BEAUFORTIA

INSTITUTE FOR SYSTEMATICS AND POPULATION BIOLOGY
(ZOOLOGICAL MUSEUM) UNIVERSITY OF AMSTERDAM

Vol. 49, no. 3 July 16, 1999

CARIDEAN SHRIMPS (CRUSTACEA, DECAPODA) FROM SEAGRASS HABITATS IN HANSA BAY, PAPUA NEW GUINEA

SAMMY DE GRAVE

Department of Invertebrates, Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, Belgium
Present address: Department of Zoology and Animal Ecology, University College Cork,
Lee Maltings, Prospect Row, Cork, Ireland

Keywords: Caridea, Papua New Guinea

ABSTRACT

Five species of caridean shrimps collected from seagrass habitats at Hansa Bay, on the northern coastline of Papua New Guinea are reported. Four species are new to the fauna of Papua New Guinea. Morphological details of *Nikoides danae*, *Latreutes pymoeus* and *L. porcinus* are discussed and compared to previous records. The previously undescribed male secondary sexual appendices of *N. danae* and *L. pymoeus* are described.

INTRODUCTION

Seagrass beds form an important component of tropical and temperate marine ecosystems. The taxonomic composition and ecology of the associated caridean shrimp fauna has been studied in various places within the Indo-Pacific (Japan: Kikuchi, 1966; Madagascar: Ledoyer, 1969; Queensland (Australia): Young & Wadley, 1979; New Caledonia: Ledoyer, 1984) and Atlantic Oceans (Panama: Coen & Heck, 1983; Mexico: Ledoyer, 1986; Florida (USA): Holmquist et al., 1989). Seagrass beds are a prominent element of both intertidal and shallow subtidal regions in numerous locations along the coastline of Papua New Guinea (Johnstone, 1982). Although they are known to harbour a high number of associated invertebrate and vertebrate species (Brouns & Heijs, 1985), data on the associated caridean shrimp fauna is generally lacking.

The present report deals with a small collection of caridean shrimps obtained from Hansa Bay, Madang Province along the northern coast of Papua New Guinea. Within Hansa Bay various seagrass species form mixed and mono-specific stands, these have been mapped by Bay & Demoulin (1989).

Seagrasses were identified using Brouns (1986). Post-orbital carapace lengths (cl.) are given in mm. All specimens have been deposited in the collections of the 'Koninklijk Belgisch Instituut voor Natuurwetenschappen', Brussels,

