PERICLIMENES SPECIES (CRUSTACEA: DECAPODA: PONTONIINAE) FROM FAR NORTH QUEENSLAND

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Recent collections from inshore waters of Cape York have provided specimens of four shrimp species of the genus *Periclimenes* Costa, 1844, from a single locality, Cape Flattery. One is a well known species that has been rarely reported from Australia, two are described as new species and the fourth, damaged, cannot be referred to any described species. ❐ *Decapoda, Caridea, Pontoniinae, Periclimenes, P. adularans, P. paulsoni, new species, Cape York, Queensland.*

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Recent surveys of inshore waters of northern Queensland for the Introduced Marine Pests Baseline Survey Projects, by the Marine Biology and Aquaculture Department of James Cook University, suggest that much still remains to be learned about the caridean fauna of this biotope, which has attracted much less scientific attention than the nearby Great Barrier Reef. Of the four species of the pontoniine *Periclimenes* Costa, 1844, only one can be placed in a described taxon, which suggests that more extensive or more detailed sampling might well produce a further substantial increase in the caridean diversity known from this region.

Two of the species are described as new species and a third, represented by a single damaged specimen, probably also represents a further as yet undescribed species. The fourth species collected, *Periclimenes grandis*, is a well known and widely distributed Indo-West Pacific species, but one that has been only infrequently recorded from Australian waters.

In the descriptions, CL refers to the postorbital carapace length; QMW to the Queensland Museum specimen catalogue numbers. Restricted synonymies only are provided. Full synonymies are to be found in Li (2000).

SYSTEMATICS

Subphylum CRUSTACEA
Order DECAPODA Latreille, 1803
Family PALAEMONIDAE Rafinesque, 1815
Sub-family PONTONIINAE Kingsley, 1878

Periclimenes grandis (Stimpson, 1860) (Fig. 1)

Anchistia grandis Stimpson, 1860: 39.
Periclimenes grandis Borradaile, 1898: 382.
Periclimenes (Ancylocaris) grandis Kemp, 1922: 210-214, figs 58-59, pl. 7, fig 10.
Periclimenes grandis Li, 2000: 186-187, fig. 235 (full synonymy).

MATERIAL. 1 ovig. ♀, # Sh 369, Cape Flattery, inner wharf pile, P3, scrapings, 7m, August 2001; 1 ♀, # Sh 370, Cape Flattery, inner wharf pile, P6, 3m, 27 October 2001.

DISTRIBUTION. *Australia*. Queensland: Magnetic Island (Bruce, 1977); John Brewer Reef (Bruce, 1987a); Abbot Point (Hoedt, et al., 2000) Northern Territory: Darwin (Bruce, 1987c); East Point, Darwin (Bruce, 1988a); Cobourg Peninsula (Bruce & Coombes, 1995); Darwin Harbour: Bullocky Point, Cameron Beach, Channel Island, Nightcliffe, Dudley Point, Lee Point, Shell Island, Weed Reef (Bruce & Coombes, 1997). Western Australia: Hibernia Reef (Bruce, 1992).

General. Type locality: Oshima, Japan. Also known from Egypt, Israel, Jibuti, Yemen, Kenya, Zanzibar, Tanganyika, Moçambique, Comoro Islands, Madagascar, Seychelle Islands, Sri Lanka, Burma, Malaya, Singapore, Indonesia, Vietnam, China, Japan, Papua New Guinea, Western Australia, Northern Territory, Queensland, Japan, Caroline Islands, Marshall Islands, Fijian Islands, Tuvalu and Tuamotu Islands.

