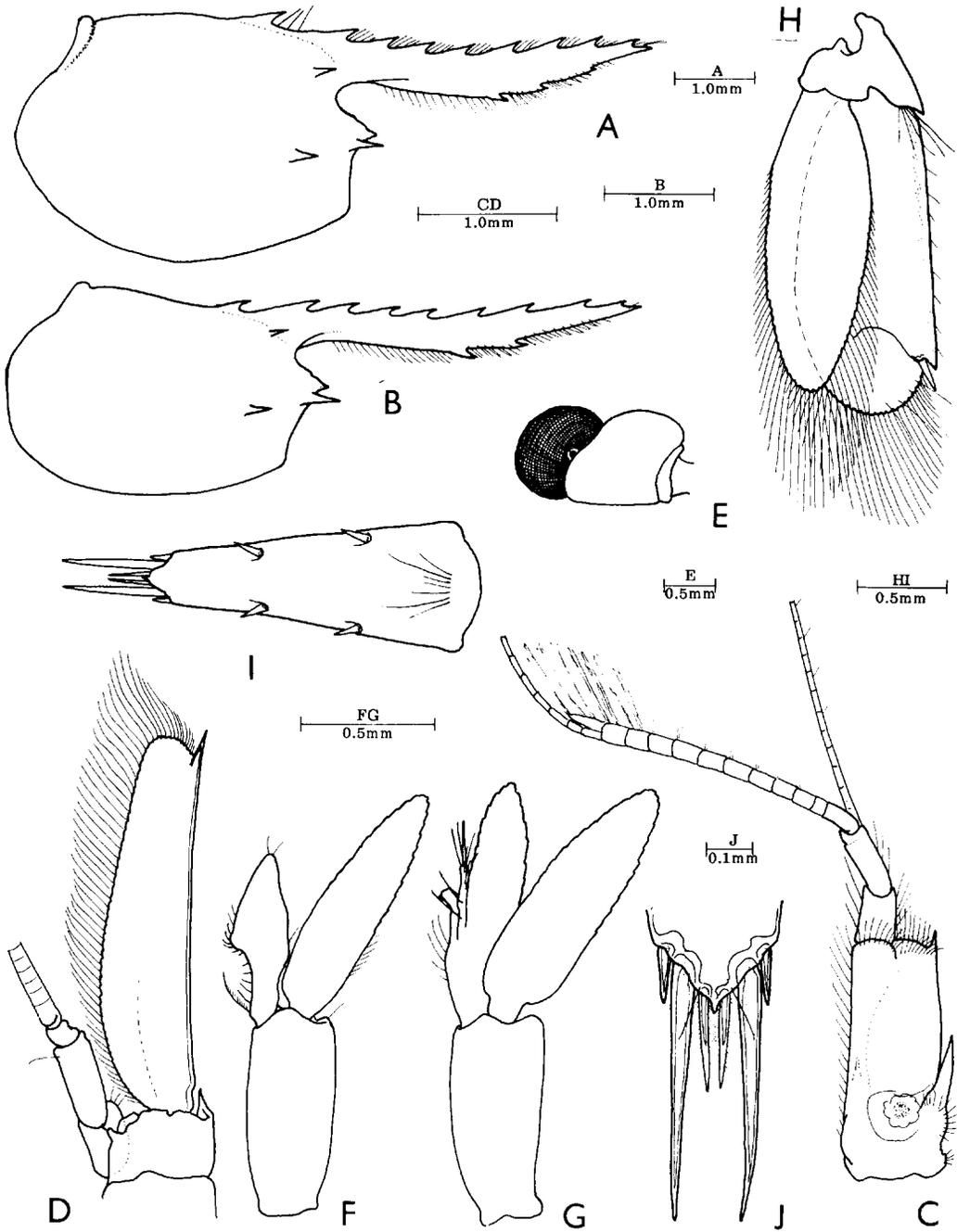
width, angular, with small acute median process; dorsal surface with transverse row of short simple setae anteriorly, two pairs of moderately large dorsal spines present at about 0.33 and 0.66 of dorsal length, each about 0.08 of mid-dorsal telson length, submarginal; three pairs of posterior spines, lateral spines short and stout, shorter than dorsal spines, intermediate spines long, robust, about 0.33 of telson length, submedian spines slender, about 0.35 of intermediate spine length, setulose, some simple setae present dorsally.