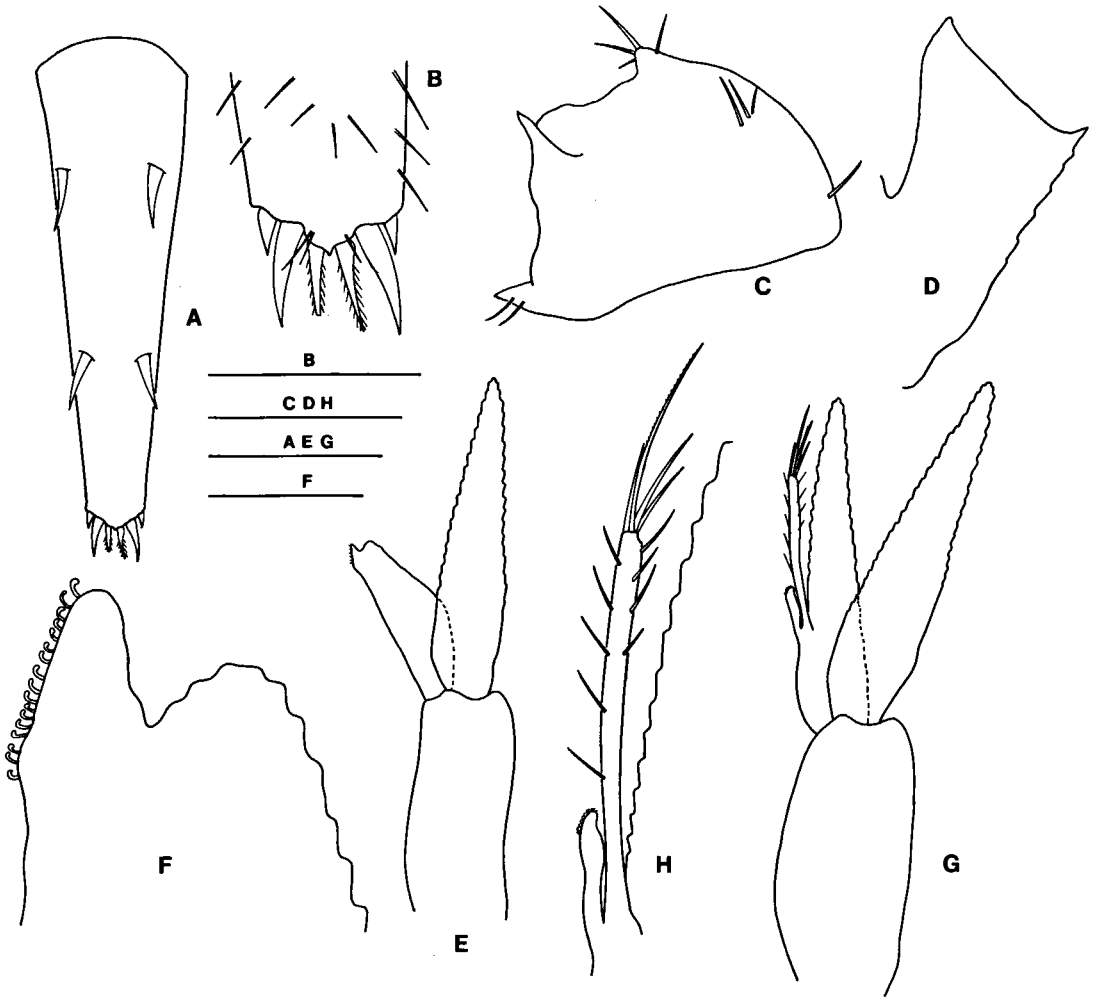

Fig. 1. *Nikoides danae* Paulson, Hansa Bay, Papua New Guinea: telson (a), posterior part of telson (b), right basicerite (c), right stylocerite (d), right first pleopod (e), tip of endopod of first pleopod (f), right second pleopod (g), appendices interna and masculina of second pleopod (h). Scale bars indicate 1.0 mm (a, e, g), 0.5 mm (b, c, d, h) or 0.1 mm (f).

registration numbers IG 27951 and IG 28056.

Contribution no. 302 of the Leopold III Biological Station, Laing Island.

SYSTEMATICS

Family Processidae

Nikoides danae Paulson, 1875
(Fig. 1)

Restricted synonymy

Nikoides Danae Paulson, 1875: 98, Plate 14 figs. 5-5d.
Nikoides danae; Hayashi, 1975: 53-58, Figs. 1-2; Wadley, 1978: 20-21, Fig. 10b-c; Ledoyer, 1984: 39, Fig. 20b; Noël, 1985: 263; Hayashi, 1991: 204, Figs. 205a-c, 206c-e.

Material examined.- Papua New Guinea, Hansa Bay, in front of Sisimangum village, 19.X. 1993, shrimp-dredge sample in *Syringodium isoetifolium* (Ascherson) Dandy bed, 5-6 m depth, leg. S. De Grave, 1 male (cl. 5.25), KBIN I.G. 28056/NAT9.

Remarks.- Hayashi (1975) used the shape of the fifth abdominal somite, the presence of an apical median spine on the telson, an acutely pointed stylocerite and a basicerite provided with

both a sharply and a bluntly pointed process as the key characteristics in which *N. danae* differs from the other Indo-West Pacific species. Ledoyer (1984) considers the shape of the stylocerite to be the only reliable character, as in his material the shape of the fifth pleuron varied considerably. As regards the stylocerite (Fig. 1d) and basicerite (Fig. 1c) the present single male specimen agrees well with the description and figures provided by Hayashi (1975, 1991). Furthermore the rostral length, its bifid apex and the ischium of the third pereiopod furnished with two spines and merus with five also corresponds with Hayashi (1975). Differences lie in the apex of the telson (Fig. 1a, b), being far less developed in the present specimen and the pleuron of the fifth abdominal somite being rounded, not pointed. The species appears to be rather variable in some of the key characters defined by Hayashi (1975), as demonstrated by the present material and the material of Ledoyer (1984) and Noël (1985). The opportunity is taken to describe and figure the male secondary sexual appendices of this species, which have not been previously described.