REMARKS. The present specimens (CLs 4.7, 4.0mm) present no special features. The rostral dentitions are:1 + 6/4, 1 + 5/4. The third ambulatory propod is 11 × longer than wide, with a pair of strong distoventral and 4 ventral spines. The dactyl is 0.28 of the propod length, about 4 × longer than its basal width, rather stouter than as reported by Kemp (1922), who

notes 6-6.5 × longer. This free-living micropredator is probably much commoner in warmer waters than the relatively sparse Australian records suggest. It is surprising that no specimens were found on Heron Island (Bruce, 1981) during collections from 1975 to 1981. Specimens however have been collected from Heron Island (coll. A.H. Banner, 1968). Other specimens have been seen from Bundegi Reef, Exmouth Gulf and North West Cape, Western Australia (coll. N.L. Bruce, 1980).

Periclimenes adularans sp. nov.
(Fig. 2)

MATERIAL. Holotype: 1 ovig. ♀, # Sh 311, Cape Flattery Service Jetty, 27 April 2001, beam trawl, 2m, QM W26554. Paratypes: 1 ♂, # Sh 317, Cape Flattery Service Jetty, 27 April 2001, beam trawl, 2m, coll. QM W26555; 1 ovig. ♀, Sh 371, Cape Flattery, Service Jetty, beam trawl, 15m, 27 October 2001, QM 26556.

ETYMOLOGY. Latin *adulari*, to flatter, after the locality of capture.

DIAGNOSIS. Small slender shrimp of the *holthuisi* species group. Rostrum strongly arched (Fig. 2A), ventrally sinuous, distally concave, reaching to near distal margin of intermediate segment of antennular peduncle, with 13 small acute teeth dorsally in female, 11 in male (Fig. 2B), with single small subterminal tooth ventrally. Carapace with epigastric tooth in female, absent in male; inferior orbital angle (Fig. 2C) strongly produced, acute, with reflected inner flange; hepatic spine slender, slightly anterior to the level of the epigastric tooth in the female; third abdominal tergite slightly posteriorly produced, not carinate; first and second pereiopods normal, similar, slightly unequal, second pereiopod (Fig. 2D) chela (female) (Fig. 2E) 0.9 of CL, with fingers subequal to palm length, dactylus unarmed, fixed finger with 2 minute acute teeth proximally, carpus 0.6 of chela length, subequal to merus: ischium 1.2 × merus length; third ambulatory pereiopod (Fig. 2F) with dactyl (Fig. 2G) slender, 7.7 × longer than basal width, 0.28 of propod length, with small slender accessory tooth at 0.8 of length, closely adpressed, unguis not clearly demarcated: propod about 19 × longer than width, uniform. Compared with the other species of this group, *P. adularans* has a smaller more slender accessory tooth that is closely adpressed to the unguis. The dactylus is distinctly longer and more slender than in the other species of this group, in which the accessory tooth is also stouter and more projecting, about

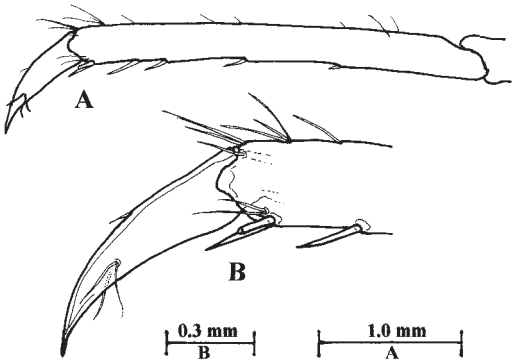

FIG. 1. *Periclimenes grandis* (Stimpson) ovigerous ♀. A, third pereiopod, propod and dactyl. B, same, dactyl.

4× longer than the basal width, and 0.2 of the propod length (Bruce, 1990).

MEASUREMENTS (mm). Holotype, CL 3.7; paratypes: (Sh 317), CL 2.7, (Sh 371), CL 3.4 mm; length of ova 0.5.

