

A new species of *Periclimenes* COSTA from Utila, Honduras (Crustacea, Decapoda, Pontoniinae)

S. De Grave* & A. Anker**

Abstract

Periclimenes colesi sp. n., a new symbiotic pontonine shrimp, is described from Utila, Honduras, in the Caribbean Sea. All individuals of the new species were collected from oscula of a purple tube sponge, *Calyspongia vaginalis*, at a depth of about 15 m. Within the heterogeneous genus *Periclimenes* COSTA, *P. colesi* sp. n. belongs to the exclusively western Atlantic *P. iridescens* LEBOUR species complex, differing from all other members of this complex by the combination of following features: ambulatory pereiopods with biunguiculate dactylus, maxilla with bifid endite, subequal second pereiopods and poorly developed setal brush on the propodus of fifth pereiopod; as well as a semi-transparent, slightly iridescent colour pattern, and its association with a sponge host.

Key words: western Atlantic, Caribbean, symbiotic shrimp, Caridea, Pontoniinae, *Periclimenes*, new species, tube sponge.

Zusammenfassung

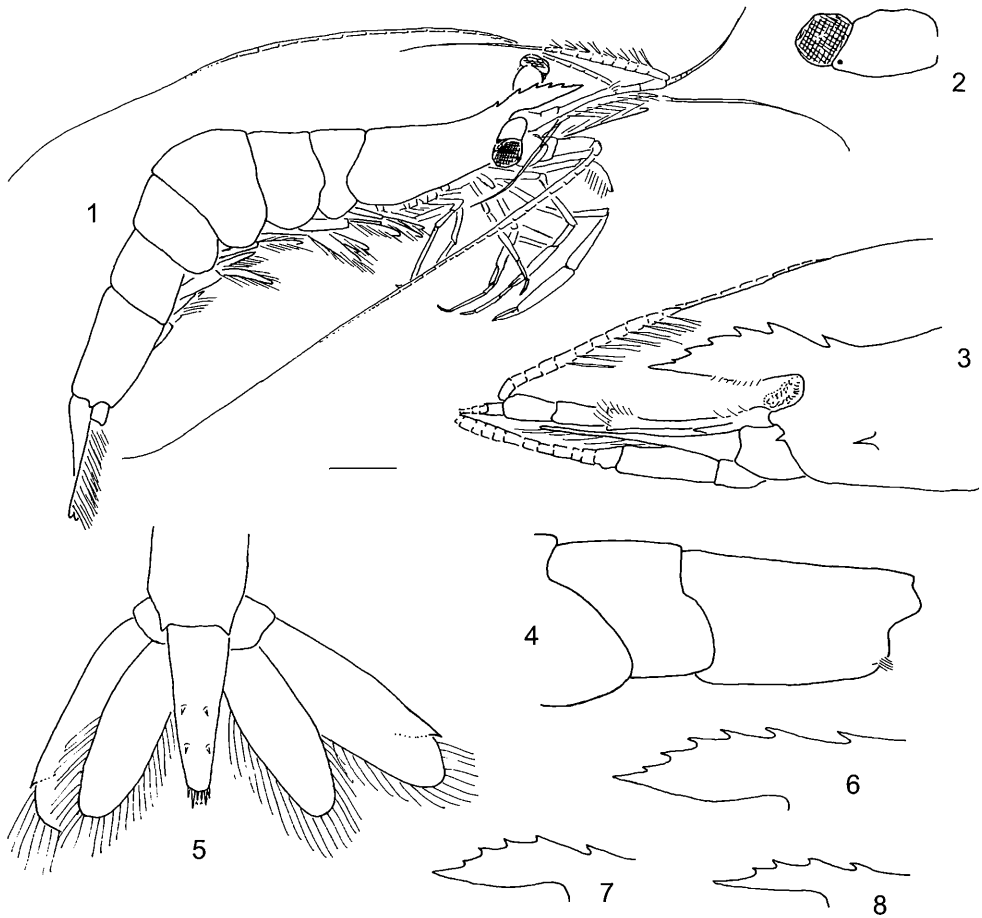
Periclimenes colesi sp. n., eine neue symbiotische pontonine Garnele wird von der karibischen Insel Utila, vor der Honduras-Küste, beschrieben. Alle Individuen der neuen Art wurden in den Öffnungen des lilafarbenden Röhrenschwammes *Calyspongia vaginalis* in einer Wassertiefe von 15 m gefunden. Innerhalb der sehr heterogenen Gattung *Periclimenes* COSTA gehört die neue Art zum ausschließlich im Westatlantik vorkommenden *P. iridescens* LEBOUR Artenkomplex. Sie unterscheidet sich von allen anderen Arten dieser Gruppe durch folgende Merkmale: Dactyl der Schreitbeine mit einem Extra-Zähnen, Maxille mit zweigeteilten Enditen, ungleiche zweite Scherenbeine und einem schwach entwickelten Borstenbüschel am Propod des fünften Pereiopoden, sowie dem halbtransparenten, leicht-schillernden Farbmuster und Vergesellschaftung mit einem Schwamm.