The endopod of the first pleopod reaches to 0.54 of the exopod (Fig. 1e); tip of exopod is deeply notched and furnished with cincinnuli along the distal mesial part (Fig. 1f); mesial margin of endopod non-setose. Appendix masculina of second pleopod inserted approximately 0.3 along margin of endopod, reaching to 0.78 of endopod length; appendix interna arising just below appendix masculina and reaching to 0.31 of length. Appendix masculina furnished with 5 non-plumose setae along mesial margin, 4 non-plumose setae along distal part of lateral margin, distal margin with three intermediate non-plumose setae and one long serrated seta. Appendix interna sigmoid-shaped, with cincinnuli along mesio-distal margin.

Distribution.- The species is widespread in the Indo-Pacific ranging from East Africa and the Red Sea to Japan and Hawaii (Hayashi, 1975; Nomura et al., 1996). *N. danae* is mainly associated with coral reef environments (Hayashi, 1975), although its occurrence in seagrass beds has previously been noted by Ledoyer (1984) in New Caledonia.

Family Hippolytidae

Latreutes pymoeus Nobili, 1904
(Figs. 2, 3)

Restricted synonymy
Latreutes pymoeus Nobili, 1904: 231.
Latreutes pygmaeus (erroneous spelling of *Latreutes pymoeus*); Nobili, 1906: 37-38, Plate 3, figs. 4-4i; Kemp, 1914: 99-101, Plate 2 figs. 7-8, Plate 3 figs. 1-7; Barnard, 1950: 707, Fig. 131c; Ledoyer, 1969: 70, Plate 6 figs. 1-12, Plate 16A; Ledoyer, 1984: 17-20, Fig. 5; Hayashi, 1994: 97, Fig. 253f.

Material examined.- Papua New Guinea, Hansa Bay, in front of Sisimangum village, 19.X. 1993, shrimp-dredge sample in *Syringodium isoetifolium* (Ascherson) Dandy bed, 5-6 m depth, leg. S. De Grave, 84 specimens (cl. 2.03-3.91), incl. numerous ovigerous females, KBIN I.G. 28056/NAT10.

Remarks.- As regards general carapace spination, rostral morphology, telson spination, antennal scale and the structure of the pereiopods (Figs. 2, 3), the present specimens agree quite well with the descriptions by Nobili (1904, 1906), Kemp (1914) and Ledoyer (1969, 1984). The following characteristics appear to have been overlooked in previous descriptions: series of stout plumose setae along the distal margin of the carpus of first pereiopod (Fig. 2a); the presence of a single large, movable spine close to the ventro-distal angle of the ischium of third pereiopod (Fig. 2c). In some respects minor differences were noted with previous descriptions. The present specimens have four mesial dactylar spines on the third pereiopod, compared to two (Ledoyer, 1969), three (Nobili, 1906) or five (Kemp, 1914; Ledoyer, 1984). As differences and variations are also apparent between these descriptions, it is clear that this species is highly variable, as first noted by Nobili (1906). In the present material some variation was noted in the relative development of the median point of the telson and the stoutness and number of terminal telson spines (Fig. 2e, 2j-l). Considerable variation is present in both rostral shape and spination (Fig. 3), both between sexes and within the same sex. Males generally have a more slender and upturned rostral shape (Fig. 3d) than females, although more

