

CP/11

Report on some commensal pontoniid shrimps (Crustacea: Palaemonidae) associated with an Indo-Pacific gorgonian host (Coelenterata: Gorgonacea)

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(With 3 figures in the text)

The occurrence of two rare shrimps and a new species of the subfamily Pontoniinae (Crustacea, Decapoda, Natantia, Palaemonidae), previously considered to be free-living, in association with the gorgonian *Mopsella ellisi* Hickson is recorded. The new species is described and illustrated and some observations are made upon the morphology, size, distribution and systematics of the other species of shrimps. A key to the known species of the genus *Hamodactylus* is provided and the species of pontoniid shrimps known to be associated with gorgonians are reviewed.

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Introduction

The material upon which this short report is based was collected by Mme Stucki Catala in July 1961. The host containing the shrimps was obtained from between Isle aux Canards and Islôt Maitre, near Noumea, New Caledonia, from a depth of 25 m. The material was hand-collected with the use of scuba apparatus.

List of species reported upon

- Family Palaemonidae Samouelle, 1819 (Crustacea, Decapoda Natantia)
- Subfamily Pontoniinae Kingsley, 1878
- Genus *Hamodactylus* Holthuis, 1952
- Hamodactylus boschmai* Holthuis, 1952
- Hamodactylus noumeae* sp. n.
- Genus *Periclimes* Costa, 1884
- Periclimes psamathe* (De Man, 1888)

Hamodactylus boschmai Holthuis
(Fig. 1)

Hamodactylus boschmai, Holthuis, 1952, pp. 18, 209–212, Figs 102–104; 1955, p. 70, Fig. 44.

Material examined. Four ovigerous females.

Measurements. Post-orbital carapace lengths, 2.4–2.7 mm.

Colouration. No data.

Host. *Mopsella ellisi* Hickson, (Coelenterata, Actinozoa, Gorgonacea).

Remarks

All specimens agree well with the detailed description given by Holthuis (1952). The rostral lamina bears six dorsal teeth in one specimen (Fig. 1(a)), five in one specimen and four teeth in two specimens. The form of the rostral lamina is slightly variable and in