SYSTEMATIC POSITION. Closely related to *Periclimenes tosaensis* Kubo, 1951. *Periclimenes adularans* may be easily distinguished from *P. tosaensis* by the accessory tooth on the ambulatory dactylus as this is absent in *P. tosaensis,* the only species of the *holthuisi*-group in which it is lacking. This dactylus is otherwise very similar in these two species, about 7 × longer than the basal width, about 0.28 of the propod length. Compared with the other species of this group, *P. adularans* has a smaller more slender accessory tooth that is closely adpressed to the unguis. The dactylus is distinctly longer and more slender than in the other species of this group, in which the accessory tooth is also stouter and more projecting, about 4 × longer than the basal width, and 0.2 of the propod length (Bruce, 1990).

COLOURATION AND HOST. Not recorded. Trawl catches did not indicate any potential hosts.

HABITAT. Silty mud substrate.

REMARKS. The holotype female has a single second pereiopod. The male lacks its right eye, one first pereiopod, both second pereiopods and fourth and fifth pereiopods. The epigastric tooth also may have been lost artificially. The ovigerous female paratype lacks the distal half of the rostrum, and pereiopods 3-5 on the right side.

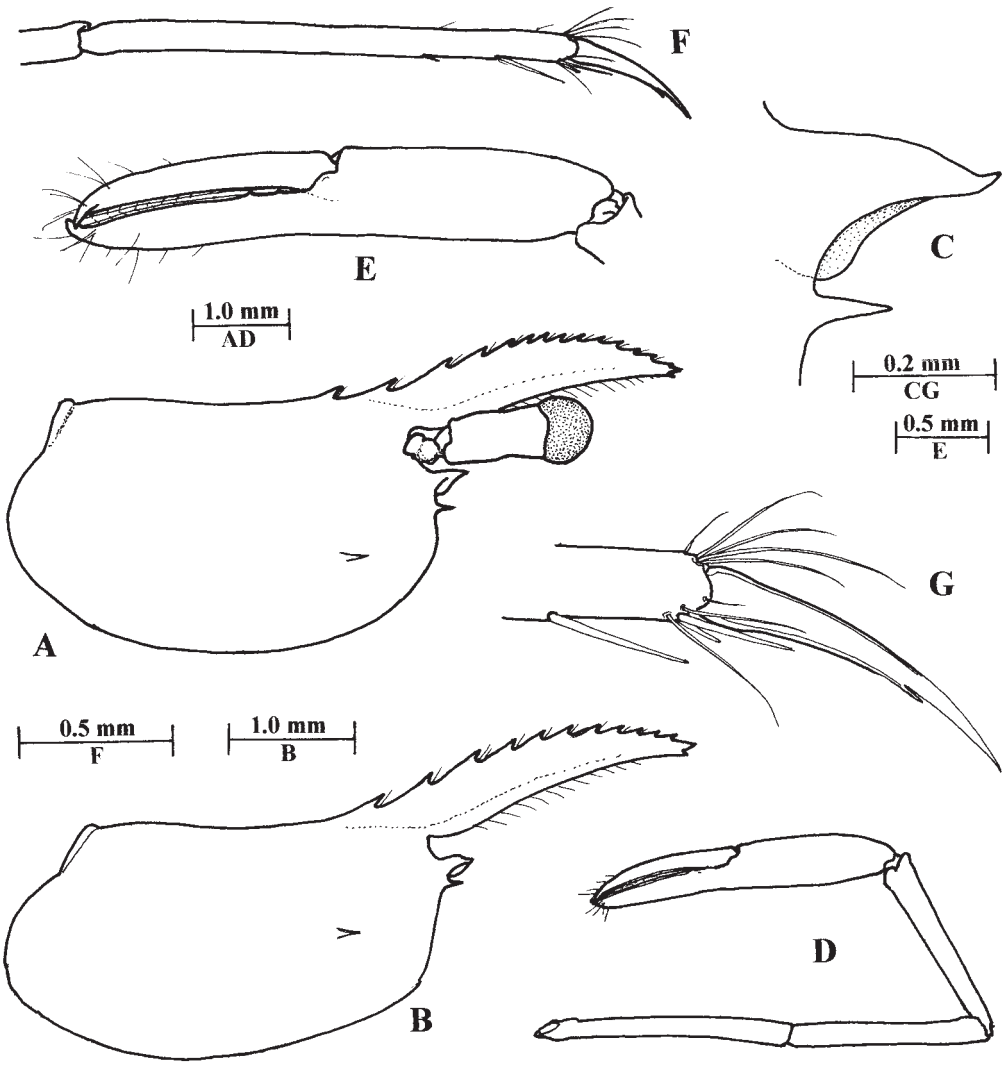

FIG. 2. *Periclimenes adularans* sp. nov. A, carapace and rostrum, ♀; B, same, ♂; C, inferior orbital angle; D, second pereiopod; E, same, chela; F, third pereiopod, propod and dactyl; G, same, distal propod and dactyl. (A,D & E, holotype; B,C,F & G, paratype).

A key to the then 6 species of the *Periclimenes holthuisi* group was provided by Bruce (1990). Since then two further species have been described: *P. tenuirostris* Bruce, 1991, and *P. kobayashii* Okuno & Nomura, 2002. An updated key follows:

1. Ambulatory dactyls simple; R 1 + 7-10/2 . . . . . *P. tosaensis* Kubo

   Ambulatory dactyls biunguiculate 2