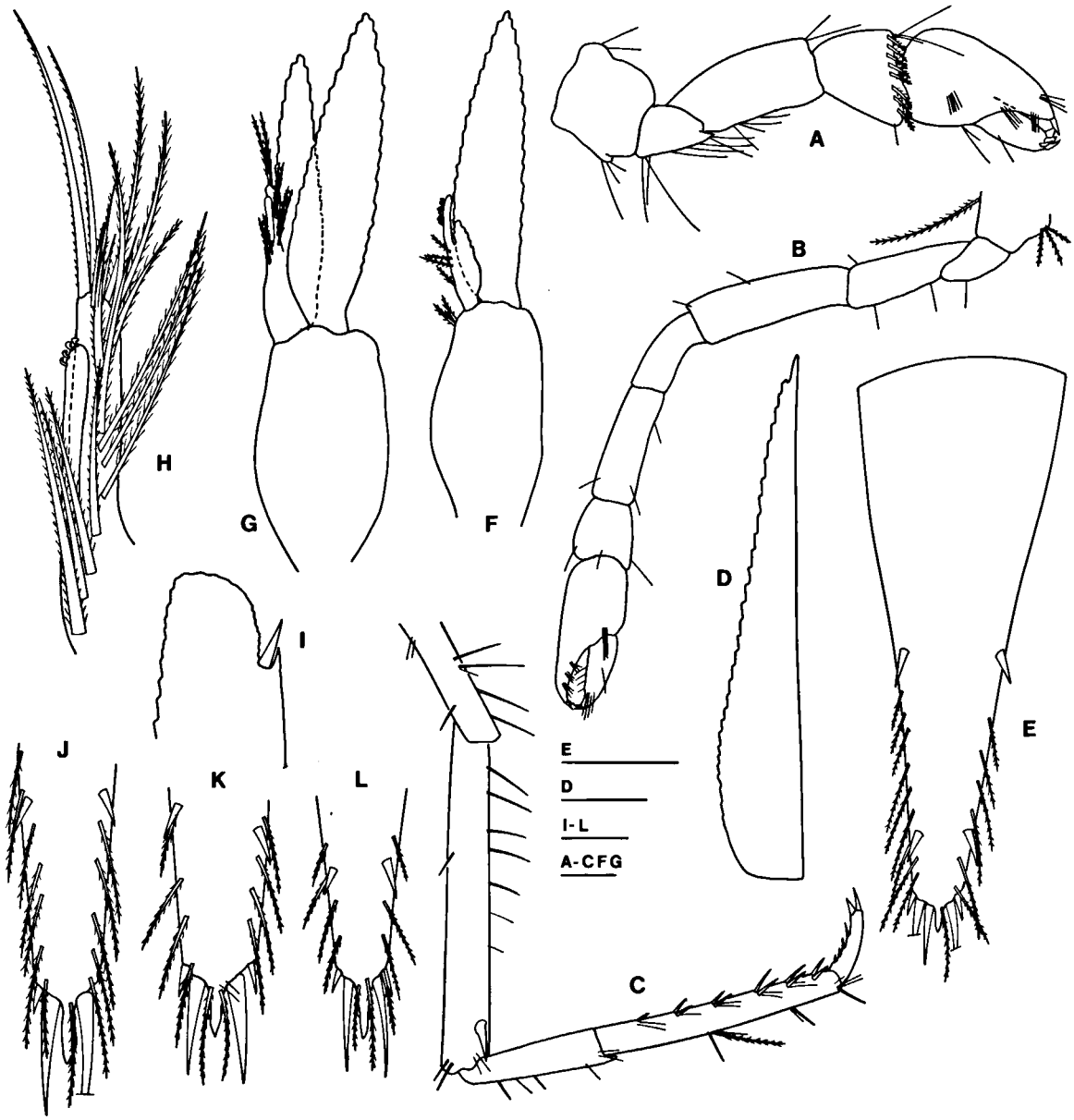

Fig. 2. *Latreutes pymoeus* Nobili, Hansa Bay, Papua New Guinea: left first pereiopod (a), left second pereiopod (b), left third pereiopod (c), left antennal scale (d), telson (e), left first pleopod (f), left second pleopod (g), appendices interna and masculina of second pleopod (h), tip of left uropodal exopod (i), posterior part of telson (j, k, l). All ovigerous (ov.) female (cl. 3.40 mm), except j (ov. female cl. 3.80 mm), k (ov. female cl. 3.40 mm) and l (male cl. 2.16 mm). Scale bars indicate 0.5 mm (e), 0.2 mm (i-l; a-c, f-g) or 0.1 mm (h).

robust shapes (Fig. 3g) can also be present. The most abundant rostral shape of females is illustrated in Fig. 3a. In the present material, the number of dorsal teeth varies from 0 to 3 and ventral teeth from 2 to 4, with the most common combinations being 2/4 in females and 0-1/2 in males. This corresponds to the variations found by Nobili (1906) and Kemp (1914). The opportunity is taken to describe and figure the male secondary sexual appendices of this species, which have not been previously described. Male first pleopod (Fig. 2f) with endopod reaching to 0.29 of exopod, furnished with appendix interna, appendix interna overreaches endopod and furnished with cincinnuli along distal half. Male second pleopod (Fig. 2g) with endopod approxi-