Eye with large globular well-pigmented cornea, oblique, without transverse banding, dorsal accessory pigment spot distinct, stalk feebly compressed, about as wide as posterolateral marginal length.

Antennular peduncle reaching to about 0.75 of rostral length; proximal segment about 2.5 times longer than central width, sides sub-parallel, stylocerite slender, acute, slightly exceeding half segment length, statocyst well developed with discoid statolith; anterolateral angle feebly produced, with

strong lateral tooth; ventromedian margin setose, with acute tooth at half length; intermediate and distal segments short, together equal to about half proximal segment length, distal segment longer and more slender than intermediate; upper antennular flagellum slender, biramous, with 11 proximal segments fused; shorter free ramus with 2 segments, about 7-8 groups of aesthetascs; lower flagellum filiform, about 1.25 times carapace length.

Antennal basicerite with strong acute lateral tooth; carpocerite short, about 2.6 times longer than distal width, not exceeding proximal fourth of scaphocerite; flagellum well developed, about 6.0 times carapace length, scaphocerite reaching to about tip of rostrum, about 4.4 times longer than greatest width, at about 0.3 of length, tapering gradually distally to broad rounded tip, width equal to about half proximal width, lateral margin feebly concave with strong acute distolateral tooth far exceeding distal margin of lamella.



**Fig. 2.** *Periclimenes anacanthus*: **A**, holotype ♀, **B**, allotype ♂. **C-E**, **H-J**, paratype ♂, **F**, **G**—paratype ♂: **A**, **B**, carapace and rostrum; **C**, antennule; **D**, antenna; **E**, eye, dorsal; **F**, first pleopod; **G**, second pleopod; **H**, uropod; **I**, telson; **J**, same, posterior spines.

Epistome unarmed. Ophthalmic segment with small, acute "bec ocellaire". Thoracic sternites moderately narrow, fourth with slender, finger-like median process.

Mouthparts generally similar to *P. grandis* (see Bruce 1976). Mandible (right) moderately robust, corpus without palp, molar process stout, slightly expanded distally, with 5 large blunt distal teeth, small group of short setae present between posterior teeth; incisor process stout, tapering, with three robust distal teeth, central tooth smaller than outer teeth, medial border sharp with row of (?) small tubercles along dorsal margin. Maxillula with bilobed palp, upper lobe smaller than lower, with two short, simple setae, lower lobe stout with distal process bearing short simple spine; upper lacinia curved, not expanded, with about 8-9 stout spines distally; lower lacinia stout, tapering, blunt, with numerous setulose distal setae, plumose setae ventrally. Maxilla with palp simple, proximal half broadened, distal half slender, lateral margin setose; basal endite slender, bilobed, distal lobe slightly broader than proximal, with 14 and 12 simple distal setae respectively; coxal endite obsolete, medial margin feebly convex; scaphognathite about 3.0 times longer than broad, posterior lobe large, rounded, anterior lobe small, tapered anteriorly, medial margin concave. First maxilliped with slender, tapering palp with setulose medial preterminal seta; basal endite broad and rounded, moderately setose along medial margin with feebly setulose setae distally and feebly serrulate setae proximally, with group of four long submarginal setae proximally, exopod well developed, caridean lobe small, flagellum flattened, with numerous plumose setae distally; coxal endite simple, medial margin sparsely setose, epipod large, obscurely bilobed. Second maxilliped of normal form, dactylar segment moderately broad, densely armed with strongly serrulate spines medially, propod with distomedial angle broadly rounded, with about 10 long serrulate spines, carpus with acute ventromedial angle, ischiomerus and basis normal, exopod well developed, with numerous plumose setae distally, coxa medially convex, with 6 long simple setae, epipod subrectangular, without podobranch. Third maxilliped slender, with endopod exceeding carpocerite by about 0.6 of distal segment length; ischiomerus distinct