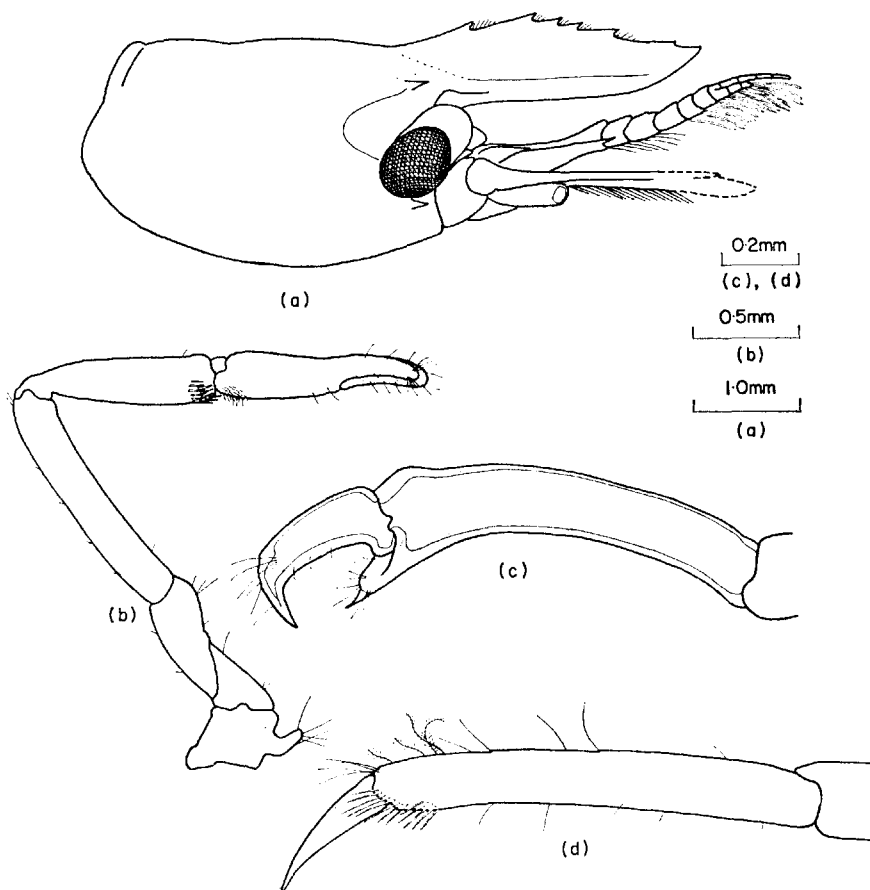


FIG. 1. *Hamodactylus boschmai* Holthuis ♀.

(a) Anterior carapace and appendages; (b) first pereiopod. (c) chela of second pereiopod; (d) dactylus and propodus of fifth pereiopod.

some specimens is deeper than shown by Holthuis. The midrib is well developed and lies along the lower margin of the rostrum, which is markedly convex in all specimens. The tip of the rostrum is acute, and distinctly exceeds the antennular peduncle in all specimens. In all specimens the teeth along the dorsal edge of the rostrum are situated well in advance of the posterior orbital margin. The supra-orbital spines and hepatic spines are robust.

The antennae are described and the anterolateral angle of the basal segment of the antennular peduncle bears only a single tooth.

The first pereopod (Fig. 1(b)) is rather more slender than that shown by Holthuis and exceeds the carpoperite by half the length of the carpus. The chela is more slender and the fingers are almost equal to the length of the palm. The carpus is shorter than the palm (7:8) and shorter and stouter than the merus (35:47). The coxa bears a well developed slender median setose lobe. The fourth thoracic sternite is broad and unarmed.

The second pereopods (Fig. 1(c)) are feeble and slender, exceeding the carpoperite by half the length of the propod only, and are subequal and similar. The chela is as described by Holthuis, but the palm is more strongly curved and the dactyl is more robust. The merus is distinctly longer than the ischium (34:23).

The ambulatory pereopods are also more slender than the appendage illustrated by Holthuis. The dactylus is relatively shorter and less curved and its length is distinctly exceeded by the length of the carpus, as shown in Fig. 1(d).

Distribution

Hamodactylus boschmai has not been recorded since its original occurrences at Djeddan, Aru Islands, at a depth of 13 m (1899) and at Ternate, Indonesia, at 2-4 m (1930).

Hamodactylus noumeae sp.n.

(Fig. 2)

Hamodactylus boschmai var? Holthuis, 1952, pp. 212-213, Fig. 105.

Material examined. One ovigerous female, damaged and lacking left uropod.

Description

In general form *Hamodactylus noumeae* is very similar to *H. boschmai* Holthuis. The main differences have already been pointed out by Holthuis and are generally confirmed by examination of the present specimen, which shows the same characteristic features, i.e. a shorter, more slender rostrum, the absence of supra-orbital spines and the presence of two or more teeth on the distolateral angle of the basal segment of the antennular peduncle. The following morphological features may also be noted.

The rostrum reaches to the middle of the intermediate segment of the antennular peduncle. The midrib is well developed and situated along the inferior margin of the rostrum, which is very feebly convex. The dorsal part of the lamina is elevated posteriorly and decreases anteriorly to a slender acute tip. The dorsal margin of the rostrum bears five teeth, which decrease in size anteriorly, the most posterior tooth lying well behind the orbital margin. The inferior orbital angle, antennal and hepatic spines are as in *H. boschmai*.

The antennae are also as in *H. boschmai* except that the anterolateral angle of the basal segment bears three acute teeth on the left and two on the right.

The mouthparts have not been dissected and examined.

