

A NEW SPECIES OF *PASIPHAEA* SAVIGNY (CRUSTACEA: CARIDEA: PASIPHAEIDAE) FROM NORTH-WESTERN AUSTRALIAN WATERS.

YUKIO HANAMURA

Nansei National Fisheries Research Institute,
Ohno-cho, Hiroshima 739-04, Japan.

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ABSTRACT

A new species of *Pasiphaea* Savigny is described, based on material collected from north-western Australian waters. This species is characterized by having the dorsal margin of the carapace bluntly carinate, the abdomen carinate dorsally at least on the second to sixth somites and the telson tip weakly emarginate distally. These features are associated with a consistently larger number of meral spines on the first and second pereopods when compared with related species.

KEYWORDS: Crustacea, Caridea, Pasiphaeidae, *Pasiphaea levicarinata* n. sp., north-west Australia.

INTRODUCTION

Shrimps of the genus *Pasiphaea* Savigny, 1816, in Australian waters have been studied by Hanamura (1987; 1989) and Kensley *et al.* (1987), resulting in the recognition of six species in the Australian *Pasiphaea* fauna.

Dr A.J. Bruce and several members of the CSIRO Fisheries Division have continued to make available samples of shrimps obtained during surveys of the Australian deep water fauna. In recent collections of deep-sea shrimps examined were more than 30 specimens belonging to *Pasiphaea*. Those from north-western Australian proved to belong to an undescribed species. This new species is characterized by having a blunt carina on the dorsal margin of the carapace, a distinct dorsal carina on the second to fifth abdominal somites as well as a blunt carina on the anterior portion of the sixth somite, the telson very weakly emarginate at the posterior end, and the meri of the first and second pereopods armed with a comparatively larger number of spines than in related species.

The type specimens, including the holotype, are housed in the Northern Territory Museum of Arts and Sciences (NTM) except for some paratypes that are deposited in the National Science Museum, Tokyo (NSMT).

SYSTEMATICS

Family Pasiphaeidae Genus *Pasiphaea* Savigny *Pasiphaea levicarinata* n. sp. (Figs 1-2)

Pasiphaea sinensis: Hanamura, 1987: 15, fig. 2 (not Hayashi and Miyake, 1971).

Pasiphaea species 1 Wadley and Evans, 1991: 14, 2 figs on p. 14.

Type material. HOLOTYPE - Ovig. female, cl 32.0 mm, 4 December 1991, 18° 30'S 117° 23'E, 0135-0615 hrs, demersal trawl, depth 530 m, FV *Striker*, coll. R. Jackson (NTM Cr 010906). PARATYPES - 6 ovig. females, cl 27.5-32.6 mm, same data as holotype (NTM Cr 010907); 3 males, cl 33.5-38.8 mm, 25 January 1988, Sta. S9, 13° 06'S 122° 18'E, trawl, depth 900-1000 m, FV *Territory Pearl*, coll. B. Wallner (NTM Cr 007210); 1 male, cl 36.0 mm, data same as preceding (NTM Cr 007211); 1 male, cl 32.1 mm, 3 ovig. females, cl 31.3-32.2 mm, data same as holotype (NSMT-Cr 11336).

Additional material. 1 female, cl 31.9 mm, 8° 38'S 132° 00'E, depth 525-540 m, FV *Ocean Pearl*, coll. M. Sachse (NTM Cr 006844); 2 males, cl 36.0 and 38.1 mm, 25 January 1988,

Sta. S8, 13° 17'S 122° 21'E, trawl, depth 600-740 m, FV *Territory Pearl*, coll. B. Wallner (NTM Cr 007212); 1 male, cl 28.8 mm, 5 females, cl 26.0-34.0 mm, 7 ovig. females, cl 26.3-36.2 mm, data same as for holotype.

Description. Rostrum (Fig. 1a) rather stout, semi-triangular, extending obliquely upward, with sharp terminal spine reaching fully or just falling short of anterodorsal end of carapace, anterior margin slightly convex.

Carapace (Fig. 1b) remarkably compressed laterally along anterior five-sevenths of dorsal margin, forming blunt or very weak carina on that portion, while distinctly rounded posteriorly; anterior half of dorsal margin noticeably concave in lateral aspect. Suprabranchial ridge rather marked. Branchiostegal spine marginal, extending anteriorly beyond anterolateral margin of carapace. Branchiostegal sinus rather deep, and nearly right-angled.