from basis, about 9.0 times longer than central width, sparsely setose, with simple setae ventrally, with 5-6 small distolateral spines; penultimate segment about 6.5 times longer than distal width, 0.6 of ischiomerus segment length, sparsely setose dorsally, with long serrulate setae ventrally; terminal segment tapering distally with stout simple terminal spine, about 0.4 of penultimate segment length, 5.0 times longer than proximal width, with numerous feebly serrulate spines ventromedially; basis obliquely articulated with ischiomerus, medial border feebly convex and setose, exopod with broad flagellum with numerous plumose setae distally; coxa slightly produced medially, feebly setose, with oval lateral plate, with small tri-lamellar arthrobranch.

First pereopods slender, reaching to about distal end of scaphocerite. Chela with palm subcylindrical, moderately compressed, about 2.2 times longer than deep, with 3-4 transverse rows of short serrulate cleaning setae proximally; fingers slender, slightly compressed, tapering with small hooked tips and entire, sharp cutting edges, dactylus about 1.2 times palm length, 5.6 times longer than proximal width, sparsely setose, fixed finger similar; carpus about 1.8 times chela length, slender, about 9.5 times longer than distal width, distal width about 2.0 times proximal width, with row of long serrulate cleaning setae distally; merus about 0.8 of carpus length, uniform, unarmed, about 10.0 times longer than central width, ischium about 0.5 of carpus length, about 5.5 times longer than distal width, obliquely articulated with basis; basis about 0.33 of carpus length, ventrally carinate, with spiniform setae; coxa robust, with small distoventral process with spiniform setae.

Second pereopods almost all detached, apparently asymmetrical and unequal, extending well beyond scaphocerite by chela and about 0.5 of carpus length. Larger pereopod with palm of chela subcylindrical, smooth, slightly swollen centrally, about 3.5 times longer than deep, fingers slender moderately compressed, with small hooked tips, dactylus about 0.7 of palm length, sparsely setose, about 0.16 times longer than proximal depth, cutting edge with two small low teeth on proximal third, distal two thirds sharp, entire, unarmed, fixed finger similar, proximal third with three small low teeth,