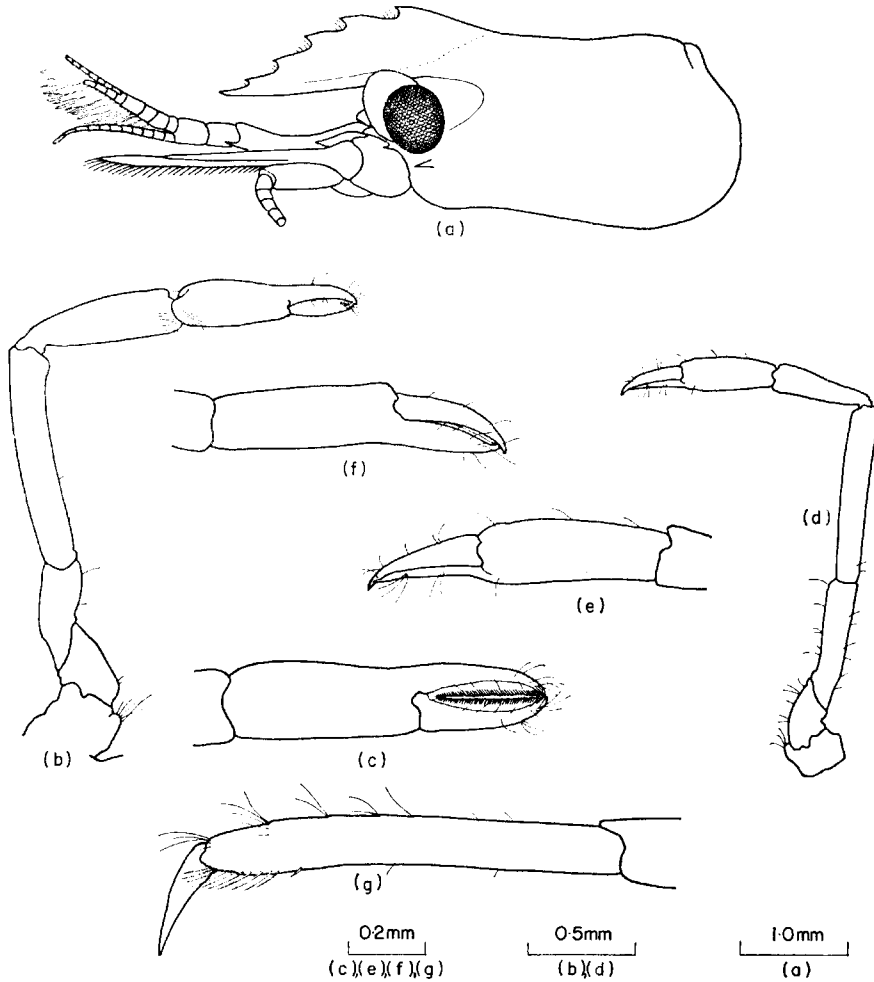


FIG. 2. *Hamodactylus noumeae* sp. n. ♀ holotype.

(a) Anterior carapace and appendages; (b) first pereiopod; (c) chela of first pereiopod; (d) second pereiopod; (e) chela of second pereiopod; (f) dactylus and propodus of fifth pereiopod.

The first pereiopods are the same as in *H. boschmai*. The second pereiopods are distinctly smaller and less robust than those appendages in *H. boschmai* and are much more feebly developed than the first pereiopods. The chelae are similar and subequal. The fingers are slightly greater than half the length of the palm and are straight, simple, with entire cutting edges, and lacking hooked tips. The dactyl and the fixed finger are subequal in length. The carpus is equal to the length of the palm and is slightly broader distally than proximally. The merus is slender and nearly one and a half times the length of the carpus. The

ischium is about five-sixths of the length of the merus. All segments are unarmed. The coxa bears a slender median setose process. The ambulatory pereiopods are similar to those of *H. boschmai* but the dactyl is slightly shorter and more curved.

Measurements. Post-orbital carapace length 2.5 mm.

Colouration. No data.

Host. *Mopsella ellisi* Hickson, (Coelenterata, Actinozoa, Gorgonacea).

Type. The holotype, the only specimen, is deposited in the collections of the Australian Museum, Sydney, registration number P16864.