Abdomen (Fig. 1c) with first somite very weakly carinate dorsally or rounded, second to fifth somites sharply carinate, sixth somite carinate on anterior two-thirds, while posterior portion is flattened dorsally. Sixth somite 1.29-1.44 (average 1.37) times as long as fifth. No postero-medial spine on any somite. Telson (Fig. 1g,h) 0.92-1.08 (average 0.96) times as long as sixth somite, weakly sulcate dorsally, although this groove is obscure at distal third; posterior end very shallowly emarginate, and armed with about 11-13 terminal spines, largest of which is lateral pair (distalmost spines of telson more or less damaged).

Eye (Fig. 1d) with cornea well pigmented, wider than eyestalk.

First antenna (Fig. 1e) with third segment of peduncle bearing sharp spine at distal end of ventrolateral margin, second segment shortest, nearly half as long as first segment. Stylocerite twisted, ending in sharp spine, and barely reaching or falling just short of distolateral end of first segment.

Second antenna (Fig. 1f) with antennal scale, 0.45-0.52 (average 0.49) times as long as carapace, and 3.40-3.85 (average 3.57) times as long as wide, outer margin convex, distolateral spine rather long, reaching well beyond distal end of lamella. Basicerite with sharp spine at distoventral end.

Mouthparts as figured (Figs 2a-f). Third maxilliped barely reaching or extending slightly beyond end of antennal scale, distal segment

1.65-1.76 (average 1.70) times as long as penultimate segment.

First pereopod (Fig. 2g,h) extending beyond antennal scale by length of whole to three-fourths of finger length, fingers 0.70-0.89 (average 0.82) times as long as palmar length, ventromesial margin of palm with four to six minute spines, basis unarmed on ventral margin except for terminal tooth, ischium unarmed, merus armed ventrally with 5-15 (commonly 8-12 in greater than 80% of specimens) spines, and dorsal portion slightly expanded distally, bearing 9-12 small spines. Second pereopod (Fig. 2i, j) extending beyond antennal scale by two-thirds to four-fifths of finger length, fingers 1.03-1.33 (average 1.22) times as long as palmar length, ventromesial margin of palm with three to seven minute spines, basis unarmed ventrally except for terminal tooth, ischium unarmed, merus armed ventrally with 19-30 (commonly 24-28 in greater than 70%) spines and 3-10 small spines on dorsal margin, especially on distal third. Third pereopod (Fig. 2k) slender, reaching proximal end of propodus of second pereopod, carpus about one-tenth as long as distal two segments combined. Fourth pereopod (Fig. 2l) distinctly shorter than fifth pereopod, reaching to or slightly exceeding end of ischium of second pereopod. Fifth pereopod (Fig. 2m) extending slightly beyond mid-length of merus of second pereopod.

Exopod of third pleopod 0.32-0.36 (average 0.33) times as long as carapace.

Appendix masculina (Fig. 2n) about two-thirds as long as appendix interna.

Branchial formula same as known for the genus.

Size. Smallest ovigerous female is cl 26.3 mm, and largest specimen is cl 38.8 mm (male).

Egg size. Non-eyed eggs 1.60-1.80 x 1.30-1.35 mm.

Colour. Body is basically white (probably semi-transparent), and reddish spots are scattered over nearly the whole of the body, concentrated especially along the ventrolateral margin of the body and dorsal margin from the second abdominal somite to end of the telson, while the lateral portion of the abdomen is less pigmented due to sparse distribution of red patches. The appendages are also well pigmented (see Wadley and Evans 1991).

Distribution. Only known from north-western Australian waters, and with a vertical range of 500 to 1000 m.