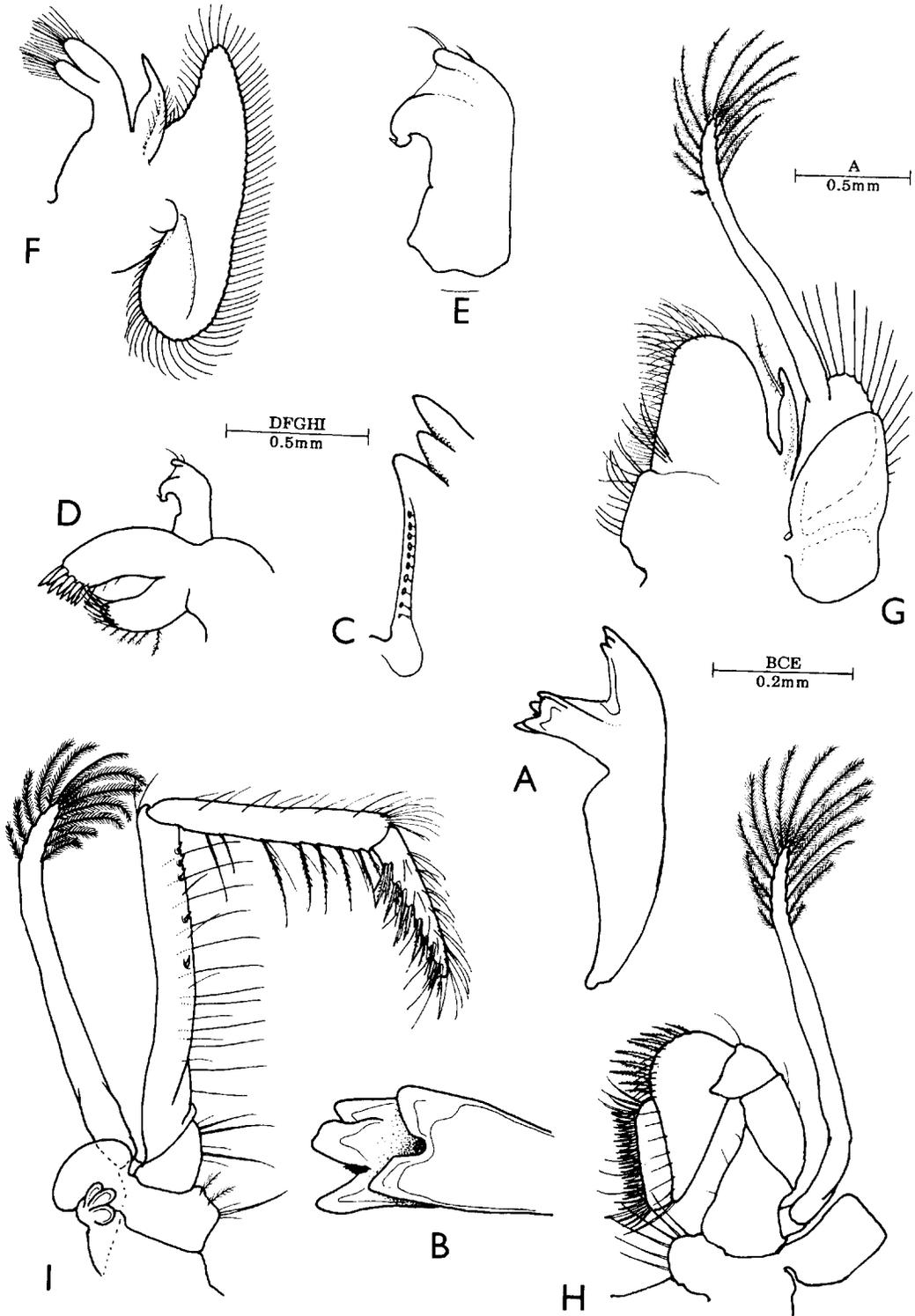


Fig. 3. *Periclimenes anacanthus* paratype ♀ : A, right, mandible; B, same, molar process; C, same, incisor process; D, maxillula; E, same, palp; F, maxilla; G, first maxilliped; H, second maxilliped; I, third maxilliped.

distal tooth larger and separated by wider gap than proximal two; carpus about 1.18 of palm length, moderately swollen distally, about 8.0 times longer than distal width, distal margins feebly excavate, unarmed; merus subequal to palm length, about 8.5 times longer than central width, without distoventral tooth; ischium about 0.85 of palm length, tapered proximally, unarmed, about 8.0 times longer than distal width; basis and coxa without special features. Smaller pereopod similar, shorter and more slender; palm about 3.4 times longer than central depth, fingers about 0.9 of palm length, dactylus about 8.0 times longer than proximal width, fingers with distal half of cutting edges entire, proximal half with series of 7-8 small low acute teeth, most marked on fixed finger, with distal tooth largest; carpus about 0.85 of chela length, slender, unarmed, about 9.5 times longer than distal width; merus distoventrally unarmed, about 0.85 of carpus length, 1.65 of ischium length.

Ambulatory pereopods moderately slender. Third pereopod exceeds scaphocerite by about length of dactyl; dactyl equal to about 0.4 of propod length, slender, curved, about 6.5 times longer than proximal depth, compressed, ventral margin sharp, unguis feebly distinct, about 0.33 of carpus length, corpus with small group of setae at 0.6 of dorsal margin length, sparse short, ventral setae and single distolateral and medial setae; propod about 14.5 times longer than distal width, with pair of strong spines distoventrally and preterminally, with 5 single spines along ventral margin, dorsal border with scattered spiniform setae; carpus about 0.5 of propod length, 7.0 times longer than wide, unarmed; merus subequal to propod length, about 11.0 times longer than wide, unarmed; ischium about 0.5 of merus length, 6.5 times longer than distal width, unarmed; basis and coxa normal. Fourth and fifth pereopods similar, longer, less strongly spinose ventrally on propods.