Introduction

The genus *Periclimenes* COSTA, 1844 is the most speciose genus within the palaemonid subfamily Pontoniinae, which includes mostly shrimps living in obligate associations with various sessile and slow-moving benthic invertebrates. Currently more than 155 species are recognized within this presumably polyphyletic genus (BRUCE 2007), the vast majority of them occurring in the Indo-West Pacific region. The wider Caribbean region currently hosts 20 described species of *Periclimenes*, associated mainly with Actiniaria, Gorgonacea, Antipatharia and Echinodermata (CHACE 1972, HEARD & SPOTTE 1991, 1997, SPOTTE et al. 1994).

Dr. Sammy De Grave, Oxford University Museum of Natural History, Parks Road, Oxford, OX1 3PW, United Kingdom. – sammy.degrave@oum.ox.ac.uk

** Dr. Arthur Anker, Smithsonian Tropical Research Institute, Naos Unit 0948, APO AA 34002-0948, USA. Present address: 278 Dickinson Hall, Florida Museum of Natural History, University of Florida, Gainesville, FL 32611-7800, USA. – aanker@flmnh.ufl.edu



Figs 1–8: *Periclimenes colesi* sp. n. 1: lateral view; 2: eye; 3: frontal region, lateral; 4: posterior pleonites; 5: tailfan; 6–8: rostral variation. 1–4: holotype (NHMW 24002), 5–8: paratypes (NHMW 24003; 6 female pocl 2.3 mm, 7 male pocl 1.9 mm, 8 male pocl 1.6 mm). Scale bar indicates 1 mm (1) or 2 mm (2–8).

During fieldwork by the authors along the coast of Utila, Bay Islands, Honduras, during August 2007, a species of *Periclimenes* was discovered in the Purple Tube Sponge, *Callyspongia vaginalis* DUCHAISSANG & MICHELOTTI, 1864 (Callyspongiidae), representing a rather unusual association among Caribbean species of this genus. This species could not be identified to any previously described species of *Periclimenes* and is herein described as new.

Type material has been deposited in the Vienna Natural History Museum, Austria (NHMW); the Zoological Collection of the Oxford University Museum of Natural History, UK (OUMNH) and the Nationaal Natuurhistorisch Museum (Naturalis), Leiden, the Netherlands (RMNH).

Systematics

Family Palaemonidae RAFINESQUE, 1915

Subfamily Pontoniinae KINGSLEY, 1878

Genus *Periclimenes* COSTA, 1844

Periclimenes colesi sp.n.

(Figs. 1–26)

Holotype: NHMW 24002, male (pocl 2.0 mm), Black Coral Wall dive site, Utila, Bay Islands, Honduras, 16°05.027'N 86°54.944'W, -15m depth, inside osculum of *Callyspongia vaginalis* DUCHAISSANG & MICHELOTTI, 1864, leg. S. DE GRAVE & A. ANKER, 4 August 2007.

Paratypes: NHMW 24003, 3 females (pocl 1.6–1.9), 1 ovigerous female (pocl 2.3), 6 males (1 dissected, pocl 1.5–1.6), same data as holotype; OUMNH-ZC.2007-20-003, 11 specimens (pocl 1.5–1.9), same data as holotype; RMNH D51755, 9 specimens, pocl 1.0–1.8, same data as holotype.

Description: Small (pocl less than 2.3 mm), slender shrimp of *Periclimenes iridescens* complex. Carapace with rostrum not distally upturned, not reaching to distal margin of first antennular segment; rostrum deep, dorsally armed with four to six teeth (usually five or six), interspersed with minute setae; posterior-most tooth of dorsal series widely separated from rest of series, anterior to hepatic tooth, second tooth in dorsal series level with orbit; ventral margin unarmed, proximal half furnished with setae. Hepatic tooth well developed, more robust than antennal tooth, antennal tooth separated from orbit.