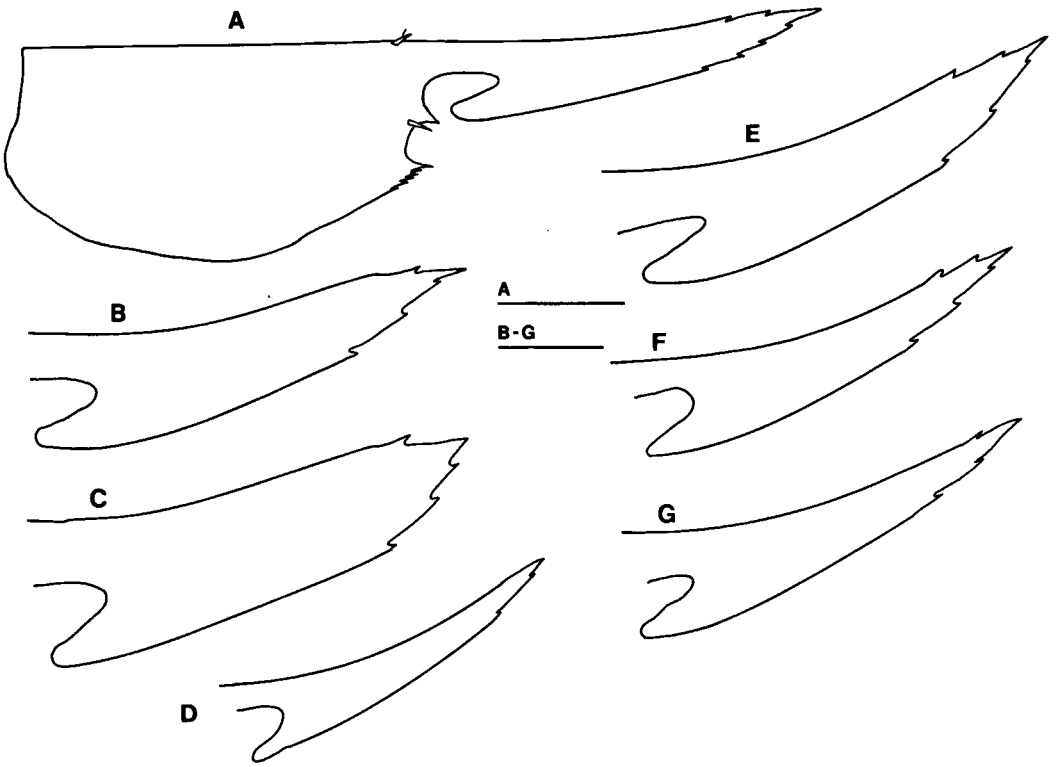

Fig. 3. *Latreutes pymoeus* Nobili, Hansa Bay, Papua New Guinea: carapace of ov. female, cl. 3.84 mm (a), rostrum (b: ov. female cl. 3.40 mm, c: ov. female cl. 3.72 mm, d: male cl. 2.16 mm, e: ov. female cl. 3.40 mm, f: ov. female cl. 2.64 mm, g: male cl. 2.84 mm). Scale bars indicate 1 mm.

mately 0.88 of exopod length, with appendices at 0.32 along medial margin; appendix interna with few distal cincinnuli (Fig. 2h); appendix masculina with series of long, plumose setae; tip of appendix masculina with two long, sparsely plumose setae (Fig. 2h).

The present taxon has usually been recorded under the name *Latreutes pygmaeus*, however in the type description the name *Latreutes pymœus* is used (Nobili, 1904). Although this is more than likely a printing error, as Nobili himself in subsequent papers used the spelling *pygmaeus*, the original spelling should be used, as was already done by Chace (1997).

Distribution.- Ranges from the Red Sea and East Africa to Australia and Japan (Holthuis, 1978), extending into the Central Pacific (Hayashi, 1986). Usually associated with seagrasses and/or seaweeds (Johnson, 1961; Ledoyer, 1969, 1984).

Latreutes porcinus Kemp, 1916
(Fig. 4)

Restricted synonymy

Latreutes porcinus Kemp, 1916: 397-398, Fig. 3, Plate 36, fig. 3.
Latreutes porcinus; Hayashi, 1994: 96-97, Fig. 253.
L.[atreutes] nr *porcinus;* Wadley, 1978: 17, Fig. 8h.

Material examined.- Papua New Guinea, Hansa Bay, in front of Sisimangum village, 19.X. 1993, shrimp-dredge sample in *Syringodium isoetifolium* (Ascherson) Dandy bed, 5-6 m depth, leg. S. De Grave, 1 ovigerous female (cl. 3.52), KBIN I.G. 28056/NAT11.