Pleopods with basipodite robust, compressed. Male first pleopod with basipodite about 2.3 times longer than broad; exopod about 1.2 times basipodite length, 4.0 times longer than wide; endopod 0.7 of exopod length, 2.8 times longer than wide, proximal half narrow, bilaterally concave, medial margin with long setulose seta proximally, 11 distally serrulate spines distally, lateral margin without

spines or setae, distal half tapering to rounded tip, with sparse, short, feebly plumose setae and numerous simple setae. Male second pleopod about 2.3 times longer than broad; exopod 1.3 times longer than basipodite, 3.4 times longer than broad, endopod 0.9 of exopod length, about 4.3 times longer than wide, with appendices arising at about 0.37 of medial margin; appendix masculina with corpus short, reaching to about 0.6 of endopod length about 5.0 times longer than wide, with four long simple setae distally, subequal to length of carpus, two shorter preterminal ventral setae, four single setae spaced along ventral aspect, proximal 2 setae with central portions serrulate, others simple; appendix interna much shorter than appendix masculina, with few distal concinuli only.

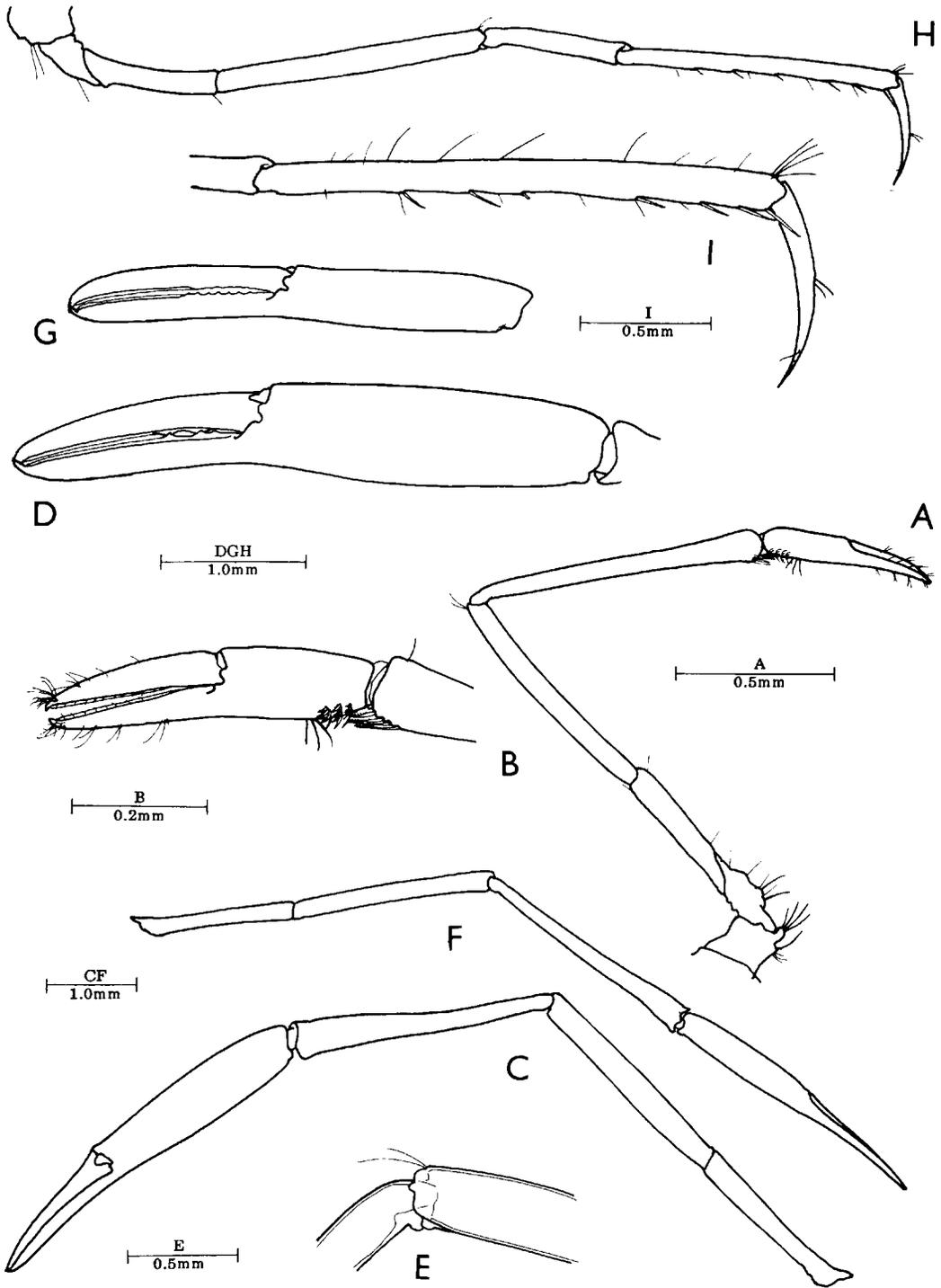
Uropod with protopodite posterolaterally acute, with long setae dorsally; exopod broad, about 2.5 times longer than wide, extending well beyond posterior telson margin, lateral margin straight, sparsely setose, with numerous submarginal setae ventrally, with stout distolateral tooth, with strong mobile spine medially, diaeresis moderately distinct; endopod about 0.9 of exopod length, 3.0 times longer than wide.