Remarks

Hamodactylus noumeae sp. n. is most closely related to *H. incompletus* Holthuis, at present known only from the holotype which was obtained at Sharam el Sheik, Sinai Peninsula, in the Red Sea, and unfortunately lacked both of the second pereiopods. *H. noumeae* may be distinguished from *H. incompletus* by the form of the chela of the first pereiopods which is robust, with the fingers subspatulate and almost equal to the length of the palm. In *H. incompletus* the chela is long and slender, with fingers equal to less than a third of the length of the palm, which tapers markedly distally. The ambulatory pereiopods are more slender, with relatively longer and less hooked dactyls. The hepatic spine is robust and lies at a level well below the antennal spine. In *H. incompletus* the hepatic spine is feeble and situated at the same level as the antennal spine. The distolateral angle of the basal segment of the antennular peduncle may bear three small acute teeth. In *H. incompletus* only two teeth are present in this position.

Periclimenes psamathe (De Man)

(Fig. 3)

Urocaris psamathe De Man, 1902, pp. 816–822, Pl. 25, Fig. 51.

Urocaris psamathe Borradaile, 1917, pp. 323, 354, Pl. 53, Fig. 3.

Periclimenes (Ancylocaris) psamathe Kemp, 1922, p. 173.

Periclimenes (Harpilius) psamathe Holthuis, 1952, pp. 12, 61, Fig. 23.

Periclimenes psamathe Bruce, 1966, p. 21, Figs 3(c), 4(c,d).

Material examined. Three males, six females (four ovigerous) and one juvenile.

Measurements. Post-orbital carapace lengths: male, 4.7–6.0 mm; female (ovigerous), 6.3–7.0 mm; female (non-ovigerous), 5.5–6.0 mm; juvenile, 3.0 mm.

Colouration. No data.

Host. *Mopsella ellisi* Hickson, (Coelenterata, Actinozoa, Gorgonacea).

Remarks

The specimens agree well with the detailed description given by De Man (1902) which was based upon a single ovigerous female. In this specimen the rostrum was twice the post-orbital carapace length and with six teeth along the dorsal margin of the carapace and rostrum, including a subapical tooth at the tip and an epigastric tooth. The present specimens agree closely, although the juvenile and the larger male have an

additional dorsal rostral tooth. In all specimens the ventral margins of the tips of the three posterior teeth show small serrations as shown by Holthuis. The length of the rostrum is variable and ranges from 1.66 to 2.22 times the post-orbital carapace length, being greatest in the largest male.