Remarks.- The single specimen agrees in most details with the descriptions by Kemp (1916) and Hayashi (1994). The dorsal carina on the carapace bears 13 procurved teeth, which are separated into two groups; separated from rostral teeth by relatively narrow gap; rostral series con-

Fig. 4. *Latreutes porcinus* Kemp, Hansa Bay, Papua New Guinea: carapace (a), uropod (b), right third maxilliped (c), right third pereiopod (d), right first pereiopod (e), left second pereiopod (f), peduncle of right antennula (g), antennal scale and peduncle of right antenna (h), telson (i). Scale bars indicate 0.5 mm (b-i) or 1 mm (a).

sisting of 21 teeth; antero-lateral margin of carapace with 6 teeth (Fig. 3a); hepatic spine mobile (Fig. 3a). Dactylus of third pereiopod furnished with six stout spines, terminal spine more slender and shorter than sub-terminal one (Fig. 3d). Kemp (1916) illustrates three pairs of terminal telson spines, with the outer pair being smallest and the intermediate pair stouter and longer. In the present specimen, only two pairs of terminal telson spines are present, the inner ones being stouter and longer than the outer pair (Fig. 3i).

Distribution.- Previously known from Port Blair, Andaman Islands (Kemp, 1916); Singapore (Johnson, 1961); Phuket, Thailand (Komai, pers. comm.); Moreton Bay, Australia (Wadley, 1978); Okinawa Islands (Kamezaki et al., 1988) and Iriomote-jima Island, Yaeyama Islands, southern Ryukyus, Japan (Hayashi, 1994), always associated with seaweed or seagrass beds and/or pools in the intertidal or shallow subtidal regions.

Family Palaemonidae

Leander tenuicornis (Say, 1818)

Restricted synonymy

P[alaemon] tenuicornis Say, 1818: 249-250.

Leander tenuicornis; Holthuis, 1950: 26, Figs. 1-2; Ledoyer, 1969: 68; Plate 2 figs. 1A-6A, Plate 3 figs. 1-4, Plate 15A; Ledoyer, 1984: 25, Fig. 9; Chace & Bruce, 1993: 6-7.

Material examined.- Papua New Guinea, Hansa Bay, in front of Sisimangum village, 19.X. 1993, shrimp-dredge sample in *Syringodium isoetifolium* (Ascherson) Dandy bed, 5-6 m depth, leg. S. De Grave, 1 male (cl. 3.25), KBIN I.G. 28056/NAT11.

Remarks.- The single male specimen agrees with previous descriptions of the species (Holthuis, 1952; Manning, 1961). It harbours 11 dorsal rostral teeth, of which 2 are placed post-orbitally and 6 ventral teeth.

Distribution.- Widespread in the Indo-Pacific and Atlantic Oceans (Chace & Bruce, 1993). This species is nearly always associated with attached vegetation in shallow water, previously found in association with seagrass beds (Ledoyer, 1969, 1984; Manning, 1961; Coen & Heck, 1984). Has been reported previously from Papua New Guinea (near Hood Point, Beagle Bay, Central Province) by Nobili (1899), as *Periclimenes parasiticus* and *Periclimenes tenuipes* (partim) (see Holthuis, 1952).

Periclimenes amymone De Man, 1902

Restricted synonymy

Periclimenes amymone De Man, 1902: 829, Plate 25 fig. 53.

Periclimenes (Harpilius) amymone; Holthuis, 1952: 82-83, Fig. 32; Johnson, 1961: 58.

Periclimenes amymone; Bruce, 1980:262-264, Fig. 1e-i; Chace & Bruce, 1993: 102-103.

Periclimenes (Harpilius) cf. *amymone;* Ledoyer, 1984: 28-29, Fig. 11.

Material examined.- Papua New Guinea, Hansa Bay, in front of Sisimangum village, 19.X. 1993, shrimp-dredge sample in *Syringodium isoetifolium* (Ascherson) Dandy bed, 5-6 m depth, leg. S. De Grave, 1 male (cl. 2.16) KBIN I.G. 28056/NAT11.

Remarks.- The single male specimen corresponds closely to previous descriptions. The rostrum is armed with 7 dorsal teeth, of which one is placed post-orbitally and 2 ventral teeth.

Distribution.- The species ranges from the Nicobar Islands to Samoa (Chace & Bruce, 1993) and is normally associated with a range of scleractinian coral genera (Bruce, 1977). It has been previously found in a seagrass habitat by Ledoyer (1984), who did not consider it a typical component of the seagrass community.