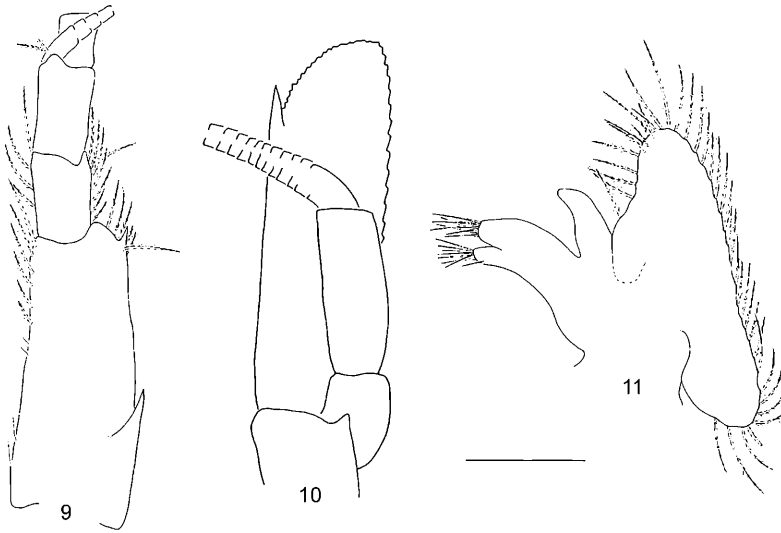
Abdominal somites with pleura rounded, sixth somite approximately 1.75 times as long as fifth. Telson with two pairs of dorsolateral spines, anterior pair situated approximately at mid-length, posterior pair at two-thirds of telson length; three pairs of stout apical setae present, lateral setae short, intermediate setae longest, robust; mesial pair plumose; minute acute, apical process present between mesial setae.

Antennular peduncle with sharp slender stylocerite, not reaching to mid-length of basal segment; distolateral margin of basal segment with one spine; lateral flagellum fused for three or four articles, distal three or four articles separated, each furnished with aesthetascs (basal article with four aesthetascs, distal articles with two aesthetascs). Antennal peduncle extending to mid-length of blade; flagellum long, reaching nearly to end of telson. Antennal scale reaching to mid-length of distal segment of antennular peduncle, approximately three times as long as wide, lateral margin straight, distolateral spine falling well short of anteromesial margin of blade.

Eye with corneal diameter distinctly less than proximal diameter of eyestalk; accessory, non-facetted, pigment spot present.

Mouthparts typical for *P. iridescens* complex (see HEARD & SPOTTE 1991, 1997, SPOTTE et al. 1994, MARTINEZ-MAYÉN & ROMÁN-CONTRERAS 2006). Maxilla with bilobed endite; third maxilliped with well-developed exopod bearing three terminal plumose setae and numerous long, simple setae.

First pereopods of equal size and shape, extending to end of antennal scale; dactylus weakly bifid, shorter than palm; carpus of equal length to propodus, merus approximately



Figs 9–11: *Periclimenes colesi* sp. n., paratype male (pocl 1.9, NHMW 24003). 9: antennule; 10: antennal peduncle; 11: maxilla. Scale bar indicates 0.5 mm (9–10) or 0.15 mm (11).

0.55 times as long as carpus. Second pereopods subequal in size and shape, slender, not enlarged, extending just past antennal scale by half of chela; fingers short, 0.25 of chela length, mesial margin of dactylus with single flat tubercle at approximately mid-length; carpus approximately half chela length, slightly shorter than merus; ischium of equal length. Third and fourth pereopods of equal size and shape, dactylus biunguiculate; propodus with one stout seta on distal flexor margin; fifth pereopod morphologically distinct, slightly longer than third and fourth; two rows of poorly developed comb-like setae (four to five setae per row) present on distomesial surface, single hamate seta on distolateral margin; dactylus biunguiculate.