2. Carapace with 2-3 postorbital teeth; R 2-3 + 6-7/2-3 . . . . . *P. aesopius* (Bate)

   Carapace with 0-1 postorbital teeth. 3

3. Carpus of second pereiopods distinctly longer than chela; without epigastric tooth; R 5-6/0-2 . . . . . *P. longicarpus* Bruce & Svoboda

   Carpus of second pereiopods shorter than chela 4

4. Fingers of second pereiopod chela with series (5-7) of small acute recurved teeth; propods of ambulatory pereiopods with short distoventral spines; R 1 + 5-7/0-2 . . . . . *P. venustus* Bruce

   Fingers of second pereiopod chelae without series of small acute recurved teeth; propods of ambulatory pereiopods with long distoventral spines 5

5. Second pereiopods with chelae bowed, carpus about 0.6 of palm length; R 1 + 7-8/1-2 . . . *P. magnificus* Bruce

   Second pereiopods with chelae not bowed, carpus subequal to palm length or longer 6

6. Third abdominal tergite without posterior median carina . 7

   Third abdominal tergite with posterior median carina . 8

7. Third ambulatory dactyl 7 or more × longer than basal width, about 0.28 of propod length, with very slender adpressed accessory tooth: R 0-1 + 11-13/1. . . . . *P. adularans* sp. nov.

   Third ambulatory dactyl about 4 × longer than basal width, about 0.2 of propod length, with well developed projecting accessory tooth; R 1 (-2) + 8-11/2-4 . . . . . *P. holthuisi* Bruce

8. Rostrum feebly arched, almost straight, directed upwards, exceeding antennular peduncle; first pereiopod with dactylus longer than palm; R 1 +6-7/2-3 . . . . *P. tenuirostris* Bruce . . . . . .

   Rostrum distinctly arched not exceeding antennular peduncle; first pereiopod dactylus shorter than palm; R 1 + 6-8/1-3 . . . . . *P. kobayashii* Okuno & Nomura

Periclimenes paulsoni sp. nov.
(Fig. 3A-P)

MATERIAL. 1♂ holotype, Sh 383, Cape Flattery, inner wharf pile, scrapings, 7m, August 2001, coll.# FAK, QM W26557.

ETYMOLOGY. Named in honour of Otto Mikhailovich Paul'son, (1837-86), author of *Studies on the Crustacea of the Red Sea* (1875).