ACKNOWLEDGEMENTS

The author acknowledges the assistance of Dr. H. Wilkins with collecting and the constructive criticism on the manuscript by Profs. A. A. Myers and K. Wouters. Dr. T. Komai is thanked for translations and assistance with Japanese literature while Dr. V. Wadley kindly send on a copy of her paper.

REFERENCES

BARNARD, K. H., 1950. Descriptive Catalogue of South African Decapod Crustacea (Crabs and Shrimps). Ann. S. Afr. Mus., **38**: 1-837.

BAY, D. & V. DEMOULIN, 1989. The seagrass beds of Hansa Bay (north coast of Papua New Guinea). Bull. Soc. R. Bot. Belg., **122**: 3-17.

BROUNS, J. J. W. M., 1986. Seagrasses in Papua New Guinea, with notes on their ecology. Science in New Guinea, **12**: 66-92.

BROUNS, J. J. W. M. & F. M. L. HEIJS, 1985. Tropical seagrass ecosystems in Papua New Guinea. A general account of the environment, marine fauna and flora. Proc. Kon. Ned. Akad. Wetensch., **C88**: 145-183.

BRUCE, A. J., 1977. The hosts of the coral-associated Indo-West Pacific pontoniine shrimps. Atoll Res. Bull., **205**: 1-19.

BRUCE, A. J., 1980. Some Pontoniine Shrimps from the Solomon Islands. Micronesica, **16**: 261-269.

CHACE, F. A. Jr., 1997. The caridean shrimps (Crustacea: Decapoda) of the *Albatross* Philippine expedition, 1907-1910, Part 7: Families Atyidae, Eugonatonotidae, Rhynchocinetidae, Bathypalaemonellidae, Processidae, and Hippolytidae. Smiths. Contr. Zool., **587**: 1-106.

CHACE, F. A. Jr. & A. J. BRUCE, 1993. The caridean shrimps (Crustacea: Decapoda) of the *Albatross* Phi-lippine expedition, 1907-1910, Part 6: Superfamily Palaemonoidea. Smiths. Contr. Zool., **543**: 1-152.

COEN, L. D. & K. L. J. HECK, 1983. Notes on the biology of some seagrass-dwelling crustaceans (Stomatopoda and Decapoda) from Caribbean Panama. Proc. Biol. Soc. Wash., **96**: 202-224.

DE MAN, J. G., 1902. Die von Herrn Professor Kükenthal in Indischen Archipel gesammelten Dekapoden und Stomatopoden. Abh. Senckenberg. Naturforsch. Ges., **25**: 467-929, Plates 19-27.

HAYASHI, K.-I., 1975. The Indo-West Pacific Processidae (Crustacea, Decapoda, Caridea). J. Shimonoseki Univ. Fish., **24**: 47-145.

HAYASHI, K.-I., 1986. An annotated list of shrimp (Alpheidae and Palaemonidae excluded) collected from the Gilbert and Solomon Islands. Proc. Japanese Soc. Syst. Zool., **32**: 17-29.

HAYASHI, K.-I., 1991. Prawns, shrimps and lobsters from Japan (60). Family Processidae - Genera *Nikoides* (2), *Processa* (1). Aquabiology, **13**: 268-271 (In Japanese).

HAYASHI, K.-I., 1994. Prawns, shrimps and lobsters from Japan (76). Family Hippolytidae - Genera *Latreutes* (2) and *Hippolyte*. Aquabiology, **16**: 95-98 (In Japanese).

HOLMQUIST, J. G., POWELL, G. V. N. & S. M. SOGARD, 1989. Decapod and stomatopod assemblages on a system of seagrass-covered mud banks in Florida Bay. Mar. Biol., **100**: 473-483.

HOLTHUIS, L. B., 1950. The Decapoda of the Siboga Expedition. Part X. The Palaemonidae collected by the Siboga and Snellius expeditions with remarks on other species. I. Subfamily Palaemoninae. Siboga Exp. Monogr., **39a** (9): 1-268.

HOLTHUIS, L. B., 1952. A general revision of the Palaemonidae (Crustacea Decapoda Natantia) of the Americas. II. The subfamily Palaemoninae. Allan Hancock Found., Occ. Paper, **12**: 1-396.

HOLTHUIS, L. B., 1978. A collection of decapod Crustacea from Sumba, lesser Sunda Islands, Indonesia. Zool. Verh. (Leiden), **162**: 1-55.