**Measurements (mm).** Holotype ♀: total body length 23.6; carapace and rostrum 7.3; postorbital carapace 3.15; chela of second pereopod 4.0. Allotype ♂: total body length 12.0; carapace and rostrum 5.0; postorbital carapace 3.0; chela of second pereopod 2.0. Postorbital carapace lengths: ovigerous ♀ paratypes, 2.5-3.2; non-ovigerous ♀ paratype 3.0; ♂ paratypes 2.0-2.2. Largest detached major second pereopod, dactyl 1.8; propod, 4.4; carpus, 3.0; merus, 2.6; ischium, 2.0; largest detached minor second pereopod, dactyl, 1.5; propod 2.2; carpus, 2.7; merus, 2.3; ischium, 2.8. Length of ovum, 0.5m.

**Colouration.** No data.

**Habitat.** The specimens were all collected from a single night haul of an epibenthic sledge through *Zostera*.

**Associated fauna.** *Periclimenes indicus* (Kemp), abundant; *Hippolyte caradina* Holthuis, abundant; *Latreutes pygmaeus* Nobili and *L. mucronatus* (Stimpson), numerous; *Nikoides danae* Paulson, two; *Processa australiensis* Baker, two; *Alpheus papillosus* Banner and Banner, one.



**Fig. 4.** *Periclimenes anacanthus* paratypes: **A**, first pereiopod; **B**, same, chela; **C**, major second pereiopod; **D**, same, chela; **E**, same, mero-carpal joint; **F**, minor second pereiopod; **G**, same, chela; **H**, third pereiopod; **I**, same, propod and dactyl.