DIAGNOSIS. Small sized slender shrimp of the *grandis* species group. Rostrum (Fig. 3B) slender, about 0.8 of CL, well exceeding antennular peduncle, horizontal, slightly up-curved, with 5 small acute teeth dorsally, 3 ventral teeth, tip acute, simple. Carapace (Fig. 3A) with epigastric tooth, robust marginal antennal spine, inferior orbital angle (Fig. 3C) obsolete; hepatic spine slender, slightly anterior in level to the epigastric tooth; scaphocerite (Fig. 3E) slender, with distal tooth far exceeding lamella; cornea hemispherical (Fig. 3F), diameter about 0.33 of CL; fourth thoracic sternite with slender median process; third abdominal tergite not posteriorly produced; first pereiopods (Fig. 3G,H) normal, exceeding scaphocerite by length of chela, carpus subequal to chela; second pereiopod (Fig. 3I) chela 1.2 of CL, with fingers (Fig. 3J) about 0.4 of palm length, unarmed, acute hooked tips, cutting edges entire, carpus 1.25 of chela length, subequal to merus and ischium length; third ambulatory pereiopod (Fig. 3K) with dactyl (Fig. 3L) robust, simple, curved, 5.7 × longer than basal width, 0.3 of propod length, unguis not clearly demarcated; propod about 10.5 × longer than width, subuniform, with 2 slender distoventral spines, 4 smaller solitary ventral spines; telson and uropods normal.

MEASUREMENTS (mm). Holotype, CL 1.35, carapace and rostrum 3.2; second pereiopod chela 1.9; third pereiopod propod 1.6.

SYSTEMATIC POSITION. *Periclimenes paulsoni* is closely related to *P. anacanthus* Bruce, 1988b and *P. nilandensis* Borradaile, 1915. It may also be closely related to *P. edwardsii* (Paulson, 1875) with which species the specimen was initially identified. *Periclimenes edwardsii* and *P. nilandensis* were not included in the *grandis* species group by Kemp (1922) as they lacked distoventral meral spines on the second pereiopods. Bruce (1987a) revised the species of this group and included all species with a conspicuous finger-like median process on the fourth thoracic sternite, a feature present in *P. paulsoni*, *P. anacanthus* and *P. nilandensis*. It is not known if it is present in *P. edwardsii*, but this seems likely from the close resemblances between the three species.

Periclimenes paulsoni may be distinguished from *P. anacanthus* by the shorter more slender rostrum, about 1.2 of CL, as opposed to 1.6 in male of *P. anacanthus*, lesser rostral dentition, 1 + 5/3, as opposed to 1 + 6-9/2-3; the obsolete inferior orbital angle, well developed, acute in *P. anacanthus*; shorter stouter, 5 segmented fused ramus of upper antennular flagellum, as opposed to long slender 11 segmented ramus; corneal diameter about 0.3 of CL, as opposed to 0.6; first pereiopod carpus subequal to chela; second pereiopod with carpus slightly longer than palm, subequal to meral length, comparatively short and stout, as opposed to longer and more slender in *P. anacanthus*; third pereiopod dactyl about 5.7 × longer than basal width, as opposed to 6.5 ×, propod about 10.5 × longer than width, as opposed to 14.5 × in *P. anacanthus.*

The pleopods (Fig. 3M,O) of *P. paulsoni* are unusual and differ markedly from *P. anacanthus*. They are similar on left and right sides. The first pleopod endopod (Fig. 3N) is simple, tapering distally, about 4 × longer than the basal width, with 3 feeble setae medially. In *P. anacanthus* it is about 7 × longer than the basal width, much expanded centrally, with numerous spines on the concave proximo-medial margin, with numerous fine marginal setae over the rest of the expanded portion. The endopod of the male second pleopod (Fig. 3P) is much reduced in *P. paulsoni,* about 0.6 of the exopod length, with a small appendix interna at 0.75 of the length. The appendix