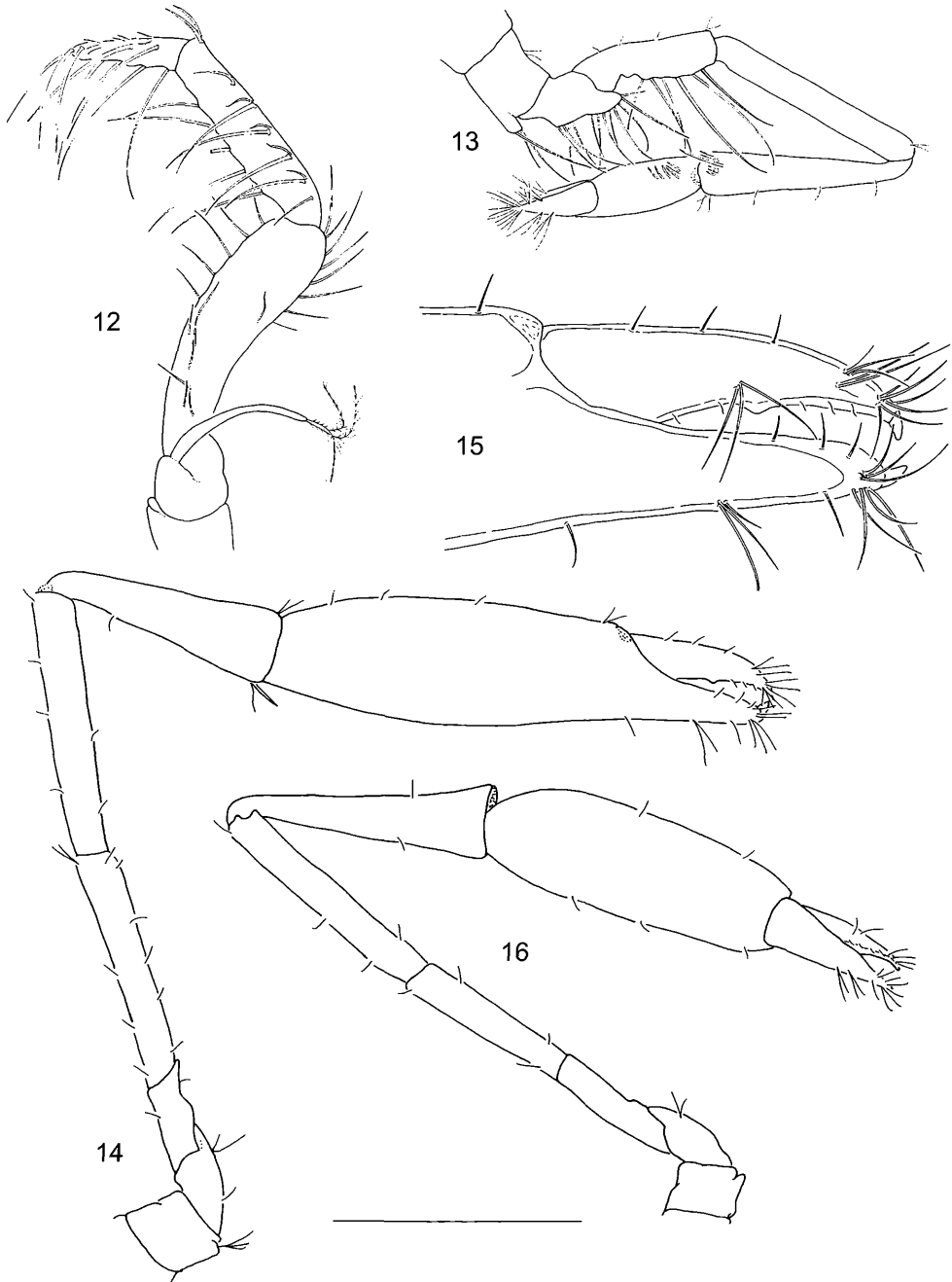
Uropods extending beyond distal margin of telson; movable spine between distolateral tooth and blade longer than distolateral tooth.

Endopod of second male pleopod with appendices interna and externa; appendix masculina shorter than appendix interna, with one simple lateral seta and two terminal, simple setae.