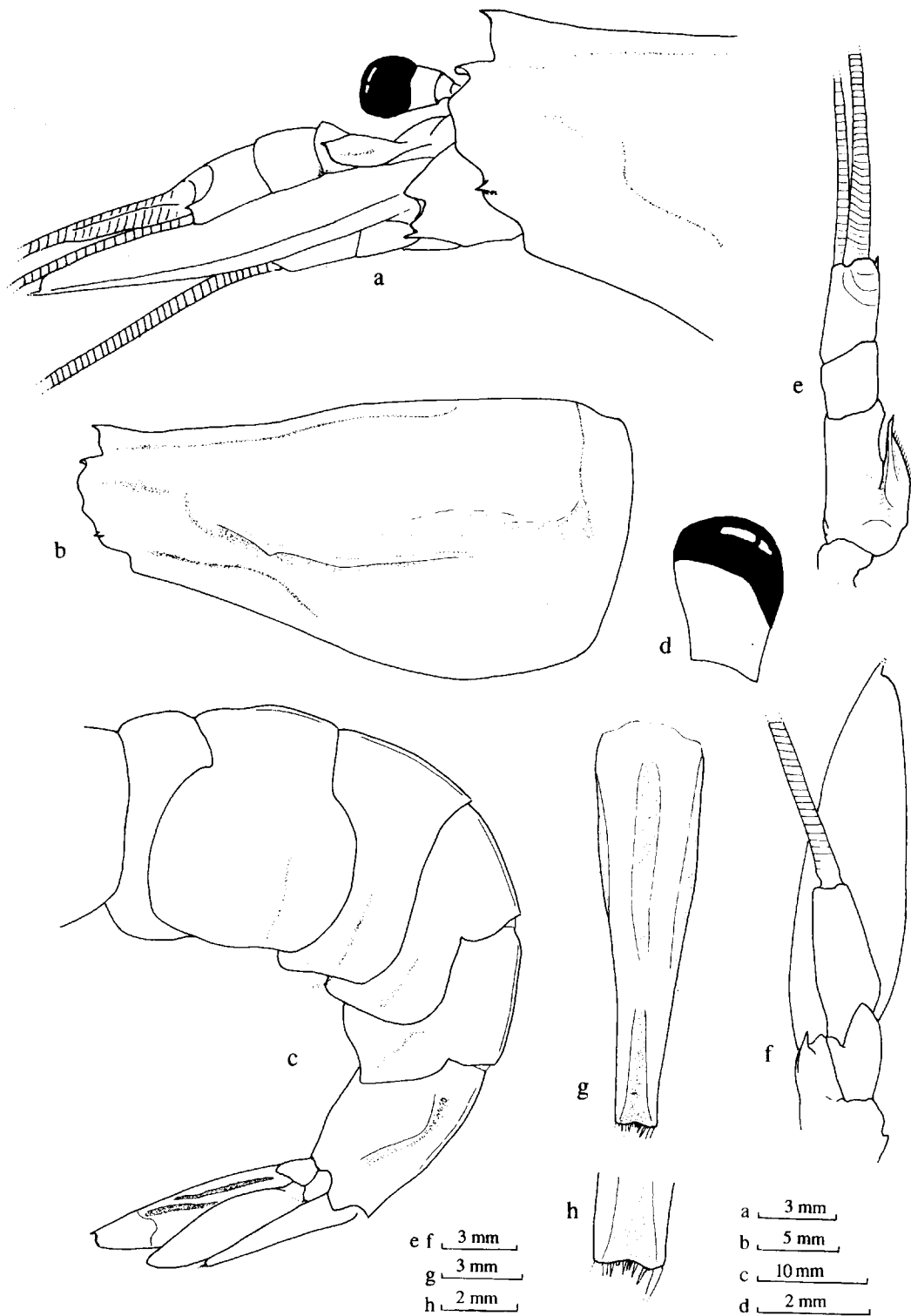


Fig. 1. *Pasiphaea levicarinata* sp. nov. a-c, holotype, ovig. female cl 32.0 mm and d-h, paratype, ovig. female, cl 31.8 mm. a, anterior part of body; b, carapace; c, abdomen; d, eye; e, 1st antenna; f, 2nd antenna; g, telson; h, same, distal end enlarged.



Fig. 2. *Pasiphaea levicarinata* sp. nov. a-m, paratype ovig. female, cl 31.8 mm, n, paratype, male, cl 36.0 mm. a, mandible; b, 1st maxilla; c, 2nd maxilla; d, 1st maxilliped; e, 2nd maxilliped; f, 3rd maxilliped; g, 1st pereopod; h, same, distal portion; i, 2nd pereopod; j, same, distal portion; k, 3rd pereopod; l, 4th pereopod; m, 5th pereopod; n, appendix masculina and appendix interna.

Table 1. Diagnostic characters and differentiation of seven related species of *Pasiphaea*