**Systematic Position.** *P. anacanthus* appears most closely related to either *P. calmani* Tattersall or *P. grandis* (Stimpson) and *P. ensifrons* (Dana). *P. anacanthus* resembles *P. calmani* in the absence of a distoventral tooth on the merus of the second pereopods and the general proportions of the rostrum and pereopods, but differs distinctly in the presence of supraorbital spine. The only Indo-West Pacific *Periclimenes* species known to have a fourth thoracic sternal process, supraorbital spines and without meral spines on the second pereopods, is *P. nilandensis* Borradaile, a commensal species of more squat proportions, with distinctly shorter, more robust second pereopods, with the carpus much shorter than the palm (Holthuis 1952; Bruce 1978). *P. anacanthus* is generally similar in its morphology to *P. grandis*, the species used by Kemp (1922) to typify his "*P. grandis* species group", but it differs in lacking a distoventral meral spine on the second pereopods, and spines on the distal carpus. The carpal spines are also lacking in *P. ensifrons*, but this little known species has rarely featured in recent literature and is known with certainty only from the original brief original descriptions and illustrations (Dana 1852, 1852a, 1855) and the type material from north Borneo is no longer extant. The only other record (Nobili 1907) is from the Tuamotu Islands and should be re-examined, as the specimen of *P. ensifrons* reported by Nobili (1899) from Beagle Bay, Papua, has been subsequently re-identified as a specimen of *Leander tenuicornis* (Say) by Holthuis (1952). *P. ensifrons* has a distinctly deeper, more strongly up-curved rostrum. The scaphocerite has a particularly slender lamina, far exceeded by the distolateral tooth, closely similar to that of *P. elegans* (Paulson) as illustrated by Kemp (1922, fig. 61a) whereas that of *P. anacanthus* is more similar to that of *P. demani* Kemp (Kemp 1922, fig. 64).

## DISCUSSION

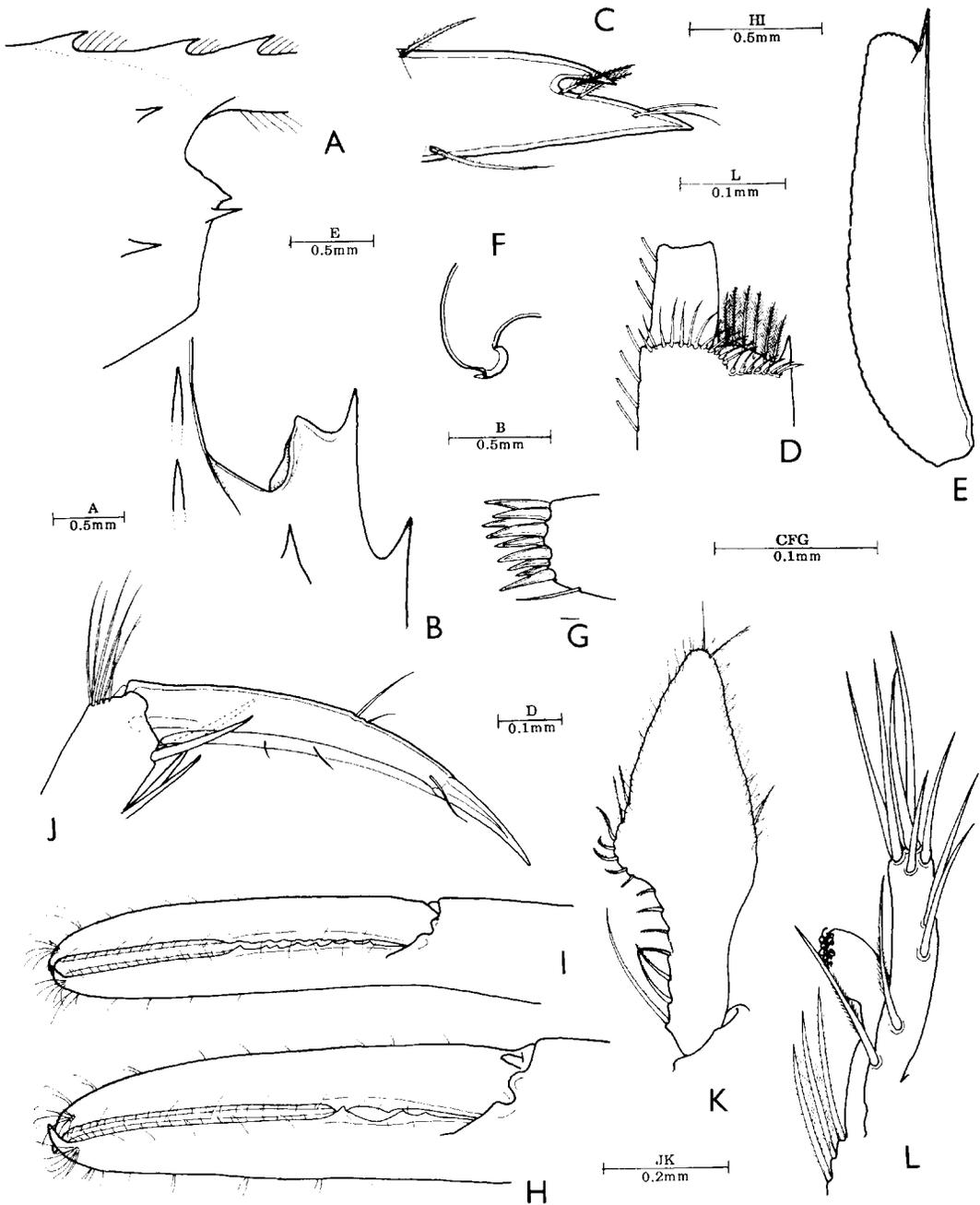
*Periclimenes grandis* (Stimpson) and *P. elegans* (Paulson), together with other members of the "*P. grandis* species group", as originally designated by Kemp (1922) are amongst the commonest and most widely dis-