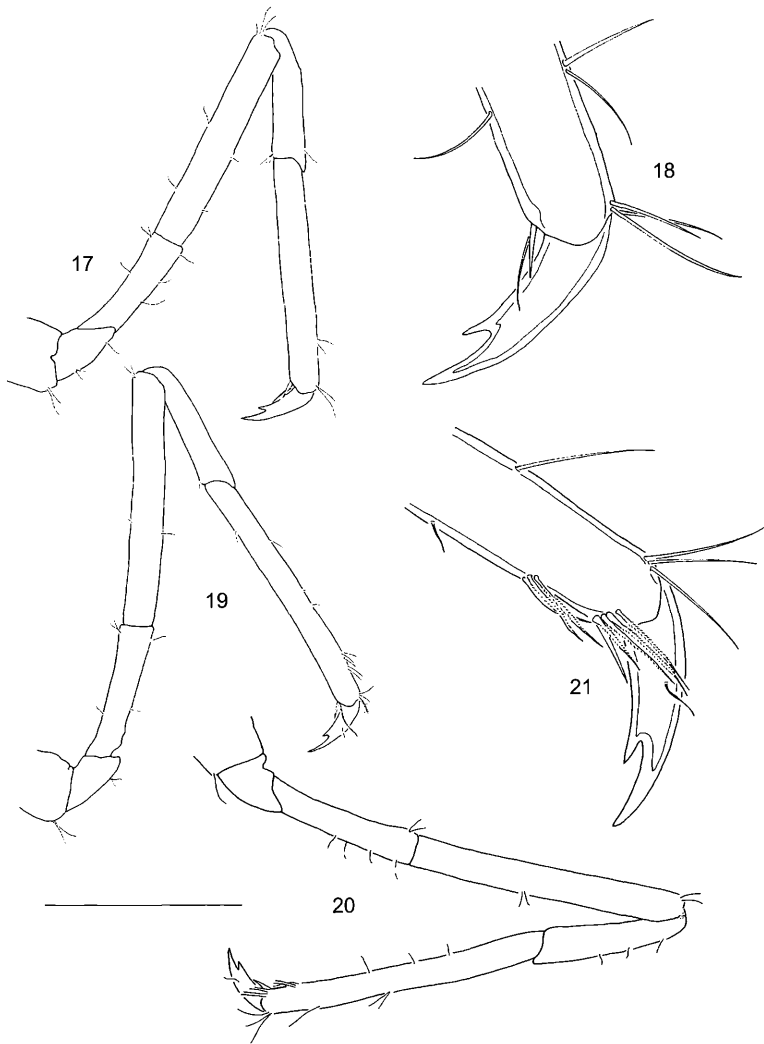
Etymology: The new species is named after Dr. Tim Coles, Director of Operation Wallacea, who not only facilitated the field work of the authors, but also in recognition of his long standing commitment to scientific conservation and sustainable development.

Ecology: The type series was collected inside the oscula of a colony of the purple tube sponge, *Callyspongia vaginalis*, on a coral reef slope, at about 15 m.

Colour pattern: Semi-transparent, without visible chromatophores, but with slight greenish and purplish iridescence, especially on scaphocerite blade and setae, and tail-fan; eyes pale; first and second chelipeds and ambulatory pereopods with whitish articulation zones (Fig. 26).