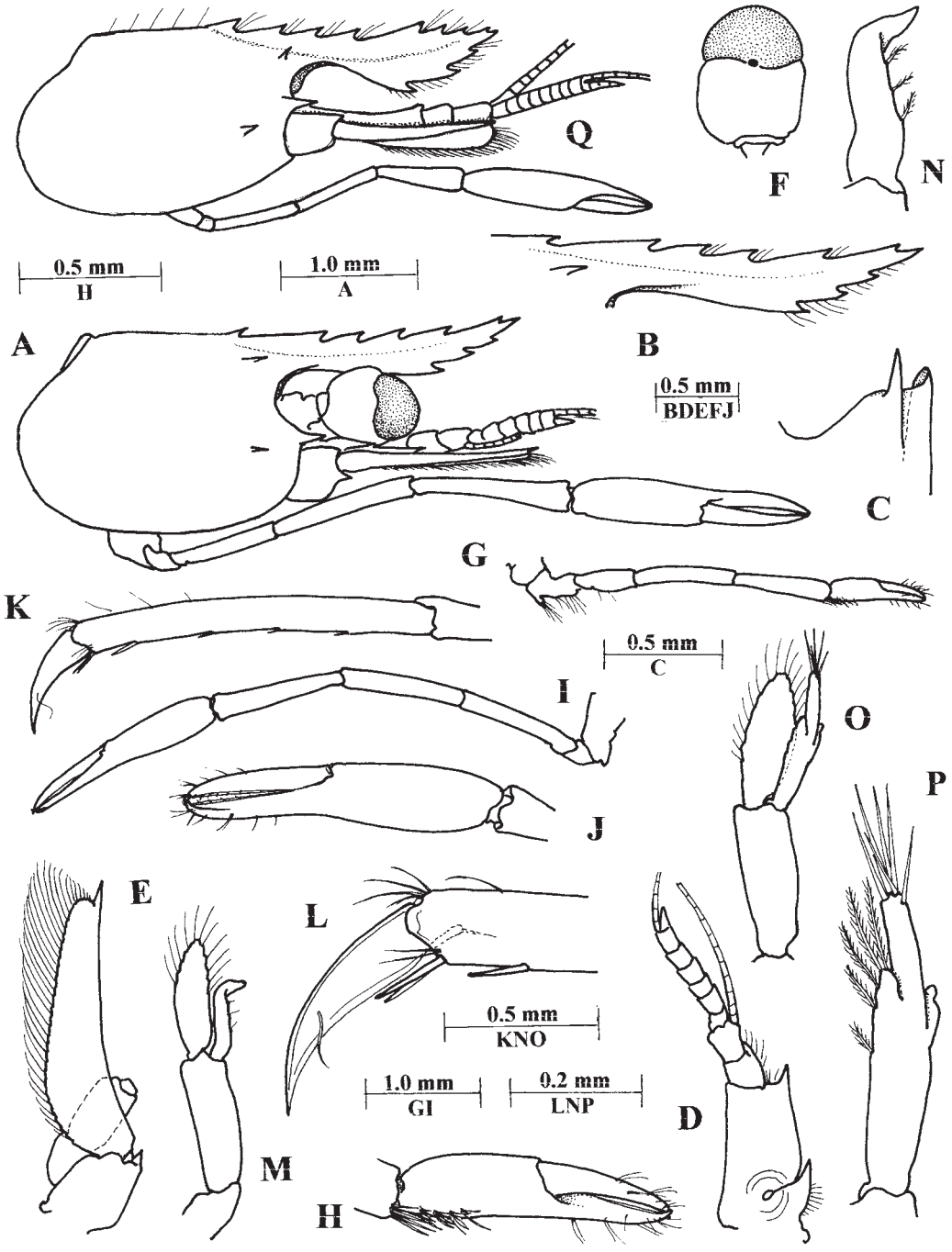

FIG. 3. A-P, *Periclimenes paulsoni* sp. nov. holotype ♂. A, carapace and appendages; B, rostrum; C, inferior orbital angle, dorsal aspect; D, antennule; E, antenna; F, eye, dorsal; G, first pereiopod; H, same, chela; I, second pereiopod; J, same, chela; K, third pereiopod, propod and dactyl; L, same, distal propod and dactyl; M, first pleopod; N, same, endopod; O, second pleopod; P, same, endopod. Q, *Periclimenes edwardsii* (Paulson), redrawn from Paulson (1875).