tributed of intertidal and shallow subtidal Indo-West Pacific coral reef shrimps. Amongst specimens of these shrimps a small number are not infrequently found that lack the meral and carpal spines of the second pereopods that are present in the other specimens. Some of these would therefore appear to represent specimens of *P. ensifrons* or *P. anacanthus* or other species, depending upon the combination of deficiencies. These variations are probably due to changes in pereopod morphology as the result of regeneration following autotomy. Where the other species, such as *P. grandis*, *P. elegans*, etc., have been collected in some numbers, these aberrant specimens can probably be safely assigned to one of the dominant species. The identifications of isolated specimens can often present problems. No doubt exists over *P. anacanthus* as all of the dozen specimens were collected simultaneously and are consistent in the lack of meral and carpal spines on the second pereopods. Also, no specimens resembling *P. grandis* or *P. elegans* were collected. However, as almost all of these appendages are detached, it is not fully certain that they are similar and asymmetrical in males and females. It is possible that the males have similar large chela, with few strong teeth, and the females, similar small chelae, with more numerous small teeth.

The endopod of the male first pleopod is particularly unusual for a species of *Periclimenes*. Many species have a small distomedial lobule, (but this is generally absent in the *P. grandis* group), with short spines and stout plumose setae proximally and with slender plumose setae around the distal and lateral margins. No other species have been reported in which numerous slender simple setae are distributed over the distal and lateral margins of the endopod.

A key to the species of an expanded "*Periclimenes grandis* species group" has been recently provided (Bruce 1987). *P. anacanthus* can be readily inserted into that key by the addition of the following couplet:

- |      |  |  |
|------|--|--|
| 16.  | Supraorbital spines present .....  | 16a                                    |
|      | Supraorbital spines absent .....   | 17                                     |
| 16a. | Second pereopods with carpus much shorter than palm; R. 1 + 7-9/3-5 .... | ..... <i>P. nilandensis</i> Borradaile |
|      | Second pereopods with carpus much longer than palm; R. 1 + 6-9/2-3.      | ..... <i>P. anacanthus</i> sp. nov.    |



**Fig. 5.** *Periclimenes anacanthus* paratypes: **A**, orbital region, lateral; **B**, same, dorsal; **C**, tip of rostrum; **D**, antennular peduncle, distal end of proximal segment; **E**, scaphocerite; **F**, maxillula, ventral lobe of palp; **G**, same, upper lacinia, distal end; **H**, major second pereiopod, fingers of chela; **I**, minor second pereiopod, same; **J**, third pereiopod, dactyl; **K**, male first pleopod, endopod; **L**, male second pleopod, endopod, appendix interna and appendix masculina.

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