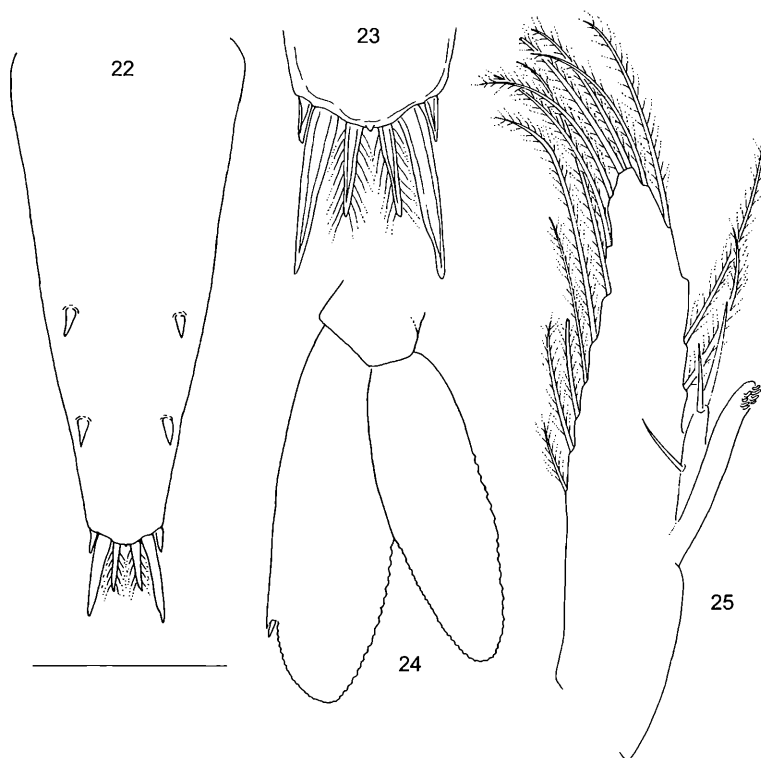


Figs 12–16: *Periclimenes colesi* sp. n., paratype male (pocl 1.9, NHMW 24003). 12: third maxilliped; 13: first pereiopod; 14: left second pereiopod; 15: same, tip of chela; 16: right second pereiopod. Scale bar indicates 0.85 (14, 16), 0.5 mm (12–13) or 0.25 mm (15).



Figs 17–21: *Periclimenes colesi* sp. n., paratype male (pocl 1.9, NHMW 24003). 17: third pereopod; 18: same, dactylus; 19: fourth pereopod; 20: fifth pereopod; 21: same, dactylus. Scale bar indicates 0.85 mm (20), 0.5 mm (17, 19) or 0.25 mm (18, 21)

Remarks: The deep-bladed, ventrally unarmed rostrum, the presence of a small apical process on the distal margin of the telson, and the biunguiculate dactyli on the ambulatory pereopods place *Periclimenes colesi* sp. n. in the *Periclimenes iridescens* complex (established by HEARD & SPOTTE 1997). *Periclimenes iridescens* LEBOUR, 1949 was originally described from Bermuda from a tow-net sample, and could either be free-



Figs 22–25: *Periclimenes colesi* sp. n., paratype male (pocl 1.9, NHMW 24003). 22: telson; 23: same, distal part; 24: uropod (setae omitted); 25: endopod of second pleopod. Scale bar indicates 0.85 (24), 0.5 mm (22) or 0.25 mm (23, 25).

living or an associated species (SPOTTE et al., 1994). This species has also been recorded from a number of other locations in the northwestern Atlantic, but as noted by SPOTTE et al. (1994), it remains unclear if all these records refer to the true *P. iridescens* or one of several as yet undescribed species. For instance, HOLTHUIS (1951) and CRIALES (1980, 1984) ascribed specimens with simple and biunguiculate dactyli to this species; however, the biunguiculate condition is clearly a species-specific character (see HEARD & SPOTTE 1991, 1997, SPOTTE et al. 1994, MARTINEZ-MAYÉN & ROMÁN-CONTRERAS 2006). Three other species within this complex are associates of black corals (*P. antipathophilus* SPOTTE, HEARD & BUBUCIS, 1994) and gorgonians (*P. patae* HEARD & SPOTTE, 1991; *P. mclellandi* HEARD & SPOTTE, 1997), whilst the recently described *P. siankaanensis* MARTINEZ-MAYÉN & ROMÁN-CONTRERAS, 2006 is a free living species in seagrass meadows. MARTINEZ-MAYÉN & ROMÁN-CONTRERAS (2006) also included *P. platalea* HOLTHUIS, 1951, an associate of gorgonians and black corals, in the *P. iridescens* complex, a species found in both the eastern and western Atlantic (see HALE & DE GRAVE 2007). However, because of the unique morphology of the ambulatory pereopods, *P. platalea* has been recently transferred to *Rapipontonia* MARIN, 2007 (see MARIN 2007). Thus the *P. iridescens* complex is currently restricted to the western Atlantic.