Species	Carapace	Abdomen	1st pereopod	2nd pereopod	Literature
<i>P. affinis</i>	dorsal margin nearly straight in lateral aspect, not sinuous on anterior portion; rostrum triangular-shaped, directed obliquely upward, tip not directed forward, distal extremity barely reaching end of carapace	2nd to 5th somites bluntly carinate dorsally; telson distinctly grooved distally, 2/5 times as deep as distal wide, bearing about 20 spines distally	<5 (3) meral spines [number of spines of holotype female in parentheses]	6-10 (6) meral spines	Rathbun 1902, 1904; Burukovsky & Roman- sky 1987; Chace, pers. comm.
<i>P. magna</i>	dorsal margin descending on anterior 2/3; rostrum directed forward well beyond distal end of carapace, fully reaching cornea of eye	2nd to 6th somites carinate dorsally; telson very weakly sinuous distally, bearing 12 spines	4 or 5 meral spines	12 or 13 meral spines	Faxon 1893, 1895; Mendez 1981
<i>P. nishiei</i>	dorsal margin weakly sinuous on anterior half in lateral aspect; rostrum nearly triangular-shaped, directed obliquely upward, tip slightly turned anteriorly, distal extremity reaching anterior end of carapace	2nd to 4th somites carinate dorsally; telson truncated distally, bearing 8 spines	unarmed on merus	1 meral spine	Iwasaki 1990
<i>P. princeps</i>	dorsal margin descending on anterior 2/5; rostrum directed forward or slightly upturned distally, distal extremity extending beyond end of carapace, but not reaching to cornea of eye	2nd to 6th somites carinate dorsally; telson deeply grooved distally, about as deep as distal width, bearing about 20 spines	unarmed on merus	5 meral spines	Smith 1884; Iwasaki 1990
<i>P. propinqua</i>	dorsal margin nearly straight or faintly sinuous on anterior half in lateral aspect; rostrum forming obtuse and low carination, distal extremity falling far short of distal end of carapace; branchiostegal sinus indistinct	2nd to 4th somites bluntly carinate dorsally; telson distinctly produced posteriorly as round lobe, bearing 10 spines	no data available	no data available	de Man 1916, 1920
<i>P. westindica</i>	dorsal margin weakly sinuous on anterior half; rostrum subtriangular-shaped, directed obliquely upward, tip turning anteriorly, distal extremity reaching to or slightly extending beyond anterior end of carapace	2nd to 6th somites bluntly carinate; telson weakly grooved distally, bearing about 10 spines	3 meral spines	7 or 8 meral spines	Tchesunov 1984
<i>P. levicarinata</i> n.sp.	dorsal margin weakly sinuous on anterior half; rostrum subtriangular-shaped, slightly directed upward, tip turning anteriorly, distal extremity barely reaching anterior end of carapace	2nd to 5th somites distinctly carinate dorsally, and 6th bluntly carinate on anterior 2/3; telson weakly sinuous distally, bearing about 11-13 spines	5-15 (8; >80%) meral spines	19-30 (24-28; >70%) meral spines	present work

Remarks. Among some 45 species of the genus *Pasiphaea*, *P. levicarinata* n.sp. resembles the following six species in having the carapace without a sharp carina along the dorsal margin and some somites of the abdomen noticeably carinate dorsally: *P. affinis* Rathbun, 1902; *P. magna* Faxon, 1893; *P. nishiei* Iwasaki, 1990; *P. princeps* Smith, 1884; *P. propinqua* de Man, 1916; and *P. westindica* Tchesunov, 1984.

Pasiphaea levicarinata can be distinguished from these species by the features set out in Table 1. The new species is immediately distinguishable from *P. propinqua* by having a well developed rostrum and a deep branchiostegal sinus. The meri of the first and second pereopods in *P. levicarinata* are provided with larger number of spines, which are well beyond the ranges known for *P. affinis*, *P. magna*, *P. nishiei*, *P. princeps*, and *P. westindica*.

On the other hand, *Pasiphaea merriami* Schmitt, 1931, may occasionally have carinae on some of the abdominal somites (Schmitt 1931; Tchesunov 1984). But the spines on the meri of the first and second pereopods of this species are considerably fewer than those of *P. levicarinata*. In this regard, there remains little known about the identity of *P. nishiei*. The meral spine count in *P. merriami* is the same as that of *P. nishiei*. In addition, these two species exhibit a close similarity in rostral shape, carination on the lateral face of the carapace as well as no carina on its dorsal margin, and even the truncated telson tip. Such close resemblance in morphology has brought suspicion that *P. nishiei* may represent a form of the variable species *P. merriami*. Close analyses and comparison of the two species based on rather extensive materials may be needed.

In my earlier paper (Hanamura 1987), I recorded *P. sinensis* Hayashi and Miyake, 1971, based on a single female from the north-west Australian continental shelf. Examination of abundant material recently received from the same area has convinced me that the RV *Soela* specimen reported in 1987 should be referred to *P. levicarinata*. The general form, and fingers to palm ratios of the first two chelae of that specimen are within the range of those of *P. levicarinata*. Confusion might derive from the presence of a slight carination on the dorsal margin of the carapace, and the meral spine numbers on the first two pereopods which overlap extensively between the two species. According to the original authors (Hayashi and

Miyake 1971), *P. sinensis* has the carapace distinctly carinate dorsally throughout its length, and the telson is deeply notched distally in contrast to being weakly sinuous in the new species.

Pasiphaea species 1 recorded by Wadley and Evans (1991) from western Australian waters is actually identical to *P. levicarinata*.

Etymology. The compound Latin word "*levicarinata*" refers to an obtuse or very weak carination on the dorsal margin of the carapace.

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