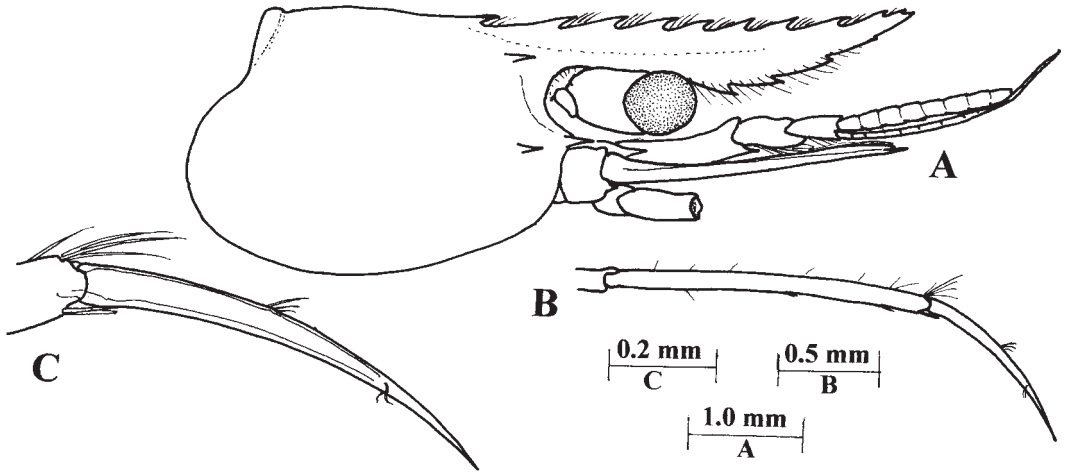

FIG. 4. *Periclimenes* sp., aff. *anacanthus* Bruce. A, carapace and appendages; B, third pereiopod, propod and dactyl; C, same, distal propod and dactyl.

masculina is very well-developed, about 0.6 of the endopod length, far exceeding the end of the endopod, with 5 long simple terminal spines and 1 slightly preterminal spine. In *P. anacanthus* the appendix masculina is much shorter than the endopod, which is well-developed, about 0.6 of its length, and has 6 terminal spines, with 4 spines along the ventral surface.

Periclimenes paulsoni also resembles *P. nilandensis* Borradaile, 1915. This species has a distally broad scaphocerite, not greatly over reached by the terminal tooth, a well developed inferior orbital angle not found in *P. paulsoni*, the first pereiopod carpus is markedly longer than the chela, the second pereiopod carpus is markedly shorter than the merus and the rostral dentition of 1 + 7-8/3-4, with the first tooth situated on the carapace.

The present specimen of *P. paulsoni* was initially thought to be referrable to *P. edwardsii* (Paulson, 1875), a little known species that has rarely been reported since its original description. The loss of all Paulson's material has handicapped further description of this species. *P. edwardsii* (Fig. 3Q) has a deeper rostrum than *P. paulsoni*, with a rostral dentition of 1 + 7/3, with a bifid tip, an obsolete inferior orbital angle very similar to *P. paulsoni*, and a relatively broad scaphocerite with the lamella exceeding the tip of the distolateral tooth. Ledoyer (1968) reported on a number of specimens as *P.* cf. *edwardsi* from Tuléar, Madagascar, on the basis of the assessment by Kemp (1922), and illustrated the major features. The figure shows a rostral dentition of 1 + 6/2 and a feebly produced inferior orbital angle. His material differs from Paulson's particularly in the second pereiopod where the slender carpus, 7 × longer than the distal width, is subequal to the palm length, about 4 × longer than wide and 0.6 of the palm length in *P. edwardsii* s.str.

The key to the species of the expanded '*Periclimenes grandis* species group' given in Bruce (1987b) was augmented in Bruce (1988b). A further augmentation is provided below, to include *P. paulsoni* and *P. edwardsii*, which was not included in the 1987a key.