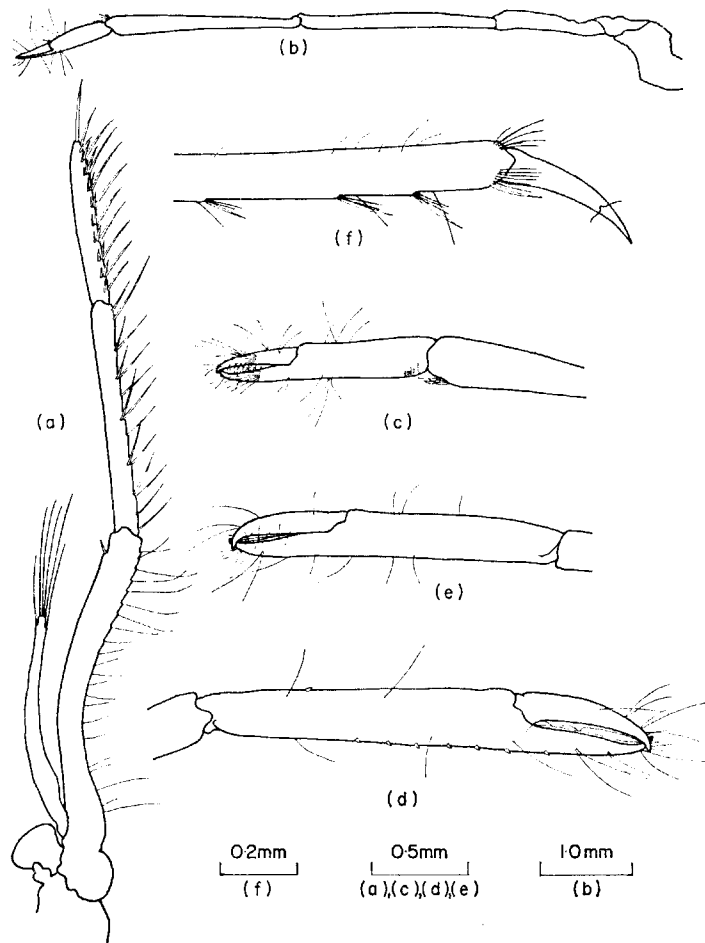


FIG. 3. *Periclimenes psamathe* (De Man) ♂.

(a) Third maxilliped; (b) first pereopod; (c) chela of first pereopod; (d) chela of major second pereopod; (e) chela of minor second pereopod; (f) distal end of propodus and dactylus of fifth pereopod.

Many of the pereopods are detached and it is not possible to allocate the second pereopods to definite individuals. In only one example are both second pereopods still attached, and in this example, as in the holotype, one limb is much longer than the other. The chela and carpus also show the minute denticles reported by De Man.

The fourth thoracic sternite is narrow and unarmed. The coxa of the first pereopod lacks a median setose process.

Distribution

Periclimenes psamathe has been previously recorded from only five localities, Ternate, Indonesia; North Male Atoll, Maldive Archipelago; Diego Garcia, Chagos Archipelago; between Misool and New Guinea, and Amboina, Indonesia.

Discussion

It is now known that the great majority of shrimps of the subfamily Pontoniinae are commensals of other marine invertebrates. The genus *Periclimenes* contains shrimps that are associated with a wide range of marine phyla and several are known from corals and giant anemones. A single species, *P. investigatoris* Kemp, 1922, has been recorded from an alcyonarian and so far only a single species has been reported in association with any gorgonians. *Periclimenes psamathe* is, therefore, only the second member of the genus known to be associated with a gorgonian although the hosts of many species still remain to be discovered. *Periclimenes psamathe* occupies an isolated systematic position in the genus and does not indicate which other species may have a similar association.

The discovery that the genus *Hamodactylus*, previously considered to consist of free-living species, contains shrimps that are associates of gorgonians, conforms with what is known of the hosts of the related genera. Of the shrimp genera characterized by the absence of an exopod on the third maxilliped (excluding the aberrant genus *Anchistoides* Paulson), three (*Neopontonides* Holthuis, *Veleronia* Holthuis and *Balssia* Kemp) are known to live in association with gorgonians. The hosts of the other genera, which are probably also commensals (*Waldola* Holthuis, *Pontonides* Calman*, *Coutiërea* Nobili and *Pseudocoutiërea* Holthuis), remain unknown.

The species of pontoniinid shrimp known to be associated with gorgonians may now be listed as follows:

| Host | Commensal shrimp |
|------------------------------------|--|
| <i>Acabaria frondosa</i> (Brundin) | <i>Mesopontonia gorgoniophila</i> Bruce |
| <i>Corallium rubrum</i> (L.) | <i>Balssia gastii</i> (Balss) |
| <i>Leptogorgia virgulata</i> | <i>Neopontonides beaufortensis</i> (Borradaile) (Patton, 1963) |
| <i>Melitheia?albitincta</i> Ridley | <i>Mesopontonia gorgoniophila</i> Bruce |
| | <i>Periclimenes gorgonicola</i> Bruce (Bruce, 1969) |
| <i>Mopsella ellisi</i> Hickson | <i>Hamodactylus boschmai</i> Holthuis |
| | <i>Hamodactylus noumeae</i> sp. n. |
| | <i>Periclimenes psamathe</i> (De Man) |
| Unidentified gorgonians | <i>Veleronia laevifrons</i> Holthuis |

The collection of further specimens of the genus *Hamodactylus* has enabled some dubious points to be cleared up. The confusion arose due to the fact that the morphology of the thoracic appendages in two out of three species was incompletely known. The additional specimen, that is referable to *H. boschmai* var., now shows that it should be awarded full specific status and that three species of the genus are now known. The species may be separated by the following key:

* The association of *Pontonides* with an antipatharian has recently been established (Davis & Cohen, 1968).