JOHNSON, D. S., 1961. A synopsis of the Decapoda Caridea and Stenopodidea of Singapore with notes on their distribution and a key to the genera of Caridea occurring in Malayan waters. Bull. Natl. Mus. Singapore, **30**: 44-79.

JOHNSTONE, I. M., 1982. Ecology and distribution of the seagrasses. *In*: Gressitt, J.L. (ed.), Biogeography and Ecology of New Guinea, Junk, The Hague, Vol. 1: 497-512.

KEMP, S., 1914. Notes on Crustacea Decapoda in the Indian Museum. V.- Hippolytidae. Rec. Indian Mus., **10**: 81-129.

KEMP, S., 1916. Notes on Crustacea Decapoda in the Indian Museum. VII. Further notes on Hippolytidae. Rec. Indian Mus., **12**: 385-405.

KAMEZAKI, N., T. HAMANO, K. NOMURA & H. MISAKI, 1988. Marine animals in Okinawa, No. 8. Crustacea (shrimps, lobsters and anomurans). Shinchei Tosho Publications, Okinawa: 1-232. (In Japanese).

KIKUCHI, T., 1966. An ecological study of the *Zostera* belt in Tomioka Bay, Amakusa, Kyushu. Publ. Amakusa Mar. biol. Lab., **1**:1-106.

LEDOYER, M., 1969. Les Caridea de la frondaison des herbiers de phanérogames de la région de Tuléar. Rec. Trav. St. mar. d'Endoume, Suppl. **8**: 63-115.

LEDOYER, M., 1984. Les Caridea (Crustacea: Decapoda) des herbiers de phanérogames marines de Nouvelle-Calédonie (région de Nouméa). Zool. Verh. (Leiden), **211**: 1-58.

LEDOYER, M., 1986. Faune mobile des herbiers de phanérogames marines (*Halodule* et *Thalassia*) de la Laguna de Términos (Mexique, Campéche). I. Les Caridea (Crustacea Decapoda) et aperçu sur la faune globale. An. Inst. Ciencias Mar Limn. Univ. Nac. Autón. México, **13**: 147-170.

MANNING, R. B., 1961. A redescription of the palaemonid shrimp, *Leander paulensis* Ortmann, based on material from Florida. Bull. Mar. Sci., **11**: 525-536.

NOBILI, G., 1899. Contribuzioni alla conoscenza della fauna carcinologica della Papuasia, delle Molluche e dell' Australia. Ann. Mus. Civ. Storia Nat. Genova, (2), **20**: 230-282.

NOBILI, G., 1904. Diagnoses préliminaires de vingt-huit espèces nouvelles de Stomatopodes et Décapodes Macroures de la mer Rouge. Bull. Mus. Hist. Nat., **10**: 228-238.

NOBILI, G., 1906. Mission J. Bonnier et Ch. Pérez (Golfe Persique, 1901). Crustacés Décapodes et Stomatopodes. Bull. Sci. Fr. Belg., **40**: 1-159.

NOEL, P., 1985. Crustacés décapodes : Processidae de l'Indo-Ouest-Pacifique. Mém. Mus. Histoire Nat., **133** : 261-301.

NOMURA, K., S. NAGAI, A. ASAKURA & T. KOMAI, 1996. A preliminary list of shallow water decapod Crustacea in the Kerama Group, the Ryukyu Archipelago. Bull. Biogeogr. Soc. Japan, **51**(2): 7-21.

PAULSON, O., 1875. Podophthalmata and Edriophthalmata (Cumacea). Part I. Studies on Crustacea of the Red Sea, with notes regarding other seas. Kiev, i-xiv + 1-144 (in Russian).

SAY, T., 1818. An Account of the Crustacea of the United States, part 5. J. Acad. Nat. Sci. Philadelphia, **1**: 235-253.

WADLEY, V. A., 1978. A checklist and illustrated key to the epibenthic shrimps (Decapoda: Natantia) of Moreton Bay, Queensland. Commonwealth Scientific and Industrial Research Organization, Division of Fisheries and Oceanography Report, **99**: 1-24.

YOUNG, P. C. & V. A. WADLEY, 1979. Distribution of shallow-water epibenthic macrofauna in Moreton Bay, Queensland, Australia. Mar. Biol., **53**: 83-97.

Received: 16 March, 1999