16. Supraorbital spines present 16a
Supraorbital spines absent 17

16a Second pereiopod carpus much longer than palm; R. 1 + 6-9/2-3 . . . . . *P. anacanthus* Bruce
Second pereiopod carpus not longer than palm . . . 16b

16b Inferior orbital angle obsolete; R. 1 + 5/3 . . . . . *P. paulsoni* sp. nov.
Inferior orbital angle distinct. 16c

16c Rostral lamina slender, second pereiopod carpus distinctly shorter than merus; R. 1 + 7-8/3-4 . . . . . *P. nilandensis* Borradaile
Rostral lamina deep, second pereiopod carpus subequal to merus; R. 1 + 7/3 . . . . . *P. edwardsii* (Paulson)

Couplet 13 of the original key also contained some unfortunate errors and should read:

13. Epigastric and first three dorsal teeth grouped and enlarged; ambulatory propods with distal ventral spine only; R. 1 - 6-7/3-4 . . . . . *P. kororensis* Bruce
Dorsal teeth similar and evenly distributed; ambulatory propods ventrally spinulate; R. 1+ 6/5-6 . . . . . *P. platycheles* Holthuis

Periclimenes sp. aff. anacanthus Bruce, 1988 (Fig. 4)

MATERIAL. 1♀, Sh 305, Cape Flattery, Service Jetty, beam trawl, 5m, August 2001, QM W26558.

REMARKS. The single specimen, CL 2.4mm, with a well-developed median process on the fourth thoracic sternite, unfortunately lacks both second pereiopods. The rostrum (Fig. 4A), about 1.25 × the CL, far exceeds the antennular peduncle and has a dentition of 1 + 9/4, the distal ventral tooth being minute. The inferior orbital angle is not acutely produced, almost obsolete. The first pereiopod has the carpus about 1.35 × the chela length. The propod of the third pereiopod (Fig. 4B) is about 0.78 of the CL, 18.6 × longer than wide, with a pair of small distoventral spines and two minute ventral spines only. The dactyl (Fig. 4C) is about 0.57 of the propod length, 8.5 × longer than the proximal depth.

None of the other species of the '*grandis* group' that have supraorbital spines have such slender ambulatory dactyls, except *P. anacanthus.* This species has an acutely produced inferior orbital angle, the first pereiopod carpus about 1.8 × the chela length, the third pereiopod propod about 14.5 of the CL, with long distoventral spines and numerous well developed ventral spines, and the dactylus is about 0.4 of the propod length, 6.5 × longer than its proximal depth. *P. anacanthus* is known from Moreton Bay, Queensland and the Cobourg Peninsula, Northern Territory.

The Cape Flattery specimen also shows some similarity to *P. digitalis* Kemp (1922), which has much more slender ambulatory dactyls, about 14 × longer than the proximal depth and 0.45 of the length of the propod, which also lacks ventral spinules. *Periclimenes digitalis* lacks a supra-orbital spine, having only a small tubercle in this position. *Periclimenes digitalis* has been reported from the Andaman Islands, Singapore, Hong Kong, China and Indonesia.

This specimen cannot be referred to any of the described species of the '*grandis* species group' and appears to represent a distinct taxon. Without second pereiopods it is not suitable for designation as a holotype specimen and the collection of further complete specimens must be awaited for a full description.

ACKNOWLEDGEMENTS

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ADDENDUM

Since the preparation of this article a further species of the *Periclimenes holthuisi* species group has been described from the Ryukyu Islands, Japan by Okuno (2002). This species, *Periclimenes sarasvati* Okuno, is most closely related to *Periclimenes venustus* Bruce (1990) and may be distinguished from that species by the absence of a *béc ocellaire*, the presence of a bilobed distal maxillary endite, the second pereiopods exceeding the scaphocerite by the proximal part of the palm, with the fingers bearing 2-4 acute recurved teeth and a rostral dentition of 7-9/1-2.