Hamodactylus Holthuis, 1952

- | | |
|---|---------------------------------|
| 1. Supra-orbital spines absent | 2 |
| Supra-orbital spines present | <i>H. boschmai</i> Holthuis |
| 2. Antennal and hepatic spines on same level | <i>H. incompletus</i> Holthuis |
| Hepatic spine at much lower level than antennal spine — | <i>H. noumeae</i> sp. n. |

The morphology of the secondary pereiopods of *H. incompletus* is still unknown. The second pereiopods in *H. noumeae* are now known to be normal in type and to lack the characteristic shape found in *H. boschmai*, which gave rise to the name of the genus. The feebly-developed fixed finger and the much larger, hook-shaped dactyl found in *H. boschmai* are not a characteristic feature of the genus *Hamodactylus*, which is therefore closely related to the genus *Waldola* Holthuis, 1951. The two genera may be separated by the presence of hepatic and antennal spines in *Hamodactylus* and the presence of hepatic and absence of antennal spines in *Waldola*.

I am indebted to Dr J. C. Yaldwyn for giving me the opportunity to examine and report upon these specimens and for the identification of the host.

REFERENCES

- Borradaile, L. A. (1917). On the Pontoniinae. The Percy Sladen Trust Expedition to the Indian Ocean in 1905, under the leadership of Mr J. Stanley Gardiner. *Trans. Linn. Soc. Lond. (Zool.)* **17**: 323–396.
- Bruce, A. J. (1966). Notes on some Indo-Pacific Pontoniinae. I. *Periclimenes tosaensis* Kubo. *Crustaceana* **10**: 15–22.
- Bruce, A. J. (1967). Notes on some Indo-Pacific Pontoniinae. III–IX. Descriptions of some new genera and species from the western Indian Ocean and South China Sea. *Zool. Verh., Leiden* No. 87: 1–73.
- Bruce, A. J. (1969). Preliminary descriptions of sixteen new species of the genus *Periclimenes* Costa, 1844 (Crustacea, Decapoda Natantia, Pontoniinae). *Zool. Meded., Leiden* **43**: 253–278.
- Davis, W. P. & Cohen, D. M. (1968). A gobiid fish and a palaemonid shrimp living on an antipatharian sea whip in the tropical Pacific. *Bull. mar. Sci. Gulf Caribb.* **18**: 749–761.
- Holthuis, L. B. (1951). The subfamilies Euryrhynchinae and Pontoniinae. A general revision of the Palaemonidae (Crustacea Decapoda Natantia) of the Americas. I *Occ. Pap. Allan Hancock Fdn* **11**: 1–332.
- Holthuis, L. H. (1952). The Decapoda of the Siboga Expedition. Part XI. The Palaemonidae collected by the Siboga and Snellius Expeditions with remarks on other species. II. Subfamily Pontoniinae. *Siboga Exped.* **39(a)** (10): 1–253.
- Holthuis, L. B. (1955). The recent genera of the Caridean and Stenopodidean shrimps. (Class Crustacea, Order Decapoda, Supersection Natantia) with keys for their determination. *Zool. Verh., Leiden* No. 26: 1–157.
- Kemp, S. (1922). Notes on Crustacea Decapoda in the Indian Museum. XV. Pontoniinae. *Rec. Indian Mus.* **24**: 113–288.
- Man, J. G. de (1902). Die von Herrn Professor Kükenthal im Indischen Archipel gesammelten Dekapoden und Stomatopoden. In: Kükenthal, W., *Ergebnisse einer zoologischen Forschungsreise in den Molukken und Borneo. Abh. Senckenb. naturforsch. Ges.* **25**: 467–929.
- Patton, W. K. (1963). Animal associates of the gorgonian coral *Leptogorgia virgulata* at Beaufort. *Am. Zool.* **34**: 522.