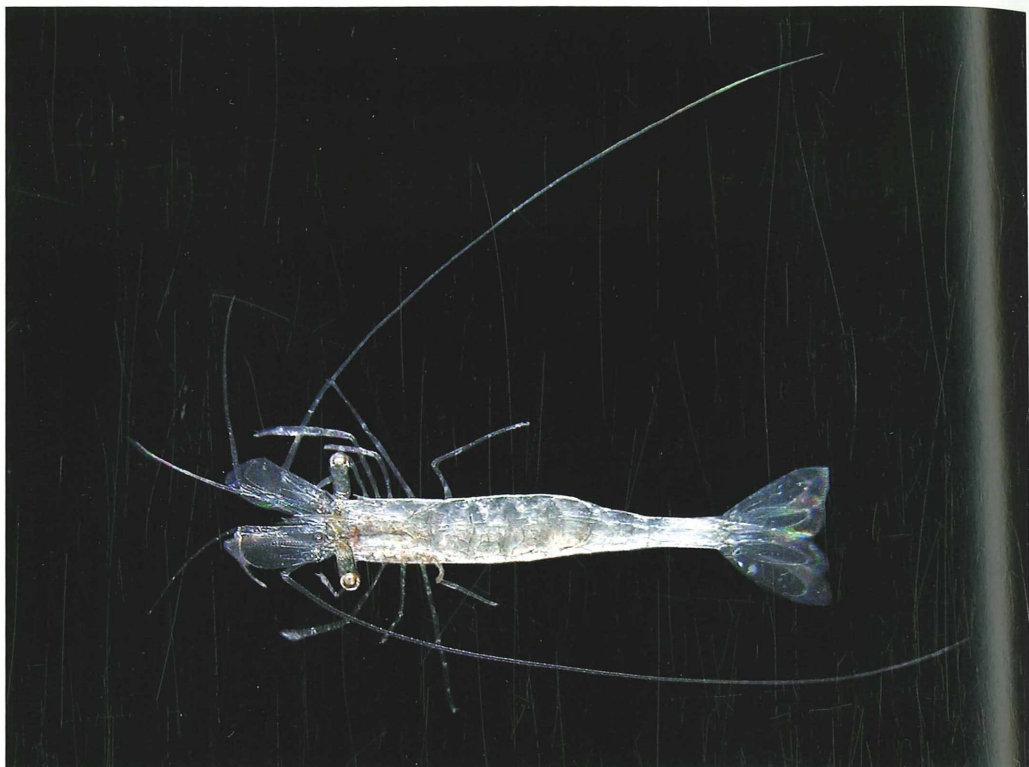


Fig 26: *Periclimenes colesi* sp. n., colour pattern (NHMW 24003).

Periclimenes colesi sp. n. differs from *P. patae* and *P. mclellandi* in having a biungiculate dactylus on the ambulatory pereopods (vs. simple in *P. patae* and *P. maclellandi*); from *P. siankaanensis* in having a bifid endite on the maxilla (vs. entire in *P. siankaanensis*); and from *P. antipathophilus* in the presence of a minute apical process on the telson (absent in *P. antipathophilus*). The new species is morphologically closest to *P. iridescens*, but differs from the latter species (based on the holotype redescription by HEARD & SPOTTE 1991) in a number of features. For instance, the second pereopods of *P. colesi* sp. n. are subequal (vs. unequal in *P. iridescens*), whilst the armature of the major second chela comprises a small protuberance in *P. colesi* sp. n. (vs. a large recurved tooth in *P. iridescens*). In addition, the two species differ in the relative development of the apical process on the telson and the development of the setal brush on the fifth pereopod.

Ecologically, the sponge-associated *P. colesi* sp. n., can be easily separated from the majority of species in the *P. iridescens* complex, which live on black corals (*P. antipathophilus*), gorgonians (*P. patae*, *P. mclellandi*), or are free-living in seagrass meadows (*P. siankaanensis*). The ecology of *P. iridescens* is rather poorly known, with specimens reported from sandy bottoms, algae, sea anemones and antipatharians (HOLTHUIS 1951, CRIALES 1980, 1984). Although *P. iridescens* may well be a symbiotic shrimp, its actual host or group of hosts remains to be determined. Given the morpho-

logical variety previously documented for this species (HOLTHUIS 1951, CRIALES 1980, 1984), it cannot be excluded that some of these records refer to *P. colesi* sp. n., although none have listed *C. vaginalis* as the origin of their samples.

Although sponges host a variety of pontoniine shrimps (BRUCE 1976), among them there are only a few species of *Periclimenes*, including the above-described *P. colesi* sp. n. and *P. incertus* BORRADAILE, 1915 from the Indo-West Pacific (DE GRAVE 2000). In the western Atlantic, PEARSE (1950) listed *Periclimenes* sp. from *Sphaciospongia vesparia* and *Haliclona rubens*, as well as *Kemponia americana* (KINGSLEY, 1878) (as *Periclimenes americanus*) from *Iotrochoa brotulata*. However, *K. americana* is commonly encountered as free-living in a variety of habitats (CHACE 1972), and is not considered a symbiont. It remains unclear if the specimens listed as *Periclimenes* sp. by PEARSE (1950) refer to *P. colesi* sp. n., a free-living species or yet another undescribed form in this clearly understudied complex of Caribbean shrimps.

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